Brain Power

The Political Economy of Higher Education

Timo Idema, Merton College

Trinity Term, 2011

Thesis submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Politics in the Department of Politics and International Relations at the University of Oxford.

Brain Power

The Political Economy of Higher Education

Timo Idema, Merton College

Trinity Term, 2011

Thesis submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Politics in the Department of Politics and International Relations at the University of Oxford.

Abstract

This dissertation disputes conventional interpretations of the comparative political economy literature on higher education. In particular, I challenge the common assumption that access to higher education is structured by income. Instead, based on insights from the relevant psychology, sociology and economics literature, I argue that a child's probability of entering higher education is predominantly a function of her abilities, and that her abilities are strongly related to her parents' level of education. I develop a theory of the distributive politics of higher education solidly grounded in this relationship. The result of this model is the counter intuitive hypothesis that the initial expansions of higher education benefit the children of more highly educated parents. Moreover, more highly educated families are the net beneficiaries of free higher education and generous subsidies. Extensive survey evidence from Britain, Australia, Canada and Sweden of higher education policy preferences confirms this picture of the politics of higher education as a zero-sum distributive game between highly and lesser educated families. In order to analyse the consequences of these preference patterns for higher education policy, I develop a theoretical and empirical measure of voting power for multi-party systems. Voting power measures how many votes a party stands to gain from converting and mobilising voters by distributing resources from one group to another. Using data from 15 EU countries, I show that parliaments and cabinets, on average, stand to win more votes from pleasing highly educated voters than from targeting less educated voters. Furthermore, the conversion imperative is much stronger than the mobilisation imperative. Statistical analyses show that variations in the voting power of highly educated individuals over the government help to explain variations in higher education policy across countries and within countries over time. All in all, the theoretical and empirical analyses presented in this dissertation represent a significant contribution towards understanding the specific distributive politics of higher education, and the political economy of redistribution more generally.

Approximately 95,000 words

Acknowledgements

First and foremost I am profoundly grateful to my supervisor David Rueda for his unwavering support throughout this project. His encouragement, high expectations, ever critical comments and generosity with his time have made this dissertation process at the same time ambitious, realistic and fun.

Institutionally, I have several debts. Merton College has been supportive in contributing funds to many of my conference trips. I wrote part of this dissertation while holding a one-year lectureship at University College, Oxford. I would like to thank the college, colleagues and students for providing me with an inspiring environment. Part of the third year of this project was spent at Princeton University. Many of the key ideas of this dissertation came to fruition in Princeton. I thank Jonas Pontusson for helping me organise this stay. Two weeks spent at the Harvard-Manchester Workshop on Inequality and Social Change in Britain and the U.S. at Crewe Hall, England, during last summer were an intellectual and social highlight of my graduate school experience. I would like to thank the convenors - Bob Putnam, Ed Fieldhouse and Bruce Western – organisers and participants for creating an excellent atmosphere.

I am also indebted to the Prins Bernhard Cultuurfonds, the Oxford-Princeton Partnership Programme, the Stichting Dr Hendrik Muller's Vaderlandsch Fonds, the Stichting de Fundatie van de Vrijvrouwe van Renswoude te 's-Gravenhage and the Department of Politics and International Relations at Oxford for their generous funding.

Different parts of this dissertation have been presented in various stages at the "Redistributive Preferences in Comparative Perspective" Workshop in Oxford (2011), the Annual Meeting of the American Political Science Association (Washington D.C. 2010, Toronto 2009 and Boston 2008), the Welfare State Traditions, Education and Higher Education Policy conference at the University of Konstanz (2010), the Graduate Research Seminar in Comparative Politics at Princeton University (2010) and the Inequality and Institutions in Industrialised Democracies meeting in Oxford (2009). I would like to thank the many participants at these presentations for their helpful feedback and encouragement.

For their specific comments on chapters and early versions, I would like to thank in particular Jim Alt, Larry Bartels, Michael Becher, Pablo Beramendi, Marius Busemeyer, Ed Fieldhouse, Tim Hicks, Daniel Horn, Alexander Kuo, Noam Lupu, Michael O'Donnelly, Sergi Pardos, Jonas Pontusson and Isabelle Stadelmann-Steffen. I also thank Larry Bartels and Ray Duch, my examiners, for the excellent debate during my defence in a Seattle hotel room on the sidelines of the American Political Science Association's annual meeting in August 2011.

Two key propositions of this dissertation leave me further indebted. First, I argue that the chances of people like me to attain higher education are in large part related to the contexts provided by their parents. I would therefore like to thank my parents, Sieto and Bregitta, for providing a home environment that nurtured my intellectual curiosity. Second, I argue that higher education, in most cases, constitutes a net-transfer from tax-payers to those attaining higher education. Much of my undergraduate education was paid for by the Dutch government, which continued to provide some of these benefits – including a low-interest, risk-free student loan – when I moved to Oxford. For part of my undergraduate degree I was at the University of California, Berkeley, at that time still receiving substantial contributions from the State of California. At Oxford and Princeton, moreover, I have reaped my share of the proceeds of tax-exempt endowments in the form of funding and facilities. I would like to express my gratitude to all tax-payers that have contributed to my generous share of the pie of benefits. I owe you.

It goes without saying that neither these taxpayers, nor my parents, nor any of the other people mentioned above, should be implicated in any short-comings that remain in this dissertation.

Contents

Abstract . . . i
Acknowledgements . . . iii
Table of Contents . . . v
List of Figures . . . vii
List of Tables . . . xi

1 Introduction **1**
1.1 The argument . . . 3
1.2 The evidence . . . 9
1.3 The contribution . . . 13
1.4 Outline of the dissertation . . . 17

2 A review of two conflicting literatures **19**
2.1 Introduction . . . 19
2.2 Higher education in the political economy literature: a brief synopsis and critique . . . 21
2.3 How parental education conditions the probability of attaining higher education . . . 36
2.4 Conclusion . . . 42

3 The distributive politics of higher education **47**
3.1 Introduction . . . 47
3.2 A cost-pooling model of the distributive politics of higher education 51
3.3 The effects of income inequality and income taxation on preferences for higher education policy . . . 69
3.4 Introducing a labour market . . . 90
3.5 Conclusion . . . 96
3.6 Appendix . . . 98

4 Preferences over higher education policy **103**
4.1 Introduction . . . 103
4.2 Data . . . 105
4.3 Expectations about children . . . 107
4.4 Preferences for expanding enrolment in Britain . . . 109
4.5 Preferences for higher education financing in Britain . . . 134
4.6 Higher education as a budget priority in Britain . . . 146
4.7 Validation . . . 158
4.8 Conclusion . . . 166

5 A theory of electoral targeting in multi-party systems **171**
5.1 Introduction 171
5.2 Literature review 176
5.3 A theory of electoral targeting in multi-party systems 183
5.4 Discussion of future extensions: electoral systems, strategic party competition and collusion in government 212
5.5 Conclusion 215
5.6 Appendix 217

6 Voting power in 15 European democracies **219**
6.1 Introduction 219
6.2 Data and methods 223
6.3 Conversion or mobilisation 233
6.4 Group voting power vis-a-vis political parties 241
6.5 Group voting power vis-a-vis parliaments and cabinets 254
6.6 Conclusion 263
6.7 Appendix 265

7 How voting power shapes higher education policy **289**
7.1 Introduction 289
7.2 A synopsis of the theory 290
7.3 Variables, measurements, and data 296
7.4 Methodology 305
7.5 Results 309
7.6 Conclusion 325
7.7 Appendix 326

8 Concluding remarks **329**
8.1 The demand side of higher education politics 329
8.2 The supply side of higher education politics 332
8.3 Voting power and recent higher education policy changes 336
8.4 Avenues of future research 341

Bibliography **345**

List of Figures

2.1 The effect of family income and maternal characteristics on math score 45
2.2 Composition of time spent in different contexts from age 4 to 18 . . 46
2.3 Trend in mean cognitive score by maternal education 46

3.1 Frequency distribution for ability of children of higher and lower educated parents 57
3.2 Probability density for ability of children of higher and lower educated parents 58
3.3 Average probability to attain higher education at different levels of enrolment 61
3.4 Enrolment inversion points (h^*) at different parental education effect sizes and parental enrolment rates 63
3.5 Enrolment threshold for preferences over subsidies 76
3.6 Parental enrolment rate thresholds for preferences over subsidies . . 80
3.7 Enrolment threshold for preferences over expanding enrolment . . . 83
3.8 Parental enrolment rate thresholds for preferences over expanding enrolment 86

4.1 Parental and current enrolment rate in Britain 110
4.2 Difference in percentage in favour of expanding enrolment, by education level 112
4.3 Total effect of higher education on enrolment preferences in Britain 117
4.4 Breakdown of direct and indirect effect 118
4.5 The effect of education on income 120
4.6 The direct effect of higher education on enrolment preferences in Britain 123
4.7 Breakdown of higher education effect on enrolment preferences in Britain 124
4.8 The association between household income and enrolment preferences 126
4.9 The total effect of household income and enrolment preferences . . . 127
4.10 Enrolment preferences of high, middle and low incomes, as a function of enrolment 128
4.11 Enrolment preferences by party identification in Britain 129
4.12 The effect of partisanship, age, gender and children on enrolment preferences 132
4.13 The effect of having children on enrolment preferences in Britain . . 133
4.14 The effect of education and income on preferences for per-student spending 140

4.15 The total effect of education on ranking higher education as a top two spending priority 150
4.16 The effect of education and other variables on ranking higher education as a top two spending priority 151
4.17 The effect of having children (and their age) on the priority of higher education spending 152
4.18 Uncontrolled association between income and enrolment. 153
4.19 Breakdown of the effect of higher education on education as a spending priority 155
4.20 The total effect of household income on ranking higher education as a spending priority 156
4.21 The effect of higher education and income on higher education spending preferences in Australia 161
4.22 The effect of higher education and income on higher education spending preferences in Canada 163
4.23 The effect of higher education and income on higher education spending preferences in Sweden 164

5.1 Utility distributions of three hypothetical voters (I) 190
5.2 Utility distributions of three hypothetical voters (II) 201

6.1 Positive turnout buying and the effective number of parties 237
6.2 Voting power of higher educated over parties, Austria 1999-2009 . . 244
6.3 Voting power of higher educated over parties, Belgium 1989-2009 . . 244
6.4 Voting power of higher educated over parties, Britain 1989-2009 . . 245
6.5 Voting power of higher educated over parties, Denmark 1989-2009 . 245
6.6 Voting power of higher educated over parties, Finland 1999-2009 . . 246
6.7 Voting power of higher educated over parties, France 1989-2009 . . 246
6.8 Voting power of higher educated over parties, Germany 1989-2009 . 247
6.9 Voting power of higher educated over parties, Greece 1989-2009 . . 247
6.10 Voting power of higher educated over parties, Ireland 1989-2009 . . 248
6.11 Voting power of higher educated over parties, Italy 1989-2009 . . . 248
6.12 Voting power of higher educated over parties, the Netherlands 1989-2009 249
6.13 Voting power of higher educated over parties, Portugal 1989-2009 . 249
6.14 Voting power of higher educated over parties, Spain 1989-2009 . . . 250
6.15 Voting power of higher educated over parties, Sweden 1999-2009 . . 250

7.1 Enrolment and expenditure per student in 2005 301
7.2 Marginal effect of highly educated voting power on enrolment, low wage premium 313
7.3 Marginal effect of highly educated voting power on enrolment, medium wage premium 315
7.4 Marginal effect of higher educated voting power on enrolment, high wage premium 316
7.5 Marginal effect of voting power on expenditure per student, low wage premium 321

7.6 Marginal effect of voting power on expenditure per student, medium wage premium 322
7.7 Marginal effect of voting power on expenditure per student, low wage premium 323
7.8 Marginal effect of left government on expenditure per student at different enrolment rates 324

List of Tables

2.1 Overview of existing literature 35
2.2 Intergenerational Transmission of Education 37

3.1 Overview of real-world model parameters in 2000 73
3.2 Simulation of model predictions using 2000 real-world parameters . 88

4.1 Subjective Parental Expectations by Parental Education 108
4.2 Determinants of enrolment preferences in Britain 116
4.3 The effect of higher education on household income 119
4.4 The effect of higher education on the probability of having children 121
4.5 The effect of partisanship on enrolment preferences in Britain . . . 130
4.6 Preferences over grants to students in Britain, 1985-2000 138
4.7 Preferences over tuition fees in Britain, 1985-2000 139
4.8 Breakdown of the effect of higher education on fees and grants . . . 144
4.9 Higher education as a government spending priority in Britain. The role of education and income 149
4.10 The effects of higher education and income on higher education spending preferences in Australia 160
4.11 The effect of higher education and income on higher education spending preferences in Canada 162
4.12 The effect of higher education and income on higher education spending preferences in Sweden 169

6.1 Representational inequality 254
6.2 Voting power of highly educated citizens over the legislature 257
6.3 Voting power of several socio-economic groups over the legislature . 258
6.4 Voting power of highly educated citizens over the government . . . 260
6.5 Voting power of several socio-economic groups over the government 261
6.6 Conditional Logit, Predicted Model Values, Variance Decomposition 266
6.7 Logistic Regressions Predicting Turnout 272
6.8 Summary Statistics for Turnout Regressions 278

7.1 Gross enrolment rates for 14 European countries, 1990-2005 297
7.2 Expenditure per student in 14 European countries, 1990-2005 . . . 299
7.3 Higher education rates in 14 European democracies, 1990-2005 . . . 302
7.4 Wage premium to higher education 303
7.5 The effect of highly educated voting power on enrolment 310
7.6 The effect of highly educated voting power on spending per student 319

7.7 Alternative specifications of enrolment models 327
7.8 Alternative specifications of expenditure models 328

Chapter 1

Introduction

The general nature of the redistributive effects of the current method of financing public higher education in California is clear. Some low-income persons have benefited handsomely from the availability of publicly-subsidised higher education. But on the whole, the effect of these subsidies is to promote greater rather than less inequality among people of various social and economic backgrounds, by making available substantial subsidies that lower income families are either not eligible for or cannot make use of because of other conditions and constraints associated with their income position. [...] In any case, it is clear that whatever the degree to which our current higher education programs are rooted in the search for equality of opportunity, the results still leave much to be desired. (Hansen and Weisbrod 1969, p191)

The distributive patterns that Hansen and Weisbrod found for the state of California in the 1960s are still a fairly accurate description of the consequences of publicly funded higher education going into the 21st century. Similar distributive patterns have been found in other U.S. contexts (Radner and Miller 1970, Peltzman 1973, Jackson and Weathersby 1975, Bishop 1977)[1], Britain (Le Grand 1982*a*,*b*) and developing countries (Psacharopoulos, Tan and Jimenez 1986). Since the time of Hansen and Weisbrod, however, the higher education policy landscape in industrialised democracies has witnessed remarkable change. Elitist post-war systems reserved for the fortunate few have expanded to provide education to ever larger segments of the population. While expansion of enrolment has occurred across the board, the extent of these changes varies substantially across countries. Some Nordic countries, like Sweden and Finland, have come to expand higher education to the majority of their population and combine this with generous public

[1]However, see Johnson (2006) for a critical review.

funding. Others, like Germany and France, have maintained much lower levels of enrolment. Equally, funding changes in higher education occur in opposing directions. The British government, having introduced fees of 3,000 pounds in 2004, is currently cutting higher education funding and raising the cap on tuition fees to 9,000 pounds.[2] Similarly, the Dutch and Irish governments are pursuing spending cuts to the sector, while considering additional charges to students.[3] This contrasts with the situation in Germany and France, where politicians have responded to the financial crisis by increasing allocations to higher education.[4] Following an election victory by the Green Party and the social-democratic SPD in Baden-Württemberg, one of the German Länder, the incoming government has announced to abolish tuition fees that were for the first time introduced a few years back.[5]

These observations pose some puzzling questions for students of political science. Which groups in society benefit from what kind of higher education policies? Why do generously funded systems of higher education with regressive consequences exist as a political equilibrium? Why do some countries increase public subsidies to higher education while others cut funding and introduce tuition fees? Why do some countries expand enrolment in higher education, whereas other maintain lower levels? The ideas presented in this dissertation emerged in response to these pertinent

[2] Chris Cook. “Student funding plan sparks controversy.” Financial Times. May 6, 2011

[3] “Eerste Kamer keurt boete voor langstudeerders goed” *NRC Handelsblad.* 6 July, 2011. Bart Funnekotter. “Economische crisis bezegelt lot basisbeurs.” *NRC Handelsblad.* Novermber 13, 2009; Seán Flynn. “Further student fees considered as Minister refuses to rule out options.” The Irish Times. May 31, 2011

[4] Christian Schwägerl. “Schavan kündigt 18-Milliarden-Euro-Paket an" *Spiegel Online* May 6, 2009.
URL: http://www.spiegel.de/wissenschaft/mensch/0,1518,623164,00.html; Ben Hall “Sarkozy offers funds to place France’s cultural heritage online.” *Financial Times.* December 15, 2009

[5] Amory Burchard and Anja Kühne. "Unis in Baden-Württemberg bangen um Studiengebühr." *Zeit Online.* March 29, 2011. URL: http://www.zeit.de/wissen/2011-03/studiengebuehr-baden-wuerttemberg

questions.

1.1 The argument

Distributive politics generally involves demand and supply. The study of the demand side asks "who wants what kind of redistribution?", while the study of the supply side asks "whose preferences will prevail?" This dissertation is structured accordingly. The first part is concerned with demand side questions: "who wants and who benefits from what kinds of higher education policy?" The second part takes on the supply side question: "whose higher education policy preferences will prevail, and which political actors benefit from delivering policies that favour these groups?" The Latin adage "*cui bono?*" – meaning "to whose benefit?" – guides the search for the answer to each of these questions.[6]

1.1.1 The demand side of the politics of higher education

The starting point of my analysis is that higher education policy preferences of highly and lesser educated voters are fundamentally different, and often diametrically opposed. The origins of these preferences lie in the distributive effects of public higher education. To understand these distributive effects, three questions need to be answered. First, who receives public higher education? Second, how great are the benefits of receiving public higher education? Third, who pays for public higher education? There are two higher education policy parameters that influence the answer to these questions: the enrolment rate and the level of subsidies. The enrolment rate – defined as the percentage of children attaining higher education – affects admission into higher education institutions. The level of subsidies – defined as the amount spent per student – affects how much those enrolled in higher education get in financial support, facilities and resources. The product

[6] This heuristic tool is attributed by Cicero to L. Cassius Longinus Ravilla. In Pro Roscio Amerino (§84), Cicero wrote *"L. Cassius ille quem populus Romanus verissimum et sapientissimum iudicem putabat identidem in causis quaerere solebat 'cui bono' fuisset."* ["The famous L. Cassius, whom the Roman people used to regard as a very honest and wise judge, was in the habit of asking, time and again, 'to whose benefit?' "]

of these two dimensions gives us the higher education budget.[7] Who covers the tax bill for this higher education budget depends on the distribution of income and the progressivity of the tax system.

The key to the argument is that the probability of attaining higher education is substantially higher for children of highly educated parents compared to children of lower educated parents. Chapter two explores the relevant literature from the disciplines of economics, psychology and sociology on the intergenerational transmission of inequalities through education and finds that individual “abilities” to ensure admission into higher education institutions are influenced by parental characteristics. Parents affect their children’s abilities through a diverse set of mechanisms that start at the earliest stages of childhood and continue right through to the end of secondary school. These include parenting approaches, neighbourhood effects, parental expectations, guidance and encouragement. To pre-empt controversy, I should stress that my understanding of this intergenerational transfer of abilities is through “nurture” and that my argument does not rely on any genetic inheritance.[8] These parental effects result in a distribution of abilities at age 18 that is stacked in favour of children of highly educated parents.

All else being equal, we would then expect highly educated families to benefit most from generously funded higher education. But not all else is equal. Highly educated families also tend to earn more than lower educated families, and therefore pay more in taxes. Which of these two effects is dominant, and under which conditions, is modelled in chapter three. At first sight, the reader may be inclined to think that expanding enrolment will always benefit the children of lower educated parents. Counterintuitively, my model of access to higher education in chapter three reveals quite the contrary. True, expansions of higher education improve the probability of accessing higher education for all. However, initial expansions of enrolment

[7] Higher Education Budget = Number of Children × Probability to Attain Higher Education × Per Student Spending

[8] In fact, I believe researchers should be very cautious to offer genetic explanations when alternative nurture based explanations cannot be ruled out.

increase the probability of attaining higher education *more* for children of *highly* educated families than for children of *lower* educated families. At the same time, expanding enrolment increases the higher education budget, and thus the tax-bill for highly and lower educated parents alike. I show that the benefits of these initial expansions outweigh the costs for highly educated parents, but for lower educated parents the costs outweigh the benefits.

Three additional factors intervene in my demand side argument: the parental enrolment rate, the wage premium of achieving higher education qualifications, and the strength of the parental education effect on the capability of children to obtain higher education. All these factors are considered exogenous to the model. The first intervening variable, the parental enrolment rate, refers to the percentage of parents in society who attained higher education. The parental enrolment rate affects the probabilities of the children of highly and lower educated parents to attain higher education at a given current enrolment rate. Second, in interaction with the wage premium – the second intervening variable – the parental enrolment rate affects how much highly educated families contribute to the higher education budget. The higher the wage premium, the higher the tax bill of highly educated parents and their contribution to the budget. The third intervening variable is the strength of the parental education effect, expressed as the ratio of the odds of children of highly educated parents over those of lower educated parents.[9] The stronger this effect, the more the distribution of abilities is stacked in favour of the children of lower educated parents, the higher their *ceteris paribus* probability to attain higher education. Chapter two estimates these odds ratios empirically for a large set of European countries.

So far, the labour market has been left out of my story of the distributive politics

[9] The odds of an event, in this case going to higher education, are given by the ratio of the probabilities of an event happening ($\Pr(Y = 1)$, in our case Y is higher attaining higher education) over the probability of the event not happening ($\Pr(Y \neq 1)$, which is 1-$\Pr(Y = 1)$). The odds ratio is then given by the odds of attaining higher education conditional on having highly educated parents ($P = H$) over the odds of attaining higher education conditional on having lower educated parents, so that: Odds Ratio=[Pr(Y=1|P=H)/(1-Pr(Y=1|P=H))]/[Pr(Y=1|P=L)/(1-Pr(Y=1|P=L))]

of higher education. A common assumption is that an increase in the supply of workers with higher education qualifications will reduce their wage premium. The last section of chapter three argues that it does not have to be so. Evidence from the labour market in the United States has shown that an increase in the supply of highly educated workers can actually be consistent with an increase in their wage premium. Skill biased technological change is an often cited explanation for a widening of the wage premium of higher education (Autor, Katz and Krueger 1998, Autor, Katz and Kearney 2006).

1.1.2 The supply side of the politics of higher education

The demand side of my argument models the distributive politics of higher education as a zero-sum game between highly and lower educated families. I argue that it is inaccurate to link the interests of highly educated voters inextricably with the Left or the Right of the political spectrum. In what circumstances would we then expect governments to supply policies favouring either of these groups? Our maxim "*qui bono?*" again guides my search for an answer to this supply side question. Which political actors benefit from providing policies that benefit highly educated voters? This question is particularly interesting given that highly educated voters tend to make up only a minority of the electorate. I take this question as an empirical challenge rather than an invitation to design a new grand theory of political coalitions and party behaviour.

While the maximand of families in the first part of the dissertation is of a monetary nature (the expected balance of subsidies received and taxes paid), the maximand of political actors is assumed to be power. More specifically, I assume that elected politicians – whether in government or in opposition – will seek to maintain, and preferably expand, their seatshare in the legislature. I argue that parties can win votes – and thereby seats – through conversion and mobilisation of the electorate. Parties can convert voters who are certain to turn out, but may vote for a different political party. Alternatively, parties can mobilise prospective voters who are certain to vote for that party, but not so sure to turn out. In chapter five I build a model of individual voting behaviour to determine how much of the vote-share parties can win from converting and mobilising certain groups of voters by offering them policy benefits. Inspired by Bartels (1998), this is what I call a group's "voting power" over that party. In chapter six I apply the model to estimate empirically how much voting power highly educated voters held over all major parties in 15 European countries between 1989 and 2009.

How does one model a group's voting power? I start by devising an individual measure of voting power that I then aggregate to arrive at a group measure of voting power. The starting point of this model is the assumption that individuals associate a "partisan utility" with each party. A voter's partisan utility is high for their preferred party and low for their least preferred party. An individual who is indifferent between two parties will hold equal partisan utilities with respect to both these parties. The distribution of these partisan utilities is exogenous to the model. I model the decision to vote for a particular party as well as the decision to turn out as a function of the distribution of partisan utilities. The vote decision is straightforward. An individual votes for the party with the highest utility to them. Hence, if two or more parties are close to having the highest ranking utility, each of these parties will vie to become the party with the highest ranking utility. In contrast, when a party's partisan utility is substantially below the partisan utility of the highest ranking party / parties, then a party has very little chance of improving their chances of attaining the individual's vote. Equally, when the partisan utility of a runner-up is substantially below that of the front-runner, the front-runner is already guaranteed to attain that individual's vote and has no incentive to convince the voter further.

The individual's turnout decision is modelled as, *inter alia*, a function of the utility difference between an individual's preferred election outcome and the utility associated with the expected election outcome. I refer to this difference as an individual's "preference strength." The more a voter stands to gain in utility from a different election outcome, the higher the utility associated with turning out, the higher her probability of turning out.[10] The distribution of partisan utilities affects both the utility associated with the preferred outcome and the utility associated with the expected outcome. Therefore, parties can affect a voter's turnout by changing the distribution of partisan utilities.

I assume that a change in expected policy benefits translates linearly into a change of utility, and that the rate at which this happens is identical for all voters. Thus, a 100 dollar increase in policy benefits from a given party will improve a prospective voter's utility as much as a 100 increase in taxes will decrease another voter's partisan utility. I further assume a perfectly proportional electoral system, so that a party's seat-share is given by its voteshare.[11] An individual's contribution to a party's voteshare is then simply the product of her probability of voting for that party and her probability of turning out, divided by the total expected turnout. From this, we can straighforwardly calculate the *change* in an individual's contribution to party's seatshare for a *change* in policy benefits pursued by a given party. This is our measure of individual voting power. The more a voter changes their contribution to a party's seatshare in response to a change in policy benefits, the more voting power that individual holds. This theory of voting power generalises Bartels' (1998) model of voting power in the two-party context of American presidential elections to the context of multi-party elections.

However, this measure is at the individual level, and my interest is in policies that redistribute between distinct groups. A party's ability to distribute benefits to a group of individuals is not like manna from heaven. Instead I assume an earthly

[10] There is a longstanding debate on the rationality of voting given the miniscule chance that an individual will make a difference to an election result, known as the paradox of voting (Downs 1957, Riker and Ordeshook 1968). My argument does not claim to solve this paradox, it mainly makes a plausible empirical assertion voting is an expression of preference and that people with strong preferences are more likely to express these by turning out (Sanders 1998, 2001).

[11] An extension to chapter five discusses the implications of this assumption.

zero-sum world of scarcity.[12] What is given to some has to be taken from others. Hence, a group's voting power is ultimately given by the difference between the votes gained from distributing resources to those inside the group and the votes lost by taking resources away from those outside the group. Thus, a group's voting power is obtained by subtracting the average voting power of those outside a group from the voting power of those inside a group. I show in chapter five that group size does not matter for this kind of distributive politics. After all, the increased benefit of pleasing a larger in-group is likely to be directly offset by the increased cost of taxing a smaller out-group.

What does this model of voting power tell us about the politics of higher education? Chapter seven combines the model of higher education policy preferences in chapter three with the voting power model in chapter five to develop hypotheses about government higher education policies. The higher the voting power of highly educated voters over the government, the more I expect governments to pursue policies in the interest of highly educated voters. Conversely, the higher the voting power of lower educated voters, the more I expect governments to pursue policies in line with the interests of lower educated voters.

1.2 The evidence

Comparative political economists commonly produce arguments about the relationship between governments and policy outcomes. Generally, these arguments rely on a series of intermediary mechanisms linking the beginning of a causal chain to its end. Often, these intermediary mechanisms are left as assumptions, and are therefore under-theorised and under-tested. This dissertation, in contrast, sets out to formally theorise and empirically test most of the intermediary steps. This dual

[12]This zero-sum model is not to deny the potential existence of Pareto optimal goods: public goods that improve the utility of all. Higher education, as will be discussed in the next chapter, can have positive externalities. However, I argue in this thesis that there is also a large, zero-sum, distributive component to the public funding of our higher education. I focus in my analysis on that zero-sum component.

effort in combining careful theorising with elaborate empirical testing places the work within the sphere of the recent Empirical Implications of Theoretical Models (EITM) movement within political science (Bartels and Brady 1993, Achen 2002, Aldrich, Alt and Lupia 2008).

Most theorising is formal and the evidence leveraged in support of the theoretical models in quantitative. There are some well known advantages to formal modelling.[13] A first advantage of formally theorising policy preferences and party behaviour is that all assumptions are made explicit. Formal models force scholars to establish the precise assumptions on which their predictions rest. In John Huber's words, "[t]his transparency eliminates confusion about the sources of theoretical claims, making it easy for scholars to identify the precise elements of a theoretical argument that they find most objectionable or inappropriate" (Huber 1996, p15). Moreover, working through the implications of basic behavioural assumptions and mechanisms can result in counterintuitive hypotheses.[14] Examples of such counterintuitive predictions in this thesis include the hypothesis that highly educated voters benefit from expanding enrolment, my measure of voting power itself, the potential for negative turnout buying in multi-party systems and the hypothesis that group-size does not matter for distributive politics. While the arguments in this dissertation rely on some decision-theoretic mathematics, the logic and intuition behind the claims is made using words and graphs. Therefore, most of my theoretical arguments should be readily understandable by readers lacking previous training in such mathematical methods.

Quantitative statistical analyses best suit the type of theoretical predictions developed in this dissertation. First, predictions about policy preferences are well tested using surveys of public opinion.[15] Second, the random utility assumptions

[13] See (Huber 1996, p 14-16) for a good overview

[14] As Huber (1996) points out, the term counterintuitive can be misleading: Countering one's first intuition might be a better term. The logic of the model should help us to find intuitive what in the first instance seems counter intuitive.

[15] An alternative way to test individual preferences could be to use laboratory or survey experiments (Morton and Williams 2008, Gerber and Green 2008)

underlying my theoretical model of voting power are set-up to be tested empirically on survey data. Hence, electoral surveys are needed to quantify the voting power of different groups. Having such a quantitative explanatory variable, a logical next step is to apply it to as wide a number of cases as possible. I therefore perform a cross-sectional time series analysis of higher education policy in 15 European democracies between 1989 and 2009.

The well-known advantages of using quantitative analyses are their clear tests of the hypotheses and the generalisability of their results (Lijphart 1971, King, Keohane and Verba 1994, Brady and Collier 2004). A common critique of quantitative analyses is that they insufficiently trace the causal process and mechanisms that link the explanatory variable to the dependent variable (Brady and Collier 2004). In part, the approach in this dissertation rectifies some of this critique by formally modelling and empirically testing many of these intermediary steps (distributional assumptions, assumed preference patterns, voting power of parties, and the behaviour of parties in response to these measures of voting power). Furthermore, to give a more qualitative interpretation to these quantitative analyses, the concluding chapter discusses the plausibility of the hypotheses by briefly reflecting on several cases of higher education policy change.

The theory is designed as a general theory of the distributive politics of higher education in industrialised democracies. The selection of cases to test the theory is pragmatic. I try to test the empirical implications of my theoretical methods on as wide a set of cases as possible. Data limitations, however, restrict the number of industrialised democracies on which the theory can be tested. Most of the macro-level analyses are limited to a subset of industrialised democracies: the member states of the European Union. The use of the European Election Studies to estimate my measure of voting power results in only EU members being included in the analysis. The micro-level analyses, in turn, are limited to four countries for which survey material on higher education policy preferences is available: Britain, Sweden, Australia and Canada.

On the demand side, chapter three formally models the distributive implications of higher education spending and derives the preference patterns from these distributive implications. Chapter four tests the individual level predictions *and* assumptions of this model of policy preferences using survey evidence. In particular, I empirically disentangle the role of education and income in shaping individual level preferences over per-student spending and enrolment. Most of the analyses rely on a set of British Social Attitudes Surveys from between 1983 and 2007, specifically stacked for the purpose of this analysis. This dataset is uniquely suitable for testing hypotheses about preferences regarding higher education policy because it consistently asks comparable questions about enrolment preferences, and preferences regarding policies related to per-student spending. What is more, the long time-frame over which data is available allows us to test for the interaction between macro-level data (in this case parental enrolment) and micro-level data (the education level of respondents) in shaping preferences regarding higher education policy. Less elaborate survey data from Sweden, Australia and Canada are used to test the generalisability of the results of my analysis of the British evidence.

On the supply side, chapter five formally models the incentives that encourage parties to cater to the preferences of a particular group of voters. Chapter six then estimates the incentives for parties to cater to highly educated voters and several other socio-economic groups. The chapter employs 20 years of European Election Studies (EES) data for 15 European countries to estimate the voting power of respondents. The EES data is particularly suitable for this analysis because it provides a good measure of the partisan utilities that respondents associate with all the relevant parties in their national system. This distribution of partisan utilities is the key to estimating an individual's conversion and mobilisation value, the two components of my measure of voting power.

The chapter disentangles the relative contribution of conversion incentives and mobilisation incentives, and finds that conversion is a much stronger imperative than mobilisation. Within conversion, it shows that more votes are to be won from efforts of positive vote-buying than negative vote-buying (Nichter 2008). It shows moreover that there are substantial and significant differences between the voting power that highly educated voters hold over different parties, legislatures and governments.

On the demand side, I then have a formally theorised and empirically tested a set of hypotheses about the distributive preferences related to higher education spending. On the supply side, I have theorised the incentives to parties to cater to certain groups and obtained empirical estimates of the strength of these incentives for different parties, governments and legislatures. Putting these two together, I now have a motive for parties to cater to certain groups (their voting power), and an opportunity to do so (policies that improve the utilities of certain groups of voters). Chapter seven puts these demand and supply sides together to explain higher education policy outcomes in terms of enrolment rates and expenditure per-student. Using data from the UNESCO Institute of Statistics, the OECD, the European Social Survey and the European Election Studies I test whether governments with strong incentives to act in the interests of highly educated voters actually pursue policies in the interest of these voters. The statistical evidence developed in chapter seven shows the substantial and significant effect of the voting power of the highly educated over cabinets on the politics of higher education.

1.3 The contribution

The chapters of this dissertation contribute to the literature on comparative political economy in several important ways. The first part of the literature review in chapter two reveals that the literature on political economy has modelled access to and preferences regarding higher education policy as a function of the distribution of income (Fernandez and Rogerson 1995, Ansell 2008*b*, 2010*a*, Iversen and Stephens

2008, Busemeyer 2009). The second part of the literature review, in turn, suggests that this access model is flawed. Instead, parental education is found to be the most important determinant of a child's chances of attaining higher education. While parental education and income are related, they are not interchangeable. Chapter three challenges existing models of the political economy of higher education by using this empirically observed *probabilistic* relationship between parental education and a child's chances of attaining higher education as the cornerstone of a new theoretical model. Accurately incorporating this access model in our theory yields the counterintuitive hypothesis that early expansions of enrolment benefit children of highly educated parents *more* than children of lesser educated parents. Moreover, the chapter contributes to the literature by simulating the distributive impact of how different empirically observed values of the parental education effect and the wage premium on higher education policy to show the conditions under which highly educated families benefit from expanding enrolment and per-student subsidies.

Chapter four provides a initial attempt to thoroughly test the individual-level predictions of theories of higher education policy preferences.[16] The empirical tests trace the respective roles of a respondent's education level, income, and partisanship in shaping higher education policy preferences. The dataset is novel too. By stacking British Social Attitudes Surveys I obtain a long time-series with detailed responses about higher education policy preferences regarding enrolment and per-student spending. It is the first time this data has been used for the purpose of testing theories about higher education policy preferences. Moreover, the difference in the macro-level enrolment variable over the period of these surveys allows us the unique opportunity to test the hypothesised relationship between the parental enrolment rate and the effect of an individual's education on preferences for expanding enrolment.

Furthermore, the model of voting power for multi-party democracies developed

[16]The only other test of this nature in the literature contained in Ansell (2010*a*), it is argued, relies on an overly restrictive question that taps into support for student from poor families only.

in chapter five provides an innovative approach to measure the incentives available to parties through targeting different groups. This model is the first attempt to bring the literature on electoral targeting with a predominantly two-party focus (Cox and McCubbins 1986, Lindbeck and Weibull 1987, Dixit and Londregan 1996, Bartels 1998, Dahlberg and Johansson 2002, Stokes 2005) to the multi-party setting.[17] The model challenges more conventional partisanship approaches to comparative political economy (Hibbs 1977, Cameron 1978, Stephens 1979, Huber and Stephens 2001, Alt and Chrystal 1983, Alt 1985, Alvarez, Garrett and Lange 1991, Garrett 1998, Boix 1998) and median voter approaches to the study of distributive politics (Downs 1957, Romer 1975, Meltzer and Richard 1981). The model builds on an important contribution by Bartels (1998) that has received insufficient attention in the literature. I generalise Bartels two-party model to incorporate multi-party systems, from which a model similar to Bartels' two-party model arises as a special case. In this model, voters susceptible to conversion are no longer as central as they may be in between two or more parties on the left or right of the spectrum. Moreover, by explicitly modelling distributive politics under a budget constraint I reveal the potential for redistribution to electorally powerful minorities.

Chapter six capitalises empirically on the theoretical contribution of chapter five. First, by estimating the relative size of conversion and mobilisation imperatives, I show that conversion is a much stronger imperative to political parties in Europe than mobilisation. Second, by estimating the electoral incentives that parties, governments and legislatures face I create a new independent variable for the study of distributive politics in comparative political economics. This approach provides an important addition to the current toolset of political economists to measure the electoral incentives of parties. The current toolbox consists of various measures of the left-right ideology of parties and government. These include measures of the seats held by parties of the left (Armingeon et al. 2011), manifesto-based estimates

[17]While Dahlberg and Johansson (2002) apply their model to the case of multi-party Sweden, they reduce political competition to two blocks, effectively assuming a multi-party system works the same way as a two-party system.

of party positions (Budge 2001, Cusack and Engelhardt 2002) or the position of median voters (Kim and Fording 1998, 2003) and expert-based measures of party positions (Castles and Mair 1984, Huber and Inglehart 1995, Budge 2000). I show that highly educated voters hold high voting power over a variety of parties. This voting power does not simply coincide with the left-right position of parties. Moreover, highly educated voters are found to hold high voting power over parties in government and parliament. In other words, parties – on average – stand to win more votes from pleasing highly educated citizens than from pleasing their lesser educated compatriots. To the best of my knowledge this is the first empirical measure of the electoral power held by different groups over parties, governments and legislatures in multi-party democracies in Europe. The web-appendix to the dissertation also provides measures of the voting power of other socio-economic groups over governments. Hence, my empirical measures of voting power can also be useful to understand other kinds of distributive politics that cannot straightforwardly be mapped onto a left-right axis.

Chapter seven challenges a body of literature that has sought to explain higher education policy as the outcome of left-right partisan politics (Ansell 2008*b*, 2010*a*, Iversen and Stephens 2008, Busemeyer 2009). The analysis is novel for two main reasons. First, it uses the voting power of highly educated voters over governments as the explanatory variable. Second, it clearly separates between two dependent variables: spending per student and enrolment. While Ansell (2008*b*, 2010*a*) analyses the effects of partisanship on enrolment, all studies analyse an aggregate of spending. I argue that instead we should look at per- student spending and enrolment separately to best analyse the distributive implications of higher education policy. I find the voting power of highly educated voters has significant effects on both enrolment and per-student spending. All in all, the parental education and voting power approach presented in this dissertation contribute to our understanding of the distributive politics of higher education.

1.4 Outline of the dissertation

The discussion of my argument, evidence and contribution above have already provided the reader with an insight into the contents of the thesis' chapters. To briefly recap, the argument proceeds as follows. The dissertation is divided in two halves. In the first three chapters I present theory and evidence for the demand side of higher education. Chapter two ("A review of two conflicting literatures") starts with a critical review of the political economy literature on the politics of higher education and identifies gaps within it. The second part of the same chapter reviews the literature on access to higher education and finds that parental education is the most important determinant of a child's probability of attaining higher education. Next, chapter three ("The distributive politics of higher education") uses this empirical relationship to build a theoretical model of individual preferences on enrolment and the level of subsidies. Extensions in the latter sections of the same chapter include a model of the effects of wage inequality and the effects of different labour market assumptions on the predictions of the model. Chapter four ("Preferences over higher education policy") tests this theoretical model of higher education policy preferences against alternative hypotheses on survey data from Britain. Moreover, the chapter validates these results using additional survey data from Australia, Canada and Sweden. Chapter five ("A theory of electoral targeting in multi-party systems") develops a general theoretical model of electoral targeting in multi-party systems. The resulting measure of voting power, consisting of a voter's conversion and mobilisation value, provides a theoretically grounded approach to measuring the incentives of parties to distribute resources to specific groups of voters. Chapter six ("Voting power in 15 European democracies") uses the model presented chapter five to estimate the voting power of highly educated voters and other socio-economic groups over parties, governments and legislatures in 15 European countries over a period of 20 years. Deconstructing the variance in voting power I show that parties stand to win far more votes through conversion than through mobilisation. Chapter seven ("How voting power shapes higher education policy") uses the measure of voting power estimated in chapter six, combined with voters' hypothesised preferences on higher education policy to explain the creation of higher education policy. Chapter eight ("Concluding remarks") concludes by discussing the implications of the dissertation for our understanding of the politics of higher education and the comparative political economy more generally.

Chapter 2

A review of two conflicting literatures

Augmenting family income or reducing college tuition at the stage of the life cycle when a child goes to college does not go far in compensating for low levels of previous investment. (Cunha and Heckman 2007*a*, p34)

2.1 Introduction

Flavio Cunha and Nobel laureate James Heckman, in a 2007*a* article in the American Economic Review, challenge the myth that access to higher education is structured by family income in the adolescent years, or by tuition fees. Instead, Cunha and Heckman argue that a child's abilities and skills, which are a product of parental investments in the child's life up to adolescence, are the key to accessing higher education. Lack of abilities and skills prove to be a more important barrier to accessing higher education than credit constraints. These abilities and skills, in turn, are strongly affected by the educational experiences and resources that children are exposed to through their parents. Very few children do not make it to university because they do not have the money. Most do not make it because they do not have the scores and encouragement when they leave secondary school.

Nonetheless, a review of the political economy literature on higher education in the next section of this chapter finds that most theories work on the assumption that income structures access to higher education. This results in predictions about preferences for higher education policies derived from an individual's position in the income distribution. Such models hypothesise that the rich seek to maintain their privileged access to higher education, and that those with poor and middle incomes seek to overcome class biases and improve their chances of access. Moreover, income is seen as the main determinant of voting behaviour. This has resulted in authors arguing that Left wing parties representing the poor will be the champions of higher education by increasing subsidies and enrolment to promote access (Iversen and Stephens 2008, Busemeyer 2007, 2009). Others have argued that Right wing parties, representing rich constituents, have an interest in generously funding elite higher education systems, of which their children are the exclusive beneficiaries, but that this role is taken over by the Left when higher education reaches mass levels (Ansell 2008*b*, 2010*a*). Other models use the interests of the voter with the median income to explain higher education funding as a regressive equilibrium outcome (Fernandez and Rogerson 1995).

This assumption that access to higher education is determined by income contrasts with the findings of a review of the psychology, sociology and economics literature in section three. That review reveals an emerging consensus that parental education, and not income, is the main factor conditioning a child's probability of pursuing higher education (Pfeffer 2008, Cunha and Heckman 2007*a*, Feinstein, Duckworth and Sabates 2004). The main barrier to access is not a lack of wealth to pay for tuition and maintenance costs, but rather low educational attainment and a lack of parental encouragement. In turn, a child's ability during adolescence is strongly affected by the abilities of her parents (and not necessarily their income and wealth). Children of highly educated parents thus stand a better chance of attaining higher education.

This chapter performs two straightforward tasks. First, by reviewing and critiquing the political economy literature on higher education, this chapter provides the reader with an overview of the present insights that political economists have provided for understanding the distributive politics of higher education. Chapter four tests these extant hypotheses next to the alternative hypotheses developed in the next chapter. I further argue that current interpretations of the political economy of higher education fail to provide a convincing explanation of the emergence, change and persistence of generously funded public higher education policies with perverse redistributive consequences. Second, by providing an overview of the psychology, sociology and economics literature on access to higher education, I develop the central premise of this dissertation, namely that access to higher education is predominantly a function of parental education. This premise is further supported by a descriptive analysis of the association between parental education and a child's education in countries included in the European Social Survey. These insights provide a strong foundation for the access assumptions of the model of individual preferences developed in the next chapter. There I will argue that instead of modelling the politics of higher education as a distributive struggle between rich and poor, or Left and Right, it is better understood as a distributive game between highly educated and lesser educated groups in society.

The chapter proceeds as follows. The next section provides an overview of the political economy literature by categorising the literature in three distinct strands: complementarity / externality approaches, credit-constraint approaches and partisanship approaches. Section three analyses the association between parental education and a child's probability of attaining higher education and reviews the explanations offered for this association by the psychology, sociology and economics literatures. Section four concludes by discussing the conflicting implications of both literatures.

2.2 Higher education in the political economy literature: a brief synopsis and critique

While the majority of the political economy literature on education focuses on general education spending (Castles 1989, Boix 1998, Busemeyer 2007, Ansell 2008*a*), a growing literature has emerged that focusses on higher education specifically (Fernandez and Rogerson 1995, Iversen and Stephens 2008, Ansell 2008*b*, 2010*a*, Busemeyer 2009). The synopsis below sets out the main theoretical propositions in the literature regarding 1) individual preferences for public higher education policy, and 2) the aggregation of these individual or group level preferences. The extant hypotheses about preferences for per-student subsidies and enrolment uncovered in this review are tested in chapter four, alongside the alternative hypothesis developed in the next chapter. This section further shows that assumptions about who receives higher education and who benefits from expansion of enrolment are central to the predictions of theories of the politics of higher education. It turns out that most models assume that access is income dependent, rolling out from the children of the richest individuals to the poor. This central assumption is challenged in section three of this chapter, where a literature review finds that parental education is a more important predictor of a child's chances of attaining higher education than parental income.

Conventional models of government spending under majority voting predict transfers from the rich to poor and middle incomes (Romer 1975, Meltzer and Richard 1981, Persson and Tabellini 2000). Similarly, for education spending, a standard textbook treatment by Atkinson and Stiglitz (1980) demonstrates that when public education is considered a publicly provided private good, majority voting will lead to redistribution from the wealthy to the poor.[1] Indeed, many studies have found a positive relationship between empowerment of the median voter through democratisation and expansions of public education spending (Lake and Baum 2001, Baum and Lake 2003, Brown and Hunter 2004, Lindert 2004, Rudra and Haggard 2005, Stasavage 2005, Ansell 2008*b*). However, as many authors have pointed out, in the case of higher education these predictions are at odds with a well-documented empirical reality: children of higher-income families have better

[1]Models by Glomm and Ravikumar (1992), Saint-Paul and Verdier (1993) and Stiglitz (1974) yield similar predictions.

chances of attaining higher education and therefore the net effect of public funding to higher education is a transfer from lower-income individuals to higher-income individuals (Fernandez and Rogerson 1995, p250). For example, the seminal study by Hansen and Weisbrod (1969) found the effects of higher education spending to be strongly regressive in the State of California.[2] Studies by Le Grand (1982*b*,*a*) report similar distributive effects in Britain, while Psacharopoulos, Tan and Jimenez (1986) come to the same conclusion for developing countries. Spending on tertiary education is only selectively consumed by a subset of society. This results in very different distributive implications and may result in a rather different politics.

How has the literature so far explained this distributive anomaly? Explanations come in three categories. The first type argues that higher education spending actually benefits those who do not receive it, either because of positive externalities such as economic growth (Creedy and Francois 1990, Creedy 1995) or because of complementarities in the labour market (Johnson 1984). Public investment in higher education is thus modelled as a positive-sum affair. The second type of explanation argues that credit constraints in accessing higher education can be exploited by middle and high incomes to extract transfers from the poor (Fernandez and Rogerson 1995, Austen-Smith 2003). Their models find that, under credit constraints, redistribution from lower to higher incomes can be a majority preferred equilibrium outcome. The third category of explanations models higher education as a political struggle between the haves and the have-nots. The haves – represented by the Right – will seek to preserve the regressive redistributive outcome from which they benefit. The have-nots – represented by the Left – will seek to overcome barriers to access by expanding enrolment and funding to secure their part of the pie (Iversen and Stephens 2008, Busemeyer 2009, Ansell 2008*a*, 2010*a*). I refer to these as partisanship models of higher education, as they argue the Left-Right partisanship of governments is an important explanatory variable of the politics of higher educa-

[2] Other U.S. studies reporting similar findings include Bishop (1977), Radner and Miller (1970), Peltzman (1973) and Jackson and Weathersby (1975)

tion. The review of each of these three categories is followed by a critical discussion of their weaknesses in explaining the distributive politics of higher education. All in all, I argue that neither of these three interpretations provides a convincing explanation of the emergence, persistence and change of public higher education policies in industrialised democracies.

2.2.1 Positive externalities and complementaries

Economic efficiency is a popular explanation for the public preference for investment in higher education, especially amongst economists. These accounts of higher education are positive-sum in nature, and as such focus on how policies increase the overall size of the pie. This contrasts with the zero-sum model developed in chapter three that focusses instead on the division of the pie. Such explanations see public subsidies as a means to overcome failures in the market for education that lead to socially sub-optimal levels of investment. One type of market failure is the presence of externalities. Besides private returns, there may be public returns from investments in higher education for which the individual investing in education is not compensated. For example, higher education can generate technological innovations that cannot be fully patented, or other social "goods" such as active civic engagement (McIlrath and MacLabhrainn 2007). Rationally, a self-interested individual will only consider her private benefits when investing in higher education. Collectively, therefore, societies that leave higher education entirely to the market will underinvest in higher education. In the presence of externalities, it is Pareto efficient (i.e. in everyone's interest) to publicly subsidise a good (Pigou 1920, Coase 1960, Atkinson and Stiglitz 1980). Creedy and Francois (1990) and Creedy (1995) model higher education as an investment good that contributes to future economic growth from which everyone benefits. Hence, it is in the interest of those not receiving higher education, which includes the median voter, to subsidise higher education.[3] Similarly, Bevia and Iturbe-Ormaetxe (2002) argue that people whose children do not receive higher education should nevertheless agree to help pay for such education. They argue that higher wages of highly educated workers will flow back to those who have not received higher education through high redistribution in the future.

Other models have focused on complementarities between workers of different skills (Johnson 1984). Complementarities mean that, all else being equal, the increase in the size of one group will positively affect the productivity of another group. For example, if high-skilled and low-skilled labour are complements in production, then more high skilled workers will increase the marginal product of low skilled workers (Borjas 1995). Johnson (1984) divides the population into three groups: low, medium and high skilled workers. By investing in education, the medium skilled can become high skilled workers, but they will only do so when the benefits outweigh the costs. The low skilled – or "intellectually challenged", as Johnson likes to call them – cannot improve their skills. When the productivity of low skilled workers increases through a rise in the number of high skilled workers, then low skilled workers will benefit indirectly from subsidies towards the cost of educating medium skilled workers. Johnson evaluates the conditions under which low-skilled workers could benefit from paying taxes to subsidise the education of medium skilled workers. With sufficient complementarity between low and high skilled workers, Johnson argues, the low skilled can benefit from expanding the number of high skilled workers by subsidising medium skilled workers to train to become high skilled workers. Related to these complementarity theories, more functionalist work on higher education politics looks at technological changes that increase the systemic demand for skilled workers (Trow 1973, Teichler 1993, Nugent 2004). However, these kinds of approaches suffer from two weaknesses (see Ansell

[3]It should be noted that the numerical predictions of Creedy and Francois's framework are contingent on the selection of model parameters. These include assumptions about the complementarity between individual abilities and investment in higher education, the level of public externalities, the opportunity costs of higher education and the tuition cost. Different values result in rather different preferred subsidies and corresponding enrolment rates.

2008*b*, for a similar critique) . First, there is no theory of political agency that links systemic forces to policy outcomes. Policy is simply modelled as a resultant of systemic forces. Second, in the absence of a theory of different levels of technological change between countries, such theories do not help to account for the levels of cross-national variation in higher education policy that we observe.

A few critical notes are in order. First, economists who have attempted to estimate the social externalities of education find that they are modest at best and small compared to private returns (Acemoglu and Angrist 2000, Heckman and Klenow 1997, Psacharopoulos and Patrinos 2002). Hence, only a relatively small public contribution would be sufficient to realise the public benefits. Second, models surrounding complementarities between different labour types assume a constant production technology. An anecdote about the wage premium in the United States suggests this assumption is not necessarily accurate. At first, the expansion of higher education in post Second World War period saw the wage premium of highly educated workers drop from 55 percent in 1970 to 41 percent in 1980. In 1995, however, the wage premium was up again to 71 percent (Autor, Katz and Krueger 1998). Skill-biased technological change is frequently used as an explanation of this increase in the wage premium, despite increases in the supply of labour (Autor, Katz and Krueger 1998, Autor, Katz and Kearney 2006). Despite substantial increases in the number of skilled workers, the wages of the bottom half of the income distribution have not converged with those of high skilled workers, at best they have kept up (Kenworthy 2010). To be precise, new technologies such as computerisation, improved information technologies, and post-fordist production set-ups make the abilities of highly skilled individuals more productive. In an influential paper, Acemoglu (1998) argues that the development of such technologies may be endogenous to the supply of skilled labour. That is, an expansion of the supply of high skilled labour creates a demand for technologies to be developed that use that factor of production, thereby increasing the productivity of high skilled workers. Moreover, signalling models of education show that attaining education also has an informational effect: it signals a certain level of ability or productivity of the group attaining the signal (Spence 1973, 2002, Fernandez and Gali 1999, Bergh and Fink 2009). Hence, when higher education expands from the most able towards the least able, it may not only reduce the average ability signal for those attaining higher education, it may also reduce the signal of those with the lowest abilities who do *not* attain the signal. Signalling models would therefore predict that lesser educated workers can lose out from expansions of higher education.

In short, both theoretically and empirically there are reasons to doubt a positive effect of expansions of skilled labour on the income of low-skilled labour. This means that externalities and complementarity based theories are based on inaccurate labour market assumptions. Moreover, even if the assumed labour market relationships were true, then these theories leave will still leave us ill equipped to explain cross-national or over-time variations in higher education policy. While positive externalities may play a minor role in explaining some level of public intervention in higher education, we need to look beyond complementarity and externality based explanations to understand 1) the high levels of public intervention in higher education and 2) cross-national variations in higher education policy.

2.2.2 Wealth barriers to access and credit market failures

A second strand of the literature is based on the notion that credit markets may fail to provide loans for higher education. The reason banks do not provide sufficient student loans, or at prohibitively high interest rates, is that human capital cannot be used as collateral. It is difficult for banks to ensure that individuals will be able to pay back their loans, not least because of uncertainties surrounding future income (see for a discussion García-Peñalosa and Wälde 2000, Lazear 1983, Bishop 1977). If an individual defaults on mortgage payments for their house, the bank can repossess the collateral through foreclosure to cover its losses. Since the abolition of slavery there has not been an equivalent way of repossessing or auctioning a debtor's human capital.

Consequently, in the presence of credit constraints and the absence of subsidies, only those with sufficient wealth can afford to go to university. Fernandez and Rogerson (1995) show that a vote over the level of subsidies is also a vote over who receives higher education. After all, increased subsidies reduce the wealth threshold at which individuals can attain higher education. Therefore, the rich and middle incomes can extract resources from the poor by setting a level of subsidies such that the median voter can attain higher education, but the poor are still excluded. A partial subsidy of higher education can thus be a way to extract taxes from the poor (and possibly the rich) to subsidise middle incomes. Fernandez and Rogerson argue further that higher income inequality increases the potential for this kind of transfer. To be precise, in systems with high income inequality the poor need to receive a lot of subsidies before they can access higher education.[4] Hence, any level of subsidies up to the point that the poor receive higher education is an extraction of taxes from the least well-off. One criticism of this model is that subsidising higher education is the only policy in town. What would happen if the median voter could also choose for a universal lump sum transfer to all citizens? Austen-Smith (2003) considers this question and shows that such a partial subsidy targeted at the top half of the wealth distribution is only preferred by the majority over a lump-sum transfer in societies with more equal wealth distributions. In societies with more unequal wealth distributions, the middle incomes are better off with an alliance with the poor to extract subsidies from the rich. In short, these theories show that, under credit constraints, a regressive redistributive outcome can be the majority preferred outcome in a median voter model.

The insight that regressive redistribution is potentially preferred by the majority in a model with credit constraints is an important contribution to the political

[4]In addition, under high inequality and a marginal income tax the rich will also pay a larger share of total taxes.

economy literature generally. However, these models suffer from several weaknesses in explaining the political economy of higher education. First, the individual level predictions of these models are not straightforward, with individuals only preferring subsidies if it gives them access to higher education.[5] Second, the equilibrium results rely heavily on credit constraints. As a result, consumption of higher education is entirely endogenous to the level of subsidies. While this leads to a very parsimonious model, it rules out other distributive choices available to politicians. To begin with, governments can maintain high subsidies while limiting enrolment by setting stringent exam criteria or limiting the number of funded places. What is more, governments can overcome credit constraints without high taxation by setting up a system of student loans or graduate taxes. Introducing these options would undermine the mechanism that drives the regressive equilibrium. Third, a public subsidy to higher education that does not include the median voter is not an equilibrium outcome in these models. This contrasts with an empirical reality where most democracies sustain, or have sustained, systems of generously funded public education with enrolment rates below 50 percent. Differences in the shape of the income distribution are the only exogenous source of variation that are allowed to explain the generosity of higher education subsidies. As I argue in section three of this chapter, modelling higher education strictly and deterministically as a function of income and subsidies misrepresents the actual dynamics of access to higher education. Instead, in chapter three I model higher education as a probabilistic function of the education level of a child's parents and the level of enrolment set

[5] This is because access to education is endogenous to the level of subsidies. Let us define s as the level of subsidies and s_i^* as the threshold subsidy for an individual i to be able to attain higher education (and the subsidy). An individual would be opposed to any increase in s that does not bring s to s_i^*. After all, this would only increase taxes without giving higher education subsidies in return. Thus, for values of s up to $s*$ the marginal utility is negative. However, once s is beyond s_i^*, an individual can be a net recipient of subsidies up to the point that the marginal benefit from an increase in s is outweighed by the marginal increase in taxes paid. How much taxes will increase due to an increase in s, in turn, depends on the inequality of the wage distribution. This is for two reasons. First, the distribution of income defines the proportion of the overall budget that has to be paid by an individual i. Second, the distribution of income determines the marginal growth of the number of individuals enrolling in higher education due to an increase in subsidies.

by the government. Moreover, I model enrolment as a separate policy parameter set by the government. This results in very different distributive implications of expanding enrolment and subsidies.

2.2.3 Partisanship models of the distributive politics of higher education

Theorists in the partisanship tradition have argued that investment in non-tertiary education is a conscious redistributive strategy of the Left (Castles 1989, Boix 1998, Busemeyer 2007, 2009, Iversen and Stephens 2008, Ansell 2010*a*). When the distribution of income mirrors the distribution of skills, then equalising skills is a way to redistribute income. Boix (1998) argues that investment in human capital has become a popular supply side policy of the Left to increase both growth and equality. This, he argues, is especially the case because globalization has rendered the Left's Keynesian demand strategies ineffective.[6] Several studies find similar patterns of Left-wing investment in education (Busemeyer 2007, Iversen and Stephens 2008, Busemeyer 2009). Ansell (2010*a*) argues that the relationship between Left-partisanship and education expenditure is conditioned by the electoral system. Coalition dynamics in systems of proportional representation forces parties to bargain over policy and gives more power to centrist groups.

How could we think about higher education in a partisan context? Ansell (2008*b*, 2010*a*) develops a model of individual preferences for higher education policy in which access to higher education is strictly income dependent.[7] Moreover, Ansell's labour market model assumes complementarities between highly and lesser educated wages.[8] The model yields predictions about policy preferences for three in-

[6] The demand side efforts following the 2008 financial crisis, as well as insights from the new-Keynesian economics (Iversen and Soskice 2006), cast some doubt on this premise.

[7] A model with income independent access is also considered, yielding standard income based distributive results (i.e. conform Meltzer and Richard (1981)). Ansell argues that a situation approximating income independence can be achieved by active strategies such as affirmative action, targeted grants and loans, or reducing the streaming of secondary education systems. Ansell argues further that the Left has an interest in policies *overcoming* income dependence, whereas the Right has interest in *maintaining* income dependence.

[8] It is not clear, however, that these assumptions are necessarily driving Ansell's predictions. The distributive effects of higher education subsidies may be sufficient. Moreover, positive-sum effects

come groups (rich, middle income and poor) over enrolment rates and per-student subsidies. In contrast to Fernandez and Rogerson, Ansell models enrolment as a policy parameter directly set by the government. Since the richest third of the population already have access to higher education, they have no interest in expanding enrolment. At low levels of enrolment, they benefit firstly from scarcity rents due to the low number of highly skilled workers in a labour market with complementarities; and, secondly, from a net transfer from the poor and middle-incomes, who are taxed without receiving higher education subsidies in return. However, when for exogenous reasons enrolment expands, the very rich will start to oppose subsidisation given that it increases their tax burden. When forced to choose between two types of mass system, the rich will therefore prefer a more privately funded system over a publicly funded system. In short, we would expect the rich's preferences for subsidies to be positive at low levels of enrolment and declining to zero at higher levels of enrolment. Like Fernandez and Rogerson (1995), Ansell's model predicts the strongest support for both subsidies and expansion of enrolment to be amongst the middle incomes. Middle incomes favour expanding enrolment because it gives them access to a slice of the higher education subsidy pie and they favour higher subsidies because it constitutes a net-transfer from the rich and poor alike. After all, the rich pay more in taxes and the poor pay some taxes without receiving any higher education. Low-income families, Ansell argues, have nothing to gain from either expansion or subsidisation. They therefore prefer systems with low public costs. This means either low levels of enrolment (the elite system), or systems with low per-student expenditure (the partially private system).

All in all, this pattern of preferences creates the potential for an ends-against-the-middle coalition, where the poor and the rich can design a policy at the expense of the middle's interests. Ansell's political model, however, assumes this option

are assumed away by Ansell by normalising income to one and complementarities are assumed to only affect those attaining higher education, as the lower educated wage is assumed to be unaffected by demand and supply of high and low skilled work. Ansell's discussions do not engage with variations in the level of complementarity and how these drive the model's results.

away. He uses a set-up in which the Left party represents the poorest half of the population, and the party on the Right represent the richest half of the population. Hence, at low (or elite) levels of enrolment, the core constituency of the Right is the exclusive beneficiary of higher education spending. This is the case when less than half of the population receives higher education, i.e. when enrolment is smaller than the size of the Right-wing constituency. Until that point, Ansell argues, the Right constituency has an interest in expanding enrolment and to increase per-student subsidies. When enrolment moves to mass levels and passes the fifty percent mark, Left constituencies will become recipients of higher education subsidies. Ansell argues that at this point the preferences of Left and Right-wing parties reverse. The Left will be interested in increasing subsidies and enrolment, while the Right will want to reduce subsidies and enrolment.

Again, a few critical notes are in order. First, the Left and Right are likely to be internally divided over both subsidies and enrolment. Once enrolment passes 25 percent, half the Right-wing constituency would be opposed to further expansion. Similarly, as enrolment expands, the richest parts of the Right-wing constituency are likely to become net-contributors to higher education subsidies, and would start to oppose them. When this will happen, in turn, depends on the progressivity of the tax system and the level of income inequality. In more progressive tax systems or more unequal societies, the very rich will be more opposed to subsidies than in more equal societies. Equally, only when enrolment reaches 75 percent will the majority of the Left's support base start benefiting from higher education subsidies. Until then, the poorest segment of the Left is still a net contributor, as they pay taxes without receiving higher education in return. Moreover, those individuals not benefiting from higher education subsidies would prefer a lump-sum universal redistributive transfer over spending on higher education. On average, until enrolment reaches 100 percent, the Left constituency is always better off with a universal lump-sum redistributive transfer. Ansell's model is unclear about how these contradicting interests within parties are resolved.

Other arguments based on partisan colour are made by Iversen and Stephens (2008) and Busemeyer (2009). Both authors claim that higher education policy can be a strategy of the Left to woo the middle classes and re-forge class alliances between the middle and working class. This can especially achievable if higher education spending focuses on overcoming class biases. Both studies present empirical evidence that Left-wing parties are more likely to increase spending on higher education. The logic of wooing the middle classes is appealing as it provides a motive for parties to favour one group over others. It is not clear, however, why the Left has more incentives to woo the middle classes than the Right. Moreover, there is no micro-logic presented to suggest that the Left would benefit most from expanding generous state-funding, especially in comparison to a lump-sum alternative, which – as discussed above – would always be preferable to the Left's constituency.

2.2.4 Gaps in the literature that need to be addressed

Table 2.1 on page 35 provides an overview of the assumptions and predictions of the literature reviewed above. I have argued that complementarity and externality based literatures fail to explain variations observed in higher education policy across countries. Median-voter models based on credit-constraints fail to account for the incremental expansion of higher education policy as has been observed in most industrialised democracies. Moreover, I argue that the literature that does provide an explanation for variations in higher education policy – the partisanship literature – fails to address the conflicting interests within the Right and the Left constituencies. To be precise, half the Right's constituency (the richest quarter), never stands to benefit from expanding enrolment. Moreover, half the Left's constituency (the poorest quarter) always stands to lose from expansions of higher education spending until three-quarters of the population are enrolled and benefits much more from lump-sum redistribution. The partisanship literature is unclear about how these internal contradictions within parties are resolved. Moreover, the literature fails to explain the rather constant expansion of enrolment that has been observed across industrialised democracies.[9]

What is more, in most existing studies, income takes a central explanatory role in the formation of preferences towards higher education policy. Income indicates who gets education, income indicates who pays for public education, and income or class indicates voting behaviour. If, however, we look at who consumes higher education, I find in the next section that a child's ability is a more important predictor than her parents' income. Moreover, individual ability is strongly related to parental education levels, and less to parental income. In the next chapter, I argue that there is an alternative underlying logic of the distributive politics of higher education. By modelling access to higher education as a probabilistic function of parental education I show, counterintuitively, that highly educated families stand to benefit from expanding enrolment. Moreover, the theory of voting power developed in chapter five provides an alternative political model that shows that parties of both the Left and Right face strong incentives to cater to the interests of highly educated voters.

[9]Instead, partisanship approaches would argue that such drives are can only be explained by one of the two parties in power.

Table 2.1 – Overview of the existing literature on the political economy of higher education

Theory	Authors	Labour Market Assumptions	Access Assumptions	Political Assumptions
Externalities	Creedy and Francois (1990), Creedy (1995)	Return to higher education dependent on individual ability. All incomes benefit from a growth externality	Access endogenously determined by individual cost benefit analysis, a positive function of ability and level of subsidies	Median voter sets per-student subsidies
Complementarities	Johnson (1984)	Positive complementarities between supply of different skill levels	Only the able part of society can attain higher education. Endogenous cost-benefit decision, affected by complementarities, subsidy and tax	No explicit political model, just group preferences
Functionalist theories	Trow (1973), Teichler (1993), Nugent (2004)	Social and technological changes drive demand for higher education	No explicit access assumptions. Norms about equality affect access.	Politics reflects overall needs in society. No direct political agency.
Credit constraints	Fernandez and Rogerson (1995), Austen-Smith (2003)	Constant positive return to higher education	Access endogenously determined by individual wealth and the level of subsidies	Median voter sets per-student subsidies
Partisan inversion hypothesis	Ansell (2008*b*), Ansell (2010*a*)	Complementarities with output normalised to one	Level of enrolment set politically, but income dependent from rich to poor	Incumbent party sets enrolment, subsidies and per-student subsidies in line with its constituents' preferences
New partisan theory	Iversen and Stephens (2008), Busemeyer (2009)	Unspecified	Higher spending promotes access to middle incomes and poor	Incumbent party sets overall level of higher education spending and balances the interests of its constituents with its interest in wooing the middle classes

2.3 How parental education conditions the probability of attaining higher education

Enrolment rates for tertiary education vary significantly between countries (OECD 2010). In contrast to enrolment rates for primary and secondary education, enrolment in tertiary education is far from universal in any existing polity. If a polity has an enrolment rate of h percent for a given cohort, this does not mean that each individual in that cohort faces a probability of h of receiving higher education. Instead, probabilities are conditioned by individual characteristics and family background. This means that some individuals have an above average probability of enrolling in university, while others have a below average probability.

Which factors condition a child's probability of attaining higher education? The literature distinguishes between two types of constraints on admission to higher education: credit constraints and ability constraints. Both are determined by parental background factors. Credit constraints are a function of family wealth and have been discussed in the previous section. Ability constraints are a function of the educational behaviour of parents, which is highly correlated with parental education levels. While the literature on the political economy of higher education tends to focus on credit constraints,[10] Research in the economics and sociology literature suggests that the ability constraint is more binding.[11]

Parental education plays an important role in determining who obtains one of the limited number of places in higher education institutions. Data from the European Social Survey provides us with good descriptive insights into the strength of this association. Respondents were asked not only about their own level of education but also about the education level of each of their parents. Table 2.2 compares

[10] See the review in the previous chapter for more details. Fernandez and Rogerson (1995) model access to education as a function of income. Others assume access to higher education to be a function of income and class (Iversen and Stephens 2008, Ansell 2008*b*, 2010*a*, Busemeyer 2009). Fink (2007) focusses on the role of both income and ability, but is not explicit on the determinant of ability.

[11] See Carneiro and Heckman (2002, 2003) Cunha et al. (2006) for evidence in the economics literature, and Pfeffer (2008) for the sociology literature.

Table 2.2 – Intergenerational transmission of education for different generations – Ratio of the odds of attaining higher education for those with at least one highly educated parent compared to those without, by decade of birth

Country	1920s	1930s	1940s	1950s	1960s	1970s	All
Austria	23.1	20.1	6.7	13.6	15.0	10.0	10.4
Belgium	8.1	10.4	9.7	7.4	8.0	7.4	6.8
Britain	10.8	5.0	9.5	4.6	4.4	3.8	5.9
Czech Republic	9.5**	35.1	5.9	10.9	10.5	10.7	10.6
Denmark	4.6	16.1	5.3	4.3	3.8	3.6	4.5
Estonia	8.9**	2.3*	10.2	3.5	4.3	5.0	4.3
Finland	21.2	8.7	9.7	4.9	5.4	2.6	4.8
France	23.5	15.7	5.0	10.6	9.8	5.8	8.5
Germany	6.2	3.0	4.1	3.6	3.4	4.2	3.6
Greece	++	17.1	36.5	11.0	14.4	9.1	13.0
Hungary	17.9	14.3	13.4	12.2	10.1	12.5	12.0
Ireland	15.9	6.4	11.9	6.6	5.3	5.0	7.2
Italy	31.5	31.1	11.3	13.9	9.5	6.6	13.2
Luxembourg	25.5	71.5	17.3	13.2	10.1	6.8	11.7
Netherlands	5.7	6.2	5.1	5.7	4.3	5.4	5.5
Norway	4.0	7.1	10.5	4.6	5.1	3.4	4.5
Poland	12.2	38.5	14.8	10.9	10.8	7.9	12.1
Portugal	48.8	53.4	28.7	20.7	21.5	12.2	21.9
Slovakia	−	8.2**	10.2	7.2	9.0	6.0	7.5
Slovenia	++	9.3	11.1	7.7	7.0	3.9	5.9
Spain	11.2	22.8	21.4	9.6	9.7	7.3	10.5
Sweden	10.0	7.5	6.0	4.8	4.5	4.7	4.8
Switzerland	12.8	9.8	5.8	6.6	7.3	6.4	7.0
Ukraine	8.1	11.4	9.5	8.4	8.0	6.1	7.4

Source: Author's calculations using European Social Survey data (2002, 2004, 2006).
Notes: All odds ratios are significantly different from 1 at the 99 percent level, unless indicated differently. ++ failed to compute because success perfectly predicts outcome. − insignificantly different from 1 ($p < .90$). * only significant at $p > .90$. ** only significant at $p > .95$. See footnote 12 for a discussion of potential issues with sample sizes and events per variable issues.

the odds of attaining higher education for those who have at least one highly educated parent with those without a highly educated parent. Odds ratios are used because they are insensitive to changes to enrolment.[12] To be precise, the odds ratio of a given parental education effect is invariant to the underlying probability in the population of attaining higher education. The table provides an overview

[12] See footnote 9 for an explanation of the interpretation of odds ratios. Odds ratios can be affected by small sample sizes and the number of events per variable. These can be an issue for the estimates of the oldest generations (1920s and 1930s), for which there are not that many respondents (Peduzzi et al. 1996, Nemes et al. 2009) and not that many highly educated parents (the events per variable). For the 1970s generation, however, the sample sizes (not reported in the table) and events per variable are well over the recommended thresholds of 500 and 10 respectively. We can thus be confident of the estimates for the post-war generations.

of the association between parental education and the educational attainment for different birth cohorts in 24 European countries. The good news for intergenerational mobility is that, across the board, the association between parental education and that of their children has been declining. For example, the odds for an Austrian child with highly educated parents of attaining higher education were 23 times higher for children born in the 1920s, compared to 10 times higher for the 1970s cohort. Similarly, the odds in Sweden went from 10 for the 1920s cohort to about 4.7 for the 1970s cohort. The bad news for social mobility is that, even in Finland – the country where this association between parent and child is the weakest for the 1970s cohort – the odds of a child of highly educated parents attaining higher education were still 2.6 times higher. Scandinavian countries have the lowest association between parental education and a child's education, while Mediterranean and post-communist countries show some of the strongest associations. In Portugal, for example, the odds of a child of highly educated parents going to university are 12.2 times higher for the 1970s cohort. Hungary, with an odds ratio of 12.5, has the strongest parental education association of all post-communist countries included in the data.

This table raises fascinating questions about the causes of these cross-national and over-time variations. Candidate explanations include the degree of stratification of post-secondary education (Pfeffer 2008) and the positive effects of expanding enrolment for children with less educated parents. What matters at this stage of the analysis is that a child's probability of attaining higher education is very strongly affected by their parent's education. A key question unanswered by this table is whether the causal path from parental education to a child's educational attainment runs through the effect of parental education on parental income, or because there are direct effects of parental education levels on the abilities of their children. To address this question, this section reviews key findings from other academic disciplines, including psychology, sociology and economics. Moreover, the empirical analysis in chapter four will deconstruct the respective effects of income and education in shaping higher education policy preferences.

Recent research by Cunha and Heckman (2007*b*) shows that about 50% of lifetime inequality in American society is determined by factors known to agents at age eighteen. It turns out that abilities matter a great deal in determining later outcomes in life. 'Ability' is a value laden and controversial term, as demonstrated by the tumult caused by the suggestions about genetic and racial determinism of intelligence in *The Bell Curve* by Herrnstein and Murray (1994). That noted, it should be stressed that this section does not rely on any genetic or racial explanations. Nurture processes related to parental education can provide a sufficient explanation of differences in the abilities of children.

A rough distinction can be made between cognitive and non-cognitive abilities. Non-cognitive abilities include such traits as perseverance, motivation, time preference, risk aversion, self-esteem, self control and preferences for leisure. Cognitive ability is usually measured by scholastic achievement tests or IQ tests. Both cognitive and non-cognitive abilities strongly affect a variety of outcomes in life, amongst which are wages (controlling for schooling), schooling itself, and many other aspects of social and economic life (Bowles, Gintis and Osborne 2001, Heckman, Stixrud and Urzua 2006, Cunha and Heckman 2007*a*). Several studies in the psychology literature have shown that non-cognitive skills have an important role in affecting the schooling performance of children and adolescents (Duckworth and Seligman 2005, Wolfe and Johnson 1995).

Research by Belley and Lochner (2007) shows that the primary factor explaining differentials in college attendance is not family income, but cognitive ability.[13] Moreover, research shows that when controlling for ability, family income only plays a minor role in explaining college participation of children.[14] Controlling for ability, minorities in the U.S. are in fact *more likely* to go to college, notwithstanding their

[13]However, this research also shows some growth in the importance of family income constraints in the college-going decisions of Americans, which could be related to increasing inequality.

[14] See, for a summary of the evidence, Carneiro and Heckman (2002, 2003) Cunha et al. (2006)

lower incomes (Cameron and Heckman 2001). Carneiro and Heckman (2002) find that at most eight percent of American families are potentially credit constrained when making college participation decisions, and that ability constraints tend to be the most binding.

How are abilities formed, and what determines the distribution of cognitive and non-cognitive abilities in society? Ability gaps between individuals, and across socio-economic groups, open up at an early age. Figure 2.3 shows the trend in mean cognitive score by maternal education. A gap in cognitive ability already emerges at age three and persists from thereon. This suggests a high level of path dependence in the skill development of children, and a strong influence of early child development on skill formation in later life. Levels of child skills show high correlations with family background factors like parental education and maternal ability (Carneiro and Heckman 2003, Cunha et al. 2006, Cunha and Heckman 2007*a*). Initially, stark racial differences in cognitive and non-cognitive abilities almost disappear when controlling for maternal education, maternal ability and broken families.[15] Similarly, differences in math scores between income groups disappear when controlling for maternal education, maternal ability and broken families (Carneiro and Heckman 2003, Heckman 2008). It is worth noting again that these differences in abilities are explained by nurture processes, rather than by genetic differences. The strict distinction between nature and nurture, prevalent in earlier economic models, is exaggerated. Instead, research in developmental psychology has shown that gene expressions are influenced by environmental conditions, and that abilities are produced (Rutter 2006).

Moreover, a key insight from new research in the behavioural economics of human capital formation is that "skills produced at one stage augment the skills attained at later stages" (Heckman 2000).[16] There is an effect of self-productivity and positive feedback. Emotional security at a young age encourages children to

[15] See graphs in the web appendix of Cunha and Heckman (2007*a*)

[16] See Camerer, Loewenstein and Rabin (2003), Loewenstein (2007) for an overview of recent advances in behavioural economics.

explore, and thereby improve learning of cognitive skills.[17] Thus, a high level of cognitive and non-cognitive skills in one period, yields a higher stock of cognitive and non-cognitive skills in the next period. More crucially, there is a complementarity between one's level of skills, and the productivity in investment in skills. Therefore, an investment in a child's skills at an early age will mean that later investments in skills are more productive. This dynamic complementarity in the production of skills has made a group of economists argue that it is both more equitable and more efficient to invest in the early development of children.[18] "Together, dynamic complementarity and self-productivity produce multiplier effects which are the mechanisms through which skills beget skills and abilities beget abilities" (Cunha and Heckman 2007*a*, p35).

The role parents play in the development of children, even relative to the schooling environment, becomes apparent from a break-down of a child's time spent in different environments. The pie-chart in Figure 2.2 shows an estimate by Mourshed, Chijioke and Barber (2010) that children between 4 and 18 years old spend less than 15 percent of their time in school and over 50 percent in their home and community. The sheer amount of time spent with parents and their environment can in itself explain why they have such a strong influence on a child's development.

Equally, sociologists have found that out-of-school learning is an important contributor to social inequality in education (Heyns, 1978; Entwisle et al., 1997; Downey et al., 2004). In addition to parental background having a primary effect on ability, sociologists have focussed on the secondary effects of parental education on educational choices. Such effects could relate to parental resources, but also to a child's perceptions of the different options available in life. Parents are involved in the strategic decisions necessary in pursuing higher education. Parental skills will help children making their first steps in their future educational career (see for an overview Pfeffer 2008, p545-546). Thus, parental education has a strong effect on

[17] See Heckman (2000), Cunha and Heckman (2007*a*) for an overview of the literature.

[18] See, for exampleHeckman (2000) Heckman, Krueger and Friedman (2003) Heckman (2006*a*) Heckman (2006*b*) Heckman (2006*b*)

the cognitive and non-cognitive development of their children, and this significantly affects the probability that children will have the level of ability to attain higher education. As an empirical finding, parental education has the strongest effect on educational attainment of all family background factors (Pfeffer 2008). While for each country there is a strong effect of parental education on the educational attainment of children, the effects vary by country. A full discussion of these cross-national variations is beyond the scope of this dissertation. Several sociologists, including Pfeffer (2008), have argued that the stratification of secondary education systems could be an explanation.[19]

To summarise, parental education is the most important determinant of the educational attainment of children. Parental education influences the abilities of children through parenting styles, especially in the early years. Moreover, more educated parents are better able to assist their children in navigating the education system and making strategic choices to attain higher education.

2.4 Conclusion

To conclude, most existing theories of the political economy of higher education assume that access to higher education is a function of parental income. Yet, the review in the previous section of this chapter shows that individual ability, which

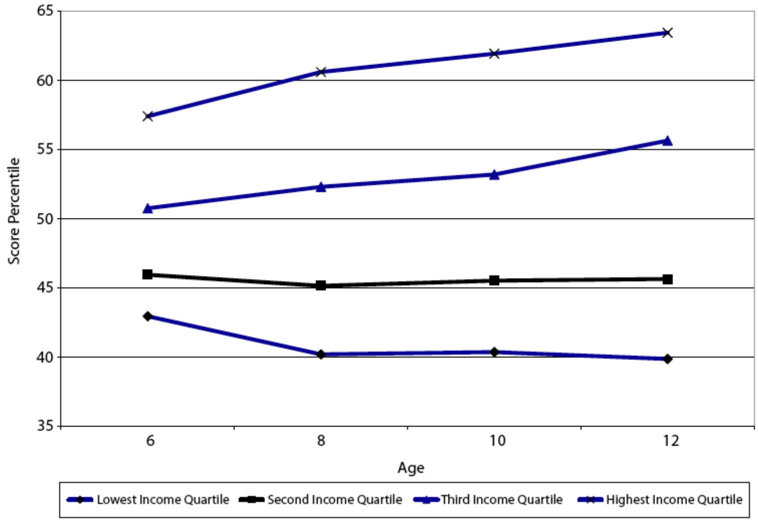
[19] See, for a detailed discussion of the effects of stratification Kerckhoff (1995) and Pfeffer (2008). Stratification refers to the degree to which educational opportunities are differentiated within and between educational levels. It captures the timing and rigidity with which students are tracked and streamed according to their ability. For example, Germany, Italy, the Netherlands and Switzerland have highly stratified systems in which children are streamed somewhere between age 10 and 12 into pre-university, higher vocational and lower vocational tracks. Attainment of one of the highest streams is generally a necessary (and often sufficient) condition to access higher education. Less stratified systems like Sweden, Finland and Norway only stratify at age 16 into different upper-secondary tracks. Generally, many of those upper-secondary tracks provide access to tertiary education. In most stratified systems a necessary condition for continuing to tertiary education is the completion of a certain level of stream. When such streaming takes place at an early age, the educational career of a child is largely determined by the ability of this child at this point, and the ability of parents to navigate the system. Therefore, the educational fortunes of children are even more influenced by the parental level of education in systems with high levels of stratification. Indeed, Pfeffer (2008) presents evidence that the association of parents and their children's education is higher in countries with highly stratified education systems. That said, even in the least stratified countries the effect of parental education is still very strong.

is for a variety of reasons strongly related to parental education, plays a central role in determining access to higher education. Even though parental education and income are correlated, this correlation is far from perfect: there are plenty of highly educated individuals with middle incomes and wealthy people with few qualifications. Hence, analysing access to higher education as a function of income or as a function of parental education are not just two sides of the same coin. The finding that access is shaped by parental education is central to the model of higher education policy preferences developed in the next chapter. Moreover, chapter four will show that such a parental education approach to modelling higher education politics more accurately represents the empirical data of individual preferences than income-centric approaches.

Besides giving a central role to income in understanding the distributive implications and resulting preference patters, the majority of the literature also gives a central role to income in understanding the translation of preferences to government policy. This happens either through using median voter models in which the preferences of the voter with the median income dominates (Fernandez and Rogerson 1995), or through Left-Right government partisanship models in which the preferences of either the rich (Right) or poor (Left) half of society are represented in government (Ansell 2008*b*, 2010*a*, Iversen and Stephens 2008, Busemeyer 2009). Moreover, income-centric models do not provide internally consistent explanations for incremental increases in enrolment. After all, the median voter models cannot explain a level of enrolment below 50 percent. Partisan models, on the other hand, are unclear about how conflicting internal interests with respect to subsidies and enrolment are resolved.

The theory developed in the next chapter addresses this gap by providing a theory that is consistent with a gradual expansion of enrolment being in the interest of highly educated voters. Chapters five and six take on the challenge of providing an alternative to these median voter and partisanship approaches by modelling and estimating the incentives on offer to parties if they pursue policies in the interest of highly educated individuals. This framework of voting power is then used in chapter seven as an alternative explanation of cross-national and over-time variation in higher education policy.

(a) Average Percentile Rank on PIAT-Math Score by Family Income Quartile.



(b) After Adjustments (Maternal Education, Maternal AFQT and Broken Home).

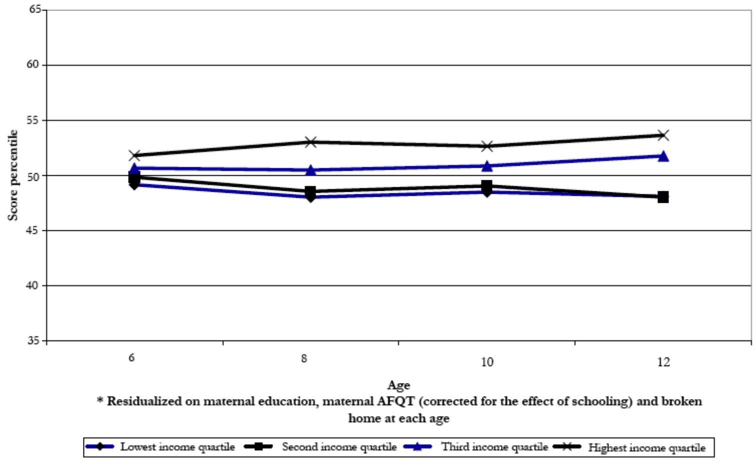
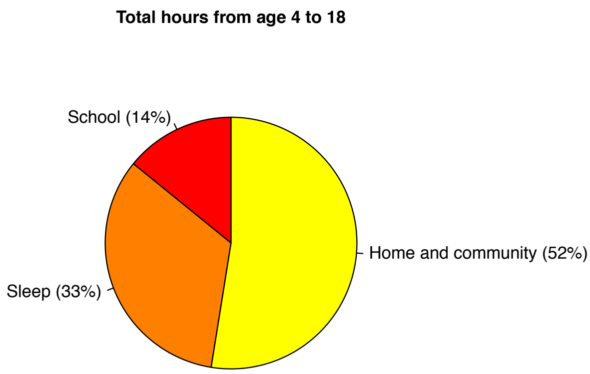


Figure 2.1 – The effect of family income and maternal characteristics on math score

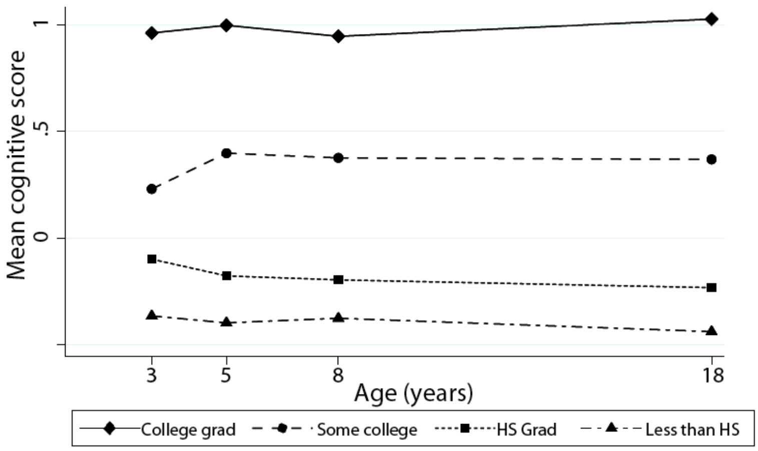
Source: Carneiro and Heckman (2003), cited in Heckman:2008
Notes: Evolution by age of average percentile ranks on the PIAT math score by family income status: unadjusted (top) and adjusted (bottom) for maternal characteristics.

Figure 2.2 – Composition of time spent in different contexts from age 4 to 18



Source: Mourshed, Chijioke and Barber (2010)
Notes: Children spend most of their time in their homes and communities. Assumptions: 365 days each year; 8 hours sleep each night; 14 years of schooling at 180 seven-hour days each year.

Figure 2.3 – Trend in mean cognitive score by maternal education



Source: Brooks-Gunn et al. (2006), cited in Heckman (2008)
Notes: Trend in mean cognitive score by maternal education. International Human Dimensions Programme (IHDP) Study Using all observations and assuming that data are missing at random.

Chapter 3

The distributive politics of higher education

3.1 Introduction

What does the relationship between parental education, individual ability and access to higher education found in the previous chapter mean for policy preferences regarding enrolment rates and subsidies per student? In this chapter I use this probabilistic relationship to build a model of the distributive effects of higher education policy. From this model and its extensions I develop hypotheses about policy preferences regarding subsidies and enrolment.

With respect to subsidies, the model's predictions are straightforward. Children of highly educated parents have a higher probability of attaining higher education at all levels of enrolment. Therefore, subsidies of higher education constitute a net subsidy to this group. All else (including income) being equal, highly educated parents are conjectured to prefer higher subsidies and lesser educated parents to prefer lower subsidies. For enrolment, however, the model's predictions are more counterintuitive. Even though children of highly educated parents already have a much higher probability of attaining higher education, highly educated parents are also predicted to be the champions of expanding enrolment, at least at lower levels of enrolment. This is because, as enrolment increases above the parental level of enrolment, initial expansions benefit the children of highly educated parents more than children of lower educated parents. To be precise, at low levels of parental enrolment, children of highly educated parents have an above average probability of attaining a space created by expanding higher education. The reason for this is that the relationship between parental education and a child's ability is probabilistic rather than deterministic. While, on average, the abilities of children of highly educated parents are above those of children of lesser educated parents, there will nevertheless be plenty of highly able children of lower educated parents defying the general trend. Consequently, when maintaining enrolment at the rate of the parents' generation, a chunk of all higher education places will be taken up by these highly able children of lesser educated parents. As a result, not all children of highly educated parents receive higher education. Once higher education expands beyond the parental level of enrolment, there are disproportionately more children of highly educated parents than children of lower educated parents at the "expansion frontier" – i.e. the next ability increment to be admitted into university. Section two explains these mechanisms in full detail. The cost-pooling model results in the hypothesis that children of highly educated parents continue to benefit from initial expansions of higher education up to parental education levels of 50 percent, after which lesser educated parents become the champions of expanding higher education.

The parsimonious cost-pooling model in section two abstracts from income inequality, taxation and labour markets. With respect to the former two variables, a complication is posed by the dual effect of parental education on access and family income. While children of highly educated parents may be more likely to attain higher education, their parents (and their children) are also more likely to have above average incomes and tax bills. This raises questions about which effect dominates in forming higher education policy preferences: the positive effect of higher chances of attaining higher education or the negative effect of paying high taxes? Section three extends the cost-pooling model by introducing marginal tax and income differences between highly and lesser educated families. Moreover, it is shown that progressive taxation can straightforwardly be modelled as an increase in the wage premium. These extensions to the model demonstrate that even with high income differetials between highly and lesser educated families, or fairly progressive levels of taxation, the benefits created by a higher probability of their children attaining higher education may outweigh the costs of their higher tax contribution. The income-tax model of section three still assumes away labour market effects of expanding enrolment. Section four discusses the implications and plausibility of this assumption and models higher education instead as a productive investment.

This chapter develops the first model of access to higher education as a probabilistic function of parental education. While the preference model has a compelling underlying logic, only data will be able to tell us whether this model improves our understanding of higher education politics compared to those extant. Therefore, I subject both existing and newly developed hypotheses to empirical tests using public opinion datasets from several countries in the next chapter. Specifically, the analysis in chapter four statistically deconstructs the effect of parental education into a direct effect on access and an indirect effect on income. The evidence presented there suggests that the direct effect of education on access overshadows the effects of education on income.

The theory developed in this chapter contributes to the relevant literature on higher education in two important ways. First, this chapter develops novel hypotheses – solidly based on a central finding from other disciplines – about preferences for higher education policy being structured by parental education. This new theoretical framework provides a critical alternative to extant theories that analyse preferences for higher education policy as structured by income (Fernandez and Rogerson 1995, Iversen and Stephens 2008, Ansell 2008*a*, 2010*a*, Busemeyer 2009). While important recent work in political economy has focussed on the relationship between skills, labour market risks, and demand for redistribution as a form of social insurance (Iversen and Soskice 2002, Kitschelt and Rehm 2006, Rehm 2009), there is less work looking at the direct distributive interests resulting from education levels. The theory developed in this chapter is an important addition to the literature that models preferences as predominantly determined by economic self-interest (Alesina and Ferrara 2005, Kitschelt and Rehm 2006, Anderson and Pontusson 2007, Rehm 2009, Svallfors 2004*a*); an approach that contrasts with the literature arguing that values and beliefs (**?**Jaeger 2006, Linos and West 2003), or one's relative position vis-a-vis others (Alesina, Glaeser and Sacerdote 2001, Corneo and Grüner 2002, Scheve and Stasavage 2006), shape policy preferences. Second, considering a distributive conflict along education lines forces us to think differently about party strategies and electoral competition. After all, voters cannot be mapped straightforwardly on a Left-Right axis of political competition based on their education level. Instead we will find parties on both the Left and the Right that attract highly educated voters. For example, Green parties tend to attract highly educated voters. Equally, Central Liberal parties are often popular with more educated strata of the electorate. In addition, highly educated voters are, on average, more uncertain about their party-choice, and this may trigger an increased attentiveness towards their preferences from parties. All in all, the theory developed in this chapter, and the empirical evidence in subsequent chapters, adds to recent scholarship challenging the myth that parties on the Left always act pro-poor (see Rueda 2005, 2007, Beramendi and Rueda 2007). Instead, Left parties faced with highly educated voters may actually pursue policies with regressive consequences.

This chapter proceeds as follows. The next section develops a baseline cost pooling model of higher education policy preferences. This model is used to tease out the logic behind a counterintuitive relationship between parental education and preferences for enrolment. Section three extends this model by replacing the lump-sum tax of the cost-pooling model with a marginal tax and allowing for unequal income between highly and lesser educated families. Section four discusses the implications of labour market dynamics for the model of higher education. Section five concludes.

3.2 A cost-pooling model of the distributive politics of higher education

I assume a society of similar sized families made up of parents and children. The crux of the model developed below is that all families contribute equally to higher education through a lump-sum tax, but that the probability to attain higher education is a function of parental education. This leaves the probability of a family's child to attain higher education the only source of variation between families.

The assumption that society consists of only similar sized families is an abstraction reality where there are also many other kinds of households: households that are not families, households that are families without children, and households with different number of children. If the sole benefit of higher education is attained through children, then those without children would be opposed to any form of higher education spending. Moreover, parents with more children or children in an age category close to the entry age to higher education, can be expected to be more in favour of higher education spending. I argue, however, that higher educated individuals largely conceive of their interests as a group. Higher educated individuals socialise with other higher educated individuals, and conceive of their interest as the interest of people like them. Moreover, young households without children may expect children in the future, while older households may internalise the interests of their grand children. In the next chapter I explore empirically whether these group patterns of interest formation hold. On top of that, I also explore empirically whether in addition to these group patterns, variations in family circumstances – such as the presence of children and their age – affect preferences over higher education policies.

The population is normalised to one, of which a fraction α is higher educated and the remaining fraction of $1-\alpha$ is lower educated. Each family is charged a lump sum tax τ, used exclusively to pay for subsidies to students of higher education σ. Assuming the government runs a balanced budget, the following constraint must hold.

$$\tau = h\sigma \tag{3.1}$$

such that the total tax income τ has to equal the percentage of the population receiving higher education (h, the enrolment rate) times the level of the per person subsidy σ, paid to those attaining higher education.

For simplicity, a family's expected utility is assumed to be a positive linear function of expected higher education subsidies and a negative linear function of taxes paid. The utility of parents and children is thus added to form family utility, which is what parents are assumed to maximise.

$$u_i \quad = \pi_i\sigma - h\sigma \tag{3.2}$$

where π_i, the probability of a family's child to enrol in higher education, equals π_L for lower educated families and π_H for higher educated parents.

We thus assume an efficiency of one in the production function of higher education. This has two implications. First, the utility improvement that an individual receives from a one dollar investment in higher education is equal to the utility improvement resulting from receiving one dollar in cash or a reduction of one dollar in taxes. Second, it means that higher education is purely modelled as a zero-sum game between higher and lower educated families. There are no positive sum gains to be made in the model, the size of the pie is always the same and the only thing that varies is how it is split between higher and lower educated families.[1]

We can evaluate preferences over subsidies by taking the derivative of this utility

[1] Although it is the contention of this dissertation that a large component of higher education spending is distributive rather than efficiency enhancing, there are good reasons to believe that there are some positive externalities to higher education that justify a public intervention. However, modelling higher education as a zero-sum game allows us to home in on the distributive implications.

function with respect to subsidies.

$$\begin{gathered}\frac{\partial u_i}{\partial \sigma} = \pi_i - h \\ \text{where } \frac{\partial u_i}{\partial \sigma} > 0 \text{ if and only if } \pi_i > h\end{gathered} \tag{3.3}$$

Hence, a family stands to benefit from increasing subsidies to higher education if their probability to attain higher education is higher than the average probability to attain higher education.

We can also evaluate preferences over enrolment by taking the derivative of the expected utility function with respect to enrolment.

$$\begin{gathered}\frac{\partial u_i}{\partial h} = \frac{\partial \pi_i}{\partial h} - 1 \\ \text{where} \\ \frac{\partial u_i}{\partial h} > 0 \text{ if and only if } \frac{\partial \pi_i}{\partial h} > 1\end{gathered} \tag{3.4}$$

That is, a family stands to gain from expanding enrolment when the marginal change in the individual probability to attain higher education is higher than the marginal change in enrolment.

It is clear from this preliminary cost-pooling model that the benefits of higher education are driven by the relationship between the probabiliy of higher and lower educated families to attain higher education at different levels of enrolment. The remainder of this section turns to modelling the average and marginal probability to attain higher education for higher and lower educated families as a function of enrolment. This allows us to develop the conditions under which higher and lower educated families benefit from subsidies and expanding enrolment.

3.2.1 Who benefits from expanding enrolment?

From the previous chapter we know that children of university-going age with higher educated parents have, on average, higher abilities than children of lower educated parents. These differential abilities are the result of several nurture processes linked to parental education levels. The model of access to higher education developed below relies on the stylised representation that access to higher education is a meritocratic process. Most countries tend to have some form of requirements that relate to merit, such as secondary school grades, entrance exam scores, or the attainment of the highest-level secondary school stream. Therefore, children with higher abilities have a higher chance of attaining higher education.[2] Thus, children of higher educated parents have above average probabilities to attain higher education. This relationship between parental education and a child's ability is probabilistic rather than deterministic, thus allowing for the existence of those well known exceptions such as highly able daughters from working class families and less able sons of city lawyers.

This section explores how changes in enrolment rates affect the probabilities of children of both groups of parents to gain access to higher education. Let us think of the distribution of abilities in society as being generated by the following process.

$$x_i = \psi + \beta p_i + \epsilon_i \tag{3.5}$$

where x_i, the ability of an individual (indexed by i), is a function of parental education p_i, a constant ability ψ, and an error term $\epsilon_i \sim \mathcal{N}(0, \sigma^2)$ to account for variations in ability unexplained by parental education factors. The coefficient β gives the strength of the effect of parental education on a child's ability. Recall that society consists of α higher educated parents (P=H, p_i=1), and (1-α) lower educated parents (P=L, p_i=0) This results in a probability distributions of ability for children of lower educated parents (x_i|P=L$\sim \mathcal{N}(\psi, \sigma_L^2)$) and a distribution for children of higher educated parents (x_i|P=H$\sim \mathcal{N}(\psi + \beta, \sigma_H^2)$). For simplicity, the standard deviations of both distributions are assumed equal to one ($\sigma_H = \sigma_L = 1$)

[2]It should be noted, of course, that factors unrelated to merit may play an additional role in accessing higher education, such as networks, encouragement, information etc. As many of these factors are related to parental education as well, they can be conceived of as part of a broader definition of abilities that includes the stock of general resources required to pass the hurdles of accessing higher education.

and the average ability of children of lower educated parents is normalized to zero ($\psi = 0$).[3] Consequently, the average ability of children of higher educated parents is given by β.[4] Given that not all ability is explained by parental education – hence the error term – there will be overlap between both distributions. We can now distinguish between three ability distributions:

$$\begin{aligned} f_L(x;) &= \phi(x) \\ f_H(x;\beta) &= \phi(x-\beta) \\ f_{LH}(x;\alpha,\beta) &= \alpha\phi(x-\beta) + (1-\alpha)\phi(x) \end{aligned} \tag{3.6}$$

where $f_L(x)$ and $f_H(x)$ are the probability density function (pdf) of some measure of ability x for children of lower and higher educated parents respectively.[5] $f_{LH}(x)$ is the societal distribution of ability, which is a mixture function of both distributions, i.e. the sum of both distributions weighted by their share of the population.

The level of enrolment is assumed to be determined purely by setting an ability threshold $\hat{x}$, above which everyone enrols in higher education.[6] Consequently, the area under the ability distributions to the right of $\hat{x}$ represents the subset of children that enrol in higher education. Since the area to the left of a point is given by the cumulative distribution function (cdf) and the total area under a pdf by definition equals one, the area to the right is given by 1-cdf. The probability of enrolling in

[3] This is assumed purely for notational ease and not to suggest or assume a “zero” average ability for children of lower educated parents. Ultimately, the analysis is concerned with the distributive consequences of differences in ability, and not with their absolute levels.
[4] This is the ability of lower educated parents (assumed zero) plus the parental education effect.
[5] The scaling of this measure of ability is irrelevant to the discussion at this stage. What matters is its ordinal nature, namely that higher values of x mean higher relative ability.
[6] Think of this as the minimum test-score, high-school grades or degrees to be achieved to enrol in university.

higher education (π=Pr(H=1)) at ability threshold $\hat{x}$ is then given by

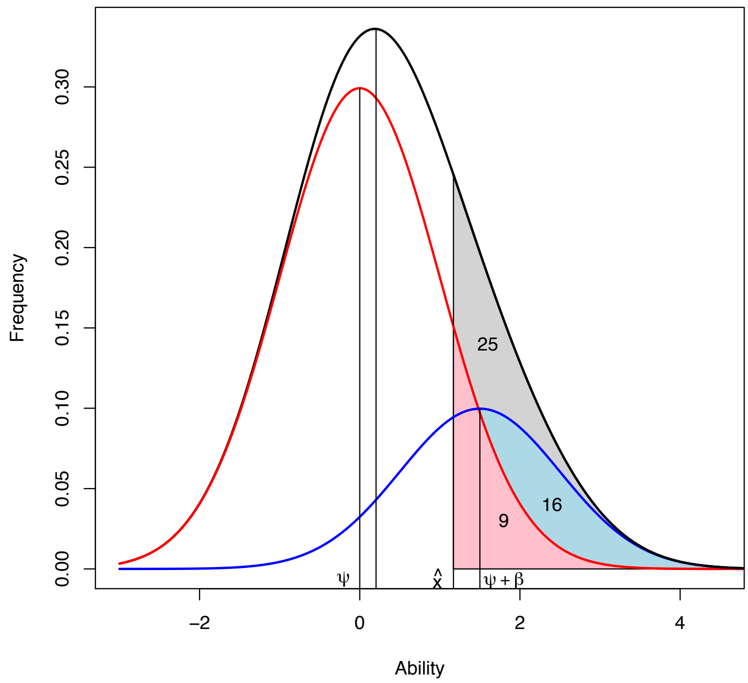
$$\begin{aligned}
\pi_L(\hat{x}) \quad &= \Pr(\text{H=1}|\text{P=L},\hat{x}) &&= 1 - F_L(\hat{x}) \\
& &&= 1 - \Phi(\hat{x}) \\
\pi_H(\hat{x};\beta) \quad &= \Pr(\text{H=1}|\text{P=H},\hat{x},\beta) &&= 1 - F_H(\hat{x};\beta) \\
& &&= 1 - \Phi(\hat{x}-\beta) \\
\pi_{LH}(\hat{x};\beta,\alpha) \quad &= \Pr(\text{H=1}|\hat{x},\beta,\alpha) &&= 1 - F_{LH}(\hat{x},\alpha,\beta) \\
& &&= \alpha(1 - F_H(\hat{x};\beta) + (1-\alpha)(1 - F_L(\hat{x})) \\
& &&= \alpha(1 - \Phi(\hat{x}-\beta) + (1-\alpha)(1 - \Phi(\hat{x}))
\end{aligned} \tag{3.7}$$

where F_L and F_H are respectively the cdf of ability for higher and lower educated parents, F_{LH} is the societal cdf of ability and Φ is the cdf of the standard normal distribution.

To provide the reader with some intuition about the effects of expanding enrolment, figure 3.1 on the next page plots three *frequency* distributions for a hypothetical society. The population in this simulation is normalized to one, 25% of parents are higher educated ($\alpha = \frac{1}{4}$) and the average ability of children of higher educated parents is 1.5 ability units higher than that of those with lower educated parents ($\beta = \frac{3}{2}$).[7] The red and blue curves with means at $\psi = 0$ and $\psi + \beta = \frac{3}{2}$ are respectively the ability distributions of children of lower and higher educated parents. The black curve is the societal distribution of ability. The total area under the black curve represents the whole population of children (100%), the total area under the blue curve the size of the population of children of higher educated parents (25%) and the total area under the red curve that of children with lower educated parents (75%). The shaded areas indicate the percentage of children that go on to attain higher education. The ability threshold $\hat{x}$ in the graph is set such that enrolment h is equal to the current fraction of parents with higher education (i.e. $h = \alpha$ =25%). The grey area under the societal ability distribution therefore represents the 25%

[7]Because the standard deviation is set to one, this also means 1.5 standard deviations.

Figure 3.1 – Frequency distribution for ability of children of higher and lower educated parents

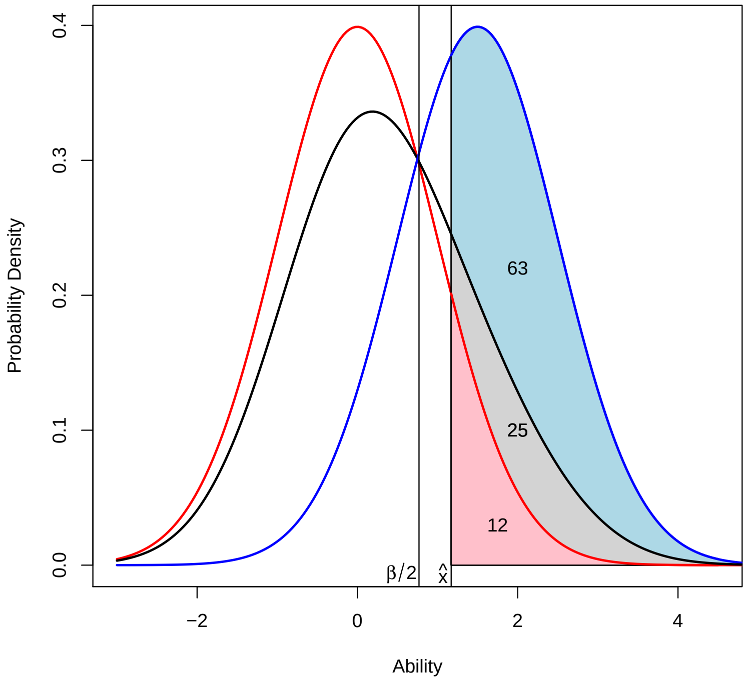


Notes: Frequency distribution of ability simulation for a society with $\alpha = \frac{1}{4}$, $\psi = 0$ and $\beta = \frac{3}{2}$. The area under the graph represents the percentage of children enrolled (grey, 25%), children of higher educated parents (blue, 16%) and children of lower educated parents (red, 9%).

of the population's children that is enrolled. In this example, this 25% is composed of 16% children with higher educated parents and 9% children with lower educated parents. The ratio of students with higher educated parents to students with lower educated parents is thus approximately 1.8 to 1. While a larger proportion of children of higher educated parents are enrolled, there is still a substantial chunk of children of higher educated parents not attaining higher education.

Figure 3.2 on the following page plots the three *probability density functions* for the same society. The black curve is the *unconditional* probability that there exists a child of a given ability x in society. The red and blue curves represent the probability that there exists a child of ability x, *conditional* on having lower and higher educated parents respecively. The *area* under the curve to the right of point $\hat{x}$ denotes the probability that a child attains higher education when the enrolment

Figure 3.2 – Probability density for ability of children of higher and lower educated parents



Notes: Simulation for a society with $\alpha = \frac{1}{4}$, $\psi = 0$ and $\beta = \frac{3}{2}$. The area under the graph represents the percentage probability of attaining higher education for all children (grey, 25%), children of higher educated parents (blue, 63%) and children of lower educated parents (red, 12%).

threshold is set at $\hat{x}$. For the blue and the red curve this is the probability to attain higher education, respectively conditional on having higher and lower educated parents. This figure shows that at a rate of enrolment of 25%, the probability to enrol for children of higher educated parents is 63%, compared to only 12% for children of lower educated parents. This means that the probability to go to higher education in this simulation is 5.6 times higher for children of higher educated parents compared to their lower educated compatriots. This implies an odds ratio of 12.5[8], which is a high parental education effect in the distribution of odds ratios in Table 2.2. However, it is not unrealistic as it is below that of Austria's and Greece's 1960s generation, and the same as Portugal's statistic for the 1970s generation.

[8]The odds ratio is calculated as follows: odds ratio $= \dfrac{63/(100-63)}{12/(100-12)} \approx 12.5$

Who would, in this example, benefit most from an expansion of enrolment above 25 percent? To answer this question we need to look at the expansion frontier, which I define as the next increment to be allowed into university if $\hat{x}$ (the vertical line marking the left-side of the shaded area in figures 3.1 and 3.2) moves to the left. In absolute terms, the frequency distribution (figure 3.1) shows that there are more children of lower educated families at the expansion frontier than that there are children of higher educated parents. After all, the frequency distribution of lower educated parents (the blue line) is higher than that of lower educated parents (the red line) at $\hat{x}$. However, there are also many more lower educated tax-payers funding any expansion of higher education. Therefore, to answer this question, we should not look at absolute figures, but instead at figures relative to the size of the underlying sub-population. Figure 3.2 gives us these marginal probabilities for an expansion of higher education to the left of $\hat{x}$. The figure shows that there are more children of higher educated parents *as a percentage of the higher educated population* at point $\hat{x}$ than that there are children of lower educated parents *as a percentage of the lower educated population.* This is because the conditional probability density function for the ability of children from higher educated families (the blue line in figure 3.2) is above the conditional probability density function for the ability of children from lower educated families (the red line). Moreover, the black-line – the unconditional probability density function of ability for the population – is below the conditional probability density function for the ability of children of higher educated families. This means that the increase in the average probability to attain higher education (the enrolment rate, h) resulting from a move of $\hat{x}$ is *lower* than the increase in the probability of children of higher educated parents to attain higher education. Therefore, moving $\hat{x}$ to the left will increase the probability of children from higher educated families to attain higher education more than that it will increase the probability of children from lower educated families. Furthermore, a one percent increase in the enrolment rate (i.e. the general probability) will lead to a *less* *than one percent* increase in the probability to attain university for a child of a lower educated family and a *more than one percent* increase in the probability to attain higher education for a child from a higher educated family. Coming back to our cost-pooling model, how does this affect the costs and benefits of expanding higher education for higher and lower educated families? For higher educated parents, an expansion of higher education to the left of $\hat{x}$ results in an increase in the benefits that is larger than the increase in tax costs. For lower educated parents, however, expanding enrolment increases the costs of higher education more than that it increases the benefits.

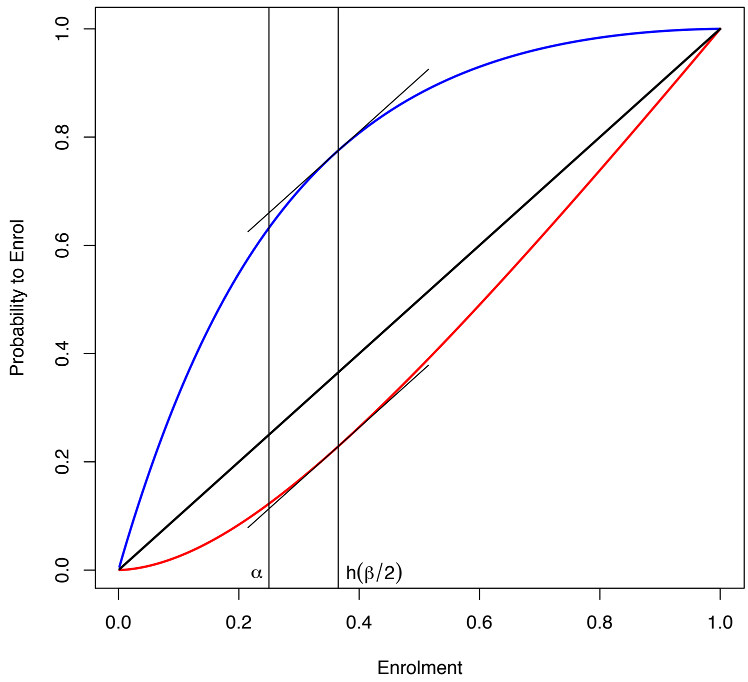
We see in figure 3.2 that the conditional marginal probability to attain higher education is higher until $\hat{x}$ has decreased to $\frac{\beta}{2}$. That is the point where the marginal probability to attain higher education is equal for higher and lower parents alike (i.e. the points where the three lines intersect). In our example, this equals an enrolment rate of 36%.[9] Therefore, while only 25% of children has higher educated parents, the extra student spaces created by an expansion up to 36% will still be disproportionately taken up by children of higher educated parents. To be precise, the group that already has a high probability of attaining higher education benefits most from expanding it further.

Expanding enrolment benefits the group whose conditional pdf is the highest at that level of enrolment. The pdf of the ability of children of higher educated parents is above that of children of lower educated parents for all values of the enrolment threshold of $\hat{x} > \frac{\beta}{2}$. The intuition behind this cut-off point is that $\frac{\beta}{2}$ is exactly in between the means of both distributions (0 and β). Because both probability distributions have the same standard deviation, the probability at this midpoint has to be equal for both groups.[10] Given that there is no other point equidistant to both means, this is the only intersection of both probability density functions.

[9] This result is obtained by plugging $\hat{x} = \frac{\beta}{2}$ into equation 3.7

[10] This follows from the line symmetry of the standard normal curve around its mean. Future models could consider whether this assumption of equal standard deviations is valid and consider modelling the effects of differential standard deviations. These could, for example, be attained by analysing the distribution of PISA scores by parental education.

FIGURE 3.3 – AVERAGE PROBABILITY TO ATTAIN HIGHER EDUCATION AT DIFFERENT LEVELS OF ENROLMENT



Notes: Simulation of a society with $\alpha = \frac{1}{4}$, $\psi = 0$ and $\beta = \frac{3}{2}$. The blue and red graph plot the probability to attain higher education for a child of higher and lower educated parents respectively in a society with 25 % higher educated parents. Moving from α to $h(\frac{\beta}{2})$ we see that the slope of the probability function is above one for children of higher educated parents and below one for children of lower educated parents.

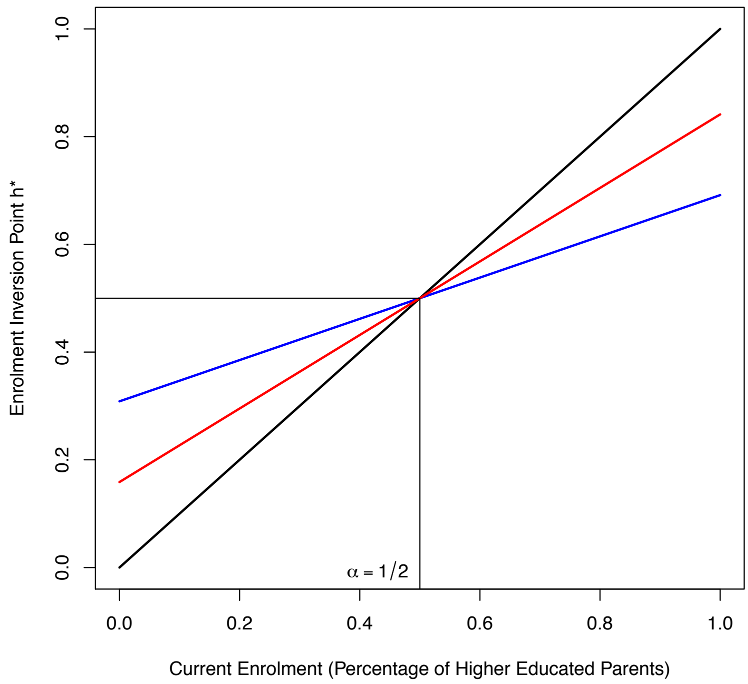
Consequently, children of higher educated parents have a higher marginal probability to attain higher education as long as x is larger than $\frac{\beta}{2}$. The probability that there exists a child of ability $x = \frac{\beta}{2}$ is equal for both groups. The conditional probability that there exists a child of ability x where $x < \frac{\beta}{2}$, given parental education, is always higher for children of lower educated parents than for children of higher educated parents. To summarize:

$$\begin{array}{lccccc} f_H(x;\beta,1) > f_{LH}(x;\alpha,\beta) > f_L(x) & \text{for all} & x > \frac{\beta}{2} & \text{and} & \beta > 0 & \\ f_H(x;\beta,1) = f_{LH}(x;\alpha,\beta) = f_L(x) & \text{i.f.f.} & x = \frac{\beta}{2} & \text{or} & \beta = 0 & (3.8) \\ f_H(x;\beta,1) < f_{LH}(x;\alpha,\beta) < f_L(x) & \text{for all} & x < \frac{\beta}{2} & \text{and} & \beta > 0 & \end{array}$$

Figure 3.3 plots the probability to attain higher education as a function of different enrolment rates for the same society with 25% higher educated parents and $\beta = \frac{3}{2}$. The concave blue line represents the probability to attain higher education for children of higher educated parents, while the convex red line represents the probability to attain higher education for children of lower educated parents. The 45 degree line represents the average probability to enrol (i.e. the enrolment rate). This plot reveals two important characteristics. First, the probability to attain higher education is above average for children of higher educated parents and below average for children of lower educated parents at all levels of enrolment in the range (0,100). Second, the marginal probability to enrol for children of higher educated parents is higher than one (i.e. the average or unconditional marginal probability represented by the 45 degree line) for enrolment rates below h^*, and lower than one for enrolment rates above h^*. Conversely, the marginal probability to enrol for children of lower educated parents is lower than one for enrolment rates below h^* and higher than one for enrolment rates above h^*. This example thus demonstrates the possibility that children of higher educated parents benefit from expanding higher education beyond the level of enrolment of their parents.

How much can we generalise from the results obtained in this example? While in this example the inversion point h^* is larger than levels of parental enrolment α – meaning that higher educated families benefit from expanding higher education beyond the parental rate of enrolment – this is not necessarily the case for all values of α and β. We can evaluate the conditions under which higher educated families benefit from expanding enrolment by writing the inversion point h^* (the enrolment rate where the conditional probability density functions intersect, i.e. the enrolment rate where $x = \frac{\beta}{2}$) as a function of the parental enrolment rate α and the parental effect size β, by substituting x for $\frac{\beta}{2}$ in the mixture function in equation 3.7 and evaluating $h^* - \alpha$

Figure 3.4 – Enrolment inversion points (h^*) at different parental education effect sizes and parental enrolment rates



Notes: One simulation has a strong parental effect of $\beta = 2$ (red), the other a moderate parental effect of $\beta = 1$ (blue). The 45 degree line in black shows the parental level of enrolment α. For parental enrolment rates below 50 percent ($\alpha < \frac{1}{2}$), children of higher educated parents have an above average marginal probability to attain a seat when enrolment expands to h^*. For parental enrolment rates above 50 percent ($\alpha > \frac{1}{2}$) children of lower educated parents have an above average marginal probability to attain higher education, upto a contraction of enrolment to $h*$.

$$h^* = 1 - \alpha + (2\alpha - 1)\Phi(\tfrac{\beta}{2}) \text{ where } \begin{cases} h^* > \alpha & \text{for all} \quad \alpha < \frac{1}{2} \\ h^* = \alpha & \text{i.f.f.} \quad \alpha = \frac{1}{2} \\ h^* < \alpha & \text{for all} \quad \alpha > \frac{1}{2} \end{cases} \tag{3.9}$$

Equation 3.9 shows that the inversion point h^* is larger than α, if and only if α is smaller than $\frac{1}{2}$. That is, as long as less than half of parents are higher educated, children of higher educated parents will have a higher probability of taking up a place created by an expansions of higher education up to h^*. In contrast, for levels of enrolment above h^*, the marginal probability to attain a place created by higher education is lower for a child of higher educated parents. For parental enrolment rates above 50%, h^* is lower than α. This means that if more than half the parental population is higher educated, and when enrolment for the new generation is kept the same as that for the old generation ($h = \alpha$), then the marginal probability to attain higher education for a child of higher educated parents will be lower than the marginal probability of a child of lower educated parents.[11] Figure 3.4 on the preceding page plots this inversion point h^* as a function of parental enrolment rates (i.e. the percentage of parents with higher education). Firstly, this plot shows that the enrolment inversion point h^* is higher than parental enrolment for parental enrolment rates below 50% and lower than parental enrolment for parental enrolment rates above 50%. Moreover, it shows that the inversion points gets closer to the parental enrolment rate when the parental enrolment rate approximates 50 percent and when the effect of parental education on children's abilities (β) is high. That is, for very high values of β there will be very little overlap between the ability distributions of higher and lower educated parents. Hence, a small increase in the enrolment rate above the parental enrolment rate will practically guarantee all children of higher educated parents a place in higher education.

To summarize, by modelling the ability distribution of children of higher and lower educated parents as a simple stochastic process we have generated some interesting conjectures. Counterintuitively, the children of higher educated parents take up a disproportionate share of higher education seats created by expanding enrolment above the level of their parents' generation. This is the case as long as the level of parental enrolment is less than half the population, and as long as the expansion of enrolment does not exceed a defined inversion point h^*. It is only once parental enrolment reaches levels above 50% that children of lower educated parents will start to disproportionately take up seats created by expanding enrolment.

[11] And, by definition, the marginal probability will be lower than the average or unconditional marginal probability.

3.2.2 Deriving hypotheses about preferences over subsidies and enrolment

We can now evaluate preferences over subsidies by filling out the conditions derived in equation 3.3 on page 53. Because we know from the previous section that $\pi_H > h$ and $\pi_L < h$ for all values of h, we can conclude that

$$\frac{\partial u_H}{\partial \sigma} > 0 \text{ and } \frac{\partial u_L}{\partial \sigma} < 0 \text{ for all } h \in (0,1) \tag{3.10}$$

Thus, under cost pooling assumptions, higher educated parents are always net beneficiaries of higher education subsidies and benefit from expanding them further. The result of equation 3.3 can be summarised by the following two hypotheses.

Hypothesis 1 *Higher educated parents will seek to increase higher education subsidies per-student at all levels of enrolment.*

Hypothesis 2 *Lower educated parents will seek to decrease higher education subsidies per-student at all levels of enrolment.*

Next, we can evaluate preferences over enrolment by using the properties of the marginal probability to enrol as a function of enrolment and filling these into equation 3.4 on page 53

$$\begin{gathered} \frac{\partial u_i}{\partial h} > 0 \text{ if and only if } \frac{\partial \pi_i}{\partial h} > 1 \\ \text{where } \frac{\partial \pi_i}{\partial h} = \frac{\partial \pi_i / \partial x}{\partial h / \partial x} \text{ such that } \frac{\partial \pi_i}{\partial h} > 1 \text{ if and only if } \frac{\partial \pi_i}{\partial x} > \frac{\partial h}{\partial x} \end{gathered} \tag{3.11}$$

Remember from the discussion of figure 3.2 on page 58 that the pdf's of ability, conditional on having higher and lower educated parents, intersect if, and only if, $\hat{x} = \frac{\beta}{2}$. Hence, that is the only value of x where $\frac{\partial \pi_H}{\partial x} = \frac{\partial \pi_L}{\partial x} = \frac{\partial \pi_{LH}}{\partial x}$, and thus the only value of x where $\frac{\partial \pi_i}{\partial h} = 1$. We can now solve for the level of enrolment associated with $\frac{\partial \pi_i}{\partial h} = 1$ by substituting $\frac{\beta}{2}$ into equation 3.7 on page 56. From equation 3.9 on page 63 we know this is at $h^* = 1 - \alpha + (2\alpha - 1)\Phi(\frac{\beta}{2})$. Therefore,

$$\begin{aligned} \frac{\partial u_H}{\partial h} > 0 \text{ and } \frac{\partial u_L}{\partial h} < 0 &\quad \text{if and only if } h < h^* \\ \frac{\partial u_H}{\partial h} = \frac{\partial u_L}{\partial h} = 0 &\quad \text{if and only if } h = h^* \\ \frac{\partial u_H}{\partial h} < 0 \text{ and } \frac{\partial u_L}{\partial h} > 0 &\quad \text{if and only if } h > h^* \\ \text{where } h^* = 1 - \alpha + (2\alpha - 1)\Phi(\tfrac{\beta}{2}) \end{aligned} \tag{3.12}$$

Equation 3.4 shows that the utility of higher educated individuals first increases with enrolment and, beyond a certain inversion point h^*, decreases. Hence, holding the level of per-student subsidies constant, the maximum utility of higher educated individuals is at h^*, and a minimum at $h = 0$ and $h = 1$. Therefore, h^* is the optimal enrolment rate for higher educated individuals. h^* is the same point as the inversion point described in equation 3.9 on page 63.

We now know that higher educated parents benefit from expanding enrolment up to a point defined by h^*. However, we are ultimately interested to know if higher educated parents are interested in expanding enrolment beyond their own level of enrolment (α). That is, for which parental enrolment rates α do higher educated families benefit from expanding enrolment, or, for which α is $h^* > \alpha$? This conditions under which this is the case were already provided in the discussion of equation 3.9 on page 63.

$$\text{when } h = \alpha \begin{cases} \frac{\partial u_H}{\partial h} > 0 \text{ and } \frac{\partial u_L}{\partial h} < 0 & \text{if and only if } a < \frac{1}{2} \\ \frac{\partial u_H}{\partial h} = \frac{\partial u_L}{\partial h} = 0 & \text{if and only if } a = \frac{1}{2} \\ \frac{\partial u_H}{\partial h} < 0 \text{ and } \frac{\partial u_L}{\partial h} > 0 & \text{if and only if } a > \frac{1}{2} \end{cases} \tag{3.13}$$

Figure 3.4 on page 63 graphically represents this relationship. As long as $\alpha < \frac{1}{2}$ the higher educated will want an expansion of enrolment to h^*. This is because $h^* > \alpha$ for values of α below $\frac{1}{2}$. However, once the parental enrolment rate is beyond half the population ($\alpha > \frac{1}{2}$), higher educated parents will seek an enrolment rate below the current rate of enrolment to h^*. This is because $h^* < \alpha$ for values of α above

$\frac{1}{2}$. Hence, as long as the parental enrolment rate is less than 50 percent, higher educated individuals will seek an expansion of enrolment beyond the parental level of enrolment. Once parental enrolment rates are above percent, higher educated parents will seek a reduction of enrolment below the parental rate of enrolment.

The utility of lower educated individuals, on the other hand, first decreases with enrolment and then, after the same inversion point h^*, increases with enrolment. Hence, the utility of lower educated individuals has a minimum at h^* and maximums at $h = 0$ and $h = 1$. Therefore, as long as the enrolment rate is less than 50%, lower educated parents will benefit from a reduction in enrolment. Over 50%, however, lower educated parents face a positive marginal utility to increasing enrolment. Hence, at parental enrolment rates above 50%, higher educated individuals will seek to increase enrolment.[12]

Figure 3.4 on page 63 also shows the effects of different parental effect sizes (β). When there is a very large difference between the average ability of children of higher and lower educated parents, then h^* will be closer to α. Since high differences in ability between both groups mean that there is little overlap between the ability distribution of children of higher and lower educated individuals, current levels of enrolment will mean higher educated parents will only need a small increase in enrolment to practically guarantee a of higher educated parents a place.

We can summarize these theoretical findings with the following three testable hypotheses.

Hypothesis 3 *At parental enrolment levels below* 50%*, higher educated parents will seek to expand enrolment and lower educated parents will seek to reduce enrolment.*

Hypothesis 4 *At parental enrolment levels above* 50%*, higher educated parents will seek to reduce enrolment and lower educated parents will seek to expand enrolment.*

Hypothesis 5 *The higher the ability differences between children of higher and lower educated parents, the smaller the increased increment in enrolment sought by*

[12]The maximum is thus achieved by a corner solution at $h = 0$ for $\alpha < \frac{1}{2}$ and at $h = 1$ for $\alpha > \frac{1}{2}$

higher educated parents.

To conclude, a simple cost-pooling model of higher education predicts a distinct pattern of preferences for higher and lower educated parents with respect to enrolment and subsidies. At parental levels of enrolment below 50%, the marginal probability to enrol is higher for higher educated parents than for lower educated parents up to an inversion point h^*. Therefore, higher educated parents are net beneficiaries of an initial expansion of enrolment while lower educated parents benefit from reducing enrolment. This is because increasing enrolment implies increasing the net subsidy to children of higher educated parents. At parental levels of enrolment above 50%, the marginal probability to enrol for children of higher educated parents is *below* that of children of lower educated parents. At these levels of parental enrolment, lower educated parents benefit from expanding enrolment while higher educated parents benefit from reducing enrolment. In contrast, a further expansion of higher education would reduce the net-subsidy received by higher educated parents. Moreover, because the probability to attain higher education is always higher for children of higher educated parents, higher educated parents will prefer increasing subsidies while lower educated parents will prefer decreasing subsidies.

While the parsimony of the above cost-pooling model is attractive, it stands susceptible to two strands of criticisms. First, higher educated parents, on average, earn higher incomes than lower educated parents and therefore pay more in taxes, especially under systems of progressive taxation. Higher educated parents may have an above average probability to see their offspring attend higher education, their parents also have an above average probability to foot the tax bill. The second strand of criticism relates to the labour market. Changes in enrolment may affect labour market returns. If high and low skilled labour are assumed to be complements in production, and technology is constant, then a relative increase in the supply of higher educated labour could reduce the wage premium for higher educated workers because 1) their wages go down, and 2) the wages of lower educated workers go up. The two upcoming sections address both these criticisms. The next section expands the cost-pooling model to a model with marginal taxation and wage inequality between higher and lower educated parents. This is followed by a section discussing the impact of labour market effects on preferences for higher education policy.

3.3 The effects of income inequality and income taxation on preferences for higher education policy

In this section I introduce the effects of income and marginal taxation to our model of higher education politics. This will allow us to see whether the parental education effects uncovered in the previous section will outweigh the effects the higher tax bill paid by highly educated parents, and under what conditions. Akin to the cost-pooling model, I model a society consisting of α highly educated families (indexed by $i = H$), and $(1 - \alpha)$ lesser educated families (indexed by $i = L$). Similarly, each family is assumed to consist of an equal number of parents and children.[13] Parents are assumed to maximise their family's utility, aggregating their own financial situation with that of their children. The provision of higher education is still modelled as a zero-sum distributive game with efficiency equal to unity. However, in contrast to the cost-pooling model, the income of highly educated and lesser educated parents is allowed to diverge, and the lump-sum tax is substituted for a marginal tax on income, such that the individual utility function can be written as

$$u_i = (1 - \tau)y_i + \pi_i\sigma \tag{3.14}$$

where τ is the marginal tax rate on a family's income y_i, π_i is the probability that a family's child enrols in higher education, and σ is the per student subsidy that a child receives, if and only if she enrols in higher education.

[13]e.g. two parents and two children or one parent and one child

Instead of using the standard normal distribution function to model a child's probability of attaining higher education I now use a logistic function. It should be stressed that for all intents and purposes, logit and probit models have very similar shapes and that differences between them will not drive the model's results.[14] The advantage of using a logistic functions is that it allows us to simulate the empirical parental effect odds ratios for the European countries found in table 2.2 on page 37.[15]

The probability of a child attaining higher education is then given by

$$\pi_i = \frac{1}{1 + e^{-(x + \log_e(\beta) p_i)}} \tag{3.15}$$

where π_i is a positive function of the government set enrolment parameter x, and the strength of the effect of parental education p_i ($p_H = 1$ and $p_L = 0$), given by odds-ratio of the parental education effect β. This is a logistic probability function for attaining higher education, where the ratio of the odds of children of highly over lesser educated parents of attaning higher education is constant at β (Berkson 1944). Parental education effects are assumed to be greater or equal to one (i.e. $\beta \geq 1$), where unity ($\beta = 1$) means equal odds for highly and lesser educated families (i.e. educational equality), and values of $\beta > 1$ mean that the odds of children of highly educated families of enrolling in university are always higher than those of children of lesser educated families (i.e. educational inequality in favour of higher educated families). The government can thus expand enrolment by increasing x, or reduce it by decreasing x.[16] The relationship between this probability function and x is positive for all values of x ($\partial\pi_i/\partial x > 0$ for all $x \in \mathbb{R}$), where $\lim_{x\to\infty} \pi_i \to 1$ and $\lim_{x\to-\infty} \pi_i \to 0$.

[14]See, for example, Aldrich and Nelson (1984) for a discussion of the differences

[15]Moreover, it has the added advantage that it allows for easier mathematical representation, which is convenient given the added complexity of adding marginal taxation. An advantage of using the standard normal density function in the previous section was that it allowed us to intuitively and graphically represent the effect of parental education through its effect on the distribution of abilities.

[16]Policy levers to affect x are similar to those in the previous section, and include lowering entry standards, increasing the number of available funded places, and setting quotas.

Family income is given by

$$y_i = w_L(1 + p_i r) \tag{3.16}$$

where lesser educated parents ($p_L = 0$) earn the fixed lesser educated wage w_L and highly educated parents ($p_H = 1$) earn w_L plus a wage premium of $w_L r$. Highly educated parents earn $r \times 100$ percent more than lesser educated parents, where $r \geq 0$. $r = 0$ means perfect wage equality between highly and lesser educated families and $r = 1$ means highly educated parents' wages are 100% higher than the lesser educated wage (i.e. twice as high). Both the parental wage premium r and the lesser educated wage w_L are exogenous to the model. Moreover, the actual level of the lesser educated wage will not affect any of the results.

The government's budget is assumed to be subject to a balance constraint, such that total revenues have to equal total spending.

$$\tau\bar{y} = h\sigma \tag{3.17}$$

where h is the average probability of attaining higher education in a society (i.e. the enrolment rate) and $\bar{y}$ is the average income in society. h is given by

$$h = \frac{\alpha}{1 + e^{-(x+\log_e(\beta))}} + \frac{1-\alpha}{1+e^{-x}} \tag{3.18}$$

where $\alpha \in [0, 1]$ and where α and $1 - \alpha$ are respectively the share of highly and lesser educated parents in society. Thus, $\alpha = .25$ means 25 percent of families are highly educated and 75 percent are lesser educated. The enrolment rate is thus the average probability of the children of highly and lesser educated families attending university, weighted by α, their share in society. h is a positive function of x ($\partial h/\partial x > 0$ for all $x \in \mathbb{R}, \beta > 1, r > 0$), where $\lim\limits_{x\to\infty} h \to 1$ and $\lim\limits_{x\to-\infty} h \to 0$. $\bar{y}$, the average income, is given by:

$$\begin{aligned}\bar{y} =& \quad (1-\alpha)w_L + \alpha w_L(1+r) \\ =& \quad (1+r\alpha)w_L\end{aligned} \tag{3.19}$$

which is the weighted average of the lesser educated wage w_L and the highly educated wage $(1+r)w_L$. Note again that w_L is an exogenous constant. I can now rewrite the utility function as

$$u_i \quad = (1 - \frac{h\sigma}{\bar{y}})y_i + \pi_i \sigma \tag{3.20}$$

And, by filling in the full expressions for π_i, y_i, h, and $\bar{y}$ I obtain the full form expression

$$u_i \quad = \left(1 - \frac{\left[\frac{\alpha}{1+e^{-(x+\log_e(\beta))}} + \frac{1-\alpha}{1+e^{-x}}\right]\sigma}{w_L(1+\alpha r)}\right) w_L(1+p_i r) + \frac{\sigma}{1+e^{-(x+\log_e(\beta)p_i)}} \tag{3.21}$$

where utility is now written as a function of x, the government controlled enrolment parameter; β, the strength of the parental education effect; α, the parental enrolment rate; w_L, the lesser educated wage; and r, the wage premium for highly educated families. In the analysis that follows below, four exogenous inputs will affect whether highly or lesser educated families benefit from increased subsidies or expanding enrolment: 1) the strength of the parental education effect, 2) the parental enrolment rate, 3) the current enrolment rate, and 4) the wage premium. Table 3.1 on the next page provides the reader with an overview of the real-world values of these model parameters in 2000. The parental effect odds ratio, as described in the previous chapter, varies from a low 2.6 in Finland to a high 12.2 for Portugal. The parental enrolment rate – the percentage of the working-age adult population with higher education qualifications– varies from as low as 9 percent in Portugal and Italy to as high as 30 percent and over for Finland and Sweden. En-

Table 3.1 – Overview of real-world model parameters in 2000, for 15 EU countries

Country	Parental Effect† Size (odds ratio) β	Parental Enrolment ‡ Rate (percentage) α	Enrolment Rate†† (percentage) h	Wage premium ‡‡ (percentage) r
Austria	10.0	14	34	52[b]
Belgium	7.4	27	33[a]	33
Britain	3.8	26	47	60
Denmark	3.6	26	57	24
Finland	2.6	32	73	53[c]
France	5.8	22	-	50[c]
Germany	4.2	23	30	43
Greece	9.1	18	30	-
Ireland	5.0	20	32	53
Italy	6.6	9	39	38
Luxembourg	6.8	18	-	45[d]
Netherlands	5.4	23	53	48[d]
Portugal	12.2	9	-	78
Spain	7.3	23	47	29[e]
Sweden	4.7	30	67	31[e]

Sources: †Based on author's own calculations from four rounds of the European Social Survey (2002-2006) for the 1970s generation (table 2.2 on page 37). ‡ Percentage of population aged 25-64 with tertiary education, OECD (2010, Table A1.4. p37). ††Entry rates into tertiary education OECD (2010, Table A2.4. p57). ‡‡Percentage difference between earnings of those with tertiary education minus those with upper secondary and post-secondary non-tertiary education in the total population aged 25-64 OECD (2010, Table A7.2a. p128).
Notes: For missing values the nearest by available data is presented here: [a]2003, [b]2005, [c]1999, [d]2002, [e]2001

rolment rates are much higher than this. The lowest values are around 30 percent and the highest were again found in Finland and Sweden (around 60-70 percent).[17] Highly educated individuals generally have earnings between 25 percent and 60 percent higher than those with only upper secondary education or upper secondary non-tertiary degrees. Portugal is an outlier where highly educated workers earn 78 percent more than their colleagues with only upper secondary education or post-secondary non-tertiary education degrees.

3.3.1 Preferences over subsidies

Under which wage premiums, parental education effects, and (parental) enrolment rates will highly educated families prefer increasing subsidies to higher education?

[17]Problems with measuring enrolment rates are discussed in more detail in chapter seven and in OECD (2010) and its annexes.

We can answer this question by evaluating the effect of raising subsidies on the utility of highly and lesser educated families. By taking the derivative of equation 3.20 with respect to σ we obtain marginal family utility with respect to subsidies.

$$\frac{\partial u_i}{\partial \sigma} = \frac{-hy_i}{\bar{y}} + \pi_i \tag{3.22}$$

Which is positive under the following condition

$$\frac{\partial u_i}{\partial \sigma} > 0 \text{ if and only if } \pi_i > \frac{y_i h}{\bar{y}} \tag{3.23}$$

The reasoning behind this relationship is that the marginal benefit of a one unit increase in subsidies depends on the probability of a family's offspring attaining higher education (π_i). The marginal cost of a one unit increase in subsidies is given by the enrolment rate, multiplied by the ratio of individual income over average income. Hence, the marginal costs of increasing subsidies are greater at higher levels of enrolment, and greater for those who earn more. This also implies that highly educated families benefit from expanding subsidies as long as the ratio of their probability of attaining higher education is higher than the ratio of their income over the average income.

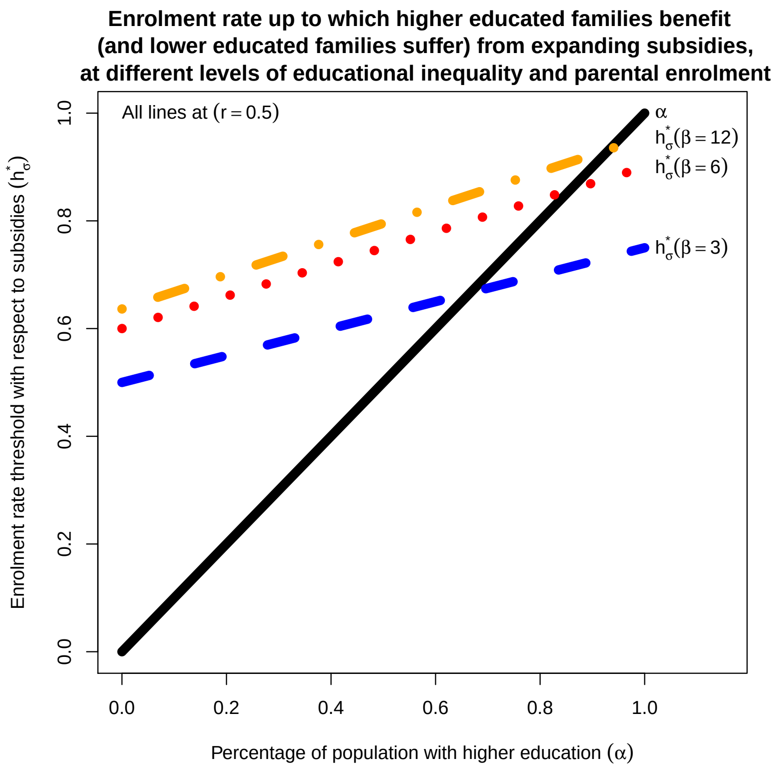
For which level of parental enrolment (α), level of current enrolment (h), wage premium (r) and parental education effect (β) is the marginal utility with respect to subsidies positive for highly and lesser educated families respectively? That is to say, under which parameters do highly educated families benefit from increasing subsidies, and under which parameters do lesser educated families benefit from increasing subsidies? We can find the answer by substituting the full expressions for π_i, h, y_i and $\bar{y}$ in equation 3.23, to obtain the values of the enrolment parameter x for which the marginal utility with respect to subsidies is positive for highly educated and lesser educated families respectively. We can then substitute this value of x into our expression for h to attain the enrolment rates for which the marginal utilities are positive. For presentational reasons these mathematical steps are included in the appendix at the end of this chapter (section 3.6.1 on page 98). This results in the following conditions for whether of marginal utilities with respect to raising subsidies are positive or negative.

$$\begin{aligned}
\frac{\partial u_H}{\partial \sigma} > 0 \text{ and } \frac{\partial u_L}{\partial \sigma} < 0 \quad & \text{if and only if} \quad & h < h^*_\sigma \text{ and } r \leq \beta - 1 \\
\frac{\partial u_H}{\partial \sigma} = \frac{\partial u_L}{\partial \sigma} = 0 \quad & \text{if and only if} \quad & h = h^*_\sigma \text{ and } r \leq \beta - 1 \\
\frac{\partial u_H}{\partial \sigma} < 0 \text{ and } \frac{\partial u_L}{\partial \sigma} > 0 \quad & \text{if, and only if} \quad & \text{either } [h > h^*_\sigma \text{ and } r \leq \beta - 1] \text{ or } r > \beta - 1 \\
& \text{where } h^*_\sigma = \frac{-(\alpha r + 1)(r - \beta + 1)}{(r+1)(\beta - 1)} \text{ for all } r \leq \beta - 1 &
\end{aligned} \tag{3.24}$$

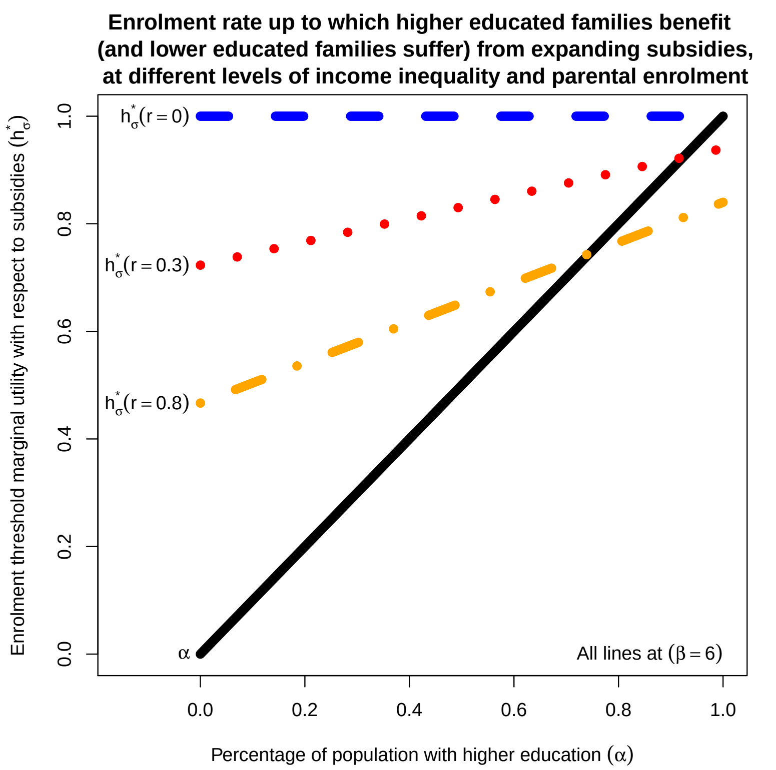
For wage premiums r above $\beta - 1$, the enrolment threshold h^*_σ does not exist, and lesser educated families always stand to benefit from increasing subsidies to higher education. For wage premiums below $\beta - 1$ the marginal utility depends on the level of enrolment h relative to the enrolment threshold value h^*_σ. At enrolment levels h below h^*_σ, highly educated families benefit from increasing subsidies. That is, their marginal utility with respect to an increase in subsidies is positive. However, for enrolment levels above h^*_σ, their marginal utility with respect to subsidies is negative. For lesser educated families the relationship is the exact reverse. At levels of enrolment below h^*_σ, increasing subsidies decreases their utility while at levels of enrolment above h^*_σ increasing subsidies increases their utility. Highly and lesser educated families are indifferent to increases in subsidies when enrolment equals the threshold ($h = h^*_\sigma$). The explanation behind these relationships is that for highly educated families, at low levels of enrolment the benefits flowing from a higher than average probability of participating in higher education easily outweighs the costs of the higher than average contribution to that system.

How does this enrolment threshold for subsidies (h^*_σ) relate to the level of parental enrolment (α), the parental education effect (β) and earning inequality between highly and lesser educated families (r)? First, as noted above, as long

Figure 3.5 – Enrolment threshold for preferences over subsidies at different parental enrolment rates, parental education effects and wage premiums



(a) h^*_σ at different levels of educational inequality (b)



(b) h^*_σ at different levels of income inequality (r)

Notes: Simulations based on formal model.

as the wage premium (r) is smaller than the parental education effect minus one, there exists a threshold level of enrolment above zero and thus a range of enrolment levels for which highly educated families are net beneficiaries of higher education subsidies. The lowest parental education effect of 2.6 in Finland would thus allow for a wage premium of 160%, which is far above the highest wage premium (80%) found in Portugal. Hence, for all European values of β and r there exists a positive level of enrolment below which highly educated parents are the net beneficiaries of subsidies to higher education and benefit from making subsidies more generous.

Provided the wage premium is below or equal to the previously defined threshold ($r \leq \beta - 1$), the threshold h^*_σ is an increasing function of the level of parental education (α), an increasing function of the strength of the parental education effect (β) and a decreasing function of the wage premium (r). That is, $\partial h^*_\sigma / \partial \alpha > 0, \partial h^*_\sigma / \partial \beta > 0, \partial h^*_\sigma / \partial r < 0,$ for all $0 < r < \beta - 1 \wedge \beta > 1$. In words, the larger the proportion of highly educated families in society, the higher the level of enrolment up to which these families benefit from higher education.[18] The direction of the parental education effect is intuitive. All else being equal, the higher the parental education effect, the higher the probability of children of highly educated families of attaining higher education, the greater the benefit of higher education to highly educated families. Last, the effect of the wage premium is also intuitive. All else being equal, the higher the wage premium, the more highly educated families contribute to higher education, the higher the ratio of their children's probability of attending university over the average probability will need to be to offset the negative effects of their tax share. This ratio, in turn, is a negative function of enrolment.

Figure 3.5 on the facing page plots the enrolment threshold (h^*_σ) with respect to subsidies at different levels of parental enrolment (α), parental education effects (β) and wage premiums (r). Values of β and r are chosen to match low, middle and high

[18] Note that while the threshold level of enrolment (h^*_σ) is a positive function of the parental enrolment rate (α), the threshold is not necessarily larger than the parental enrolment rate. This is discussed in more detail below.

values found for industrialised democracies.[19] The figure summarises the parameters under which highly and lesser educated individuals have positive marginal utilities with respect to increasing subsidies. The top of figure 3.5 on page 76 keeps the wage premium constant at 50 percent and then plots h^*_σ for three levels of the parental education effect ($\beta = 3, \beta = 6, \beta = 12$). For example, the figure tells us that at a modest parental education effect of $\beta = 3$ and a parental enrolment rate of 20 percent ($\alpha = .20$), highly educated parents would benefit from increasing subsidies up to enrolment levels of 55 percent ($h^*_\sigma = .55$). By implication, under the same conditions, lesser educated parents will only start to benefit from higher education subsidies at levels of enrolment above 55 percent. As the parental education effect β increases, the line for h^*_σ switches upwards. For example, at the same parental enrolment rate, a parental education effect of $\beta = 12$ increases the threshold to 72 percent. This corresponds to the earlier finding that the stronger the parental education effect, the higher the level of enrolment up to which highly educated parents benefit from higher education subsidies.

The bottom of figure 3.5 keeps the parental education effect β constant at 6 and plots h^*_σ for different wage premiums ($r = 0, r = .3, r = .8$). As the wage premium (and thus the tax contribution) of highly educated families increases, the level of enrolment up to which they are net beneficiaries of higher education subsidies decreases. Moreover, in the hypothetical situation where there is no wage premium as a result of higher education ($r = 0$), so that highly educated families pay the same taxes as lesser educated families, then highly educated families benefit from increasing subsidies for all levels of enrolment ($h^*_\sigma = 1$). This is a replication of the result found in the simple cost pooling model in the previous section. However, even at a high wage premium of 80 percent (the level found in Portugal), highly educated families benefit from increasing higher education subsidies up to high levels of enrolment. For example, if parental enrolment is 10 percent ($\alpha = .10$), then highly educated families still benefit from increasing subsidies up to enrolment

[19] See table 3.1 on page 73 for actual values of r and β.

levels of around 50 percent.

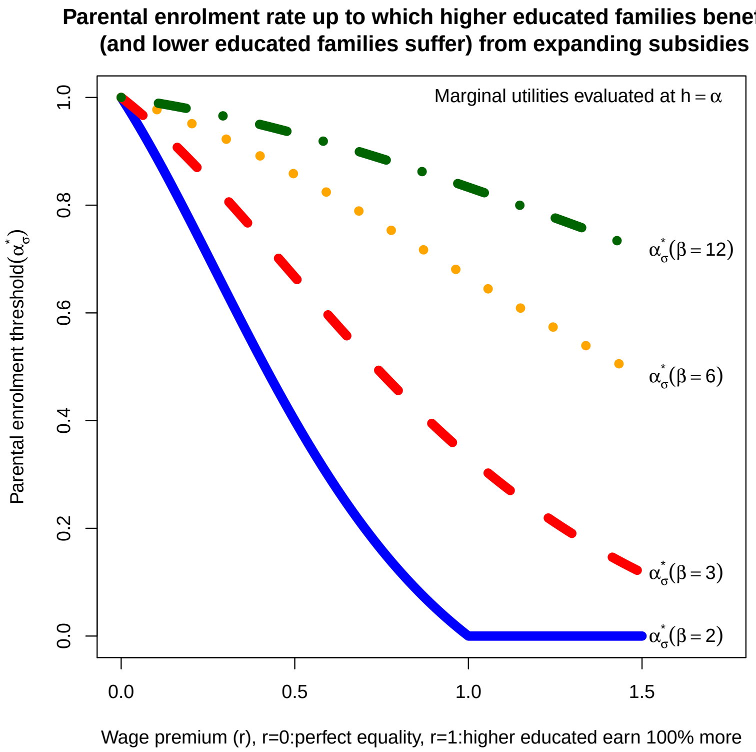
Last, we are interested to know whether the threshold level of enrolment up to which highly educated families benefit from higher education subsidies lies above the parental enrolment rate. In other words, if enrolment for the children's generation is maintained at the level of the parent's generation ($h = \alpha$), will highly educated families benefit from increasing subsidies to higher education? For which values of parental enrolment α is $h^*_\sigma > \alpha$? Remember that for the case of the cost-pooling model in figure 3.5 we see that this intersection takes place at different levels of α, depending on the constellation of β and r. We can evaluate this condition from equation 3.24 by solving for $h^*_\sigma > \alpha$. For presentational reasons the mathematical steps are included in the appendix, from which we obtain

$$\begin{gathered} h^*_\sigma > \alpha \text{ for all } \alpha < \alpha^*_\sigma \text{ and } r < \beta - 1 \\ \text{where } \alpha^*_\sigma = \frac{-r + \beta - 1}{r^2 + \beta - 1} \end{gathered} \tag{3.25}$$

where $\partial\alpha^*_\sigma/\partial r < 0$ and $\partial\alpha^*_\sigma/\partial\beta > 0$. The parental enrolment level threshold α^*_σ is thus a negative function of the wage premium and a positive function of the strength of the parental education effect. To provide the reader with an explanation of this relationship, figure 3.6 on the next page plots this parental enrolment threshold α^*_σ for different real world parental education effects (β) and different wage premiums (r). The graph tells us, amongst other things, that highly educated families still benefit from subsidies up to enrolment levels of 45 percent when the wage premium is high at 80 percent ($r = .80$) and the parental education effect modest at an odds ratio of three ($\beta = 3$).

From the analysis in this section we can conclude that under real world parental education effects and wage premiums, highly educated families can be expected to benefit from increasing subsidies at low levels of enrolment. However, there will exist a threshold of enrolment (h^*_σ) at which lesser educated families start to benefit from higher education subsidies. Theoretically it is possible that highly educated families

Figure 3.6 – Parental enrolment rate thresholds for preferences over subsidies



Notes: The level of parental enrolment up to which the marginal utility for highly educated families with respect to subsidies is positive, provided $h = \alpha$

will always lose out as a result of higher education subsidies (i.e. when $r > \beta - 1$). However, this requires parental education effects below the lowest found in Europe (Finland), or wage premiums far above the highest in Europe (Portugal). The exact level of this threshold (h^*_σ) depends positively on the enrolment rate of the parent's generation and the strength of the parental education effect, and negatively on the size of the wage premium. As the graphs in figures 3.5 and 3.6 have shown, these thresholds tend to be at fairly high levels of enrolment for real world levels of the parental education effect and wage premium.

3.3.2 Preferences over enrolment

The cost-pooling model taught us that, under cost-pooling assumptions, highly educated families continue to benefit from expanding enrolment up to parental enrolment level of fifty percent. This sub-section evaluates the extent to which the cost-pooling model's predictions are affected by the introduction of a marginal tax and of income differences between highly and lesser educated families. Under which wage premiums, parental education effect sizes and (parental) enrolment rates do highly educated families benefit from expanding enrolment? Taking the derivative of equation 3.20 with respect to h provides the marginal family utility with respect to enrolment.

$$\frac{\partial u_i}{\partial h} = \frac{\partial \pi_i}{\partial h} - \frac{y_i}{\bar{y}} \tag{3.26}$$

Which is positive under the following condition

$$\frac{\partial u_i}{\partial h} > 0 \text{ if and only if } \frac{\partial \pi_i}{\partial h} > \frac{y_i}{\bar{y}} \tag{3.27}$$

Thus, the marginal utility with respect to enrolment is positive when the change in a family's child's probability ($\partial \pi_i$) for a change in the enrolment rate (∂h), is higher than the ratio of parental income (y_i) over average income ($\bar{y}$). Note that this definition in terms of changes (i.e. the *marginal* probability) differs from the condition for positive marginal utilities with respect to subsidies, which required the family's child's *average* probability over the enrolment rate to be larger than the ratio of parental income over average income. The explanation is that highly educated families only benefit from expanding enrolment if the marginal benefits are greater than the marginal costs. The marginal benefits are defined by the increase in their child's probability of attaining higher education due to a change in enrolment. The marginal cost is, like in the case of subsidies, given by the marginal tax cost of a change in enrolment, i.e. the ratio of the family's income over the average income.

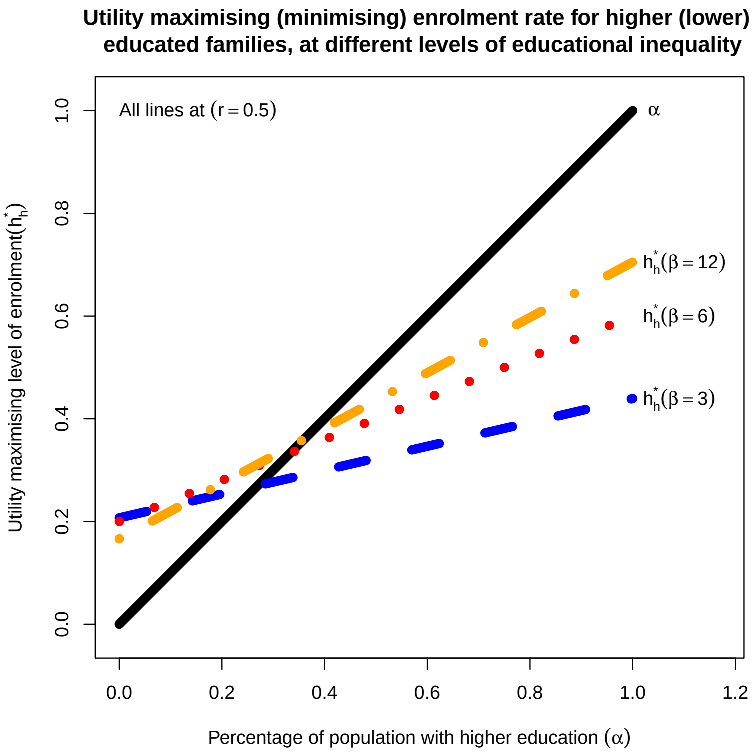
For which level of parental enrolment (α), level of current enrolment (h), wage premium (r) and parental education effect (β) is the marginal utility with respect to enrolment positive for highly and lesser educated families respectively? As in the case of subsidies, we can again find the answer by substituting the full expressions for π_i, h, y_i and $\bar{y}$ in equation 3.26, to obtain the values of the enrolment parameter x for which the marginal utility with respect to enrolment is positive for highly educated and lesser educated families respectively. We can then substitute this value of x into our expression for h to find the enrolment rates over which these marginal utilities are positive. Again, for presentational reasons these mathematic steps are included in the appendix at the end of this chapter (section 3.6.2 on page 101). These steps result in the following sign for the marginal utility with respect to expanding enrolment for highly and lesser educated families.

$$
\begin{aligned}
\frac{\partial u_H}{\partial \sigma} > 0 \text{ and } \frac{\partial u_L}{\partial \sigma} < 0 \quad & \text{if and only if} & h < h^*_\sigma \text{ and } r \leq \beta - 1 \\
\frac{\partial u_H}{\partial \sigma} = \frac{\partial u_L}{\partial \sigma} = 0 \quad & \text{if and only if} & h = h^*_\sigma \text{ and } r \leq \beta - 1 \\
\frac{\partial u_H}{\partial \sigma} < 0 \text{ and } \frac{\partial u_L}{\partial \sigma} > 0 \quad & \text{if, and only if} & \text{either } [h > h^*_\sigma \text{ and } r \leq \beta - 1] \text{ or } r > \beta - 1 \\
\text{where } h^*_h = \frac{(r-\beta+1)(\alpha-1)}{(\beta-1)[r+\sqrt{\beta(r+1)}+1]} & - \frac{(r-\beta+1)\alpha\beta}{\beta+(\beta-1)\sqrt{\beta(r+1)}} & \text{for all } r \leq \beta - 1
\end{aligned}
\tag{3.28}
$$

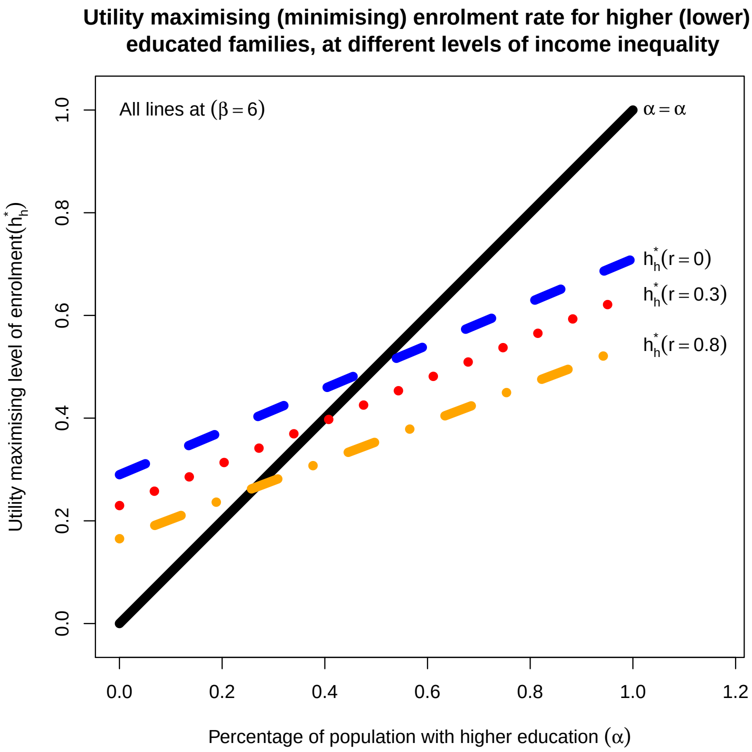
In words, for wage premiums above $\beta-1$, lesser educated families are always the exclusive beneficiaries of expanding enrolment. When the wage premium r is smaller than $\beta-1$, the marginal utility depends on the level of enrolment h. For enrolment levels h below h^*_h, highly educated families benefit from expanding enrolment. That is, their marginal utility with respect to an increase in enrolment is positive. However, for enrolment levels above h^*_h, their marginal utility with respect to enrolment is negative. For lesser educated families the relationship is the exact reverse. At levels of enrolment below h^*_h, expanding enrolment decreases their utility while at levels of enrolment above h^*_h expanding enrolment increases their utility. When enrolment equals the threshold, highly and lesser educated parents are indifferent to expansions of higher education.

The explanation behind these relationships is the following. At low levels of enrolment, the change in the probability of attaining higher education associated with a change in the enrolment rate can be substantially larger than one. That is, an

FIGURE 3.7 – ENROLMENT THRESHOLD FOR PREFERENCES OVER ENROLMENT AT DIFFERENT PARENTAL ENROLMENT RATES, PARENTAL EDUCATION EFFECTS AND WAGE PREMIUMS



(a) h_h^* at different levels of educational inequality (b)



(b) h_h^* at different levels of income inequality (r)

Notes: Simulations based on formal model.

increase in the average probability (h) can lead to a much larger change in the family specific probability (π_i). A numeric example helps to illustrate this point. If $\beta = 5$, $\alpha = .2$ and $h = .2$, then a 1% change in the enrolment rate (the average probability) yields a 1.71% change in the probability for a child of highly educated parents of attaining higher education and only a .82% increase in the probability for a child of a lesser educated family.[20] Thus, expanding enrolment benefits children from highly educated families more than children from lesser educated families. Even if highly educated families earn a substantial wage premium and thus pay higher taxes to fund the expansion, this negative effect can easily be offset by their high propensity to benefit from increasing enrolment. The wage premium up to which this is the case can easily be found by inserting 1.71 for $\partial\pi_H/\partial h$ in equation 3.26, which gives a wage premium of .93.[21] Thus, for wage premiums up to .93, highly educated families benefit from expanding enrolment when the parental education rate and enrolment rate are 20% and the parental education effect equals 5.

How does this enrolment threshold (h_h^*) relate to the level of parental enrolment (α), the parental education effect (β) and earning inequality between highly and lesser educated families (r)? First, we should note that as long as the wage premium (r) is smaller than the parental education effect minus one, there exists a threshold level of enrolment above zero and thus a range of enrolment levels at which highly educated families are net beneficiaries of expanding enrolment. Hence, like in the case of subsidies, for all European values of β and r there exists a positive level of enrolment up to which highly educated parents are the net beneficiaries of expanding enrolment. The threshold h_h^* is an increasing function of the level of parental education ($\partial h_h^*/\partial\alpha > 0$, see proof). In words, the larger the proportion of highly educated families in society, the higher the level of enrolment up to which these families benefit from higher education.[22] However, the relationship between h_h^* is

[20] These marginal increases in family probability for a change in h are obtained by first solving x for h in equation 3.18 and then substituting this value of x into $\partial\pi_i/\partial h = (\partial\pi_i/\partial x)/(\partial h/\partial x)$, which is the left hand side of the condition in equation 3.26

[21] $1.71 > (1 + r)/(1 + \alpha r) \Leftrightarrow r < .93$

[22] Again, as in the case of subsidies, note that while the threshold level of enrolment (h_h^*) is a

cross-dependent on the level of β and the level of r and not consistently in one direction, as becomes clear from the graphs in figure 3.7.

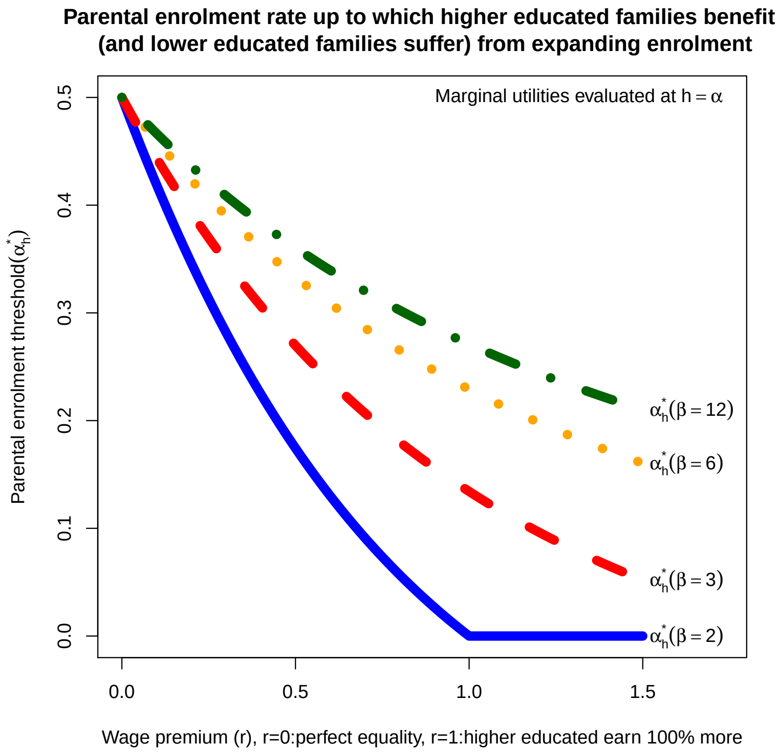
Figure 3.7 on page 83 plots the enrolment threshold (h_h^*) at different levels of parental enrolment (α), parental education effects (β) and wage premiums (r). The same values of β and r are used as in figure 3.5. The graph summarises the parameters under which highly and lesser educated individuals have positive marginal utilities with respect to expanding enrolment. The top of figure 3.7 on page 83 keeps the wage premium constant at 50 percent and then plots h_h^* for three levels of the parental education effect ($\beta = 3, \beta = 6, \beta = 12$). For example, at a modest parental education effect of $\beta = 3$ and a parental enrolment rate of 20 percent ($\alpha = .20$), highly educated parents would benefit from expanding admission up to enrolment levels of 25 percent ($h_h^* = .25$). By implication, under the same conditions, lesser educated parents will only start to benefit from increasing admission at levels of enrolment above 25 percent. As the parental education effect β increases, the line for h_h^* rotates counter clockwise. For low values of parental enrolment (α) this means a slight decrease in h_h^* while for high values of parental enrolment it results in an increase of h_h^*.

The bottom of figure 3.7 keeps the parental education effect β constant at 6 and plots h_h^* for different wage premiums ($r = 0, r = .3, r = .8$). As the wage premium (and thus the tax contribution) of highly educated families increases, the level of enrolment up to which they benefit from higher education decreases. Even at a high wage premium of 80 percent (the level found in Portugal), highly educated families benefit from expanding enrolment up to quite high levels. For example, if parental enrolment is 10 percent ($\alpha = .1$) the parental education effect 6 ($\beta = 6$) and the wage premium 80 percent ($r = .80$), then highly educated families still benefit from expanding enrolment up to 20 percent.

Last, we would like to know under what conditions highly educated families are

positive function of the parental enrolment rate (α), the threshold is not necessarily larger than the parental enrolment rate. This is discussed in more detail below.

FIGURE 3.8 – PARENTAL ENROLMENT RATE THRESHOLDS FOR PREFERENCES OVER EXPANDING ENROLMENT



Notes: Plots for the level of parental enrolment up to which the marginal utility for highly educated families with respect to enrolment is positive, provided $h = \alpha$. Different levels of parental education effect and the wage premium.

interested in expanding enrolment *above the parental rate of enrolment.* For the cost-pooling model this threshold value of parental enrolment above which highly educated families prefer no further expansion (α_h^*) was found to be at 50 percent. We can now explore how this threshold is affected by the introduction of a marginal tax on income and income differences between highly and lesser educated families. In other words, if enrolment for the children's generation is maintained at the level of the parents' generation $(h = \alpha)$, will highly educated families benefit from expanding enrolment? For which values of parental enrolment α is $h_h^* > \alpha$? In figure 3.7 we see that this intersection takes place at different levels of α, depending on the combination of β and r. We can evaluate this condition from equation 3.28 by solving for $h_h^* > \alpha$. The exact mathematical steps are again described in the appendix. From this we then obtain the following condition.

$$h_h^* > \alpha \text{ for all } \alpha < \alpha_h^* \text{ and } r < \beta - 1$$

where

$$\alpha_h^* = -\frac{r-\beta+1}{\left[\frac{\beta(r-\beta+1)}{(\beta+\sqrt{\beta(r+1)})} - \frac{r-\beta+1}{(r+\sqrt{\beta(r+1)}+1)} + (\beta-1)\right](r+\sqrt{\beta(r+1)}+1)} \tag{3.29}$$

This mathematical notation does not provide a direct explanation of behaviour at this parental education threshold α_h^*. To provide such an explanation, Figure 3.8 on the preceding page plots this parental enrolment threshold for different parental education effects (β) and different wage premiums (r). For example, the graph tells us that highly educated families still benefit from expanding enrolment up to 30 percent when the wage premium is 50 percent ($r = .50$) and the parental education effect modest at an odds ratio of three ($\beta = 3$). Also, the graph shows that for most of these values, with the exception of high wage premiums and very low parental education effects, a positive threshold exists. All this shows that even when we introduce income taxes and income inequality between highly and lesser educated parents, there are still substantial ranges over which highly educated parents benefit from expanding enrolment.

From the analysis in this section we can conclude that under real world parental education effects and wage premiums, highly educated families can be expected to benefit from increasing enrolment at low levels of admission. However, there will exist a threshold of enrolment (h_h^*) at which lesser educated families start to benefit from expanding admission. Theoretically it is possible that highly educated families will always lose out from expanding enrolment (i.e. when $r > \beta - 1$). However, this requires parental education effects below the lowest currently found in Finland, or wage premiums far above those found in unequal Portugal. The level of this threshold (h_h^*) depends positively on the enrolment rate of the parents' generation. As the graphs in figures 3.7 and 3.8 have shown, these thresholds tend to be at fairly high levels of enrolment for real world levels of the parental education effect

TABLE 3.2 – SIMULATION OF MODEL PREDICTIONS USING 2000 REAL-WORLD PARAMETERS FOR 15 EU COUNTRIES

					Marginal Tax				Progressive Tax†			
Country	β	α	h	r	h^*_σ	α^*_σ	h^*_h	α^*_h	h^*_σ	α^*_σ	h^*_h	α^*_h
Austria	10.0	14	34	52	67	91	24	35	50	79	20	26
Belgium	7.4	27	33	33	78	93	32	39	64	84	28	31
Britain	3.8	26	47	60	57	70	24	27	34	38	15	14
Denmark	3.6	26	57	24	78	89	32	39	62	75	26	30
Finland	2.6	32	73	53	51	57	22	23	22	20	10	9
France	5.8	22	-	50	66	85	27	33	48	66	21	23
Germany	4.2	23	30	43	67	82	28	33	47	59	21	22
Greece	9.1	18	30	-	-	-	-	-	-	-	-	-
Ireland	5.0	20	32	53	63	81	26	31	43	57	19	20
Italy	6.6	9	39	38	70	91	24	37	52	78	20	28
Luxembourg	6.8	18	-	45	69	89	27	35	52	74	22	26
Netherlands	5.4	23	53	48	67	85	28	33	49	65	21	23
Portugal	12.2	9	-	78	56	88	19	31	38	71	15	20
Spain	7.3	23	47	29	79	94	31	40	65	86	27	32
Sweden	4.7	30	67	31	76	89	32	38	61	75	27	29

Sources: See table 3.1 on page 73 for details of sources for β, α, h, and r. All other values are based on the author's calculations using the equations of the model developed in this section, using these real world values as inputs. *Notes:* † Progressive tax assumption is attained by multiplying the wage premium by two. This means that individuals earning above the lesser educated wage pay a rate of tax twice as high on that additional income.

and wage premium.

3.3.3 Conclusions about the effects of educational and income inequalities

To sum up, the main results of the cost-pooling model are robust despite the introduction of wage inequality and income taxation. At real-life values of the wage premium and educational inequalities there are still ranges over which highly educated families are the net beneficiaries of expanding enrolment and subsidies. The general effect of higher wage premiums is a reduction of the range of enrolment rates at which highly educated families are net beneficiaries. The effect of the strength of the parental education effect is more straightforward for the case of subsidies then for the case of enrolment. For preferences over subsidies, high education inequality means that highly educated families benefit more from expanding subsidies, at all levels of enrolment. For preferences over enrolment, a growth in educational inequality increases the parental enrolment rate threshold up to which highly educated families benefit from expanding enrolment.

Furthermore, the results of the wage premium can be used to hypothesise about the effects of progressive income taxation without explicitly modelling such a tax. If we assume, for example, that individuals earning more than the lesser educated wage pay a higher rate of taxation on the additional income, then we can model the introduction of progressive taxation as a multiplication of the wage premium. For example, if earnings above the lesser educated wage are taxed at twice the rate of lesser educated workers then we multiply the wage premium by two.

Table 3.2 on the preceding page returns to our table of real world values of parameters found in table 3.1 on page 73 and simulates the main model parameters for these values: the enrolment and parental enrolment threshold values for which highly educated parents prefer increasing subsidies (h^*_σ and α^*_σ) and enrolment (h^*_h and α^*_h). For each of these I calculate simulations under two scenarios: marginal taxation and progressive taxation.[23] The progressive tax scenario assumes that highly educated families are taxed at a rate twice that of lesser educated families for their income above the lesser educated wage.[24]

First, let us look at the predicted enrolment threshold rates for preferences over subsidies (h^*_σ). For the marginal tax scenario we see that the actual enrolment rates (h) are lower than the threshold enrolment rate (h^*_σ). This means that in most countries highly educated families benefit from increasing subsidies to higher education. Finland is the only country where the actual enrolment rate has crossed the threshold in this scenario. Under progressive taxes, however, the threshold enrolment rate for positive marginal utilities is reduced for all countries. Now, Britain, Sweden, and the Netherlands have to be added to the list. In these countries highly educated families no longer benefit from expanding subsidies if they experience progressive taxation.

Next, let us look at the predicted enrolment threshold rates for preferences over

[23] I do not simulate actual tax progressivities in this model because such data is not readily available and real tax systems are more complex.

[24] Hence, the wage premium is multiplied by two to attain these results

enrolment. There are some countries for which the actual enrolment rate is close to the utility maximising enrolment rate, for example in Belgium and Germany. That notwithstanding, by 2000 the majority of countries had reached enrolment rates above the level at which highly educated families benefit from expanding them further.[25] This is especially the case for Britain, Finland, the Netherlands and Sweden, where enrolment rates by far exceed the preferred enrolment rate. Introducing progressive taxes further depresses the thresholds and places most countries' enrolment rates far above their threshold values. At the turn of the millennium, we would thus expect most highly educated populations in most of these countries to have been opposed to further expansion of enrolment.

We can summarise these predictions about the effects of income taxation and inequality on higher education policy preferences in the following two hypotheses.

Hypothesis 6 *The higher a family's income is above the average income, the lower their marginal utility from expanding enrolment and increasing subsidies.*

Hypothesis 7 *These negative effects of income notwithstanding, the positive effects of parental education on the probability of enrolling in higher education are expected to trump the negative effects of increasing subsidies.*

Chapter four will explore these empirical implications using public opinion data from the several countries for which it is available. In particular, we will be able to test whether the predicted effects of income and education on enrolment and per-student subsidies preferences at different levels of (parental) enrolment.

3.4 Introducing a labour market

Thus far, the distributive politics of higher education have been modelled in the absence of a labour market. The benefits of attaining higher education were conceived of as the cash value of the subsidy. Using the language of economists, I thus

[25]It should be noted, however, that enrolment rates tend to be upwardly biased, as they are often distorted by people enrolling in multiple degrees and international students. Chapter seven discusses these measurement issues in more detailed.

assumed that the efficiency of investing in higher education is equal to unity. This assumption has two troubling implications. First, if families were to decide whether to invest privately in higher education, they will be indifferent between investing a certain dollar amount in higher education or consuming it as both yield identical utility. With an efficiency of one there are no productive gains or losses to be expected from investing in higher education. Second, the model predicts that when highly educated families benefit from increasing subsidies, they do so regardless of the amount of subsidies already provided to students. Highly educated families are thus predicted to want ever more subsidies to higher education. Instead, there may be a high level of public investment at which highly educated families are satisfied. It is therefore more realistic to assume that higher education is a productive investment with diminishing returns. This introduces both a private incentive to invest in higher education, and at the same time puts a limit on the increases of subsidies sought.

I first introduce productive investments in higher education to the cost-pooling model. This will allow us to home in on these effects of a productive investment in higher education without getting distracted by the complications introduced by income taxation and inequality. I assume the benefit of investing in higher education to be higher future wages. I further assume that future wages reflect the productivity attained through higher education.[26] Lesser educated workers have a certain baseline level of productivity, equal to w_L. Highly educated workers gain an additional productivity by investing in higher education (the wage premium) equal to $r = g(s)$, where $g(s)$ is the higher education production and $g'(s) > 0$ and $g''(s) < 0$ for all s, $g'(0) \to \infty$ and $\lim_{s\to\infty} g'(s) \to 0$. That is, an agent's productivity is an increasing but diminishing function of investment in higher education, and initial investments in higher education yield a return above unity. The marginal return to investing *privately* in higher education is given by $g'(s) - 1$, which is the marginal return ($g'(s)$) minus the marginal cost of a dollar investment. A rational income

[26]I assume away any complementarity in productivity or signal value of higher education

maximising individual would then invest in higher education up to the point that marginal returns equal marginal costs $g'(s) = 1$.

Next, let us introduce the option of publicly funding higher education, such that a fraction $p \in [0, 1]$ of the amount invested in higher education (s) is funded publicly. The expected utility from public higher education is given by

$$u_i = w_L + \pi_i(g(s) - (1 - p)s) - hsp \tag{3.30}$$

where w_L is the baseline lesser educated wage earned by everyone, π_i is the individual probability of attaining public higher education, $g(s)$ is the higher education production function, $(1 - p)s$ is the private contribution paid only when attaining higher education and hsp is the public contribution through a lump sum tax.[27]

First, let us evaluate the marginal utility with respect to making higher education public (i.e. increasing p).

$$\begin{gathered}\frac{\partial u_i}{\partial p} = s\pi_i - hs \\ \frac{\partial u_i}{\partial p} > 0 \text{ if and only if } \pi_i > h \\ \frac{\partial u_i}{\partial p} = 0 \text{ if and only if } \pi_i = h \\ \frac{\partial u_i}{\partial p} < 0 \text{ if and only if } \pi_i < h\end{gathered} \tag{3.31}$$

Preferences for public over private funding of higher education follow the same direction as preferences for increasing subsidies in the cost-pooling model. The utility of highly educated families, whose children have an above average probability of attaining higher education, increases by making higher education entirely public, whereas lesser educated parents, whose children have a below average probability of attaining higher education, prefer private financing. By analogy, preferences for a private option will follow the direction of preferences for subsidies in the income tax and inequality model of the previous section. Highly educated families will thus

[27] This is the same lump sum tax as in the cost-pooling model, multiplied by the fraction p to account for the part that is funded publicly.

prefer public higher education at levels of enrolment below the threshold h^*_σ and public higher education at levels of enrolment above the threshold.

Next, we can evaluate the level of preferred spending under private and public higher education, by evaluating the marginal utility with respect to subsidies at $p = 0$ (private higher education) and $p = 1$ (publicly funded higher education).

$$\begin{aligned} \frac{\partial u_i}{\partial s} &= \pi_i(g'(s) - (1-p)) - hp \\ \frac{\partial u_i}{\partial s} &= 0 \text{ if and only if } \quad s = \quad g'^{-1}(1) \quad \forall p = 0 \\ \frac{\partial u_i}{\partial s} &= 0 \text{ if and only if } \quad s = \quad g'^{-1}(\frac{h}{\pi_i}) \quad \forall p = 1 \end{aligned} \tag{3.32}$$

When higher education is entirely privately funded ($p = 0$), highly educated and lesser educated families alike will invest up to the level of s for which the marginal return equals the marginal private cost of investing in higher education. The marginal private cost is one for highly and lesser educated parents alike, so both will prefer to invest up to the point that the marginal return equals one. However, when higher education is publicly funded ($p = 1$), families would prefer the government to invest up to the point that marginal returns ($\pi_i(g'(s))$) equal the marginal public cost (h). Hence, for highly educated families for whom the individual probability of attaining higher education (pi_i) is *higher* than the average probability (h), the effective marginal costs of public investments in higher education are *smaller* than one. In contrast, for lesser educated parents the marginal costs are higher than unity because their probability of attaining higher education is lower than the average probability. However, when higher education is only publicly funded, they will nevertheless prefer a minimum amount of investment in higher education given the high marginal returns from the lowest level of investments.

This extension of the model with a higher education production function has contributed two main new insights. First, when higher education is a productive investment, the preference patterns predicted by the cost-pooling model hold for preferences over private and public funding. Second, while highly educated individuals prefer higher public spending than lesser educated individuals, there exists a maximum level of spending above which highly educated families seek no further spending. This level of spending is likely to be above the efficient level of investment where marginal productivity equals marginal costs. These findings can be summarised in the following hypotheses.

Hypothesis 8 *Preferences for public over private higher education mirror preferences for greater or lesser subsidies in the cost-pooling and income tax models.*

Hypothesis 9 *A preferred upward change in spending per student is a diminishing function of the actual level of spending per student.*

The mirror image of this hypothesis is that

Hypothesis 10 *A preferred downward change in spending per student is an increasing function of the level of spending per student.*

Last, it is worthwhile to briefly engage with potential critiques to this approach of modelling the labour market. First, complementarity approaches model the wages of highly educated and lesser educated workers as an inverse function of their supply. Hence, highly educated workers have an interest in maintaining a low supply of their labour because this provides them with scarcity rents. Lesser educated workers, on the other hand, benefit from expanding higher education because it increases their chances of attaining higher education and increases the scarcity value of their lesser educated wage if they do not attend university. The illustrative example of the American labour market in the literature review put some doubt on the constant technology assumption of such modes, given that the wages of highly educated labour actually increased over a period in which the stock of higher education expanded substantially (Autor, Katz and Krueger 1998, Autor, Katz and Kearney 2006, Acemoglu 1998).

Second, signalling models – another family of labour market models – perceive of education as an unproductive signal of the average ability of the group attaining the signal (Spence 1973, 2002, Bergh and Fink 2009, Fernandez and Gali 1999, Hendel, Shapiro and Willen 2005). Hence, the wages of highly educated workers reflect the average ability of those attaining higher education, while the wages of lesser educated workers reflect the average ability of those not attaining higher education. In a signalling framework, expanding enrolment will have two effects. First, it will reduce the signalled ability of those attaining higher education as more individuals with less ability are admitted into higher education institutions. Second, it will reduce the signalled ability of those *not attaining* higher education. After all, the average ability of the group not attaining higher education drops when the most able individuals in that group attend university. The consequence of expanding enrolment can in this case be a drop in the signalled ability of both categories, leaving the difference between both signals largely intact. This can result in a constant wage premium of attaining higher education. Simulations published in the web appendix reveal that such a constant wage premium model is consistent with a constant signal wage premium to higher education.

A remaining question relates to the cross-national variations found in the wage premiums in table 3.1. One explanation is different levels of past investment in higher education. Another explanation for this level of variation is institutional. A wide ranging literature has identified partisan and institutional reasons for variations in wage inequality (Soskice 1990, 1999, Rowthorn 1992, Freeman and Katz 1995, Gottschalk and Smeeding 1997, Pontusson 2000, Rueda and Pontusson 2000). Pontusson, Rueda and Way (2002), for example, find that unionisation, centralisation and the level of public sector employment have upward affects on the top of the wage distribution, which is presumably occupied by highly educated workers. Policies by left wing governments, on the other hand, constrain inequality in the top half of the wage distribution.

3.5 Conclusion

The core of this chapter was a model of access to higher education based on the distribution of ability amongst children. The ability of children, in turn, was modelled as a function of parental education plus a stochastic component. This approach contrasts with most extant analyses that assume access to higher education to be a function of income. More specifically, this model provides the following two key, counterintuitive insights for understanding the political economy of higher education.

First, highly educated parents and their children are the net beneficiaries of public subsidies to higher education. The reason is that the children of highly educated parents have, on average, greater abilities at the end of their secondary education. Hence, they have much better chances of attaining higher education. This result withstands the introduction of substantial differences in the income of highly and lesser educated parents, at least at lower levels of enrolment. That is, the higher tax contribution of highly educated parents is offset by the above average probability of their children attaining higher education. These results were obtained by simulating empirical parameters for wage premiums and estimates of educational inequality (i.e. the effect of parental education on their child's probability of attaining higher education). Highly educated parents are thus hypothesised to prefer increased spending per student, and to prefer public over private funding. The pattern of preferences for lesser educated parents is the exact reverse.

Second, highly educated parents and their children are the net beneficiaries of initial expansions of enrolment. The reason for this is that the relationship between parental education and a child's ability is probabilistic rather than deterministic. While, on average, the abilities of children of highly educated parents are above those of children of lesser educated parents, there will nevertheless be plenty of highly able children of lesser educated parents defying the general trend. Consequently, when maintaining enrolment at the rate of the parents' generation, a proportion of all higher education places will be taken up by these highly able children of lesser educated parents. As a result, not all children of highly educated parents receive higher education. Once higher education expands beyond the parental level of enrolment, there are disproportionately more children of highly educated parents than children of lesser educated parents at the "expansion frontier" – i.e. the next level of ability to be admitted into university. Again, the extension in the third section of this chapter shows that these results are robust even with the introduction of income differences between highly and lesser educated parents. Even in the presence of such differences, highly educated individuals are the net beneficiaries of expansions up to 25 to 40 percent. The higher tax costs of such expansions imposed on highly educated families are offset by the benefits flowing from a substantial increase in the probability of their children attaining higher education.

The individual level predictions of this model, as well as the underlying assumptions, are subjected to empirical tests in the next chapter using individual level survey evidence from Britain, Australia, Canada and Sweden. Furthermore, chapter seven tests whether parties that have electoral incentives to cater to the interests of highly educated individuals pursue policies in line with the preference patterns predicted in this chapter.

3.6 Appendix

3.6.1 Mathematical analysis for preferences over subsidies

Solution of marginal utility with respect to subsidies for highly educated parents.

$$
\begin{aligned}
\frac{\partial u_H}{\partial \sigma} &= \frac{\beta e^x + b}{\alpha\beta - \alpha + \beta e^x + 1} - \frac{r+1}{\alpha r + 1} \\
\frac{\partial u_H}{\partial \sigma} &= 0 \iff x = x^*_\sigma \text{ where } x^*_{H,\sigma} = \log_e\left(\frac{\beta - r - 1}{\beta r}\right) \\
\frac{\partial u_H}{\partial \sigma \partial x} &= \frac{\alpha\beta e^x(\beta - 1)}{\alpha\beta - \alpha + \beta e^x + 1}^2 \\
\frac{\partial u_H}{\partial \sigma \partial x} &> 0 \text{ for all } \beta > 1 \wedge \alpha \in (0,1) \\
&\text{Therefore,} \\
\frac{\partial u_H}{\partial \sigma} &> 0 \text{ for all } x > x^*_{H,\sigma} \\
\frac{\partial u_H}{\partial \sigma} &< 0 \text{ for all } x < x^*_{H,\sigma}
\end{aligned}
\tag{3.33}
$$

Solution of marginal utility with respect to subsidies for lesser educated parents.

$$
\begin{aligned}
\frac{\partial u_L}{\partial \sigma} &= \frac{\beta e^x + 1}{\alpha\beta - \alpha + be^x + 1} - \frac{1}{\alpha r + 1} \\
\frac{\partial u_L}{\partial \sigma} &= 0 \iff x = x^*_\sigma \text{ where } x^*_{L,\sigma} = \log_e\left(\frac{\beta - r - 1}{\beta r}\right) \\
\frac{\partial u_L}{\partial \sigma \partial x} &= \frac{\alpha\beta e^x(\beta - 1)}{\alpha\beta - \alpha + \beta e^x + 1}^2 \\
\frac{\partial u_L}{\partial \sigma \partial x} &> 0 \text{ for all } \beta > 1 \wedge \alpha \in (0,1) \\
&\text{Therefore,} \\
\frac{\partial u_L}{\partial \sigma} &> 0 \text{ for all } x > x^*_{L,\sigma} \\
\frac{\partial u_L}{\partial \sigma} &< 0 \text{ for all } x < x^*_{L,\sigma}
\end{aligned}
\tag{3.34}
$$

$x^*_{L,\sigma} = x^*_{H,\sigma} = x^*_\sigma$, therefore, the marginal utility for both highly and lesser educated families is zero if, and only if, $x = x^*_\sigma$. Plugging x^*_σ into the expression for h in equation 3.18 yields h^*_σ.

$$
\begin{aligned}
h^*_\sigma &= \frac{-(\alpha r + 1)(r - \beta + 1)}{(r+1)(\beta - 1)} && \text{for all } 0 \leq r < \beta - 1 \text{ and } \beta > 1 \\
h^*_\sigma &= 0 && \text{for all } r \geq \beta - 1 \text{ and } \beta > 1
\end{aligned}
\tag{3.35}
$$

Because $\frac{\partial h}{\partial x} > 0$ for all x, by analogy to the above conditions in equations 3.33 and 3.34 we can state.

$$\begin{aligned} &\frac{\partial u_L}{\partial \sigma} < 0 \quad \text{and} \quad \frac{\partial u_H}{\partial \sigma} > 0 \quad \text{for all } h < h^*_\sigma \\ &\frac{\partial u_L}{\partial \sigma} > 0 \quad \text{and} \quad \frac{\partial u_H}{\partial \sigma} < 0 \quad \text{for all } h > h^*_\sigma \end{aligned} \tag{3.36}$$

Conditions for $h^*_\sigma > 0$

$$\begin{gathered} h^*_\sigma = 0 \iff \frac{-(\alpha r + 1)(r - \beta + 1)}{(r+1)(\beta - 1)} = 0 \\ h^*_\sigma = 0 \iff r = \frac{-1}{\alpha} \vee r = (\beta - 1) \\ \text{the only possibility is } r = (\beta - 1) \text{ given that} \\ r \neq \frac{-1}{\alpha} \text{ for all } \alpha \in (0,1) \wedge r > 0 \\ \frac{\partial h^*_\sigma}{\partial r}(r = \beta - 1) < 0 \text{ for all } \alpha \in (0,1) \wedge \beta > 1 \\ \text{where } \frac{\partial h^*_\sigma}{\partial r}(r = \beta - 1) = \frac{-\alpha(\beta - 1) + 1}{\beta(\beta - 1)} \\ \text{Therefore, } h^*_\sigma > 0 \text{ for all } \beta > 1 \wedge 0 \leq r < \beta - 1 \end{gathered} \tag{3.37}$$

Conditions for $\frac{\partial h^*_\sigma}{\partial \alpha} > 0$

$$\begin{gathered} \frac{\partial h^*_\sigma}{\partial \alpha} = \frac{-r(r - \beta + 1)}{(\beta - 1)(r + 1)} \\ \frac{\partial h^*_\sigma}{\partial \alpha} = 0 \iff r = 0 \vee r > \beta - 1 \end{gathered} \tag{3.38}$$

Conditions for $\frac{\partial h^*_\sigma}{\partial r} < 0$

$$\frac{\partial h^*_\sigma}{\partial r} = \frac{\beta(\alpha - 1)}{(\beta - 1)(r + 1)^2} - \frac{\alpha}{\beta - 1} \tag{3.39}$$

The numerator of the first term is negative for $\beta > 1$ and $\alpha \in (0,1)$ while its denominator is positive for $r > 0$ and $\beta > 1$. This leaves the first term negative. The second term is always positive for $\alpha \in (0,1)$ and $\beta > 1$. Subtracting the second term from the first term will therefore always yield negative values for all values of

$\alpha \in (0,1)$, $r > 0$, $\beta > 1$.

Conditions for $\dfrac{\partial h^*_\sigma}{\partial \beta} > 0$ for all $\beta > 1 \wedge r > 0$

$$\frac{\partial h^*_\sigma}{\partial \beta} = \frac{r(\alpha r + 1)}{(\beta - 1)^2 (r + 1)} \tag{3.40}$$

Both the denominator and the numerator are positive for all values of $r > 0$,$\beta > 1$.

Solving $h{*}_\sigma > \alpha$ provides us with the following conditions for a positive marginal utility that does not require a reduction of the enrolment rate below that of the parental rate.

$$\begin{gathered} h^*_\sigma - \alpha > 0 \text{ if, and only if } 0 < \alpha < \alpha^*_\sigma \\ \text{where} \\ \alpha^*_\sigma = \frac{-r + \beta - 1}{r^2 + \beta - 1} \end{gathered} \tag{3.41}$$

3.6.2 Mathematical analysis for preferences over enrolment

The marginal utility with respect to expanding enrolment

$$
\begin{aligned}
\frac{\partial u_i}{\partial h} &= \frac{\partial \pi_i}{\partial h} - \frac{y_i}{\bar{y}} \\
&= \frac{\partial \pi_i/\partial x}{\partial h/\partial x} - \frac{y_i}{\bar{y}} \\
\text{where } \frac{\partial \pi_i}{\partial x} &= \frac{\beta^{p_i}}{e^x * (1/e^x + \beta^{p_i})^2} \text{ and } \frac{\partial h}{\partial x} = \frac{\alpha\beta e^x}{\beta e^x + 1}^2 - \frac{\alpha - 1}{e^x(1/e^x + 1)^2} \\
\frac{\partial u_i}{\partial h} &= \frac{-\beta_i^p}{e^x\left[\frac{\alpha - 1}{e^x(1/e^x+1)^2} - \frac{\alpha\beta e^x}{(\beta e^x + 1)^2}\right]\left[\frac{1}{e^x} + \beta_i^p\right]^2} - \frac{p_i r + 1}{\alpha r + 1} \\
\frac{\partial u_i}{\partial h} &= 0 \text{ if, and only if } x = x_h^* \text{ where } x_h^* = \log_e\left(\frac{(\beta - 1)\sqrt{\beta - \beta r} - \beta r}{\beta^2 r - \beta + \beta^2}\right) \\
\frac{\partial u_L}{\partial h \partial x} &> 0 \text{ for all } \beta > 1 \wedge \alpha \in (0,1)
\end{aligned}
$$

where

$$
\frac{\partial u_L}{\partial h \partial x} = \frac{2\alpha\beta e^x(e^x + 1)(\beta - 1)(\beta e^x + 1)}{(\alpha\beta - \alpha + \beta^2 e^{2x} + 2\beta e^x + \alpha\beta e^{2x} - \alpha\beta^2 e^{2x} + 1)^2}
$$

The numerator is always positive for all values of $\beta > 1 \wedge \alpha \in (0,1) \wedge x \in \mathbb{R}$

The denominator is always positive given that the entire term is squared

$$
\frac{\partial u_L}{\partial h \partial x} < 0 \text{ for all } \beta > 1 \wedge \alpha \in (0,1)
$$

where

$$
\frac{\partial u_H}{\partial h \partial x} = \frac{(\alpha - 1)2\beta e^x(e^x + 1)(\beta - 1)(\beta e^x + 1)}{(\alpha\beta - \alpha + \beta^2 e^{2x} + 2\beta e^x + \alpha\beta e^{2x} - \alpha\beta^2 e^{2x} + 1)^2}
$$

The numerator is always negative due to $(\alpha - 1) < 0$ for all $\beta > 1 \wedge \alpha \in (0,1) \wedge x \in \mathbb{R}$

Otherwise identical to above.

Therefore,

$$
\begin{aligned}
\frac{\partial u_H}{\partial h} &> 0 \text{ and } \frac{\partial u_L}{\partial h} < 0 \text{ for all } x < x_h^* \\
\frac{\partial u_H}{\partial h} &< 0 \text{ and } \frac{\partial u_L}{\partial h} > 0 \text{ for all } x > x_h^*
\end{aligned}
\tag{3.42}
$$

Plugging x_h^* into the expression for h in equation 3.18 yields h_h^*.

$$h_h^* = \begin{cases} \dfrac{(r-\beta+1)(\alpha-1)}{(\beta-1)[r+\sqrt{\beta(r+1)}+1]} - \dfrac{(r-\beta+1)\alpha\beta}{\beta+\sqrt{\beta(r+1)}(\beta-1)} & \forall 0 \leq r < \beta-1 \wedge \beta > 1 \\ 0 & \forall r \geq \beta - 1 \wedge \beta > 1 \end{cases} \tag{3.43}$$

$$\alpha_h^* = -\frac{r-\beta+1}{\left[\dfrac{\beta(r-\beta+1)}{(\beta+\sqrt{\beta(r+1)})} - \dfrac{r-\beta+1}{(r+\sqrt{\beta(r+1)}+1)} + (\beta-1)\right](r+\sqrt{\beta(r+1)}+1)} \tag{3.44}$$

Chapter 4

Preferences over higher education policy

4.1 Introduction

There has been an increasing number of analyses of individual-level policy preferences in the political science and sociology literature (Iversen and Soskice 2002, Alesina and Ferrara 2005, Kitschelt and Rehm 2006, Anderson and Pontusson 2007, Rehm 2009, Svallfors 2004*a*). Moreover, as the literature review in chapter two uncovered, there is a developing literature making individual-level assertions about the policy preferences towards higher education (Fernandez and Rogerson 1995, Ansell 2008*b*, 2010*a*, Iversen and Stephens 2008, Busemeyer 2009). Despite these two growing literatures, there is very little work testing the individual-level implications of these models on survey data. Ansell (2010*a*) is an exception, but his analysis – as will be argued below – relies on a question asking about financial support for students from poor backgrounds, which only pertains to a very small section of students. This chapter sets out to address this neglect by analysing both the individual-level hypotheses developed in this dissertation as well as alternative hypotheses suggested in the literature. One explanation for the relative paucity of research on higher education policy preferences is the absence of good measures quantifying these preferences in the large international survey programmes. Therefore, this chapter takes an alternative approach and relies instead on a collection of national surveys, and especially British Social Attitudes surveys, that tap into the most important aspects of higher education policy preferences: enrolment and per-student spending.

In particular, the analyses test the hypotheses developed in the previous chapter, as well as some of their underlying assumptions. The models in the previous chapter predicted that higher education preferences are structured by the probability of children of attaining higher education. The probability of attaining higher education, in turn, was modelled as a function of parental education. Highly educated parents are predicted to prefer higher subsidies for higher education than lesser educated parents. Moreover, at low levels of parental enrolment, highly educated parents will benefit from expanding enrolment, while at higher levels they will prefer to reduce admission. While the extension argued that income will have a negative effect on such preferences, it was also argued that the negative effect of income is unlikely to trump the positive effects of higher education. Moreover, the results were predicted to hold for the range of parental effect sizes found in European countries. Rival hypotheses, in contrast, explain preferences for higher education policy based on individual positions in the income distribution, as well as their partisan leanings.

The analyses presented in this chapter are designed to address the empirical implications of our theoretical models. Do highly educated parents know that their children have a greater probability of attaining higher education? Do higher educated parents in fact prefer higher subsidies than lesser educated parents? Do preferences regarding the rate of enrolment change as enrolment rates expand? How do the countervailing effects of education and income play out? In addition, this chapter tests the hypotheses of this model against the rival – income and partisanship based – hypotheses found in the literature and discussed in chapter two.

In this chapter I directly test several of the key assumptions and predictions on a unique stacked dataset of British Social Attitudes (BSA) surveys. The data is stacked specifically for this analysis, and, to the best of my knowledge, has never been used to answer these questions before. The BSA data is particularly well suited for testing a theory of higher education policy preferences because it contains very specific questions on preferences for enrolment, subsidies (fees, grants, etc), and the overall level of spending. Moreover, because identical questions were asked repeatedly between 1983 and 2007, the dataset allows us to test hypotheses that involve cross-level interactions between macro-level variables (such as the current enrolment rate) and individual-level variables (such as education).

A limitation of using survey data from a single country to test a general theory is that the results may suffer from low external validity. Can we generalise the causal inferences derived from the specific situation of the British population to other industrialised democracies? To validate the results, I have collected existing surveys from Australia, Canada and Sweden. While the questions on higher education policy preferences are less specific in these surveys, and not available in a time-series, they all confirm the predictions of the model developed in the preceding chapter.

The analysis continues as follows. The next section discusses the availability of data on higher education policy preferences. Section three probes and discusses a central assumption of the previous chapter's model, namely that highly educated families and lesser educated families are aware of their children's diverging probabilities of attaining higher education. Using data from the British Social Attitudes Survey, section four tests preferences regarding enrolment, section five regarding subsidies and section six regarding overall higher education spending. Section seven validates these results by looking at additional survey evidence from Australia, Canada and Sweden. Section eight concludes.

4.2 Data

A common way of addressing questions of policy preference found in the literature is to use one of the large international social surveys[1]. Unfortunately, none of these

[1](European Social Survey (ESS), Eurobarometer, European Election Studies (EES), International Social Survey Programme (ISSP), World Values Survey (WVS))

surveys contains questions on specific preferences towards higher education policies. Only the ISSP contains a question on whether the government should provide support for *poor* students. This question is used by Ansell (2010*a*) to analyse the effects of income and partisanship on preferences towards higher education policy. Given that the majority of students come from more affluent backgrounds, this question only concerns a small subsection of the population enrolled in higher education. It is not clear whether the question taps into general redistribution preferences (i.e. support for the poor), higher education funding (i.e. support for public funding of universities) or expansion of access (more university places). Moreover, across all countries, there is a very high level of agreement in the response to this question.[2] This leaves most of the variation between those who think the government should *probably* support poor students and those who think the government should *definitely* do so. To test the actual individual-level implications of the present model, as well as alternative models, we need more specific questions about enrolment and per student spending.

In order to find good data about higher education policy preferences, we need to turn to national surveys. I therefore conducted a survey of national experts on the availability of data sets that contain questions about public spending.[3] The British Social Attitudes Survey (BSA), which was conducted (mostly) annually between 1983 and 2010, is the best national data source identified through this survey of surveys. First, it is the only data set that has specific questions about preferences towards the different aspects of higher education policy (enrolment, fees, grants & spending). Second, the survey is unique in that it consistently asks several of these questions for a period of 24 years. The time-series nature of the BSA survey data allows us to explore the effects of changes in macro-level variables – such as enrolment – on the relationship between individual-level variables (education levels

[2] Across all countries in the 1996 ISSP Role of Government Survey, 86 percent of respondents agree with support for poor students in the first place. (Author's own calculations)

[3] I contacted all country coordinators of the International Social Survey Programme whose contact details are available on http://www.issp.org/

and policy preferences). In particular, it allows us to test the hypothesis that the effect of education on enrolment preferences reverses at higher levels of parental enrolment.

To address concerns about the external validity of a single country time-series study I conduct an external validation exercise in section seven. There I test the predictions of the model on survey data from the three other countries for which national surveys were identified: Sweden, Australia and Canada. However, questions on policy preferences from these countries are much more limited than the BSA data and there are no equal time-series to seriously test macro-level interactions. Sweden is a partial exception, with four surveys asking the same question between 1986, when enrolment was around 30 percent, and 2002, by which time enrolment had increased to 75 percent.

4.3 Expectations about children

A key criticism of rational choice models, like the one presented in the previous chapter, is that they assume a lot of calculation and knowledge on the part of agents. In this respect, a key question is whether highly educated parents actually know that their children have a greater probability of attaining higher education?

The 2002 wave of the British Social Attitudes Survey asks a question that taps into such parental expectations. Table 4.1 shows a simple cross-tabulation of the proportions of highly and lesser educated parents who think their children are likely to go to university. The table teaches us two things. First, proud parents have a rather rosy view of their own children's abilities and prospects. At a time when around 40 percent of British children were going to university, 79 percent of parents thought that one of their children were either very likely or fairly likely to go to university. Second, highly educated parents, correctly, have an even more rosy view of their children's prospects than lesser educated parents. The percentage of highly educated parents who think one of their children is very likely to go to university

Table 4.1 – Subjective Parental Expectations for a Child's Probability to Attain Higher Education, by parental education

Parental Education	Low	High	Total
"Very likely"	31.4%	62.5%	37.3%
"Fairly likely"	43.6%	33.9%	41.8%
"Not very likely"	19.4%	3.3%	16.3%
"Not at all likely"	5.6%	0.3%	4.6%
Total	81.0%	19.0%	100%

Source: British Social Attitudes Survey (2002)
Notes: Original question: "How likely do you think it is that any of your children who are still at school will go to university?" Higher education defined as those holding at least a college degree. Sample weights applied. n=2038.

(62.5 percent) is twice the percentage of lesser educated parents who think similarly about their children (31.5 percent). Moreover, 96 percent of highly educated parents expect their child to be either very or fairly likely to go on to university, compared to 75 percent of lesser educated parents.

Milton Friedman's response to the above critique of rational choice was to judge a model by the quality of its predictions (Friedman 1953).

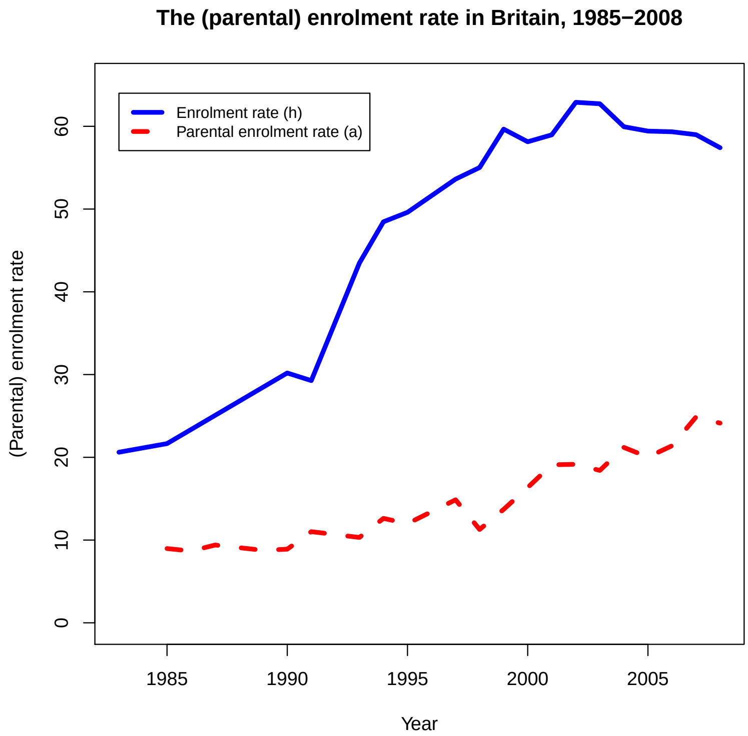
While the subsequent sections will present some compelling statistical evidence corroborating the predictions of the model, it is worthwhile to consider the logic and plausibility of the mechanism by which cause leads to effect (Brady 2008, Hedstrom 2008, 2010). It seems inconceivable to expect the average agent to calculate conditional probabilities, or to have full knowledge of the official statistics of participation in higher education. How then could we expect preferences to follow such a rational pattern? A cogent answer to this question lies in a process of social observation. Education levels play an important role in socialisation patterns (Huckfeldt and Sprague 1993, 1995, La Due Lake and Huckfeldt 1998). Highly educated individuals socialise with other highly educated individuals, and lesser education individuals socialise with other lessed educated individuals. By observing the participation rates of children of fellow highly educated parents, highly educated individuals are provided with a sample from which to estimate the probability that a child of parents like them will go on to higher education. Equally, individuals may make observations about participation rates in other groups. A plausible mechanism is thus that parents favour expansion when they observe increasing participation rates of their group combined with space for further expansion (i.e. not all children go to university). Equally, when participation rates seem to be favouring the out-group more than the in-group, individuals are likely to oppose further expansion. This could happen because the in-group is close to saturation, or because changes in university admission rates are seen as benefitting the children of the out-group (lesser educated parents at low rates of enrolment).

4.4 Preferences for expanding enrolment in Britain

The theory developed in the previous chapter predicts that, at low levels of enrolment, highly educated individuals favour further expansion of higher education more than lesser educated citizens. The logic behind this prediction is that the children of highly educated parents have an above average probability of attaining a newly created place in a higher education institution. As enrolment expands, however, this relationship is expected to decline, and subsequently, to reverse. At high levels of enrolment, newly created places will predominantly go to children of lesser educated parents. This section explores whether this predicted relationship holds in practice. In addition, this section tests the strength of this prediction against alternative explanations of enrolment preferences, which are often based on an individual's income and party identification.

The BSA data is uniquely suited for answering this question. The precise question on enrolment preferences is *"Do you feel that opportunities for young people in Britain to go on to higher education - to a university, college or polytechnic - should be increased or reduced, or are they at about the right level now?"* The question has five ordinal response categories (*"increased a lot", "increased a little", "about right", "reduced a little", "reduced a lot"*). Unlike the ISSP question, this question does not distinguish between socio-economic groups. It just asks whether an individual

Figure 4.1 – Parental and current enrolment rate in Britain



Source: Parental enrolment rates are from the British Social Attitudes Surveys (1985-2007). Enrolment rates are from UNESCO Institute of Statistics, accessed through World Bank Education Statistics Database.
Notes: The parental enrolment rate is the estimated percentage of the population in the British Social Attitudes Survey sample reporting to have a tertiary-level degree. Small fluctuations in the trend could therefore reflect sampling error rather than actual fluctuations. The current enrolment rate is the total enrolment in tertiary education, regardless of age, expressed as a percentage of the total population of the five-year age group beyond secondary school leaving age.

thinks that higher education should be expanded. While the question is not explicit about who should provide these opportunities, we can be confident in interpreting this as more opportunities in public higher education, given that the British higher education landscape was dominated by public funding. For ease of interpretation, I recode the variable into a dichotomous variable, distinguishing between those in favour of further expansion and those in favour of maintaining, or even reducing the current level.[4]

Another attractive feature of this stacked dataset, as mentioned above, is that

[4]In addition, running multi-level ordinal logit models leads to a complicated analysis of which the results are more difficult to interpret.

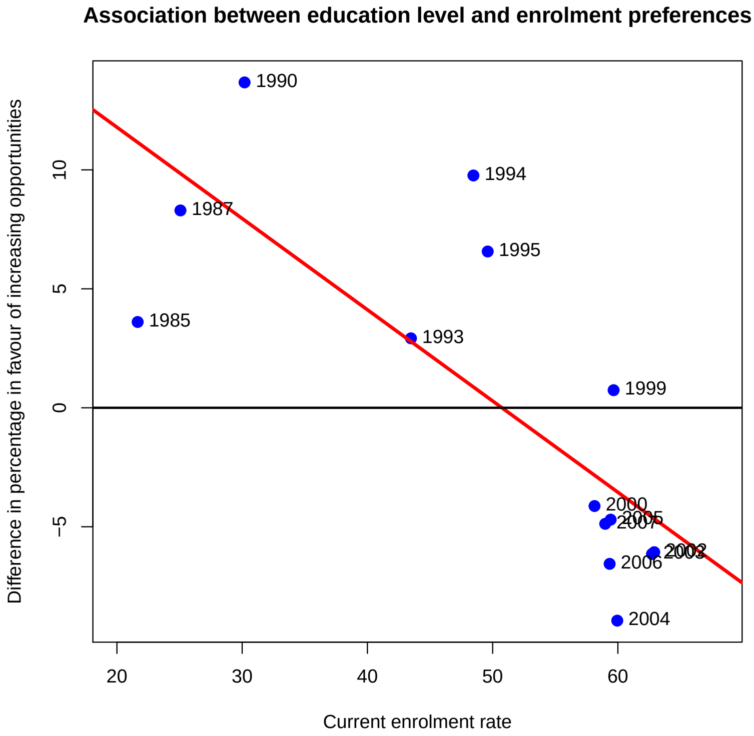
the actual enrolment rate and the parental education rate changed substantially during this period of time. Figure 4.1 plots both these rates for the period 1985 to 2008. The enrolment rate is measured as the total number of students enrolled as a percentage of the five-year cohort above high school completion age. As is discussed in more detail in chapter seven, this statistic suffers from some measurement issues resulting from individuals studying for multiple degrees, international students, drop-outs and variations in the average degree duration. It therefore tends to overestimate the number of individuals actually attaining a first-time undergraduate degree. For the UK, in the first decade of the 21st century, this measure of the enrolment rate was in the high fifties while in actual fact only 40 percent of those completing secondary education could expect to obtain a higher education degree.[5] Unfortunately, these more precise measures of enrolment are only available from the late 1990s and are therefore unsuitable for this analysis. Nevertheless, we can expect our measure of enrolment to be highly correlated with actual first-time graduation rates and therefore to be a very good proxy.

The parental enrolment rate is directly estimated from the British Social Attitudes Survey and is the percentage of the population age 25-64 reporting a higher education degree.[6] Remember that the theory developed in the previous chapter states that preferences of the highly educated for expanding enrolment were positive at low levels of enrolment. However, as enrolment increases beyond a threshold h_h^*, the highly educated were expected to start opposing enrolment. The model predicts this threshold, h_h^*, to be a positive function of the level of parental enrolment. For the year 2000, table 3.2 on page 88 in the previous chapter predicts this threshold value of enrolment – assuming a marginal tax scenario – to be around 25 percent. Moreover, it predicts that, at a parental enrolment rate of around 27 percent, highly

[5]Note how this contrasts with Tony Blair's publicly stated objective to have 50 percent of the population attain higher education. In fact, enrolment remained fairly constant throughout New Labour.

[6]The attentive reader may note that for 2000 there is a discrepancy between this survey based estimate and the OECD estimate presented in table 3.1 on page 73, which reports a higher percentage. This suggests that our self-reported estimate underestimates the actual level of parental enrolment.

FIGURE 4.2 – DIFFERENCE IN PERCENTAGE IN FAVOUR OF EXPANDING ENROLMENT, BY EDUCATION LEVEL



Source: Enrolment preferences based on British Social Attitudes Surveys (1985-2007). Enrolment rates from UNESCO Institute of Statistics, accessed through World Bank Education Statistics Database.
Notes: Percentage point difference between highly and lesser educated respondents in favour of increasing higher education.

educated parents will seek no further expansion *beyond* their own level of enrolment (i.e. 27 percent). Both the parental enrolment rate and the current enrolment rate in figure 4.1 trend upwards in an equal fashion, showing a high level of correlation.[7] Including both parental and current enrolment rates will therefore result in issues of multicollinearity, and in the analyses that follow I focus exclusively on the current enrolment rate.

Besides the parental and current enrolment rate, two other variables – the strength of the parental education effect and the wage premium – are predicted to have an effect on the relationship between education levels and preferences regarding enrolment. For the parental education effect we do not have annual observations.

[7]The correlation coefficient is .80

Moreover, this variable is expected to be a rather time-invariant institutional variable. Table 2.2 on page 37 confirms this by showing only a very modest change between the 1960s and 1970s generation in Britain (from 4.4 to 3.8).[8] In this analysis the impact of the wage premium is not analysed at the group level but rather at the individual level. I include the British Social Attitudes Survey's measure of standardised household income in the analyses.[9] As most rival hypotheses are based on income, this variable needs to be included regardless. To sum up, I test the two main implications of the theoretical model. Firstly, I test whether the predicted interaction between enrolment and education in shaping preferences over enrolment exists. Secondly, I test whether high differences in income negatively affect preferences regarding enrolment.

Figure 4.2 on the facing page provides a first glance at the data to answer this question. It shows the difference between the percentage of highly and lesser educated respondents agreeing with expanding enrolment. 'Highly educated' is defined as those respondents who have a higher education degree.[10] At low rates of enrolment in the 80s and 90s, the percentage of highly educated individuals in favour of expanding enrolment was *higher* than the percentage of lesser educated individuals in favour of such an expansion. However, as enrolment increases in the late 90s and first decade of the 21st century, this difference fades, and subsequently, reverses. In the 21st century there were generally more lesser educated individuals in favour of expanding higher education. At a first glance, it appears that the data follows the pattern predicted by the model.

Association, however, does not mean causation. First, we need to know whether these differences are actually statistically significant, or merely the consequence of sampling error. Second, there could be confounding factors explaining both an individual's education level and her preferences for expanding enrolment. The two

[8] This difference is small and statistically insignificant at the 95 percent level.

[9] To be precise, the income variable is standardised to have mean zero and standard deviation one.

[10] This is the education question asked consistently from 1985 onwards. For 1983 we only have the number of years in full-time education, which is less precise as participants with many years in education include those spending longer than average in secondary education.

main correlates of higher education that could also explain enrolment preferences are age and gender. Because enrolment expanded over the second half of the 20th century, there will be more highly educated young people than highly educated old people. Moreover, in this period, more men than women tended to go to university. Hence, the relationship between a respondent's education level and enrolment preferences could potentially be spurious and explained by the fact that highly educated individuals are on average younger or more likely to be male.

In short, the next step is to test for the presence of an interaction effect between enrolment and an individual's education level, while controlling for these potentially confounding factors (i.e. age and gender). To this end, I estimate a hierarchical model where some explanatory variables, such as an individual's education, age and gender, occur at the micro-level (individuals, indexed by i), and others, such as the enrolment rate, occur at the macro-level (years, indexed by j). Moreover, I test whether there is an interaction across these levels, i.e. whether the enrolment rate influences the effect of an individual's education on enrolment preferences. Using the notation of Franzese (2005)[11], I estimate the following hierarchical logistic regression model:

$$\text{logit}(\pi_{ij}) = \beta_{0j} + \beta_{1j}T_{ij} + \textstyle\sum_{k=1}^{K} \lambda_k X_{kij} + \epsilon_{ij} \tag{4.1}$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01}Z_j + \mu_{0j} \tag{4.2}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}Z_j + \mu_{1j} \tag{4.3}$$

$$\Rightarrow \text{logit}(\pi_{ij}) = \gamma_{00} + \gamma_{10}T_{ij} + \gamma_{01}Z_j + \gamma_{11}T_{ij}Z_j + \textstyle\sum_{k=1}^{K} \lambda_k X_{kij} + (\epsilon_{ij} + \mu_{0j} + \mu_{1j}T_{ij}) \tag{4.4}$$

where π_{ij} is the probability of agreeing with expanding higher education; β_{0j} is the model's intercept; β_{1j} is the slope of the effect of the explanatory variable T_{ij} (a dichotomous variable for whether an individual attained higher education); and λ_k

[11] Also see Bowers and Drake (2005)

are the coefficients for the $k = 1, 2, ..., K$ covariates that potentially affect both the explanatory variable and the outcome, X_{kij} (age and gender). Both the model's intercept (β_{0j}) and slope (β_{1j}) are estimated as a function of the macro-level variable Z_j (enrolment). Equation (4.2) writes the intercept of equation (4.8) as a function of Z_j (enrolment) with coefficient γ_{01} and a macro-unit-specific error term μ_{0j} that only varies across and not within macro levels. Equation (4.3), in turn, writes the slope of the effect of the explanatory variable T_{ij} (education) in 4.8 as a function of Z_j with coefficient γ_{11} and a macro-unit-specific error term μ_{1j}. Plugging these equations (4.2) and (4.3) back into equation (4.8) provides us with equation (4.4). The main difference between this model and a non-hierarchical interactive logit model is the compounded error term ($\epsilon_{ij} + \mu_{0j} + \mu_{1j}T_{ij}$) (Franzese 2005). Because the error component for the random slope ($\mu_{1j}T_{ij}$) was found to be insignificant across models I constrain this coefficient to zero and present estimates of random intercept models (i.e. with error structure ($\epsilon_{ij} + \mu_{0j}$)).[12] The estimated coefficients and standard errors can be found in table 4.2 on the next page under model (4).

Figure 4.3 on page 117 plots the results of this model with controls for covariates age and gender. The figure displays the average treatment effect, which is the simulated effect of the explanatory variable (being highly educated) on a representative sample of the population.[13] In this model, the effect of higher education on

[12] See Rabe-Hesketh, Skrondal and Pickles (2005) for more details on maximum likelihood estimation of random -intercept and random-slope multilevel model.

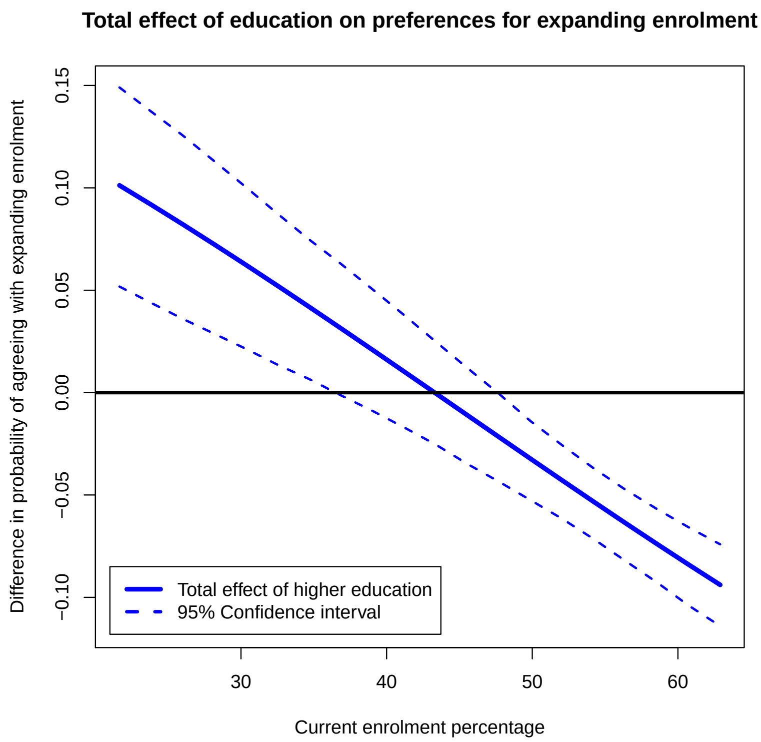
[13] A meaningful way of displaying the results of this analysis is to present the percentage change in the probability of the outcome (being in favour of higher education) as a result of the explanatory variable (in experimentalist language, the "treatment', i.e. being highly educated), and its respective confidence interval (say at the 95 percent level). This is more intuitive than just reporting regression coefficients, which are difficult to substantively interpret in a framework where the outcome variable is discrete (e.g. logit or probit analyses). The problem with reporting such predicted probabilities is that they are affected by the constellation of other variables included in the analysis. If, hypothetically, someone's age and gender would already predict a 99 percent probability of being in favour of expanding higher education, then the additional effect of higher education could never be more than 1 percent. One common method is to choose a constellation of variables and alter the variable of substantive interest, reporting the ensuing difference in predicted probabilities. The problem with this method is that, again, the results depend on the choice of constellation. The method chosen here, instead, calculates the predicted probability for each individual in a representative sample of that population, only changing the variable of substantive interest. This is known as the average treatment effect.

Table 4.2 – Determinants of enrolment preferences in Britain

Model	1	2	3	4
Higher educated	2.327***		2.302***	2.289***
	(0.399)		(0.427)	(0.423)
Student	3.709***		6.425***	6.323***
	(1.721)		(3.988)	(3.922)
Female	1.175***		1.100***	1.105***
	(0.0286)		(0.0292)	(0.0293)
Age	0.986***		0.985***	0.984***
	(0.000697)		(0.000846)	(0.000852)
Has children			1.151***	1.147***
			(0.0464)	(0.0462)
Age of children			1.014***	1.013***
			(0.00365)	(0.00364)
Income (normalised)		1.272***	1.062	
		(0.0530)	(0.0548)	
Enrolment rate	0.993**	0.992**	0.992**	0.998
	(0.00330)	(0.00328)	(0.00351)	(0.00378)
Higher educated × enrolment	0.981***		0.984***	0.983***
	(0.00298)		(0.00325)	(0.00323)
Student × enrolment	0.980**		0.972**	0.973**
	(0.00819)		(0.0107)	(0.0107)
Income × enrolment		0.993***	0.995***	
		(0.000790)	(0.000953)	
High income (top 3rd)				1.177
				(0.139)
Middle income (middle 3rd)				0.941
				(0.121)
High income × enrolment				0.988***
				(0.00218)
Middle income × enrolment				0.996*
				(0.00236)
Constant	2.263***	1.325*	2.335***	2.234***
	(0.398)	(0.221)	(0.442)	(0.456)
Panel-specific σ	0.0275***	0.0359***	0.0310***	0.0321***
	(0.0111)	(0.0139)	(0.0125)	(0.0130)
Observations	28578	27268	25040	25040
Years	14	15	14	14

Sources: British Social Attitudes Surveys (1985-2007) for all variables except for enrolment, which is from UNESCO Institute of Statistics.
Notes: Outcome variable is a dichotomous variable for whether the respondent was in favour of expanding opportunities for higher education. Multilevel random effects logistic regression. Coefficients are odds ratios (i.e. 1 is "no effect"). Standard errors in parentheses. *** $p < .01$; ** $p < .05$; * $p < .10$

Figure 4.3 – Total effect of higher education on enrolment preferences in Britain

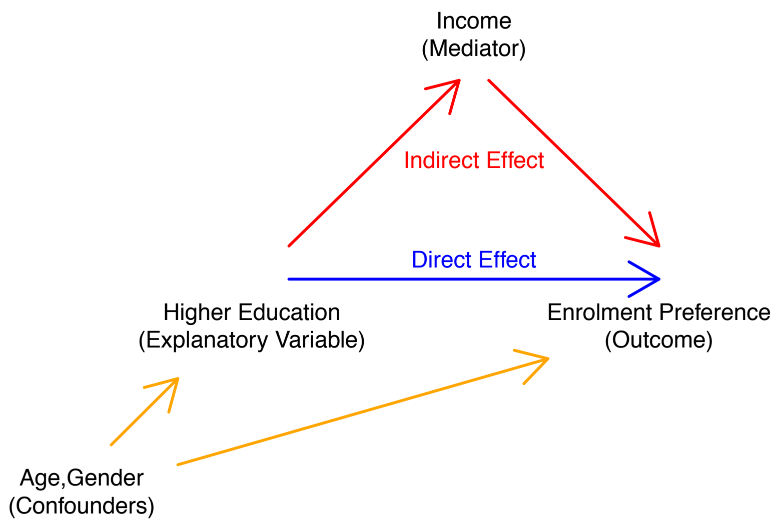


Notes: Average treatment effect. Predictions based on model (1) in table 4.2 on the facing page

enrolment preferences is interacted with the enrolment rate.[14] The highly education category is broken down into two sub-categories, one for those with a higher degree and one for those studying for a higher education qualification. Students, given the centrality of higher education policy to their lives and their low income, are expected to hold particularly distinct views on higher education and are therefore treated as a separate category. The analysis, however, focusses on the main and larger category of highly educated citizens. Figure 4.3 demonstrates that, when controlling for confounding co-variates, the effect of higher education on enrolment preferences is first positive (up to enrolment rates of 35 percent, or up to the level of 1992), then indistinguishable from zero (between ca 35 percent and 50 percent), and then negative (enrolment rates over 50 percent, the level of 1995 and beyond). The direction of this pattern closely resembles that predicted by my theoretical

[14]See figure 4.1 on page 110 for source and notes.

FIGURE 4.4 – BREAKDOWN OF THE TOTAL EFFECT OF HIGHER EDUCATION ON PREFERENCES INTO A DIRECT AND AN INDIRECT EFFECT



models: highly educated individuals favour expansion of enrolment at low levels of admission, but oppose further expansion once enrolment passes a certain threshold. While the inversion point is somewhere beyond the 25 percent predicted by the theoretical model, it is – given the somewhat inflated nature of our enrolment variable discussed above – very close to that level.

Having controlled for confounding variables, we now know that being highly educated affects preferences for enrolment (the total effect). However, we do not yet know *how* higher education affects these preferences. Does higher education directly affect preferences for enrolment (a direct effect)? Or, does higher education indirectly affect preferences through a mediating third factor, such as a higher income (an indirect effect)? Figure 4.4 provides a graphical representation of this potential for causal mediation (Baron and Kenny 1986, Imai, Keele and Yamamoto 2010). The difference between a confounding and a mediating factor is that a confounding factor is expected to be causally prior to the explanatory variable. The confounding variable thus *causes* both the explanatory variable and the outcome, whereas the mediating factor *is caused* by the explanatory variable and then in turns *causes* the outcome. To find out how higher education affects preferences regarding enrolment we can now add these mediating factors to the model. This way I control

Table 4.3 – The effect of higher education on household income at different levels of parental enrolment

Higher educated	0.70***	0.79***
	(0.012)	(0.037)
Age	0.093***	0.094***
	(0.0023)	(0.0023)
Age^2	-0.0012***	-0.0012***
	(0.000026)	(0.000026)
Female	-0.25***	-0.25***
	(0.0084)	(0.0084)
Percentage higher educated		-0.0068***
		(0.00081)
Higher educated× percentage higher educated		-0.0043**
		(0.0021)
Constant	-1.42***	-1.34***
	(0.045)	(0.046)
σ of ϵ_{ij}	0.90	0.90
Observations	46907	46907
Years	21	21
R^2 within model	0.14	0.14
R^2 between model	0.0028	0.075
R^2 overall model	0.14	0.14

Source: British Social Attitudes Surveys 1985-2007
Notes: Dependent variable: normalised household income. Multi-level random-effects GLS regression. The macro-level term parental education level is estimated from the survey data (see figure 4.1 on page 110). Standard errors in parentheses. *** $p < .01$; ** $p < .05$; * $p < .10$

for the indirect effects of higher education through mediating variables, such that the coefficient obtained for higher education now provides us with the direct effect of higher education on preferences regarding enrolment.

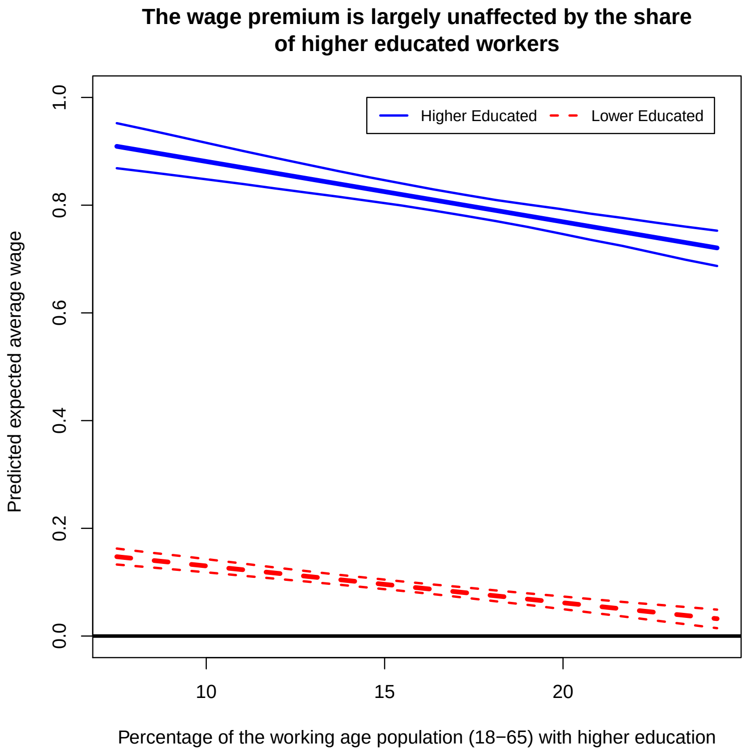
Let us first look at the effects of higher education on these candidate mediating variables. Mediating variables can be modelled as a function of the explanatory variable and a set of covariates, such as age and gender. Below is the example of a continuous mediating variable, such as income.[15]

$$M_{ij} = \alpha_0 + \alpha_1 T_{ij} + \sum_{k=1}^{K} \lambda_k X_{kij} + (\mu_j + \epsilon_{ij}) \tag{4.5}$$

where M_{ij} is the mediating variable (e.g. income), α_0 the model's constant, α_1 the effect of the explanatory variable T_{ij} (higher education) on the mediator, and λ_k are

[15]For a discrete mediating variable we would write logit(M_{ij}) instead of M_{ij}.

FIGURE 4.5 – THE PREDICTED INCOME OF A HIGHLY AND LESSER EDUCATED INDIVIDUAL, AT DIFFERENT PERCENTAGES OF HIGHLY EDUCATED INDIVIDUALS.



Source: British Social Attitudes Surveys 1985-2007
Notes: Predicted income at different levels of parental enrolment. Figures obtained from table 4.3

the coefficients for the $k = 1, 2, ...K$ confounding covariates X_{kij} (age, age-squared and gender) that could affect both the mediator and the explanatory variable.

Income is the most obvious candidate for an indirect effect. Higher education, on average, leads to higher income. Income, successively, could affect policy preferences because it increases an individual's tax burden or because it affects an individual's opportunities to pay for higher education privately. Table 4.3 on the previous page shows the results of a regression analysis of the effects of education on income. As some have argued that an increase in the supply of highly educated workers on the labour market may supress the wage-premium of higher education, I also include a model that interacts the effect of household income with the percentage

Table 4.4 – Highly educated individuals are less likely to have children

Higher educated	0.63***
	(0.016)
Age	1.37***
	(0.0058)
Age^2	1.00***
	(0.000048)
Female	1.59***
	(0.029)
Constant	0.0021***
	(0.00022)
Panel-specific σ	0.060***
	(0.019)
Observations	67037
Years	21

Source: British Social Attitudes Surveys 1985-2007
Notes: Dependent variable: dichotomous variable for having children in the household. Multi-level random-effects logistic regression. Standard errors in parentheses. *** $p < .01$; ** $p < .05$; * $p < .10$

of the working-age population that is highly educated.[16] The average effect of higher education on household income is .70 household income standard deviations. Figure 4.5 on the facing page, which plots the interaction between the percentage of highly educated individuals in the population of working age, shows that there is only minimal convergence between highly and lesser educated individuals: a strong wage premium remains despite an increase in the stock of highly educated workers. This analysis further confirms the earlier critique in this dissertation of the effects of the relative scarcity of highly and lesser educated workers on wages. Another possible mediator is the effect of higher education on the probability of having children. Table 4.4 shows the results of a logistic regression of the effects of an individual's education level, age, age squared and gender on an individual's probability of having a child in their household. It shows that highly educated individuals are less likely than lesser educated individuals to have children. Having children, in turn, may affect enrolment preferences.

Next, we can include these mediating variables in equation (4.4), such that γ_{10}, the coefficient of the explanatory variable, now provides us with an estimate of the

[16]This percentage is obtained from the British Social Attitudes data itself.

unmediated *direct* effect.[17]

$$\begin{aligned}\text{logit}(\pi_{ij}) =& \gamma_{00} + \gamma_{10}T_{ij} + \gamma_{01}Z_j + \gamma_{11}T_{ij}Z_j + \textstyle\sum_{k=1}^{K} \lambda_k X_{kij} + \sum_{l=1}^{L} \xi_l M_{lij} \\ & + (\epsilon_{ij} + \mu_{0j} + \mu_{1j}T_{ij})\end{aligned} \tag{4.6}$$

where ξ_l is the coefficient for the $l = 1, 2, \ldots, L$ mediators (M_{lij}) (income, income $\times$ enrolment, having children, age of children). The regression coefficients of this analysis are displayed under model (3) in table 4.2 on page 116.

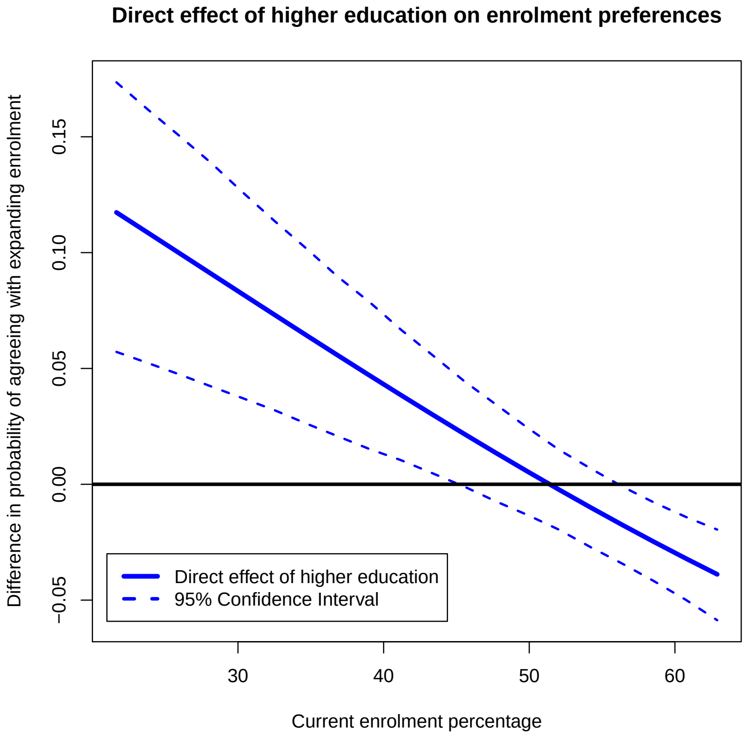
Figure 4.6 on the next page plots the direct effect of higher education, controlling for the mediating variables of income and having children. Compared to the total effect in figure 4.3 on page 117, the line of the direct effect is higher, intersecting the zero line around 50 percent. Because we now control for the effects of income, the direct effect resembles the prediction of the cost-pooling model in the previous chapter. Since we look at the effect of education on enrolment preferences *in isolation of* its effect on income, the threshold at which preferences reverse (h_h^*) is – as predicted – higher than the total effect of education.

How substantial is the indirect effect of higher education on enrolment preferences through its positive effect on income? In a linear regression framework it would be easy to calculate the indirect effect of education through income by subtracting the coefficient for the direct effect from the coefficient of the total effect. In the non-linear framework of the logistic regression model, however, this breakdown is more complicated. I use a method developed by Erikson et al. (2005) and Buis (2010) to disentangle direct and indirect effects in the context of discrete outcome variables.[18]

[17] These are the actual values of the variables that can mediate the effect and not the predicted values from the previous regressions on income and the probability of having children. The analysis should therefore not be confused with a two-stage procedure.

[18] As this method does not allow for multi-level breakdowns, I resort to a two stage procedure, inspired by Huber, Kernell and Leoni (2005). In short, in the first stage I run the breakdown analysis for each year. This provides a table of coefficients and standard errors for the direct, indirect and total effect of higher education. In the second stage, I regress these coefficients on the macro-level, while taking into account the standard errors from the first stage estimates using the weighting procedure described in Huber, Kernell and Leoni (2005).

Figure 4.6 – The direct effect of higher education on enrolment preferences in Britain



Notes: Direct effect estimated by controlling for confounding variables age and gender, and mediating variables income and "having children". Average treatment effect. Predictions based on model (3) in table 4.2 on page 116.

Figure 4.7 plots the results of this breakdown analysis. Unlike the other graphs, results are plotted as odds-ratios (the ratio of the odds of highly educated individuals agreeing with expanding enrolment over lesser educated individuals). The reason for plotting odds-ratios instead of predicted probabilities is that this method does not yield a full table of coefficients for the control variables, which does not allow for a calculation of predicted probabilities. At low rates of enrolment, the indirect effect of higher education is close to an odds ratio of one (i.e. "no effect"). However, as enrolment expands, the indirect effect of income becomes increasingly negative. This explains the difference between the direct and the indirect effect. While the total and direct effect are initially similar at low enrolment rates, the total effect has a steeper slope than the direct effect, resulting in an earlier intersection with the "no effect" line. The model in the previous chapter, in contrast,

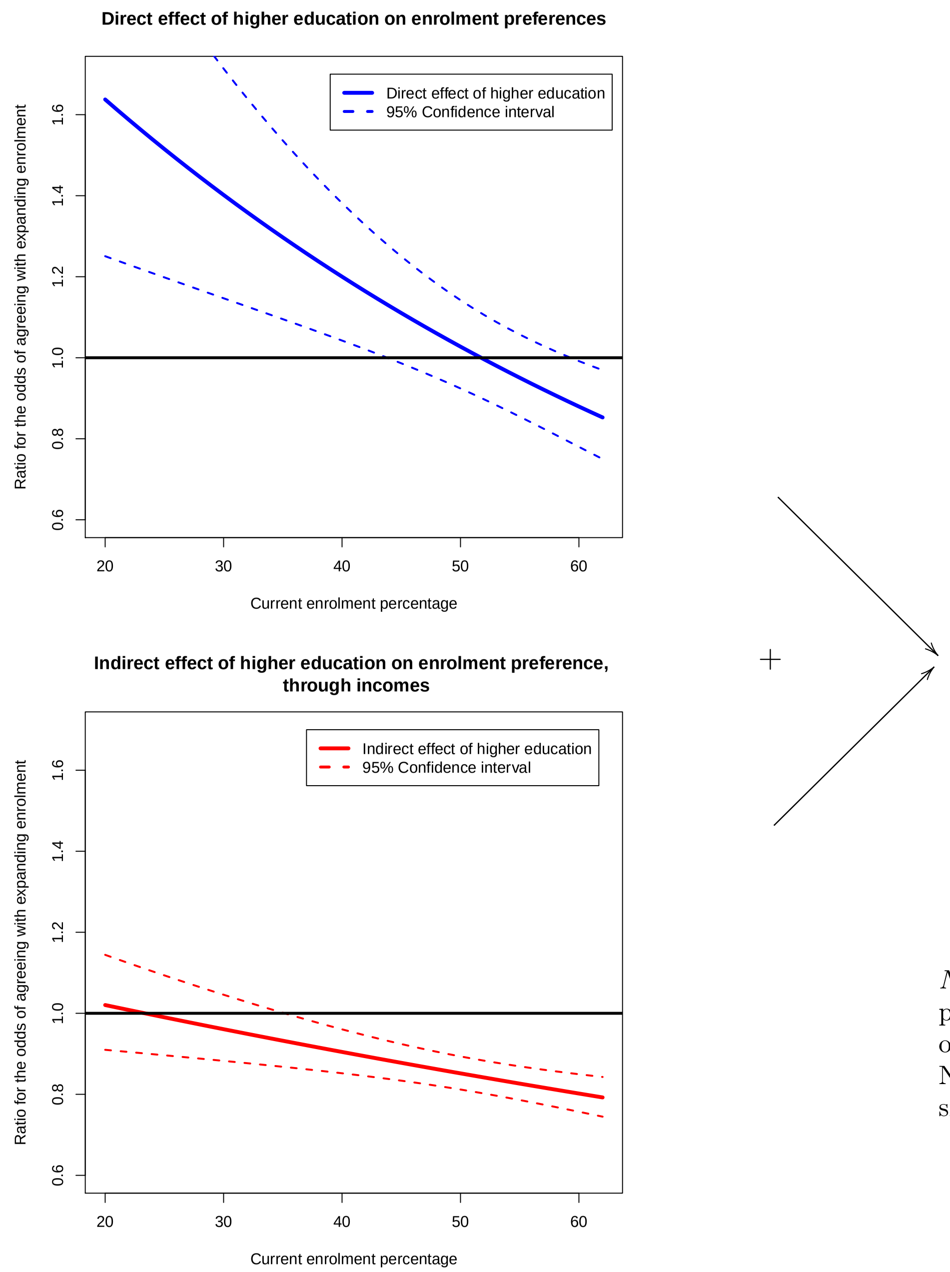
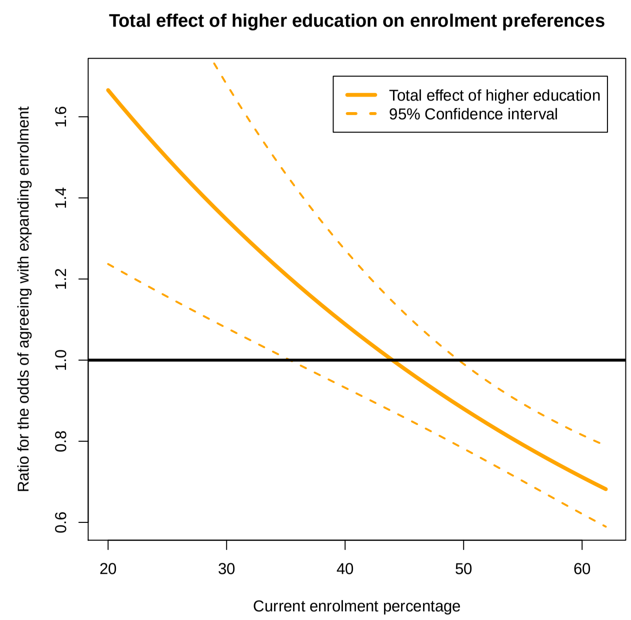


Figure 4.7 – Breakdown of higher education effect on enrolment preferences into a direct effect and an indirect effect (through income) in Britain



Notes: Decomposition analysis using method by Buis (2010). Figures present odds ratios as the Buis method does to present a full table of coefficients of control variables to estimate predicted probabilities. Note that the exponential nature of odds ratios increases the absolute size of the confidence intervals at higher odds ratios.

predicted a constant negative effect of income. The reason was that expansions of higher education always had a similar effect on taxation. Plausibly, individuals conceive of expansions as percentages of the number enrolled rather than absolute increments. Hence, individuals may conceive an expansion of enrolment at a high level of admission to be much more costly.[19]

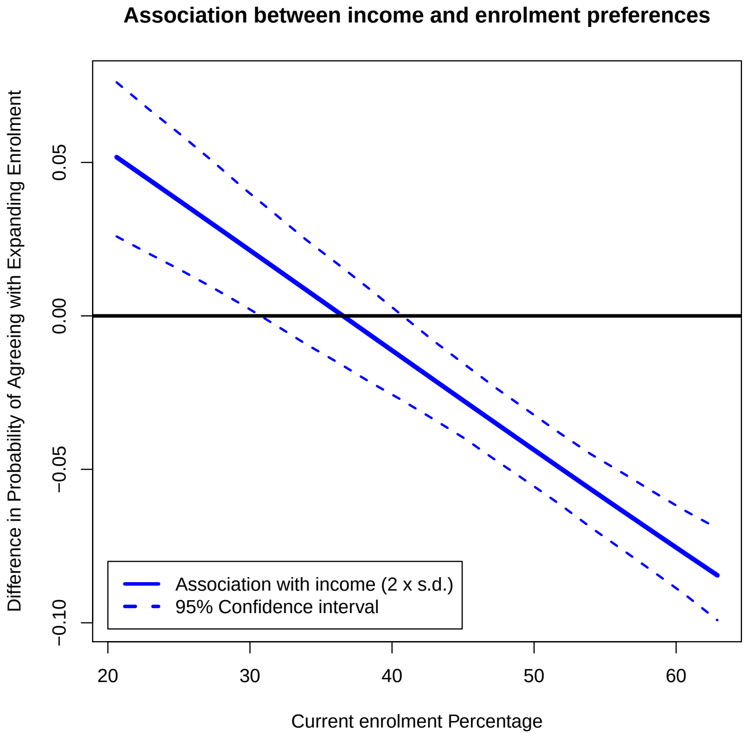
All in all these analyses demonstrate strong support for the predicted effect of an individual's education level on preferences regarding enrolment. At low levels of enrolment, highly educated individuals were more likely than their lesser educated compatriots to favour expanding higher education. At higher levels of enrolment, however, they become more likely to oppose it. While a negative effect of income is found, this effect – as predicted – does not trump the positive effect of education.

4.4.1 Alternative explanations of enrolment preferences

The analysis now turns to testing the alternative explanations of enrolment preferences in the literature. Income is of particular interest, given its centrality in other theories of higher education politics. Model (2) in table 4.2 present the estimates of a model for the association between income and enrolment. Figure 4.8 on the next page plots this association. The term association is used instead of effect, because confounding covariates of income – such as age, gender and education – are not included in the analysis. At first sight, we see a pattern that looks much like that predicted by Ansell (2010*a*). The rich prefer expansion of enrolment at low levels

[19] Another candidate explanation relates to differential gender participation rates in higher education. In the 1980s men were much more likely to have a higher education degree than women (the odds ratio for the BSA sample was 1.5 for 1985). In 2008, in contrast, the difference between the two gender groups became insignificant. Therefore, at low levels of enrolment in the 1980s, there were more couples where the husband is highly educated and the wife is lesser educated compared to high levels of enrolment in the 2000s. Families where the husband is highly educated are likely to have a higher income. While household income is a household level variable, education is an individual level variable. Consequently, women from such families are likely to report a high income but no higher education qualification when in fact they represent a highly educated family, whose children have an above average probability of attaining higher education. Thus, unequal attainment rates between men and women in the early years of the sample could have resulted in income being a signal of a highly educated family. This, in turn, could explain the positive (or less negative) effect of income in the early years of the sample. Further testing would be needed to corroborate this explanation.

Figure 4.8 – The association between household income and enrolment preferences

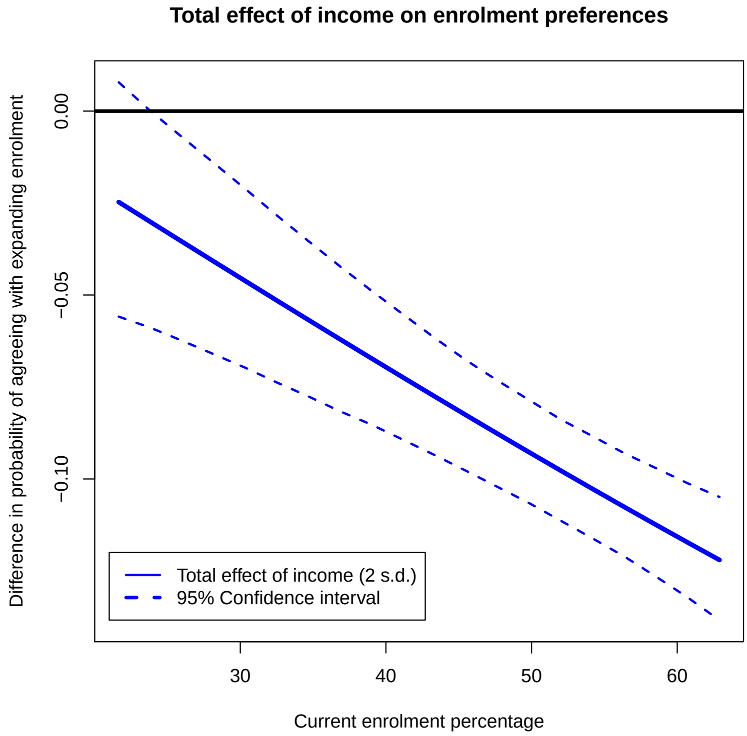


Notes: Prediction based on model (2) in table 4.2 on page 116. Because confounding variables such as education are excluded from this model, this figure presents the association between income and enrolment preferences and *not* the total effect of income on enrolment preferences.

of enrolment and the poor prefer expansion at higher levels of enrolment.

The question is whether this is a causal effect of income on enrolment preferences, or a mere spurious association explained by a third factor affecting both income and enrolment preferences. To find the actual effect of income on enrolment preferences, we have to control for the confounding variables age, gender and education. This analysis is displayed in figure 4.9 on the next page, where we find that the actual effect of income on preferences for expanding enrolment is indistinguishable from zero for enrolment rates up to 25 percent, and purely negative at enrolment rates above that. High-income individuals are thus more likely to oppose expanding enrolment, but only at high enrolment rates. As discussed above, this contrasts somewhat with my model's prediction surrounding wage premiums, namely that *ceteris paribus*, the higher an individual's income the greater her oppo-

Figure 4.9 – The total effect of household income and enrolment preferences

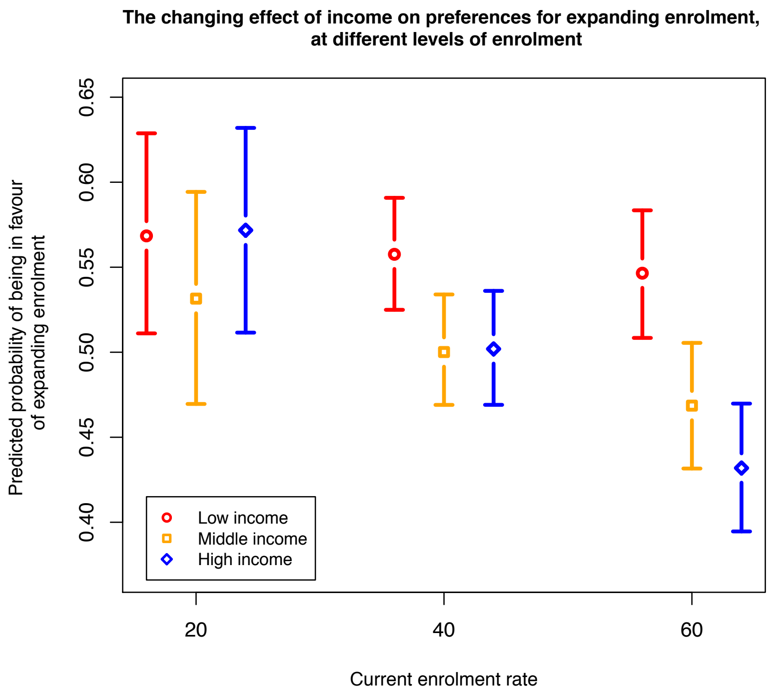


Notes: Prediction based on model (3) in table 4.2 on page 116. This model controls for the effects of confounding variables such as age, gender and education that may explain both income and enrolment preferences.

sition to expanding enrolment. A plausible explanation, as discussed above, is that the perceived marginal costs of expanding higher education are proportional to the size of higher education, for example because expansion is conceived of as a percentage increase rather than an absolute increase. My model, in contrast, assumed constant marginal costs. Specifying my model in relative changes (for example by taking the log of enrolment), would result in similar predictions for the effect of income.

That notwithstanding, it is still possible that the relationship between income and enrolment is more complex and non-linear. Both Fernandez and Rogerson (1995) and Ansell (2008*b*, 2010*a*) speak of the potential for a conflict of the ends (the poor and the rich) against the middle. Under income dependent access, they argue, middle incomes are likely to benefit most from expansions of higher education. The

FIGURE 4.10 – ENROLMENT PREFERENCES OF HIGH, MIDDLE AND LOW INCOMES, AS A FUNCTION OF ENROLMENT



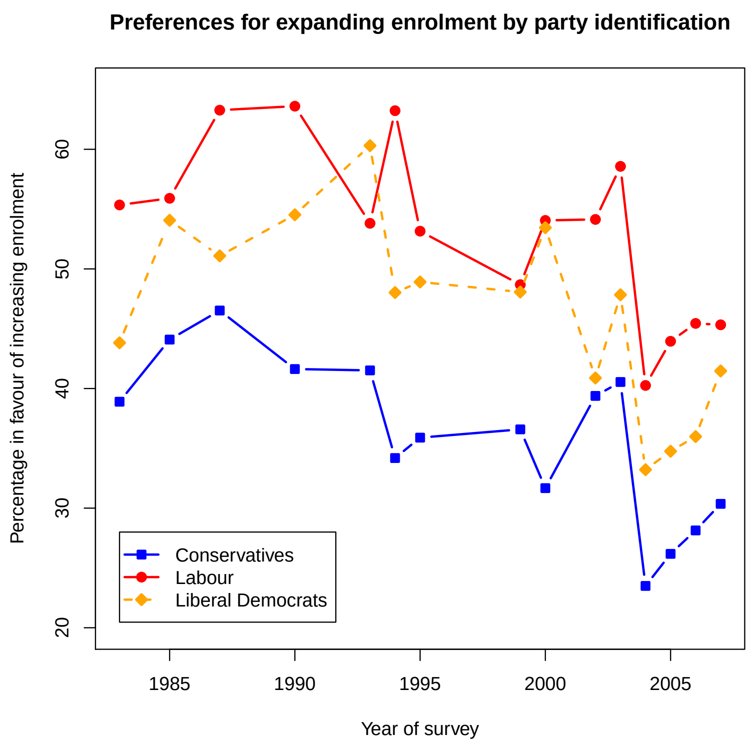
Notes: Average treatment effects based on model (4) in table 4.2 on page 116.

poor do not like publicly funded higher education because they do not attain it, the rich like it less because they also have to pay more for it. Middle income families may be the main beneficiary of expanding higher education (Fernandez and Rogerson 1995, Ansell 2008*b*, 2010*a*, Busemeyer 2009). To test these theoretical predictions I include a variable for the top and middle third of the income distribution in model (4) in table 4.2.[20] Moreover, both income category dummies are interacted with income. This set-up allows us to detect non-linear income effects, in which the enrolment preferences of middle income groups can be distinct from those of the rich and poor.

Figure 4.10 plots the predicted probability of supporting expanding enrolment for each of the three income groups, at three levels of enrolment. At low rates of enrolment, the enrolment preferences of the three income groups are indistin-

[20]The bottom third is implicitly defined when these two dummies are zero. I divide the household income into three thirtiles. Given that the household income variable is not continuous the cutpoints are the closest cutpoints to 33.3 percent.

Figure 4.11 – Enrolment preferences by party identification in Britain



Source: British Social Attitudes Surveys (1983-2007)
Notes: Descriptives based on last vote variable

guishable. As enrolment expands further into the middle third (i.e. between 33.3 percent and 66.7 percent), the percentage of middle and high incomes that agrees with expanding enrolment decreases. While the enrolment preferences of the high and middle incomes decrease with increased admission, the enrolment preferences of low income individuals stay stable. This analysis does not provide strong support for an expansion of higher education driven by middle incomes. Nevertheless, with enrolment expanding, figure 4.9 on page 127 and 4.10 on the preceding page do suggest a negative linear effect of income on pro-enrolment preferences as predicted by the income tax model in the previous chapter. However, as we saw in the analysis above, the effect of education tends to trump this effect of income.

Partisanship is another prominent explanation in the literature (Ansell 2008*b*, 2010*a*, Iversen and Stephens 2008, Busemeyer 2009). Partisanship is often used interchangeably with income. That is, the rich are generally assumed to have in-

Table 4.5 – The effect of partisanship on enrolment preferences in Britain

Model	5	6	7	8
Higher educated		2.309***		2.270***
		(0.498)		(0.492)
Student		8.740***		8.683***
		(6.797)		(6.753)
Female		1.094***		1.094***
		(0.0336)		(0.0336)
Age		0.986***		0.986***
		(0.00101)		(0.00102)
Has children		1.099**		1.098**
		(0.0518)		(0.0518)
Age of children		1.013***		1.013***
		(0.00424)		(0.00424)
Income (normalised)		1.101		1.109*
		(0.0656)		(0.0680)
Enrolment rate		0.990***	0.989***	0.989***
		(0.00389)	(0.00366)	(0.00406)
Higher educated × enrolment		0.982***		0.983***
		(0.00378)		(0.00380)
Student × enrolment		0.968**		0.968**
		(0.0134)		(0.0134)
Income × enrolment		0.995***		0.995***
		(0.00110)		(0.00113)
Conservative	0.487***	0.525***	0.542***	0.494***
	(0.0144)	(0.0180)	(0.0515)	(0.0621)
Liberal (Democrat)	0.719***	0.763***	0.797	0.887
	(0.0290)	(0.0343)	(0.120)	(0.169)
Conservative × enrolment			0.998	1.001
			(0.00185)	(0.00236)
Liberal (Democrat) × enrolment			0.998	0.997
			(0.00281)	(0.00347)
Constant	1.150*	3.426***	1.925***	3.464***
	(0.0846)	(0.725)	(0.361)	(0.764)
Panel-specific σ	0.0753***	0.0380***	0.0422***	0.0380***
	(0.0284)	(0.0154)	(0.0163)	(0.0155)
Observations	23651	19204	23651	19204
Years	15	14	15	14

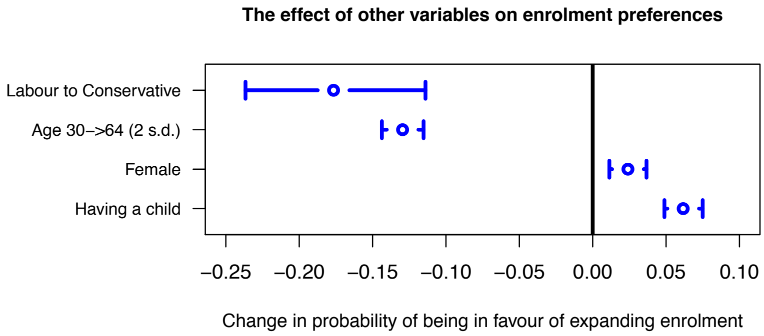
Sources: British Social Attitudes Surveys (1985-2007) for all variables except for enrolment, which is from UNESCO Institute of Statistics.
Notes: Outcome variable is a dichotomous variable for whether the respondent was in favour of expanding opportunities for higher education. Low income thirtile is implicitly defined by the high and medium income dummies. Multilevel random effects logistic regression. Coefficients are odds ratios (i.e. 1 is "no effect"). Standard errors in parentheses. *** $p < .01$; ** $p < .05$; * $p < .10$

terests best represented by parties of the Right and the poor have interests best represented by parties of the Left. Are there distinct preferences when we compare partisan supporters of different parties? To begin with, let us look at the raw data. Figure 4.11 on page 129 plots the percentage in favour of expanding higher education among those who identify as Conservative, Liberal or Labour supporters.[21] The graph shows a consistent gap between 1983 and 2007 of approximately 15 percent between labour supporters and conservative party supporters. These data do not show the kind of partisan inversion predicted by Ansell (2008*b*, 2010*a*), where the Right would be the champion of expanding access at low levels of enrolment, and the Left would become the champion at higher levels of enrolment. Instead, the Left constituency is the consistent champion of expanding enrolment, and the liberal democrats fall somewhere in between.

This pattern is confirmed by the models in table 4.5 on the preceding page. Model (5) presents the association between partisanship and enrolment preferences, while model (6) controls for factors possibly confounding this relationship (income, education, age, etc.) Models (6) and (7) present the same model but test for a partisanship inversion, where those on the Right favour expanding higher education at low levels of enrolment and those on the Left favour expanding higher education at high levels of enrolment. All in all, the picture that emerges is one in which Conservative voters are consistently more opposed to increasing enrolment than Labour voters. Moreover, this relationship holds even when controlling for confounding factors such as age, gender and income, suggesting that there is an independent effect of ideology rather than an effect of income through ideology. There is no support for a partisan inversion hypothesis. This constant effect of partisanship over time is puzzling given that the association between income and enrolment preferences showed a clear relationship with enrolment. After all, if the rich were to consistently vote Conservative then we would expect a partisan inversion in line with

[21] The exact question for party identification is: "If there were a general election tomorrow, which political party do you think you would be most likely to support?"

Figure 4.12 – The effect of partisanship, age, gender and children on enrolment preferences

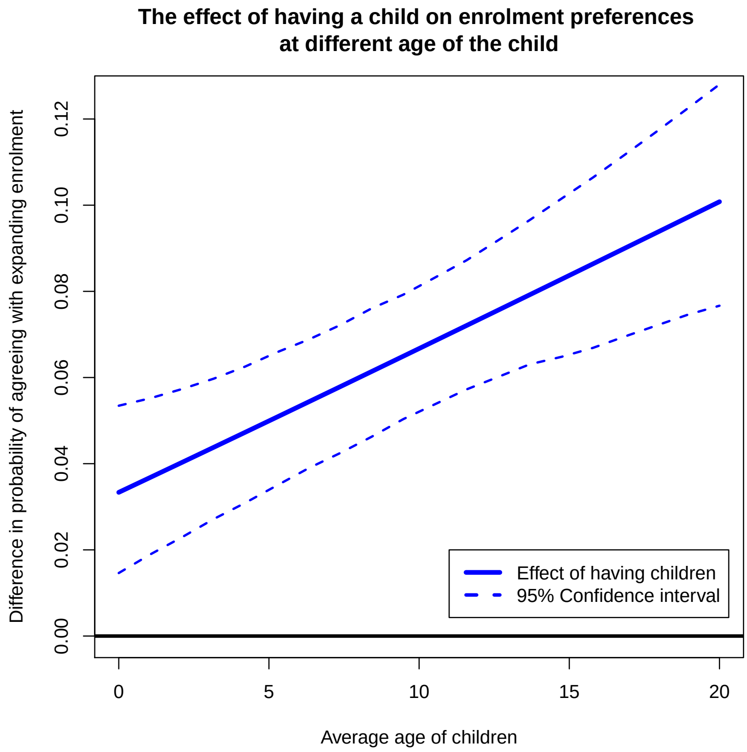


Source: British Social Attitudes Surveys (1983-2007)
Notes: Average treatment effects of several control variables on enrolment preferences. Estimates based on model (6) in table 4.5 on page 130.

that presented in figure 4.8. Instead, the effect of Left partisanship on enrolment preferences is *constant* while the preferences of different income groups *change* at different levels of enrolment. As I will argue in the next chapters of this dissertation, our income based models of political behaviour may be too simplistic. All in all, this picture provides some support to those who argue that Left partisanship is associated with expanding access to higher education (Iversen and Stephens 2008, Busemeyer 2009). That effect, however, coexists with a strong effect of education in line with the model of higher education policy preferences proposed in this dissertation.

Last, figure 4.12 highlights some of the control variables of enrolment preferences. First, there is the negative effect of age. The direct effect of two standard deviations in age (e.g. an individual moving from age 30 to 64), is about thirteen percent. One potential explanation is that older people are less likely to have (or expect to have) children who will benefit from higher education. Moreover, women are about 2.5 percent more likely to be in favour of expanding enrolment than men. While this may tap into distinct gender-based pattern preferences for welfare state policies (Iversen and Rosenbluth 2010), another explanation lies in the fact that women were for a long time underrepresented in universities. In addition to the

FIGURE 4.13 – THE EFFECT OF HAVING CHILDREN ON ENROLMENT PREFERENCES IN BRITAIN



Source: British Social Attitudes Surveys (1983-2007)
Notes: Average treatment effects of several control variables on enrolment preferences. Estimates based on model (6) in table 4.5 on page 130.

strong picture of group-interests uncovered in the preceding analyses, there is some evidence of specific self-interest. Figure 4.13 plots the predicted effect of having children of different ages. The closer children get to university going age, the more likely parents are to support expanding enrolment.

To sum up, this section provides strong support for the relationship hypothesised in the theoretical models of the previous chapter. Highly educated individuals are more likely to be in favour of expanding higher education at low levels of enrolment, and less likely to favour expansion at higher levels of enrolment.[22] Most of this effect is a direct consequence of education. There is, however, a growing negative indirect

[22] A caveat to be added to this analysis of the interaction effect between enrolment and higher education relates to the number of observations at the macro-level. There were fourteen years available between 1985 and 2008 that had data on enrolment preferences, income and individual education. This does not allow enough degrees of freedom to control for other rival macro-level variables that may explain this interaction.

effect through the higher income of highly educated respondents. As predicted in the formal model, the effect of education trumps the negative effect of income.

At the purely associational level there is a positive relationship between income and enrolment preferences at low levels of admission. However, once I control for confounding variables such as gender, age and education, this relationship disappears. The actual relationship between income and enrolment preferences is insignificant at low levels of enrolment and becomes increasingly negative as higher education expands to mass levels. No evidence was found for a distinct middle income effect on enrolment preferences. Party identification has an independent effect, suggesting that ideology, unrelated to income and other individual characteristics, plays a supplementary role in shaping enrolment preferences.

4.5 Preferences for higher education financing in Britain

Besides predicting policy preferences regarding enrolment, the formal model also predicts that highly educated individuals are likely to prefer high per-student public spending and favour public over private financing of higher education. Lesser educated individuals, in contrast, are expected to prefer lower per-student public spending and to favour private over public financing of higher education. The logic behind these hypotheses is based on the fact that children of highly educated parents have a substantially higher probability of enrolling in university. Therefore, all else (including income)being equal, highly educated families are the net-beneficiaries of expanding subsidies to higher education. However, preferences are likely to not only be informed by considerations of "who benefits?", but also by considerations of "who pays?". The position of the highly educated is interesting in this respect. On the one hand, their children are much more likely to benefit from higher education. On the other hand, highly educated individuals are more likely to have higher incomes, and therefore shoulder a greater share of the costs through progressive income taxes. The model in the previous chapter considered the conditions under which highly educated families are the net beneficiaries of higher education subsidies. The model predicts threshold values of enrolment up to which highly educated families are the net beneficiaries. These thresholds are generally higher than the thresholds predicted for preferences regarding expanding enrolment. For all countries bar Finland, this threshold value is predicted to be higher than the actual level of enrolment, meaning that highly educated families are the net beneficiaries of subsidies to higher education. Highly educated individuals are thus predicted to prefer generous subsidies and public higher education, despite their higher income. A first goal of this section is to test this hypothesis.

My argument stands in sharp contrast with the popular conception of generously funded public higher education as a means of promoting access for children from middle and low-income families (Fernandez and Rogerson 1995, Iversen and Stephens 2008, Busemeyer 2009).[23] The second goal of this section is to compare the explanatory power of the education based hypothesis, developed in the formal model in chapter three, against that of income based explanations found in the literature review in chapter two. Are 'outsiders' looking to lower the cost barrier to increase the chances of access to higher education for their children? Or, are 'insiders' looking to increase their exclusivity following from their children's already high probability of attaining higher education?

To answer these questions I again use data from the British Social Attitudes Surveys. Unfortunately, the BSA data does not provide us with a consistent question on per-student spending across all years. Instead, there are four different questions that tap into preferences over per-student spending. These questions were asked at different points in time in only a few surveys. Between 1983 and 1990 the question was "*When British students go to university or college they generally*

[23]Recall that Ansell (2008*b*, 2010*a*), on the other hand, recognises the distributive effects of per-student spending but assumes that these effects depend on the level of enrolment. At low levels of enrolment, the rich attain higher education and benefit from generous subsidies. At higher levels of enrolment, the middle and poor income start attaining higher education and benefit from generous per-student subsidies. If this theory holds we would expect a positive effect of income on preferences over fees and grants in early, low enrolment years and a negative effect of income for questions in later years, when enrolment was higher.

get grants from the local authority. Do you think they should get grants as now, or loans which would have to be paid back when they start working?" The two response categories were (0) "*loans*" and (1) "*grants*". Between 1995 and 2000, the question became more nuanced: "*And, at present, some full-time British university students get grants to help cover their living costs. Getting a grant depends upon the student's circumstances and those of their family. Generally speaking, do you think that... (1) all; (2) some; (3) no students should get grants*". This last question is recoded into a binary variable that is one for those who answered (1), i.e. those who think that all students should get grants, and zero if either of the other two options was chosen.

Similarly, the question about fees changes from a dichotomous question to a more nuanced three category question. From 1993 to 1995 three surveys asked "*At present, British-university students get their teaching fees paid by their local authorities. Do you think that students should ... (0) pay something towards their own teaching fees; or (1) local authorities should continue to pay the whole amount*" From 1999 to 2007 four surveys asked a variant of the question " *At present, some full-time university students have to pay a 1,000 pounds tuition fee. Others have all or part of the fee paid by the government. Whether they have to pay or not depends upon the student's circumstances and those of their family. Do you think that... (1) all; (2) some; or (3) no students or their families should pay towards their tuition costs while they are studying* ". For analysis the last question is recoded into a binary variable that is one for those who answered (3) (i.e. those who think there should be no tuition costs) and zero otherwise.

All these questions tap into preferences for per-student spending and preferences regarding the public/private mix in the financing of higher education.[24] However, the different choice options and dimensions of spending – a maintenance grant or a waiver of tuition costs – mean that they do not provide commensurate measures

[24]Recall from the previous chapter that the direction of preferences over the public/private mix are expected to be correlated with preferences over the size of per-student subsidies.

of per-student spending preferences. This makes it difficult to directly test for an interaction between per-student spending preferences and enrolment (as, for example, predicted by Ansell (2008*b*, 2010*a*)). Nevertheless, we may be able to detect a reversal of the sign of the effect of income or higher education by comparing questions asked during early – low enrolment – times with questions asked during later – high enrolment – times.

I use a similar statistical approach to the previous section on enrolment preferences. First, I check whether we can detect a total effect. Controlling for the confounding covariates age and gender, I regress fee and grant preferences on higher education. The total effect estimation is then similar to equation 4.4 on page 114, minus the macro-level variable enrolment and the cross-level interaction between enrolment and a respondent's education:

$$\text{logit}(\pi_{ij}) = \gamma_0 + \gamma_1 T_{ij} + \sum_{k=1}^{K} \lambda_k X_{kij} + (\mu_j + \epsilon_{ij}) \tag{4.7}$$

where π_{ij} is the probability of an individual agreeing with the response category on the fee or grant question that is favourable to students (e.g. "grants for all" or "no fees"); γ_0 is the model's constant; γ_1 is the coefficient for the effect of the explanatory variable T_{ij} (higher education); and λ_k are the coefficients for the $k = 1, 2, ...K$ confounding covariates (X_{kij}) that could affect both the explanatory variable and the outcome (i.e. age and gender).

To detect whether the effect of education is direct or indirect, I also check for the effect of possible mediators, such as income and having children. To this end I also estimate models that include these mediators.

$$\text{logit}(\pi_{ij}) = \gamma_0 + \gamma_1 T_{ij} + \sum_{l=1}^{L} \gamma_l M_{lij} + \sum_{k=1}^{K} \lambda_k X_{kij} + (\mu_j + \epsilon_{ij}) \tag{4.8}$$

where γ_l is the coefficient for the $l = 1, 2, \ldots, L$ mediators (M_{lij}) (income, and a dummy for having children).

Table 4.6 – Preferences over grants to students in Britain, 1985-2000

Question	Grants over Loans (1985–1990)						Grants for all over grants for some/none (1995–2000)					
Model	1	2	3	4	5	6	1	2	3	4	5	6
Higher educated	1.888***	2.104***	2.090***	2.052***		1.903***	0.789*	0.851	0.813	0.819		0.850
	(0.246)	(0.292)	(0.290)	(0.291)		(0.308)	(0.0987)	(0.116)	(0.109)	(0.113)		(0.132)
Student	2.233**	1.613	1.632	1.340		2.216	2.027**	1.896	1.931	1.757		1.492
	(0.846)	(0.676)	(0.683)	(0.565)		(1.218)	(0.713)	(0.824)	(0.839)	(0.768)		(0.783)
Female	1.304***	1.290***	1.296***	1.310***		1.312***	1.145*	1.162*	1.167*	1.170*		1.154
	(0.0765)	(0.0829)	(0.0832)	(0.0864)		(0.0978)	(0.0901)	(0.0982)	(0.0988)	(0.100)		(0.109)
Age	0.980***	0.978***	0.978***	0.979***		0.982***	0.998	1.000	1.000	1.000		1.003
	(0.00167)	(0.00211)	(0.00211)	(0.00217)		(0.00252)	(0.00219)	(0.00262)	(0.00266)	(0.00268)		(0.00303)
Has children		1.270***	1.258***	1.229***		1.284***		1.273***	1.262**	1.216**		1.259**
		(0.0862)	(0.0853)	(0.0850)		(0.101)		(0.117)	(0.115)	(0.113)		(0.131)
Income (normalised)		0.881***		0.888***		1.010		0.900**		0.924*		0.931
		(0.0327)		(0.0337)		(0.0459)		(0.0408)		(0.0426)		(0.0489)
Middle income (middle 3rd)			0.906						0.858			
			(0.0796)						(0.0927)			
High income (top 3rd)			0.759***						0.829*			
			(0.0632)						(0.0880)			
Enrolment preferences				2.052***						1.604***		
				(0.134)						(0.135)		
Conservative					0.411***	0.378***					0.598***	0.621***
					(0.0253)	(0.0317)					(0.0593)	(0.0677)
Liberal (Democrat)					0.648***	0.611***					0.689***	0.713**
					(0.0661)	(0.0800)					(0.0920)	(0.102)
Constant	4.725***	4.771***	5.342***	3.131***	3.261***	6.404***	0.432***	0.366***	0.411***	0.285***	0.500***	0.367***
	(0.751)	(0.853)	(1.032)	(0.555)	(0.397)	(1.244)	(0.0543)	(0.0588)	(0.0762)	(0.0484)	(0.0283)	(0.0673)
Panel-specific σ	0.0503***	0.0494***	0.0485***	0.0425***	0.0502***	0.0460***	0.00142*	0.00370***	0.00319***	0.00240**	1.65e-30	1.79e-09
	(0.0440)	(0.0440)	(0.0432)	(0.0384)	(0.0385)	(0.0420)	(0.00485)	(0.00716)	(0.00674)	(0.00629)	(.)	(0.00000320)
Observations	5659	4838	4838	4737	5762	3773	3203	2891	2891	2828	2617	2334
Years	3	3	3	3	4	3	3	3	3	3	3	3

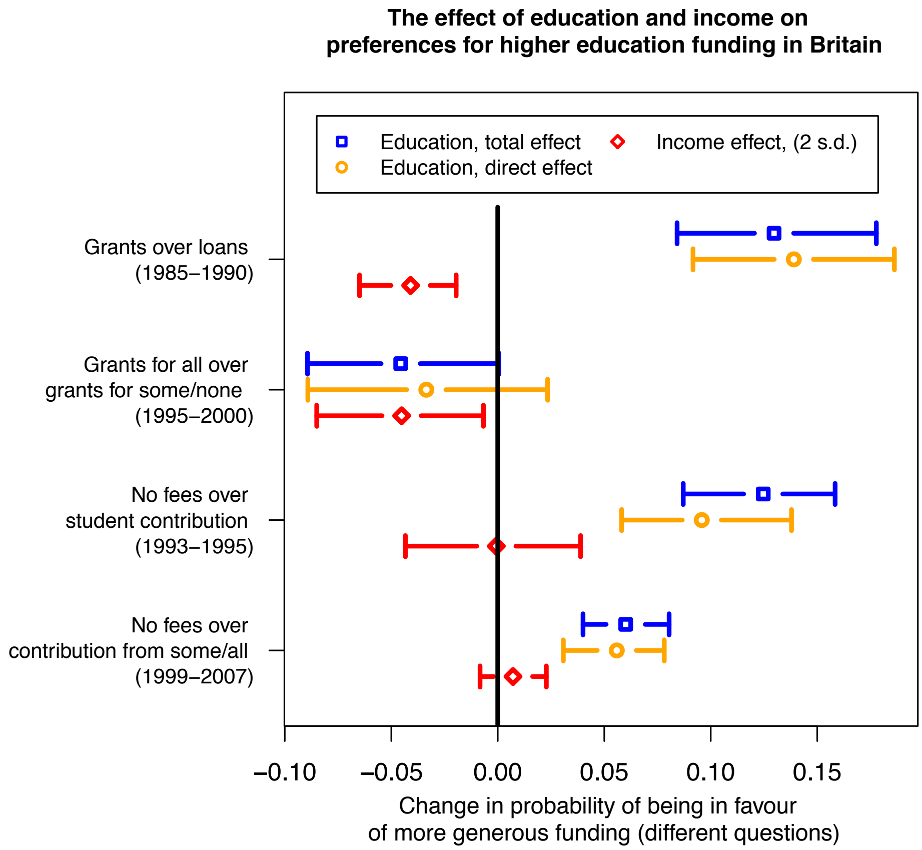
Sources: British Social Attitudes Surveys (1985-2000)
Notes: Outcome variables: dichotomous variable for favouring grants (1) over loans (0) (six models on the left side), recoded dichotomous variable for favouring grants for all students (1) over grants for some/no grants at all (0) (six models on the right side). Low income thirtile is implicitly defined by the high and medium income dummies. Multilevel random effects logistic regression. Coefficients are odds ratios (i.e. 1 is "no effect"). Standard errors in parentheses. *** $p < .01$; ** $p < .05$; * $p < .10$

Table 4.7 – Preferences over tuition fees in Britain, 1985-2007

Question	No fees over student contribution (1993–1995)						No fees over contribution from some/none (1999–2007)					
Model	1	2	3	4	5	6	1	2	3	4	5	6
Higher educated	2.509***	2.477***	2.474***	2.489***		2.450***	1.325***	1.310***	1.303***	1.332***		1.339***
	(0.423)	(0.443)	(0.440)	(0.456)		(0.482)	(0.0637)	(0.0708)	(0.0697)	(0.0785)		(0.0832)
Student	7.112***	7.061***	7.155***	6.913***		5.388**	1.473***	1.240	1.231	1.179		1.118
	(5.149)	(5.157)	(5.226)	(5.055)		(3.974)	(0.213)	(0.238)	(0.236)	(0.247)		(0.267)
Female	1.535***	1.463***	1.471***	1.473***		1.504***	1.057	1.070*	1.068	1.074		1.043
	(0.119)	(0.122)	(0.123)	(0.125)		(0.138)	(0.0391)	(0.0433)	(0.0432)	(0.0476)		(0.0489)
Age	0.984***	0.988***	0.988***	0.989***		0.988***	0.999	1.001	1.001	1.003*		1.004**
	(0.00213)	(0.00260)	(0.00263)	(0.00264)		(0.00293)	(0.00106)	(0.00129)	(0.00131)	(0.00143)		(0.00158)
Has children		1.471***	1.468***	1.452***		1.422***		1.173***	1.172***	1.173***		1.226***
		(0.139)	(0.138)	(0.138)		(0.149)		(0.0517)	(0.0516)	(0.0566)		(0.0643)
Income (normalised)		1.018		1.024		1.077		1.023		1.049*		1.056**
		(0.0470)		(0.0479)		(0.0568)		(0.0227)		(0.0256)		(0.0284)
Middle income (middle 3rd)			1.084						0.919			
			(0.118)						(0.0479)			
High income (top 3rd)			1.073						1.048			
			(0.114)						(0.0545)			
Enrolment preferences				1.367***						1.262***		
				(0.114)						(0.0560)		
Conservative					0.661***	0.665***					0.854***	0.882**
					(0.0594)	(0.0681)					(0.0404)	(0.0466)
Liberal (Democrat)					0.957	0.919					1.110*	1.051
					(0.117)	(0.123)					(0.0671)	(0.0697)
Constant	4.345***	3.251***	3.045***	2.675***	3.331***	3.806***	0.386***	0.320***	0.327***	0.264***	0.397***	0.282***
	(0.538)	(0.505)	(0.555)	(0.436)	(0.225)	(0.673)	(0.0454)	(0.0417)	(0.0448)	(0.0383)	(0.0414)	(0.0408)
Panel-specific σ	0.00263***	2.68e-18	1.48e-21	6.84e-29	0.00238**	9.69e-10	0.0698***	0.0755***	0.0751***	0.0768***	0.0694***	0.0803***
	(0.00590)	(1.96e-10)	(4.57e-12)	(.)	(0.00636)	(0.00000246)	(0.0391)	(0.0423)	(0.0421)	(0.0466)	(0.0394)	(0.0455)
Observations	3603	3194	3194	3128	3073	2694	15233	13371	13371	11274	11750	10060
Years	3	3	3	3	3	3	7	7	7	6	7	7

Sources: British Social Attitudes Surveys (1993-2007)
Notes: Outcome variables: dichotomous variable for no fees (1) over a student contribution (0) (six models on the left side), recoded dichotomous variable for no fees (1) over a student contribution from some / all (0) (six models on the right side). Low income thirtile is implicitly defined by the high and medium income dummies. Multilevel random effects logistic regression. Coefficients are odds ratios (i.e. 1 is "no effect"). Standard errors in parentheses. *** $p < .01$; ** $p < .05$; * $p < .10$

Figure 4.14 – The effect of education and income on preferences for per-student spending and the public/private mix



Source: British Social Attitudes Surveys (1985-2007) *Notes:* Various outcome variables. Average treatment effects of education and income. Total effect estimate on model (1) in tables 4.6 and 4.7. Direct effect estimate based on model (2) in the same tables.

The results of both analyses are presented in table 4.6 and table 4.7 for preferences on grants and fees, respectively. Moreover, figure 4.14 plots the total effect of education, the direct effect of education and the effect of income on the probability of agreeing with the more generous student funding response option to each of the four questions. For the early grants question, as well as for both fee questions, the total effect of higher education is positive and significant. The direct effect of higher education is very close to the total effect, suggesting that most of the effect of higher education on per-student funding preferences is direct, and not mediated by the effect of higher education on household income.

The effect of income is negative for both grant questions. This suggests some reluctance on the part of richer individuals to foot the bill for the higher education of other people's children. Nevertheless, the effect of income on the first (1985-1990) grant question is eclipsed by the effect of education. On average, an increase in income of two standard deviations reduces an individual's probability of being in favour of grants by only four percent. In contrast, a change in an individual's education level to being highly educated increases the probability of preferring grants over loans by fourteen percent. The significantly positive total effect of thirteen percent suggests that, despite their substantially higher income, highly educated individuals are more likely to be in favour of providing grants instead of loans. The total and direct effect of higher education on an individual's probability of agreeing with the second grant question is insignificantly different from zero. A potential explanation for the absence of an effect of education on the answer to this question is in the wording of the question. The criteria by which "some" students should have their fees paid is left unspecified. Some respondents may interpret "some" as "high ability students", while others may interpret it as "only those whose parents do not have the means". In the former case, highly educated parents may be more likely to prefer "some" over "all", but in the latter case, highly educated parents (given their on average higher income) may prefer "all" over "some".

For both fee questions there is a significantly positive total and direct effect of education. The effect of income on preferring no tuition fees is insignificantly different from zero for both questions. For the early fees question, the total effect of an individual's education is around thirteen percent and the direct effect around ten percent.[25] The later fees question may suffer from ambiguities surrounding the criteria for the category "some". There are, nonetheless, a significant positive total effect of 6 percent and a direct effect of around 5.5 percent. In short, highly

[25] Given that the expected value of the income effect is zero, this negative indirect effect has to come from some other mediating variable. As discussed above and reported in table 4.4 on page 121, highly educated individuals are also less likely to have children in their household. Combining this observation with the finding that all models report a positive effect of having children on fee and grant preferences, we can expect a negative indirect effect of education – through a lower probability of having children – on funding preferences.

educated individuals are significantly more likely to be in favour of no fees at all. In contrast to the grants questions, there is no negative effect of income on the responses to the fee question. A potential explanation is that the transfer is more visible in the case of grants than in the case of fees.

A closer look at the regression tables teaches us a few more things about preferences for higher education spending. Four models are presented for each question. Model (1) is the total effect estimation (equation 4.7 on page 137), controlling for confounding covariates. The effect of being a student is generally strongly positive, but statistically insignificant. A likely explanation is the small percentage of students in the sample for each question, which inflates standard errors. For the early grant and fee questions, there is a significant positive effect of gender and a significant negative effect of age. The gender effect could have several explanations. First, a gender gap in university enrolment explains a stronger motivation for women to increase access university, as was found in the previous section on enrolment preferences. Second, women may internalise the interests of their children more than men. Related to this, women are more likely to have children in their household if the relationship with the father discontinues (see table 4.4 on page 121 for some statistical evidence). Third, these preferences may be part of wider gender patterns of preferences for welfare spending (Iversen and Rosenbluth 2010). The other confounding covariate, age, shows that older people are less likely to be in favour of generous per-student funding. One explanation is that older people are less likely to have or expect children in the age categories that benefit from higher education funding. While the analysis presents strong evidence for a group-level effect of education, there is also evidence of additional self-interested motivations. Model (2) presents the results of the estimation that includes mediating variables such as income and having children. The effects of income have already been discussed above: there is only a small negative effect for the first grant question. The other mediating variable – having children – has a positive and significant effect on the response to all four questions. Individuals with children are more likely to be in favour of generous per-student funding (through grants or a waiver of fees). Interestingly, table 4.4 on page 121 shows that highly educated individuals are less likely to have children. This suggests that there is a small negative indirect effect of higher education on fee preferences, mediated by the probability of having children.

Some have suggested that the middle incomes will be the strongest proponents of increased higher education funding (Fernandez and Rogerson 1995, Ansell 2008*b*, 2010*a*, Busemeyer 2009). Recall that these arguments rely on two assumptions. First, they assume income dependent access. Given that the rich already attend university, middle incomes are likely to be the next in line to benefit from newly generated places in higher education (Fernandez and Rogerson 1995, Ansell 2008*b*, 2010*a*, Busemeyer 2009). Assuming income-dependent access, lowering costs is a way of expanding enrolment (Fernandez and Rogerson 1995, Austen-Smith 2003). Second, given that the middle incomes pay less in taxes than the rich, the provision of higher education to middle and high incomes is in effect a transfer from the rich and poor to the middle. Model (3) tests the hypothesis that middle incomes are more likely to be in favour of generous per-student funding than the poor and rich. Analogous to the analysis of enrolment preferences, I include a binary variable for whether an individual had a high income (top third) and a binary variable for whether an individual had a middle income (middle third).[26] For the middle income hypothesis to hold, we would expect a significantly positive effect of the middle-income variable. Models numbered (3) yields an effect of middle incomes that is insignificantly different from that of low incomes for both of the grant questions in table 4.6 and the fee questions in table 4.6. The BSA data therefore seem to reject the middle income hypothesis when it comes to per-student funding. This finding challenges the popular assumption that free access is favoured by those seeking admission.

[26]Recall that this way low incomes are implicitly defined by both these binary variables being zero.

Table 4.8 – The effect of higher education on fee and grant preferences is predominantly direct and only slightly mediated by its effect on enrolment preferences

	Grants		Fees	
	1985-1990	1995-2000	1993-1995	1999-2007
Total effect	2.146***	0.829	2.536***	1.311***
	(0.130)	(0.108)	(0.493)	(0.0957)
Indirect effect	1.064***	1.005	1.024***	0.983***
(through opporunities)	(0.00950)	(0.0199)	(0.00612)	(0.00247)
Direct effect	2.016***	0.824*	2.475***	1.333***
	(0.125)	(0.0924)	(0.496)	(0.0992)
Observations	4737	2828	3128	11274

Source: British Social Attitudes Surveys (1985-2007)
Notes: Logistic breakdown analysis results using method described in Buis (2010). Coefficients are odds ratios (i.e. 1 is "no effect"). Control variables include income, gender, age, student, having children and a year dummy for fixed effects. The Buis (2010) method does not provide separate coefficients for controls. Bootstrapped standard errors in parentheses.
*** $p < .01$; ** $p < .05$; * $p < .10$

Model number(4) further tests whether preferences for student funding are driven by considerations of outsider access or by considerations of insider benefit. To do so, I control for the effect of enrolment preferences. After all, if the effect of education were entirely related to considerations of outsider access, then holding enrolment preferences constant would render the education effect insignificant. While there is a significant correlation between enrolment preferences and grant and fee preferences, its inclusion hardly affects the coefficient for education. Therefore, it is unlikely that preferences in favour of expanding enrolment drive preferences for low fees. Instead, this result suggests that most of the effects of education on fee preferences are independent of the effects directly related to the benefits of low fees to those consuming higher education. However, given this positive effect of opportunities preferences on fee and grant preferences, and given the effect of education on enrolment preferences found in the previous section, there may well be a significant indirect effect. Therefore, table 4.8 shows the results of a breakdown analysis using the Buis (2010) procedure described above. The results for the second grant question are again insignificant and not further discussed here.[27] The results for the

[27] See discussion above for a potential explanation relating to the ambiguous phrasing of the question

other three questions confirm that the direct effects of higher education on fee and grant preferences dwarf the indirect effects through enrolment preferences.[28] Nevertheless, there is a small but significant effect in the expected direction. At low levels of enrolment the indirect effect is positive and statistically significant. This is the case for the questions up to 1995 when enrolment was relatively low[29], which includes the early grant and fees questions. This positive effect can be explained by the positive effect of higher education on enrolment preferences at these lower levels of enrolment. The insignificant results of the second grants question were discussed above. In later years, with higher levels of enrolment, the indirect effect becomes negative. This is the case for the fee question asked between 1999 and 2007. Despite this small negative indirect effect, there is still a strong positive total effect of higher education on fee preferences. This analysis rejects a popular misconception, namely that preferences regarding fees and grants are driven by access considerations. While there is a minor effect of such considerations, the dominant effect shows that those insiders already likely to consume higher education seek to increase their insider benefits.

Next, models (5) and (6) consider the relationship between party identification and preferences for spending. Model (5) looks at the uncontrolled association between partisan identification on preferences for per-student spending. Only identifications with the three main parties were included in the analysis. The base-category is Labour, the two alternative categories are Liberal (Democrat) and Conservative. Conservatives and Lib-Dems alike are less likely to favour grants over loans. However, Lib-Dems are as likely as Labour identifiers to oppose fees. Model (6) controls for the variables that may affect party identification and preferences for enrolment, to see whether there is an actual effect of ideology. Interestingly, the effects of partisanship in model (6) are surprisingly similar to the associations in model (5). This suggests that party identification has an effect that is independent of an individual's

[28] The odds ratios are commensurate because both enrolment preferences and higher education are on a dichotomous scale.

[29] See figure 4.1 on page 110 for an overview of enrolment rates in Britain.

household income, education, gender, age and family composition. This hints at a role for ideology in shaping preferences about higher education policy.

Turning back to the questions posed at the beginning of this section we can conclude that the "who gets?" imperative prevails over the "who pays" imperative. Education – which is strongly related to whose children are likely also to attain higher education – has positive and significant, total and direct effects on preferences for grants and preferences for abolishing tuition fees. Income – which determines who pays – only has a minor negative effect on the first grants question, and no effect on fee preferences. All in all, these findings provide strong support for the education based model of higher education policy preferences proposed in the last chapter. Furthermore, the results challenge the predictions of income based theories of higher education preferences.

4.6 Higher education as a budget priority in Britain

Most comparative studies in the political economy of higher education use some measure of aggregate spending on higher education. Iversen and Stephens (2008) and Busemeyer (2009) look at higher education as a percentage of GDP and Ansell (2008*b*, 2010*a*) uses the percentage of the education budget devoted to higher education in his empirical analysis. A caveat with using preferences over aggregate budgets is that they are not clearly informative about the distributive implications of changes in spending. After all, an increase in the higher education budget can be used for more generous subsidies to a select few, or it can be used for an expansion of the number of higher education places. Simplifying somewhat, we can view the higher education budget as the product of enrolment and per-student funding (i.e. Budget= Total Enrolment $\times$ Per-student spending). Preferences over the budget are then plausibly a consequence of an individual's enrolment preferences and an individual's per-student spending preferences. In forming preferences over the higher education budget, it is unclear what relative weighting individuals as-sign to preferences over enrolment and preferences over per-student spending. That notwithstanding, we would expect someone who is in favour of both expanding enrolment and increasing per-student spending to be most in favour of increasing the higher education budget. In contrast, someone who would like to see enrolment decreased but subsidies to students increased may have a more neutral view on expanding higher education funding. From our model's predictions in table 3.2 on page 88 and the subsequent evidence in this chapter we know that 1) enrolment in Britain over this period passed the threshold for preferences of enrolment (h_h^*) but that enrolment is still below the threshold for preferences over subsidies (h_σ^*) so that highly educated families still benefit from increasing per-student spending. We thus expect the highly educated to be more in favour of expanding spending on higher education at low levels of enrolment. At higher levels of enrolment it is not certain how the countervailing preferences over enrolment and per-student subsidies combine to form preferences over overall spending. This is the question to be assessed empirically in this section.

Again, the British Social Attitudes data provides us with some good information about government spending preferences in general, and education spending preferences in particular. First, the survey asks individuals which areas of government spending they think should have the highest and second highest priority.[30] This question includes a list of ten broad categories of government spending such as health care, defence, and education.[31] Second, the survey asks which areas of education spending should have the highest and second highest priority.[32] The response categories include 1) nursery or pre-school, 2) primary school, 3) secondary school, 4) children with special needs, 5) university education.[33] Each of these ques-

[30]The exact phrasing of the question is "Here are some items of government spending. Which of them, if any, would be your highest priority for extra spending?"

[31]All categories are education, defence, health, housing, public transport, roads, police and prisons, social security benefits, help for industry and overseas aid

[32]The exact phrasing of the question is: "Now some questions about education. Which of the groups on this card, if any, would be your highest priority for extra government spending on education?"

[33]This question is consistently asked until 2004. Beyond 2004 the option "further education" was added, which changes the options available for choice. Hence, the analysis only includes years

tions is followed up with a question about the second highest priority for spending, presenting the same list of options, minus the category chosen as the first priority.

To create a question that taps into preferences for "more money to higher education" I create a dummy variable that is one if 1) a respondent ranked education as a top two government spending priority, and 2) a respondent ranked higher education as a top two government education spending priority.[34] The strength of these questions is that they force a budget prioritisation choice on respondents. This avoids an often cited problem with surveys of spending preferences, which is that most people do not respond to survey questions with a budget constraint in mind: they want the government to simultaneously spend more on programmes across the board, provide generous tax cuts and reduce the deficit.

The approach to analysing the effect of education on this question should by now start to sound familiar. I start with an analysis of the total effect by controlling for pre-treatment covariates. I also test for the presence of an interaction between enrolment and the effect of education, given that this effect was hypothesised (and confirmed) for enrolment preferences. The results of this model are found under model (1) in table 4.9 on the next page. To analyse which of these two components is driving variance in the joint probability measure I present estimation results for both components in addition to the composite measure. Columns marked "A" provide the results for an estimation of the probability of ranking education as a top 2 government spending priority; columns marked "B" show the results of an estimation of the probability of ranking higher education as a top 2 education spending priority, conditional on having ranked education as a top 2 government spending priority; and columns marked "C" presents the results of the estimation for the overall variable, which is the joint probability of "A" and "B".

The total effect of higher education in "C" is strongly positive and statistically

up to 2004.

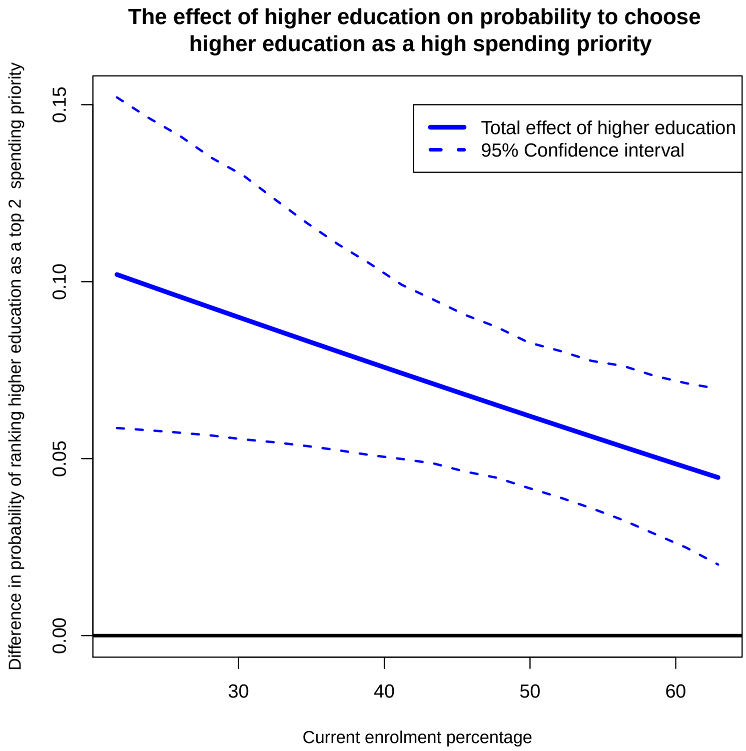
[34] Put formally, the question gives us $\Pr(\mathrm{E}_i = 1 \cap \mathrm{HE}_i = 1) = \Pr(\mathrm{E}_i = 1) \times \Pr(\mathrm{HE}_i = 1 | \mathrm{E}_i = 1)$ where E_i equals one if respondent i lists education as a top two government spending priority and HE_i equals one if higher education is listed as a top two government education spending priority.

Table 4.9 – Higher education as a government spending priority in Britain. The role of education and income

Model	(1)			(2)			(3)			(4)		
Analysis	A	B	C	A	B	C	A	B	C	A	B	C
Higher educated	1.808***	1.851***	2.253***	1.491**	1.625**	1.749***	1.349***	1.370***	1.469***	1.357***	1.341***	1.458***
	(0.337)	(0.407)	(0.450)	(0.302)	(0.385)	(0.379)	(0.0829)	(0.0979)	(0.0985)	(0.0783)	(0.0903)	(0.0920)
Student	0.774*	6.204***	3.642***	1.067	6.565***	4.294***	1.036	6.475***	4.117***	1.069	6.583***	4.316***
	(0.106)	(1.033)	(0.480)	(0.179)	(1.394)	(0.707)	(0.179)	(1.426)	(0.705)	(0.180)	(1.399)	(0.711)
Female	1.232***	0.968	1.068	1.242***	1.050	1.143***	1.256***	1.036	1.132***	1.237***	1.047	1.138***
	(0.0394)	(0.0425)	(0.0434)	(0.0437)	(0.0502)	(0.0508)	(0.0463)	(0.0518)	(0.0526)	(0.0435)	(0.0500)	(0.0505)
Age	0.981***	1.008***	0.997***	0.988***	1.008***	1.001	0.990***	1.010***	1.003*	0.989***	1.008***	1.001
	(0.000907)	(0.00136)	(0.00119)	(0.00110)	(0.00165)	(0.00148)	(0.00116)	(0.00175)	(0.00157)	(0.00111)	(0.00166)	(0.00149)
Has children				1.548***	0.605***	0.781***	1.529***	0.633***	0.799***	1.555***	0.606***	0.783***
				(0.0836)	(0.0456)	(0.0544)	(0.0856)	(0.0494)	(0.0577)	(0.0839)	(0.0457)	(0.0546)
Age of children				1.028***	1.044***	1.048***	1.026***	1.040***	1.044***	1.029***	1.044***	1.048***
				(0.00516)	(0.00657)	(0.00603)	(0.00531)	(0.00676)	(0.00621)	(0.00516)	(0.00656)	(0.00603)
Enrolment rate	1.013***	0.996	1.002	1.015***	0.996	1.003	1.015***	0.997	1.004	1.017***	1.003	1.011***
	(0.00251)	(0.00322)	(0.00274)	(0.00263)	(0.00345)	(0.00291)	(0.00263)	(0.00381)	(0.00318)	(0.00297)	(0.00410)	(0.00353)
Higher educated × enrolment	0.995	0.993*	0.992**	0.998	0.996	0.996						
	(0.00347)	(0.00407)	(0.00371)	(0.00380)	(0.00443)	(0.00408)						
Income (normalised)				1.437***	1.414***	1.656***	1.448***	1.375***	1.620***			
				(0.0803)	(0.115)	(0.122)	(0.0803)	(0.110)	(0.118)			
Income × enrolment				0.996***	0.994***	0.992***	0.996***	0.995***	0.993***			
				(0.00111)	(0.00156)	(0.00143)	(0.00111)	(0.00155)	(0.00141)			
Enrolment preferences							1.447***	1.648***	1.814***			
							(0.0531)	(0.0830)	(0.0851)			
High income (top 3rd)										2.077***	2.362***	3.227***
										(0.256)	(0.422)	(0.530)
High income × enrolment										0.993***	0.985***	0.982***
										(0.00247)	(0.00345)	(0.00317)
Middle income (middle 3rd)										1.414**	1.542**	1.828***
										(0.192)	(0.312)	(0.340)
Middle income × enrolment										0.999	0.993*	0.993**
										(0.00267)	(0.00385)	(0.00355)
Constant	1.912***	0.310***	0.187***	0.954	0.287***	0.130***	0.743**	0.197***	0.0847***	0.669**	0.191***	0.0735***
	(0.251)	(0.0538)	(0.0275)	(0.137)	(0.0562)	(0.0217)	(0.107)	(0.0424)	(0.0154)	(0.108)	(0.0440)	(0.0146)
Panel-specific σ	0.0124***	0.0203***	0.0137***	0.0132***	0.0231***	0.0150***	0.0126***	0.0282***	0.0183***	0.0134***	0.0225***	0.0141***
	(0.00692)	(0.0111)	(0.00797)	(0.00752)	(0.0129)	(0.00906)	(0.00767)	(0.0160)	(0.0112)	(0.00758)	(0.0126)	(0.00865)
Observations	17457	10703	17457	15366	9473	15366	14108	8698	14108	15366	9473	15366
Years	11	11	11	11	11	11	10	10	10	11	11	11

Source: British Social Attitudes Surveys (1985-2007)
Notes: Three outcome variables used for each model. A: Pr(E=1), the probability that an individual ranks education as a top 2 government spending priority; B: Pr(HE=1|E=1), the probability that an individual ranks higher education as a top 2 government spending priority, conditional on having ranked education as a top 2 government spending priority; C: Pr(E=1∩HE=1), the joint probability that an individual ranks education as a top 2 government spending priority and higher education as a top 2 education spending priority. Multilevel random effects logistic regression. Coefficients are odds ratios (i.e. 1 is "no effect"). Standard errors in parentheses. *** $p < .01$; ** $p < .05$; * $p < .10$

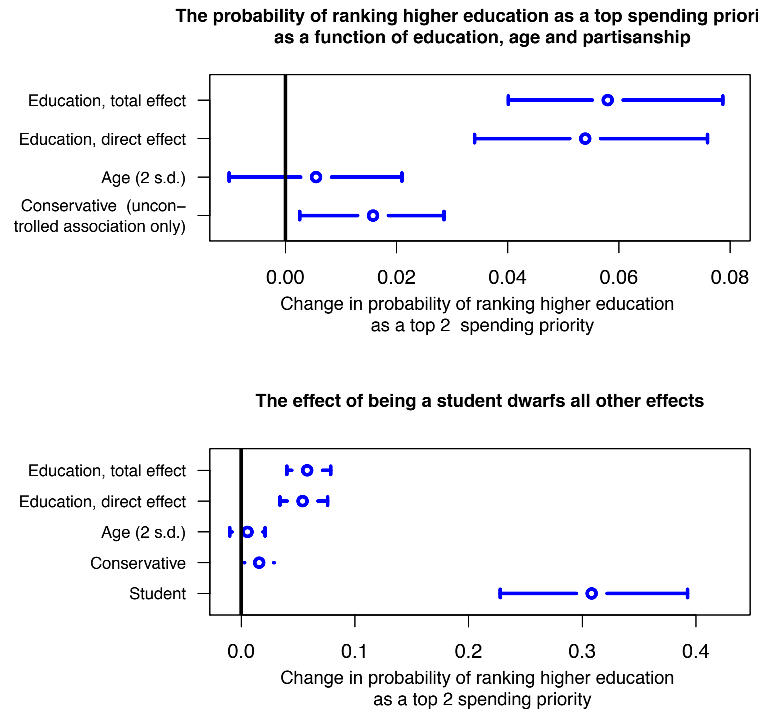
Figure 4.15 – The total effect of education on ranking higher education as a top two spending priority



Notes: Average treatment effect at different levels of enrolment. Simulation based on model (1), column "C" in table 4.9.

significant. There is also a significant interaction between the total effect of education and enrolment, which is plotted in figure 4.15. This results in the predicted effect of higher education from ten percent at low levels of enrolment to around five percent at high levels of enrolment. While there is a small drop as enrolment increases, probably because the highly educated start to oppose expanding enrolment, the overall effect remains significantly positive. The remaining positive effect is likely to be caused by the preferences of highly educated families for high per student spending. These figures may sound small but are in fact quite substantial when we keep in mind that 1) higher education is chosen amongst many other rival areas of spending, and 2) on average only fifteen to twenty percent of respondents lists higher education as a top two spending priority. Furthermore, the results in table 4.9 show that higher education affects both the probability of prioritising ed-

FIGURE 4.16 – The effect of education and other variables on ranking higher education as a top two spending priority



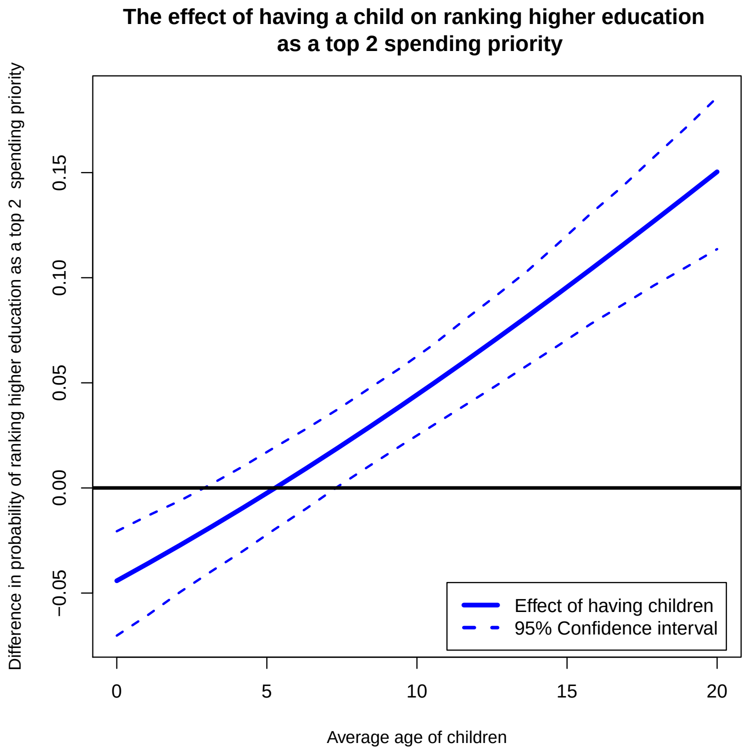
Notes: Average treatment effect at different levels of enrolment. Simulation based on model (2), column "C" in table 4.9. Total effect based on model(1) in the same table, which is the average treatment effect across different levels of enrolment.

ucation expenditure in the overall budget and the probability of prioritising higher education within the education budget.[35]

Next, I control for the two candidate mediators: having children and income. The results of this analysis are presented under model (2) in table 4.9. The weakly significant interaction effect disappears in this model, and is therefore dropped from subsequent models. We now obtain the direct effect (plotted in figure 4.16). Note that the direct effect is very close to the total effect. This suggests that most effects of education on higher education spending priorities are direct and that there is only a limited effect taking place through mediating third variables. Moreover, strong effects of higher education remain for both "A" and "B". That is, highly educated people are more likely to prioritise education spending, and within

[35]In addition, being a student strongly affects the probability of choosing higher education as a top two spending category ("C"). This effect is mainly driven by the strong positive effect on the priority students give to higher education within the education budget ("B").

Figure 4.17 – The effect of having children (and their age) on ranking higher education as a top two spending priority

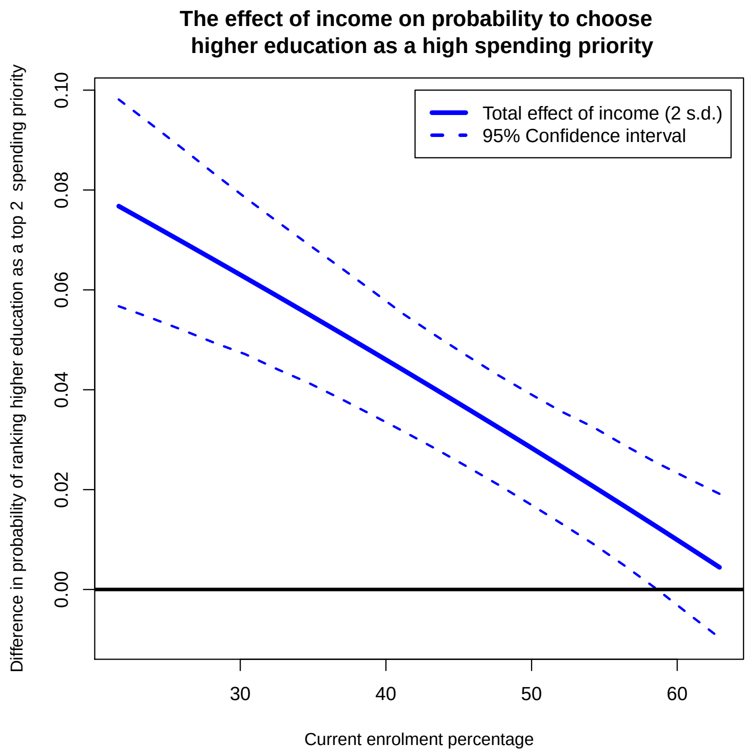


Notes: Average treatment effect of having children at different average ages of all children in the household.

education spending, they are more likely to prioritise higher education.

Figure 4.16 also introduces the effect of some familiar control variables. To begin with, students – the direct beneficiaries of higher education spending – top the list of effects by having a thirty percent higher probability of ranking higher education as a top spending priority. There is also strong positive effect of having children, and especially of the relevant age. Figure 4.17, which plots this effect at different ages of the children, shows that parents with children of university going age are predicted to be 15 percent more likely to favour spending on universities than parents without children. First, parents are generally much more likely to prioritise education spending ("A"). Second, while parents with young children are less likely to prioritise higher education spending, parents with older children are substantially more likely to prioritise higher education spending. The data again

Figure 4.18 – Uncontrolled association between income and enrolment.



Notes: Average treatment effect. Simulation based on model (2) in table 4.9.

show us a very clear pattern of parents holding preferences in the (changing) interest of their children.

In addition, there is a positive effect of income, which declines with increasing enrolment. Figure 4.18 plots the total effect of income on higher education priorities. Individuals with high incomes are more likely to list higher education as a high spending priority, but only at low levels of enrolment. The results under model (3) in table 4.9 show that income affects both the probability of prioritising education spending and the probability to then prioritise higher education spending. This finding challenges partisan theories that claim that the poor are most likely to favour increases in higher education spending. It provides some initial support, however, for Ansell's theory that the rich may prefer public spending on higher education. This finding also poses a question for the theory developed in the previous chapter, which predicts that income will always have a negative effect on spending and enrolment preferences. The finding is particularly puzzling given the negative effect of income on both preferences on enrolment and the insignificant or negative effects of income on preferences over per-student spending in the previous section. If preferences over the higher education budget are simply the product of these two components we would have expected a negative effect for this question as well.

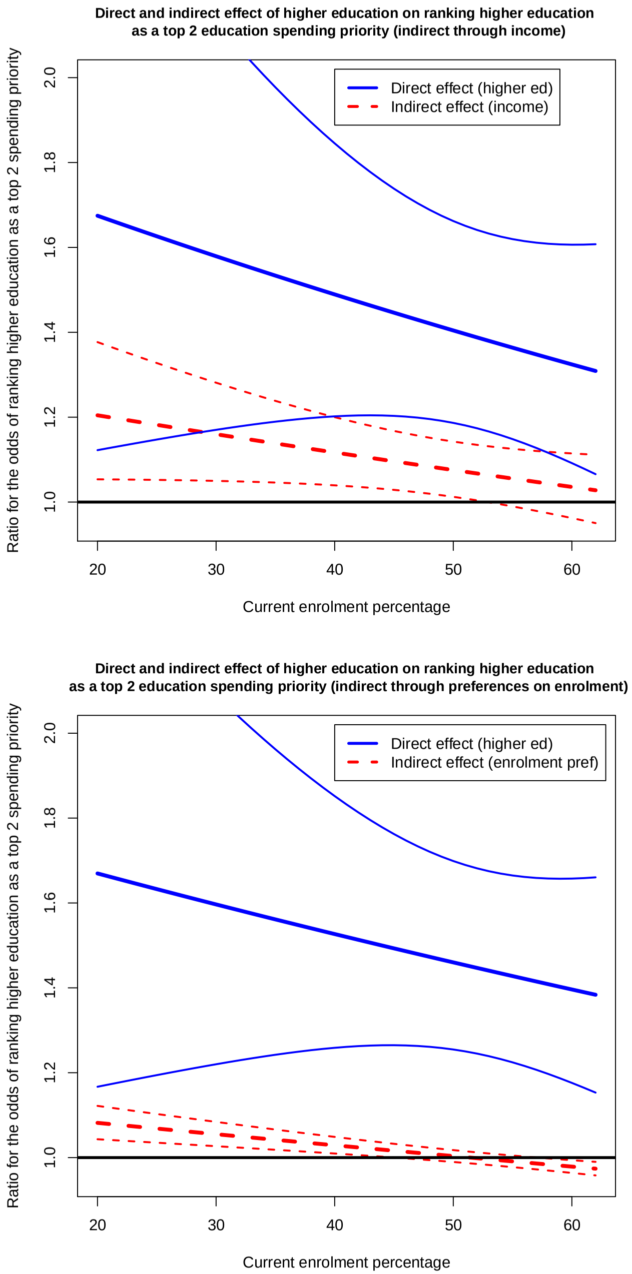
A potential explanation of this positive effect of income can be found in the nature of the prioritisation used in questions employed in this analysis. In this question, “cut all government spending” is not an option offered to respondents. Instead, respondents are pushed to prioritise an area for spending increases. Hence, individuals may choose the spending option that they consider the least redistributive. People with high incomes may be less inclined to prioritise more redistributive universal government spending on health, social-security benefits, or industry. Moreover, within education they would be more likely to pick selective higher education over more universal and redistributive forms of higher education spending such as primary and secondary education.[36,37]

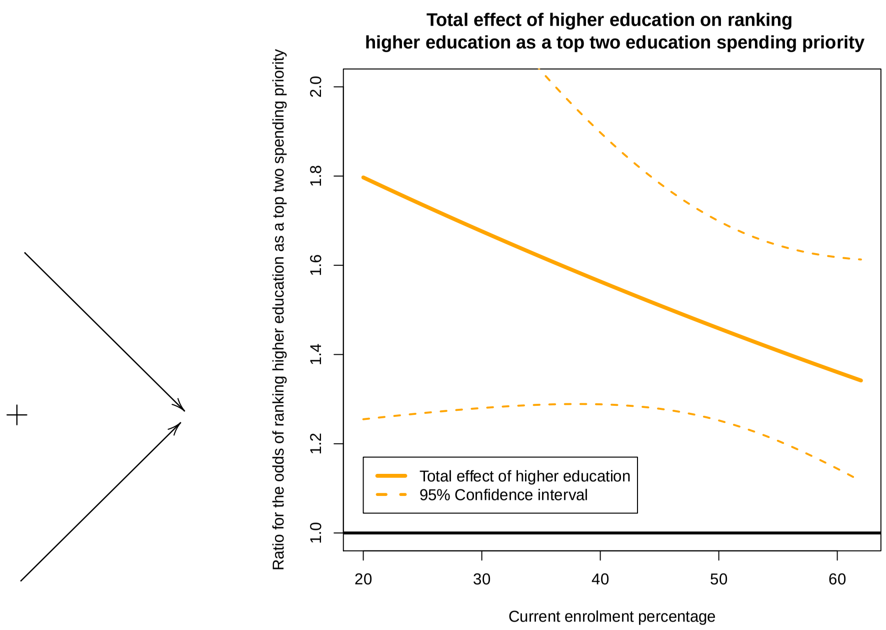
In addition, I explore the effect of the indirect effect of higher education through higher income. The top graph of Figure 4.19 shows us the result of a cursory breakdown analysis of the effect of education into a direct effect and an indirect effect, through income. The analysis uses the same breakdown approach by Buis (2010) described above. The indirect effect, expectedly, follows the same pattern as figure 4.18: a positive effect at low levels of enrolment and no effect at high levels of enrolment. Again, the direct effect dominates the indirect effect. This brings us to another important question: to what extent is the effect of higher education on education spending priorities driven by the effect of education on enrolment preferences, and to what extent is it driven by per-student spending priorities? To answer

[36] The earlier explanation relating to unequal gender participation rates could apply here as well. Household income can be a signal of having a highly educated spouse in the early years of the sample. See footnote 19 on page 125 for this explanation.

[37] An additional reason for the rich to oppose subsidies to these categories of education expenditure may be that their children are more likely to be enrolled in private pre-university education and therefore do not benefit from such subsidies.

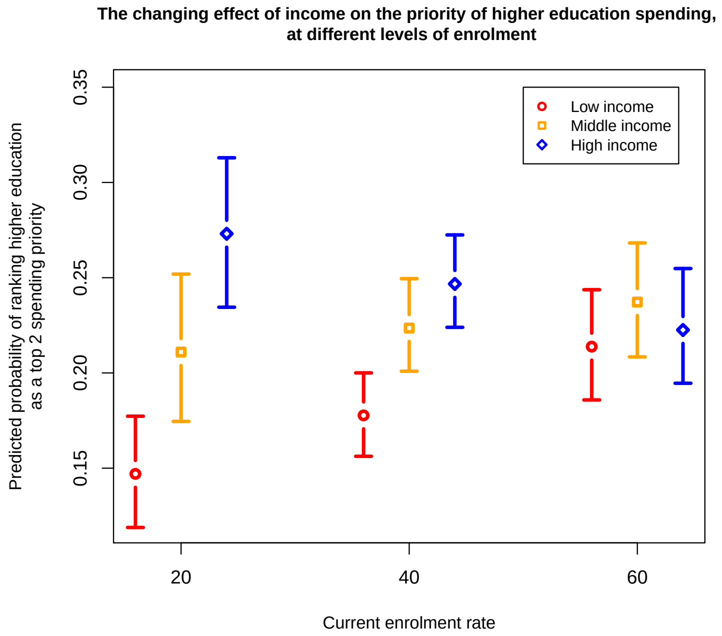
FIGURE 4.19 – BREAKDOWN OF THE EFFECT OF HIGHER EDUCATION ON EDUCATION AS A SPENDING PRIORITY: MEDIATION THROUGH INCOME AND ENROLMENT OPPORTUNITIES





Notes: Breakdown analysis using method by Buis (2010). Figures present odds ratios as the Buis method does to present a full table of coefficients of control variables to estimate predicted probabilities. Note that the exponential nature of odds ratios increases the absolute size of the confidence intervals at higher odds ratios. The higher bands for the direct effect of higher education still leave us confident that this effect is positive.

Figure 4.20 – The total effect of household income on ranking higher education as a spending priority



Notes: Average treatment effect. Based on model (4) in table 4.9 on page 149

this question, model (3) in table 4.9 on page 149 controls for enrolment preferences. The resulting effect of enrolment preferences on the probability of selecting higher education as a spending priority is significant and substantial (an odds ratio of 1.8). That notwithstanding, there is also a strong remaining and substantial direct effect of higher education, independent of enrolment preferences. This remaining direct effect would be the effect of higher education on per-student spending preferences. This suggests that both per-student spending considerations *and* enrolment preferences drive higher education spending preferences. The bottom graph of figure 4.19 plots the indirect effect of higher education through enrolment preferences. This effect turns from a significant positive effect to a significant negative effect, exactly as we would expect based on reversal pattern found in the section on enrolment preference above.[38]

[38] In particular, the pattern found in figure 4.6 on page 123.

I now turn to analysing the effect of alternative explanations provided in the literature. A linear effect of income has already been discussed above. In contrast to what is claimed by Iversen and Stephens (2008) and Busemeyer (2009), individuals with high incomes – if any – are likely to be most in favour of prioritising higher education as a spending category. Model (4) in table 4.9 further explores whether there is possibly a non-linear effect of income, where middle-incomes are the strongest supporters of higher education spending. Figure 4.20 on the preceding page plots the results of this analysis. No support is found for the middle-income hypothesis. Instead, high income respondents are most likely to prioritise higher education spending at enrolment rates up to 40 percent. An interesting auxiliary finding is that low incomes have substantially increased their support for higher education as enrolment expands.[39]

To summarise, the analysis in this section confirms a strong positive total and direct effect of a respondent's education level on their probability of ranking higher education as a top spending priority. While in part higher education spending preferences are driven by preferences for expanding enrolment, there is a strong independent direct effect of education on spending preferences as well. This suggests, as for the analysis of preferences on grants and fees, that there is a separate per-student funding component to policy preferences regarding higher education. To be precise, people whose children are more likely to attain higher education also want the government to spend more on it.

Besides these positive effects of education, there are additional effects of income. Those with high incomes are more likely to favour spending on higher education, especially at low levels of enrolment. This challenges the assumption that the Left will always champion increasing higher education spending. This finding contradicts the expectation of a negative effect of partisanship and income based on the findings of the previous sections, where rich respondents both opposed fees and opposed

[39]This is the result of a consistent positive association found in all models between the enrolment rate and the probability of ranking education as a top government spending priority ("A").

expanding enrolment. Plausibly, I argued, this effect is the result of the nature of the survey question where respondents are constrained into making a choice between different areas of government spending, with cuts to the entire budget not being presented as an option. Hence, rich respondents may choose an option they deem the least redistributive. As in the analyses in the previous two sections, no evidence was found for specific preferences of middle-income groups.

4.7 Validation

All in all, the evidence in the previous three sections provides strong support for the hypotheses derived from the theory developed in the previous chapter. However, a caveat in the use of this evidence is that we are left uncertain about their generalisability. The analysis may demonstrate that the mechanism is at work in Britain, but does the same mechanism apply elsewhere? There are no *a priori* expectations for the application of the theory to be limited to specific country contexts. It is nevertheless worthwhile testing whether the theory can be generalised to others settings. However, as discussed at the start of this chapter, there is insufficient survey data available to run a proper cross-national, individual-level analysis. I therefore rely on several other country-level surveys identified in my survey of surveys. Besides Britain, I identified three other countries that have surveys which contain useful questions about higher education policy preferences: Austria, Sweden and Canada. None of these surveys ask questions relating to expanding enrolment. The questions relate to preferences about spending per student, the public/private mix of higher education funding and preferences regarding spending on higher education in general (i.e. the overall size of the budget).

4.7.1 Australia

For Australia, three surveys were identified asking different questions about higher education policy preferences. The first is the National Social Science Survey, 1987-

1988, which asks a set of questions on policy preferences.[40] The relevant higher education question asks whether individuals want to increase spending on universities. There are five ordinal response categories: 1) much more, 2) more, 3) the same, 4) less, 5) much less. Respondents are warned that if they say "more", it might require a tax increase.[41] Two rounds of the Australian Survey of Social Attitudes, conducted in 2003 and 2005, asks if respondents agree that university education should be free of fees and charges.[42] Again, there are five response categories: 1) strongly agree; 2) agree; 3) neither agree nor disagree; 4) disagree; 5) strongly disagree.[43] Last, the Australian National University's (ANU) Poll, which runs a quarterly national representative survey on an issue of national importance, ran a poll on Higher Education in 2008.[44] This poll has various questions regarding higher education spending, the most relevant of which asks *"If the government had to choose between spending more on universities or reducing taxes, which would you prefer?"* The four response categories were: 1) Strongly favour spending more on university education; 2) Mildly favour spending more on university education; 3) Depends; 4) Favour reducing taxes. Each of these questions were recoded into a binary response variable that is one for individuals were in favour of spending more on higher education, or making higher education free, and zero otherwise.

Between 1986 and 2008, the enrolment rate expanded from 29 percent to 77 percent.[45] Assuming an average parental education effect size, the theory in the previous chapter predicts that the highly educated will be in favour of increasing subsidies, but will start to oppose further expansions of enrolment during this period

[40]See Kelley (1991) for more survey details.

[41]The exact wording of the question is *"Q3. Here are some more areas of government spending. Please show whether you would like to see more or less government spending in each area by circling a number after each question. Remember that if you say "more", it might require a tax increase to pay for it. 3L. Universities?"*

[42]See Wilson et al. (2004) and Wilson et al. (2006) for more survey details.

[43]The exact wording of the question is *Q G5"Here are some statements about the education system in Australia. Please tell us how much you agree or disagree with each of the following statements. Statement D: University education should be free of fees and charges."*

[44]See ANUpoll (2008) for full details about this survey.

[45]Gross Enrolment Rate derived from the World Bank Education Statistics Database. UNESCO Institute for Statistics. Accessed May 7, 2011.

Table 4.10 – The effects of higher education and income on higher education spending preferences in Australia

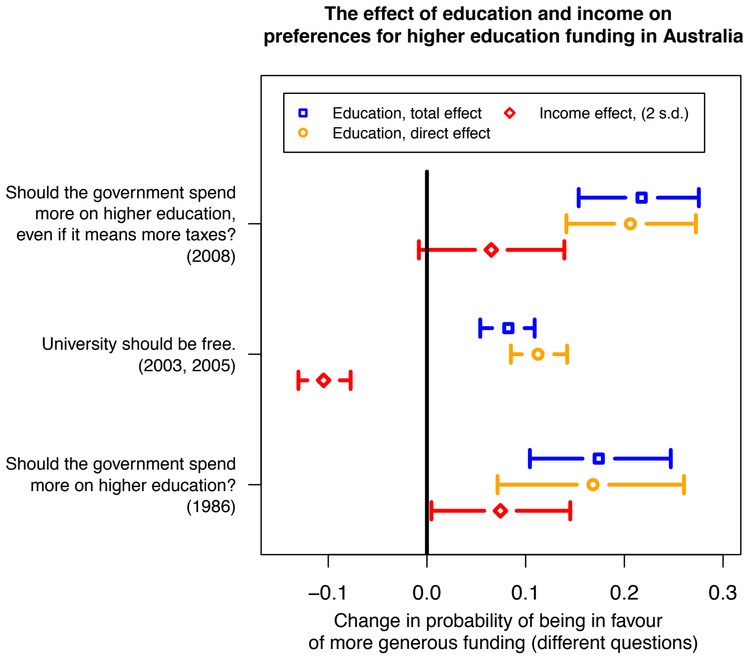
Survey Question:	1987		2003, 2005		2008	
Effect:	Total	Direct	Total	Direct	Total	Direct
Higher educated	2.021***	2.028***	1.394***	1.585***	2.483***	2.360***
	(0.298)	(0.426)	(0.0775)	(0.0953)	(0.325)	(0.345)
Age	0.995	1.004	1.007***	1.004**	1.014***	1.018***
	(0.00335)	(0.00567)	(0.00153)	(0.00178)	(0.00415)	(0.00534)
Female	1.136	1.092	1.128***	1.082	1.132	1.089
	(0.119)	(0.158)	(0.0524)	(0.0535)	(0.142)	(0.150)
Income (normalised)		1.164**		0.803***		1.139*
		(0.0858)		(0.0228)		(0.0890)
Has children		1.585***		1.267***		0.788
		(0.257)		(0.0660)		(0.119)
Student			2.007***	1.852***	1.636	1.860
			(0.279)	(0.277)	(0.605)	(0.780)
Constant	0.669**	0.332***	0.492***	0.522***	0.200***	0.200***
	(0.108)	(0.108)	(0.0502)	(0.0602)	(0.0457)	(0.0607)
Panel-specific σ			0.00485***	0.00375***		
			(0.00592)	(0.00494)		
Observations	1593	884	7650	6934	1172	981
Years	1	1	2	2	1	1

Sources: National Social Science Survey, 1987-1988 (Kelley 1991); The Australian Survey of Social Attitudes conducted in 2003 and 2005 (Wilson et al. 2004, 2006); Australian National University's (ANU) Poll 2008 (ANUpoll 2008).
Notes: Logistic regression (with random effects for the pooled 2003 and 2005 surveys). Various outcome variables, recoded to binary variables for those who favour more spending on universities. 1987: "Should the government spend more on universities?" 2003,2005: "Higher education should be free", 2008 "If the government had to choose between spending more on universities or reducing taxes, what would you prefer?". Coefficients are odds ratios (i.e. 1 is "no effect"). Standard errors in parentheses. *** $p < .01$; ** $p < .05$; * $p < .10$

of expansion. Table 4.10 presents the result of two logistic regressions for each survey.[46] For each question the first model explores the total effect of education on higher education spending preferences while the second explores the direct effect, controlling for mediating variables such as income and having children. Figure 4.21 on the facing page plots the simulated results of this analysis. The 1987 and 2008 questions relate to aggregate government spending, whereas the 2003 and 2005 question relates directly to per-student spending (i.e. no fees). In all cases the total and direct effects are positive, statistically significant and substantial. In the 1987 survey, the predicted effect of higher education was around 22 percent. For a similar question in 2008, the total and direct effects of higher education were still around

[46] In case of the two country waves it is a multi-level random effects logistic regression.

FIGURE 4.21 – THE EFFECT OF HIGHER EDUCATION AND INCOME ON HIGHER EDUCATION SPENDING PREFERENCES IN AUSTRALIA



Notes: Average treatment effect. Simulation based on results in table 4.10 on the facing page

18 percent. This provides especially strong support for the hypotheses because the question made people choose between tax reductions and higher education spending increases. Highly educated respondents in Australia, despite their higher income, are more likely to prefer increases to higher education spending over tax reductions.

The 2003 and 2005 questions show that being highly educated on average increases the probability of preferring higher education to be free by over 10 percent. Income has a significant negative effect on the response to this question. A two standard deviation increase in income reduces the probability of being in favour by about 10 percent. Notwithstanding this negative indirect effect of income, there is still a strong total effect of higher education. Highly educated individuals are thus more likely to be in favour of free higher education, despite their higher income.

Table 4.11 – The effect of higher education and income on higher education spending preferences in Canada

Survey Question:	"Federal government should increase funding for higher education"		"Federal government should provide funding for higher education"	
Effect:	Total	Direct	Total	Direct
Higher educated	1.846***	1.731***	2.431***	2.237***
	(0.257)	(0.259)	(0.353)	(0.351)
Female	1.022	1.051	1.051	1.111
	(0.118)	(0.126)	(0.119)	(0.132)
Age	0.960	0.951	0.839***	0.856***
	(0.0363)	(0.0383)	(0.0302)	(0.0330)
Income (normalised)		0.954		1.081
		(0.0602)		(0.0677)
Constant	1.657***	1.761***	2.812***	2.701***
	(0.241)	(0.269)	(0.401)	(0.404)
Observations	1331	1236	1483	1366

Sources: National Angus Reid Poll, January 1991. Laurier Institute for the Study of Public Opinion and Policy (LISPOP) (1991)
Notes: Logistic regression. Various outcome variables, recoded to binary variables for those who favour more spending on universities. See text for exact questions. Coefficients are odds ratios (i.e. 1 is "no effect"). Standard errors in parentheses. *** $p < .01$; ** $p < .05$; * $p < .10$

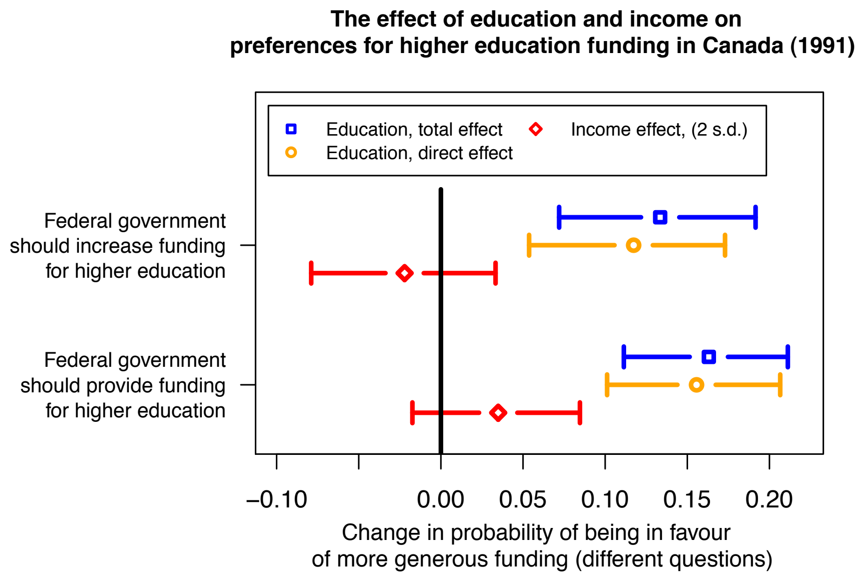
4.7.2 Canada

Next, for Canada, two questions were identified in the National Angus Reid Poll of January 1991.[47] The first question asks whether respondents agree with the statement *"The federal government should provide funds for university education"*. The four response categories are: 1) strongly agree; 2) agree; 3) disagree; 4) strongly disagree. Given that 95 percent either agrees or strongly agrees, this variable was recoded into a binary variable for the strongly agree category (66 percent). The second question is better phrased, and asks *"In your view, should the federal government's financial contribution to support the cost of university education...?"*. There are three response categories: 1) increase; 2) remain the same; 3) decrease. This question is recoded into a binary variable for those who agree with an increase (63 percent).[48]

[47] See Laurier Institute for the Study of Public Opinion and Policy (LISPOP) (1991) for more details

[48] This question is an evaluation of the current level of spending, and responses therefore depends on the level of current higher education spending. Regardless the size of this feedback effect, we would still expect highly educated respondents to prefer higher spending and lesser educated

Figure 4.22 – The effect of higher education and income on higher education spending preferences in Canada



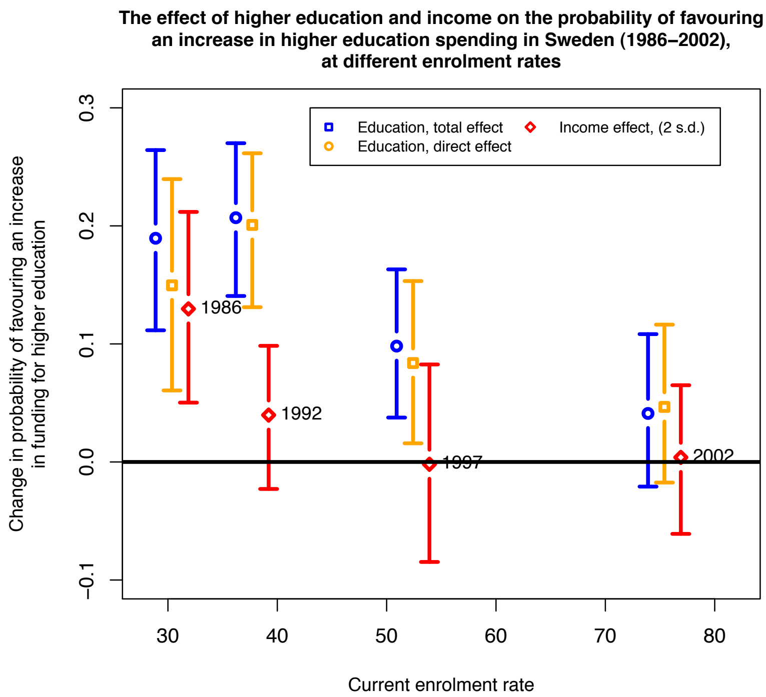
Notes: Average treatment effect. Derived from logistic regression analysis in table 4.11 on the preceding page

Table 4.11 on the facing page shows the result of two logistic regressions for each of the questions. Again, the first model explores the total effect of higher education on higher education spending preferences, the second question explores the direct effect, controlling for the mediator income.[49]. Figure 4.22 plots the simulated results of this analysis. The picture that emerges is very similar to the situation in Australia. Highly educated individuals are significantly and substantially more likely to favour spending on higher education. Since there is no significant effect of income, most effects of higher education are direct. Highly educated Canadians were around 13 percent more likely to favour higher education spending and around 16 percent more likely to strongly agree with the role of the federal government in higher education.

respondents to prefer less spending. Hence, I expect a higher probability that highly educated individuals respond that spending should increase.

[49]There was no variable for having children in this poll

FIGURE 4.23 – THE EFFECT OF HIGHER EDUCATION AND INCOME ON HIGHER EDUCATION SPENDING PREFERENCES IN SWEDEN



Notes: Average treatment effect. Simulations based on logistic regression analyses in table 4.12 on page 169

4.7.3 Sweden

Last, data from four Swedish Welfare State Surveys conducted between 1986 and 2002 by Stefan Svallfors and colleagues consistently asks a question about higher education funding to a nationally representative sample of the Swedish population.[50] The question asks whether spending on research and higher education should 1) increase, 2) be maintained, or 3) be decreased.[51] Between 1986 and 2002, the Swedish enrolment rate increased substantially from around 30 percent in 1986 to around 75 percent in 2002.[52] This variation allows us to explore the effects of expanding enrolment on preferences for higher education spending. The Swedish measure taps

[50]See Svallfors (2004*b*, 2003, 1992, 1995) for more details.

[51]This question asks for preferences about changes in spending relative to the current level of spending. It could therefore be that variations are affected by changes in spending per student, rather than by changes in preferences over the absolute level of spending. However, one would expect this level of spending to impact more on the overall level of support than on the difference between highly and lesser educated respondents.

[52]Gross enrolment rate derived from World Bank Education Database.

into preferences for the aggregate higher education budget, and does not break this down in terms of preferences over enrolment and per-student spending. I expect highly educated parents to prefer higher per-student spending at most levels enrolment. However, as the enrolment rate approaches high levels of around 75 percent, it starts coming close to the predicted threshold value of 76 percent for h^*_σ in table 3.2 on page 88 in the previous chapter. Moreover, as enrolment expands beyond 30-40 percent (the values of h^*_h and α^*_h, I expect highly educated parents to start to oppose further expansion. These two effects combined could cancel out the positive effect of higher education at high levels of enrolment.

Table 4.12 on page 169 shows the result of two logistic regressions for each of the four survey years. The first model for each year explores the total effect of higher education on higher education spending preferences, the second question explores the direct effect, controlling for the mediator income. Figure 4.23 on the facing page plots the simulated results of the direct and indirect effect of education, as well as the effect of income. At low levels of enrolment, highly educated parents are very strongly in favour of increasing higher education funding. The effect of education declines for the subsequent years and was still significantly positive in 1997 when the enrolment rate came close to fifty percent. For 2002, however, when enrolment comes close to 75 percent, the effect of education was no longer significant. This is in line with the forecast of the formal model in the previous chapter that predicts that highly educated families no longer benefit from subsidies to higher education at levels of enrolment above 76 percent.

To sum up, the survey evidence from Australia, Canada and Sweden further corroborate the model's predictions. Highly educated individuals prefer more spending on higher education than lesser educated individuals. However, the case of Sweden demonstrated that high levels of enrolment may change such preferences. Moreover, the effect of income on higher education preferences is generally found to be insignificant or negative.

4.8 Conclusion

From the preceding analyses there can be little doubt that the education level of respondents plays a major role in shaping preferences over enrolment, per-student spending, and the size of the higher educated budget in general. All in all, the analyses provide strong individual level support for the mechanisms predicted by the models developed in chapter three. The mediation analyses confirm that the positive effect of parental education on the probability of attaining higher education easily outweighs the negative effect of education through income and taxes. That is, highly educated respondents are in favour of higher per student spending and more opportunities despite their higher incomes. The effect of income on per-student spending is generally negative or insignificant.

For preferences over enrolment, the hypothesised interaction effect with the level of enrolment was found. At low levels of enrolment, highly educated respondents are more likely to favour expanding enrolment than lesser educated respondents. As enrolment expands however, this relationship declines and eventually turns negative. The effect of income on enrolment preferences, in contrast, is negative.

The model's predictions regarding preferences over per-student subsidies and the public/private mix are also confirmed in the analyses of fees and grants. Highly educated respondents are more in favour of grants and no tuition fees than their lesser educated compatriots. Insider rents derived from increasing spending drive preferences more than outsider considerations over the cost of accessing higher education. Again, the negative effect of income was smaller and was dominated by the positive effect of education. Similar preference patterns were found for preferences over higher education spending in general. Highly educated individuals are persistently more likely to rank higher education spending as one of their highest spending priorities.

A similar picture was confirmed in the external validation exercise, in which surveys from Australia, Canada and Sweden showed that highly educated respondents are the most in favour of increasing the higher education budget. A breakdown of these preferences showed that while they are affected by considerations over access, there is still a direct effect of education that relates to preferences for high per-student spending. Interestingly, and in line with the formal model, the case of Sweden suggests that when countries reach very high levels of enrolment, the positive effect of higher education disappears.

Evidence for self-interested drivers behind higher education preferences are abundant. Parents with children, and especially children close to university going age, are much more likely to support policies that benefit their offspring. Moreover, older people are less likely than younger people to support increases in funding or opportunities. In addition, a significant supplementary role of ideology was found across the board. Individuals supporting left-wing parties were more likely to prefer expanding enrolment and be in favour of public spending on students, either through grants or no tuition fees.

By providing the first individual-level test of several rival models of the political economy of higher education, this chapter provides a unique contribution to the literature. Moreover, by breaking down the effects of education and income, the analysis has provided new insights in the countervailing effects of both.

For the purposes of this dissertation we now have a formal model of the distributive politics of higher education with empirically corroborated individual-level predictions. While this micro-level story provides us with important insights in the distributive politics of higher education, I am ultimately interested in uncovering what this pattern means for higher education policy. Knowing that the distributive politics is structured along education lines poses a new challenge: when and why do governments act in the interest of highly educated individuals? This question is especially puzzling given that for a long time highly educated voters did not come close to the majority of society. How can we explain why governments have pursued policies of spending and expansion in their interest? It is these questions that I turn to in the next chapters.

Table 4.12 – The effect of higher education and income on higher education spending preferences in Sweden

Survey Question:	1986		1992		1997		2002	
Effect:	Total	Direct	Total	Direct	Total	Direct	Total	Direct
Higher educated	2.237***	1.918***	2.325***	2.270***	1.485***	1.409**	1.195	1.227
	(0.429)	(0.391)	(0.317)	(0.324)	(0.200)	(0.209)	(0.169)	(0.190)
Age	0.996	0.996	1.009**	1.010**	1.000	1.001	1.015***	1.015***
	(0.00390)	(0.00407)	(0.00377)	(0.00385)	(0.00393)	(0.00443)	(0.00418)	(0.00468)
Female	0.995	1.169	0.731***	0.784**	0.885	0.797*	0.979	1.013
	(0.130)	(0.173)	(0.0831)	(0.0962)	(0.106)	(0.104)	(0.127)	(0.141)
Income (normalised)		1.185**		1.078		1.037		0.998
		(0.0934)		(0.0679)		(0.0693)		(0.0708)
Constant	1.234	1.164	0.506***	0.486***	0.665**	0.663*	0.260***	0.238***
	(0.235)	(0.231)	(0.0982)	(0.0956)	(0.136)	(0.151)	(0.0600)	(0.0606)
Observations	970	930	1309	1278	1166	991	1061	932

Sources: Swedish Welfare State Surveys 1986,1992,1997,2002 Svallfors (2004*b*, 2003, 1992, 1995)
Notes: Logistic regression analysis. Binary response variable for respondents who want to increase research and higher education spending. Response categories "maintain" or "reduce" coded as zero. Coefficients are odds ratios (i.e. 1 is "no effect"). Standard errors in parentheses. *** $p < .01$; ** $p < .05$; * $p < .10$

Chapter 5

A theory of electoral targeting in multi-party systems

5.1 Introduction

As set out in the introduction, the study of distributive politics involves demand and supply. Chapters three and four have focused on the demand side question "who wants what kind of redistribution?" The theory developed in chapter three and tested in chapter four hypothesises that highly educated individuals prefer more spending per student, and, at lower levels of parental enrolment, expansion of enrolment. Knowing that the distributive conflict over higher education is between highly and lesser educated individuals, the present chapter sets out to theoretically address the supply side question: "whose preferences will prevail, and when?"

To address this question, I develop a theoretical measure of group voting power in multi-party systems.[1] In short, voting power is a measure of how many votes a party can be expected to gain from distributing resources from those outside a group to those inside a group. This concept of voting power will be used in the next chapter to empirically estimate the voting power of highly educated citizens with respect to parties in parliament and government. It will therefore help us to understand which political parties have incentives to pursue policies in the interest of highly educated families. Furthermore, in chapter seven, I use the measure to

[1]The voting power idea is derived from Bartels (1998) voting power model for the two-party setting of U.S. presidential elections.

test whether parties with such incentives pursue policy changes in the interest of highly educated families.

A logical first step in addressing the question "whose preferences will prevail?", however, is to explore existing tools offered by the political economy literature. The next section reviews the literature on electoral targeting. On the one hand, the partisanship literature in the tradition of Hibbs (1977) argues that parties pursue policies in accordance with the objective economic interests and subjective preferences of class-defined political constituents. On the other hand, median voter theories in the tradition of Downs (1957) and Meltzer and Richard (1981) argue that, in order to win elections, parties have to be attentive to the preferences of those voters in the middle who are not core supporters. These theories, however, offer few predictions when distributive conflicts do not boil down to economic interests and subjective preferences related to an individual's position in the class structure or income distribution. To the extent that the political science literature has offered predictions about such distributive conflicts, it has tended to focus on differences in organisational abilities (Olson 1965, Grossman and Helpman 2001), or power asymmetries following from path-dependent institutional configurations (Thelen 2004) and systems of coordination (Hall and Soskice 2001). This chapter seeks to address this gap in the political science literature by developing a measure of the voting power of socio-economic groups.

Higher education politics is not unique in being characterised by a conflict that is not just structured by income or asymmetric organisational power. There are many ways to split the pie of public expenditure which do not simply distribute from rich to poor (or vice versa). For example, forms of government spending (or policy) can have distinct effects on several groups in society. Think, to mention but a few, of distributive struggles involving age (Lynch 2006), gender (Iversen and Rosenbluth 2006, 2010), home ownership (Schwartz and Seabrooke 2009, Ansell 2010*b*), public sector versus private sector (Pierson 2002), exposed versus sheltered sector (Garrett 1998, Burgoon 2001), labour market insiders and outsiders (Rueda 2005, 2007), industrial sectors and occupations (Iversen and Soskice 2002, Rehm 2009), or life-risks more generally (Kitschelt and Rehm 2006). Many individual-level studies reveal more complicated and conditional preference patterns that cannot be easily mapped onto the crude categorisation of the Left and Right of the partisanship literature or the single dominant dimension of median voter models. While some of these conflicts may be characterised by asymmetric organisational power resources, there may be additional asymmetries in the electoral value of these groups to parties in government.

This chapter studies the electoral incentives available to parties if they use distributive policies to win votes from groups. Assuming parties behave as rational seat-share maximisers, this chapter theoretically identifies the characteristics of groups that are most electorally lucrative. Voting power is defined as the marginal increase in a party's expected seat-share from redistributing towards a specific group of citizens. This change in seat-share is the balance of the seats gained by directing resources towards the members of one group and the seats lost by taking resources away another group. The higher this marginal increase, the stronger the incentives of a politician to cater to a group's interests. Rational seat-share maximising parties will thus pursue policies in favour of prospective voters with high voting power, at the expense of those with low voting power. Policy benefits can be thought of as changes to the policy status quo that improve the welfare of the prospective voter – for example, through a transfer or tax-cut targeted at that group.

The model of the interacting behaviour of prospective voters and politicians is inspired by Bartels' (1998) two-party model of voting power in the American context. The present model generalises the two-party set-up to a multi-party system. From this multi-party model, a two party model akin to Bartels' emerges as a special case.[2] A prospective voter's behaviour is modelled to consist of two distinct

[2]There are nevertheless some differences between my model and that of Bartels. I use logit models of party choice and turnout whereas Bartels (1998) uses probit models. Moreover, the specification of the effect of partisan propensity on turnout is different. Bartels uses a simple

choices: 1) a decision to turn out, and 2) conditional on turning out, a choice of party. Both decisions are modelled as a function of the prospective voter's retrospective evaluation of a party's past policies (when the party was in government) or policy proposals (when the party was in opposition). Hence, by changing its policies (or proposed policies), a party can affect an individual's future turnout decision and party choice in its favour. Parties are assumed to pursue policies while aware that they will be evaluated retrospectively at the next election. Partisan evaluations are assumed to form through a process of updating, using all past observations of party policy. The evaluation of past policies is exogenous to the model and conceptualised as a distribution of partisan utilities. A new observation only affects a perception of a party's position at the margin and parties cannot entirely rewrite a prospective voter's perception.

Three types of policy incentives follow from the model. First, parties can use policy benefits to try to convert voters who are relatively indifferent between two or more parties. Second, parties can use policy benefits to mobilise those citizens who are most likely to vote for them, but are not guaranteed to turnout. Third, parties can try to prevent those individuals who are most likely to vote for other parties from turning out.

While the theory is built on individual-level decision making foundations, politics in industrialised democracies tends to be about groups. Besides the obvious ethical and constitutional obstructions that parties face to prevent individual targeting, gathering individual-level information and focussing benefits individually could simply be prohibitively costly.[3] Since parties in industrialised democracies can only target the groups that individuals belong to, group voting power is measured as the mean voting power of the individuals that constitute an identifiable group minus the mean voting power of those outside the group. An identifiable

squared term of the probit "score" for partisanship propensity whereas I develop a new measure of preference strength to accommodate multiple parties of different sizes.

[3]This is not necessarily true in non-industrialised democracies where local clientelist party machines target individual voters. See, for example, Calvo and Murillo (2004), Stokes (2005) and Dunning and Stokes (2008)

group is a subset of the electorate that can be targeted by policy. This definition neither assumes nor precludes a level of group organisation. It turns out that size does not matter for group voting power. The benefits of targeting a large group are exactly offset by the costs of benefitting many.

The model allows for the use of a variety of election surveys to estimate measures of voting power across different socio-economic and demographic groups with respect to all parties in a system. This subsequently allows for estimates of the voting power of these groups vis-à-vis the legislature and the government. In doing so, the model provides an important contribution to several literatures. First, the model brings a literature of electoral targeting with a two-party focus to the multi-party context. An important implication of this is that marginal voters are no longer just central voters in between the two main parties. Instead, a main left wing party will face marginal voters at the centre and at the left, and is possibly in parallel competition with more than one party. Second, by developing a theoretical and statistical model of group voting power, the chapter develops a new explanatory variable for the study of distributive politics. Given the limitations of current median voter and partisanship approaches discussed in the literature review in the next section, such a new explanatory variable is a welcome addition to the toolbox of the student of industrialised democracies. Third, the measure allows for normative evaluations of the incentives faced by politicians: do parliaments and governments have incentives to cater equally to all groups in society – as the one person one vote principle would suggest is desirable – or, are some groups in society more attractive to target than others? Do different electoral and party systems generate more equal polities than others? Last, the model has practitioner value for the electoral strategies of parties and their campaigns. The positive analysis assumes parties act rationally on the available information in order to win the most seats at the next election. To the extent that practitioners behave only partially rationally with respect to this maximand, the model – for better or worse – provides a prescriptive guideline for seat-maximising parties on who to target.

The argument proceeds as follows. The next section discusses the literature on electoral targeting and identifies gaps in extant theories. Section three develops the model for the straightforward case of a single district system of proportional representation. To begin with, I develop a random utility model of an individual's decision to turn out, and – conditional on turning out – party choice at the ballot box. This gives us a measure of the probability that an individual will contribute to the seat-share of a party as a function of her distribution of utilities with respect to each of the parties in the system. By taking the derivative of this probability function with respect to an individual's utility associated with a given party I obtain the voting power of that individual over that party. If the change in this probability of contributing to the seat-share for a change in utility is high, then the individual has high voting power. If there is little change in the probability in response to a change in utility then the individual has low voting power. From this individual measure of voting power we then arrive at a group measure of voting power, which is the average voting power of those inside the group minus the average voting power of those outside the group. Section four considers several complications and potential future extensions. These include the effects of different electoral systems, the strategic effects of party-competition and the effects of coalitions on the voting power of groups over the parties in government. Section five concludes.

5.2 Literature review

The model and empirical evidence presented below provides a new way of understanding the distributive incentives available to politicians. Our classic understanding of democracy is premised on the idea that voters select politicians based on an assessment of their position on issues. Anticipating this voter rationality, candidates or parties adopt policy positions on issues to maximise their probability of winning elections (Key and Cummings 1966, Downs 1957). The median voter theorem is the most rudimentary version of such a vision of representative democracy (Hotelling 1929, Black 1948, Downs 1957) and has been central in the seminal models on inequality and redistribution (Romer 1975, Meltzer and Richard 1981).[4] Since the work of Arrow (1951), however, it has been established that a median voter equilibrium outcome only exists under restrictive assumptions. For example, the existence of an equilibrium is no longer guaranteed when a second orthogonal dimension of policy preferences is introduced. The voting power model developed below improves on these models by neither imposing restrictive assumptions relating to the transitivity of individual party preferences, nor restricting the dimensionality of issues on which parties compete. Moreover, the equilibrium proposed by the Meltzer and Richard model only derives from a restriction imposed on the taxation function (a positive linear function of income) and the spending distribution function (a uniform distribution). In practice, there are no reasons why a politician cannot give more to one group over another. For example, a government could satisfy a majority by taking from the middle third and giving to the poor and rich thirds. Such incentives will be demonstrated by the model discussed below, but are ruled out by assumptions in our conventional median voter models.

Tangential to these median voter arguments, another branch of scholarship has explored the relationship between public opinion and policy outcomes. Proponents of this approach argue that parties in power need to be sensitive to the preferences of the entire electorate to win future elections, and therefore posit a causal relationship between average preferences for expanding government expenditures on the one hand, and changes in government expenditure on the other (see, for example, Stimson, Mackuen and Erikson 1995, Erikson, MacKuen and Stimson 2002, Wlezien 2004, Soroka and Wlezien 2005*b*,*a*, 2010). Bartels (2008) shows, however, that U.S.

[4]These models build upon the logic that the further the median voter's income is below the mean income, the more redistribution she prefers. That is, the more inequality, the more redistribution. Yet, evidence for this positive relationship between inequality and redistribution is weak and even suggests the reverse when comparing countries. However, there is some evidence which indicates that increasing inequality within countries over time leads to more redistribution (Milanovic 2000, Kenworthy and Pontusson 2005).

Senators are much more responsive to the opinions of the rich than to the opinions of the poor. In a similar vein, the model I develop in this chapter proposes that not all preferences should have equal weight for a government. To be precise, the preferences of groups with high voting power should matter more.

Furthermore, the economic voting literature has demonstrated that voters, in turn, are responsive to the performance of parties (Key and Cummings 1966, Fiorina 1981, Lewis-Beck 1988, Lewis-Beck and Stegmaier 2000, Anderson 1995, Duch and Stevenson 2005, 2006, 2008, Brug, Van der Eijk and Franklin 2007). Duch and Stevenson (2005, 2006, 2008), in the largest test of economic voting so far (163 voter preference surveys in 19 countries), shows that the median effect of a unit deterioration in economic evaluations results in a five percent decrease in the probability of voting for the party in government. The argument I develop in this dissertation takes from this body of literature the observation that voters' evaluations of parties are responsive to their performance in government.[5] I generalise beyond the effects of evaluations of the economy to general evaluations of the impact of a party's policies on an individual's wallet. Hence, various policies can affect the evaluations of distinct groups differently. Moreover, I argue that the responsiveness of an individual's vote to a change in these evaluations depends on a running tally of all past party evaluations.

The model developed below is close to a family of models that considers competition for swing voters in a two-dimensional setting. In such models, one dimension captures voter preferences for parties' fixed ideological position while the other dimension captures voter preferences for a government policy – for example a transfer (Lindbeck and Weibull 1987, 1993, Dixit and Londregan 1996, 1998). Two parties, L and R, compete within a single district with an exogenous level of turnout to maximise their probability of winning the election. Individuals have preferences for the ideological position of party R over party L. A voter with an ideological

[5]Although it should be noted that different economic facts may be explained quite differently depending on partisan lenses (Bartels 2002, Margalit 2011)

preference for party R will vote for party L only if the additional utility of transfers to her group promised in L's platform outweighs her ideological preference for R. Somewhat analogous to the median-voter theorem, these models predict that parties will target their transfers to groups with a lot of swing voters.

Several extensions of this model have been made. Persson and Tabellini (2000) allows for different levels of turnout, and shows that parties would be more responsive to groups with high levels of turnout. Stromberg (2004) argues that parties have greater incentives to target more informed voters, because they are more likely to be aware of the policy change and adjust their choice. Dixit and Londregan (1996) further argues that lower income voters would derive higher utility from one dollar transferred, and that therefore their votes are "easier" to buy. Empirical studies finding support for the swing-voter thesis include Wright (1974), Stein and Bickers (1994), Bickers and Stein (1996), Denemark (2000), Case (2001), Dahlberg and Johansson (2002), Johansson (2003), Herron and Theodos (2004), Stokes (2005).[6]

A first empirical limitation of these swing-voter studies is that groups are generally defined by geography, rather than socio-economic characteristics. Most studies use the party preference distribution in an electoral district as the explanatory variable for the allocation of policy benefits to that district. Dahlberg and Johansson (2002), Johansson (2003), Golden and Picci (2008) and Case (2001) are an exception to this by studying the allocation of funds to municipalities within electoral districts. Stokes (2005) is another exception, who considers the allocation of benefits to individual voters within a district. A second theoretical and empirical limitation is that these swing voter models assume two-party systems. Even studies focussing on multi-party systems, such as Dahlberg and Johansson (2002) and Johansson (2003), model competition between multiple parties as competition between two blocks – thereby turning the dynamics of a multi-party system into those of a two-party system. Empirically, the two party focus of the existing lit-

[6]There also exists a large literature that does not find this result, which is discussed in more detail below.

erature means that the bulk of industrialised democracies are excluded from the analysis because their multi-party systems. Theoretically, the very fact that two-party systems have two parties is a consequence of the behaviour of parties within the context of the electoral system, rather than an exogenous matter of fact. Third, a limitation of existing swing voter models is that they assume turnout to be exogenously determined, rather than an outcome attributable to the operating of parties. Indeed, parties play a significant role in mobilising the electorate to to vote. As the empirical evidence focusses on transfers to regions, these swing voter models have not been central to the study of redistribution between groups. Despite these limitations, the idea that some voters are more easily persuaded than others is an important contribution that is central to the model developed in this chapter.

The theoretical and empirical approach proposed in this chapter improves on these swing-voter models in three important ways. First, the number of parties is allowed to vary above two, thereby departing from the idea that swing-voters equal centrist voters. Second, instead of assuming exogenous turnout, turnout is made endogenous to the behaviour of parties. Third, the model uniquely allows for an empirical measure of the voting power of socio-economic groups.

Another set of models focusses on party incentives to target their core voters. Parties mobilise voters and regulate the number of people seeking office (Robertson 1976, Aldrich 1995, Powell 2000, Cox 2006, 2008). Any attempt by parties to convince indifferent swing-voters with policy benefits is futile if its core support base does not turn out to vote. If a party fails to coordinate the number of candidates running for office, it risks splitting the vote. This could happen if a third party enters its ideological space (Cox 2006, 2008), or if there emerges a split in its own ranks. Parties cannot be assumed to guarantee mobilisation and coordination without the help of activists and funders. In exchange for their services, this support base expects policy to be targeted in its direction. When coordination and mobilisation are modelled as endogenous to the allocation of transfers by parties to the core, a logic for targeting spending towards core constituents emerges (Aldrich 1983, Aldrich and McGinnis 1989, Cox 2006, 2008).

A second reason for targeting core voters is based on the quality of information about the preferences of voters. Some authors argue that, because politicians are better informed about the preferences of their core electoral group, they can more easily target transfers towards them (Cox and McCubbins 1986, Dixit and Londregan 1996). Since individuals who identify with only one party may feel disenfranchised if that party fails to represent them, turnout amongst such individuals may be sensitive to a party's behaviour. Hence, parties have an incentive to direct expenditures towards their core base. It is this logic that is central to the theory developed in this chapter. In contrast to the policy convergence hypotheses of swing-voter theories above[7], core-voter theories posit that the partisan composition of government matters for policy. All else being equal, a different party in government will result in different policy outcomes. The preferences of those who voted for a party in power are thus influential. Starting with the seminal work by Hibbs (1977, 1987), numerous studies have looked at the effects of partisanship on government policy (Huber and Stephens 2001, Garrett 1998, Boix 1998). The main claim of partisan theories is that parties differ because they pursue policies "in accordance with the objective economic interests and subjective preferences of their class-defined core political constituencies" (Hibbs 1987, p291). Many authors have used the partisan composition of governments to explain their redistributive politics, with left-wing governments representing the interests of the poor and therefore pursuing redistributive policies (Huber and Stephens 2001, Garrett 1998, Boix 1998).

Another criticism of extant partisanship arguments relates to how they go about measuring the core and its interests. In their most basic form, partisan analyses include a dummy for the participation of a party from a certain family in government,

[7]The model below will show that only two-party swing voter models will predict convergence between the two competing parties. Multi-party competition does not mean that parties compete symmetrically for the same groups.

for example a left-party government participation dummy. Other studies include the share of the left party in the government. More advanced measures combine a measure of the participation of a party in government (share of cabinet seats, share in government majority in parliament) and measures of party ideology. There are two common ways of measuring ideologies, each with its own flaws. On the one hand, expert surveys have been used to map the left-right positioning of parties. Expert measures are derived from surveys that are administered infrequently and that may suffer from different interpretations in different national contexts (see Gabel and Huber 2000). Alternatively, measures are derived from party manifestos (Budge 2001). These measures can be criticised for being merely a reflection of party rhetoric and not of their actual behaviour or intentions (Woldendorp, Keman and Budge 2000, see). Moreover, using these measures as an explanatory variable in a regression of policy risks answering the question "do parties stick to their promises" rather than "which groups hold power over a party's policy agenda?" Furthermore, core voter models assume that there exists a clearly identifiable core. Indeed, there is some evidence that class is a predictor for voting behaviour (Evans 1999), albeit contested (Dalton 2008). Yet, it is also known that these group attachments to parties are far from perfect. A large section of the British working class used to vote Tory (Crewe 1986); and – with the exception of race – there is rarely a gap of more than twenty percentage points between the proportions of major socio-economic groups voting for one presidential candidate over the other in elections in the United States between 1952 and 1992 (Aldrich 1995, Abramson, Aldrich and Rohde 1994). Therefore, linking group interests to parties by using the partisan colour of a government is sensitive to a chain of assumptions that are generally left untested.

The model developed in this chapter adopts two of the main contributions of the current electoral targeting literature. First, from swing-voter models, it takes that vote maximising parties have incentives to target those voters who are relatively indifferent between parties. However, in the multi-party context, this does not necessarily mean that voters are central. Second, from core-voter models and partisan theories it notes that parties play a role in mobilising their support base by targeting resources towards it. Bartels (1998) original model incorporates both of these aspects in the two-party setting of American presidential elections. Bartels uses a random utility probit model to model an individual's party choice and turn out decision. This results in a function for the probability that an individual will contribute to the president's plurality. By taking the derivative of this probability function, Bartels provides us with a two-party measure of the voting power of a variety of religious, geographic, racial and socio-economic groups in the American electorate. The literature has paid insufficient attention to this model and its potential for improving our understanding of distributive politics. This chapter takes this central idea from Bartels and generalises it to the multi-party context.

Theoretically and empirically, the model presented below addresses an important shortcoming of current models of distributive politics. To be precise, it provides a direct measure of which voters parties must target to win seats. Rather than relying on indirect measures derived from party manifestos or expert judgments, it uses election surveys to determine the characteristics of voters whom parties will try to convert and/or mobilise. Moreover, it gives us insights in the pressures that parties face when balancing the countervailing incentives of converting undecided independents and mobilising core supporters. Given that the model is eclectic in its definition of a group it allows us to calculate the voting power of any group that can be identified in an election survey, be it based on geography, socio-economic status, gender, race, religion or any other discriminating characteristic.

5.3 A theory of electoral targeting in multi-party systems

Parties are assumed to devise rational strategies to maximise their share of seats in parliament. Seat-share maximising parties' policies will benefit those voters who provide them with the highest marginal change in their seat-share in return for those benefits. Such voters have high voting power over that party: i.e. the party has strong incentives to act in their interest. Seat-share maximising parties will take from those voters for whom a change in benefits has no effect on their turnout or party-choice, and thus no effect on the party's seat share. Such voters have low voting power with respect to that party: i.e. the party has no incentives to act in their interest. This model results in three kinds of strategies for parties to increase their seat-share. First, parties have incentives to mobilise their loyal supporters to turn out. Second, parties have incentives to demobilise loyal supporters of their opponents. Third, parties have incentives to convert voters who are sure to turn out, but uncertain in their choice between two or more parties.

In what follows, individuals (indexed by i) in the eligible voting population of N citizens make two decisions. First, individuals decide to turn out. Second, conditional on turning out, individuals choose to vote for one of the J parties (indexed by j). Both decisions are modelled as a function of, amongst others, the distribution of utilities associated with each of the parties, referred to as "partisan utilities" (U_{ij}). These partisan utilities, in turn, are a function of a party's past record and current policies. The closer a party's past policy positions were to an individual's ideal point in some multi-dimensional space, the higher that individual's partisan utility for that party. The distribution of these partisan utilities is not modelled explicitly and instead taken as an exogenous input to the model. Individuals are assumed to continuously update these partisan utilities based on new information (i.e. new party policies of which they are made aware). Accordingly, parties can affect both turnout and vote-choice by proposing changes to the policy status quo. Individual i's voting power vis-à-vis party j (VP_{ij}) is defined as the marginal effect of a change in individual i's utility with respect to party j (U_{ij}) on j's seat-share (S_j). The higher this marginal effect, the higher her voting power.

The model assumes parties and voters go through the following steps.

1. Individuals hold a prior distribution of utilities, based on past party policies (exogenous input).

2. Party j independently announces a new set of policies to change the status quo (a proposal that gives to some groups and takes from others, balancing at zero). Think of this announcement as the alternative policies proposed when a party is in opposition or the actual policies implemented when a party is in government.

3. Individuals update their partisan utilities based on new party policies to form a posterior distribution of utilities.

4. Individuals decide to turn out in the election, amongst others based on an individual's preference strength about the outcome of the election resulting from the posterior distribution of utilities.

5. Conditional on turning out, individuals vote for the party with the highest utility in the posterior distribution.

6. Party seats are allocated based on the distribution of votes (for now assumed to be proportional).

The model assumes the prior distribution of utilities (step one) to be exogenously determined. Empirically, these distributions of utilities will be estimated using election survey data in the next chapter. Based on the prior distribution of utilities, I calculate which groups a party will target in step two to create a posterior distribution that maximises its seat share in the upcoming election. Parties are assumed to have good information about the distribution of these partisan utilities. Moreover, parties are assumed to make these decisions independently (i.e. not taking the strategies of other parties into account). For simplicity, the baseline model assumes a party's seat share to be proportional to a party's vote share. I discuss potential extensions such as the impact of electoral systems, strategic interactions between parties and coalition dynamics in section four.

Individuals are expected to base their evaluation of a party's position at time t on a "running tally" of past party evaluations (Downs 1957, Fiorina 1981). This results in a distribution of utilities associated with each party. Prospective voters update this distribution of utilities in the direction of new information.[8] I assume that the impact of all policy changes can be reduced to an expected effect on disposable income. The change in utility is then modelled as a direct linear function of a change in disposable income that follows from a party's policy proposal.[9] Moreover, I assume that a one dollar increase in disposable income following from any party's proposal moves the partisan utility of different individuals for that party in the same direction to the same extent. This means I assume away the effects of individual characteristics such as age, partisan orientation or degree of political information on the updating process.[10]

5.3.1 A random utility model of individual party choice

The next section models an individual's probability of turning out. In this section I model a prospective voter's party-choice, conditional on her turning out. What is the probability that an individual chooses party j? This is a typical discrete

[8]Traditionally, models of electoral targeting have assumed a strict separation between an individual's ideological preferences for the parties in competition, and "pork", a non-ideological bribe provided by parties to convince a voter to vote against their ideological preference (Dixit and Londregan 1996, Persson and Tabellini 2000). In contrast, I conceive of "pork" as changing an individual's ideological preference for a party on the margin.

[9]Plausibly, a one dollar change in disposable income affects a poor person's utility more than that of a rich person (see, for example, Dixit and Londregan 1996). If we, rather conventionally, model utility as a positive function of income ($\frac{\partial U_{ij}}{\partial y_{ij}} > 0$) but with diminishing utility to income ($\frac{\partial^2 U_{ij}}{\partial y_{ij}^2} < 0$), then a change in income has a larger effect on the utility of individuals with low incomes than individuals with high incomes. Future extensions could incorporate such effects. It would suggest that 1) the social welfare (in the welfare economics sense of the word) is improved by a degree of redistribution and, 2) that under equal voting power of poor and rich, we would still find a degree of redistribution (as is the case in all industrialized democracies).

[10]This representation is a simplification of more sophisticated work in the literature on partisan identification. Bayesian learning models of updating provide more sophisticated accounts of how new information affects the evaluation of parties (Achen 1992, 2002, Gerber and Green 1998, Bartels 2002, Grynaviski 2006). This results in similar information moving different agents differently. In particular, the literature has provided us with the effects of age and inherited partisan views (Achen 1992, 2002), the effect of partisan biases on the processing of information (Bartels 2002) and the effects of variance in observations on a party's brand (Grynaviski 2006).

choice problem, where the choice set contains all available parties (J), and π_{ij} gives the probability that an individual i will choose party j ($\pi_{ij} = \Pr(y_{ij} = 1)$, where $\pi_{ij} \in [0,1]$ and $\sum_{j=1}^{J} \pi_{ij} = 1$ for all i. Discrete choice models are derived from utility theory, where individuals are assumed to vote for party j if the utility associated with party j is the highest of all alternatives. That is,

$$y_{ij} = \begin{cases} 1 & \text{if } U_{ij} > U_{ik} \text{ for all } k \neq j \\ 0 & \text{else} \end{cases} \tag{5.1}$$

where U_{ij} is individual i's utility associated with party j, the partisan utility. Utility itself is a latent (i.e. unobserved) construct. Parties and researchers only observe the outcome of this utility maximising process (the party choice, y_{ij}) and the characteristics of individuals and alternatives. These observable variables make up the systemic component of utility. For another part, individual utilities are related to unobserved variables, which make up the stochastic (or random) part that gives this class of discrete choice models the name "random utility model". An individual's partisan utility is then given by

$$\begin{aligned} U_{ij} =& \quad \hat{U}_{ij} + \epsilon_{ij} \\ \text{where } \hat{U}_{ij} =& \quad \xi_{\mathbf{i}}' \beta_{\mathbf{j}} + \mathbf{X}_{\mathbf{ij}}' \beta_{\mathbf{0}} \end{aligned} \tag{5.2}$$

where $\hat{U}_{ij}$ is the systemic part of utility, relating to observed variables, and ϵ_{ij} is the stochastic (or random) part of utility. $\hat{U}_{ij}$ can be estimated as a function $\xi_{\mathbf{i}}'$, a row vector of individual characteristics; $\beta_{\mathbf{j}}$ is a vector of party specific parameters to be estimated (including the intercept); $\mathbf{X}_{\mathbf{ij}}'$ a row vector of individual-alternative specific attributes, and $\beta_{\mathbf{0}}$ is the vector of coefficients for these alternative specific measures.[11] An example of individual characteristics would be an individual's education level and an example of the latter would be the ideological distance between an individual and a party on a left-right or post-materialist scale. To estimate a

[11]In chapter seven we will rely on an actual proxy measure of an individual's utility for each party.

logit model, the random error term ϵ_{ij} is assumed to be independently and identically distributed (iid) according to an extreme values distribution. The randomness derives from unobserved variations in tastes and attributes of alternatives, errors of perception and optimisation by the voter.

We can now write the probability that individual i will vote for party j as

$$\begin{aligned} \pi_{ij} = Pr(y_{ij} = 1) = &\ Pr(U_{ij} > U_{ik}) \text{ for all } k \neq j \\ = &\ Pr(\epsilon_{ik} - \epsilon_{ij} < \hat{U}_{ij} - \hat{U}_{ik}) \text{ for all } k \neq j \end{aligned} \tag{5.3}$$

McFadden (1974) shows that, under certain further assumptions, we can then write the probability of voting for party j in the following multi-nomial logit notation:[12]

$$\begin{gathered} \Pr(Y_i = j | T_i = 1) = \frac{\exp(\hat{U}_{ij})}{\exp(\hat{U}_{ij}) + \sum_{k=1}^{J-1} \exp(\hat{U}_{ik})} \\ \text{where } k \neq j \text{ and } J \text{ is the number of alternatives} \end{gathered} \tag{5.4}$$

Since there is no scale on which to measure utility, its progression needs to be normalized. Moreover, the vector of parameters for one of the alternatives j has to be constrained to zero ($\beta_j = 0$). The model further assumes individuals vote sincerely.[13]

[12] These assumptions include that the utilities of the various alternatives are independently distributed and follow an extreme value distribution (log Weibull). The use of multi-nomial logit has been criticised for unrealistically assuming Independence of Irrelevant Alternative (IIA)(Alvarez and Nagler 1998). IIA imposes the restriction that the relative odds selecting between two alternatives is unaffected by the introduction of another alternative (Arrow 1951, Luce 1959). Dow and Endersby (2004) argue that the IIA assumption is mainly relevant to analysing cases of candidate/party entry and exit. Moreover, citing Train (1993), Dow and Endersby argue that estimated probabilities can be made consistent with IIA by including the appropriate right-hand side variables. A choice-specific intercept, as in Equation (5.2), will generally be sufficient.

[13] I assume away the potential for strategic voting in which candidates forego their preferred candidate to avoid an undesirable election outcome (Duverger 1954, McKelvey and Ordeshook 1972, Cox 1994, Alvarez and Nagler 2000, Kselman and Niou 2010) Strategic voting is also known as tactical voting or sophisticated voting. However, this issue is addressed, albeit imperfectly, in three ways. First, the utility measure of X_{ij} can include strategic considerations. For example, the measure of individual utility used in the next chapter – the response to the question "how likely is it that you will ever voter for party j" – can be said to pick up on elements of strategic voting. After all, an individual who really likes a party, yet does not consider it electorally viable, may still respond with a low response on this utility measure. Second, by including a party-specific utility intercept we pick up on the effect that people may – on average – choose some parties more often than would be expected based on their relative utility score. Third, by creating a measure of voting power for parties in parliament and government, and weighting

Figure 5.1 on the next page shows the distribution of systemic utilities for three hypothetical voters through which the working of the model can be intuitively understood. The first voter has a clear preference for party "C" over all other parties. The probability that the stochastic component of utility will result in an actual utility that is higher than "C" is very small, and hence the model will predict a very high probability that the individual will vote for party "C". In contrast, since the second hypothetical voter has no clear preference for any of the parties, the probability that the stochastic component provides any of these parties with the highest utility is fairly equal. Therefore, the model will predict rather equal choice probabilities for each. Last, the third hypothetical voter has high utilities associated with parties "B" and "E". Consequently, she will have medium high probabilities associated with each of these two parties, and low probabilities with the remaining three parties.

This multinomial logit model allows us to estimate the probability that individuals with diverse characteristics will vote for each of the parties in a given party system. Moreover, by taking the derivative of equation 5.4 with respect to utility, we will be able to obtain the expected change in party choice for a change in partisan utility. Both the choice probability and this marginal change in the choice probability are key building blocks for the measure of voting power developed below. This model can be estimated for any number of parties above one.[14]

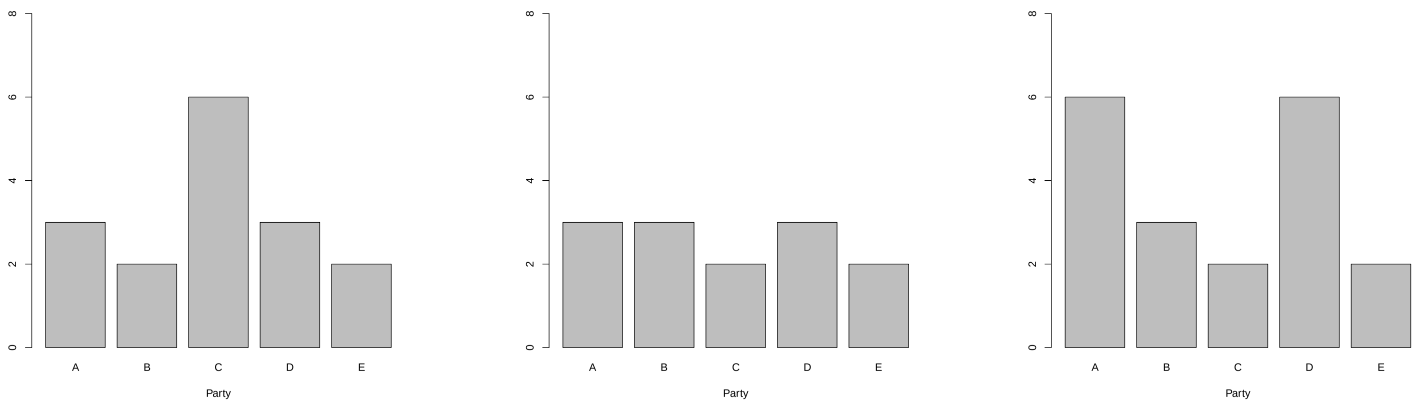
5.3.2 A random utility model of turnout

On the basis of similar principles, I now develop a random utility model to estimate the probability of an individual to turn out ($\tau_i = \Pr(t_i = 1)$, where $\tau_i \in [0, 1]$). Individuals are assumed to only vote when the utility of turning out is higher than

voting power by the seat-share of these parties, the measure filters out the "losers" of strategic voting and concentrates on the dominant parties.

[14] In case there are two parties, the multinomial logit takes the form of a binomial logit.

FIGURE 5.1 – UTILITY DISTRIBUTIONS OF THREE HYPOTHETICAL VOTERS (I)



	Hypothetical Voter 1 "The Convinced Middle Finger"					Hypothetical Voter 2 "The Indifferent Fist"					Hypothetical Voter 3 "The Devil's Horns' Dilemma"				
Party j	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
$\hat{U}_{ij}$	3	2	6	3	2	3	3	2	3	2	6	3	2	6	2
$\Pr(y_i = j)$	4.4%	1.6%	88.0%	4.4%	1.6%	26.8%	26.8%	9.8%	26.8%	9.8%	47.9%	2.4%	.9%	47.9%	.9%
V_j	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
$\Pr(y_i = j) - V_j$	-15.6%	-18.4%	68.0%	-15.6%	-18.4%	6.8%	6.8%	-10.2%	6.8%	-10.2%	27.9%	-17.6%	-19.1%	27.9%	-19.1%
$\sigma(\hat{U}_{ij})$			2.41					.20					2.06		
$\Pr(t_i = j)$			80.3%					31.1%					74.2%		

Notes: Simulations of hypothetical values in the model to illustrate model effects. U_{ij} and V_j are exogenous, as are the following parameter assumptions: $\gamma = 1$, $\alpha_0 + Z_i\alpha = -1$ for all voters. All other model values follow endogenously from this configuration.

the utility of not-voting, such that

$$t_i = \begin{cases} 1 & \text{if } W_i > 0 \\ 0 & \text{else} \end{cases} \tag{5.5}$$

where W_i is the utility associated with voting compared to not voting. Again, the utility associated with voting depends on some observable characteristics of the voter (the systemic part of utility) and some non-observable characteristics (the stochastic or random part of the model).

The utility of voting is given by

$$W_i = \mathbf{Z_i'}\alpha + \gamma\sigma(\hat{U}_i) + \delta_i \tag{5.6}$$

where W_i is the latent, unobserved utility associated with turning out, $\mathbf{Z_i'}$ is a row vector of individual characteristics associated with an individual's propensity to turn out; $\sigma(\hat{U}_i)$ is a measure of the preference strength associated with the outcome of the election, developed below. α and γ are fixed effects parameters to be estimated; δ_i is a stochastic error term that derives its randomness from similar factors as ϵ_{ij} above, such as unobserved variations in tastes, attributes of alternatives and errors of perception and optimisation by the voter. The exact definition of $\mathbf{Z_i'}$ and $\sigma(\hat{U}_i)$ are discussed in more detail below.

The probability that voter i will decide to turn out can then be written in the following logit specification

$$\mathrm{Pr_i(t_i = 1)} = \frac{1}{1 + \exp(-\hat{W}_i)} \tag{5.7}$$

where t_i is one if the individual votes and zero if not.

The crux of this element of the model is that the utility of voting is in part a function of how much an individual cares about the outcome of the election. A common way of measuring this is to ask that question directly (Riker and Ordeshook 1968, Blais and Achen 2010).[15] In contrast, I model the extent to which an individual cares about the outcome of an election based on the distribution of partisan utility. This way, parties can also influence how much an individual is invested in the outcome, and – through that – their potential to turn out. The logic behind this approach is best explained by the following example. Consider two hypothetical voters, one with the same utility associated with each of the parties ($U_1 = U_2 = ... = U_J$) and another who has a very high utility associated with just one of the parties ($U_j \gg U_k$ for all $k \neq j$). Since each party provides equal utility to the former voter, she is indifferent in respect to the seat-share of the parties. The latter voter, however, has a very different utility associated with a parliament consisting of a majority of party j compared to a majority of one of the other $k \neq j$ parties. I expect the latter voter to be more invested in the outcome and therefore to be more likely to turn out. However, if everyone was going to vote for party j in the first place, then the incentives for the latter voter would be reduced as well.

This difference can be operationalised by defining an individual's ideal election outcome and comparing it to the utility associated with the expected outcome of the election. Beginning with the latter, an individual's expected utility from an election outcome is given by the average utility of the parties in parliament, weighted by their expected seat-share.

$$\mathbb{E}(U_i^E) = \sum_{j=1}^{J} \mathbb{E}(V_j)\hat{U}_{ij} \tag{5.8}$$

where $\mathbb{E}(U_i^E)$ is the expected utility of the election outcome for individual i, $\mathbb{E}(V_j)$ is the expected vote-share (and therefore seat-share) of each of the parties and $\hat{U}_{ij}$ is individual i's partisan utility associated with each of the parties. Given that we do not observe actual utility, $\hat{U}_{ij}$ is taken as a good proxy for an individual's utility. The expected vote-share of all parties ($\mathbb{E}(V_j)$) is exogenous to the model and known to voters through election polls.

[15] Blais and Achen (2010), for example, ask "How much do you personally care who wins the election this fall?" or "How much do you personally care which party will form the government after the election?"

How do we define the ideal outcome? Is this a majority consisting entirely of an individual's preferred party or a parliament in which all seats are taken by the preferred party? Voters are here assumed to have a naive view of politics where the influence of each party is a function of its share of seats. We are thus assuming away any strategic insights on the part of the voter when it comes to the likelihood of a party being in a coalition under different compositions of the electorate. Therefore, the utility associated with a voter's ideal scenario is defined as the expected utility associated with their preferred party holding 100 percent of the vote.[16] As the preferred party is not perfectly defined in this stochastic model, this utility maximising election outcome is approximated by taking as the average utility weighted by the probability that an individual will vote for that party:

$$\hat{U}^E_{i,\max} = \sum_{j=1}^{J} \pi_{ij} \hat{U}_{ij} \tag{5.9}$$

where π_{ij} is the probability associated with individual i voting for party j, and $\hat{U_{ij}}$ is the systemic utility that individual i derives from voting for party j.[17]

On the basis of equations 5.8 and 5.9, we can now rewrite the expected outcome of the election as a function of individual i's decision to turn out

$$\mathbb{E}(\hat{U}^E_i) = \frac{T}{T+t_i} \sum_{j=1}^{J} V_j \hat{U}_{ij} + \frac{t_i}{T+t_i} \sum_{j=1}^{J} \pi_{ij} \hat{U}_{ij} \tag{5.10}$$

where T is the expected absolute turnout of all other voters and $t_i = 0, 1$ is the individual's decision to turn out. If individual i does not turn out to vote the result is equation 5.8, while if the voter does turn out to vote the result is in the

[16]Of course, technically one could argue that a voter's ideal scenario is already achieved when their preferred party achieves a majority, and that utility does not improve from there. However, around 3 out of 4 OECD countries had multi-party coalition governments(Bargsted and Kedar 2009), suggesting that parties do not make it to 50 percent most of the time. Hence, assuming the ideal is 100 will still approximate individuals striving for a mere majority in most of the cases. Moreover, such majorities may be uncertain and therefore individuals may still have incentives to turn out to vote.

[17]Note that this is only an estimate of the systemic part of an individual's utility associated with their ideal election outcome.

individual's preferred direction by the marginal utility of turning out:

$$\sigma(U_i) = \frac{\partial \mathbb{E}(\hat{U}_i^E)}{\partial t_i} = \frac{1}{T+1} \sum_{j=1}^{J} \Big[(\pi_{ij} - V_j)\hat{U}_{ij} \Big] \tag{5.11}$$

where an individual utility of voting ($\partial \mathbb{E}(\hat{U}_i^E)/\partial t_i$), from hereon referred to as an individual's preference strength ($\sigma(U_i)$), is higher when there is a difference between her ideal vote-share for party j (π_{ij}) and the expected vote-share for party j (V_j). Moreover, the higher the utility associated with a given party ($\hat{U}_{ij}$), the more important this difference is. The factor $1/(T+1)$ summarises Downs' (1957) voting paradox: one individual, by herself, can only have a very minor impact on the share of seats a party receives.[18] It is not the intention of the present study to conclusively resolve the voting paradox. I merely assert plausibly that, all else being equal, voters who care about the outcome are more likely to vote than voters who are indifferent about the outcome.[19]

This measure of a voter's preference strength has two interesting properties. First, the larger the difference between the utility of an individual's preferred parties and the weighted utility of all other parties, the larger an individual's preference strength. For example, an individual who is indifferent between all parties, is likely to have a preference strength of zero, whereas an individual who strongly prefers one party by a large margin over all others is likely to have a high preference strength. Second, the larger the expected vote-share ($\hat{V}_j$) of an individual's preferred party, the smaller the preference strength. The latter effect captures the phenomenon that people may stop turning out if their preferred party is relatively sure to win.

The hypothetical voters in figure 5.1 on page 190 will help to provide greater

[18] This paradox has given rise to an elaborate literature concerned with the question of whether turning out to vote is rational, and whether current levels of turnout can be squared with rational choice assumptions (Downs 1957, Riker and Ordeshook 1968, Ferejohn and Fiorina 1974, Fiorina 1976, Rosenthal 1985, Myerson 1998, Dhillon and Peralta 2002). These debates have focussed, amongst others, on the probability that an individual is pivotal (i.e. decisive) in deciding the election result (Riker and Ordeshook 1968, Blais and Lago 2009).

[19] I expect this imperative to influence individual behaviour regardless of whether it is a rational imperative. The empirical analysis in the next chapter will confirm empirically whether this imperative influences turnout.

understanding of this preference strength measure. Let us for now assume that each of these five parties poll exactly 20 percent of the seats. From the discussion above we know that the first voter has a very high probability to vote for party "C". Moreover, the utility associated with voting for party "C" is high. Hence, the ideal scenario would be a parliament consisting of party "C", yielding a "high" utility. The expected outcome, however, is that 80 percent of seats will go to parties that provide a low utility, and only 20 percent will go to the high utility party "C". Consequently, this hypothetical voter will have a strong preference strength and be very likely to turn out. The second hypothetical voter, in contrast, will obtain very similar utilities from each of the parties, and therefore has a low preference strength associated with the outcome of the election. *Ceteris paribus*, this individual has lower incentives to turn out. Last, the third hypothetical voter's ideal scenario is a parliament consisting entirely of parties "B" and "E". Since 40 percent of expected seats already yield a high utility, the expected utility of the election is looking better for this voter compared to the first voter. However, the voter would rather see all seats going to parties "B" and "E". Therefore, this voter has a fairly high preference strength and incentives to turn out. Ergo, modelling voter turnout as a function of the distribution of partisan utilities and vote probabilities means that parties can influence voter turnout through their policies, that is – parties can increase or decrease the utility associated with turning out.

Nevertheless, it is a stretch to assume that voters turn out solely because of their contribution. Other factors matter as well. One of these is a sense of civic duty to turn out (Blais and Achen 2010).[20] Ideally, a sense of duty is measured directly through a question instrument.[21] However, even in the absence of such an instru-

[20] In particular, Blais and Achen (2010) argue that duty enters the choice process lexicographically. That is, firstly, individuals either decide whether or not to vote based on ethical considerations surrounding a sense of duty. Secondly, non-ethical considerations – e.g. the strength of preferences for one of the parties over others – only become important for those individuals for who a sense of duty was not decisive in the first stage. Given that their approach is work in progress, the present analysis does not model this process lexicographically. Instead, the effects of each is modelled in a similar additive fashion.

[21] See Blais and Achen (2010) for possible questions to tap into a sense of duty.

ment an individual's non-instrumental reasons to turn out can be approximated on the basis of individual characteristics such as age, education, union membership and religion. In addition to tapping into duty related characteristics these questions may also tap into informational and cost related factors that influence an individual's propensity to vote.[22] These factors are therefore included in the vector of individual attributes $\mathbf{Z}'_\mathbf{i}$ in equation (5.6).

5.3.3 Voting power under proportional representation

We now have a model of individual behaviour that parties can influence by changing the partisan utility of that individual ($\hat{U}_{ij}$). Parties can influence turnout by increasing or decreasing an individual's preference strength by changing their partisan utility. They can also change an individual's party-choice probabilities by increasing or decreasing their partisan utility. These two individual level foundations are the key to the model of voting power derived below.

As discussed above, we assume the effect of a policy change with an income effect of $\partial\tau_{ij}$ to have the same partisan utility effect of $\partial\hat{U}_{ij}/\partial\tau_{ij}$ across all individuals. Moreover, we assume a perfectly proportional single-district electoral system where a party's seat-share (S_j) is directly proportional to its vote-share (V_j), where by definition $S_j \in [0,1]\forall j$ and $\sum_{j=1}^{J} S_j = 1$.[23] Party j's expected seat-share is then given straightforwardly by the total expected votes for party j, divided by the total

[22] Hypothetically, it may be more costly for older people to make their way to the polling station, and union membership may reduce information seeking costs associated with voting.

[23] As discussed above, strategic voting because of electoral systems is partially incorporated in the model of vote choice (see Footnote 13 on page 188. Moreover, disproportionalities created by the electoral system are accounted for in the measures of group voting power over governments and parliaments by weighting parties according to their seat-share. Electoral system effects are discussed in more detail in an extension in section four.

votes cast.

$$S_j = V_j = \frac{\overbrace{\sum_{i=1}^{N} \Pr(y_i = j)\Pr(t_i = 1)}^{\text{total votes for party } j}}{\underbrace{\sum_{i=1}^{N} \Pr(t_i = 1)}_{\text{total votes cast in election}}} \tag{5.12}$$

prospective voter i's *absolute* voting power with respect to party j is then defined as the marginal effect of a change in $i's$ utility with respect to party j ($\partial \hat{U}_{ij}$) on j's seat share. Our definition of absolute voting power is thus the derivative of equation 5.12 with respect to $\hat{U}_{ij}$ (see section 5.6.1 on page 217 in the appendix of this chapter for a step-by-step derivation)

$$\mathrm{VP}_{ij} = \frac{\partial S_j}{\partial \hat{U}_{ij}} = \frac{1}{\sum_{i=1}^{N} \Pr(t_i = 1)} \left(\overbrace{\frac{\partial \Pr(y_i = j)}{\partial \hat{U}_{ij}} \Pr(t_i = 1)}^{\text{Voter } i\text{'s conversion value for party } j} + \right.$$
$$\left. \underbrace{\frac{\partial \Pr(t_i = 1)}{\partial \hat{U}_{ij}} \left[\Pr(y_i = j) - \frac{\sum_{i=1}^{N} \Pr(y_i = j)\Pr(t_i = 1)}{\sum_{i=1}^{N} \Pr(t_i = 1)} \right]}_{\text{Voter } i\text{'s mobilisation value for party } j} \right) \tag{5.13}$$

To begin with, an individual's absolute voting power vis-a-vis a party j is a negative function of the number of other individuals turning out ($1/\sum_{i=1}^{N} \Pr(t_i = 1)$). This is intuitive: the larger the number of voters turning out, the smaller the marginal effect of an individual vote on a party's voteshare.[24]

[24]We will find, however, that this effect cancels out when voting power is aggregated to the group level in our measure of relative voting power.

Conversion value

Next, a prospective voter's voting power with respect to party j is a positive function of her conversion value:

$$\text{conv}_{ij} = \overbrace{\frac{\partial \text{Pr}(y_i = j)}{\partial \hat{U}_{ij}}}^{\text{Change in probability } i \text{ votes party } j} \times \overbrace{\text{Pr}(t_i = 1)}^{\text{Probability } i \text{ turns out to vote}} \tag{5.14}$$

which is the marginal effect of a change in i's partisan utility on the probability of voting for party j, times the probability that the voter will actually turn out to vote. That is, a vote-share maximising party will target those voters for whom a marginal change in their partisan utility will substantially alter the probability of choosing party j over any of the other parties. Neither preaching to the choir nor preaching to convinced atheists is likely to win souls; preaching to agnostics, however, may. Moreover, a party will focus its conversion effort on those with a high probability of turning out to vote. Naturally, there is little point in converting individuals who subsequently do not turn out to vote.

The estimator of a voter's conversion value is

$$\widehat{\text{conv}}_{ij} = \overbrace{\frac{\exp(\hat{U}_{ij}) \sum_{k=1}^{J-1} \exp(\hat{U}_{ik})}{\left(\exp(\hat{U}_{ij}) + \sum_{k=1}^{J-1} \exp(\hat{U}_{ik})\right)^2}}^{\text{Change in probability } i \text{ votes party } j} \times \overbrace{\frac{1}{1 + \exp\left(-\hat{W}_i\right)}}^{\text{Probability } i \text{ turns out to vote}} \tag{5.15}$$

where $\hat{U}$, $\hat{\alpha}$ and $\hat{\gamma}$ are parameters estimated by Equations 5.4 and 5.7. See Appendix section 5.6.2 on page 218 for a step-by-step derivation of $\partial \text{Pr}(y_i = j)/\partial \hat{U}_{ij}$.

Voters have the highest conversion value when the slope of the logit function is at its steepest (i.e. the closer the predicted probability is to .5). For the two party context this is intuitive, as those are the voters at the centre. Since the slope of the logit function is at its flattest at its tails, voters have the lowest conversion value when they either have a very high or a very low probability to vote for party j.

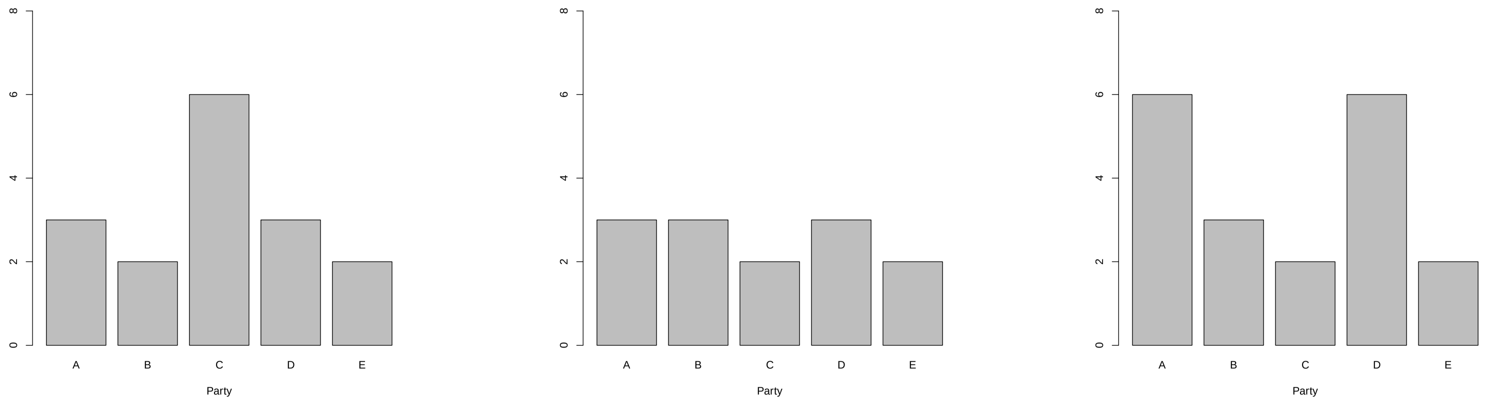
Figure 5.2 on page 201 updates the three hypothetical voters of figure 5.1 with the components of an individual's conversion value to provide some further understanding of the conversion value of different types of voters. These simulations assume $\gamma = 1$ and $\mathbf{Z_i}\alpha = -1$ for all voters and are merely intended to show the dynamics of the model. The first hypothetical voter (with the shape of a middle finger) has a clear preference for party "C", with a predicted vote choice of 88%. While this is high, there is still some certainty to be gained by party "C". This is indicated by the voter's marginal change in vote choice for a change in utility. This predicted marginal change is 10.6%. Moreover, this voter has a high preference strength (σ=2.41) which gives a 80.3% predicted probability of turning out, meaning that converting this voter will yield a 10.6%×80.3%=8.5% increase in the contribution of this voter to party j's voteshare. The conversion value of this voter for the other parties is much lower. Across all five parties the average conversion value of this voter is 3.6%. This average conversion value is relatively low because the voter has relatively low convertibility, especially with respect to the four lowest ranking parties.

The second hypothetical voter (with the shape of a fist) is fairly indifferent between the five parties, with a slight preference for parties "A", "B" and "D" over "C" and "E". The probability of voting for one of the parties with utility three is 26.8%, while the predicted probability for the two parties with utility two is 9.8%. For the three parties slightly in the lead this voter is likely to change their vote-choice significantly for a change in it partisan utility (19.6%). However, the indifference also results in a low preference strength (σ=.20) and therefore a low predicted probability of turning out (31.1%). Consequently, the combination of low turnout but high convertibility lead to a conversion value of only 6.1% for the three leading parties (19.6%×31.1%=6.1%) and 2.8% for the trailing parties (8.9%×31.1%=2.8%). Across all five parties the average conversion value is 4.8%. This is higher than the first voter because the high convertibility with respect to most parties trumps the lower turnout.

Last, the third hypothetical voter (with the shape of the devil's horns) is indifferent between parties "A" and "D" but has a strong preference for party "A" and "D" over "B", "C" and "E". This results in predicted choice probabilities of 47.9% for "A" and "D", and minimal probabilities for the remaining three parties. Moreover, the voter is highly convertible for these two highest ranking parties. A small increase in utility will lead to a 25% increase in vote-share. This constellation also results in a high preference strength of (σ=2.06) and predicted turnout of 74.2%. Hence, the conversion value of this voter is 18.5% for the two highest ranking parties (25%×74.2%=18.5%), and minimal for the other parties. The average conversion value of this voter is 8.0%, the highest of all three parties: this is due to the combination of a predicted high probability of turning out and high convertibility.

These three examples demonstrate the dynamics behind the conversion value of a voter. Conversion only makes sense for voters that are both convertible and have a high probability of turning out. Even a voter that is fairly certain to vote for one party can still have a conversion value for that party as long as their predicted probability is below 100%. The highest convertibility for an individual party emerges in the case of the third voter, where the predicted probability of a voter's party choice is equally split between two parties, and close to 50%. In this scenario each party can win a high premium from pleasing this voter. It should be noted that the choice of parameters was rather arbitrary, and that variations in turnout only followed from variations in the preference strength. In the real world, variations in $\mathbf{Z_i'}\alpha$ will also explain variations in turn out.

Figure 5.2 – Utility distributions of three hypothetical voters (II)



	Hypothetical Voter 1 “The Convinced Middle Finger”						Hypothetical Voter 2 “The Indifferent Fist”						Hypothetical Voter 3 “The Devil’s Horns’ Dilemma”					
Party j	A	B	C	D	E		A	B	C	D	E		A	B	C	D	E	
$\hat{U}_{ij}$	3	2	6	3	2		3	3	2	3	2		6	3	2	6	2	
$\Pr(y_i = j)$	4.4%	1.6%	88.0%	4.4%	1.6%		26.8%	26.8%	9.8%	26.8%	9.8%		47.9%	2.4%	.9%	47.9%	.9%	
V_j	20%	20%	20%	20%	20%		20%	20%	20%	20%	20%		20%	20%	20%	20%	20%	
$\Pr(y_i = j) - V_j$	-15.6%	-18.4%	68.0%	-15.6%	-18.4%		6.8%	6.8%	-10.2%	6.8%	-10.2%		27.9%	-17.6%	-19.1%	27.9%	-19.1%	
$\sigma(\hat{U}_{ij})$			2.41						.20						2.06			
$\Pr(t_i = j)$			80.3%						31.1%						74.2%			
$\partial \Pr(y_i = j)/\partial \hat{U}_{ij}$	4.2%	1.6%	10.6%	4.2%	1.6%		19.6%	19.6%	8.9%	19.6%	8.9%		25.0%	2.3%	.9%	25.0%	.9%	
conv_{ij}	3.4%	1.3	8.5%	3.4%	1.3%	**3.6**	6.1%	6.1	2.8%	6.1%	2.8%	**4.8**	18.5%	1.7	.6%	18.5%	.6%	**8.0**
$\partial \Pr(t_i = 1)/\partial \hat{W}_i$			15.8%						21.4%						19.1%			
$\partial W_i/\partial \hat{U}_{ij}$	-.27	-.24	1.03	-.27	-.24		.12	.12	-.18	.12	. -.18		.35	-.24	-.23	.35	-.23	
$\partial \Pr(t_i = 1)/\partial \hat{U}_{ij}$	-4.3%	-3.8%	16.2%	-4.3%	-3.8%		2.6%	2.6%	-3.9%	2.6%	-3.9%		6.6%	-4.7%	-4.3%	6.6%	-4.7%	
mob_{ij}	.7%	.7%	11.0%	.7%	.7%	**4.2**	.2%	.2%	.4%	.2%	.4%	**.3**	1.9%	.8%	.8%	1.9%	.8%	**1.2**
VP_{ij}	4.0%	2.0%	19.5%	4.0%	2.0%	**6.8**	6.3%	6.3%	3.2%	6.3%	3.2%	**5.0**	20.4%	2.6%	1.5%	20.4%	1.5%	**9.3**

Notes: Simulations of hypothetical values in the model to illustrate model effects. U_{ij} and V_j are exogenous, as are the following parameter assumptions: $\gamma = 1$, $\mathbf{Z}_\mathrm{i}'\alpha = -1$ for all voters. All other model values follow endogenously from this configuration.

Mobilisation value

Last, an individual's voting power is a positive function of her mobilisation value for party j:

$$\text{mob}_{ij} = \overbrace{\frac{\partial \Pr(t_i = 1)}{\partial \hat{U}_{ij}}}^{\text{Change in probability } i \text{ turns out}} \times \left(\overbrace{\underbrace{\Pr(y_i = j)}_{\text{Probability } i \text{ prefers } j} - \underbrace{\frac{\sum_{i=1}^{N} \Pr(y_i = j)\Pr(t_i = 1)}{\sum_{i=1}^{N} \Pr(t_i = 1)}}_{\text{Expected vote-share } j}}^{\text{Expected contribution of } i \text{ to } j\text{'s voteshare}} \right) \tag{5.16}$$

which is the marginal effect of a change in i's utility towards party j on i's probability to turn out, times the expected contribution to j's seat-share. This expected contribution is positive when an individual has an above average probability to vote for party j and negative when an individual has a below average probability to vote for party j.[25] Hence, parties have mobilisation incentives in two directions. First, the most commonly analysed direction is that parties mobilise those voters who are more likely than average to vote for them. Parties thus have incentives to mobilise voters when 1) their probability of voting for party j is above average (the last term), and 2) there is a large positive effect of increasing an individual's partisan utility on turning out (high values of the first term, $\partial \Pr(t_i = 1)/\partial \hat{U}_{ij}$). The logic is that party j can encourage those voters who are already likely to vote for party j by making them feel even stronger in favour of party j. To be precise, increasing partisan utility with respect to party j will increase the utility of turning out. This is because an election outcome where party j obtains a higher share yields a higher utility then one where party j yields a lower share.

Second, the less commonly analysed direction is that parties can try to discourage from turning out those voters with a below average propensity to vote for party j. Parties thus have incentives to demobilise voters when 1) their probability of voting for party j is below average (the last term), and 2) there is a large negative

[25] The logic behind this is that a party with an expected vote-share of 10 percent benefits from the turnout of a voter who has a 20 percent probability of voting for that "small" party. A party with an expected vote-share of 30 percent, however, loses from the turnout of a voter who has a 20 percent probability to vote for that "large" party.

effect of increasing an individual's partisan utility with respect to party j on turning out (high negative values of the first term, $\partial \Pr(t_i = 1)/\partial \hat{U}_{ij}$). The latter can be achieved when parties are in the position to make a voter indifferent about the election outcome. Think of a hypothetical voter in a two party setting with a slight preference for party R over party L. Party L could pursue policies in the interest of this voter such that the voter becomes indifferent between party L and party R. From equation 5.11 it follows that indifferent voters have a preference strength of zero. Hence, by making a voter "happier", a given party can make that voter indifferent and thereby reduce their likelihood of turning out.

The estimator of a voter's mobilisation value is given by:

$$\widehat{\text{mob}}_{ij} = \overbrace{\underbrace{\frac{\hat{\gamma}}{T+1}\left[\pi_{ij}\left(1 - \hat{U}_{ij}\pi_{ij} + \hat{U}_{ij}\right) - V_j - \sum_{k=1}^{J-1}\pi_{ij}\pi_{ik}\hat{U}_{ik}\right]}_{\text{Change in } i\text{'s utility of turning out for a change in partisan utility } (\partial W_i/\partial \hat{U}_{ij})} \times \underbrace{\frac{\exp(-\hat{W}_i)}{\left[\exp(-\hat{W}_i)+1\right]^2}}_{\partial \Pr(t_i=1)/\partial \hat{W}_i}}^{\text{Change in } i\text{'s probability to turn out for a change in partisan utility with respect to party } j}$$

$$\underbrace{\times\,(\pi_{ij} - V_j)}_{\text{Expected contribution of } i \text{ to } j\text{'s voteshare}}$$

where

$$\begin{aligned}
\pi_{ij} &= \frac{\exp(\hat{U}_{ij})}{\exp(\hat{U}_{ij}) + \sum_{k=1}^{J-1}\exp(\hat{U}_{ik})} \\
\pi_{ik} &= \frac{\exp(\hat{U}_{ik})}{\exp(\hat{U}_{ij}) + \sum_{k=1}^{J-1}\exp(\hat{U}_{ik})} \\
\hat{W}_i &= \mathbf{Z_i'}\alpha + \gamma\sigma(\hat{U}_i)
\end{aligned} \tag{5.17}$$

where $\hat{U}$, $\hat{\alpha}$, $\hat{\gamma}$ and $\hat{\lambda}$ are parameters estimated by Equations (5.4 on page 188) and (5.7 on page 191). See Appendix section 5.6.3 on page 218 for a step-by-step derivation of $\partial \Pr(t_i = 1)/\partial \hat{U}_{ij}$.

The mobilisation value of a voter is thus the product of how much a change in partisan utility will change an individual's probability of turning out and the expected contribution of voter i to j's vote share, when she votes. The latter is simply the predicted probability that voter i will vote for party j minus the average probability that a voter will vote for party j (i.e. its expected voteshare).

The former, the effect of partisan utility on turnout, can be deconstructed into three components. First, it depends on the effect of an individual's partisan utility on an individual's preference strength ($\partial\sigma(\hat{U}_i)/\partial\hat{U}_{ij}$). From equation 5.11 it follows that the effect of partisan utility on an individual's preference strength is strongly positive when there is a big difference between the individual's predicted probability of voting for a given party (π_{ij}) and the expected voteshare of that party (V_j). Moreover, an increase in utility will simultaneously increase the probability that that party is preferred (i.e. π_{ij}), as well as the utility associated with that preferred outcome compared to the expected utility from the expected outcome. Note that this effect can be both positive and negative. Parties already preferred by the voter can increase the preference strength by increasing their partisan utility. When an individual's predicted probability to vote for a party is smaller than its expected voteshare, the effect of an increase in partisan utility is negative. Parties not favoured by a voter can make that voter indifferent by increasing their partisan utility, which reduces the voter's preference strength. This programmatic potential for negative turnout buying complements recent developments on negative turnout buying in the clientelism literature (Nichter 2008).[26] Second, the effect of parties on turnout depends on the effect of this preference strength on an individual's utility associated with turning out, given by the estimated parameter $\hat{\gamma}$ ($\partial\hat{W}_i/\partial\sigma(\hat{U}_i)$). This is an empirically estimated parameter for the effect of preference strength on an individual's turnout decision. Third, how far parties can influence a voter's turnout depends on the effect of a change in turnout utility on the probability of turning out. The closer $\hat{W}_i$ is to 0 (i.e. predicted turnout probabilities of 50%), the higher the effect of a change in utility on the probability of turning out. This is logical given that the slope of the logit function is at its steepest at a predicted probability of 50%. Moreover, it makes sense that there is no point in mobilising voters who are either very certain or very unlikely to turn out.

[26]Bartels' (1998) model also incorporated the potential for negative turnout buying.

To sum up, a high effect of partisan utility on the preference strength, a high value of γ and a 50% predicted probability to turn out make a voter mobilisable for a party. It only makes sense for parties to mobilise voters who have an above average probability of voting for them. Hence, the higher the predicted vote share of a party, the higher the individual's predicted probability to vote for that party needs to be in order to be worthwhile to mobilise them. For example, a party that already expects to get 40% of the vote loses from mobilising a voter that has a 25% probability to vote for it. In contrast, a party that only expects 10% of the votes will gain from mobilising such a voter.

Again, the three hypothetical voters in figure 5.2 will help to demonstrate these dynamics. The first voter has a high predicted probability to turn out (80.3%) and a high probability to vote for party "C" (88.0%). Hence, the expected contribution of this individual's vote to Party "C"'s vote share is 68.0% (the last part of equation 5.17). Party "C" would thus gain from increasing this voter's turnout probability further. It can do so by increasing its preference strength. It is actually well positioned to do so because the individual already prefers party "C" to have a high share of the votes. Party "C" can further increase the utility that this individual associates with turning out by increasing individual i's utility with respect to "C". Moreover, as we saw above, an increase in utility will further concentrate the preference of this voter towards party "C" by an estimated "10%". Both these effects increase the utility associated with turning out by 1.03 (the first part of equation 5.17, $\partial \hat{W}_i / \partial \hat{U}_{ij}$, assuming $\gamma = 1$). Moreover, a one unit increase in utility results in a 15.8% increase in the probability of turning out (The second part of equation 5.17, $\partial \Pr(t_i = 1)/\partial \hat{W}_i$, assuming $\mathbf{Z_i'}\alpha = -1$). Altogether, this gives this voter a mobilisation value of $(\hat{W}_i / \partial \hat{U}_{ij}) \times (\Pr(t_i = 1)/\partial \hat{W}_i) \times (\pi_{ij} - V_J)$=1.03×15.8%×(88.0%-20.0%)=11.0%.

In contrast, all other parties stand to lose voteshare from this voter turning out (between 15.6% and 18.4%). They therefore have good reasons to disincentivise her to turn out. However, they have limited abilities to do so. The reason is that increasing partisan utility will only reduce the voter's utility from turning out in a very limited way (between -.24 or -.27 compared to the 1.03 of party "C"). An increase in partisan utility with respect to these parties would make the voter somewhat indifferent about the election outcome and would thus result in a reduced probability of turning out. These effects are between -4.3% and -3.8%.) Hence, these voters also have a mobilisation value, but a very low one of .7% (-.27×-15.8%×(4.4%-20%)=.7%).

Next, the second voter is indifferent about the outcome of the election. There is not a big difference between the expected utility of the next parliament and the ideal composition of this voter. This results in a low preference strength (σ=.20) and therefore a low probability of turning out. Since this voter does not strongly prefer one of the parties, parties have a limited ability to increase the voter's utility associated with turning out. For example, a one unit increase in partisan utility with respect to one of the leading parties can only increase the voter's utility of turning out with .12. What is more, this voter is unlikely to give any of the parties a substantial increase in their vote-share, only the three slightly leading parties stand to gain a mere 6.8% (26.8%-20.0%). This is very small compared to the first voter's 68.0% for party "C". All in all, this results in a very low mobilisation value of .2% (.12× 21.4%×(26.8%-20.0%)=.2%).

Last, the third voter could contribute substantially to the vote-share of party "A" and party "D". After all, this voter's predicted probability of voting for either of these parties is 27.9% higher than their predicted vote-share. However, the ability to change the voter's utility with respect to turning out is not as strong as it was for the first voter. The reason is that the voter already has a fairly high utility associated with two-fifth of the expected voteshares (parties "A" and "D"). While an increase in the utility with respect to one of these parties will increase the utility associated with turning out (in fact by .35), this effect is not as strong as when this utility increases only with respect to one preferred party (1.03 for voter 1 with respect to party C). Hence, the total mobilisation value of these voters is 1.9% (.35×19.1%×(47.9%-20.0%)=1.9%).

The model also shows the potential for parties to be involved in negative turnout buying by targeting the partisan utility of those voters who are more likely to vote for other parties. Since increasing the partisan utility towards party j may make individuals indifferent about the outcome, parties can prevent supporters of opponents from turning out. Parties have strong incentives to engage in negative turnout buying under the following conditions: 1) the further the probability to vote for party j is below average, 2) the larger the negative effect of an increase in the partisan utility for party j (i.e. high positive values of (γ), and 3) the slope of the logit function is at its steepest (the closer the probability of turning out is to .5).

From Equation 5.16 it follows that the potential for positive turnout buying is the largest for parties with a small share of votes in the polls. After all, such parties allow for the highest *positive* values of $\Pr(y_i = j) - \frac{\sum_{i=1}^{N}\Pr(y_i=j)\Pr(t_i=1)}{\sum_{i=1}^{N}\Pr(t_i=1)}$. Conversely, the potential for negative turnout buying is the largest for parties with a high predicted current vote-share. Such parties have the highest *negative* values of $\Pr(y_i = j) - \frac{\sum_{i=1}^{N}\Pr(y_i=j)\Pr(t_i=1)}{\sum_{i=1}^{N}\Pr(t_i=1)}$

5.3.4 A measure of relative group voting power

As Stokes (2009) points out succinctly, the literature on electoral targetting suffers from conceptual confusion. Terms such as pork-barrel politics, distributive politics, programmatic redistribution, tactical redistribution, machine politics and vote-buying are often used interchangeably to refer to, what are in effect, conceptually distinct activities. Stokes proceeds to offer a useful conceptual framework to categorise the universe of electoral strategies. The highest level distinction she makes is between strategies relying on material inducements and strategies relying on non-material, symbolic appeals. Think of these non-material appeals as ethical questions relating to religion, abortion and same-sex marriage rights. Further subdividing the material branch, Stokes' next distinction is between programmatic and non-programmatic material appeals. Programmatic appeals are defined as those policies in which "[1] The objectives are a matter of public debate; [2] These objectives shape the official, codified criteria for distribution of the program or resource, and; [3] The official criteria shape the actual distribution of the program or good" (Stokes 2009, p8). Although not explicitly broken down as such by Stokes, we can distinguish here between programmatic appeals that are of a distributive, targeted nature or programmatic appeals that are of a pure public good nature. Most welfare state programmes are clearly distributive, yet programmatic. However, some programmatic public goods like national defence or sound macro-economic management can be argued to benefit all without clearly distributing across groups.[27]

Non-programmatic policies, on the other hand, are characterised by discretion, i.e. by not meeting the three criteria above. Stokes continues to pursue further branching between unbiased and biased non-programmatic policies. Unbiased service, referred to as constituency service, benefits all voters in the constituency without favouring some voters over others. Biased non-programmatic strategies are partial to a group deemed electorally important. Last, within the non-programmatic biased branch, Stokes makes an important distinction between electoral targeting that involves the *quid pro quo* exchange of (policy) favours for votes and those that do not involve *quid pro quo* favours. The latter includes those cases where discretionary spending (pork) is used to generate goodwill amongst vital constituents. The assumption is, like in our model, that increased goodwill will improve the electoral fortunes of a party. For example, Dahlberg and Johansson (2002) study the use of discretionary environmental grants towards municipalities with the highest density of undecided voters in Sweden. Parties, however, cannot credibly threaten

[27] That said, while such policies have public good characteristics they often also involve distributive elements. Defence spending (procurement and employment) benefits some groups in society over others, while macro-economic policy choices on issues such as inflation are, as the New Keynesian Economics reminds us, not without their distributive implications (Hibbs 1977, Iversen and Soskice 2006).

to withhold such benefits from individuals who vote for other parties. Discretionary spending can be targeted within geographic areas as well. For example, support for a local factory of which it is known that the workers are key constituents is a form of discretionary, yet clearly targeted, non-programmatic spending.

For the *quid pro quo* branch to exist party machines must be able to monitor individual voting behaviour in the *de jure* or *de facto* absence of a secret ballot. Moreover, they must have the discretion to impose individual policy rewards and punishments (such as withholding benefits). Individual electoral targeting, however, is not common practice in western democracies for practical and ethical reasons. That notwithstanding, the study of clientelism, the *quid pro quo* exchange of (policy) favours for votes, is the focus of much important work in political science (Calvo and Murillo 2004, Stokes 2005, Nichter 2008, Hicken 2011, see, for example). Indeed, my approach to measuring the voting power at the individual level could be used by scholars of clientelism to estimate the cheapest voters to buy by political machines.

Higher education policy in industrialised democracies is a targeted programmatic policy. A party can win votes by pursuing higher education policies that create goodwill amongst certain groups, which in turn influences that group's decision to turnout and vote for that party. Therefore, individual targeting is out of the question and unaggregated individual voting power is rather irrelevant. Group-level aggregates of voting power, however, are relevant. Remember from chapters 2 and 3 that highly and lesser educated strata have opposing interests when it comes to expanding enrolment and per-student subsidies. Hence, knowing the relative voting power of highly and lesser educated individuals vis-à-vis parties is relevant for exploring the incentives available to parties when choosing their policy positions.

High voting power means a high responsiveness of a voter's contribution to a party j's seat share resulting from a change in partisan utility with respect party j. What matters for distributive politics, however, is the relative voting power of groups, not their absolute voting power. To be precise, politicians have no electoral incentives to favour one group over another if all citizens have equal voting power. Whether this equal level of voting power is high or low does not affect the distributive outcome. After all, a party would lose as many votes by taking from some as it would gain by giving to another. A party will only have electoral incentives to change the *status quo* when there are opportunities to increase its vote-share by taking from those with lower voting power and giving to those with higher voting power.

Let society consist of a number of groups, indexed by $g = 1, 2, ..., G$, which are all subsets of the set of all prospective voters, the universal set U. Each in-group g has its out-group g^c, which are all citizens in the set U that are not members of the subset g.[28] To make results comparable across countries, groups and time it is best to think about the sum of redistribution to group g in Purchasing Power Parity (PPP) per capita currency or percentage of GDP terms.[29] In what follows I assume that a government is looking to redistribute t PPP corrected dollars, such that the total amount to be distributed equals Nt (the total population times the per-capita redistributed amount). If distributed to a group of size N_g, then each individual in group g receives tN/N_g dollars, while each individual outside the group is taxed $-tN/(N - N_g)$. This results in a balanced budget.

The expected change in seats resulting from spending tN on group g is then

[28] In set-theory this subset is known as the complement of set g relative to set U, denoted by g^c, or the set-difference of U and g, denoted $U\backslash g$

[29] This can be illustrated in the following example. Assume the government is considering redistributing a certain amount T, which means that it gives T to one group and takes $-T$ from another group. Using an absolute dollar amount for T would make results incomparable across countries. For example, redistributing 1 billion means redistributing (i.e. either giving or taking) – on average – 4000 dollars per person to all of Luxembourg's 500,000 citizens, and only 6 dollars per person to each of the 310 million citizens of the United States. Obviously, the redistributive effects – and the vote-share buying potential – of the same amount, are radically different.

One potential solution is to use an absolute (PPP) corrected per-capita amount (e.g. one 2005 PPP corrected dollar per person). Alternatively, we could denote redistribution as a percentage of GDP amount, i.e. redistribution amounting to x percent of GDP.

given by the following equation

$$\delta S_j(t) = \sum_{i=1}^{N} \left[\mathrm{VP}_i \frac{tN}{N_g} M_i + \mathrm{VP}_i \frac{-tN}{N - N_g} (1 - M_i) \right] \tag{5.18}$$

where $M_i = 1$ if i is a member of group g. From this we can calculate our measure of relative group voting-power

$$\begin{aligned} \mathrm{RVP}_{gj} = \frac{\partial S_j}{\partial t} &= \textstyle\sum_{i=1}^{N} \left[\mathrm{VP}_i \frac{N}{N_g} M_i + \mathrm{VP}_i \frac{N}{N-N_g} (1 - M_i) \right] \\ &= N \left[\overline{\mathrm{VP}}_g - \overline{\mathrm{VP}}_{g^c} \right] \\ &= (1/\overline{\Pr(T=1)}) \left[(\overline{\mathrm{conv}}_g + \overline{\mathrm{mob}}_g) - (\overline{\mathrm{conv}}_{g^c} + \overline{\mathrm{mob}}_{g^c}) \right] \end{aligned} \tag{5.19}$$

Thus, a group's voting power is the difference between the mean voting power of the in-group ($\overline{\mathrm{VP}}_g$) and the voting power of the out-group ($\overline{\mathrm{VP}}_g$), multiplied by the size of the population, N. This multiplication exactly cancels out the negative effect of the size of the population turning out on individual voting power.[30] Instead, we find that the lower average turnout, the higher the voting power of those who do turn out.

An important implication of this measure is that size does not matter for distributive politics that involve the distribution of scarce resources. This makes intuitive sense: the costs of redistribution and the benefits are both directly linear to the group's size. Hence, any benefit that arises from redistributing to a large group is offset by the cost of doing so, or because a fixed budget is stretched thin when distributed to a large group.

The model of voting behaviour developed above provides a measure of actual voting power. Bartels (1998) points out that such a measure of power conforms to Jack Nagel's definition of power as "an actual or potential causal relation between the preferences of an actor regarding an outcome and the outcome itself" (Nagel

[30] An individual's effect on a party's vote-share is, all else equal, an inverse function of the population size. The average individual voter in Luxembourg has more influence on a party's vote-share than the average influence of a voter in the USA has on the vote-share in a national election.

1975, p 29). In Bartels' words: "voter i's power over the election outcome derives not simply from his or her right to vote but additionally, and more subtly, from the candidates' strategic imperative to compete for his or her vote; disparities in the force of that strategic imperative can produce disparities in electoral influence, even in a system in which every person is legally entitled to cast one vote" (Bartels 1998, p 48).

5.4 Discussion of future extensions: electoral systems, strategic party competition and collusion in government

The model has so far made several assumptions that require some further discussion. First, the behaviour of parties has been modelled in the absence of other parties. Strategic considerations could result in bidding wars between parties over voters with high voting power over two or more parties. This may further increase the voting power of these sought-after voters and decrease the voting power of others.[31] Second, parties are assumed to individually affect voter utility. However, parties in coalition governments may only be able to *jointly* affect the utility of voters. This leaves less potential for competition for voters between the parties in government, which may actually reduce the voting power of individuals whose preferences fall in between the parties in government and redirect it to voters whose preferences fall in between the parties in government and the parties in opposition. Moreover, there is a potential for collusion between government parties in avoiding bidding wars for the same voters.[32] Third, the model has so far been working on single district

[31] We could think of a distinction between voters holding symmetric voting power over many parties being the subject of "bidding wars", in which the parties anticipate the bidding behaviour of other parties and therefore bid more. Voters with asymmetric voting power with respect to just one party, however, would be less likely to be the subject of such bidding wars. These strategic considerations could further increase the voting power of those already found to have high voting power (i.e. those with voting power with respect to multiple parties). Hence, strategic considerations are unlikely to change the direction of the results substantially

[32] The central idea behind the voting power model is that parties can improve the utility of voters through their actions in government or opposition and that parties do so independently. Although different opposition parties are able to take divergent stances, this is not necessarily the case for parties in government. Parties in government are bound to compromise. Hence, it is not unreasonable to assume that a policy change by a government affects the voter's utility

PR assumptions. To truly model the voting power of individuals the model would need to consider electoral system effects such as the competitiveness of districts, disproportionately sized districts, differential turnout across district as well as an analysis of the "parties in competition" within a district. A full treatise of each of these electoral system effects is beyond the scope of the present dissertation. However, the discussion below provides an overview of the questions faced and sets a preliminary agenda for such research.

Politicians are assumed to ultimately care more about seats and office than about votes. Seats are instrumental to obtaining office, but seats also have an intrinsic value. They provide legislative influence, a platform to campaign from for future elections, and are often the basis for determining levels of party funding. How votes translate into seats varies by electoral system (see for example Lijphart and Aitkin 1994, Cox 1997, Gallagher and Mitchell 2008). For very proportional electoral systems, like the Netherlands or Israel, parties effectively maximise their seats by maximising their vote-share. In other electoral systems, parties have incentives to target some voters over others. For example, in a single member district (SMD) system, parties may target voters in marginal seats over voters in safe seats. The maximand changes too, as a seat-maximizing party would maximize its plurality rather than its vote-share, which means the main battle over votes is about the vote-share of the front-runner *relative to* the runner-up. It is not the purpose of the present discussion to develop a measure of voting power for all extant electoral systems, that is a task for future research. The more modest intention is instead to give the reader an insight into the interactions of voting power and electoral systems. Moreover, I will argue that vote-share maximisation is likely to be a good

with respect to each of the parties in government equally. By implication, any pre-existing partisan utility differences that held by voters with respect to the parties in government are left unaffected by the actions of government. What can be changed, however, is the utility vis-à-vis parties in opposition. Even if we relax the assumption of cabinet unity, thereby allowing parties to differentiate themselves within cabinet, then there may be incentives to collude for the parties in government. For example, parties in government could collude to prevent costly bidding wars for voters that can only lead to zero sum gains between the members of government. Instead, members of a governing coalition may cooperate in winning votes from the opposition.

approximation of a party's seat-share maximising strategy *regardless* of the electoral system.

First, individual voting power may be influenced by variations in the proportion of seats to voters in different districts. All else being equal, if two single member districts have differential population sizes then a voter in the smaller district has more voting power than a voter in the larger district. Second, if two single member districts have equal populations but differential turnout rates, then the voter in the low turnout district will have higher voting power than the individual in the high turnout districts. Third, if a district is very competitive (i.e. a close race) then the chance that the individual's contribution to a party's vote-share will actually affect the party's seat-share is larger. This will make voters in the competitive district more valuable than those in a safe district. Measuring the actual competitiveness of districts is a challenge beyond the scope of this dissertation (see for a discussion Blais and Lago 2009).[33]

The seat-share won by a party j in a district is also a function of how the electoral system translates the vote shares of all parties in a given district into seats.[34] This is where most variation between electoral systems occurs. Only in completely proportional cases is the vote-share of party j (V_{dj}) the main determinant of its seat-share. For other electoral systems, the vote-share *relative* to that of other parties is decisive. For example, winning a single member district is a function of the difference between the front-runner and the runner-up. Hence, a voter indifferent to the front-runner and the runner-up is more lucrative to target than a voter indifferent to either of these parties and a third, smaller party.

For now, I will discard all these electoral system effects and assume that parties maximise their vote-share in order to maximise their seat-share. Regardless the electoral system, a higher vote-share will always benefit a party. A practical reason

[33] Also see Larcinese, Snyder and Testa (2009) for a discussion on the endogeneity bias of measures such as the margin of victory.

[34] Of course double ballots and electoral systems that involve preference rankings cannot be reduced to vote-shares. Separate models would need to be developed for such systems.

not to model electoral system effects at this point is that the data used to estimate voting power in the next chapter lacks the kind of district level data required to build such models. Future work, however, should incorporate these effects and weigh voting power by district. It should be stressed, however, that the next chapter will incorporate an important aspect of electoral systems that is related to the outcome of elections rather than the strategic imperatives involved in electoral competition. Namely, by weighting voting power over cabinets and legislatures by the seat-share of parties, the disproportionality resulting from electoral systems is captured in our measure.

5.5 Conclusion

To conclude, this chapter has developed a novel measure of the incentives on offer to parties if they target different socio-economic groups, solidly based on an assumption of rational seat-share maximising behaviour. This has resulted in three distinct values of voters to parties. First, voters undecided between two or more parties have conversion value for these parties, especially if they are likely to turn out. Second, voters who are more likely to vote for one party over others, but not certain to turn out may have mobilisation incentives. Third, parties may have incentives to prevent from turning out those voters who have an above average probability of voting for another party.

In developing this measure, this chapter has brought important insights from the literature on party competition in two-party systems to the world of multi-party systems. This contribution is valuable for understanding distributive politics in industrialised democracies, given that many of these polities are multi-party systems. The measure may provide a more credible alternative to determine the incentives on offer to parties than extant measures used by comparative political economists. By not endorsing a singular dimension of political competition, the model challenges the idea that the median voter is the driving force behind the behaviour of seat-share maximising parties. Moreover, by modelling the incentives of parties, rather than their positions, this theory provides an understanding of the causal motivation behind party positions. Another key insight provided by the model is that group-size does not matter for voting power. This explains why parties are incentivised to cater for groups that only make up a small section of the electorate. For the case of higher education politics this is relevant, given that highly educated groups make up only a small fraction of society, especially a few decades ago.

The theoretical nature of this chapter may make the reader hungry for some empirical flesh. Which groups have high voting power over which parties? Are there some groups with higher voting power than others? Which component dominates in explaining voting power: conversion or mobilisation? Does voting power actually affect policy-making? The next two chapters should help to sate some of this hunger. Chapter six uses this theoretically derived measure of voting power to estimate the voting power of different groups over parties in 15 European countries over a period of 20 years. It will also analyse whether the mobilisation or conversion component of voting power is more important for an individual's total voting power. Last, it will aggregate the voting power over parties to a measure of the voting power over legislatures and governments. For the purposes of this dissertation, this will give us an insight into the power of highly educated voters over parties, governments and legislatures. Chapter seven, in turn, will use that measure of voting power to explain government higher education policy across the same set of countries.

5.6 Appendix

5.6.1 Derivative of Voting Power

$$
\begin{aligned}
S_j &= \frac{\sum_{i=1}^{N} \Pr(Y_i = j|T)\Pr(T_i = 1)}{\sum_{i=1}^{N} \Pr(T_i = 1)} \\
S_j &= \frac{\sum_{k=1}^{K} \Pr(Y_k = j|T)\Pr(T_k = 1) + \Pr(Y_i = j|T)\Pr(T_i = 1)}{\sum_{k=1}^{K} \Pr(T_k = 1) + \Pr(T_i = 1)} \\
S_j &= \frac{V_k + Y_i T_i}{T_k + T_i}
\end{aligned}
$$

where $V_k = \sum_{k=1}^{K} \Pr(Y_k = j|T)\Pr(T_k = 1)$, $Y_i = \Pr(Y_i = j|T)$,

$T_i = \Pr(T_i = 1)$ and $T_k = \sum_{k=1}^{K} \Pr(T_k = 1)$

by the quotient rule the derivative of the seat share with respect to utility is

$$
\frac{\partial S_j}{\partial U_{ij}} = \frac{\frac{\partial [V_k + Y_i T_i]}{\partial U_{ij}}[T_k + T_i] - [V_k + Y_i T_i]\frac{\partial [T_k + T_i]}{\partial U_{ij}}}{[T_k + T_i]^2}
$$

where, by the product rule, $\frac{\partial [V_k + Y_i T_i]}{\partial U_{ij}} = \frac{\partial}{\partial U_{ij}}(Y_i T_i) = T_i \frac{\partial Y_i}{\partial U_{ij}} + Y_i \frac{\partial T_i}{\partial U_{ij}}$

and where $\frac{\partial [T_k + T_i]}{\partial U_{ij}} = \frac{\partial T_i}{\partial U_{ij}}$

rewriting, the derivative of a party's seat share with respect to partisan utility is

$$
\begin{aligned}
\frac{\partial S_j}{\partial U_{ij}} &= \frac{(T_i \frac{\partial Y_i}{\partial U_{ij}} + Y_i \frac{\partial T_i}{\partial U_{ij}})[T_k + T_i] - [V_k + Y_i T_i]\frac{\partial T_i}{\partial U_{ij}}}{[T_k + T_i]^2} \\
&= \frac{1}{T_k + T_i}\left(T_i \frac{\partial Y_i}{\partial U_{ij}} + [Y_i - \frac{[V_k + Y_i T_i]}{T_k + T_i}]\frac{\partial T_i}{\partial U_{ij}}\right) \\
&= \frac{1}{\sum_{i=1}^{N} \Pr(T_i = 1)}\left(\frac{\partial \Pr(Y_i = j|T)}{\partial U_{ij}}\Pr(T_i = 1) + \right. \\
&\quad \left. \frac{\partial \Pr(T_i = 1)}{\partial U_{ij}}\left[\Pr(Y_i = j|T) - \frac{\sum_{i=1}^{N} \Pr(Y_i = j|T)\Pr(T_i = 1)}{\sum_{i=1}^{N} \Pr(T_i = 1)}\right]\right)
\end{aligned} \tag{5.20}
$$

5.6.2 Derivative of Vote-Choice Multinomial Logit

$$
\begin{aligned}
\Pr(Y_i = j|T_i = 1) = &\ \frac{\exp(\hat{U}_{ij})}{\sum_{k=1}^{J}\exp(\hat{U}_{ik})} \\
= &\ \frac{\exp(\hat{U}_{ij})}{\exp(\hat{U}_{ij}) + \sum_{k=1}^{J-1}\exp(\hat{U}_{ik})}\ \text{, where } k \neq j \\
= &\ \frac{u}{u+w}\ \text{, where } u = \exp(\hat{U}_{ij}),\ w = \textstyle\sum_{K=1}^{J-1}\exp(\hat{U}_{ik})\forall k \neq j
\end{aligned}
$$

By the quotient rule we can write the derivative of vote-choice as

$$
\begin{aligned}
\frac{\partial \Pr(Y_i = j|T_i = 1)}{\partial U_{ij}} = &\ \frac{\frac{\partial u}{\partial U_{ij}}(u+w) - u\frac{\partial}{\partial U_{ij}}(u+w)}{(u+w)^2}\ \text{, where } \frac{\partial}{\partial U_{ij}}(u+w) = \frac{\partial u}{\partial U_{ij}} = u \\
= &\ \frac{u(u+w) - u^2}{(u+w)^2} = \frac{uw}{(u+w)^2} \\
= &\ \frac{\exp(\hat{U}_{ij})\sum_{k=1}^{J-1}\exp(\hat{U}_{ij})}{(\sum_{k=1}^{J}\exp(\hat{U}_{ij}))^2}
\end{aligned}
\tag{5.21}
$$

5.6.3 Derivative of Turnout Logit

$$
\begin{aligned}
\Pr(\mathrm{T_i} = 1) = &\ \operatorname{logit}(Z_i\alpha + \gamma\sigma(\hat{U}_i) + Z_i\sigma(\hat{U}_i)\lambda) \\
= &\ \frac{1}{1 + \exp(-Z_i\alpha - \gamma\sigma(\hat{U}_i) - Z_i\sigma(\hat{U}_i)\lambda)} \\
= &\ u^{-1}
\end{aligned}
$$

where $u = 1 + e^w$ and $w = -Z_i\alpha - \gamma\sigma(\hat{U}_i) - Z_i\sigma(\hat{U}_i)\lambda$

The derivative with respect to partisan utility can then be written as

$$
\frac{\Pr(\mathrm{T_i} = 1)}{\partial U_{ij}} = -u^2\frac{\partial u}{\partial U_{ij}}
$$

where $\frac{\partial u}{\partial U_{ij}} = e^w\frac{\partial w}{\partial U_{ij}}$ and where $\frac{\partial w}{\partial U_{ij}} = \frac{\partial \sigma(U_i)}{\partial U_{ij}}(-\gamma - \lambda Z_i)$

From Equation 5.11 it follows that

$$
\frac{\partial \sigma(U_i)}{\partial U_{ij}} = \Pr(Y_i = j|T) - V_j = \frac{\exp(\hat{U}_{ij})}{\sum_{k=1}^{J}\exp(\hat{U}_{ik})} - \hat{V}_j
$$

Rewriting results in the derivative of turnout with respect to partisan utility

$$
\begin{aligned}
\frac{\Pr(\mathrm{T_i} = 1)}{\partial U_{ij}} = &\ (\gamma + Z_i\lambda) \times \frac{\exp(-Z_i\alpha - \gamma\sigma(\hat{U}_i) - Z_i\sigma(\hat{U}_i)\lambda)}{[1 + \exp(-Z_i\alpha - \gamma\sigma(\hat{U}_i) - Z_i\sigma(\hat{U}_i)\lambda)]^2} \\
&\ \times \left(\frac{\exp(\hat{U}_{ij})}{\sum_{k=1}^{J}\exp(\hat{U}_{ik})} - \hat{V}_j\right)
\end{aligned}
\tag{5.22}
$$

Chapter 6

Voting power in 15 European democracies

6.1 Introduction

This chapter applies the model developed in the previous chapter in order to estimate the voting power of groups determined by education, age, gender and income for 15 European countries over a period of 20 years. The data used to estimate these measures come from the European Election Studies, which have been held in EU member states every five years between 1989 and 2009. To begin with, I estimate for each party how much of the seat-share it stands to gain from distributing from those outside a given groups to those inside that group. These party-level measures of group voting power are then aggregated to arrive at parliament and cabinet-level measures of group voting power.

The previous chapter shows that an individual's voting power is the sum of an individual's conversion and mobilisation value. This chapter estimates the relative contribution of each of these "values" to explaining variations in individual voting power. Do parties stand to gain more from mobilising their loyal followers or from converting doubters? Across the board I find that the conversion imperative is stronger than the mobilisation imperative. Moreover, as the reader will recall from the previous chapter, an individual's mobilisation and conversion value can each be broken down into two components. An individual's mobilisation value is the product of her expected contribution to a party's vote-share $(\Pr(Y_i = j) - V_j)$

and her mobilisibility – the marginal effect of an increase in partisan utility on an individual's probability to turn out ($\partial \Pr(T_i = 1)/\partial U_{ij}$). An individual's conversion value is the product of her expected turnout ($\Pr(T_i = 1)$) and her convertibility – the expected marginal effect of an increase in partisan utility on an individual's probability to vote for party j ($\partial \Pr(Y_i = j)/\partial U_{ij}$). This chapter also breaks down the relative contribution of each of these four components to a citizen's mobilisation and conversion value.

Since the role of parental education in the political economy of higher education is at the core of this dissertation, the analysis concentrates on the group voting power of highly educated citizens.[1] However, in addition, I also estimate group the voting power of age, gender and income groups. Besides being of substantial interest, these alternative measures of group voting power present us with a reference point against which to compare the relative voting power of highly educated individuals. This provides a gauge of how much a party stands to gain from distributing between education groups compared to distributing between, for instance, income or age groups.

The analysis in this chapter provides three important empirical contributions. First, by developing an empirical measure of the incentives on offer to parties if they cater to the interests of different groups, a new explanatory variable is created for students of (comparative) political economy. This new variable complements existing explanatory variables such as party manifesto measures of party positions (Budge 2001) or estimates of the Left-Right position of median voters (Kim and Fording 1998, 2003). Given that this measure is eclectic to the dimensionality of politics, it should help us to understand distributive conflicts involving groups that cannot be easily mapped along classical Left-Right class lines. Moreover, in contrast to these extant measures, this measure has clear underlying micro-foundations that link a party's policy incentives to their seat-share maximising behaviour.

[1] By definition, this is the mirror of the voting power of lesser educated citizens. The voting power of the out-group equals voting power of the income group multiplied by minus one.

Second, a new dependent variable is created to analyse representational equality. Ultimately, a measure of representational equality should measure the congruence between the preferences of different citizens and the extent to which these are represented by the actions of parties (see for example Powell 2000, Vieira and Runciman 2008). My measure of voting power, instead, provides an intermediary measure of the incentives that underlie the actions of political parties. Unequal incentives, *ceteris paribus*, can be expected to lead to unequal actions. For example, the measure helps us to answer questions such as "Do parties, parliaments and governments stand to gain votes from catering to the interests of highly educated citizens at the expense of lesser educated citizens?" More fundamental to debates in political economy, the results also provide us with some insights into the differential incentives to cater to different income groups. How many votes do the Left and Right stand to gain from catering to the interest of low, middle and high income groups?

Third, the results empirically address a long-standing debate in the political economy literature regarding the respective weights of mobilisation and conversion imperatives. Which of the countervailing incentives are stronger for parties: those to mobilise core voters or those to convert undecided swing voters? As indicated above, the evidence in this chapter point to the conversion incentive. The reasoning behind this finding is the following. First, an individual's conversion value is likely to be shared by several parties. For example, when an individual has equal utilities associated with three parties, then each of these three parties has strong incentives to cater to that individual. In contrast, positive mobilisation incentives are generally unique to one party. At the same time, negative mobilisation incentives tend to be fairly minimal. A citizen's conversion value thus tends to have a larger effect on a citizen's average voting power across parties, and – by extension – on a citizen's average voting power over parliaments and cabinets. Second, the effect of a one unit change in utility on an individual's vote choice is likely to be more significant than a one unit change in utility on an individual's turnout, especially when the base-line level of turnout is already high. Nevertheless, the incentives to mobilise core voters in this model are limited only to those that relate turnout to the distribution of partisan utilities. There are other incentives and tools to cater to core voters that are excluded from this model. These include interventions that address the costs associated with turning out and rewarding party activists and funders with policy benefits.

Within the overall framework of this dissertation, this chapter shows that, on average, parties stand to gain more seat-share from catering to the interests of highly educated citizens than from catering to the interests of lesser educated citizens. This helps to explain the emergence and persistence of generously funded systems of public higher education across industrialised democracies. After all, chapters three and four uncovered that such generously funded systems benefit highly educated individuals. Parties thus stood to gain votes from pursuing such systems and to lose votes from cutting down on funding However, the incentives to cater to highly educated individuals vary between parties and within parties over time. Furthermore, the extent to which parties differ in their incentives to cater to highly educated citizens varies between countries and over time. These variations are used in the next chapter as an explanatory variable to predict changes in the two dimensions of higher education policy: per-student subsidies and enrolment.

The empirical strategy of estimating an individual's voting power is the following. First, a multinomial logit analysis of party choice provides us with the estimates of the individual distribution of partisan utilities ($\hat{U}_i$) and consequently the predicted probabilities for each individual in the sample to vote for one of the J parties. This already allow us to estimate two of the four components of a prospective voter's voting power. From the predicted probabilities I can derive a prospective voter's expected vote-contribution to party j ($\Pr(Y_i = j) - V_j$) – one of the two components of an individual's mobilisation value. Moreover, it allows us to calculate the marginal effect of a change in partisan utility on the probability of voting for party j ($\partial \Pr(Y_i = j)/\partial \hat{U}_{ij}$) – one of the two terms in a prospective voter's conversion value. Furthermore, on the basis of these predicted probabilities and utilities I can calculate a prospective voter's preference strength ($\sigma(\hat{U}_i)$). In the second stage of the analysis, this preference strength features next to other individual-level variables in estimating an individual's probability to turn out. The ensuing predicted probability of turning out ($\Pr(T_i = 1)$) completes the calculation of each prospective voter's conversion value. By calculating the marginal effect of utility on an individual's propensity to turn out I obtain the other ingredient to calculate an individual's mobilisation value – namely, their mobilisibility.

The chapter proceeds as follows. The next section discusses the data available in the European Election Studies between 1989 and 2009 and outlines the estimation strategy. Section three estimates individual voting power by running two types of regressions for each country-year wave in the European Election Studies. This is followed by a breakdown analysis of the relative roles of prospective voters' mobilisation and conversion values in explaining variations in voting power. Section four uses these individual estimates of voting power to calculate group voting power over political parties. Section five, in turn, uses these group voting power estimates over parties to calculate group voting power over parliaments and cabinets. Section six concludes.

6.2 Data and methods

This chapter uses data from five rounds of European Election Studies to estimate the model parameters α, β and γ discussed in the preceding chapter. European Election Studies coincide with elections to the European Parliament, which are held every five years. European Election Studies data are available for five waves: 1989, 1994, 1999, 2004 and 2009.[2] The surveys include questions tapping into

[2] I use a stacked dataset of the four surveys between 1989 to 2004 (Van der Eijk et al. 1993, Schmitt et al. 1997, Van der Eijk et al. 2002, Schmitt et al. 2005). For the stacked dataset I rely on the code by EES Trend File, Version 0.96, May 3, 2008 by Slava Mikhaylov. On top of this I stack the advance release data from the 2009 European Election Studies (Van Egmond et al.

both EU-level and national level political behaviour. The data-set is ideal because it is comparable across countries and time. Moreover, the dataset consistently includes a non-ipsative measure of partisan utility in the form of a question that asks prospective voters how likely it is that they would ever vote for each of the parties in a country. This measure provides us with an estimate of the distribution of partisan utilities of each individual. European Election Studies are available for the EU15 countries between 1989 and 2009.[3] Country data are only available for those years that a country was a member of the European Union. Hence, data for Austria, Sweden and Finland – countries that joined the EU in 1995 – is only available from the 1999 wave onwards. Moreover, the essential probability to vote measure is missing for Belgium, Luxembourg and Sweden in the 2004 round. The analysis below treats each country-wave as a separate survey. To estimate an individual's party-choice and turnout probabilities I thus run 66 separate multinomial logit analyses of party choice as well as 66 logit analyses of turnout.[4] Because of this large number of analyses the (sizeable) tables with results and statistics are included in the appendix at the end of this chapter.

6.2.1 Individual and marginal party-choice probabilities

I begin by estimating each respondent's probability to vote for each of the J parties in a given country-year. To this end, I estimate an alternative specific multinomial logit model to arrive at a latent distribution of partisan utilities for each individual in the dataset (think of these distributions as the graphs in figure 5.1 on page 190). This distribution of party-choice probabilities is one of the two components of a citizen's mobilisation value. Moreover, the distribution of utilities allows us to

2010). Data is available through http://www.ees-homepage.net and http://www.piredeu.eu. See the documentation for relevant disclaimers.

[3]EU15 is used to refer to the 15 EU members between the enlargement rounds of 1995 and 2004. This includes Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom

[4]5×10 (EU 12 countries) + 4×2 (Belgium and Luxembourg) + 2×3 (Austria and Finland) + 1×2 (Sweden) = 66

calculate the marginal effect of a change in partisan utility (∂U_{ij}) on the probability of voting party j ($\Pr(Y_i = j)$). Recall that this is one of the two components of an individual's conversion value. In addition, this distribution of utilities forms the basis of estimating an individual's preference strength ($\sigma(\hat{U}_i)$), which is a key explanatory variable in the turnout regression below.

Equation 5.2 on page 187 expresses partisan utility in an extensive form as a function of party characteristics, individual characteristics and alternative-specific characteristics that measure the distance between individuals and parties. In this chapter I instead use a more restrictive form, focussing only on alterative-specific measures (X_{ij}). Individual specific characteristics are discarded in the estimation. This is because the alternative specific measure itself is a sufficient proxy of an individual's partisan utility. Hence, all effects of individual characteristics on a prospective voter's evaluation of a given party are expected to be picked up by this measure of partisan utility. The main function of this estimation is to rescale our empirical proxy measure of utility in a way that maximises the likelihood of replicating the observed distribution of party-choices.

To operationalise the dependent variable party choice I use a question asking an individual for their intended vote if there was a general election tomorrow. This measure most directly taps into the respondent's intended party-choice at the time of the survey. The exact question in the 2009 survey was

> "If there was a general election tomorrow, which party would you vote for?"

Respondents can either indicate a party of choice, or indicate that they 1) would vote blank, 2) would spoil their vote, 3) would not vote, or 4) do not know. Only respondents who responded with a party-choice are included in this part of the analysis.

To operationalize X_{ij}, the measure of distance between individuals and parties, I use a measure of party preference which asks the respondents to answer the following question for each of the parties in a given system:

> "We have a number of parties in (country), each of which would like to get your vote. How probable is it that you will ever vote for the following parties? Please specify your views on a scale where 0 means "not at all probable" and 10 means "very probable"."

This is a non-ipsative measure. In contrast to ipsative measures such as vote intention or preference rankings, non-ipsative measures do not force a choice on the respondent. That is, the different scores for parties do not have to add up, and respondents are free to rank several parties with an equal probability. Van der Eijk et al. (2006) and Van der Eijk and Marsh (2007) have argued that non-ipsative measures of party preferences perform well as a proxy for partisan utilities – the utilities associated with each party. Other non-ipsative measures include thermometer ratings or feelings scores of parties, such as likes and dislikes scores. In a paper comparing the performance of different non-ipsative measures, Van der Eijk and Marsh (2007) find that responses to the "probability to ever vote" question perform best in approximating the utility associated with each of the available party choices. 6.8 on page 278 in the appendix of this chapter provides the summary statistics for the vote intention variable and "probability to ever vote party j" variable.[5] This measure is used here because it is deemed a good proxy for an individual's distribution of utilities and because it is available consistently for all EU countries over a relatively long period of time.[6]

[5] The mean for the vote intention variable in this table reflects the percentage of respondents that responded with a party choice to this variable

[6] However, the presence of this question in an election survey is not necessary to estimate the voting power model. After all, the model developed in the previous chapter was purposefully versatile with respect to the explanatory variables used to estimate the latent distribution of utilities. These could be other non-ipsative measures such as temperature or likes and dislikes scores, or more conventional ways of measuring the distance between prospective voters and parties in an ideological space (Alvarez and Nagler 1998, Wilson 2009). Hypothetically, a vector of individual attributes could suffice. In fact, traditionally, discrete choice models have provided latent estimates of utility based on observed party choice and individual characteristics. This method of arriving at estimates of utility can, however, be troublesome for several reasons. First, only if all relevant characteristics of prospective voters and parties are known and controlled for does this procedure yield unbiased estimates of utility (Manski and McFadden 1981, Van der

The probability to vote is used as our measure for X_{ij} in equation 5.2, where ϵ_{ij} is the stochastic error term and β is used to scale the utilities beyond the arbitrary 1-10 scaling of the survey question. After all, the difference between utilities, and not their level, will be deciding in the vote-choice. Hence, differently scaled linear transformations of the same set of utilities do not predict vote choice equally.

I thus estimate a conditional logit model with alternative-specific measures of partisan utility (X_{ij}). The top section of table 6.6 on page 266 provides the coefficient estimates of β. The bottom section is discussed in more detail below. Unsurprisingly, all estimates of β are highly significant: respondents are significantly more likely to intend to vote for the parties they claim to be most likely to ever vote for. Also, the highly significant Wald's χ^2 statistics show that all models significantly outperform a baseline constants only model. Using these β estimates I can now calculate the (estimated) distribution of partisan utilities, which allows us to calculate 1) the predicted probability to vote for each of the j parties, 2) the marginal effect of a change in partisan utility on the probability for voting party j and 3) the respondent's preference strength ($\sigma(\hat{U}_i)$).

6.2.2 Individual and marginal turnout probabilities

Next, I estimate the individual probability to turn out as a function of individual-specific characteristics, including the preference strength ($\sigma(\hat{U}_i)$) of individuals. Given that turnout is a discrete outcome, I estimate a logit regression. This analysis serves two main purposes. First, it provides us with individual specific probabilities of turning out, which is the other essential component of an individual's conversion value. Second, it provides us with an estimate of the change in the probability of turning out for a change in partisan utility. This estimates how mobilisable a respondent is by a party.

Eijk et al. 2006). Second, the small number of choices for the smallest parties necessitates their exclusion from the analysis (Van der Eijk et al. 2006). Using this observed measure of individual utility helps us overcome some of these traditional problems of deducing utilities.

The dependent variable is a measure of turnout in the last election. For the 1989 and 1994 surveys a separate question was included asking about turnout in the last general election. From the 1999 survey onwards the categories "did not turn out" or "voted blank" were included as response categories to a question asking which party the respondent voted for in the last election. All these variables were transformed for a variable that is one if the individual turned out and voted for a party and zero if the individual voted blank, or if the individual did not turn out to vote at all. Table 6.8 on page 278 in the appendix of this chapter provides the average reported turnout in the surveys. The high reported turnout highlights a well known phenomenon of turnout over-reporting, which is corrected below.

The main variable of interest in predicting turnout is thus an individual's preference strength ($\sigma(\hat{U}_i)$). The preference strength measures the effect of the outcome of the election on an individual's utility. The higher this effect, the higher the expected utility associated with turning out. See section 5.3.2 on page 193 for a more detailed discussion and equation 5.11 on page 194 for the precise definition. With the inclusion of this variable in the regression I seek to relate an individual's likelihood to turn out to the distribution of partisan utilities. As discussed in the previous chapter, individuals who strongly prefer one party to win over others are expected to be more likely to turn out than those those who are indifferent between all parties. Two of the three components of an individual's preference strength are derived from the multinomial logit analyses described in the section above: 1) an individual's distribution of utilities, and 2) the resulting distribution of party choice probabilities. The other component, the expected vote-share of each of the parties is derived from the observed proportions of vote intentions. In real life, most individuals receive this information through opinion polls published by news outlets. A significantly positive coefficient for the preference strength will suggest that individuals are indeed more likely to turn out when they have a stronger preference strength over the outcome.

The vector of individual characteristics ($\mathbf{Z_i'}$) associated with turnout consists of a measure of age in years; age squared; two education variables (a dummy for whether an individual was highly educated and a linear variable for years of education); a dummy variable for an individual's gender (one if female); a variable for family income; a dummy for whether the individual was a trade-union member; a dummy for whether the individual is a regular church attender (once a week, or more) and several religious denominations (protestant, catholic, not religious or orthodox, not religious – if applicable), as well as dummy variables for whether an individual is retired or a student. The family income variable was measured differently for different countries and years. Table 6.8 on page 278 in the appendix of this chapter provides the summary statistics for each of these variables, giving an indication of their distribution.[7]

Table 6.7 on page 272 shows the results of the logit analyses for each country/year. To begin with, each regression shows a significant χ^2 score, indicating that each model significantly outperforms a constant only model. The coefficient for our measure of $\sigma(U_i)$ is positive and statistically significant at the 95 percent level in 45 out of 66 models, while for the 21 others $\sigma(U_i)$ is insignificantly different from zero. None of the models yields a negative coefficient for $\sigma(U_i)$. This means, however, that for 21 countries there was no statistical relationship between an individual's distribution of partisan utilities and their probability to turn out. This contrasts with the consistently positive and significant relationship between partisan utility and vote-choice.

A detailed discussion of the control variables is beyond the scope and intention of this analysis. After all, the main purpose of this analysis is to generate best estimates of an individual's turnout probability and to link this turnout to their distribution of partisan utilities. However, it can be noted that age and age-squared frequently returned statistically significant coefficients in the analyses. The linear term tends to be positive, while the quadratic term is negative, suggesting an ini-

[7]See the codebooks of the European Election Studies for full details

tially positive but then diminishing effect of age.[8] Moreover, the two education variables frequently return positive and significant coefficients.[9] Overall, no single pattern of control variables emerges that consistently explains turnout in all countries.

Correcting for over-reporting of turnout

It is well known that individuals are likely to report turning out when in fact they did not. This leads to reported turnout probabilities from surveys that are substantially higher than the turnout recorded in the official election results. To correct for such over reporting, estimated turnout probabilities for each country-year were adjusted to reproduce aggregate turnout figures consistent with the actual published aggregate turnout. The procedure used to achieve this correction is similar to that described in Bartels (1998).

These adjustments are based on the assumption that the individual probability of misreporting is proportional to the probability of turning out. This assumption is a stylised representation of the patterns of misreporting observed by Silver, Anderson and Abramson (1986): "Respondents most inclined to over report their voting are those who are highly educated, those most supportive of the regime norm of voting, and those to whom the norm of voting is most salient - the same characteristics that are related to the probability that a person actually votes" (Silver, Anderson and Abramson 1986, p 613).

The coefficient of over reporting is then

$$\rho_t = \frac{R_t - V_t}{V_t(1 - V_t)} \tag{6.1}$$

where R_t is the proportion of the sample reported voting in election t and V_t is the proportion of the population actually voting in election t. Table 6.6 on page 266

[8]Of course the exact shape of the age effect can only be known by calculating the implied coefficient for sample values of the age variable.

[9]Nevertheless, the effect of education on turnout is negative in a few cases.

reports the coefficient of over reporting for each country. Actual turnout probabilities were obtained from the Comparative Political Dataset (Armingeon et al. 2011). The adjusted turnout probability V_i for respondent i can be expressed as a function of the apparent turnout probability R_i estimated from the logit analyses reported in table 6.7 on page 272 and the coefficient of over reporting ρ_t:

$$V_i = \frac{1 + \rho_t - \sqrt{(1+\rho_t)^2 - 4\rho_t R_i}}{2\rho_t} \tag{6.2}$$

The correction for the derivative of turnout with respect to partisan utility is a little more complicated. I arrive at this by taking the derivative of 6.2.

$$\frac{\partial V_i}{\partial U_{ij}} = \frac{1}{\sqrt{(1+\rho_t)^2 - 4\rho_t R_i}} \frac{\partial R_i}{\partial U_{ij}} \tag{6.3}$$

In the calculations presented in this chapter both turnout and its derivative were corrected using the above procedure. This brings the new average corrected estimated turnout to approximate actual turn-out.

6.2.3 Calculating individual voting power

We now have all the necessary ingredients to calculate our measure of individual voting power defined in equation 5.13 (page 197 in the previous chapter). An individual's conversion value can be calculated by multiplying her predicted turnout probability (from the turnout logit analyses) by the marginal change in her vote-choice for a change in partisan utility (from the multinomial logit of party choice). An individual's mobilisation value can be calculated by multiplying her expected contribution to party j's vote-share with the marginal effect of partisan utility on her propensity to turn out. Taking the sum of an individual's mobilisation and conversion value now provides us with their voting power with respect to each of the parties. To be clear, an individual does not have one "voting power" but instead has different "voting powers" with respect to each of the parties.

Equation 5.13 defines individual voting power as the sum of conversion and mobilisation values, divided by the total number of individuals turning out. This is to demonstrate that individual contributions to a party's seat-share is inescapably miniscule. However, it will be difficult to get an intuitive understanding of such small figures. Moreover, individual voting power will by definition fluctuate with country size. At the end of the day, the average individual voting power will always be much higher in Luxembourg than in Germany. To overcome these barriers to interpretation and comparability, table 6.6 on page 266 rescales the individual contribution to the following hypothetical situation: "If all citizens were like citizen i, how much would party j's voteshare increase as a result of increasing the utility of all these citizens by one unit?"[10] This is achieved by simply dividing the conversion and mobilisation values by the average turnout probability.

To provide the reader with some insight into the distribution of an individual's voting power, table 6.6 on page 266 displays a summary of the average individual minimum, mean and maximum of citizens' conversion values, mobilisation values and voting power. The average individual minimum is obtained by taking the average of the individual minimum of all individuals in a given country-year. It is therefore not the same as the country year's sample minimum. The same applies to the average individual mean and maximum statistics. For example, looking at the data for Austria in 2009 (the first column), we see that on average parties stand to gain just under a five percent seatshare from improving the partisan utility (U_{ij}) of a given citizen. On average there is also one party over which citizens have negligible voting power. Improving the utility of this citizen leaves that party's seat-share unaffected. Moreover, there typically exists one party whose seat-share will improve by 13% in return for improving a citizen's partisan utility by one unit.

[10] An alternative interpretation is "If i were the only citizen, how much would the probability of citizen i voting for party j increase as a result of a one unit increase in her partisan utility?".

6.3 Conversion or mobilisation

Next, a key question is whether these variations in voting power within and between individuals are driven by variations in individual conversion values or by variations in individual mobilisation values. A cursory look at table 6.6 already provides a hint at the answer. The conversion value's individual minimum, mean and maximum closely mirror the citizen's voting power. For example – again for the case of Austria in 2009 – the average minimum conversion value is .51%, the mean individual conversion value is 4.8% and the average individual maximum is around 12%. In contrast, the distribution of a citizen's mobilisation value is of a very different range compared to the range of an individual's voting power. The average citizen's minimum mobilisation value is 0%, the average mean individual mobilisation value is only .4% and the average maximum individual mobilisation value is 1.7%. This means that the maximum seat-share a party stands to gain, on average, from mobilising a supporter is 1.7%. This is of a very different order than the 12% that parties can gain from converting individuals.

An actual breakdown of the variance of voting power confirms this picture. The breakdown of the variance of the sum of two correlated variables is given by:[11]

$$\mathrm{Var}[\mathrm{conv} + \mathrm{mob}] = \mathrm{Var}[\mathrm{conv}] + \mathrm{Var}[\mathrm{mob}] + 2 \times \mathrm{Cov}[\mathrm{conv}, \mathrm{mob}] \tag{6.4}$$

Similarly, the variance of voting power can be broken down into the variance of the mobilisation value, the variance of the conversion value and the covariance between the conversion and mobilisation value times two. The bottom three rows of table 6.6 express each of these as percentages of the variance in voting power. This clearly shows that by far most variance in voting power is explained by variance in the conversion value of citizens. Across all models, variance in the conversion value explains 89 percent or more of the variance in voting power. The remainder is

[11]See, for example, Greene (2008, p1004)

predominantly picked up by the covariance of the conversion and mobilisation value (less than 8 percent). These are those cases who – like the "devil's horns" in figure 5.1 on page 190 – derive conversion value from the fact that they are indifferent between two parties and mobilisation value from the fact that they nonetheless strongly prefer these two parties over all other parties. Last, simple variance in mobilisation value only accounts for less than 3 percent of variance in voting power.

We now know that most variation in voting power is due to conversion value. However, we do not yet know what drives the variance in conversion value between individuals. Recall that a prospective voter's conversion value is the product of a voter's convertibility ($\partial \Pr(Y_i = j)/\partial U_{ij}$) and a voter's turnout propensity ($\Pr(T_i = 1)$). Breaking down the variance of the product of two dependent variables, however, is not as straightforward as doing the same for a sum (Mood, Graybill and Boes 1974). I therefore limit the discussion to an inspection of descriptives and bivariate correlations. Table 6.6 provides the individual minimum, mean and maximum convertibility ($\partial \Pr(Y_i = j)/\partial U_{ij}$) of respondents for each country-year. Note how these values closely mirror the conversion value. At a first glance this suggests that the high conversion value of citizens is largely due to how convertible citizens are. Taking the first column data for Austria in 1999, for example, the maximum convertibility of the average Austrian is 13 percent, compared to a maximum conversion value of 12 percent. The correlation between individual conversion value and its two components confirms this picture. Correlation coefficients for the relationship between individual conversion values and their convertibility are all above 87%, and mostly in the high nineties. This contrasts with close to zero or negative coefficients for the correlation between an individual's conversion value and the individual turnout propensity.

The negative correlation with turnout may at first seem surprising, given that a prospective voter's conversion value is a positive function of a citizen's predicted turnout. However, it can be explained by the knowledge that the most decided –

and hence inconvertible – citizens are also predicted to have the highest turnout (because of their high $\sigma(U_i)$). Hence, I expect (and find) a negative correlation between high predicted turnout and convertibility.[12]

Although a much smaller portion of voting power is derived from the mobilisation imperative, it is nevertheless worthwhile to explore which factors explain this low value. Since variance in mobilisation value can be due to either positive or negative turnout buying incentives, I first decompose its variance into the respective contribution of each of these incentives. Recall that positive turnout buying incentives arise when parties can increase the turnout propensity of citizens by increasing their preference strength ($\partial \Pr(T_i = 1)/\partial U_{ij} > 0$) and when their expected contribution to a party's seat-share is above average ($\Pr(Y_i = j) > \mathbb{E}(V_j)$). Negative turnout buying incentives, on the other hand, arise when parties can decrease a prospective voter's turnout propensity by decreasing their preference strength (i.e. making them more indifferent, $\partial \Pr(T_i = 1)/\partial U_{ij} < 0$) and when their expected contribution to a party's seat-share is negative ($\Pr(Y_i = j) < \mathbb{E}(V_j)$). The relative contribution of each can be broken down, knowing that the total sum of squares (TSS) of the mobilisation value can be broken down into the sum of the total sum of squares of cases of positive turnout buying and cases of negative turnout buying:

$$\text{TSS}_{\text{mob}} = \text{TSS}_{\text{mob}} \left| \left(\frac{\partial \Pr(T_i = 1)}{\partial U_{ij}} \geq 0 \right) + \text{TSS}_{\text{mob}} \right| \left(\frac{\partial \Pr(T_i = 1)}{\partial U_{ij}} < 0 \right) \quad (6.5)$$

Therefore, we can straightforwardly express the percentage of the total sum of squares that is due to each of these components. Table 6.6 shows that for most country-years a vast share of variance in mobilisation is explained by variance in positive turnout buying. For example, for the case of Austria in 1999, 88 percent of variance in mobilisation value was due to positive turnout buying. This means that, on average, parties stand to gain more from mobilising determined supporters than from attempts to demobilise voters intent on voting for opponents. That said,

[12]See the row $\text{Corr}(\partial \Pr(Y_i = j)/\partial U_{ij}, \Pr(T_i = 1))$ in table 6.6 on page 266

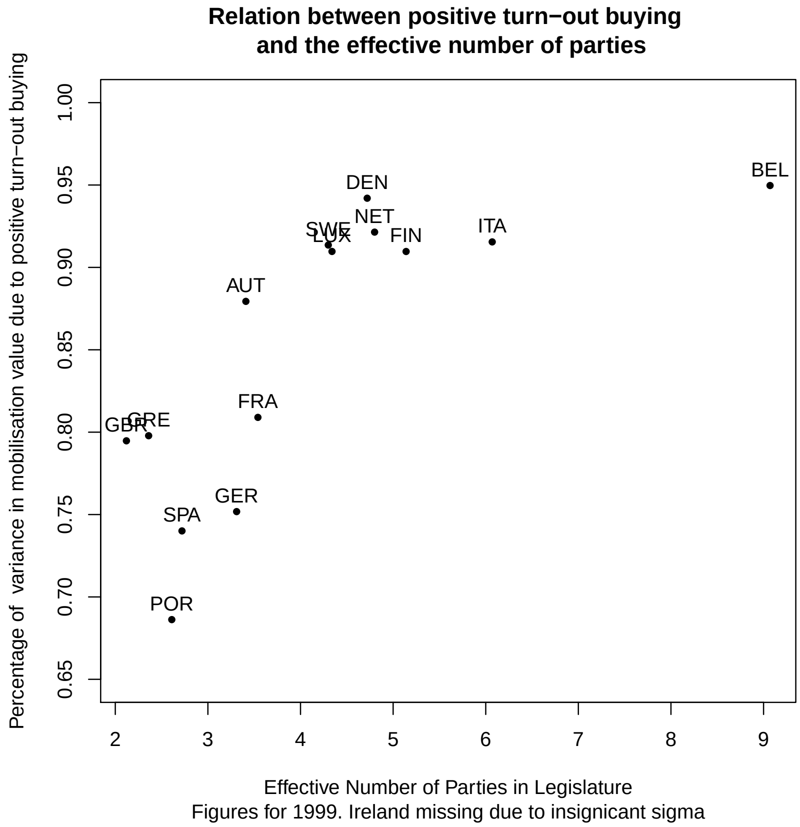
these negative turnout buying incentives exist as well. For the case of Austria, they explain 12% of the variance in mobilisation value. For some countries, however, the reported percentage of variance explained by positive turnout buying is very small (e.g. Ireland from '89 to '99) due to statistically insignificant estimates of $\sigma(U_i)$.

What is more, the proportion of variance taken up by positive mobilisation values is related positively to the effective number of parties. Figure 6.1 on the next page plots this relationship. Countries with a high number of effective parties – such as Belgium and Denmark – also have the highest positive turnout buying proportion. In contrast, countries with a lower effective number of parties – like Britain and Portugal – also have a lower proportion of positive turnout buying. A full investigation of this relationship is beyond the scope of the present dissertation. However, we can conjecture that a system with a high number of effective parties implies a system with more small parties. Small parties, in turn, have strong positive mobilisation incentives because of their small expected vote-share. The expected contribution of a prospective voter with a high probability to vote for them is higher than for a party that already has a high expected vote-share.[13] In addition, smaller parties have a stronger positive effect on a citizen's preference strength than large parties (see discussion around equation 5.11 on page 194). A similar citizen voting for a party that already has an expected vote-share of 40% is not as worthwhile mobilising as her expected contribution is zero. What is more, large parties have a larger potential to reduce a party's preference strength given their weight in the expected outcome of the election. A one unit increase in utility associated with a party attaining 40 percent of seats is more significant to the expected outcome of the election than when that party holds only 10 percent of seats. Hence, large parties are better positioned to make citizens indifferent about turning out.

The bottom of Table 6.6 lists the bivariate correlation between a citizen's mobilisation value and its two constituent components: expected contribution ($\Pr(Y_i =$

[13] For example, a citizen that has a 40% predicted probability to vote for a party with a 10% expected vote-share is worth mobilising for that party: the expected contribution of that individual turning out is 30%.

Figure 6.1 – Positive turnout buying and the effective number of parties



$j) - \mathbb{E}(V_j))$ and mobilisibility $(\partial \Pr(T_i = 1)/\partial U_{ij})$. Given that positive mobilisation values can follow from either positive or negative turnout buying incentives the two are separately presented in the analysis. For mobilisation values due to positive turnout buying we see a strong positive correlation with the prospective voter's mobilisibility and a medium positive correlation with their expected contribution to the party's vote-share. Furthermore, there is a medium positive correlation between the two. This makes sense given that most parties have the highest influence on the preference strength of prospective voters that are already likely to vote for them. In short, the mobilisation value of citizens is strongly determined by their mobilisibility and to a considerable degree also by their expected contribution to a party's voteshare, the two of which tend to go hand in hand.

A similar picture, but then of negative correlations, emerges for negative turnout buying. There is a strong negative correlation between negative mobilisibility (i.e.

demobilisibility) of individuals and their mobilisation value. Moreover, there is a medium negative correlation between their expected (negative) contribution to a party's voteshare and their mobilisation value. Again, the two tend to go hand in hand, shown by the strong correlation between the two. The citizens who are expected to give the strongest negative contribution to a party's voteshare are also the ones that tend to be the most susceptible to negative turnout buying.

Low mobilisation values are thus largely due to low mobilisibility with a considerable role for the expected contribution to a party's voteshare. Given that most variance in mobilisation is due to positive turnout buying, we have to answer the question as to why positive mobilisibility is as low as it is. A first explanation lies in already high levels of turnout. If individuals already have a predicted turnout of above 80 percent, then the scope for further mobilisation is limited. The higher the predicted baseline turnout probability, the smaller the marginal effect of any variable on increasing turnout. As discussed in the previous chapter, mobilisability would be higher if the average predicted turnout were around 50 percent.

However, the positive and significant coefficient of .62 for $\sigma(U_i)$ suggests that a one unit increase in $\sigma(U_i)$ would increase an individual with a baseline turnout of 75 percent by an additional 9.8 percent.[14] However, from equation 5.11 on page 194 we know that a one unit change in partisan utility will only rarely result in a one unit change in $\sigma(U_i)$. This is the case only if the probability of voting for party j approaches one ($\Pr(Y_i = j) \rightarrow 1$) and if its expected voteshare is close to zero ($V_j \rightarrow 0$). Hence, the most mobilisable supporters, according to this analysis, are those determined supporters of small parties. One explanation for the relatively modest average maximum mobilisability is that core supporters of small parties only make up a smaller fraction of the electorate.

What is more, citizens worth mobilising by definition have a high preference strength. Ultimately, parties stand to benefit most from increasing the turnout of

[14]This is the marginal effect of a .62 increase in the utility of turning out for an individual who is predicted to have a 75 percent turnout probability.

voters with a strong preference for that party, and this implies a high utility for one party over others and thus a high preference strength. In addition, as discussed above, parties are also most able to mobilise prospective voters who are already determined to vote for them. Yet, a high preference strength is also associated with high levels of predicted turnout. Consequently, all else equal, the citizens most worth mobilising are already predicted to have an above average turnout. Furthermore, the closer the baseline of predicted turnout is already to 100%, the less mobilisable they are. Ergo, there is a negative correlation between the mobilisability component ($\partial \Pr(T_i = 1)/\partial U_{ij}$) of an individual's mobilisation value and the expected contribution component ($\Pr(Y_i = j) - V_j$). The idea that there exists a mass of loyal partisans waiting to be mobilised may be an illusion if the main reason for people not to turnout in the first place is because they are indifferent to the parties.

Turning back to our real world estimates, the actual sample maximum mobilisability for Austria in 1989 is 12.5 percent and the sample maximum mobilisation value is 11.4 percent. Hence, fairly high values can be obtained under the estimated parameters. It is the low frequency of citizens with the characteristics to yield such values that drives the relatively low average individual maximum mobilisability and mobilisation value.

Last, it is worthwhile exploring the reasons for the much higher conversion values of citizens. First, the sample maximum convertibility for the case of Austria is at 25% much higher than the sample maximum for a prospective voter's mobilisibility. This means that parties can change the probability that an individual votes for them by 25% through a one unit increase in utility. Moreover, there are citizens with a close to 100% predicted probability of turning out. Multiplying these yields a high potential maximum conversion value. Besides that, such a high conversion value is likely to result from prospective voters who are perfectly indifferent between two (or more) parties. This means that, by definition, the high conversion value is shared with at least one other party. While mobilisation value was exclusive to one party, conversion value always exists with respect to multiple parties. Hence, the average individual conversion value is higher because it is carried by several parties. What is more, the analysis has shown that there is conversion value in individuals that may be classed by some as core-supporters. To be precise, citizens that have a predicted probability of, say, 75% of voting for one party are still worth converting further until they are close to 100% certain to vote for party j.

Another calculation for a two-party scenario will prove instructive to gain further information about why conversion is a stronger imperative than mobilisation. Let us assume a two-party polity with 70 percent turnout and each of the parties polling exactly 50 percent of the vote. Thus, 35 percent of the population turns out and votes for party A and 35 percent of the population turns out and votes for party B. Let us assume further that those not turning out are split exactly in 50 percent loyal supporters of party A and 50 percent loyal supporters of party B. Now, let party A, in an impressive effort, mobilise all of its "dormant" loyal voters, thereby increasing turnout from 70 to 85 percent. The voteshare of party A will only increase by 9 percent to 59 percent from this unlikely achievement, and the voteshare of party B will drop by 8 percent to 4 percent, resulting in a 16 percent plurality. This effort of mobilising 15 percent of the population thus yields an 18 percent plurality. In contrast, it would only take a much smaller conversion effort to achieve a similar plurality. After all, if 9 percent of those 70 percent originally intending to turnout could be converted into voting for party A, then an 18 percent plurality could be achieved as well. In contrast to the mobilisation effort, this only requires targeting 6.3 percent of the population (9% $\times$ 70%). This would result in 41.3 percent of the population turning out *and* voting for party A and 28.7 percent of the population turning out *and* voting for party B, resulting in an 18 percent plurality ((41.3%-28.7%)/70%=18%). In short, in this scenario, converting 6.3 percent of the population yields as much voteshare as mobilising 15 percent.

To sum up, in this section I used the model parameters estimated in the previous section to calculate the voting power of all respondents in each country-year in the data. This allowed me to explore the relative contribution of mobilisation and conversion imperatives. Conversion imperatives are found to be substantially stronger than mobilisation incentives. Most variance in conversion value, in turn, is driven by variance in convertibility as opposed to variance in turnout. The majority of variance in mobilisation value is driven by positive turnout buying incentives (around 80 %), with a minority explained by negative turnout buying incentives (around 20 %). The correlation between mobilisation value and mobilisibility is very high, while the correlation between mobilisation value and expected contribution to a party's vote-share is of medium strength. This is the case for both positive and negative turnout buying.

The analysis performed in this section provides important insights into the imperatives faced in electoral competition. It empirically estimates the relative contribution of mobilisation and conversion incentives in multi-party systems. This is an important empirical contribution to a political science literature in which the incentives to target core over swing voters in multi-party systems have been largely left too theoretical.

However, in the grand scheme of the present dissertation, this was only an intermediary step. More importantly, we are interested to know if different socio-economic groups – particularly highly educated citizens – have higher voting power over parties, governments and legislatures. It is to these questions that the next sections turn.

6.4 Group voting power vis-a-vis political parties

The reader will recall from equation 5.19 on page 211 in the previous chapter that a group's voting power is generated by the difference between the average group voting power of the in-group and the out-group. Any group-size benefits of distributing in favour of a large group were directly offset by the higher costs of doing so on the out-group.

This section calculates this difference in average group voting power with respect to several socio-economic groups determined by education, age, gender and income. For each party, I calculate the difference in the average voting power between the in-group and the out-group. Together, the in-group and out-group form the entire polity. My measure of relative voting power thus provides an estimate of how much a party stands to gain from distributing material resources from the out-group to the in-group.

While we are bound to find a difference, the key question is whether this difference is substantial and significant. To make intuitive how substantial the difference in voting power is I represent the voting power of the in-group as the difference in voting power between the in-group and out-group as a percentage of average voting power. Given the composite nature of our voting power measure, it is not straightforward to analytically derive the variance. The process for working out the variance is discussed in detail below.

6.4.1 Estimating uncertainty using bootstrapping

Working out analytically the variance of our measure of voting power is, if not impossible, at very best challenging and time-consuming. A more straightforward approach to calculating the confidence intervals of a statistic for which the sampling distribution is not easily defined theoretically is to turn to frequentist approaches, such as the bootstrap (Efron 1979, Greene 2008). Bootstrapping uses the sample data itself, rather than theoretical results, to obtain the sampling properties of an empirical estimator (Greene 2008). The procedure is as follows. From a given country-year sample I obtain $b = 1, \ldots, B$ random samples with replacement of a sample size identical to the original sample. "With replacement" means that the same observation can be sampled multiple times. For each of these B bootstrapped samples I then estimate the following steps

- The alternative specific multinomial logit model of party choice (identical to procedure described above)
- The logit model of turnout (identical to procedure described above)
- Our individual measure of party-specific voting power, using the parameters of the previous two models
- By party and group, the voting power of the in-group over the out-group

This then gives us a sample of estimates of group voting-power over each of the parties in that country-year. This sample of bootstraps is then used to provide the expected average group voting power, as well as the confidence interval by calculating the respective percentiles of the bootstrap sample. For reasons of computer power constraints, I obtain 100 bootstrap samples for each country-year. From this, the 95th and 5th percentile were used to calculate 90 percent confidence intervals.

The results for the voting power of highly educated citizens vis-à-vis parties are plotted in country graphs over the next pages. Because of space constraints, similar graphs for the voting power of those above median age, women and income thirtiles are included only in the web-appendix of this dissertation. For most country-years there are some parties over which highly educated individuals have high voting power. Generally, highly educated individuals hold strong voting power over Green parties, such as the Greens in Austria, Agalev-Groen in Belgium, the Socialist People's Party in Denmark, the Green League in Finland, les Verts in France (except for 2009), the Greens and FDP in Germany, the Ecologist Greens in Greece (since 2009), the Federazione dei Verdi in Italy, the Green-Left in the Netherlands, the Green Party in Ireland, and the Green Party in Sweden (2009 only). Social-liberal parties are another family of parties over which highly educated individuals often hold significant voting power. Examples include the Liberal Democrats in Britain, the Radical Liberals in Denmark, D'66 in the Netherlands, and the socially liberal

Figure 6.2 – Voting power of higher educated over parties, Austria 1999-2009

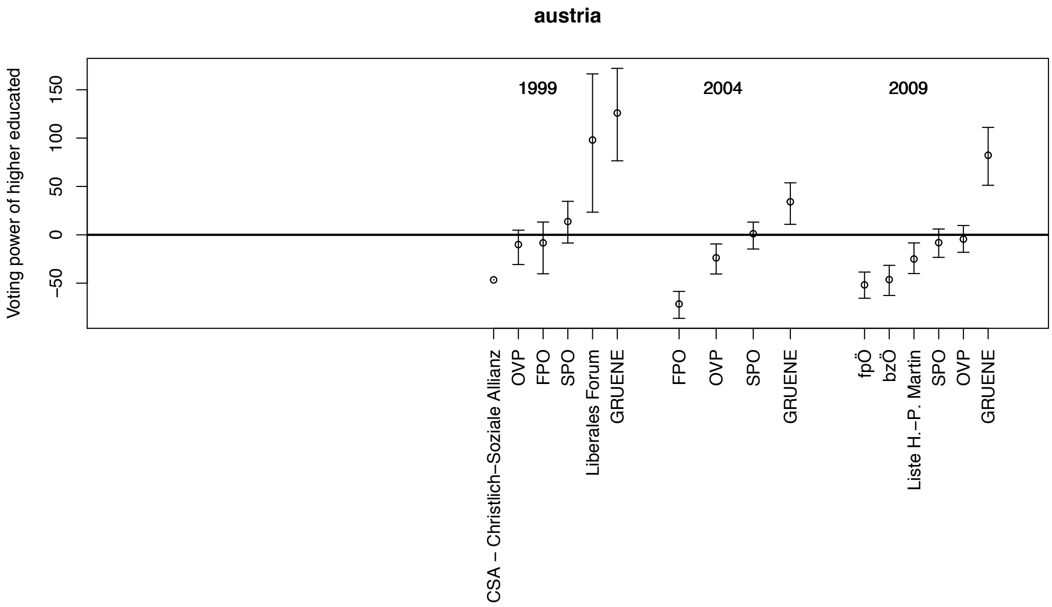
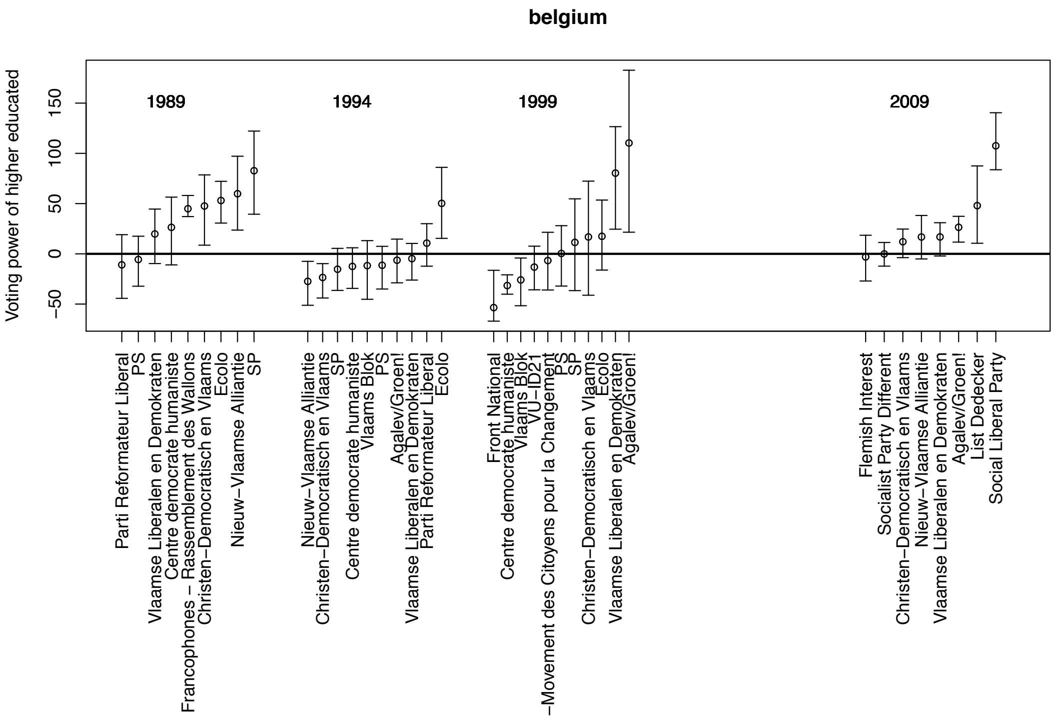


Figure 6.3 – Voting power of higher educated over parties, Belgium 1989-2009



Notes: EES probability to vote party data missing for 2004. Limited number of national parties in early version of EES 2009.

Figure 6.4 – Voting power of higher educated over parties, Britain 1989-2009

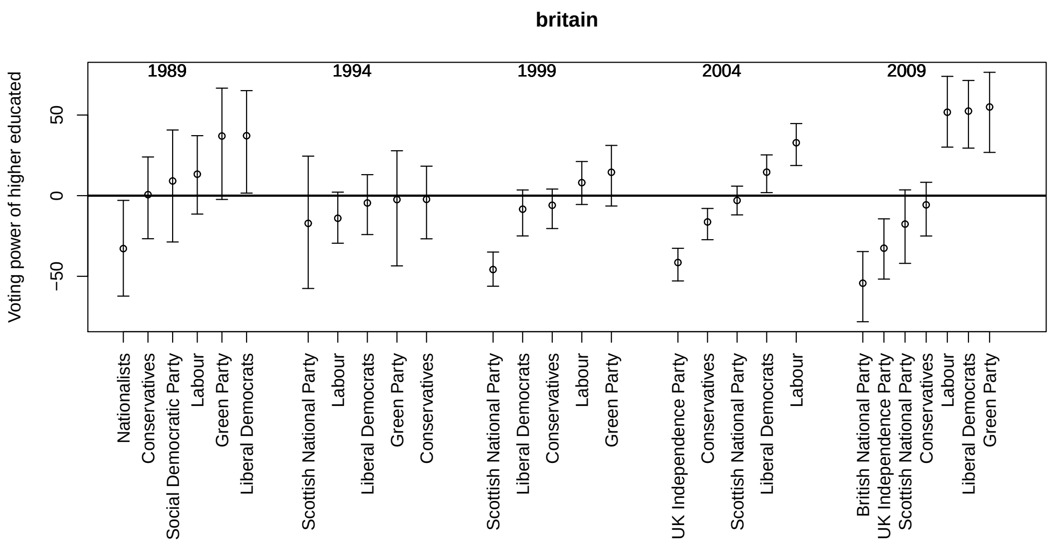


Figure 6.5 – Voting power of higher educated over parties, Denmark 1989-2009

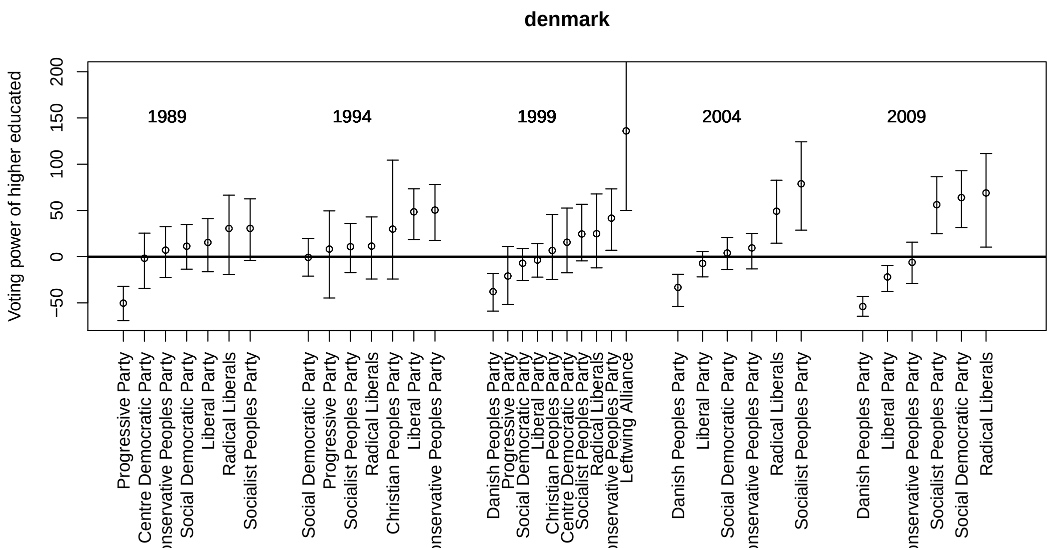


Figure 6.6 – Voting power of higher educated over parties, Finland 1999-2009

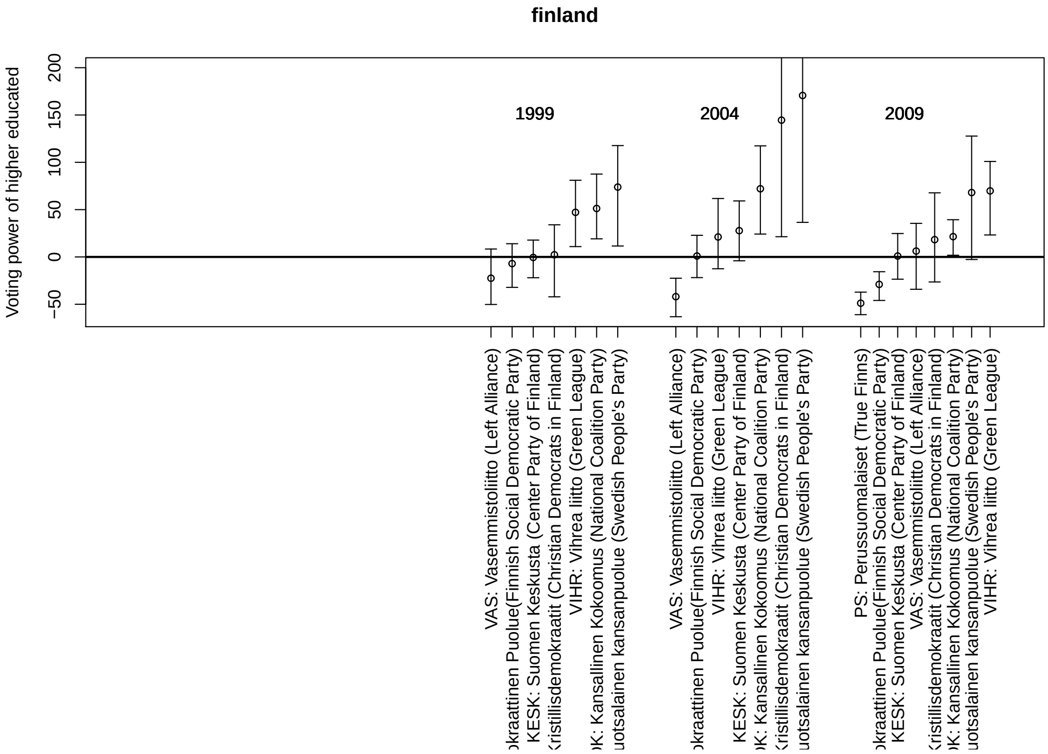


Figure 6.7 – Voting power of higher educated over parties, France 1989-2009

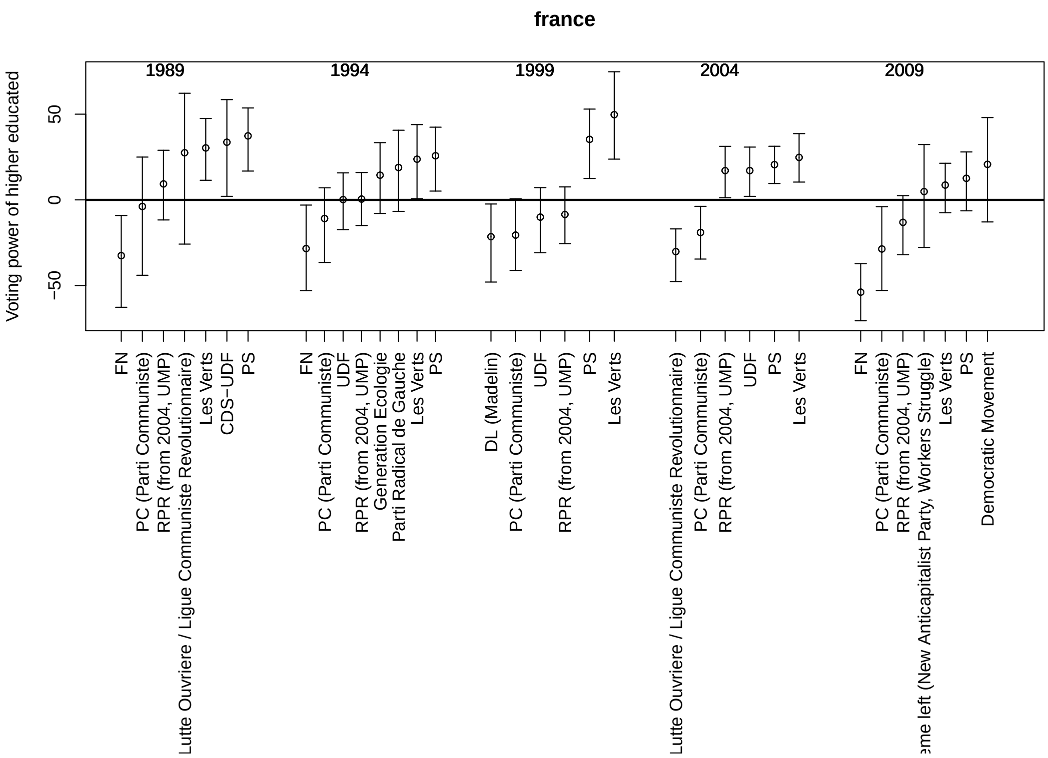


Figure 6.8 – Voting power of higher educated over parties, Germany 1989-2009

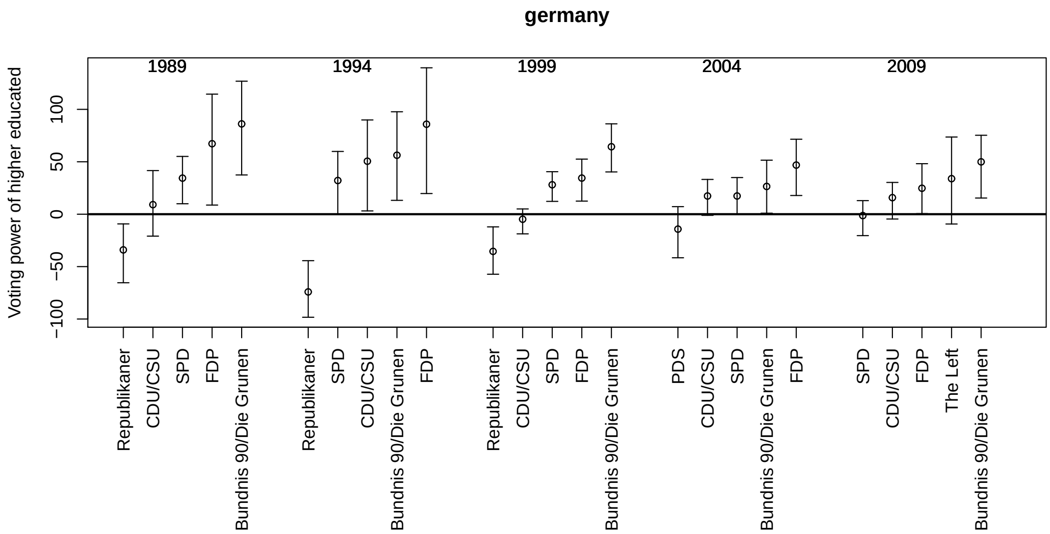


Figure 6.9 – Voting power of higher educated over parties, Greece 1989-2009

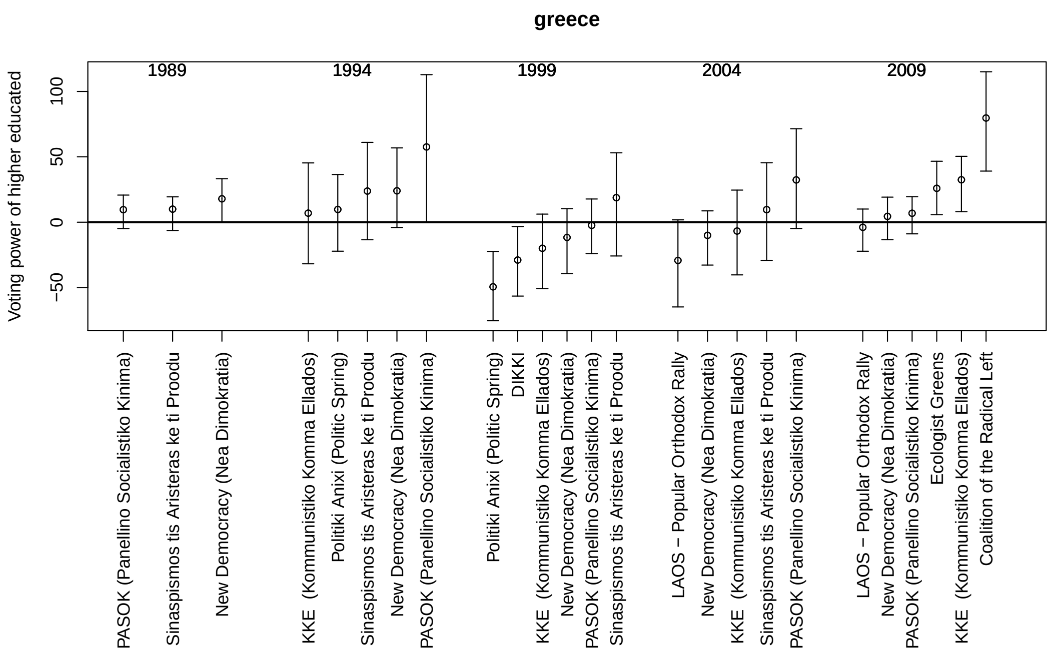


FIGURE 6.10 – VOTING POWER OF HIGHER EDUCATED OVER PARTIES, IRELAND 1989-2009

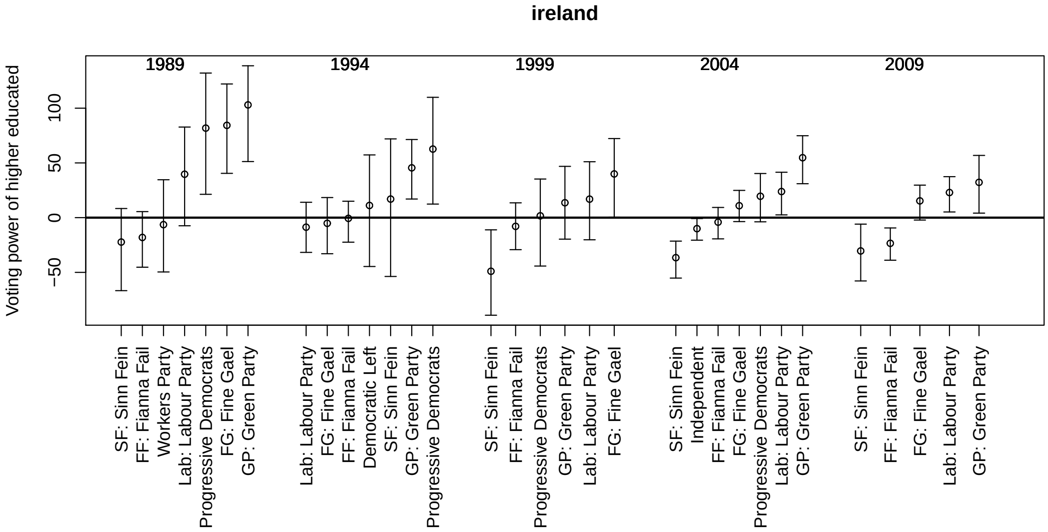


FIGURE 6.11 – VOTING POWER OF HIGHER EDUCATED OVER PARTIES, ITALY 1989-2009

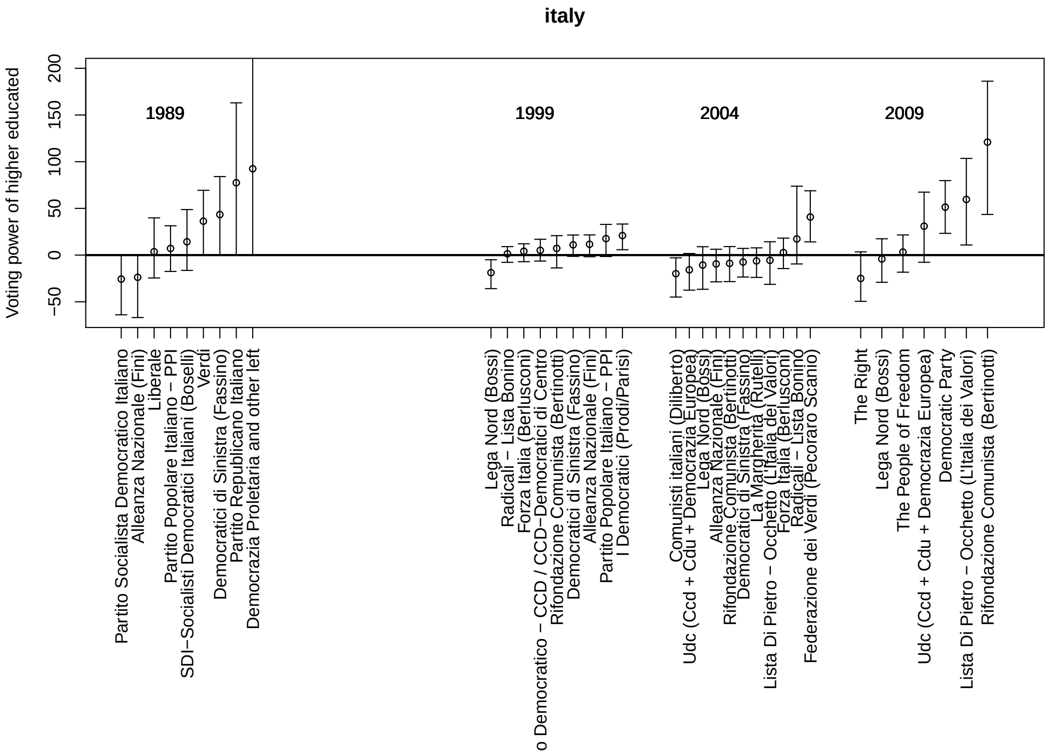


Figure 6.12 – Voting power of higher educated over parties, the Netherlands 1989-2009

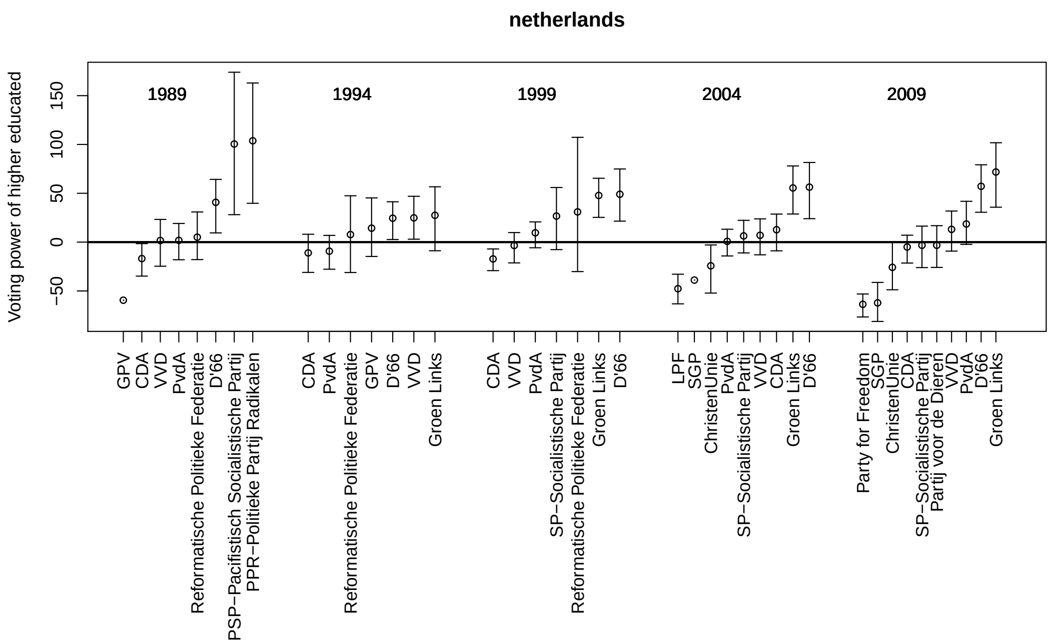


Figure 6.13 – Voting power of higher educated over parties, Portugal 1989-2009

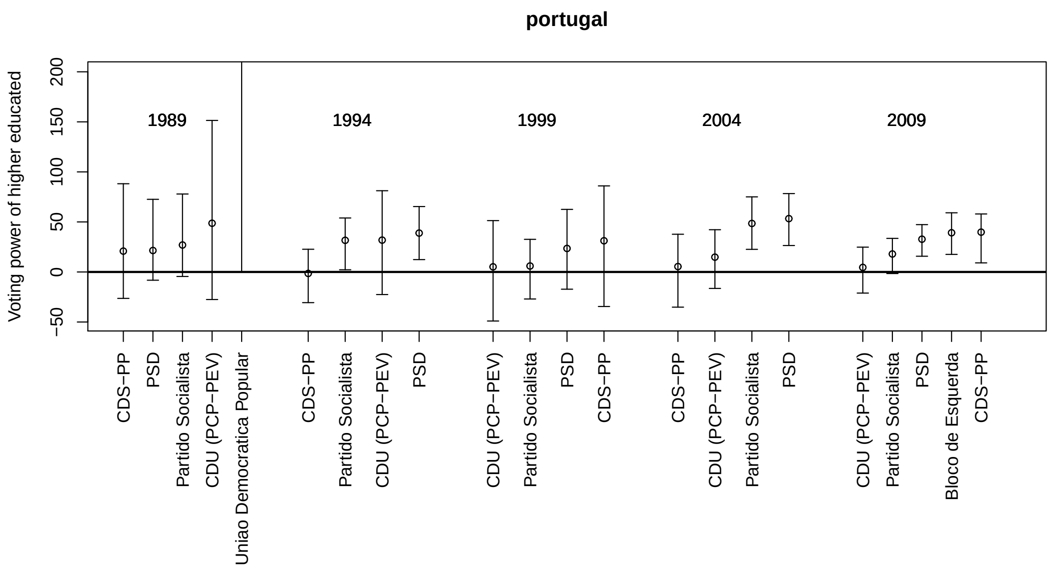


Figure 6.14 – Voting power of higher educated over parties, Spain 1989-2009

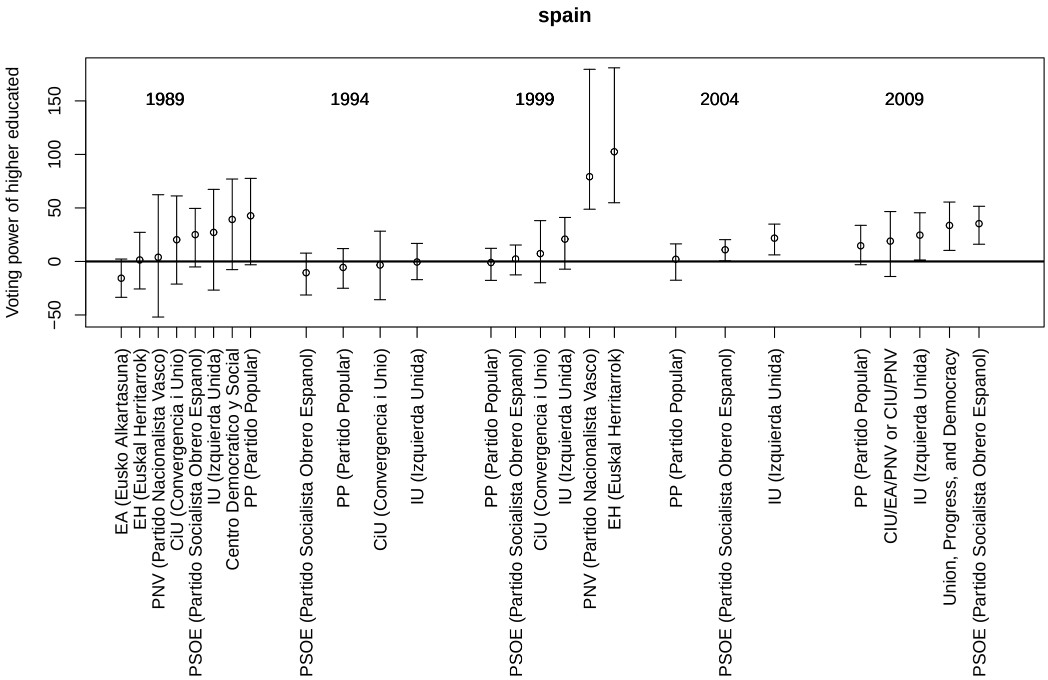
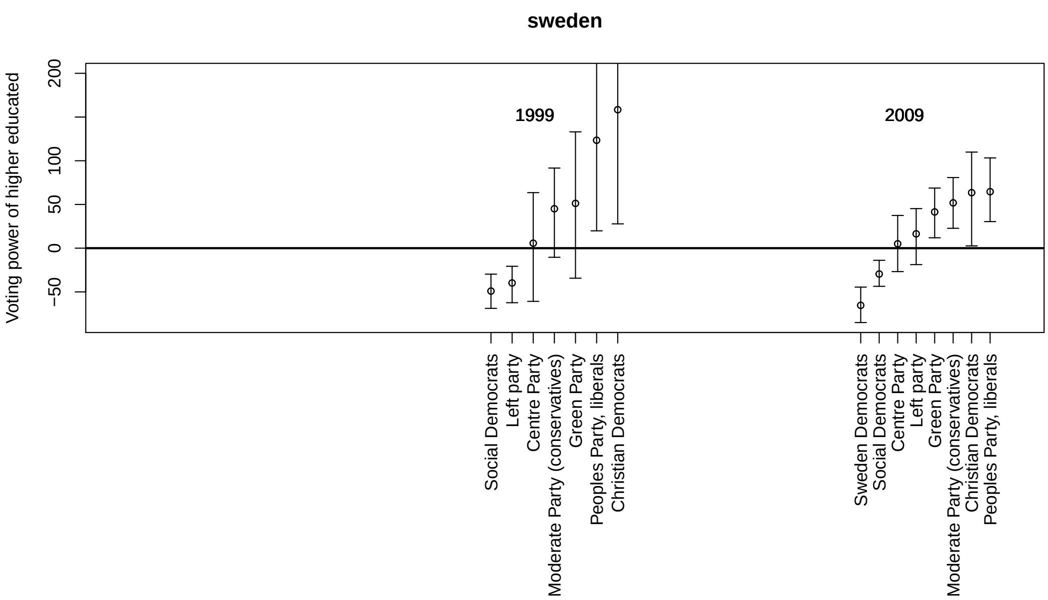


Figure 6.15 – Voting power of higher educated over parties, Sweden 1999-2009



UDF (and later Democratic Movement) in France. Social-liberal and Green parties are the only party families over which highly educated individuals consistently have positive voting power. While for some country-years the result may not be significant, there are no country-years in which lesser educated citizens hold voting power over either of these types of parties.

The main party family over which lesser educated citizens hold positive voting power are the new-right populist parties. These include the FPÖ and BZÖ in Austria, the British National Party and UK Independent Party, the Danish Peoples Party, the True Finns, the Front National in France, the Republikaner in Germany (until 1999), at points the Lega Nord in Italy, the List Pim Fortuyn and Geert Wilders' Party for Freedom in the Netherlands, and the Sweden Democrats. Sinn Féin, although a more left-wing nationalist party, could be added to this grouping.

The position of centre-left and centre-right parties is much more variable between countries. In some country-years prospective voters with higher education qualifications hold voting power over centre-left Labour parties. This is the case for the Labour Party in the UK (from 1999), the Social Democratic Party in Denmark (in 2009), the Parti Socialiste in France (except 2009), the SPD in Germany (except 2009), the Labour Party in Ireland (since 2004), the PSOE in Spain (since 2004), the Parti Socialista in Portugal (several years). Similarly, highly educated individuals hold voting power over the centre-left parties in Italy from some of the years for which data is available. In contrast, lesser educated individuals hold significant voting power over the social democratic parties in Finland and Sweden. We thus observe between countries variation in the power that highly educated citizens hold over centre-left parties. However, within countries the only variation is between statistical significance and insignificance. There is no country in which highly educated individuals held positive voting power over a left-party at some point in time and negative voting power at another.

Similarly varying patterns are observed for Europe's centre-right parties. Centre-right parties that stood to lose votes from targeting highly educated individuals over lesser educated individuals included the ÖVP in Austria in 2004, the British Conservative party in 2004, the Dutch Christian Democrats in 1989 and 1999[15]. This contrasts with highly educated individuals holding voting power over the centre-right National Coalition in Finland, the FDP and CDU/CSU in Germany in 1994, the French UMP in 2004, Fine Gael and the Progressive Democrats in Ireland at several points in time, the centre-right PDS in Portugal and the right-of-centre Swedish Parties: the Christian Democrats, the Peoples Party (Liberals) and, in 2009, the conservative Moderate Party. Although there are some country-years for which the voting power of highly educated individuals was not statistically significant, there was no year in which lesser educated individuals held voting power over any of these parties. The only party to have experienced the positive and negative voting power of highly educated citizens is the Liberal Party in Denmark, which stood to gain from targeting highly educated individuals in 1994 while standing to gain from targeting lesser educated citizens in 2009.

All in all, this picture shows that the patterns of representing highly educated individuals do not easily map on to left and right voting. There are certain types of parties, such as social-liberal and Green parties, over which highly educated individuals hold consistent voting power. Lesser educated individuals hold power over new-right populist parties. The story with centre-left and centre-right parties differs according to country context. For some countries, highly educated individuals hold more power over the centre-left than over the centre-right (e.g. France, Britain, and Spain). In several other countries, such as Sweden, Finland and the Netherlands the reverse is true. In Portugal and Germany, highly educated individuals have held high voting power over both centre-left and centre-right parties. Earmarking either the traditional left or traditional right as the representatives of highly educated individuals may therefore be an inaccurate representation of the reality of electoral

[15] Moreover, lesser educated individuals generally hold voting power over the small conservative Christian parties

incentives on offer to European parties.

Naturally, uncovering these patterns of the voting power of highly educated citizens across parties raises a whole new set of questions. What explains this variation in patterns across countries? Why do left parties in some countries face high voting power from highly educated voters, while those in others face high voting power of lesser educated voters? Why do we find a consistently high voting power of highly educated voters over Green and social-liberal parties? Why do we observe relative stability of patterns within countries? Answering these questions is beyond the scope of this dissertation. We can make some conjectures, however. Most voting power is derived from conversion value, and hence the high voting power of the highly educated suggests that highly educated voters share a high utility for both these Green and social-liberal parties together with other parties. It is well known that education is associated with post materialist attitudes (Duch and Taylor 1993, Abramson, Aldrich and Rohde 1994, Duch and Taylor 1994). Green and social-liberal parties offer such post-materialist platforms and this could be an explanation of their appeal to highly educated voters. The competitive responses of socio-democratic parties and centre-right parties to the emergence of post-materialist parties on the one hand and populist new-right parties on the other, in turn, could affect the appeal of centre-right and centre-left parties to highly educated voters (Kitschelt 1994). Moreover, the apparent continuity of high voting power over certain parties can be explained by the fact that parties have strong incentives to continue to appeal to these groups. Continuing appeal, in turn, will result in the prospective voter holding high utilities for the competing parties, which will again result in high voting power. Future research could investigate simulating these dynamic effects by focussing on the feedback mechanism of high voting power on the behaviour of parties, which in turn maintains high voting power. However, fully answering these questions is an avenue for future study in which my measure of voting power can be used as both an explanatory variable and a dependent variable.

Table 6.1 – Representational inequality. Percentage of total voting power held by 20 percent of sample with the highest voting power.

Country	1989	1994	1999	2004	2009	Average
Austria			50.4	56.0	52.5	53.5
Belgium	54.9	48.7	54.4			52.1
Britain	64.9	63.2	49.3	53.8	61.3	58.1
Denmark	69.6	74.3	64.6	66.1	57.4	66.3
Finland			43.6	77.1	63.1	64.8
France	49.0	63.9	53.0	53.2	51.2	54.3
Germany	70.9	82.1	45.1	39.4	57.2	61.6
Greece	99.8	83.9	67.1	71.3	57.3	76.5
Ireland	62.2	54.7	62.2	64.0	58.4	60.4
Italy	70.3	62.4	49.0	62.9	51.1	56.8
Luxembourg	65.9	63.5	50.6		43.5	53.2
Netherlands	70.3	56.3	54.4	57.8	59.7	59.4
Portugal	85.6	66.8	59.5	65.2	51.4	65.7
Spain	73.1	63.7	60.1	55.6	59.5	61.8
Sweden			79.5		66.4	70.8
EU15	69.3	65.6	54.6	59.9	56.9	60.9

Notes: Total voting power held by the 20 percent most electorally powerful individuals as a percentage of total voting power. In a perfectly equal society the top 20 percent would also hold 20 percent of voting power. Weights applied where available.

6.5 Group voting power vis-a-vis parliaments and cabinets

Ultimately, I am interested in how voting power over parties aggregates to inform voting power over policy-making. This section explores several options considered in the literature. First, I look at the voting power of individuals and groups over the entire legislature. Second, I consider the voting power of different socio-economic groups over the parties in government. The latter will be the explanatory variable of higher education policy-making used in the next chapter.

6.5.1 Voting power over legislatures

The most "naive" model of policy-making is one based on the composition of the legislature (Kedar 2005). If we assume that legislation originates from random majorities in the legislature, then a consideration of the average voting power over the parties in parliament is a good approximation of an individual's voting power. This average voting power is obtained by calculating a weighted average of the voting power of a group or individual over all parties in parliament. The weight applied is the seatshare of the party in parliament. Hence, only parties with parliamentary representation are weighted, and larger parties count for more voting power. For the period up to 2005 these seatshares are obtained from the Parties, Governments and Legislatures database Cusack and Engelhardt (2002).[16] The missing data for the period 2005-2009 was inputted in the database using data from the Political Data Yearbook, published as a double issue at the end of each volume of the European Journal of Political Research (Van Biezen and Katz 2006, Bale and van Biezen 2007, 2008, 2009, Bale and Caramani 2010).

First, I calculate the weighted average of individual voting power over the legislature for each of the 15 countries in the EES survey years. How equally is this voting power distributed in the population? Table 6.1 on the preceding page presents the percentage of voting power held by the top 20 percent most electorally powerful. On average across all countries, the top 20 percent holds 60 percent of total voting power, which leaves 40 percent for the remaining 80 percent of the population. To allow for a comparison with measures of income inequality, I also calculated the overall average Gini coefficient of voting power inequality, which is 54.9. This is substantially higher than most Gini coefficients for the distribution of income, which is around 37 for the US, 35 for the UK and 23 for more egalitarian Sweden.)[17] These figures seem to signal a reality far removed from the democratic ideal of one person one vote.[18]

Nevertheless, as discussed in the previous chapters, parties are rarely able to target individual citizens with policies. Ultimately, policies can only be targeted at identifiable groups. I therefore now turn to measuring the voting power of groups over the legislature. For highly educated citizens, the main group of interest, this is

[16] I use the Autumn 2007 updated version available at http://www.wzb.eu/de/personen/thomas-r-cusack?s=5662)

[17] Luxembourg Income Studies. Key Figures Poverty and Inequality. www.lisproject.org Accesses on 7 July 2011.

[18] Future research should look in detail at the composition of this top 20 percent. Another interesting avenue would be to compare the responsiveness of governments to the opinions of this top 20 percent (i.e. "powerful opinions") and compare these to their responsiveness to the opinions of the average population. Like Bartels (2008), we may find that politicians are more responsive to certain segments of the population than to others.

the average difference in voting power between highly and lesser educated citizens, as a percentage of the average voting power. First, party survey year estimates are imputed through simple linear interpolation.[19] I then calculate the average voting power of all parties in each year, weighted by their seat-share.

Table 6.2 shows that, on average, prospective voters with higher education qualifications have 10.2 percent more voting power over parliaments than lesser educated citizens. At above 20 percent, highly educated citizens in Germany and Portugal had the highest average voting power of all countries in the sample. The lowest voting power of highly educated citizens was found in Austria, Luxembourg and Denmark. This analysis demonstrates that, on average, parties in parliament stood to gain votes from pursuing the interests of highly educated citizens. If governments were randomly formed from these parties (weighted by their seatshare), then we would expect government policies favourable to the interests of highly educated citizens.

How does the voting power of highly educated citizens compare to the voting power of other socio-economic groups over legislatures? Because of space constraints, the full country-year figures of the voting power of other socio-economic group can be found on the web-appendix. Nevertheless, table 6.3 on page 258 summarises the average voting power of five additional socio-economic groupings for each country. This is the average for the years for which data was available. In effect, the plot is the last column of table 6.2 for each socio-economic grouping. With 10.2 per cent, highly educated citizens have the highest voting power difference in absolute terms of any of the socio-economic groups. The next highest are high incomes (top 3rd of the distribution), who have on average 5.3 percent more voting power, and middle incomes (3.8 percent). At -7.7 percent, low income citizens have the least voting power of all these socio-economic groups over parliaments.

[19] Thus, if data is available for the year 1999 and 2004, then the four years in between are filled in on the line between those points. This assumes that there is some year to year trend in how the voting power of groups over a party evolves. This assumption is reasonable given that distributions of utility are not rewritten annually but only evolve at the margins.

TABLE 6.2 – VOTING POWER OF HIGHLY EDUCATED CITIZENS OVER THE LEGISLATURE, 15 EU COUNTRIES BETWEEN 1989-2009

Year	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Mean
Austria											13.0	3.2	-4.4	-12.0	-8.8	-11.7	-2.7	-3.0	-1.5	-1.7	-9.2	-3.5
Belgium	23.1	17.6	12.2	7.3	2.7	-2.1	-1.2	0.3	1.9	3.4	7.6											6.6
Denmark	7.0	9.6	12.1	14.4	16.6	19.9	17.3	13.6	9.9	5.5	0.0	-1.4	-1.0	-2.9	-2.5	-2.0	-1.4	-1.6	-1.8	-1.6	-2.1	5.1
Finland											5.9	10.2	13.9	17.5	19.6	22.0	16.7	11.5	7.2	2.0	-3.7	11.2
France	19.6	13.6	12.4	11.3	3.7	-2.2	-1.3	-0.5	6.0	11.4	12.7	14.1	15.4	15.8	18.3	21.6	15.7	11.0	7.7	4.5	0.4	10.1
Germany	27.5	30.3	30.9	34.4	38.1	39.0	31.0	27.3	23.6	20.2	18.2	18.2	18.2	18.2	18.7	19.1	18.8	17.2	16.9	16.6	16.7	23.8
Greece	7.0	10.7	18.4	26.5	35.8	48.1	35.4	22.8	11.5	-0.2	-13.1	-9.1	-5.8	-2.0	1.8	1.4	0.8	1.6	2.3	3.1	4.4	9.6
Ireland	24.5	19.2	13.8	8.3	4.1	-0.9	1.7	4.2	6.5	9.2	12.1	11.4	10.7	9.1	8.9	9.4	7.1	5.4	4.7	4.3	3.1	8.4
Italy	24.6	21.4	20.5	16.6	13.4	8.5	6.0	8.0	8.9	8.6	10.0	7.2	6.8	7.0	7.5	8.8	5.1	4.0	4.2	3.9	0.4	9.6
Luxembourg						3.5	5.5	5.4	5.3	5.3	3.0	0.4	1.2	1.9	2.7	5.2	7.8	8.1	8.4	8.7	9.1	5.1
Netherlands	2.3	3.2	1.8	0.4	-1.0	-0.7	5.1	7.1	9.1	11.4	13.3	12.7	12.0	9.0	7.1	2.6	9.7	13.1	16.3	20.2	18.4	8.3
Portugal	20.5	22.0	25.2	28.7	32.0	35.6	30.2	23.1	18.2	13.3	8.3	13.7	19.8	27.0	33.1	38.8	35.0	31.6	28.4	25.1	23.6	25.4
Spain	32.2	24.7	15.1	5.4	-4.1	-14.3	-11.1	-7.8	-4.5	-1.3	1.9	2.2	2.8	3.6	4.5	6.3	9.7	12.7	15.7	19.1	22.4	6.4
Sweden											-1.7	0.2	2.1	3.9	5.2	7.0	8.9	11.2	14.7	16.4	18.0	7.8
United Kingdom	7.7	5.4	3.2	1.1	-1.6	-4.4	-3.1	-1.7	-0.4	2.2	4.8	6.7	8.5	10.3	12.2	14.1	17.7	22.0	27.3	32.6	38.0	9.7
EU15	17.8	16.2	15.1	14.0	12.7	10.8	9.6	8.5	8.0	7.4	6.4	6.4	7.2	7.6	9.2	10.2	10.6	10.3	10.8	11.0	10.0	10.2

Source: Author's calculations based on European Election Studies 1989-2009 and other sources described in the text.
Notes: Weighted average voting power of highly educated citizens over the parties in the legislature. Weighted by the seat-share of parties in the legislature. Difference between in-group and out-group, as a percentage of average voting power. See text for details.

Table 6.3 – Voting power of several socio-economic groups over the legislature, 20 year average of 15 EU countries

Country	Income			Gender	Age	Education
	(low)	(middle)	(high)	(women)	(> median)	(higher)
Austria	-1.4	2.1	3.6	-3.8	-6.1	-3.5
Belgium	3.2	-8.6	6.6	-11.5	-1.4	6.6
Denmark	-17.2	11.7	5.7	-5.6	-9.2	5.1
Finland	-11.8	10.1	-3.6	-2.0	-17.9	11.2
France	-6.8	1.8	6.0	-8.3	18.0	10.1
Germany	-6.2	6.6	4.4	2.6	-11.7	23.8
Greece	-13.4	10.7	2.9	3.6	-24.1	9.6
Ireland	-7.4	-6.9	15.7	0.3	7.4	8.4
Italy	-3.6	6.4	-2.3	2.8	1.7	9.6
Luxembourg	-9.5	10.9	3.3	-4.0	1.4	5.1
Netherlands	-10.3	6.0	4.7	2.4	-8.8	8.3
Portugal	-6.5	-5.5	13.4	-12.4	8.6	25.4
Spain	-2.0	4.2	-0.9	-6.8	5.2	6.4
Sweden	-8.0	6.0	2.5	7.6	-12.4	7.8
United Kingdom	-8.1	-0.5	11.6	-0.3	1.2	9.7
EU15	-7.7	3.8	5.3	-2.3	-2.3	10.2

Source: Author's calculations based on European Election Studies 1989-2009 and other sources described in the text.
Notes: Weighted average voting power of several socio-economic groups over the parties in the legislature. Weighted by the seat-share of parties in the legislature. Difference between in-group and out-group, as a percentage of average voting power. See text for details.

Aggregating across countries, the average voting power of women is equal to that of men. However, there are interesting cross-national differences, with women having the most power over parliament in Sweden and the least in Portugal. The average age effect is also close to zero. However, there are some interesting cross-national variations here. Older citizens hold substantial voting power in France, Portugal and Ireland while young citizens are more powerful in Greece, Finland, Sweden, Denmark and the Netherlands. Therefore, parties have most votes to gain and lose from taking stances on issues relating to highly educated citizens. On average, parties in these parliament stand to gain the most votes by pleasing highly educated citizens.

What explains this persistently high voting power of highly educated citizens over parliaments? Looking back at the breakdown analysis above, most voting power was explained by conversion value, and most conversion value was derived from variations in convertibility. Applying the same logic to explaining the variance between highly and lesser educated citizens would suggest that highly educated citizens are more convertible than average. An exact analysis of the political psychology is beyond the scope of this dissertation. A plausible explanation could be, however, that more educated citizens are more informed, and therefore consider more parties at the same time. Lesser educated citizens, on the other hand, could have stronger identity-based associations with parties and consider fewer parties. Such an explanation is consistent with research suggesting that highly educated voters are more independent in gathering information and rely less on party cues (Dalton 2008).

6.5.2 Voting power over governments

A less "naive" model acknowledges that cabinets and their majorities are what matters for policy-making. Since laws in most European systems originate from the cabinet, voting power over the cabinet may be approximated by a weighted average of voting power over the parties in government. Both changes in the voting power over parties as well as changes in the composition of the cabinet can drive changes in the voting power over cabinets. I again use the interpolated measures of party voting power described above. However, I now calculate a seat-share weighted average of the parties participating in government. The duration of cabinets, the parties participating in them, and their seatshares were obtained from Cusack and Engelhardt (2002) and, from 2005, again filled in using data from the the Political Data Yearbook.

Table 6.4 on the next page presents this measure for our dataset of 15 European countries between 1989 and 2009. Unsurprisingly, since only a sub-sample of the parties in the legislature make it to government, there is more year-by-year variation in this measure than in the parliamentary measure. The average voting power of highly educated citizens over the parties in government is 10.3 percent, slightly lower than the average voting power over parliaments. Austria and Sweden, both

Table 6.4 – Voting power of highly educated citizens over the government, 15 EU countries between 1989-2009

Year	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Mean
Austria											8.2	-16.0	-28.0	-37.6	-31.2	-32.9	-13.1	-11.0	-10.3	-12.0	-14.0	-18.0
Belgium	31.6	23.6	15.5	7.0	-0.6	-8.1	-8.9	-9.6	-10.1	-10.7	6.2											3.3
Denmark	11.2	17.4	24.0	31.4	6.3	3.2	1.3	-0.3	-1.8	-4.3	-6.7	-4.3	-1.5	-0.3	-2.7	-5.0	-6.6	-8.6	-10.6	-12.4	-14.5	0.7
Finland											11.1	13.6	15.2	16.7	17.4	21.7	13.6	5.5	10.4	7.4	-1.2	11.9
France	32.2	29.8	27.5	25.1	5.5	-4.4	-3.7	-3.0	11.9	24.2	26.2	24.6	23.0	16.9	18.5	24.1	15.6	9.0	2.4	-4.2	-10.9	13.8
Germany	17.4	25.0	33.9	41.5	49.1	56.4	43.7	33.5	23.3	16.9	28.8	27.5	26.2	25.1	24.1	22.6	19.9	15.6	14.9	14.3	16.0	27.4
Greece	16.6	-15.2	-12.2	1.1	24.2	65.2	50.1	35.0	19.9	4.8	-10.3	-3.5	3.3	10.1	16.9	-7.0	-13.6	-11.2	-8.8	-6.4	-4.0	7.4
Ireland	-16.8	-9.6	-6.1	-2.7	-3.8	-5.0	-2.6	4.9	4.9	-3.9	-5.5	-3.5	-1.4	0.8	3.0	4.9	1.7	-0.4	-2.6	-5.0	-7.3	-2.7
Italy	12.1	8.9	10.0	10.8	10.9	2.2	-1.3	20.6	18.3	16.0	13.6	6.4	7.5	11.7	13.8	16.0	9.3	3.5	5.8	1.1	-6.3	9.1
Luxembourg						-7.2	-2.8	1.5	5.9	10.3	7.2	-1.1	1.8	4.7	7.6	10.7	10.6	10.4	10.2	9.9	9.7	5.6
Netherlands	-7.0	-6.4	-8.1	-9.8	-11.5	-4.1	13.8	15.5	17.1	16.4	16.4	14.9	13.3	6.5	7.5	9.6	11.0	12.5	12.0	15.0	18.3	7.3
Portugal	10.7	16.4	22.0	27.7	33.4	39.0	34.0	17.9	10.9	4.0	-3.0	6.3	15.6	30.6	35.5	38.3	38.5	35.3	31.3	27.3	23.3	23.6
Spain	28.9	19.8	10.6	1.5	-7.7	-16.8	-13.5	-8.6	-5.0	-2.3	0.5	0.8	1.1	1.4	1.7	7.8	13.5	16.7	20.0	23.3	26.5	5.7
Sweden											-63.9	-59.3	-54.8	-50.2	-45.7	-41.1	-36.6	-14.4	40.8	39.8	38.8	-22.4
United Kingdom	4.1	3.7	3.4	3.1	2.7	2.4	1.3	0.3	0.1	5.1	9.7	13.2	16.7	20.3	23.8	27.4	33.8	40.2	46.6	53.0	59.4	17.6
EU15	12.8	10.3	11.0	12.4	9.9	10.2	9.3	9.0	7.9	6.4	2.6	1.4	2.7	4.0	6.5	6.9	7.0	7.4	11.6	10.8	9.6	7.9

Source: Author's calculations based on European Election Studies 1989-2009.
Notes: Weighted average voting power of highly educated citizens over the parties in government. Weighted by the seat-share of the government majority. Difference between in-group and out-group, as a percentage of average voting power. See text for details.

Table 6.5 – Voting power of several socio-economic groups over the government, 20 year average of 15 EU countries

Country	Income (low)	Income (middle)	Income (high)	Gender (women)	Age (> median)	Education (higher)
Austria	2.0	5.7	-1.9	-6.2	-3.0	-18.0
Belgium	5.5	-8.8	4.8	-16.3	0.5	3.3
Denmark	-32.6	13.8	24.0	-15.5	-9.2	0.7
Finland	-12.7	6.5	4.2	-6.3	-18.6	11.9
France	-8.8	3.5	7.5	-8.2	18.1	13.8
Germany	-9.6	9.9	6.6	3.1	-4.6	27.4
Greece	-17.3	16.4	1.1	-2.3	-29.7	7.4
Ireland	-9.7	-3.3	15.0	-5.6	8.1	-2.7
Italy	-3.7	7.5	-3.0	6.1	5.2	9.1
Luxembourg	-15.2	18.0	1.2	-6.0	1.8	5.6
Netherlands	-17.0	6.5	10.8	-0.6	-8.8	7.3
Portugal	-4.9	-4.0	9.9	-10.1	10.0	23.6
Spain	-5.4	7.6	0.2	-6.9	6.6	5.7
Sweden	-5.9	8.9	0.2	2.6	-14.6	-22.4
United Kingdom	-14.2	1.1	16.2	0.7	-1.7	17.6
EU15	-11.0	6.4	7.1	-4.5	-1.7	7.9

Source: Author's calculations based on European Election Studies 1989-2009.
Notes: Weighted average voting power of several socio-economic groups over the parties in government. Weighted by the seat-share of the government majority. Difference between in-group and out-group, as a percentage of average voting power.

countries for which data is only available between 1999 and 2009, have negative voting power for highly educated citizens, meaning that their governments – on average – stood to gain more votes from pursuing the interests of lesser educated citizens. In the case of Austria this is explained by the participation of the FPÖ in government, over which lesser educated citizens had high voting power. For the case of Sweden the negative voting power is explained by the years the Social Democrats were in government, over whom lesser educated citizens also had nigh voting power. In contrast, Germany had consistently high voting power for highly educated individuals. This is explained by the generally high voting power of highly educated citizens over German parties, and in particular by the power of highly educated citizens over the Greens and FDP, which for most of this period participated as junior coalition partners on the left and right respectively. Similarly, Portugal also had high voting power for highly educated citizens, explained by their high voting power over the main party on the centre-left (the socialist party) and the main party on the centre-right (the social-democratic party).

Table 6.5 on the preceding page lists the average voting power of highly educated citizens over cabinets relative to the voting power of the other socio-economic groups. Again, the highly educated yield the highest voting power of all these groups, followed by the two highest income groups. It is remarkable to observe that the top incomes, on average, hold more voting power over both the legislature and cabinet than middle incomes. Equally remarkable is the substantially lower voting power of the lowest incomes. This challenges a common academic and popular conception that politics is a battle for middle incomes. Instead, this table suggests there are as many votes to be won amongst high incomes, lending support to a nascent strand of research showing that the government in the U.S. is more responsive to the opinions of the rich (Bartels 2008, Gilens 2009). There is no average trend for powerful age or gender groups. However, older citizens are again the most powerful over the governments of Portugal and France and the least powerful over those in Greece, Sweden and Finland.

6.5.3 Alternative approaches to modelling cabinet politics

The weighted average "melting pot" approach to cabinet politics lacks a clear agent based model of the internal workings of cabinets. Nevertheless, it is the most common assumption in measuring the political policy position of cabinets. Cusack and Engelhardt (2002) use the measure to calculate their expert and manifesto based cabinet centre-of-gravity indices. Similarly, Huber et al. (2004) count the number of cabinet seats taken by left, centre or right parties as a measure of the partisanship of the government. In the next chapter I stick to using this approach.

The portfolio allocation model of (Laver and Shepsle 1990, 1996) considers ministers simultaneously as policy dictators within their departments and loyal agents of their parties. A cabinet's policy direction is then determined by the partisan background of the minister in charge. Becher (2010) insightfully builds on this idea, but instead of modelling ministers as policy dictators he models them as agenda-setters constrained by a constellation of veto-players (Tsebelis 2002). The extent to which these ministers can achieve their preferred policy position is constrained by the size of the so-called win-set of the status-quo. The win-set is the set of policy options that is a pareto improvement for the group of veto-players. The more veto-players, and the larger the ideological distance between them, the smaller the win-set and the less possibility for change (Tsebelis 2002). Becher (2010) goes on to show empirically that the influence of left-wing Labour ministers on labour market policies is constrained by the ideological distance within the cabinet.

While these alternative models of cabinet politics may be a more accurate representation of the internal workings of government, the analysis for now continues to use the conventional centre of gravity of approach to calculating cabinet voting power for two main reasons. First, given that the voting power approach is a novel way of measuring the incentives on offer to political parties, it is best tested against alternative explanations in a conventional setting. We are better off varying one variable at a time in order to identify what is causing the results. The second reason is more pragmatic. The estimates of party voting power display substantial confidence intervals. Hence, a more aggregate measure of voting power over the cabinet is likely to be more accurate than variables based on individual party estimates.

6.6 Conclusion

To the best of my knowledge, this chapter provides the first measure of voting power over European multi-party democracies. At the individual level, the measure of voting power provides us with an estimate of how much of the vote-share a party stands to gain from targeting policies to specific voters. Seat-share maximising politicians have incentives to target individuals and groups with high voting power at the expense of those with low voting power. Parties can improve their vote-share by affecting the voters' choice of party (conversion) or by affecting the turnout of voters (mobilisation). The mobilisation incentive consists of both positive and negative turnout buying incentives. The breakdown analysis of these three imperatives reveals that the conversion imperative dominates the mobilisation incentive by a substantial margin. There are many more votes to be won through converting voters than by mobilising loyal supporters or de-mobilising adversaries. This chapter thereby provides an important empirical answer to a long-standing question in the political economy literature.

The resulting empirical measure of voting power over parliaments shows that the incentives to target different voters are highly unequal. The estimated measures of inequality for the distribution of voting power are more unequal then similar measures for the distribution of income. However, politicians tend to target groups and not individuals, and therefore the main focus of the analysis was on the voting power of groups in general, and highly educated prospective voters in specific.

There were identifiable parties over which highly educated voters have high voting power (Green parties and central liberal parties), as well as identifiable parties over which highly educated voters had very low voting power (populist right parties). The voting power of highly educated individuals over centre-left and centre-right parties shows substantial variation between countries. Confidence intervals estimated using a bootstrapping procedure show that many of these estimates are statistically significant.

Aggregating voting power measures to the level of parliaments and governments reveals some interesting patters. First, of all the social-economic groups considered, highly educated voters have the highest voting power over both parliaments and governments. On average highly educated voters have around 10 percent more voting power over cabinets and legislatures. Another interesting finding is that parties have as many, if not more, votes to gain from targeting high income individuals than from targeting middle income individuals. The voting power of low income groups was negative for most countries. Governments generally do not stand to win many votes from targeting the poor. This challenges a popular conception of the median voter model. This approach to analysing the electoral incentives on offer to parties provides a new way of understanding distributive politics.

How do the findings of this chapter help us to understand the distributive politics of higher education? To begin with, the high voting power of highly educated voters can be used as an explanation of the emergence and persistence of higher education systems that redistribute resources from lesser educated families towards highly educated families. Moreover, the next chapter explores the extent to which variations in this measure of cabinet voting power of highly educated voters explain variations in higher education policy between countries and within countries over time.

6.7 Appendix

TABLE 6.6 – CONDITIONAL LOGIT ESTIMATES, PREDICTED MODEL VALUES AND DECOMPOSITION OF VOTING POWER VARIANCE

Country	1	1	1	2	2	2	2	3	3	3	3
Year	1999	2004	2009	1989	1994	1999	2009	1989	1994	1999	2004
β	0.84***	1.14***	0.90***	0.70***	0.77***	0.75***	0.78***	1.03***	1.05***	0.97***	0.99***
	(0.094)	(0.12)	(0.097)	(0.041)	(0.096)	(0.10)	(0.072)	(0.078)	(0.083)	(0.076)	(0.071)
χ^2	79.3 ***	95.1 ***	86.6 ***	284.7 ***	64.7 ***	52.6 ***	117.9 ***	174.1 ***	159.7 ***	160.9 ***	192.2 ***
(df)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Log-likelihood	-159.4	-222.3	-366.9	-354.6	-280.5	-181.3	-348.9	-353.4	-261.2	-352.3	-386.4
Nr of Alternatives	6	5	8	10	10	11	9	6	6	7	6
Nr of Cases	340	715	629	522	558	317	370	826	891	714	1026
ρ	0.011	0.011	0.013	0.011	0.011	0.011	0.011	0.013	0.013	0.014	0.017
U_{ij} (min)	1.00	1.33	0.11	0.93	1.26	0.94	0.58	1.25	1.36	1.19	1.63
U_{ij} (mean)	3.18	4.36	2.81	2.08	2.92	3.04	2.81	3.89	3.89	3.40	4.30
U_{ij} (max)	7.24	9.44	7.95	6.22	6.35	6.47	6.49	9.14	9.08	7.89	7.87
VP (min)	0.0052	0.0057	0.0019	0.0078	0.017	0.0071	0.0077	0.0037	0.0066	0.0075	0.014
VP (mean)	0.052	0.043	0.044	0.036	0.057	0.055	0.056	0.036	0.038	0.047	0.068
VP (sd)	0.061	0.044	0.060	0.048	0.050	0.056	0.060	0.040	0.040	0.053	0.056
VP (max)	0.14	0.095	0.14	0.13	0.13	0.13	0.16	0.092	0.093	0.13	0.13
Conversion Value (min)	0.0051	0.0056	0.0018	0.0078	0.017	0.0069	0.0075	0.0035	0.0063	0.0073	0.012
Conversion Value (mean)	0.048	0.040	0.043	0.035	0.055	0.053	0.054	0.033	0.034	0.044	0.061
Conversion Value (max)	0.12	0.087	0.14	0.13	0.12	0.12	0.15	0.082	0.080	0.12	0.11
Mobilization Value (min)	-0.000036	0.000042	-0.000015	0.000017	0.000062	0.000039	0.000032	0.000015	0.000043	-0.000023	0.00054
Mobilization Value (mean)	0.0041	0.0025	0.00076	0.00084	0.0018	0.0019	0.0020	0.0025	0.0035	0.0029	0.0065
Mobilization Value (max)	0.017	0.0083	0.0043	0.0062	0.0089	0.0091	0.011	0.0099	0.013	0.012	0.019
$\partial \Pr(Y_i = j)/\partial U_{ij}$ (min)	0.0063	0.0077	0.0021	0.0083	0.018	0.0092	0.011	0.0042	0.0085	0.0092	0.017
$\partial \Pr(Y_i = j)/\partial U_{ij}$ (mean)	0.052	0.044	0.043	0.037	0.058	0.058	0.058	0.035	0.039	0.047	0.067
$\partial \Pr(Y_i = j)/\partial U_{ij}$ (max)	0.13	0.091	0.14	0.13	0.13	0.13	0.15	0.086	0.088	0.12	0.12
$\partial \Pr(T_i = 1)/\partial U_{ij}$ (min)	-0.015	-0.0095	-0.0033	-0.0028	-0.0031	-0.0032	-0.0083	-0.0075	-0.012	-0.012	-0.013
$\partial \Pr(T_i = 1)/\partial U_{ij}$ (mean)	0.000016	0.0000030	0.0000053	0.000081	0.0013	0.0017	0.00027	0.000060	0.00013	0.000061	0.00035
$\partial \Pr(T_i = 1)/\partial U_{ij}$ (max)	0.029	0.015	0.0074	0.0095	0.013	0.015	0.018	0.014	0.019	0.020	0.026
Cov(VP,Conv)	94.2	96.3	98.6	98.1	96.8	94.0	95.5	97.3	96.0	95.4	97.1
Cov(VP,Mob)	1.61	0.62	0.084	0.41	0.62	0.95	0.65	0.64	1.26	0.81	1.38
Cov(VP,Cov(VP,Mob))	4.22	3.09	1.27	1.46	2.59	5.07	3.80	2.08	2.72	3.83	1.47
Corr(Conv, $\partial \Pr(Y_i = j)/\partial U_{ij}$)	95.5	98.9	99.8	95.6	98.1	98.6	98.7	94.5	95.3	97.1	94.9
Corr(Conv, $\Pr(T_i = 1)$)	3.87	-22.3	-6.80	9.66	-5.45	-8.33	-6.34	5.45	-5.68	-6.41	-3.78
Corr($\partial \Pr(Y_i = j)/\partial U_{ij}$, $\Pr(T_i = 1)$)	-15.5	-32.2	-10.8	-7.87	-19.6	-23.1	-17.7	-12.5	-23.8	-21.6	-26.4
% Positive Turnout Buying	87.9	83.2	91.7	96.9	93.6	95.0	91.9	84.0	79.3	79.5	85.7
Corr(Mob(pos), $\partial \Pr(T_i = 1)/\partial U_{ij}$)	91.5	90.6	93.9	95.3	93.8	92.8	91.8	93.7	89.6	89.5	93.0
Corr(Mob(pos), $\Pr(Y_i = j) - V_j$)	36.5	30.9	44.2	33.8	51.3	26.9	58.5	56.1	51.1	66.0	57.6
Corr($\partial \Pr(T_i = 1)/\partial U_{ij}$, $\Pr(Y_i = j) - V_j$)	13.9	4.90	26.9	23.4	35.2	7.04	42.5	39.9	27.3	45.9	37.4
Corr(Mob(neg), $\partial \Pr(T_i = 1)/\partial U_{ij}$)	-90.5	-92.5	-91.6	-89.5	-79.2	-80.1	-88.1	-95.0	-91.0	-92.8	-91.8
Corr(Mob(neg), $\Pr(Y_i = j) - V_j$)	-53.9	-51.2	-57.5	-39.9	-53.5	-37.3	-65.3	-75.1	-68.9	-78.6	-63.8
Corr($\partial \Pr(T_i = 1)/\partial U_{ij}$, $\Pr(Y_i = j) - V_j$)	40.0	38.3	46.8	26.9	20.7	11.6	49.8	65.8	60.5	71.7	41.3

Country Codes: 1 = Austria, 2=Belgium, 3=Britain, 6=Denmark, 8=Finland, 9=France, 10=Germany, 11=Greece, 13=Ireland, 14=Italy, 17=Luxembourg, 19=Netherlands, 22=Portugal, 25=Spain, 26=Sweden. * p<.10, ** p<.05, *** p<.01

Continued on Next Page…

Table 6.6 – Continued

Country	3	6	6	6	6	6	8	8	8	9	9
Year	2009	1989	1994	1999	2004	2009	1999	2004	2009	1989	1994
β	1.19***	1.51***	2.11***	1.23***	1.44***	1.48***	1.01***	2.25***	2.15***	1.08***	1.21***
	(0.13)	(0.20)	(0.22)	(0.11)	(0.081)	(0.13)	(0.19)	(0.18)	(0.26)	(0.078)	(0.10)
χ^2	78.6 ***	58.1 ***	92.8 ***	128.4 ***	318.7 ***	128.3 ***	27.1 ***	149.4 ***	69.7 ***	191.3 ***	136.5 ***
(df)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Log-likelihood	-279.6	-227.8	-177.2	-319.8	-289.3	-270.3	-166.1	-132.6	-209.7	-421.3	-375.3
Nr of Alternatives	8	7	8	10	6	7	7	8	8	9	8
Nr of Cases	634	755	806	777	1018	836	265	618	669	667	646
ρ	0.016	0.012	0.012	0.012	0.011	0.012	0.015	0.014	0.015	0.015	0.014
U_{ij} (min)	0.23	1.74	2.57	1.31	1.80	0.30	1.66	2.93	1.02	1.16	1.41
U_{ij} (mean)	3.42	5.83	7.87	4.14	6.16	5.24	4.59	8.66	7.89	4.04	4.50
U_{ij} (max)	9.65	14.1	19.4	11.1	13.2	13.6	8.98	20.0	18.7	9.42	9.82
VP (min)	0.0036	0.0022	0.0013	0.0014	0.0017	0.0012	0.0057	0.0021	0.0018	0.0031	0.0044
VP (mean)	0.037	0.027	0.020	0.025	0.032	0.030	0.057	0.020	0.027	0.044	0.047
VP (sd)	0.049	0.037	0.030	0.041	0.042	0.043	0.067	0.028	0.040	0.062	0.063
VP (max)	0.12	0.081	0.069	0.11	0.089	0.094	0.17	0.067	0.094	0.16	0.15
Conversion Value (min)	0.0035	0.0022	0.0013	0.0014	0.0016	0.0012	0.0052	0.0021	0.0017	0.0030	0.0043
Conversion Value (mean)	0.037	0.027	0.019	0.025	0.031	0.029	0.052	0.019	0.025	0.042	0.045
Conversion Value (max)	0.12	0.080	0.066	0.11	0.084	0.089	0.15	0.062	0.084	0.15	0.14
Mobilization Value (min)	-0.0000010	0.0000061	-0.0000021	-0.00000012	0.000031	-0.0000077	0.00012	-0.0000011	0.0000075	-0.000020	0.000016
Mobilization Value (mean)	0.000070	0.00023	0.00052	0.000017	0.0012	0.0010	0.0043	0.00067	0.0017	0.0019	0.0022
Mobilization Value (max)	0.00038	0.0012	0.0031	0.00013	0.0051	0.0055	0.021	0.0041	0.011	0.012	0.012
$\partial \Pr(Y_i = j)/\partial U_{ij}$ (min)	0.0042	0.0024	0.0017	0.0014	0.0021	0.0013	0.0062	0.0025	0.0032	0.0034	0.0054
$\partial \Pr(Y_i = j)/\partial U_{ij}$ (mean)	0.039	0.028	0.021	0.025	0.032	0.030	0.055	0.020	0.028	0.043	0.048
$\partial \Pr(Y_i = j)/\partial U_{ij}$ (max)	0.12	0.083	0.070	0.11	0.087	0.091	0.15	0.067	0.089	0.15	0.15
$\partial \Pr(T_i = 1)/\partial U_{ij}$ (min)	-0.00028	-0.00062	-0.0018	-0.000080	-0.0035	-0.0030	-0.013	-0.0019	-0.0047	-0.0075	-0.0078
$\partial \Pr(T_i = 1)/\partial U_{ij}$ (mean)	0.00000044	0.0000084	0.0000043	0.00000040	0.000033	0.000018	0.00025	0.0000054	0.0000011	0.000047	0.000077
$\partial \Pr(T_i = 1)/\partial U_{ij}$ (max)	0.00050	0.0017	0.0043	0.00019	0.0075	0.0080	0.032	0.0051	0.014	0.016	0.018
Cov(VP,Conv)	99.9	99.7	99.2	100.0	98.3	98.6	92.7	98.8	96.6	96.9	96.1
Cov(VP,Mob)	0.00049	0.015	0.095	0.00017	0.31	0.25	1.68	0.14	0.91	0.49	0.60
Cov(VP,Cov(VP,Mob))	0.062	0.27	0.70	0.038	1.34	1.18	5.62	1.08	2.53	2.62	3.31
Corr(Conv, $\partial \Pr(Y_i = j)/\partial U_{ij}$)	97.9	99.5	99.0	99.6	98.8	99.1	97.6	98.1	95.9	95.5	96.7
Corr(Conv, $\Pr(T_i = 1)$)	3.40	-1.67	-6.80	0.84	-3.15	-3.44	-9.59	-7.07	-6.13	10.7	-2.66
Corr($\partial \Pr(Y_i = j)/\partial U_{ij}$, $\Pr(T_i = 1)$)	-7.76	-6.49	-14.0	-3.45	-11.2	-10.7	-23.8	-15.8	-25.0	-4.89	-18.9
% Positive Turnout Buying	85.9	93.7	93.4	94.2	91.1	94.7	91.0	92.2	96.1	89.8	91.1
Corr(Mob(pos), $\partial \Pr(T_i = 1)/\partial U_{ij}$)	92.7	96.5	95.5	96.2	95.2	95.5	91.3	95.7	96.0	93.0	91.9
Corr(Mob(pos), $\Pr(Y_i = j) - V_j$)	66.6	40.1	34.1	37.0	31.7	25.5	60.7	51.4	28.3	72.6	70.5
Corr($\partial \Pr(T_i = 1)/\partial U_{ij}$, $\Pr(Y_i = j) - V_j$)	53.9	29.1	17.4	28.6	16.0	11.1	43.1	36.5	13.2	60.8	54.6
Corr(Mob(neg), $\partial \Pr(T_i = 1)/\partial U_{ij}$)	-92.5	-89.3	-92.7	-92.3	-92.5	-92.9	-92.0	-93.7	-90.8	-90.2	-89.4
Corr(Mob(neg), $\Pr(Y_i = j) - V_j$)	-74.8	-52.6	-52.3	-49.0	-51.7	-39.5	-70.8	-67.6	-38.7	-77.5	-75.9
Corr($\partial \Pr(T_i = 1)/\partial U_{ij}$, $\Pr(Y_i = j) - V_j$)	69.3	33.6	41.8	41.1	35.3	28.4	54.3	56.0	23.7	68.9	58.6

Country Codes: 1 = Austria, 2=Belgium, 3=Britain, 6=Denmark, 8=Finland, 9=France, 10=Germany, 11=Greece, 13=Ireland, 14=Italy, 17=Luxembourg, 19=Netherlands, 22=Portugal, 25=Spain, 26=Sweden. * p<.10, ** p<.05, *** p<.01

Continued on Next Page...

Table 6.6 – Continued

Country	9	9	9	10	10	10	10	10	11	11	11
Year	1999	2004	2009	1989	1994	1999	2004	2009	1989	1994	1999
β	1.20***	1.15***	1.24***	1.21***	1.51***	0.66***	0.72***	1.25***	3.83***	1.39***	1.04***
	(0.14)	(0.054)	(0.12)	(0.100)	(0.13)	(0.040)	(0.085)	(0.12)	(0.68)	(0.20)	(0.14)
χ^2	71.5 ***	449.8 ***	114.0 ***	145.7 ***	132.2 ***	279.0 ***	71.6 ***	105.4 ***	31.7 ***	50.7 ***	53.6 ***
(df)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Log-likelihood	-184.1	-477.5	-168.3	-264.1	-171.9	-443.5	-220.0	-183.5	-73.8	-105.8	-130.0
Nr of Alternatives	6	7	7	5	6	6	6	5	8	5	7
Nr of Cases	344	957	455	914	750	767	362	615	676	637	318
ρ	0.015	0.016	0.017	0.011	0.013	0.012	0.013	0.012	0.012	0.013	0.013
U_{ij} (min)	2.10	1.25	0.18	1.67	1.97	0.68	0.78	0.71	4.24	1.84	1.23
U_{ij} (mean)	5.08	4.16	3.87	5.37	6.06	2.41	2.67	5.16	11.3	5.17	3.60
U_{ij} (max)	9.27	9.38	10.2	11.0	13.4	5.86	5.99	11.0	36.0	11.8	8.98
VP (min)	0.0083	0.0048	0.0028	0.0023	0.0033	0.0081	0.012	0.0031	0.00042	0.0091	0.0044
VP (mean)	0.061	0.047	0.041	0.036	0.028	0.056	0.063	0.043	0.0092	0.032	0.038
VP (sd)	0.064	0.059	0.053	0.039	0.032	0.062	0.064	0.048	0.015	0.028	0.047
VP (max)	0.15	0.14	0.12	0.082	0.070	0.14	0.15	0.10	0.032	0.064	0.11
Conversion Value (min)	0.0082	0.0048	0.0028	0.0020	0.0032	0.0081	0.012	0.0028	0.00042	0.0090	0.0044
Conversion Value (mean)	0.060	0.045	0.038	0.033	0.027	0.055	0.061	0.040	0.0092	0.032	0.036
Conversion Value (max)	0.14	0.13	0.11	0.074	0.067	0.14	0.15	0.091	0.032	0.063	0.10
Mobilization Value (min)	-0.00000091	-0.000030	-0.000015	0.000073	0.000021	-0.0000067	-0.000045	0.00011	4.0e-09	0.0000087	-0.000032
Mobilization Value (mean)	0.0013	0.0022	0.0026	0.0024	0.00089	0.00071	0.0021	0.0026	0.00000046	0.00034	0.0017
Mobilization Value (max)	0.0051	0.010	0.013	0.0082	0.0034	0.0026	0.0083	0.0091	0.0000023	0.0012	0.0075
$\partial\Pr(Y_i = j)/\partial U_{ij}$ (min)	0.0100	0.0053	0.0046	0.0029	0.0044	0.0083	0.012	0.0043	0.0012	0.010	0.0074
$\partial\Pr(Y_i = j)/\partial U_{ij}$ (mean)	0.063	0.047	0.041	0.037	0.032	0.055	0.062	0.044	0.010	0.035	0.041
$\partial\Pr(Y_i = j)/\partial U_{ij}$ (max)	0.15	0.13	0.11	0.081	0.077	0.14	0.15	0.097	0.034	0.069	0.11
$\partial\Pr(T_i = 1)/\partial U_{ij}$ (min)	-0.0041	-0.0090	-0.010	-0.0074	-0.0031	-0.0037	-0.010	-0.0077	-0.0000021	-0.00097	-0.0078
$\partial\Pr(T_i = 1)/\partial U_{ij}$ (mean)	0.000055	0.0000099	0.000019	0.000090	0.000056	0.000023	0.000013	0.000035	0.000000012	0.000011	0.000014
$\partial\Pr(T_i = 1)/\partial U_{ij}$ (max)	0.0073	0.015	0.018	0.013	0.0050	0.0054	0.016	0.014	0.0000033	0.0018	0.012
Cov(VP,Conv)	99.0	96.7	96.5	96.2	99.4	99.1	95.7	97.7	100.0	99.9	97.0
Cov(VP,Mob)	0.091	0.49	0.65	0.88	0.097	0.093	0.77	0.39	0.00000013	0.038	0.43
Cov(VP,Cov(VP,Mob))	0.86	2.79	2.81	2.91	0.51	0.84	3.54	1.87	0.000078	0.068	2.60
Corr(Conv, $\partial\Pr(Y_i = j)/\partial U_{ij}$)	94.0	97.9	97.5	96.0	96.9	99.3	98.3	98.7	96.2	98.3	96.6
Corr(Conv, $\Pr(T_i = 1)$)	11.7	-1.77	-5.33	-3.08	-3.15	-1.30	-0.043	-11.9	5.67	-2.24	-6.93
Corr($\partial\Pr(Y_i = j)/\partial U_{ij}$, $\Pr(T_i = 1)$)	-10.9	-13.4	-19.3	-19.5	-15.8	-9.07	-12.7	-21.6	-1.36	-13.4	-22.5
% Positive Turnout Buying	80.9	81.2	84.7	85.1	81.9	75.2	71.3	85.8	82.1	90.3	79.8
Corr(Mob(pos), $\partial\Pr(T_i = 1)/\partial U_{ij}$)	90.9	90.5	92.5	93.6	92.4	90.8	87.9	92.5	97.6	95.3	90.6
Corr(Mob(pos), $\Pr(Y_i = j) - V_j$)	74.9	66.2	60.8	33.7	56.2	37.0	53.3	37.1	31.8	25.3	53.0
Corr($\partial\Pr(T_i = 1)/\partial U_{ij}$, $\Pr(Y_i = j) - V_j$)	60.0	47.8	42.8	15.5	38.4	21.1	28.9	16.2	23.0	14.1	31.5
Corr(Mob(neg), $\partial\Pr(T_i = 1)/\partial U_{ij}$)	-90.8	-91.4	-91.7	-93.4	-95.4	-94.4	-90.2	-88.0	-97.8	-93.9	-94.2
Corr(Mob(neg), $\Pr(Y_i = j) - V_j$)	-79.7	-77.0	-75.1	-55.1	-75.1	-53.8	-65.8	-56.6	-51.1	-35.1	-68.5
Corr($\partial\Pr(T_i = 1)/\partial U_{ij}$, $\Pr(Y_i = j) - V_j$)	71.4	70.0	65.8	41.7	68.0	47.0	54.6	35.1	50.2	24.9	59.8

Country Codes: 1 = Austria, 2=Belgium, 3=Britain, 6=Denmark, 8=Finland, 9=France, 10=Germany, 11=Greece, 13=Ireland, 14=Italy, 17=Luxembourg, 19=Netherlands, 22=Portugal, 25=Spain, 26=Sweden. * p<.10, ** p<.05, *** p<.01

Continued on Next Page...

Table 6.6 – Continued

Country	11	11	13	13	13	13	13	14	14	14	14
Year	2004	2009	1989	1994	1999	2004	2009	1989	1994	1999	2004
β	1.09***	0.73***	1.00***	1.02***	1.34***	0.89***	1.22***	0.99***	1.02***	1.18***	1.57***
	(0.11)	(0.091)	(0.083)	(0.094)	(0.16)	(0.094)	(0.21)	(0.076)	(0.11)	(0.12)	(0.17)
χ^2	95.4 ***	63.8 ***	145.1 ***	117.0 ***	67.9 ***	90.8 ***	35.0 ***	172.6 ***	88.7 ***	97.6 ***	82.9 ***
(df)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Log-likelihood	-87.4	-284.1	-488.0	-364.0	-161.4	-540.9	-273.0	-303.0	-262.9	-1135.1	-555.3
Nr of Alternatives	5	6	7	7	7	7	6	10	7	9	14
Nr of Cases	370	665	803	626	343	823	630	647	595	1935	1069
ρ	0.011	0.012	0.014	0.015	0.017	0.017	0.015	0.011	0.012	0.012	0.012
U_{ij} (min)	1.28	0.16	1.45	1.62	1.90	1.18	0.61	1.10	1.44	1.70	1.79
U_{ij} (mean)	4.09	2.12	4.33	4.38	5.91	3.85	4.63	3.06	3.90	3.95	5.05
U_{ij} (max)	9.68	6.31	9.10	8.83	11.7	7.85	10.3	8.91	8.62	9.11	13.4
VP (min)	0.0033	0.0088	0.0032	0.0070	0.0021	0.0039	0.0030	0.0023	0.0085	0.0074	0.0035
VP (mean)	0.032	0.046	0.049	0.051	0.041	0.056	0.047	0.026	0.050	0.041	0.025
VP (sd)	0.035	0.047	0.058	0.054	0.052	0.068	0.055	0.040	0.057	0.051	0.042
VP (max)	0.074	0.11	0.13	0.13	0.12	0.16	0.12	0.11	0.14	0.14	0.12
Conversion Value (min)	0.0031	0.0092	0.0047	0.0070	0.0026	0.0036	0.0029	0.0023	0.0085	0.0073	0.0035
Conversion Value (mean)	0.029	0.046	0.050	0.051	0.041	0.055	0.047	0.026	0.050	0.040	0.025
Conversion Value (max)	0.064	0.11	0.13	0.13	0.12	0.15	0.12	0.10	0.13	0.13	0.12
Mobilization Value (min)	0.000018	-0.0015	-0.0040	0.0000029	-0.0018	0.000057	0.0000019	-0.0000019	0.000015	0.0000066	0.0000016
Mobilization Value (mean)	0.0031	-0.00036	-0.00087	0.00031	-0.00039	0.0014	0.00053	0.00029	0.00037	0.0010	0.00024
Mobilization Value (max)	0.0098	0.0000031	-0.0000061	0.0014	0.0000047	0.0069	0.0022	0.0021	0.0018	0.0068	0.0025
$\partial\Pr(Y_i = j)/\partial U_{ij}$ (min)	0.0047	0.0094	0.0051	0.0085	0.0025	0.0054	0.0043	0.0029	0.0070	0.011	0.0037
$\partial\Pr(Y_i = j)/\partial U_{ij}$ (mean)	0.034	0.048	0.052	0.053	0.042	0.057	0.049	0.028	0.049	0.043	0.026
$\partial\Pr(Y_i = j)/\partial U_{ij}$ (max)	0.074	0.12	0.14	0.13	0.12	0.16	0.12	0.11	0.13	0.13	0.12
$\partial\Pr(T_i = 1)/\partial U_{ij}$ (min)	-0.012	-0.0022	-0.0055	-0.0012	-0.0027	-0.0042	-0.0017	-0.0013	-0.0014	-0.0044	-0.0012
$\partial\Pr(T_i = 1)/\partial U_{ij}$ (mean)	0.000043	-0.00000011	-0.000031	0.000012	-0.0000092	0.000086	0.0000061	0.0000072	0.000040	0.000050	0.000020
$\partial\Pr(T_i = 1)/\partial U_{ij}$ (max)	0.017	0.0012	0.0031	0.0021	0.0015	0.011	0.0031	0.0030	0.0032	0.011	0.0035
Cov(VP,Conv)	94.0	100.3	100.2	99.8	100.2	98.4	99.8	99.4	99.5	97.3	99.4
Cov(VP,Mob)	1.61	0.014	0.10	0.016	0.028	0.18	0.019	0.055	0.031	0.18	0.016
Cov(VP,Cov(VP,Mob))	4.41	-0.30	-0.32	0.16	-0.26	1.37	0.17	0.52	0.45	2.51	0.61
Corr(Conv, $\partial\Pr(Y_i = j)/\partial U_{ij}$)	97.0	98.6	91.5	97.9	98.7	99.1	98.6	93.6	99.6	98.9	99.9
Corr(Conv, $\Pr(T_i = 1)$)	-15.1	4.73	19.6	4.97	9.81	-1.15	2.98	9.59	-3.35	-9.57	-7.93
Corr($\partial\Pr(Y_i = j)/\partial U_{ij}$, $\Pr(T_i = 1)$)	-31.6	-6.10	-3.15	-7.78	1.97	-10.3	-7.13	-8.35	-9.20	-21.2	-10.7
% Positive Turnout Buying	77.5	12.5	13.1	85.4	13.4	93.1	88.3	94.3	92.6	91.5	94.8
Corr(Mob(pos), $\partial\Pr(T_i = 1)/\partial U_{ij}$)	91.6	-92.8	-93.5	93.4	-93.5	93.1	94.0	95.8	91.4	91.3	93.6
Corr(Mob(pos), $\Pr(Y_i = j) - V_j$)	28.9	73.4	65.5	59.8	63.3	53.0	51.9	33.2	41.2	70.8	66.5
Corr($\partial\Pr(T_i = 1)/\partial U_{ij}$, $\Pr(Y_i = j) - V_j$)	6.63	-64.6	-58.5	49.6	-57.6	37.4	40.8	23.5	24.0	52.0	51.8
Corr(Mob(neg), $\partial\Pr(T_i = 1)/\partial U_{ij}$)	-93.9	94.7	93.8	-92.2	94.5	-90.1	-91.7	-92.5	-85.6	-89.9	-87.5
Corr(Mob(neg), $\Pr(Y_i = j) - V_j$)	-55.9	-67.4	-60.1	-67.2	-55.8	-56.5	-58.4	-47.2	-47.5	-77.4	-71.3
Corr($\partial\Pr(T_i = 1)/\partial U_{ij}$, $\Pr(Y_i = j) - V_j$)	46.7	-58.5	-51.5	60.9	-46.5	37.4	50.9	39.3	28.8	60.6	60.9

Country Codes: 1 = Austria, 2=Belgium, 3=Britain, 6=Denmark, 8=Finland, 9=France, 10=Germany, 11=Greece, 13=Ireland, 14=Italy, 17=Luxembourg, 19=Netherlands, 22=Portugal, 25=Spain, 26=Sweden. * p<.10, ** p<.05, *** p<.01

Continued on Next Page…

Table 6.6 – Continued

Country	14	17	17	17	17	19	19	19	19	19	22
Year	2009	1989	1994	1999	2009	1989	1994	1999	2004	2009	1989
β	0.94***	0.71***	1.28***	0.82***	0.93***	1.54***	1.45***	1.67***	1.64***	2.20***	1.68***
	(0.14)	(0.091)	(0.16)	(0.097)	(0.11)	(0.17)	(0.17)	(0.15)	(0.079)	(0.25)	(0.25)
χ^2	44.8 ***	61.1 ***	67.0 ***	72.5 ***	67.7 ***	86.8 ***	68.9 ***	125.7 ***	436.1 ***	74.8 ***	43.5 ***
(df)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Log-likelihood	-215.5	-139.3	-126.3	-121.6	-304.1	-222.6	-359.9	-329.5	-447.0	-288.6	-97.2
Nr of Alternatives	7	7	6	7	8	9	9	10	9	11	9
Nr of Cases	457	184	349	180	543	832	864	822	1254	773	477
ρ	0.013	0.011	0.011	0.011	0.013	0.012	0.013	0.014	0.013	0.012	0.014
U_{ij} (min)	0.29	1.09	1.74	1.09	0.20	1.80	1.62	1.89	2.01	0.75	2.09
U_{ij} (mean)	2.84	2.96	5.55	3.14	3.10	4.96	5.29	6.19	6.21	8.03	5.18
U_{ij} (max)	7.97	6.31	11.3	7.09	8.23	14.3	13.0	15.1	14.8	19.5	14.8
VP (min)	0.0062	0.0089	0.0074	0.0063	0.0028	0.0015	0.0017	0.00082	0.0014	0.00032	0.0022
VP (mean)	0.048	0.059	0.044	0.051	0.045	0.019	0.028	0.024	0.027	0.023	0.016
VP (sd)	0.058	0.061	0.043	0.061	0.061	0.030	0.043	0.042	0.042	0.042	0.024
VP (max)	0.14	0.15	0.100	0.15	0.15	0.074	0.11	0.11	0.10	0.11	0.060
Conversion Value (min)	0.0061	0.010	0.0074	0.0061	0.0027	0.0014	0.0017	0.00082	0.0013	0.00032	0.0022
Conversion Value (mean)	0.045	0.060	0.043	0.047	0.043	0.018	0.027	0.024	0.026	0.022	0.015
Conversion Value (max)	0.12	0.16	0.097	0.13	0.14	0.068	0.10	0.10	0.095	0.11	0.054
Mobilization Value (min)	-0.000044	-0.0041	0.0000078	0.000033	-0.0000062	-0.0000080	0.000013	-0.000012	-0.0000090	-0.0000041	-0.000000048
Mobilization Value (mean)	0.0032	-0.0012	0.00066	0.0039	0.0012	0.0010	0.00098	0.00087	0.00092	0.00056	0.00092
Mobilization Value (max)	0.015	-0.00011	0.0028	0.019	0.0068	0.0066	0.0063	0.0066	0.0062	0.0050	0.0056
$\partial\Pr(Y_i = j)/\partial U_{ij}$ (min)	0.0093	0.010	0.0072	0.0069	0.0032	0.0019	0.0020	0.00089	0.0017	0.00036	0.0043
$\partial\Pr(Y_i = j)/\partial U_{ij}$ (mean)	0.049	0.061	0.043	0.051	0.045	0.019	0.029	0.024	0.027	0.022	0.018
$\partial\Pr(Y_i = j)/\partial U_{ij}$ (max)	0.13	0.16	0.098	0.14	0.14	0.070	0.11	0.10	0.098	0.11	0.060
$\partial\Pr(T_i = 1)/\partial U_{ij}$ (min)	-0.015	-0.0082	-0.0028	-0.014	-0.0060	-0.0048	-0.0033	-0.0035	-0.0033	-0.0016	-0.0044
$\partial\Pr(T_i = 1)/\partial U_{ij}$ (mean)	0.000031	-0.00014	0.000058	0.00016	0.000055	0.000027	0.000038	0.0000045	0.000042	0.0000042	0.000026
$\partial\Pr(T_i = 1)/\partial U_{ij}$ (max)	0.025	0.0048	0.0053	0.033	0.012	0.0096	0.0090	0.0092	0.0092	0.0062	0.0072
Cov(VP,Conv)	94.7	99.7	99.1	92.5	97.8	96.9	97.8	97.5	97.0	98.6	98.5
Cov(VP,Mob)	1.01	0.36	0.10	2.11	0.20	0.46	0.21	0.17	0.22	0.082	0.33
Cov(VP,Cov(VP,Mob))	4.29	-0.096	0.78	5.43	1.96	2.60	1.98	2.30	2.77	1.32	1.13
Corr(Conv, $\partial\Pr(Y_i = j)/\partial U_{ij}$)	97.5	94.2	99.7	96.5	99.1	98.3	98.5	99.6	99.7	99.5	91.1
Corr(Conv, $\Pr(T_i = 1)$)	-8.55	15.2	-15.0	3.88	-5.57	-3.87	-6.21	-7.98	-18.4	-5.72	3.48
Corr($\partial\Pr(Y_i = j)/\partial U_{ij}$, $\Pr(T_i = 1)$)	-24.8	-5.21	-19.5	-13.6	-13.4	-12.0	-15.7	-12.3	-23.6	-9.74	-14.3
% Positive Turnout Buying	85.6	14.8	90.5	91.0	86.6	89.7	92.6	92.1	93.2	95.3	84.7
Corr(Mob(pos), $\partial\Pr(T_i = 1)/\partial U_{ij}$)	90.8	-94.4	92.8	93.6	89.8	94.8	93.5	94.6	92.6	95.6	93.9
Corr(Mob(pos), $\Pr(Y_i = j) - V_j$)	47.5	39.4	19.7	40.7	61.9	34.5	52.8	53.7	38.7	49.7	50.9
Corr($\partial\Pr(T_i = 1)/\partial U_{ij}$, $\Pr(Y_i = j) - V_j$)	26.4	-34.0	2.74	22.0	43.8	18.2	33.5	34.5	14.1	33.0	35.9
Corr(Mob(neg), $\partial\Pr(T_i = 1)/\partial U_{ij}$)	-91.8	92.9	-88.9	-91.6	-87.3	-92.8	-93.4	-90.5	-86.3	-86.1	-95.8
Corr(Mob(neg), $\Pr(Y_i = j) - V_j$)	-64.5	-23.7	-32.6	-57.8	-72.5	-61.5	-68.0	-73.4	-57.2	-60.5	-70.8
Corr($\partial\Pr(T_i = 1)/\partial U_{ij}$, $\Pr(Y_i = j) - V_j$)	51.9	-13.3	20.0	44.2	62.4	53.8	57.5	62.0	35.4	40.7	67.3

Country Codes: 1 = Austria, 2=Belgium, 3=Britain, 6=Denmark, 8=Finland, 9=France, 10=Germany, 11=Greece, 13=Ireland, 14=Italy, 17=Luxembourg, 19=Netherlands, 22=Portugal, 25=Spain, 26=Sweden. * $p<.10$, ** $p<.05$, *** $p<.01$

Continued on Next Page...

Table 6.6 – Continued

Country	22	22	22	22	25	25	25	25	25	26	26
Year	1994	1999	2004	2009	1989	1994	1999	2004	2009	1999	2009
β	0.95***	1.07***	1.41***	0.75***	0.86***	0.97***	0.91***	0.90***	1.14***	2.31***	1.71***
	(0.088)	(0.24)	(0.19)	(0.079)	(0.081)	(0.097)	(0.081)	(0.084)	(0.12)	(0.35)	(0.30)
χ^2	116.1 ***	19.7 ***	56.4 ***	91.3 ***	112.6 ***	100.0 ***	126.3 ***	114.7 ***	83.0 ***	43.1 ***	31.6 ***
(df)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Log-likelihood	-185.7	-40.7	-83.8	-258.1	-184.2	-158.6	-180.5	-171.6	-203.3	-59.4	-213.9
Nr of Alternatives	5	4	4	5	8	6	6	3	9	7	8
Nr of Cases	614	260	480	572	488	622	587	781	649	342	733
ρ	0.015	0.015	0.016	0.016	0.014	0.013	0.013	0.013	0.014	0.012	0.012
U_{ij} (min)	1.56	1.98	2.04	0.56	0.99	1.13	1.01	1.39	0.26	2.99	0.29
U_{ij} (mean)	4.06	4.54	6.02	2.79	2.34	3.11	2.86	3.96	2.58	9.27	5.78
U_{ij} (max)	8.15	9.02	11.7	6.53	6.65	7.95	7.56	6.96	9.55	20.6	15.2
VP (min)	0.012	0.017	0.0088	0.010	0.012	0.011	0.0071	0.026	0.0036	0.00046	0.0013
VP (mean)	0.051	0.046	0.046	0.060	0.036	0.039	0.038	0.068	0.029	0.021	0.026
VP (sd)	0.043	0.031	0.040	0.058	0.037	0.038	0.043	0.038	0.040	0.033	0.038
VP (max)	0.10	0.078	0.083	0.13	0.10	0.092	0.10	0.096	0.100	0.073	0.088
Conversion Value (min)	0.011	0.017	0.0085	0.0096	0.012	0.010	0.0069	0.021	0.0035	0.00038	0.0013
Conversion Value (mean)	0.048	0.039	0.041	0.056	0.033	0.036	0.032	0.059	0.027	0.019	0.025
Conversion Value (max)	0.092	0.063	0.072	0.12	0.090	0.080	0.081	0.080	0.087	0.062	0.085
Mobilization Value (min)	0.00011	0.00025	0.000095	0.00012	-0.000037	0.00010	0.000035	0.00088	0.00000090	0.000033	-0.0000048
Mobilization Value (mean)	0.0032	0.0065	0.0047	0.0044	0.0027	0.0034	0.0054	0.0094	0.0025	0.0021	0.00046
Mobilization Value (max)	0.0094	0.016	0.011	0.015	0.014	0.013	0.020	0.017	0.013	0.011	0.0027
$\partial \Pr(Y_i = j)/\partial U_{ij}$ (min)	0.014	0.025	0.011	0.010	0.016	0.013	0.0099	0.030	0.0051	0.0010	0.0014
$\partial \Pr(Y_i = j)/\partial U_{ij}$ (mean)	0.051	0.050	0.046	0.058	0.040	0.041	0.038	0.071	0.029	0.021	0.026
$\partial \Pr(Y_i = j)/\partial U_{ij}$ (max)	0.096	0.075	0.079	0.12	0.10	0.088	0.092	0.093	0.090	0.063	0.087
$\partial \Pr(T_i = 1)/\partial U_{ij}$ (min)	-0.0097	-0.019	-0.013	-0.012	-0.012	-0.011	-0.021	-0.031	-0.014	-0.0059	-0.0019
$\partial \Pr(T_i = 1)/\partial U_{ij}$ (mean)	0.00012	0.000073	0.000078	0.000015	0.00020	0.00015	0.000080	0.000078	0.000051	0.000023	0.00000053
$\partial \Pr(T_i = 1)/\partial U_{ij}$ (max)	0.015	0.024	0.017	0.022	0.020	0.020	0.030	0.038	0.019	0.014	0.0040
Cov(VP,Conv)	99.1	92.4	98.0	96.6	94.2	95.9	91.3	89.0	95.3	95.7	99.2
Cov(VP,Mob)	0.55	2.68	1.08	0.74	2.01	1.06	3.01	2.97	0.90	0.96	0.055
Cov(VP,Cov(VP,Mob))	0.34	4.94	0.89	2.64	3.83	3.01	5.66	8.02	3.83	3.31	0.78
Corr(Conv, $\partial \Pr(Y_i = j)/\partial U_{ij}$)	95.4	86.5	93.7	97.9	88.5	97.7	89.6	94.4	96.9	98.3	99.7
Corr(Conv, $\Pr(T_i = 1)$)	6.63	-12.5	2.04	-14.1	10.2	-26.1	0.56	-38.2	-5.40	-13.8	-10.6
Corr($\partial \Pr(Y_i = j)/\partial U_{ij}$, $\Pr(T_i = 1)$)	-11.2	-45.0	-18.0	-27.7	-18.4	-40.3	-26.4	-61.6	-19.1	-22.0	-15.2
% Positive Turnout Buying	78.8	68.6	65.1	84.5	75.0	82.3	74.0	62.8	74.2	91.4	92.5
Corr(Mob(pos), $\partial \Pr(T_i = 1)/\partial U_{ij}$)	91.2	87.7	89.9	90.9	87.9	90.5	89.7	81.3	90.4	95.0	92.4
Corr(Mob(pos), $\Pr(Y_i = j) - V_j$)	55.2	51.7	54.4	69.2	53.7	54.1	49.4	26.6	60.6	36.9	31.7
Corr($\partial \Pr(T_i = 1)/\partial U_{ij}$, $\Pr(Y_i = j) - V_j$)	38.4	19.5	27.1	47.7	35.5	27.7	27.5	-14.7	41.6	14.7	14.2
Corr(Mob(neg), $\partial \Pr(T_i = 1)/\partial U_{ij}$)	-94.2	-92.8	-94.6	-91.1	-92.1	-91.9	-94.7	-87.4	-96.7	-92.3	-92.7
Corr(Mob(neg), $\Pr(Y_i = j) - V_j$)	-68.8	-72.0	-73.0	-77.8	-64.3	-70.8	-70.3	-44.0	-75.2	-61.9	-50.9
Corr($\partial \Pr(T_i = 1)/\partial U_{ij}$, $\Pr(Y_i = j) - V_j$)	60.1	60.4	66.8	57.7	57.3	61.7	62.9	19.8	70.4	44.4	37.8

Country Codes: 1 = Austria, 2=Belgium, 3=Britain, 6=Denmark, 8=Finland, 9=France, 10=Germany, 11=Greece, 13=Ireland, 14=Italy, 17=Luxembourg, 19=Netherlands, 22=Portugal, 25=Spain, 26=Sweden. * p<.10, ** p<.05, *** p<.01

Table 6.7 – Logistic Regressions Predicting Turnout

Country	1	1	1	2	2	2	2	3	3	3	3
Year	1999	2004	2009	1989	1994	1999	2009	1989	1994	1999	2004
$\sigma(U_i)$	.62***	.5***	.26	.3*	.29**	.77***	.36***	.19***	.31***	.26***	.31***
	(0.18)	(0.11)	(0.19)	(0.16)	(0.11)	(0.24)	(0.12)	(0.07)	(0.06)	(0.06)	(0.06)
Age	.22***	.1	.048	.52***	.32***	-.45**	-.0066	.29***	.21***	.16***	.19***
	(0.08)	(0.08)	(0.09)	(0.11)	(0.05)	(0.19)	(0.08)	(0.03)	(0.03)	(0.04)	(0.02)
Age^2	-.0017**	-.00061	-.00012	-.0051***	-.003***	.0056**	.0004	-.0027***	-.0017***	-.0015***	-.0014***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Years of Education	.021	.09	.38**	.042	-.039	.044	.046	.066	.3***	-.02	.1
	(0.12)	(0.10)	(0.17)	(0.15)	(0.12)	(0.19)	(0.12)	(0.07)	(0.10)	(0.08)	(0.07)
Higher Educated	1.1	.14	-2.3**	1.4**	.65	.086	.34	.37	-1.4**	.14	-.44
	(0.79)	(0.64)	(0.90)	(0.71)	(0.63)	(1.10)	(0.63)	(0.46)	(0.55)	(0.40)	(0.39)
Female	.74*	-.24	-.51	-.27	.061	.49	.095	-.0024	.17	.0085	.055
	(0.43)	(0.35)	(0.46)	(0.42)	(0.31)	(0.71)	(0.38)	(0.22)	(0.20)	(0.20)	(0.17)
Student	-2**	-.52	3.4**	-1.8*			-.35	-1.5***		-.34	.32
	(0.98)	(0.86)	(1.39)	(0.95)			(0.63)	(0.50)		(0.43)	(0.20)
Retired	-.85	-.28	.061	.99	-.22	-2.1	-1.2*	.71	.54	1.5**	-.52*
	(1.35)	(0.76)	(0.92)	(1.15)	(0.51)	(1.33)	(0.69)	(0.53)	(0.47)	(0.62)	(0.28)
Family Income	-.000014	.00041	.46		1.9e-06		-.23		.00012		4.4e-06
	(0.00)	(0.00)	(0.31)		(0.00)		(0.20)		(0.00)		(0.00)
Trade Union Member	.32	.14	1.4***	-.093	.56*	-.23	.41	-.059	.071	.69***	.4*
	(0.47)	(0.37)	(0.52)	(0.45)	(0.33)	(0.57)	(0.43)	(0.22)	(0.22)	(0.24)	(0.23)
Church Attender	.01	.34	.4			-2.4**	2.1***			-.28	.16
	(0.56)	(0.60)	(0.66)			(0.93)	(0.71)			(0.30)	(0.25)
Catholic	.62	1.6*	.1		2.6***	1.6**	1.1	.61	.85*	-.094	
	(0.58)	(0.96)	(1.31)		(0.75)	(0.74)	(0.76)	(0.58)	(0.47)	(0.38)	
Protestant	1.5	1.9	-.86		1.3		-2.4***	.74	.74**	.48	.33
	(1.21)	(1.31)	(1.47)		(1.03)		(0.82)	(0.50)	(0.34)	(0.39)	(0.34)
Orthodox		-1.9						1.5**			-.039
		(1.70)						(0.73)			(1.49)
Other religion						-1.2					-.18
						(1.01)					(0.33)
Not religious		.81	-.077	.061	2.7***		.28	.32	.22	-.45	-.34
		(1.02)	(1.35)	(0.47)	(0.77)		(0.67)	(0.51)	(0.33)	(0.32)	(0.30)
Constant	-5.5***	-4.5**	-3.3	-8.5***	-8.7***	7.7*	.65	-6.2***	-6.5***	-2.7***	-5***
	(2.01)	(1.85)	(2.92)	(2.44)	(1.55)	(3.96)	(2.00)	(0.94)	(0.84)	(1.00)	(0.67)
χ^2	55.3 ***	45 ***	36.7 ***	76.7 ***	66.1 ***	58.5 ***	49.1 ***	168 ***	144 ***	98 ***	196 ***
(df)	(13)	(15)	(14)	(10)	(12)	(11)	(14)	(13)	(12)	(13)	(15)
Log-likelihood	-87	-144	-125	-83.5	-166	-35.4	-166	-291	-327	-355	-533
Pseudo R^2	.361	.197	.156	.534	.198	.37	.167	.279	.234	.163	.209
Number of cases	355	751	776	577	714	341	603	853	940	906	1346

Country Codes: 1 = Austria, 2=Belgium, 3=Britain, 6=Denmark, 8=Finland, 9=France, 10=Germany, 11=Greece, 13=Ireland, 14=Italy, 17=Luxembourg, 19=Netherlands, 22=Portugal, 25=Spain, 26=Sweden. * p<.10, ** p<.05, *** p<.01

Continued on Next Page…

Table 6.7 – Continued

Country	3	6	6	6	6	6	8	8	8	9	9
Year	2009	1989	1994	1999	2004	2009	1999	2004	2009	1989	1994
$\sigma(U_i)$	.0059	.055	.13***	.0071	.22***	.28***	.38***	.082**	.31***	.18***	.22***
	(0.06)	(0.12)	(0.05)	(0.14)	(0.07)	(0.09)	(0.12)	(0.03)	(0.05)	(0.06)	(0.05)
Age	.12**	.23***	.26***	.21**	.27***	.0053	-.0018	.088	-.15**	.21***	.069*
	(0.05)	(0.07)	(0.05)	(0.10)	(0.06)	(0.11)	(0.07)	(0.06)	(0.07)	(0.04)	(0.04)
Age^2	-.00036	-.0022***	-.0022***	-.0016	-.0023***	.00044	.0004	-.00061	.0028***	-.0019***	-.00035
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Years of Education	.23**	-.03	.12	-.31	-.17	-.34	.28**	.068	-.33**	-.00087	.029
	(0.12)	(0.10)	(0.11)	(0.32)	(0.15)	(0.22)	(0.14)	(0.10)	(0.13)	(0.06)	(0.07)
Higher Educated	-.12	.68	-.014	.91	1**	2.3***	-1.2	1**	2.7***	1.1***	-.17
	(0.63)	(0.68)	(0.62)	(0.73)	(0.48)	(0.59)	(0.74)	(0.47)	(0.56)	(0.39)	(0.40)
Female	.25	.79**	-.26	.07	-.43	-.024	-.39	.27	-.094	-.092	-.43**
	(0.27)	(0.37)	(0.39)	(0.43)	(0.30)	(0.43)	(0.38)	(0.29)	(0.35)	(0.21)	(0.21)
Student	-.89	-.88		-.24	-.1	-.73	-1	-1*	-.44	-.63	
	(0.74)	(0.63)		(0.64)	(0.46)	(0.57)	(0.97)	(0.54)	(0.56)	(0.42)	
Retired	-.86	.016	-.29	.11	-.26	.62	-.88	.63	-2.4***	1.1*	.24
	(0.53)	(0.65)	(0.54)	(1.88)	(0.74)	(1.01)	(0.69)	(0.70)	(0.72)	(0.65)	(0.48)
Family Income	.28***	.061	2.0e-06	-3.8e-10	7.7e-06	.016		-.000052	.48***	.043	.000075***
	(0.11)	(0.06)	(0.00)	(0.00)	(0.00)	(0.18)		(0.00)	(0.14)	(0.03)	(0.00)
Trade Union Member	.47	-.51	-.42	.57	-.095	-.57	.66	.39	.24	.4	.3
	(0.37)	(0.58)	(0.46)	(0.54)	(0.38)	(0.45)	(0.44)	(0.31)	(0.36)	(0.32)	(0.38)
Church Attender	-.053			-.2	-.83	-1.5	1.9*	.19	-.061		
	(0.49)			(0.61)	(0.65)	(1.23)	(1.00)	(0.69)	(1.09)		
Catholic	-.57	1.1	.52							-.39	-.23
	(1.17)	(1.93)	(1.15)							(0.61)	(0.90)
Protestant		2.3	2***	1.9*	2.7***	1.9*	.76	1.9**	.62		
		(1.65)	(0.59)	(1.08)	(0.83)	(1.02)	(1.34)	(0.78)	(0.41)		
Orthodox		.43									
		(2.06)									
Other religion	-.38			2.2*		.55	.34		.076	-1.5	-1.6
	(1.10)			(1.24)		(1.06)	(1.64)		(1.41)	(0.90)	(1.02)
Not religious	-.77	2.2	1.5**	2.3**	2**	1.1	-.31	1.4*		-.63	-.91
	(1.08)	(1.65)	(0.66)	(1.08)	(0.84)	(0.97)	(1.35)	(0.84)		(0.63)	(0.90)
Constant	-4.5**	-4.6**	-7.4***	-2.7	-6.4***	.72	-2	-4.2**	-.18	-4.1***	-1.7
	(1.97)	(2.24)	(1.62)	(3.64)	(1.98)	(3.59)	(2.41)	(1.70)	(1.81)	(1.11)	(1.21)
χ^2	60.4 ***	51 ***	66.8 ***	69.6 ***	116 ***	78.8 ***	37.8 ***	75.2 ***	87.2 ***	131 ***	99 ***
(df)	(14)	(14)	(12)	(14)	(13)	(14)	(13)	(13)	(13)	(13)	(12)
Log-likelihood	-322	-118	-149	-99.6	-177	-132	-133	-179	-169	-301	-325
Pseudo R^2	.182	.164	.237	.26	.247	.35	.136	.174	.378	.221	.158
Number of cases	814	756	842	761	1005	914	347	617	804	736	815

Country Codes: 1 = Austria, 2=Belgium, 3=Britain, 6=Denmark, 8=Finland, 9=France, 10=Germany, 11=Greece, 13=Ireland, 14=Italy, 17=Luxembourg, 19=Netherlands, 22=Portugal, 25=Spain, 26=Sweden. * p<.10, ** p<.05, *** p<.01

Continued on Next Page. . .

Table 6.7 – Continued

Country	9	9	9	10	10	10	10	10	11	11	11
Year	1999	2004	2009	1989	1994	1999	2004	2009	1989	1994	1999
$\sigma(U_i)$	.093	.21***	.26***	.28***	.083	.21	.44**	.29***	.00012	.094	.25**
	(0.08)	(0.04)	(0.06)	(0.10)	(0.06)	(0.17)	(0.19)	(0.10)	(0.04)	(0.08)	(0.11)
Age	.15***	.16***	.13*	.23***	.22***	.24***	.081	.17***	.51***	.55***	.14*
	(0.06)	(0.03)	(0.07)	(0.07)	(0.04)	(0.07)	(0.08)	(0.06)	(0.08)	(0.09)	(0.08)
Age^2	-.0011*	-.0013***	-.00091	-.0018*	-.0018***	-.0019***	-.00054	-.0013*	-.0044***	-.005***	-.001
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Years of Education	-.019	-.0099	-.000062	.11	-.06	.41***	-.18	-.047	.27**	.22*	-.12
	(0.09)	(0.05)	(0.08)	(0.10)	(0.08)	(0.12)	(0.13)	(0.12)	(0.13)	(0.14)	(0.11)
Higher Educated	.95**	1.1***	1.2***	2.9***	1.4*	-.21	1.7***	1.2	2.5**	.17	.41
	(0.40)	(0.25)	(0.42)	(1.02)	(0.74)	(0.80)	(0.65)	(0.77)	(1.01)	(1.19)	(0.60)
Female	-.092	-.12	-.34	-.11	-.28	-.086	-.21	.18	-.36	-1.2***	-.078
	(0.27)	(0.17)	(0.27)	(0.30)	(0.27)	(0.37)	(0.35)	(0.34)	(0.37)	(0.40)	(0.38)
Student	-.89*	.47	.72	-2.9**		-2.3***	.5	-.011	-3.1***		-.56
	(0.52)	(0.55)	(0.64)	(1.13)		(0.85)	(0.79)	(0.78)	(1.18)		(0.68)
Retired	-.28	.56*	.33	-.21	-.29	.00064	1.2	-.2	-2.2	-.79	.22
	(0.56)	(0.31)	(0.65)	(1.41)	(0.60)	(0.79)	(1.20)	(0.70)	(1.73)	(1.04)	(0.97)
Family Income		-.0046	.32**	.018	.0002**	.00017*		.35**	-.18**	6.3e-07	3.6e-07
		(0.00)	(0.15)	(0.04)	(0.00)	(0.00)		(0.16)	(0.08)	(0.00)	(0.00)
Trade Union Member	.28	.29	.44	.6*	.33	-.43	.28	.69	.5	1.8**	1.3
	(0.40)	(0.28)	(0.34)	(0.32)	(0.33)	(0.39)	(0.49)	(0.49)	(0.69)	(0.88)	(0.81)
Church Attender	.029		-.17	1.1**	.29	-.58	-.59	-.16	-.58	.65	-.65
	(0.44)		(0.65)	(0.53)	(0.45)	(0.65)	(0.48)	(0.67)	(0.55)	(0.82)	(0.42)
Catholic	.26	-.63	1.5		.66**	1.8**	2**	5.7***			
	(0.71)	(0.46)	(1.07)		(0.29)	(0.83)	(0.82)	(1.38)			
Protestant		-.89		.35		1.7**	2.1***	5.5***			
		(0.72)		(0.29)		(0.82)	(0.78)	(1.40)			
Orthodox											
Other religion	-.087		.34								
	(0.92)		(1.25)								
Not religious	-.12	-.76	1.3			1.5*	.45	5.1***			-.12
	(0.70)	(0.46)	(1.05)			(0.79)	(0.70)	(1.35)			(0.59)
Constant	-3.2*	-2.7***	-6.4***	-5.5***	-4.8***	-7.2***	-1.5	-11***	-7.4***	-9.7***	-2.3
	(1.76)	(0.90)	(1.93)	(1.49)	(1.00)	(1.88)	(2.08)	(2.39)	(1.78)	(1.89)	(1.67)
χ^2	99.4 ***	158 ***	67.3 ***	126 ***	78.6 ***	43.1 ***	88.6 ***	43.3 ***	116 ***	83.6 ***	53.5 ***
(df)	(13)	(13)	(14)	(12)	(11)	(14)	(13)	(14)	(11)	(10)	(12)
Log-likelihood	-214	-487	-233	-182	-237	-122	-103	-195	-94.5	-83.4	-102
Pseudo R^2	.259	.14	.181	.322	.218	.214	.224	.203	.535	.435	.235
Number of cases	514	1297	655	777	735	780	480	726	613	784	352

Country Codes: 1 = Austria, 2=Belgium, 3=Britain, 6=Denmark, 8=Finland, 9=France, 10=Germany, 11=Greece, 13=Ireland, 14=Italy, 17=Luxembourg, 19=Netherlands, 22=Portugal, 25=Spain, 26=Sweden. * p<.10, ** p<.05, *** p<.01

Continued on Next Page. . .

Table 6.7 – Continued

Country	11	11	13	13	13	13	13	14	14	14	14
Year	2004	2009	1989	1994	1999	2004	2009	1989	1994	1999	2004
$\sigma(U_i)$	.53***	-.042	-.11	.042	-.058	.24**	.059	.11	.21**	.21***	.089
	(0.12)	(0.14)	(0.07)	(0.07)	(0.10)	(0.11)	(0.07)	(0.13)	(0.11)	(0.06)	(0.07)
Age	.22***	.047	.41***	.26***	.14*	.22***	.27***	.51***	.24***	.065	.18***
	(0.07)	(0.10)	(0.05)	(0.05)	(0.08)	(0.06)	(0.07)	(0.09)	(0.07)	(0.06)	(0.06)
Age^2	-.0023***	-.000084	-.0037***	-.0022***	-.00071	-.002***	-.0023***	-.005***	-.0026***	-.00039	-.0017***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Years of Education	.065	.13	-.066	.2**	.18	-.066	.036	.0026	.25	-.0054	.11
	(0.15)	(0.14)	(0.07)	(0.10)	(0.13)	(0.12)	(0.13)	(0.10)	(0.18)	(0.06)	(0.09)
Higher Educated	-.11	-.63	1.2	-1.3**	-.83	.11	.039	3.1**		.59*	.32
	(0.85)	(0.72)	(0.76)	(0.63)	(0.81)	(0.72)	(0.65)	(1.23)		(0.34)	(0.80)
Female	.57	-.58	-.28	-.47*	-1**	.04	.15	-.28	-.3	-.17	-.23
	(0.45)	(0.41)	(0.27)	(0.28)	(0.50)	(0.36)	(0.36)	(0.39)	(0.53)	(0.23)	(0.37)
Student	1	-.52	-1.2**		-2.3**	-.71	.02	-1.8**		-.52	.5
	(0.95)	(0.57)	(0.54)		(1.08)	(0.88)	(0.70)	(0.91)		(0.43)	(1.09)
Retired	1.9*	.19	.65	-.16	-2*	.3	.74	1.2	.21	.00039	-.29
	(1.06)	(1.52)	(1.14)	(0.72)	(1.05)	(0.87)	(1.23)	(2.23)	(0.64)	(0.60)	(0.54)
Family Income		-.077		.00034	.000078	.000015	.025	.077	1.5e-07		
		(0.15)		(0.00)	(0.00)	(0.00)	(0.16)	(0.06)	(0.00)		
Trade Union Member	-.29	1.2	.43	.23	.44	.62*	.049	-.21	-.2	-.19	.31
	(0.77)	(0.89)	(0.29)	(0.32)	(0.48)	(0.35)	(0.36)	(0.42)	(0.66)	(0.29)	(0.38)
Church Attender	.52	.12	.45	.81***	1.2**	1.1***	1.3**	-.26	1.3*		.033
	(0.60)	(0.80)	(0.31)	(0.29)	(0.60)	(0.41)	(0.54)	(0.42)	(0.73)		(0.39)
Catholic				.093	-2.3**	1.1	1.2	-.3		-.31	2
				(0.97)	(1.15)	(0.65)	(0.95)	(0.76)		(1.10)	(1.25)
Protestant			.97		-3.5**		3*				
			(1.23)		(1.48)		(1.64)				
Orthodox	4.7**	3.8**									
	(2.00)	(1.69)									
Other religion		-2				1.5		-4.1***		-2.9**	
		(2.35)				(1.07)		(1.26)		(1.18)	
Not religious	2.7	3*				1.6	-.017			-.61	1.8
	(2.09)	(1.76)				(1.04)	(1.05)			(1.14)	(1.35)
Constant	-9.2***	-2.8	-6.5***	-5.8***	-.058	-4.8***	-6.2***	-8***	-2.7	-.079	-4.7**
	(2.94)	(2.64)	(1.06)	(1.48)	(1.99)	(1.79)	(2.00)	(1.96)	(1.76)	(1.66)	(1.99)
χ^2	52.6 ***	46.4 ***	185 ***	97.3 ***	33.7 ***	51.7 ***	55.5 ***	108 ***	35.8 ***	75.2 ***	24.2 **
(df)	(12)	(14)	(11)	(11)	(13)	(14)	(14)	(13)	(9)	(12)	(12)
Log-likelihood	-78.8	-222	-192	-204	-78.4	-201	-202	-81.7	-60.3	-566	-245
Pseudo R^2	.25	.162	.475	.234	.227	.182	.269	.597	.182	.139	.0774
Number of cases	382	864	756	736	339	911	769	590	578	2089	1152

Country Codes: 1 = Austria, 2=Belgium, 3=Britain, 6=Denmark, 8=Finland, 9=France, 10=Germany, 11=Greece, 13=Ireland, 14=Italy, 17=Luxembourg, 19=Netherlands, 22=Portugal, 25=Spain, 26=Sweden. * p<.10, ** p<.05, *** p<.01

Continued on Next Page…

Table 6.7 – Continued

Country	14	17	17	17	17	19	19	19	19	19	22
Year	2009	1989	1994	1999	2009	1989	1994	1999	2004	2009	1989
$\sigma(U_i)$	.46***	-.59	.48	.62***	.2*	.22***	.16**	.15***	.33***	.099	.11**
	(0.17)	(0.42)	(0.34)	(0.18)	(0.12)	(0.06)	(0.06)	(0.05)	(0.05)	(0.10)	(0.05)
Age	.18**	.25	.25**	.27**	.12	.14**	.19***	.097*	.051	.085	.34***
	(0.07)	(0.31)	(0.11)	(0.12)	(0.07)	(0.06)	(0.04)	(0.05)	(0.06)	(0.08)	(0.05)
Age^2	-.0019**	.002	-.0024**	-.003***	-.00086	-.0012**	-.0017***	-.00074	-.00043	-.00075	-.0031***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Years of Education	.038	.59	.2	-.41	.076	-.012	.37***	.13	-.005	-.075	-.085
	(0.10)	(0.70)	(0.32)	(0.29)	(0.10)	(0.08)	(0.11)	(0.10)	(0.10)	(0.18)	(0.07)
Higher Educated	.74		.47	2.6**	.11	1.5***	-1.4**	.51	.75	1.1	3.4***
	(0.77)		(1.76)	(1.04)	(0.50)	(0.50)	(0.61)	(0.43)	(0.48)	(0.69)	(1.27)
Female	-.057	-.69	1.3	-.36	-1.1***	.061	.13	.075	.085	.28	-.76**
	(0.48)	(1.16)	(1.01)	(0.68)	(0.35)	(0.32)	(0.27)	(0.28)	(0.28)	(0.41)	(0.31)
Student	.078	-4.9		1.5	-.26	-1.5**		-.54	1.2	.24	.17
	(0.77)	(5.80)		(1.38)	(1.07)	(0.58)		(0.54)	(1.05)	(1.06)	(0.77)
Retired	3.2***	-12***	.22	1.3	-.34	.24	.14	.56		3.3***	-.012
	(1.11)	(3.86)	(1.07)	(1.25)	(0.64)	(0.68)	(0.46)	(0.66)		(0.94)	(0.75)
Family Income	.25		-6.0e-06		.45**	.091**	.00013**		.000014	.037	.025
	(0.17)		(0.00)		(0.19)	(0.04)	(0.00)		(0.00)	(0.23)	(0.05)
Trade Union Member	.56	1.8	1.3	-1.2	.24	.51	-.018	.066	.57*	.33	-.11
	(0.61)	(1.44)	(0.94)	(0.73)	(0.32)	(0.39)	(0.27)	(0.28)	(0.30)	(0.40)	(0.44)
Church Attender	-.57	2.9	-.98		.83			.019		-.13	.71*
	(0.54)	(2.00)	(1.17)		(0.58)			(0.52)		(0.75)	(0.37)
Catholic	-.015				1.5	-.06	1.5***	-.24	-.44	-.96	1.6
	(0.61)				(1.33)	(0.93)	(0.52)	(0.63)	(0.50)	(0.75)	(0.96)
Protestant						-.2	1.7***	-.27		.4	
						(0.96)	(0.65)	(0.72)		(0.83)	
Orthodox						.81	1.5**				
						(0.92)	(0.65)				
Other religion	-.23				2				-.77		
	(0.88)				(1.80)				(0.69)		
Not religious				-1.2	.85	-.26	1.4***	-.47	-.82*	-1	
				(0.80)	(1.34)	(0.86)	(0.47)	(0.60)	(0.46)	(0.70)	
Constant	-5.2***	-6.4	-4.3	-2.2	-5.3**	-3.1*	-6.5***	-1.9	-.39	-.6	-8***
	(1.97)	(5.19)	(3.82)	(4.22)	(2.48)	(1.61)	(1.21)	(1.39)	(1.68)	(2.70)	(1.46)
χ^2	43.7 ***	32.5 ***	32.5 ***	35.2 ***	31.3 ***	97.9 ***	65.3 ***	38.8 ***	66 ***	46.8 ***	93.6 ***
(df)	(13)	(9)	(10)	(10)	(14)	(14)	(13)	(13)	(12)	(14)	(12)
Log-likelihood	-156	-12.1	-30.2	-42.5	-217	-183	-244	-264	-226	-235	-136
Pseudo R^2	.247	.668	.211	.262	.137	.243	.156	.102	.127	.143	.346
Number of cases	508	146	346	160	681	824	872	924	1445	892	412

Country Codes: 1 = Austria, 2=Belgium, 3=Britain, 6=Denmark, 8=Finland, 9=France, 10=Germany, 11=Greece, 13=Ireland, 14=Italy, 17=Luxembourg, 19=Netherlands, 22=Portugal, 25=Spain, 26=Sweden. * $p<.10$, ** $p<.05$, *** $p<.01$

Continued on Next Page...

Table 6.7 – Continued

Country	22	22	22	22	25	25	25	25	25	26	26
Year	1994	1999	2004	2009	1989	1994	1999	2004	2009	1999	2009
$\sigma(U_i)$	.23***	.4***	.26***	.25**	.43***	.36***	.46***	.91***	.31***	.24***	.19**
	(0.08)	(0.11)	(0.06)	(0.10)	(0.11)	(0.08)	(0.09)	(0.14)	(0.09)	(0.06)	(0.10)
Age	.32***	.17***	.19***	.11*	.34***	.14***	.2***	.094**	.067	.11	.04
	(0.04)	(0.06)	(0.04)	(0.06)	(0.06)	(0.04)	(0.05)	(0.04)	(0.07)	(0.12)	(0.08)
Age^2	-.0027***	-.0017***	-.0017***	-.00092	-.0033***	-.0012***	-.0017***	-.00072*	-.00033	-.0011	-.000048
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Years of Education	.048	-.16**	-.11**	-.014	.09	.098	-.16**	.018	-.023	-.013	-.01
	(0.07)	(0.08)	(0.05)	(0.09)	(0.09)	(0.07)	(0.07)	(0.05)	(0.09)	(0.17)	(0.23)
Higher Educated	-.16	2.3***	2.3***	1.1*	1.9**	-.65	1.1***	.0076	.23	1.4*	.43
	(0.74)	(0.63)	(0.35)	(0.66)	(0.79)	(0.52)	(0.38)	(0.36)	(0.64)	(0.73)	(1.09)
Female	-.29	.24	-.17	.43	.49	-.72***	-.16	-.12	.4	-.27	.65
	(0.28)	(0.33)	(0.21)	(0.34)	(0.32)	(0.25)	(0.24)	(0.22)	(0.34)	(0.42)	(0.58)
Student		-1.4**	-.38	-1.3*	-2.7***		-.29	.085	-.87	-.74	-.42
		(0.66)	(0.36)	(0.70)	(0.76)		(0.42)	(0.42)	(0.83)	(0.74)	(0.93)
Retired	-.12	.38	.13	-.028	.78	.57	1.9***	.13	-.57		.17
	(0.61)	(0.79)	(0.44)	(0.59)	(0.69)	(0.50)	(0.67)	(0.47)	(0.87)		(0.98)
Family Income	4.0e-07			.087	-.12**	-7.2e-07			.31**		.24
	(0.00)			(0.14)	(0.06)	(0.00)			(0.14)		(0.17)
Trade Union Member	1***	.025	.41	-.48	1.2*	.38	.3	.41	.89	.16	.44
	(0.39)	(0.59)	(0.28)	(0.47)	(0.69)	(0.41)	(0.33)	(0.35)	(0.66)	(0.51)	(0.62)
Church Attender	.39	.31	.45*	.024	.85**		.064	-.63	3.3***		.33
	(0.30)	(0.43)	(0.25)	(0.44)	(0.37)		(0.35)	(0.43)	(0.66)		(0.84)
Catholic		.74*	2.1**	.3		1.1	-1	4.2**	1.2		
		(0.40)	(0.92)	(1.51)		(0.93)	(2.15)	(1.91)	(1.13)		
Protestant					1.9**	.17		4.7**	3*		2.4***
					(0.78)	(1.51)		(2.15)	(1.60)		(0.92)
Orthodox											.91
											(1.25)
Other religion		-1.9*	1.5	.59			-1.9			-.99	
		(0.96)	(1.29)	(1.68)			(2.29)			(1.08)	
Not religious			1.9*	-.26		.39	-1.6	3.1	.9	-.74	1.3**
			(0.95)	(1.59)		(0.96)	(2.17)	(1.94)	(1.13)	(0.55)	(0.61)
Constant	-6.9***	-3.9***	-5.9***	-2.9	-6.8***	-3.4**	-2.7	-6.2***	-4.2**	-2.1	-2.7
	(0.97)	(1.36)	(1.33)	(2.17)	(1.39)	(1.33)	(2.48)	(2.18)	(1.83)	(2.68)	(2.18)
χ^2	126 ***	68.9 ***	142 ***	33.9 ***	103 ***	62.7 ***	150 ***	69.4 ***	75.6 ***	26.8 ***	54.2 ***
(df)	(10)	(12)	(13)	(14)	(12)	(12)	(13)	(13)	(14)	(10)	(14)
Log-likelihood	-245	-132	-298	-285	-136	-242	-244	-305	-276	-97.9	-107
Pseudo R^2	.287	.307	.255	.108	.409	.143	.343	.227	.225	.197	.173
Number of cases	710	340	776	687	450	760	696	925	799	344	858

Country Codes: 1 = Austria, 2=Belgium, 3=Britain, 6=Denmark, 8=Finland, 9=France, 10=Germany, 11=Greece, 13=Ireland, 14=Italy, 17=Luxembourg, 19=Netherlands, 22=Portugal, 25=Spain, 26=Sweden. * $p<.10$, ** $p<.05$, *** $p<.01$

TABLE 6.8 – SUMMARY STATISTICS FOR TURNOUT REGRESSIONS

cntry	1		1		1		2		2		2	
year	1999		2004		2009		1989		1994		1999	
Vote Intention	.7(.022)	501	.76(.016)	1010	.69(.02)	1000	.62(.0088)	3054	.6(.0081)	4136	.7(.022)	500
	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)
Turnout	.86(.019)	445	.93(.0097)	878	.95(.012)	805	.92(.006)	1979	.83(.013)	962	.96(.011)	402
	[0,1]	(11.18)	[0,1]	(13.07)	[0,1]	(19.50)	[0,1]	(35.20)	[0,1]	(76.74)	[0,1]	(19.60)
Probability to ever vote j	3.8(.058)	479	3.9(.046)	980	3.1(.057)	969	3.3(.062)	835	4.1(.062)	834	4.2(.062)	483
	[1,8.7]	(4.39)	[1,10]	(2.97)	[0,10]	(3.10)	[1,10]	(72.66)	[1,10]	(79.84)	[1,10]	(3.40)
Age	45(.91)	501	48(.66)	1000	48(.8)	993	43(.33)	3054	44(.31)	4136	46(1.1)	500
	[18,89]	(0.00)	[18,90]	(0.99)	[18,91]	(0.70)	[15,97]	(0.00)	[15,93]	(0.00)	[18,94]	(0.00)
Age^2	2338(87)	501	2576(64)	1000	2567(74)	993	2143(31)	3054	2271(29)	4136	2485(110)	500
	[324,7.9e+03]	(0.00)	[324,8.1e+03]	(0.99)	[324,8.3e+03]	(0.70)	[225,9.4e+03]	(0.00)	[225,8.6e+03]	(0.00)	[324,8.8e+03]	(0.00)
Years of Education	5.2(.14)	484	4.9(.091)	1002	5.4(.14)	997	5.1(.057)	3054	4.9(.048)	3657	5.6(.17)	495
	[1,10]	(3.39)	[1,10]	(0.79)	[1,10]	(0.30)	[1,10]	(0.00)	[1,9]	(11.58)	[1,10]	(1.00)
Higher Educated	.21(.019)	484	.16(.012)	1002	.23(.017)	997	.2(.0072)	3054	.23(.0075)	3657	.3(.024)	495
	[0,1]	(3.39)	[0,1]	(0.79)	[0,1]	(0.30)	[0,1]	(0.00)	[0,1]	(11.58)	[0,1]	(1.00)
Female	.53(.025)	501	.52(.019)	1010	.52(.022)	1000	.51(.009)	3053	.52(.0083)	4136	.52(.026)	500
	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.03)	[0,1]	(0.00)	[0,1]	(0.00)
Family Income	3.5e+04(1784)	415	2201(64)	847	4.2(.05)	990	6.7(.073)	2184	3.5e+04(793)	3093	7.5e+04(2638)	252
	[8.0e+03,2.1e+05]	(17.17)	[150,3.8e+04]	(16.14)	[1,7]	(1.00)	[1,12]	(28.49)	[138,1.3e+05]	(25.22)	[1.9e+04,2.0e+05]	(49.60)
Trade Union Member	.48(.025)	495	.41(.019)	995	.33(.021)	985	.41(.0097)	2566	.46(.0096)	3063	.41(.025)	490
	[0,1]	(1.20)	[0,1]	(1.49)	[0,1]	(1.50)	[0,1]	(15.98)	[0,1]	(25.94)	[0,1]	(2.00)
Church Attender	.24(.023)	491	.17(.014)	983	.16(.015)	987	.3(.01)	2108	.26(.0089)	2812	.12(.019)	473
	[0,1]	(2.00)	[0,1]	(2.67)	[0,1]	(1.30)	[0,1]	(30.98)	[0,1]	(32.01)	[0,1]	(5.40)
Catholic	.75(.02)	496	.8(.015)	988	.72(.021)	985	.69(.0084)	3054	.68(.0078)	4049	.69(.024)	480
	[0,1]	(1.00)	[0,1]	(2.18)	[0,1]	(1.50)	[0,1]	(0.00)	[0,1]	(2.10)	[0,1]	(4.00)
Protestant	.062(.011)	496	.05(.0076)	988	.046(.0097)	985	.01(.0018)	3054	.01(.0017)	4049	.0098(.0076)	480
	[0,1]	(1.00)	[0,1]	(2.18)	[0,1]	(1.50)	[0,1]	(0.00)	[0,1]	(2.10)	[0,1]	(4.00)
Not religious	.19(.018)	496	.13(.013)	988	.2(.019)	985	.29(.0082)	3054	.29(.0076)	4049	.27(.023)	480
	[0,1]	(1.00)	[0,1]	(2.18)	[0,1]	(1.50)	[0,1]	(0.00)	[0,1]	(2.10)	[0,1]	(4.00)
Orthodox	0(0)	496	.0031(.0014)	988	.0059(.0042)	985	.0075(.0016)	3054	.0025(8.1e-04)	4049	.0073(.0037)	480
	[0,0]	(1.00)	[0,1]	(2.18)	[0,1]	(1.50)	[0,1]	(0.00)	[0,1]	(2.10)	[0,1]	(4.00)
Other religion	.0019(.0019)	496	.02(.0051)	988	.031(.0089)	985	.0098(.0018)	3054	.018(.0022)	4049	.016(.0063)	480
	[0,1]	(1.00)	[0,1]	(2.18)	[0,1]	(1.50)	[0,1]	(0.00)	[0,1]	(2.10)	[0,1]	(4.00)
Student	.069(.012)	500	.043(.006)	1010	.1(.017)	997	.11(.0057)	3008	.12(.0056)	4136	.099(.019)	496
	[0,1]	(0.20)	[0,1]	(0.00)	[0,1]	(0.30)	[0,1]	(1.51)	[0,1]	(0.00)	[0,1]	(0.80)
Retired	.25(.022)	500	.28(.016)	1010	.29(.019)	997	.18(.007)	3008	.22(.0069)	4136	.24(.024)	496
	[0,1]	(0.20)	[0,1]	(0.00)	[0,1]	(0.30)	[0,1]	(1.51)	[0,1]	(0.00)	[0,1]	(0.80)
N	356		751		780		317		484		189	

1st row: Mean (Standard Error) Observations, 2nd row: [min, max] (% Missing)

Country Codes: 1 = Austria, 2=Belgium, 3=Britain, 4=Denmark, 8=Finland, 9=France, 10=Germany, 11=Greece, 13=Ireland, 14=Italy, 17=Luxembourg, 19=Netherlands, 22=Portugal, 25=Spain, 26=Sweden

Continued on Next Page. . .

Table 6.8 – Continued

cntry	2		3		3		3		3		3	
year	2009		1989		1994		1999		2004		2009	
Vote Intention	.42(.023)	1002	.88(.0059)	2950	.78(.0066)	4251	.72(.015)	1008	.72(.012)	1500	.68(.018)	1000
	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)
Turnout	.88(.019)	738	.81(.0074)	2825	.78(.013)	1064	.82(.013)	976	.79(.011)	1413	.81(.018)	850
	[0,1]	(26.35)	[0,1]	(4.24)	[0,1]	(74.97)	[0,1]	(3.17)	[0,1]	(5.80)	[0,1]	(15.00)
Probability to ever vote j	3.7(.089)	918	3.8(.039)	943	3.8(.043)	1052	3.6(.046)	989	4.4(.037)	1476	2.9(.059)	980
	[0,10]	(8.38)	[1,8.2]	(68.03)	[1,10]	(75.25)	[1,10]	(1.88)	[1,10]	(1.60)	[0,8.4]	(2.00)
Age	49(.88)	967	43(.33)	2914	44(.31)	4251	47(.67)	986	48(.49)	1474	48(.72)	978
	[18,90]	(3.49)	[15,97]	(1.22)	[15,93]	(0.00)	[18,91]	(2.18)	[15,96]	(1.73)	[18,93]	(2.20)
Age^2	2716(94)	967	2180(32)	2914	2308(29)	4251	2512(69)	986	2579(49)	1474	2657(71)	978
	[324,8.1e+03]	(3.49)	[225,9.4e+03]	(1.22)	[225,8.6e+03]	(0.00)	[324,8.3e+03]	(2.18)	[225,9.2e+03]	(1.73)	[324,8.6e+03]	(2.20)
Years of Education	6.3(.15)	969	3.8(.049)	2950	3.5(.038)	3874	4.6(.097)	982	4.5(.073)	1491	4.4(.098)	992
	[1,10]	(3.29)	[1,10]	(0.00)	[1,9]	(8.87)	[1,10]	(2.58)	[1,9]	(0.60)	[1,10]	(0.80)
Higher Educated	.41(.022)	969	.12(.006)	2950	.12(.0054)	3874	.23(.014)	982	.24(.012)	1491	.2(.014)	992
	[0,1]	(3.29)	[0,1]	(0.00)	[0,1]	(8.87)	[0,1]	(2.58)	[0,1]	(0.60)	[0,1]	(0.80)
Female	.52(.023)	1002	.52(.0092)	2950	.52(.0079)	4251	.51(.017)	1008	.51(.013)	1500	.51(.02)	999
	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.10)
Family Income	4.2(.054)	951	7.7(.075)	2242	845(14)	3206	2358(136)	704	2646(373)	1500	4.3(.052)	975
	[1,7]	(5.09)	[1,12]	(24.00)	[120,2.3e+03]	(24.58)	[100,2.6e+04]	(30.16)	[0,4.0e+05]	(0.00)	[1,7]	(2.50)
Trade Union Member	.48(.024)	974	.35(.009)	2843	.29(.0082)	3204	.24(.014)	991	.22(.011)	1490	.2(.015)	987
	[0,1]	(2.79)	[0,1]	(3.63)	[0,1]	(24.63)	[0,1]	(1.69)	[0,1]	(0.67)	[0,1]	(1.30)
Church Attender	.16(.018)	951	.23(.0098)	1838	.22(.009)	2291	.22(.014)	977	.18(.01)	1479	.13(.013)	982
	[0,1]	(5.09)	[0,1]	(37.69)	[0,1]	(46.11)	[0,1]	(3.08)	[0,1]	(1.40)	[0,1]	(1.80)
Catholic	.4(.024)	921	.089(.0052)	2950	.11(.005)	4197	.14(.012)	977	.11(.0081)	1493	.099(.011)	979
	[0,1]	(8.08)	[0,1]	(0.00)	[0,1]	(1.27)	[0,1]	(3.08)	[0,1]	(0.47)	[0,1]	(2.10)
Protestant	.035(.0077)	921	.47(.0092)	2950	.43(.0079)	4197	.25(.015)	977	.26(.011)	1493	.029(.0059)	979
	[0,1]	(8.08)	[0,1]	(0.00)	[0,1]	(1.27)	[0,1]	(3.08)	[0,1]	(0.47)	[0,1]	(2.10)
Not religious	.46(.024)	921	.34(.0087)	2950	.38(.0077)	4197	.46(.017)	977	.46(.013)	1493	.57(.019)	979
	[0,1]	(8.08)	[0,1]	(0.00)	[0,1]	(1.27)	[0,1]	(3.08)	[0,1]	(0.47)	[0,1]	(2.10)
Orthodox	.0043(.0029)	921	.062(.0044)	2950	.0042(.001)	4197	.0041(.0019)	977	.0058(.002)	1493	8.0e-04(5.7e-04)	979
	[0,1]	(8.08)	[0,1]	(0.00)	[0,1]	(1.27)	[0,1]	(3.08)	[0,1]	(0.47)	[0,1]	(2.10)
Other religion	.099(.015)	921	.037(.0035)	2950	.076(.0042)	4197	.15(.012)	977	.17(.01)	1493	.3(.018)	979
	[0,1]	(8.08)	[0,1]	(0.00)	[0,1]	(1.27)	[0,1]	(3.08)	[0,1]	(0.47)	[0,1]	(2.10)
Student	.073(.012)	951	.061(.0045)	2897	.092(.0047)	4251	.054(.0075)	990	.38(.013)	1500	.046(.0083)	985
	[0,1]	(5.09)	[0,1]	(1.80)	[0,1]	(0.00)	[0,1]	(1.79)	[0,1]	(0.00)	[0,1]	(1.50)
Retired	.28(.022)	951	.18(.0071)	2897	.2(.0064)	4251	.25(.017)	990	.063(.0066)	1500	.25(.016)	985
	[0,1]	(5.09)	[0,1]	(1.80)	[0,1]	(0.00)	[0,1]	(1.79)	[0,1]	(0.00)	[0,1]	(1.50)
N	605		398		493		665		1346		816	

1st row: Mean (Standard Error) Observations, 2nd row: [min, max] (% Missing)

Country Codes: 1 = Austria, 2=Belgium, 3=Britain, 4=Denmark, 8=Finland, 9=France, 10=Germany, 11=Greece, 13=Ireland, 14=Italy, 17=Luxembourg, 19=Netherlands, 22=Portugal, 25=Spain, 26=Sweden

Continued on Next Page. . .

Table 6.8 – Continued

cntry	6		6		6		6		6		8	
year	1989		1994		1999		2004		2009		1999	
Vote Intention	.81(.0072)	3020	.81(.0066)	4006	.79(.014)	1001	.78(.011)	1317	.86(.013)	1000	.59(.026)	501
	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)
Turnout	.92(.0052)	2690	.88(.013)	971	.94(.0084)	957	.9(.0083)	1276	.94(.011)	959	.83(.023)	391
	[0,1]	(10.93)	[0,1]	(75.76)	[0,1]	(4.40)	[0,1]	(3.11)	[0,1]	(4.10)	[0,1]	(21.96)
Probability to ever vote j	4(.044)	978	3.7(.04)	979	3.4(.036)	984	4.3(.033)	1287	3.6(.048)	997	4.7(.1)	439
	[1,10]	(67.62)	[1,10]	(75.56)	[1,8]	(1.70)	[1,10]	(2.28)	[0,7.6]	(0.30)	[1,10]	(12.38)
Age	43(.32)	3020	44(.33)	4006	47(.62)	1001	46(.42)	1317	48(.69)	999	47(.99)	501
	[15,89]	(0.00)	[15,91]	(0.00)	[18,89]	(0.00)	[18,96]	(0.00)	[18,93]	(0.10)	[18,93]	(0.00)
Age^2	2134(30)	3020	2271(31)	4006	2498(62)	1001	2346(41)	1317	2584(65)	999	2486(92)	501
	[225,7.9e+03]	(0.00)	[225,8.3e+03]	(0.00)	[324,7.9e+03]	(0.00)	[324,9.2e+03]	(0.00)	[324,8.6e+03]	(0.10)	[324,8.6e+03]	(0.00)
Years of Education	6.3(.058)	3020	6.6(.049)	3492	7.5(.091)	922	7.8(.053)	1226	7.8(.086)	977	6.1(.16)	480
	[1,10]	(0.00)	[1,9]	(12.83)	[1,10]	(7.89)	[1,10]	(6.91)	[1,10]	(2.30)	[1,10]	(4.19)
Higher Educated	.39(.0089)	3020	.49(.0089)	3492	.62(.017)	922	.62(.014)	1226	.62(.019)	977	.38(.026)	480
	[0,1]	(0.00)	[0,1]	(12.83)	[0,1]	(7.89)	[0,1]	(6.91)	[0,1]	(2.30)	[0,1]	(4.19)
Female	.49(.0091)	3020	.51(.0084)	4006	.51(.017)	1001	.5(.014)	1317	.51(.019)	1000	.52(.026)	501
	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)
Family Income	6.8(.068)	2567	2.6e+05(3125)	3005	4.9e+04(3698)	855	4.1e+04(1162)	1108	4.7(.041)	997	1.5e+04(1243)	321
	[1,12]	(15.00)	[138,5.0e+05]	(24.99)	[2.0e+03,7.5e+05]	(14.59)	[0,7.0e+05]	(15.87)	[1,7]	(0.30)	[1.7e+03,2.3e+05]	(35.93)
Trade Union Member	.71(.0083)	2970	.78(.0085)	3003	.78(.014)	999	.79(.011)	1292	.76(.016)	994	.61(.026)	492
	[0,1]	(1.66)	[0,1]	(25.04)	[0,1]	(0.20)	[0,1]	(1.90)	[0,1]	(0.60)	[0,1]	(1.80)
Church Attender	.05(.0045)	2335	.045(.0042)	2908	.064(.0087)	998	.049(.006)	1295	.025(.0056)	999	.068(.011)	491
	[0,1]	(22.68)	[0,1]	(27.41)	[0,1]	(0.30)	[0,1]	(1.67)	[0,1]	(0.10)	[0,1]	(2.00)
Catholic	.011(.0019)	3020	.014(.0021)	3970	.0066(.0027)	997	.0039(.0017)	1289	.018(.0049)	987	.0018(.0018)	489
	[0,1]	(0.00)	[0,1]	(0.90)	[0,1]	(0.40)	[0,1]	(2.13)	[0,1]	(1.30)	[0,1]	(2.40)
Protestant	.76(.0078)	3020	.72(.0075)	3970	.35(.016)	997	.63(.013)	1289	.39(.018)	987	.72(.024)	489
	[0,1]	(0.00)	[0,1]	(0.90)	[0,1]	(0.40)	[0,1]	(2.13)	[0,1]	(1.30)	[0,1]	(2.40)
Not religious	.21(.0074)	3020	.24(.0072)	3970	.57(.017)	997	.34(.013)	1289	.49(.019)	987	.24(.022)	489
	[0,1]	(0.00)	[0,1]	(0.90)	[0,1]	(0.40)	[0,1]	(2.13)	[0,1]	(1.30)	[0,1]	(2.40)
Orthodox	.012(.002)	3020	3.0e-04(3.0e-04)	3970	0(0)	997	0(0)	1289	.0018(.0014)	987	.0053(.0028)	489
	[0,1]	(0.00)	[0,1]	(0.90)	[0,0]	(0.40)	[0,0]	(2.13)	[0,1]	(1.30)	[0,1]	(2.40)
Other religion	.0096(.0018)	3020	.021(.0024)	3970	.072(.0088)	997	.019(.0038)	1289	.095(.011)	987	.035(.01)	489
	[0,1]	(0.00)	[0,1]	(0.90)	[0,1]	(0.40)	[0,1]	(2.13)	[0,1]	(1.30)	[0,1]	(2.40)
Student	.13(.006)	3015	.14(.0062)	4006	.1(.011)	1001	.082(.0076)	1317	.11(.014)	1000	.098(.021)	501
	[0,1]	(0.17)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)
Retired	.19(.0072)	3015	.24(.0074)	4006	.25(.015)	1001	.17(.01)	1317	.24(.015)	1000	.28(.022)	501
	[0,1]	(0.17)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)
N	562		635		761		1008		916		247	

1st row: Mean (Standard Error) Observations, 2nd row: [min, max] (% Missing)
Country Codes: 1 = Austria, 2=Belgium, 3=Britain, 4=Denmark, 8=Finland, 9=France, 10=Germany, 11=Greece, 13=Ireland, 14=Italy, 17=Luxembourg, 19=Netherlands, 22=Portugal, 25=Spain, 26=Sweden

Continued on Next Page...

Table 6.8 – Continued

cntry	8		8		9		9		9		9	
year	2004		2009		1989		1994		1999		2004	
Vote Intention	.73(.015)	900	.7(.022)	1000	.7(.0083)	3046	.6(.0081)	4065	.37(.018)	1020	.69(.012)	1406
	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)
Turnout	.86(.012)	767	.89(.014)	845	.82(.0078)	2450	.77(.014)	985	.69(.021)	664	.84(.01)	1310
	[0,1]	(14.78)	[0,1]	(15.50)	[0,1]	(19.57)	[0,1]	(75.77)	[0,1]	(34.90)	[0,1]	(6.83)
Probability to ever vote j	3.8(.045)	880	3.7(.078)	978	3.8(.041)	979	3.7(.043)	933	4.2(.057)	805	3.6(.029)	1395
	[1,8.3]	(2.22)	[0,10]	(2.20)	[1,10]	(67.86)	[1,9]	(77.05)	[1,10]	(21.08)	[1,7]	(0.78)
Age	50(.59)	899	49(.85)	998	42(.33)	3046	43(.31)	4065	46(.76)	1020	47(.47)	1406
	[15,90]	(0.11)	[18,84]	(0.20)	[15,93]	(0.00)	[15,95]	(0.00)	[18,93]	(0.00)	[18,93]	(0.00)
Age^2	2772(61)	899	2707(84)	998	2113(31)	3046	2204(29)	4065	2409(75)	1020	2476(47)	1406
	[225,8.1e+03]	(0.11)	[324,7.1e+03]	(0.20)	[225,8.6e+03]	(0.00)	[225,9.0e+03]	(0.00)	[324,8.6e+03]	(0.00)	[324,8.6e+03]	(0.00)
Years of Education	6.9(.096)	884	6(.16)	986	4.8(.056)	3046	4.6(.048)	3602	6.4(.12)	983	6(.076)	1404
	[1,10]	(1.78)	[1,10]	(1.40)	[1,10]	(0.00)	[1,9]	(11.39)	[1,10]	(3.63)	[1,10]	(0.14)
Higher Educated	.53(.017)	884	.38(.021)	986	.17(.0068)	3046	.19(.0068)	3602	.38(.018)	983	.32(.012)	1404
	[0,1]	(1.78)	[0,1]	(1.40)	[0,1]	(0.00)	[0,1]	(11.39)	[0,1]	(3.63)	[0,1]	(0.14)
Female	.52(.017)	900	.51(.024)	1000	.52(.0091)	3037	.52(.0083)	4065	.52(.018)	1020	.52(.013)	1406
	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.30)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)
Family Income	3768(126)	734	4.1(.057)	987	7.5(.066)	2675	8921(115)	3058	1.8e+04(584)	607	10(.56)	1406
	[200,4.7e+04]	(18.44)	[1,7]	(1.30)	[1,12]	(12.18)	[138,2.0e+04]	(24.77)	[1.0e+03,1.6e+05]	(40.49)	[1,99]	(0.00)
Trade Union Member	.68(.016)	891	.69(.022)	989	.12(.0061)	2953	.12(.0065)	3044	.15(.013)	996	.13(.0089)	1403
	[0,1]	(1.00)	[0,1]	(1.10)	[0,1]	(3.05)	[0,1]	(25.12)	[0,1]	(2.35)	[0,1]	(0.21)
Church Attender	.085(.0093)	897	.046(.0095)	996	.15(.0078)	2108	.12(.0069)	2645	.14(.015)	920	.13(.011)	971
	[0,1]	(0.33)	[0,1]	(0.40)	[0,1]	(30.79)	[0,1]	(34.93)	[0,1]	(9.80)	[0,1]	(30.94)
Catholic	.0033(.0019)	900	.0035(.0022)	992	.67(.0085)	3046	.64(.008)	4013	.57(.018)	979	.64(.013)	1395
	[0,1]	(0.00)	[0,1]	(0.80)	[0,1]	(0.00)	[0,1]	(1.28)	[0,1]	(4.02)	[0,1]	(0.78)
Protestant	.84(.012)	900	.76(.02)	992	.018(.0024)	3046	.017(.002)	4013	.011(.0035)	979	.019(.0037)	1395
	[0,1]	(0.00)	[0,1]	(0.80)	[0,1]	(0.00)	[0,1]	(1.28)	[0,1]	(4.02)	[0,1]	(0.78)
Not religious	.13(.011)	900	.22(.02)	992	.29(.0082)	3046	.3(.0076)	4013	.36(.017)	979	.3(.012)	1395
	[0,1]	(0.00)	[0,1]	(0.80)	[0,1]	(0.00)	[0,1]	(1.28)	[0,1]	(4.02)	[0,1]	(0.78)
Orthodox	.0044(.0022)	900	.0047(.0019)	992	3.3e-04(3.3e-04)	3046	.0025(8.3e-04)	4013	.003(.0016)	979	0(0)	1395
	[0,1]	(0.00)	[0,1]	(0.80)	[0,1]	(0.00)	[0,1]	(1.28)	[0,1]	(4.02)	[0,0]	(0.78)
Other religion	.024(.0052)	900	.011(.0043)	992	.015(.0022)	3046	.04(.0032)	4013	.054(.0094)	979	.037(.0051)	1395
	[0,1]	(0.00)	[0,1]	(0.80)	[0,1]	(0.00)	[0,1]	(1.28)	[0,1]	(4.02)	[0,1]	(0.78)
Student	.081(.0091)	900	.092(.012)	999	.11(.0057)	3030	.11(.0049)	4065	.14(.016)	1015	.017(.0035)	1406
	[0,1]	(0.00)	[0,1]	(0.10)	[0,1]	(0.53)	[0,1]	(0.00)	[0,1]	(0.49)	[0,1]	(0.00)
Retired	.29(.015)	900	.32(.024)	999	.21(.0074)	3030	.22(.007)	4065	.25(.016)	1015	.29(.012)	1406
	[0,1]	(0.00)	[0,1]	(0.10)	[0,1]	(0.53)	[0,1]	(0.00)	[0,1]	(0.49)	[0,1]	(0.00)
N	620		813		504		541		357		903	

1st row: Mean (Standard Error) Observations, 2nd row: [min, max] (% Missing)

Country Codes: 1 = Austria, 2=Belgium, 3=Britain, 4=Denmark, 8=Finland, 9=France, 10=Germany, 11=Greece, 13=Ireland, 14=Italy, 17=Luxembourg, 19=Netherlands, 22=Portugal, 25=Spain, 26=Sweden

Continued on Next Page. . .

Table 6.8 – Continued

cntry	9		10		10		10		10		10	
year	2009		1989		1994		1999		2004		2009	
Vote Intention	.51(.017)	1000	.83(.0066)	3277	.68(.008)	4211	.79(.013)	1000	.64(.021)	596	.67(.018)	1004
	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)
Turnout	.84(.016)	694	.87(.0062)	3004	.8(.015)	1032	.93(.0083)	915	.91(.013)	514	.89(.016)	772
	[0,1]	(30.60)	[0,1]	(8.33)	[0,1]	(75.49)	[0,1]	(8.50)	[0,1]	(13.76)	[0,1]	(23.11)
Probability to ever vote j	3.2(.049)	944	4.5(.038)	1126	4(.051)	1011	3.7(.033)	991	3.7(.069)	575	4.1(.062)	977
	[0,10]	(5.60)	[1,10]	(65.64)	[1,10]	(75.99)	[1,8.8]	(0.90)	[1,10]	(3.52)	[0,8.6]	(2.69)
Age	48(.65)	986	42(.29)	3277	45(.34)	4211	48(.57)	1000	51(.91)	593	49(.72)	992
	[18,95]	(1.40)	[15,94]	(0.00)	[15,91]	(0.00)	[18,88]	(0.00)	[18,92]	(0.50)	[18,91]	(1.20)
Age^2	2630(63)	986	2007(27)	3277	2359(32)	4211	2571(57)	1000	2983(102)	593	2726(68)	992
	[324,9.0e+03]	(1.40)	[225,8.8e+03]	(0.00)	[225,8.3e+03]	(0.00)	[324,7.7e+03]	(0.00)	[324,8.5e+03]	(0.50)	[324,8.3e+03]	(1.20)
Years of Education	6.1(.099)	989	4.4(.053)	3277	3.9(.045)	3904	5.4(.097)	976	5.5(.13)	585	5(.1)	994
	[1,10]	(1.10)	[1,10]	(0.00)	[1,9]	(7.29)	[1,10]	(2.40)	[1,10]	(1.85)	[1,10]	(1.00)
Higher Educated	.34(.016)	989	.16(.0065)	3277	.13(.0058)	3904	.31(.015)	976	.34(.021)	585	.23(.015)	994
	[0,1]	(1.10)	[0,1]	(0.00)	[0,1]	(7.29)	[0,1]	(2.40)	[0,1]	(1.85)	[0,1]	(1.00)
Female	.52(.017)	1000	.5(.0087)	3277	.53(.0085)	4211	.53(.016)	1000	.54(.022)	596	.52(.019)	1004
	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)
Family Income	4(.036)	964	7.4(.065)	2761	2841(36)	3193	4292(98)	849	7461(1097)	426	4.1(.043)	983
	[1,7]	(3.60)	[1,12]	(15.75)	[138,5.5e+03]	(24.17)	[500,2.5e+04]	(15.10)	[0,1.0e+05]	(28.52)	[1,7]	(2.09)
Trade Union Member	.17(.013)	991	.22(.0074)	3177	.26(.0086)	3181	.26(.014)	995	.22(.018)	584	.25(.017)	994
	[0,1]	(0.90)	[0,1]	(3.05)	[0,1]	(24.46)	[0,1]	(0.50)	[0,1]	(2.01)	[0,1]	(1.00)
Church Attender	.074(.0089)	978	.17(.007)	2858	.17(.0073)	3423	.12(.011)	998	.13(.016)	585	.1(.012)	992
	[0,1]	(2.20)	[0,1]	(12.79)	[0,1]	(18.71)	[0,1]	(0.20)	[0,1]	(1.85)	[0,1]	(1.20)
Catholic	.4(.017)	976	.41(.0086)	3277	.39(.0084)	4192	.28(.014)	994	.28(.021)	587	.33(.019)	981
	[0,1]	(2.40)	[0,1]	(0.00)	[0,1]	(0.45)	[0,1]	(0.60)	[0,1]	(1.51)	[0,1]	(2.29)
Protestant	.011(.0034)	976	.48(.0087)	3277	.45(.0085)	4192	.31(.015)	994	.31(.022)	587	.36(.019)	981
	[0,1]	(2.40)	[0,1]	(0.00)	[0,1]	(0.45)	[0,1]	(0.60)	[0,1]	(1.51)	[0,1]	(2.29)
Not religious	.55(.017)	976	.1(.0053)	3277	.14(.0057)	4192	.39(.016)	994	.37(.021)	587	.29(.018)	981
	[0,1]	(2.40)	[0,1]	(0.00)	[0,1]	(0.45)	[0,1]	(0.60)	[0,1]	(1.51)	[0,1]	(2.29)
Orthodox	7.1e-04(7.1e-04)	976	.0012(6.1e-04)	3277	.0051(.0012)	4192	0(0)	994	.0037(.0022)	587	.0028(.0025)	981
	[0,1]	(2.40)	[0,1]	(0.00)	[0,1]	(0.45)	[0,0]	(0.60)	[0,1]	(1.51)	[0,1]	(2.29)
Other religion	.035(.0063)	976	.012(.0019)	3277	.017(.0022)	4192	.021(.0049)	994	.032(.0072)	587	.017(.0051)	981
	[0,1]	(2.40)	[0,1]	(0.00)	[0,1]	(0.45)	[0,1]	(0.60)	[0,1]	(1.51)	[0,1]	(2.29)
Student	.097(.012)	995	.098(.0052)	3240	.087(.0053)	4211	.033(.0058)	999	.065(.0092)	596	.053(.0099)	994
	[0,1]	(0.50)	[0,1]	(1.13)	[0,1]	(0.00)	[0,1]	(0.10)	[0,1]	(0.00)	[0,1]	(1.00)
Retired	.3(.015)	995	.15(.0062)	3240	.22(.0073)	4211	.27(.015)	999	.32(.023)	596	.29(.016)	994
	[0,1]	(0.50)	[0,1]	(1.13)	[0,1]	(0.00)	[0,1]	(0.10)	[0,1]	(0.00)	[0,1]	(1.00)
N	656		778		736		780		366		734	

1st row: Mean (Standard Error) Observations, 2nd row: [min, max] (% Missing)
Country Codes: 1 = Austria, 2=Belgium, 3=Britain, 4=Denmark, 8=Finland, 9=France, 10=Germany, 11=Greece, 13=Ireland, 14=Italy, 17=Luxembourg, 19=Netherlands, 22=Portugal, 25=Spain, 26=Sweden
Continued on Next Page. . .

Table 6.8 – Continued

cntry	11		11		11		11		11		13	
year	1989		1994		1999		2004		2009		1989	
Vote Intention	.64(.0088)	3000	.62(.0078)	4016	.66(.023)	500	.76(.019)	500	.71(.027)	1000	.79(.0074)	3034
	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)
Turnout	.81(.0082)	2255	.88(.01)	996	.83(.019)	456	.91(.013)	450	.91(.016)	906	.76(.0081)	2722
	[0,1]	(24.83)	[0,1]	(75.20)	[0,1]	(8.80)	[0,1]	(10.00)	[0,1]	(9.40)	[0,1]	(10.28)
Probability to ever vote j	3.1(.047)	816	3.7(.041)	888	3.5(.071)	480	3.8(.057)	495	2.9(.09)	982	4.4(.051)	959
	[1,10]	(72.80)	[1,10]	(77.89)	[1,8]	(4.00)	[1,10]	(1.00)	[0,8.3]	(1.80)	[1,10]	(68.39)
Age	44(.33)	3000	44(.29)	4016	46(.93)	500	47(.82)	481	48(.97)	986	41(.33)	3025
	[15,94]	(0.00)	[15,85]	(0.00)	[18,86]	(0.00)	[18,92]	(3.80)	[18,89]	(1.40)	[15,89]	(0.30)
Age^2	2256(32)	3000	2220(27)	4016	2437(92)	500	2500(82)	481	2599(97)	986	1974(30)	3025
	[225,8.8e+03]	(0.00)	[225,7.2e+03]	(0.00)	[324,7.4e+03]	(0.00)	[324,8.5e+03]	(3.80)	[324,7.9e+03]	(1.40)	[225,7.9e+03]	(0.30)
Years of Education	4(.061)	3000	3.6(.049)	3614	5.3(.16)	496	6(.14)	441	4.4(.21)	990	4.2(.051)	3034
	[1,10]	(0.00)	[1,9]	(10.01)	[1,10]	(0.80)	[1,9]	(11.80)	[1,10]	(1.00)	[1,10]	(0.00)
Higher Educated	.15(.0065)	3000	.15(.0061)	3614	.3(.022)	496	.42(.024)	441	.25(.021)	990	.076(.0048)	3034
	[0,1]	(0.00)	[0,1]	(10.01)	[0,1]	(0.80)	[0,1]	(11.80)	[0,1]	(1.00)	[0,1]	(0.00)
Female	.52(.0091)	3000	.51(.008)	4016	.51(.025)	500	.5(.022)	500	.51(.03)	1000	.5(.0091)	3026
	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.26)
Family Income	6.9(.067)	2480	1.4e+05(2112)	3014	5.2e+05(3.5e+04)	396	1995(124)	340	3.6(.089)	980	7.3(.072)	1785
	[1,12]	(17.33)	[138,3.7e+05]	(24.95)	[4.0e+04,7.5e+06]	(20.80)	[185,2.0e+04]	(32.00)	[1,7]	(2.00)	[1,12]	(41.17)
Trade Union Member	.15(.0065)	2973	.13(.0062)	3006	.09(.013)	496	.11(.014)	491	.065(.014)	989	.26(.0083)	2768
	[0,1]	(0.90)	[0,1]	(25.15)	[0,1]	(0.80)	[0,1]	(1.80)	[0,1]	(1.10)	[0,1]	(8.77)
Church Attender	.22(.0076)	2947	.24(.007)	3936	.31(.024)	494	.28(.02)	490	.26(.029)	982	.84(.0068)	2918
	[0,1]	(1.77)	[0,1]	(1.99)	[0,1]	(1.20)	[0,1]	(2.00)	[0,1]	(1.80)	[0,1]	(3.82)
Catholic	.0043(.0012)	3000	.0011(5.5e-04)	4010	0(0)	496	.0041(.0029)	488	2.0e-04(2.0e-04)	983	.93(.0045)	3034
	[0,1]	(0.00)	[0,1]	(0.15)	[0,0]	(0.80)	[0,1]	(2.40)	[0,1]	(1.70)	[0,1]	(0.00)
Protestant	.005(.0013)	3000	5.7e-04(4.0e-04)	4010	0(0)	496	0(0)	488	.0035(.0026)	983	.034(.0033)	3034
	[0,1]	(0.00)	[0,1]	(0.15)	[0,0]	(0.80)	[0,0]	(2.40)	[0,1]	(1.70)	[0,1]	(0.00)
Not religious	.011(.0019)	3000	.01(.0016)	4010	.057(.011)	496	.059(.011)	488	.11(.019)	983	.027(.003)	3034
	[0,1]	(0.00)	[0,1]	(0.15)	[0,1]	(0.80)	[0,1]	(2.40)	[0,1]	(1.70)	[0,1]	(0.00)
Orthodox	.98(.0028)	3000	.98(.0022)	4010	.94(.011)	496	.93(.012)	488	.88(.019)	983	0(0)	3034
	[0,1]	(0.00)	[0,1]	(0.15)	[0,1]	(0.80)	[0,1]	(2.40)	[0,1]	(1.70)	[0,0]	(0.00)
Other religion	.004(.0012)	3000	.0078(.0014)	4010	.003(.0019)	496	.0061(.0035)	488	.0086(.0042)	983	.0049(.0013)	3034
	[0,1]	(0.00)	[0,1]	(0.15)	[0,1]	(0.80)	[0,1]	(2.40)	[0,1]	(1.70)	[0,1]	(0.00)
Student	.091(.0053)	3000	.097(.0047)	4016	.073(.013)	500	.074(.012)	500	.12(.016)	995	.11(.0058)	2994
	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.50)	[0,1]	(1.32)
Retired	.18(.0071)	3000	.19(.0063)	4016	.24(.023)	500	.23(.019)	500	.26(.027)	995	.075(.0048)	2994
	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.50)	[0,1]	(1.32)
N	614		786		354		282		865		476	

1st row: Mean (Standard Error) Observations, 2nd row: [min, max] (% Missing)
Country Codes: 1 = Austria, 2=Belgium, 3=Britain, 4=Denmark, 8=Finland, 9=France, 10=Germany, 11=Greece, 13=Ireland, 14=Italy, 17=Luxembourg, 19=Netherlands, 22=Portugal, 25=Spain, 26=Sweden
Continued on Next Page. . .

Table 6.8 – Continued

cntry	13		13		13		13		14		14	
year	1994		1999		2004		2009		1989		1994	
Vote Intention	.65(.0079)	4070	.75(.02)	503	.79(.016)	1154	.72(.019)	1001	.66(.0085)	3091	.43(.0084)	4192
	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)
Turnout	.76(.014)	952	.88(.016)	440	.92(.012)	1105	.88(.017)	807	.83(.0078)	2258	.89(.01)	1037
	[0,1]	(76.61)	[0,1]	(12.52)	[0,1]	(4.25)	[0,1]	(19.38)	[0,1]	(26.95)	[0,1]	(75.26)
Probability to ever vote j	4.4(.059)	906	4.4(.06)	489	4.5(.073)	1130	3.8(.066)	986	3.2(.047)	920	4(.061)	913
	[1,10]	(77.74)	[1,10]	(2.78)	[1,10]	(2.08)	[0,10]	(1.50)	[1,10]	(70.24)	[1,10]	(78.22)
Age	42(.31)	4069	44(.91)	498	45(.73)	1136	44(.8)	978	42(.31)	3091	43(.31)	4192
	[15,91]	(0.02)	[18,87]	(0.99)	[14,101]	(1.56)	[18,88]	(2.30)	[15,93]	(0.00)	[15,91]	(0.00)
Age^2	2059(28)	4069	2234(91)	498	2310(70)	1136	2244(71)	978	2092(28)	3091	2186(29)	4192
	[225,8.3e+03]	(0.02)	[324,7.6e+03]	(0.99)	[196,1.0e+04]	(1.56)	[324,7.7e+03]	(2.30)	[225,8.6e+03]	(0.00)	[225,8.3e+03]	(0.00)
Years of Education	3.7(.039)	3566	5(.13)	493	4.6(.12)	1127	5.4(.14)	992	3.8(.063)	3091	3.9(.055)	3526
	[1,9]	(12.38)	[1,10]	(1.99)	[1,10]	(2.34)	[1,10]	(0.90)	[1,10]	(0.00)	[1,9]	(15.89)
Higher Educated	.079(.0048)	3566	.18(.018)	493	.25(.016)	1127	.24(.016)	992	.14(.0063)	3091	.15(.0069)	3526
	[0,1]	(12.38)	[0,1]	(1.99)	[0,1]	(2.34)	[0,1]	(0.90)	[0,1]	(0.00)	[0,1]	(15.89)
Female	.51(.0082)	4070	.51(.023)	503	.51(.02)	1154	.5(.021)	1001	.5(.009)	3091	.52(.0084)	4192
	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)
Family Income	551(11)	3068	2291(245)	405	1.0e+04(1054)	1038	4.5(.048)	980	7.2(.07)	2618	1.8e+06(3.3e+04)	3137
	[120,2.3e+03]	(24.62)	[70,6.0e+04]	(19.48)	[0,5.0e+05]	(10.05)	[1,7]	(2.10)	[1,12]	(15.30)	[138,5.5e+06]	(25.17)
Trade Union Member	.28(.0086)	3045	.36(.022)	494	.38(.02)	1127	.31(.019)	994	.27(.0082)	2911	.25(.0084)	3116
	[0,1]	(25.18)	[0,1]	(1.79)	[0,1]	(2.34)	[0,1]	(0.70)	[0,1]	(5.82)	[0,1]	(25.67)
Church Attender	.78(.007)	3785	.62(.023)	492	.5(.021)	1094	.41(.021)	975	.43(.0092)	2865	.44(.0089)	3764
	[0,1]	(7.00)	[0,1]	(2.19)	[0,1]	(5.20)	[0,1]	(2.60)	[0,1]	(7.31)	[0,1]	(10.21)
Catholic	.92(.0044)	4048	.81(.018)	498	.88(.012)	1149	.73(.02)	977	.93(.0047)	3091	.9(.0051)	4153
	[0,1]	(0.54)	[0,1]	(0.99)	[0,1]	(0.43)	[0,1]	(2.40)	[0,1]	(0.00)	[0,1]	(0.93)
Protestant	.017(.0022)	4048	.034(.0085)	498	.027(.005)	1149	.015(.0043)	977	.0045(.0012)	3091	.0032(9.6e-04)	4153
	[0,1]	(0.54)	[0,1]	(0.99)	[0,1]	(0.43)	[0,1]	(2.40)	[0,1]	(0.00)	[0,1]	(0.93)
Not religious	.051(.0037)	4048	.15(.016)	498	.069(.0085)	1149	.22(.018)	977	.06(.0043)	3091	.084(.0049)	4153
	[0,1]	(0.54)	[0,1]	(0.99)	[0,1]	(0.43)	[0,1]	(2.40)	[0,1]	(0.00)	[0,1]	(0.93)
Orthodox	0(0)	4048	0(0)	498	0(0)	1149	2.0e-04(2.0e-04)	977	0(0)	3091	2.7e-04(1.9e-04)	4153
	[0,0]	(0.54)	[0,0]	(0.99)	[0,0]	(0.43)	[0,1]	(2.40)	[0,0]	(0.00)	[0,1]	(0.93)
Other religion	.0087(.0016)	4048	.01(.0049)	498	.026(.0069)	1149	.038(.0088)	977	.0071(.0015)	3091	.0089(.0015)	4153
	[0,1]	(0.54)	[0,1]	(0.99)	[0,1]	(0.43)	[0,1]	(2.40)	[0,1]	(0.00)	[0,1]	(0.93)
Student	.12(.0053)	4070	.064(.011)	502	.015(.0039)	1154	.13(.018)	996	.12(.0058)	3091	.17(.0063)	4192
	[0,1]	(0.00)	[0,1]	(0.20)	[0,1]	(0.00)	[0,1]	(0.50)	[0,1]	(0.00)	[0,1]	(0.00)
Retired	.096(.0048)	4070	.17(.02)	502	.16(.014)	1154	.17(.015)	996	.18(.007)	3091	.21(.007)	4192
	[0,1]	(0.00)	[0,1]	(0.20)	[0,1]	(0.00)	[0,1]	(0.50)	[0,1]	(0.00)	[0,1]	(0.00)
N	736		343		911		769		590		677	

1st row: Mean (Standard Error) Observations, 2nd row: [min, max] (% Missing)
Country Codes: 1 = Austria, 2=Belgium, 3=Britain, 4=Denmark, 8=Finland, 9=France, 10=Germany, 11=Greece, 13=Ireland, 14=Italy, 17=Luxembourg, 19=Netherlands, 22=Portugal, 25=Spain, 26=Sweden

Continued on Next Page. . .

Table 6.8 – Continued

cntry	14		14		14		17		17		17	
year	1999		2004		2009		1989		1994		1999	
Retired	.22(.015)	3708	.1(.011)	1444	.27(.025)	978	.14(.012)	898	.17(.0092)	2129	.18(.024)	301
	[0,1]	(0.00)	[0,1]	(7.02)	[0,1]	(2.20)	[0,1]	(0.66)	[0,1]	(0.00)	[0,1]	(0.00)
Vote Intention	.68(.013)	3708	.71(.017)	1553	.49(.026)	1000	.66(.016)	904	.64(.012)	2129	.71(.027)	301
	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)
Probability to ever vote j	3.5(.046)	3386	3.5(.061)	1418	3.2(.11)	795	4.4(.13)	240	4.3(.075)	437	3.8(.089)	265
	[1,10]	(8.68)	[1,10]	(8.69)	[0,10]	(20.50)	[1,10]	(73.45)	[1,10]	(79.47)	[1,10]	(11.96)
Turnout	.88(.01)	2769	.9(.011)	1495	.83(.028)	610	.85(.014)	691	.94(.011)	494	.86(.026)	215
	[0,1]	(25.32)	[0,1]	(3.73)	[0,1]	(39.00)	[0,1]	(23.56)	[0,1]	(76.80)	[0,1]	(28.57)
Age	45(.56)	3708	47(.67)	1553	50(1)	963	41(.54)	904	43(.45)	2125	45(1.1)	301
	[18,79]	(0.00)	[18,94]	(0.00)	[18,90]	(3.70)	[15,85]	(0.00)	[13,90]	(0.19)	[18,83]	(0.00)
Age^2	2334(56)	3708	2562(64)	1553	2767(105)	963	1970(48)	904	2197(42)	2125	2343(107)	301
	[324,6.2e+03]	(0.00)	[324,8.8e+03]	(0.00)	[324,8.1e+03]	(3.70)	[225,7.2e+03]	(0.00)	[169,8.1e+03]	(0.19)	[324,6.9e+03]	(0.00)
Years of Education	4.5(.11)	3036	4.3(.11)	1342	4(.17)	982	4.9(.097)	904	4.5(.069)	1879	5.7(.2)	299
	[1,10]	(18.12)	[1,9]	(13.59)	[1,10]	(1.80)	[1,10]	(0.00)	[1,9]	(11.74)	[1,10]	(0.66)
Higher Educated	.24(.012)	3036	.17(.013)	1342	.19(.016)	982	.16(.012)	904	.19(.0098)	1879	.31(.03)	299
	[0,1]	(18.12)	[0,1]	(13.59)	[0,1]	(1.80)	[0,1]	(0.00)	[0,1]	(11.74)	[0,1]	(0.66)
Female	.51(.014)	3708	.52(.018)	1553	.52(.026)	1000	.44(.017)	904	.52(.012)	2129	.51(.031)	301
	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)
Family Income	.(.)	0	3.1e+05(2.8e+04)	1093	3.7(.066)	952	7.4(.15)	642	6.9e+04(1686)	1629	1.3e+05(4128)	199
	[.,.]	(100.00)	[720,8.2e+06]	(29.62)	[1,7]	(4.80)	[1,12]	(28.98)	[138,1.5e+05]	(23.49)	[3.5e+04,2.7e+05]	(33.89)
Trade Union Member	.2(.012)	3513	.39(.019)	1406	.22(.021)	935	.51(.018)	794	.49(.014)	1614	.45(.032)	288
	[0,1]	(5.26)	[0,1]	(9.47)	[0,1]	(6.50)	[0,1]	(12.17)	[0,1]	(24.19)	[0,1]	(4.32)
Church Attender	.(.)	0	.44(.018)	1434	.33(.025)	935	.27(.016)	801	.23(.011)	1892	.18(.025)	299
	[.,.]	(100.00)	[0,1]	(7.66)	[0,1]	(6.50)	[0,1]	(11.39)	[0,1]	(11.13)	[0,1]	(0.66)
Catholic	.87(.0082)	3533	.9(.011)	1420	.84(.018)	951	.89(.01)	904	.9(.0071)	2116	.79(.025)	296
	[0,1]	(4.72)	[0,1]	(8.56)	[0,1]	(4.90)	[0,1]	(0.00)	[0,1]	(0.61)	[0,1]	(1.66)
Protestant	.0064(.0021)	3533	.0053(.0021)	1420	.0072(.0049)	951	.0022(.0016)	904	.01(.0024)	2116	.0056(.004)	296
	[0,1]	(4.72)	[0,1]	(8.56)	[0,1]	(4.90)	[0,1]	(0.00)	[0,1]	(0.61)	[0,1]	(1.66)
Not religious	.1(.0073)	3533	.091(.01)	1420	.13(.016)	951	.09(.0095)	904	.081(.0063)	2116	.19(.024)	296
	[0,1]	(4.72)	[0,1]	(8.56)	[0,1]	(4.90)	[0,1]	(0.00)	[0,1]	(0.61)	[0,1]	(1.66)
Orthodox	.0018(6.5e-04)	3533	1.4e-04(1.4e-04)	1420	.0027(.0022)	951	0(0)	904	.0012(7.0e-04)	2116	.0028(.0028)	296
	[0,1]	(4.72)	[0,1]	(8.56)	[0,1]	(4.90)	[0,0]	(0.00)	[0,1]	(0.61)	[0,1]	(1.66)
Other religion	.021(.0033)	3533	.0038(.0017)	1420	.023(.0071)	951	.015(.0041)	904	.0084(.0026)	2116	.0084(.0058)	296
	[0,1]	(4.72)	[0,1]	(8.56)	[0,1]	(4.90)	[0,1]	(0.00)	[0,1]	(0.61)	[0,1]	(1.66)
Student	.061(.0036)	3708	.044(.0081)	1444	.012(.0028)	978	.1(.01)	898	.1(.0067)	2129	.13(.023)	301
	[0,1]	(0.00)	[0,1]	(7.02)	[0,1]	(2.20)	[0,1]	(0.66)	[0,1]	(0.00)	[0,1]	(0.00)
N	4189		938		510		123		352		147	

1st row: Mean (Standard Error) Observations, 2nd row: [min, max] (% Missing)

Country Codes: 1 = Austria, 2=Belgium, 3=Britain, 4=Denmark, 8=Finland, 9=France, 10=Germany, 11=Greece, 13=Ireland, 14=Italy, 17=Luxembourg, 19=Netherlands, 22=Portugal, 25=Spain, 26=Sweden

Continued on Next Page. . .

Table 6.8 – Continued

cntry	17		19		19		19		19		19	
year	2009		1989		1994		1999		2004		2009	
Vote Intention	.63(.02)	1001	.88(.0059)	3001	.81(.007)	4067	.84(.012)	1001	.81(.0098)	1586	.78(.021)	1005
	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)
Turnout	.85(.017)	724	.88(.006)	2854	.86(.012)	998	.89(.012)	978	.95(.0057)	1522	.9(.017)	922
	[0,1]	(27.67)	[0,1]	(4.90)	[0,1]	(75.46)	[0,1]	(2.30)	[0,1]	(4.04)	[0,1]	(8.26)
Probability to ever vote j	3.5(.063)	938	3.3(.045)	951	3.7(.043)	992	3.7(.04)	986	4(.037)	1538	3.7(.072)	991
	[0,10]	(6.29)	[1,10]	(68.31)	[1,10]	(75.61)	[1,9]	(1.50)	[1,10]	(3.03)	[0,8]	(1.39)
Age	47(.74)	996	43(.31)	3001	43(.33)	4067	44(.68)	1001	49(.37)	1586	49(1)	998
	[18,88]	(0.50)	[15,96]	(0.00)	[15,95]	(0.00)	[18,90]	(0.00)	[18,89]	(0.00)	[18,88]	(0.70)
Age^2	2521(70)	996	2130(30)	3001	2137(31)	4067	2255(64)	1001	2593(38)	1586	2695(108)	998
	[324,7.7e+03]	(0.50)	[225,9.2e+03]	(0.00)	[225,9.0e+03]	(0.00)	[324,8.1e+03]	(0.00)	[324,7.9e+03]	(0.00)	[324,7.7e+03]	(0.70)
Years of Education	6.2(.12)	997	5.5(.057)	3001	4.8(.05)	3630	6.7(.094)	969	7(.062)	1586	6.2(.17)	1002
	[1,10]	(0.40)	[1,10]	(0.00)	[1,9]	(10.75)	[1,10]	(3.20)	[1,10]	(0.00)	[1,10]	(0.30)
Higher Educated	.35(.019)	997	.3(.0084)	3001	.23(.0076)	3630	.45(.018)	969	.56(.012)	1586	.42(.024)	1002
	[0,1]	(0.40)	[0,1]	(0.00)	[0,1]	(10.75)	[0,1]	(3.20)	[0,1]	(0.00)	[0,1]	(0.30)
Female	.51(.021)	1001	.53(.0091)	3001	.51(.0087)	4067	.51(.018)	1001	.46(.013)	1586	.5(.025)	1005
	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)
Family Income	4.5(.042)	987	7.5(.064)	2694	3494(50)	3020	4717(181)	724	2515(1.0e+02)	1586	5(.065)	1001
	[1,7]	(1.40)	[1,12]	(10.23)	[138,8.3e+03]	(25.74)	[500,1.0e+05]	(27.67)	[0,1.3e+05]	(0.00)	[1,7]	(0.40)
Trade Union Member	.42(.021)	995	.29(.0084)	2912	.32(.0093)	3009	.35(.017)	997	.38(.012)	1586	.31(.022)	1000
	[0,1]	(0.60)	[0,1]	(2.97)	[0,1]	(26.01)	[0,1]	(0.40)	[0,1]	(0.00)	[0,1]	(0.50)
Church Attender	.11(.013)	992	.36(.012)	1512	.31(.012)	1832	.14(.012)	997	.27(.016)	804	.12(.017)	1000
	[0,1]	(0.90)	[0,1]	(49.62)	[0,1]	(54.95)	[0,1]	(0.40)	[0,1]	(49.31)	[0,1]	(0.50)
Catholic	.68(.02)	984	.29(.0082)	3001	.26(.0078)	4031	.24(.016)	989	.27(.011)	1569	.19(.018)	993
	[0,1]	(1.70)	[0,1]	(0.00)	[0,1]	(0.89)	[0,1]	(1.20)	[0,1]	(1.07)	[0,1]	(1.19)
Protestant	.026(.0077)	984	.15(.0065)	3001	.12(.0058)	4031	.11(.011)	989	.2(.01)	1569	.13(.017)	993
	[0,1]	(1.70)	[0,1]	(0.00)	[0,1]	(0.89)	[0,1]	(1.20)	[0,1]	(1.07)	[0,1]	(1.19)
Not religious	.28(.019)	984	.45(.0091)	3001	.49(.0088)	4031	.59(.018)	989	.49(.013)	1569	.56(.025)	993
	[0,1]	(1.70)	[0,1]	(0.00)	[0,1]	(0.89)	[0,1]	(1.20)	[0,1]	(1.07)	[0,1]	(1.19)
Orthodox	4.1e-04(4.1e-04)	984	.081(.005)	3001	.075(.0044)	4031	8.4e-04(8.4e-04)	989	.0019(.0011)	1569	6.7e-04(4.8e-04)	993
	[0,1]	(1.70)	[0,1]	(0.00)	[0,1]	(0.89)	[0,1]	(1.20)	[0,1]	(1.07)	[0,1]	(1.19)
Other religion	.016(.0055)	984	.033(.0032)	3001	.052(.0038)	4031	.063(.0086)	989	.047(.0054)	1569	.12(.017)	993
	[0,1]	(1.70)	[0,1]	(0.00)	[0,1]	(0.89)	[0,1]	(1.20)	[0,1]	(1.07)	[0,1]	(1.19)
Student	.095(.015)	999	.094(.0053)	2992	.12(.0062)	4067	.065(.012)	1001	.04(.005)	1551	.05(.013)	1003
	[0,1]	(0.20)	[0,1]	(0.30)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(2.21)	[0,1]	(0.20)
Retired	.24(.017)	999	.15(.0065)	2992	.17(.0066)	4067	.16(.013)	1001	.0013(9.1e-04)	1551	.23(.023)	1003
	[0,1]	(0.20)	[0,1]	(0.30)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(2.21)	[0,1]	(0.20)
N	682		386		378		681		741		894	

1st row: Mean (Standard Error) Observations, 2nd row: [min, max] (% Missing)
Country Codes: 1 = Austria, 2=Belgium, 3=Britain, 4=Denmark, 8=Finland, 9=France, 10=Germany, 11=Greece, 13=Ireland, 14=Italy, 17=Luxembourg, 19=Netherlands, 22=Portugal, 25=Spain, 26=Sweden
Continued on Next Page...

Table 6.8 – Continued

cntry	22		22		22		22		22		25	
year	1989		1994		1999		2004		2009		1989	
Vote Intention	.55(.0091)	3000	.59(.0083)	3999	.53(.024)	500	.51(.016)	1000	.62(.023)	1000	.55(.0091)	3017
	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)
Turnout	.74(.0095)	2101	.74(.015)	983	.75(.024)	374	.78(.014)	873	.81(.022)	738	.72(.0091)	2422
	[0,1]	(29.97)	[0,1]	(75.42)	[0,1]	(25.20)	[0,1]	(12.70)	[0,1]	(26.20)	[0,1]	(19.72)
Probability to ever vote j	3.2(.06)	699	4.4(.057)	888	4.9(.1)	490	4.2(.05)	947	3.7(.085)	910	2.9(.051)	826
	[1,10]	(76.70)	[1,10]	(77.79)	[1,10]	(2.00)	[1,10]	(5.30)	[0,10]	(9.00)	[1,10]	(72.62)
Age	42(.33)	3000	43(.3)	3999	45(.83)	500	47(.58)	958	48(.83)	994	42(.35)	3017
	[15,99]	(0.00)	[15,90]	(0.00)	[18,87]	(0.00)	[18,88]	(4.20)	[18,88]	(0.60)	[15,93]	(0.00)
Age^2	2099(31)	3000	2154(28)	3999	2317(78)	500	2481(56)	958	2591(82)	994	2179(33)	3017
	[225,9.8e+03]	(0.00)	[225,8.1e+03]	(0.00)	[324,7.6e+03]	(0.00)	[324,7.7e+03]	(4.20)	[324,7.7e+03]	(0.60)	[225,8.6e+03]	(0.00)
Years of Education	2.8(.054)	3000	2.8(.047)	3608	3.8(.16)	474	4.8(.11)	933	3.6(.15)	982	3.7(.064)	3017
	[1,10]	(0.00)	[1,9]	(9.78)	[1,10]	(5.20)	[1,10]	(6.70)	[1,10]	(1.80)	[1,10]	(0.00)
Higher Educated	.075(.0048)	3000	.098(.0053)	3608	.17(.018)	474	.26(.014)	933	.18(.016)	982	.14(.0063)	3017
	[0,1]	(0.00)	[0,1]	(9.78)	[0,1]	(5.20)	[0,1]	(6.70)	[0,1]	(1.80)	[0,1]	(0.00)
Female	.52(.0091)	3000	.53(.0084)	3999	.53(.024)	500	.59(.016)	1000	.52(.023)	1000	.54(.0091)	3009
	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.27)
Family Income	6.8(.073)	2554	9.9e+04(1236)	3002	1.7e+05(3597)	251	1781(97)	558	3.3(.06)	988	6.6(.069)	2347
	[1,12]	(14.87)	[138,1.9e+05]	(24.93)	[5.0e+04,3.5e+05]	(49.80)	[128,2.5e+04]	(44.20)	[1,7]	(1.20)	[1,12]	(22.21)
Trade Union Member	.12(.0064)	2553	.2(.0079)	2998	.087(.014)	497	.18(.012)	981	.1(.014)	992	.079(.0052)	2731
	[0,1]	(14.90)	[0,1]	(25.03)	[0,1]	(0.60)	[0,1]	(1.90)	[0,1]	(0.80)	[0,1]	(9.48)
Church Attender	.39(.0095)	2627	.36(.0085)	3659	.29(.022)	497	.39(.016)	981	.26(.02)	979	.32(.0091)	2597
	[0,1]	(12.43)	[0,1]	(8.50)	[0,1]	(0.60)	[0,1]	(1.90)	[0,1]	(2.10)	[0,1]	(13.92)
Catholic	.88(.006)	3000	.91(.0051)	3985	.86(.016)	499	.76(.014)	984	.83(.018)	981	.85(.0065)	3017
	[0,1]	(0.00)	[0,1]	(0.35)	[0,1]	(0.20)	[0,1]	(1.60)	[0,1]	(1.90)	[0,1]	(0.00)
Protestant	.0097(.0018)	3000	.0075(.0014)	3985	.0061(.0036)	499	.0061(.0025)	984	.0018(.0016)	981	.0089(.0017)	3017
	[0,1]	(0.00)	[0,1]	(0.35)	[0,1]	(0.20)	[0,1]	(1.60)	[0,1]	(1.90)	[0,1]	(0.00)
Not religious	.11(.0056)	3000	.073(.0046)	3985	.11(.015)	499	.22(.013)	984	.16(.018)	981	.13(.006)	3017
	[0,1]	(0.00)	[0,1]	(0.35)	[0,1]	(0.20)	[0,1]	(1.60)	[0,1]	(1.90)	[0,1]	(0.00)
Orthodox	3.3e-04(3.3e-04)	3000	3.1e-04(3.1e-04)	3985	0(0)	499	0(0)	984	2.7e-04(2.7e-04)	981	.0096(.0018)	3017
	[0,1]	(0.00)	[0,1]	(0.35)	[0,0]	(0.20)	[0,0]	(1.60)	[0,1]	(1.90)	[0,1]	(0.00)
Other religion	.0083(.0017)	3000	.013(.0018)	3985	.019(.0059)	499	.015(.0039)	984	.015(.0048)	981	.006(.0014)	3017
	[0,1]	(0.00)	[0,1]	(0.35)	[0,1]	(0.20)	[0,1]	(1.60)	[0,1]	(1.90)	[0,1]	(0.00)
Student	.054(.0041)	3000	.095(.0048)	3999	.079(.013)	500	.12(.01)	1000	.08(.014)	995	.12(.006)	3016
	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.50)	[0,1]	(0.03)
Retired	.18(.0071)	3000	.19(.0059)	3999	.17(.018)	500	.25(.014)	1000	.23(.019)	995	.16(.0067)	3016
	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.50)	[0,1]	(0.03)
N	412		722		174		478		688		451	

1st row: Mean (Standard Error) Observations, 2nd row: [min, max] (% Missing)
Country Codes: 1 = Austria, 2=Belgium, 3=Britain, 4=Denmark, 8=Finland, 9=France, 10=Germany, 11=Greece, 13=Ireland, 14=Italy, 17=Luxembourg, 19=Netherlands, 22=Portugal, 25=Spain, 26=Sweden

Continued on Next Page. . .

Table 6.8 – Continued

cntry	25		25		25		25		26		26	
year	1994		1999		2004		2009		1999		2009	
Vote Intention	.56(.0083)	4009	.62(.016)	1000	.69(.013)	1208	.66(.024)	1000	.7(.022)	505	.75(.017)	1002
	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)
Turnout	.8(.014)	976	.77(.016)	802	.82(.012)	1089	.84(.021)	840	.91(.015)	461	.96(.0087)	904
	[0,1]	(75.65)	[0,1]	(19.80)	[0,1]	(9.85)	[0,1]	(16.00)	[0,1]	(8.71)	[0,1]	(9.78)
Probability to ever vote j	3.4(.046)	911	3.2(.046)	919	4.4(.043)	1085	2.5(.084)	973	4(.063)	484	3.4(.056)	989
	[1,10]	(77.28)	[1,10]	(8.10)	[1,10]	(10.18)	[0,10]	(2.70)	[1,10]	(4.16)	[0,10]	(1.30)
Age	43(.31)	4009	45(.62)	1000	46(.53)	1208	47(.91)	996	47(.98)	505	49(.78)	1002
	[15,98]	(0.00)	[18,93]	(0.00)	[18,91]	(0.00)	[18,92]	(0.40)	[18,91]	(0.00)	[18,96]	(0.00)
Age^2	2186(29)	4009	2354(60)	1000	2461(53)	1208	2541(91)	996	2579(99)	505	2756(82)	1002
	[225,9.6e+03]	(0.00)	[324,8.6e+03]	(0.00)	[324,8.3e+03]	(0.00)	[324,8.5e+03]	(0.40)	[324,8.3e+03]	(0.00)	[324,9.2e+03]	(0.00)
Years of Education	3.3(.05)	3463	5.2(.13)	916	4.4(.1)	1166	3.6(.13)	983	6.8(.13)	484	6.6(.12)	979
	[1,9]	(13.62)	[1,10]	(8.40)	[1,10]	(3.48)	[1,10]	(1.70)	[1,10]	(4.16)	[1,10]	(2.30)
Higher Educated	.14(.0059)	3463	.32(.017)	916	.23(.012)	1166	.15(.012)	983	.47(.025)	484	.46(.019)	979
	[0,1]	(13.62)	[0,1]	(8.40)	[0,1]	(3.48)	[0,1]	(1.70)	[0,1]	(4.16)	[0,1]	(2.30)
Female	.51(.0083)	4009	.52(.017)	1000	.51(.014)	1208	.51(.025)	1000	.51(.025)	505	.51(.019)	1002
	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)
Family Income	9.4e+04(1599)	3003	2.3e+05(6290)	559	3.9(.06)	788	3.6(.06)	985	2.8e+04(2490)	365	4.4(.042)	988
	[138,2.5e+05]	(25.09)	[1.0e+04,8.0e+05]	(44.10)	[0,8]	(34.77)	[1,7]	(1.50)	[2.0e+03,5.5e+05]	(27.72)	[1,7]	(1.40)
Trade Union Member	.12(.0062)	2978	.19(.014)	989	.11(.009)	1185	.17(.019)	995	.69(.024)	501	.64(.019)	994
	[0,1]	(25.72)	[0,1]	(1.10)	[0,1]	(1.90)	[0,1]	(0.50)	[0,1]	(0.79)	[0,1]	(0.80)
Church Attender	.34(.0088)	3152	.3(.016)	979	.16(.011)	1152	.19(.019)	990	.073(.015)	501	.044(.0072)	994
	[0,1]	(21.38)	[0,1]	(2.10)	[0,1]	(4.64)	[0,1]	(1.00)	[0,1]	(0.79)	[0,1]	(0.80)
Catholic	.8(.0065)	3968	.64(.017)	968	.89(.009)	1192	.65(.024)	991	.011(.0064)	492	.01(.0034)	996
	[0,1]	(1.02)	[0,1]	(3.20)	[0,1]	(1.32)	[0,1]	(0.90)	[0,1]	(2.57)	[0,1]	(0.60)
Protestant	.0028(9.0e-04)	3968	.0021(.0016)	968	.0068(.0024)	1192	.007(.0048)	991	.29(.023)	492	.28(.017)	996
	[0,1]	(1.02)	[0,1]	(3.20)	[0,1]	(1.32)	[0,1]	(0.90)	[0,1]	(2.57)	[0,1]	(0.60)
Not religious	.18(.0063)	3968	.35(.017)	968	.091(.0084)	1192	.32(.023)	991	.66(.024)	492	.62(.019)	996
	[0,1]	(1.02)	[0,1]	(3.20)	[0,1]	(1.32)	[0,1]	(0.90)	[0,1]	(2.57)	[0,1]	(0.60)
Orthodox	3.9e-04(3.9e-04)	3968	0(0)	968	0(0)	1192	.0046(.0039)	991	0(0)	492	.014(.0047)	996
	[0,1]	(1.02)	[0,0]	(3.20)	[0,0]	(1.32)	[0,1]	(0.90)	[0,0]	(2.57)	[0,1]	(0.60)
Other religion	.014(.0019)	3968	.0085(.0033)	968	.0084(.0027)	1192	.023(.0084)	991	.034(.008)	492	.072(.0098)	996
	[0,1]	(1.02)	[0,1]	(3.20)	[0,1]	(1.32)	[0,1]	(0.90)	[0,1]	(2.57)	[0,1]	(0.60)
Student	.14(.0057)	4009	.12(.011)	999	.084(.008)	1208	.027(.0075)	1000	.11(.015)	505	.065(.011)	1001
	[0,1]	(0.00)	[0,1]	(0.10)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.10)
Retired	.15(.0057)	4009	.17(.013)	999	.18(.011)	1208	.19(.02)	1000	.23(.023)	505	.25(.017)	1001
	[0,1]	(0.00)	[0,1]	(0.10)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.00)	[0,1]	(0.10)
N	612		422		654		802		331		867	

Country Codes: 1 = Austria, 2=Belgium, 3=Britain, 4=Denmark, 8=Finland, 9=France, 10=Germany, 11=Greece, 13=Ireland, 14=Italy, 17=Luxembourg, 19=Netherlands, 22=Portugal, 25=Spain, 26=Sweden

Chapter 7

How voting power shapes higher education policy

7.1 Introduction

The higher education policy landscape in industrialised democracies has witnessed remarkable change over the last decades. Elitist post-war systems reserved for the fortunate few have expanded to provide university education to ever larger segments of the population. While expansions of enrolment have occurred across the board, the rate at and extent to which this has happened shows substantial cross-national variations. This chapter leverages the theoretical and empirical findings of the preceding chapters to explain some of this cross-national and over-time variation in higher education policy.

Thus far, chapters three and four have theoretically and empirically explored the preferences of highly and lesser educated groups with respect to higher education policy. Chapters five and six, again theoretically and empirically, have explored when parties and governments have incentives to act in accordance with the preferences of either group. The present chapter links these two themes in the dissertation by exploring whether parties act in the interest of highly educated citizens when they have incentives to do so. Do parties over which highly educated citizens have strong voting power pursue policies in accordance with the patterns of "highly educated interests" found in chapters three and four? Conversely, are policies favouring lesser educated citizens more likely to be pursued by parties that enjoy the voting power of the lesser educated strata of the population?

The present chapter applies the newly created voting power variable of the previous chapter as an explanatory variable of higher education policy. This approach distinguishes the contribution of this chapter from the extant literature in two important ways. First, the micro-foundations of the formal model of policy preferences are firmly rooted in the finding that parental education is the most determining characteristic determining whether a child attains higher education. Second, given that higher education preferences are modelled as a function of education and not income, higher education politics is modelled as a function of the incentives on offer to parties if they cater to highly educated individuals. This contrasts with most alternative theories that model higher education at the individual level as a function of income, and at the macro-level as a function of left-right cabinet partisanship (Ansell 2008*b*, 2010*a*, Iversen and Stephens 2008, Busemeyer 2009).

The argument in this chapter proceeds as follows. The next section discusses the theory linking cabinet voting power to higher education outcomes. Section three introduces the data and variables and section four discusses the statistical model. This is followed by a presentation and discussion of the results in section six, with separate subsections for the effects of higher educated voting power on enrolment and expenditure per student. Section six concludes.

7.2 A synopsis of the theory

Much of the theoretical background for the present analysis is provided in the preceding four chapters. The assumed motivation of governments is the desire of their constituent party/parties to maintain and consolidate their power. Increasing, or at least maintaining seat-share, is a rather uncontested mechanism to achieve this aim. How do parties increase or maintain their seat-share? The voting power approach developed theoretically and empirically in the previous two chapters has revealed that targeting some groups will have more of an effect on a party's electoral fortunes than targeting others. In particular, we now have a measure of the voting power of highly educated voters over cabinets. This tells us how much more a party stands to gain from pursuing the interests of highly educated voters compared to those of lesser educated voters.

How do parties pursue the interests of highly educated voters? The theoretical model in chapter three, tested in chapter four, reveals several higher education policy directions that improve the utility of highly educated voters. What is more, the zero-sum nature of our distributive model suggests that utility improvements for highly educated families imply a drop in the utility of lesser educated families. Hence, the policy preferences of highly and lesser educated families are always the exact opposite. The positive voting power of highly educated voters will therefore lead us to expect parties to pursue policies in the preferred direction of the highly educated. Negative voting power, in turn, will mean that parties pursue policies in the preferred direction of lesser educated voters.

The reader will remember from chapters three and four that highly educated citizens have distinct preferences over enrolment and subsidies per student. In particular, the baseline model hypothesises that preferences of highly and lesser educated families are contingent on current and parental enrolment rates. Highly educated families only benefit from expansions of enrolment at levels of enrolment below a threshold (h_h^*). Lesser educated families, on the other hand, only start to benefit from expanding enrolment once admission passes this threshold. This threshold, in turn, depends on the wage inequality between highly and lesser educated parents. A large wage difference between highly and lesser educated parents results in a higher tax bill for the former. Moreover, the strength of the parental education effect determines the likelihood that children of highly educated parents benefit from a newly created place in a higher education institution, and hence increases the thresholds for which highly educated families benefit from expanding enrolment. I expect parties over which highly educated citizens hold high voting power to pursue enrolment policies in line with these interests.

Since the probability of attaining higher education is always higher for children of highly educated parents, highly educated families are net beneficiaries of expanding university funding per student up to high levels of enrolment. The extent to which highly educated families benefit from this high probability of attaining university education, however, depends on their share of the tax burden, which is a function of the wage premium. All else being equal, highly educated families are expected to benefit more from increases in subsidies per student when wage inequality is low than when wage inequality is high. Furthermore, a strong parental education effect increases the likelihood of highly educated families benefitting from spending increases. As discussed in chapter three, diminishing marginal returns to investment in higher education will mean that the desire for higher per student spending is likely to be limited by some upper bound. I thus expect parties subject to high voting power from highly educated citizens to pursue increases in per student spending, especially when current expenditure is low, wage inequality is low and the parental education effect is strong. These preference patterns structured by income and enrolment rates have been confirmed using survey data in chapter four. The impact of the parental education effect on the preferences of highly educated voters, however, has not yet been tested on individual-level data because there was no variable available with sufficient over-time variation for the countries analysed.

The hypotheses below combine the voting power approach of chapters five and six with the preference model of chapters three and four. Hypotheses are phrased as the positive actions parties undertake when they are subject to the high voting power of highly educated voters. However, each implies a mirror negative hypothesis. That is, negative voting power will mean parties pursue policies in the opposite direction.

7.2.1 Enrolment hypotheses

From the baseline cost-pooling model we can derive the following hypothesis about the relationship between the voting power of highly educated voters and the enrolment policies pursued by parties in government.

Hypothesis 11 *At enrolment levels below a threshold value h_h^*, parties over which higher educated citizens hold high voting power will increase enrolment more than parties subject to high voting power of lesser educated voters. As enrolment surpasses this threshold, this relationship reverses and the voting power of the highly educated will result in reductions in enrolment.*

Expansions of enrolment below this threshold h_h^* will benefit highly educated voters because the children of highly educated parents have an above average probability of acquiring one of these newly created places. However, as the enrolment rate expands beyond this threshold, the new places will increasingly be taken up by the children of lesser educated parents. This pattern of preferences was confirmed at the individual-level in chapter four.

The extensions of the model in chapter three proposes two variables that may intervene in this preference relationship: wage inequality between highly and lesser educated families and the strength of the parental education effect. A higher wage premium means that the highly educated pay a higher share of the tax bill associated with higher education. The extension of the theoretical model in chapter three hypothesises that this lowers the range of parental enrolment rates over which highly educated families benefit from expanding higher education. The relationship can be summarised by the following hypothesis.

Hypothesis 12 *The higher the difference in wages between highly and lesser educated workers, the lower the threshold enrolment rate at which the enrolment preferences of parties subject to lesser and highly educated voting power reverses.*

Last, a strong parental education effect was predicted to increase the range of parental enrolment rates over which highly educated families benefit from expanding enrolment, albeit in smaller increments. This interaction is summarised by the following hypothesis.

Hypothesis 13 *The stronger the parental education effect, the higher the threshold enrolment rate at which the enrolment preferences of parties subject to lesser and highly educated voting power reverses.*

7.2.2 Party policies over expenditure

Next, the baseline model predicts that highly educated families will favour expanding per-student subsidies. The reason is that highly educated families have an above average probability of attaining higher education and will therefore prefer more spending. This relationship was confirmed in chapter four where highly educated respondents were consistently in favour of tuition fee waivers, grants, and more spending on higher education. This can be summarised in the following hypothesis.

Hypothesis 14 *Parties over which highly educated voters hold high voting power will pursue higher expenditure per-student than parties over which highly educated voters hold low voting power.*

However, the extension hypothesised that this relationship is likely to be conditional on the wage inequality between highly and lesser educated families. Again, the higher the wage inequality the more of the higher education tax bill will be paid for by highly educated parents.

Hypothesis 15 *As the wage premium increases, the positive effect of highly educated voting power on expenditure per student will fade and eventually reverse into a negative effect.*

The stronger the effect of the education of a child's parents on her probability of attaining higher education, the more overrepresented children of highly educated families will be in universities. Hence, all else being equal, the stronger the parental education effect, the more highly educated parents are expected to be in favour of increasing expenditure.

Hypothesis 16 *The stronger the parental education effect, the stronger the effect of highly educated voting power over parties in government on expenditures per student.*

The preferred expansion of expenditure predicted in the cost-pooling model was unlimited. The labour market extension of the model in chapter three brought some nuance (and realism) to this hypothesis. By instead modelling higher education as a productive good with diminishing returns, the hypothesis was amended to show that highly educated families prefer expansions of subsidies up to a certain, high level, while lesser educated families prefer a lower level. A higher education production function with this shape means that highly educated voters prefer most expansions of expenditure when expenditure is low, and that this preferred expansion diminishes as expenditure per student increases. This conditional relationship can be summarised by the following hypothesis.

Hypothesis 17 *The higher the expenditure per student, the less high voting power will be associated with increases in expenditure per student.*

7.2.3 Alternative hypotheses

The main rival hypotheses of expansions of higher education spending and enrolment are provided by Ansell (2008*b*, 2010*a*), Iversen and Stephens (2008), Busemeyer (2009). The power resource or partisanship approaches of Iversen & Stephens and Busemeyer predict that the Left will expand higher education enrolment and expenditure to overcome the class bias. The expected association is that Left-wing governments are associated with expansions of higher education, be they monetary or in terms of enrolment. This can be summarised by the following hypothesis.

Hypothesis 18 *Left-wing parties will be associated with expansion of expenditure on higher education and expansions of enrolment.*

Ansell (2008*b*, 2010*a*) instead proposes an interaction between the effect of government partisanship and the level of enrolment. Assuming that access to higher education depends on the income of parents, the richer half of the population – represented by the Right – benefits from expanding enrolment and expenditure at low levels of enrolment. As summarised in Ansell's paper (Ansell 2008*b*, p207):

Hypothesis 19 *At elite levels of enrolment, right-wing parties will prefer higher subsidisation, enrolment, and quality than left-wing parties.*

As enrolment reaches mass levels, however, the core constituencies of the Left will become the beneficiaries of increasing subsidies and enrolment. The relationship is therefore hypothesised by Ansell to reverse:

Hypothesis 20 *As enrolment expands, the partisan pattern is diluted and, past a certain threshold, left-wing parties will prefer higher subsidisation, enrolment, and quality.*

The remainder of this chapter confronts these hypotheses with panel data from 15 advanced industrial democracies between 1989 and 2009.

7.3 Variables, measurements, and data

7.3.1 Dependent variables: measuring higher education policy

Several studies have measured higher education policy as an aggregate, such as public spending on higher education as a percentage of gross domestic product (Iversen and Stephens 2008, Busemeyer 2009) or as a percentage of total education spending (Ansell 2008*b*, 2010*a*). As argued in chapter four, the distributive effect of a change in one of these aggregates, however, are contingent on whether such an increase in spending goes to an increase in enrolment or to an increase in spending

Table 7.1 – Gross enrolment rates for 14 European countries, 1990-2005

Country	1990	1995	2000	2005
Austria			55.7	48.3
Belgium	38.4	56.3	57.8	62.3
Denmark	36.1	48.2	57.6	80.8
Finland			82.8	92.0
France	39.7	51.0	53.3	55.3
Greece	36.1	42.3	51.2	90.4
Ireland	30.7	39.6	48.6	58.3
Italy	32.1	42.3	48.6	64.4
Netherlands	38.7	48.0	52.1	59.0
Portugal	23.7	38.8	48.1	55.7
Spain	37.0	47.8	59.3	66.1
Sweden			67.2	81.0
United Kingdom	30.2	49.6	58.1	59.4

Source: Gross total enrolment as a percentage of the 5-year cohort above the secondary school graduation rate
Notes: UNESCO Institute of Statistics. Obtained from World Bank Education Database on 1 May 2011.

per student. In this chapter I turn to analysing these two components of higher education policy.

Enrolment in higher education

In the theoretical model of chapter three the enrolment rate is defined as the percentage of children going to higher education. As such, it signifies the unconditional probability that a child will attain higher education qualifications. Depending on the strength of the parental education effect and the percentage of highly educated parents in society, a given enrolment rate can result in very different conditional enrolment rates for children of highly and lesser educated families. Three goals guide the identification of a variable to measure enrolment. First, it has to be a good proxy of the probability of attaining higher education. Second, it has to be widely available, both over time and across countries. Third, ideally the measure is comparable with those used in other analyses to allow for comparison of the findings.

The gross enrolment ratio from the UNESCO Institute of Statistics best satisfies these guiding goals. The measure provides a proxy for the probability that an individual attains higher education. The exact measure is the total enrolment in tertiary education, regardless of age, expressed as a percentage of the total population of the five-year age group following on from secondary school leaving age. Higher education is defined according to the International Standard Classification of Education.[1] Data is available continuously from 1990 till 2008, with some minor intermissions. This measure, however, comes with some caveats. First, gross enrolment includes international students and people registered for a second (or third or fourth) degree. Second, given that the stock of enrolled students is divided by a five-year age group, the ratio is affected by the average duration of degrees. The longer students take to finish a degree, the larger the total stock of students and hence the higher this enrolment rate. These variations do not necessarily reflect variations in the probability of attaining higher education. Third, the stock reflects several lags of intake. Hence, a policy change will take a few years to fully impact this measure. The measure can increase beyond 100 percent and should therefore not be interpreted as a probability. However, it is reasonable to assume that an increase in enrolment is positively associated with an increase in the probability of enrolling in higher education.

A better measure to approximate the probability would be the OECD's net entry rates, which measures the probability that an individual of a given cohort will enter higher education for the first-time, over the course of their life-time (OECD 2010). Other candidate measures include completion rates or graduation rates (OECD 2010), which tap into the probability that an individual will attain a university degree. In spite of the methodological superiority of these alternative measures in approximating the probability of attaining higher education, the gross enrolment rate is preferred because it is available over a substantially longer period of time (from 1990 as opposed to 1999) and because it is directly comparable to other work in the political economy literature on enrolment rates by Ben Ansell.

Table 7.1 on the previous page summarises the distribution of enrolment across

[1]See Schneider (2008, 2010) for a critical review of this classification scheme

Table 7.2 – Expenditure per student in 14 European countries, 1990-2005

Country	1990	1995	2000	2005
Austria			43.5	50.0
Belgium	32.4	17.6	34.9	34.7
Denmark	55.6	49.2	70.2	55.4
Finland			38.4	34.4
France	23.5	25.5	29.2	33.2
Greece	23.9	20.6	20.8	24.6
Ireland	37.1	30.6	30.7	24.8
Italy	22.1	21.4	26.6	22.2
Netherlands	47.4	45.4	45.4	42.8
Portugal	32.2	23.7	26.9	27.1
Spain	19.4	16.0	20.5	22.7
Sweden			50.1	40.6
United Kingdom	46.7	39.9	23.4	32.1

Notes: Total current and capital expenditure on higher education divided by total gross enrolment. The measure is presented as a percentage of GDP per Capita. Data missing for Germany.
Source: UNESCO Institute of Statistics. Obtained from The World Bank Education Statistics Database on 1 May 2011.

countries at five year intervals between 1990 and 2005. Enrolment has expanded across most countries. I argue that, at low levels of parental education, much of this growth was in the interest of highly educated families. This image is consistent with the high average voting power of highly educated voters found in the previous chapter. However, the rate at which expansion has taken place varies across countries. Some countries, like Spain, France and the United Kingdom have seen the expansion of enrolment flatten out, while Austria saw a minor reduction. The expansion from 51.2 to 90.4 per cent in Greece between 2000 and 2005 is treated as suspect, and the analyses of enrolment exclude Greece.

Expenditure per student

For expenditure per student I use a variable from the UNESCO Institute of Statistics measuring the total expenditure per student as a percentage of GDP per capita. This is the total public expenditure per student in tertiary education as a percentage of GDP per capita. This includes all current and capital government spending on educational institutions (both public and private), education administration as well as subsidies for private entities (students/households and other privates entities).

The analysis uses a logged measure of expenditure. There are two main reasons that a logged measure is preferred. First, the distribution of expenditure is skewed towards the right. By taking the log I correct for this skew such that the model better matches the assumed distribution of error terms in the regression analysis. Second, the diminishing returns to education discussed in chapter three are better captured by a logged variable. A given absolute increase at a low level of spending will have a different impact on utility than the same absolute increase at a higher level of spending.

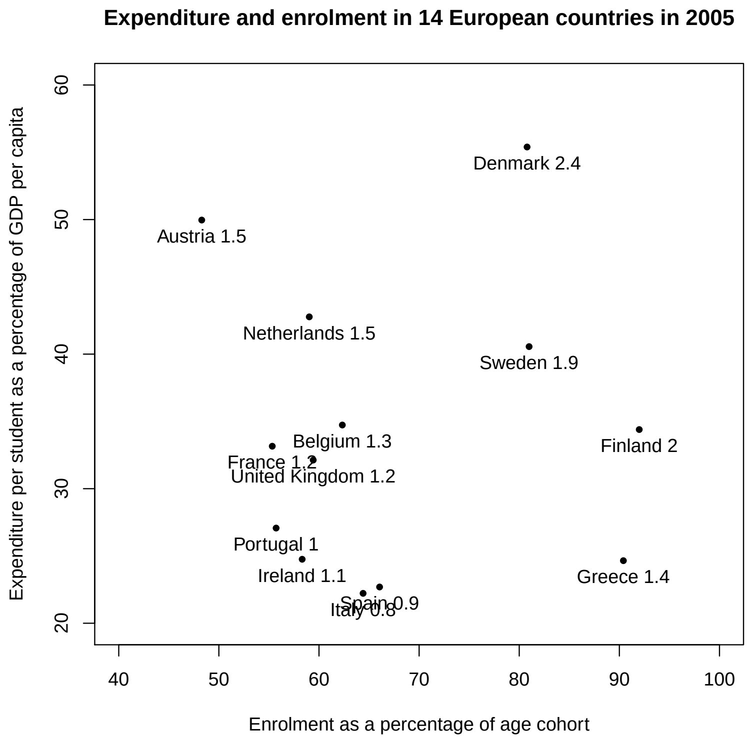
Table 7.1 on page 297 summarises the distribution of expenditure per student across countries at five year intervals between 1990 and 2005. There is no similar upward or downward trend as was the case with enrolment. Instead, some countries have witnessed a downward trend (such as the UK and Ireland) while others (such as France) have experienced an upward trend.

Figure 7.1 on the next page plots the two dependent variables in a scatterplot. The labels in the figure also contain the total expenditure on higher education as a percentage of GDP. The figure shows that countries can occupy many positions in this space, and that there is no direct relationship between both explanatory variables. There is no strict relationship between the generosity of higher education systems and the enrolment rate. High enrolment does not follow on from higher per student spending (as Fernandez and Rogerson (1995) would suggest). Moving from the left-bottom to the right-top the total higher education budget increases. However, any move from left top to the right bottom is within budget. This figure demonstrates that similar levels of overall higher education spending can have substantially different distributive effects.

7.3.2 The explanatory variable: cabinet voting power

The explanatory variable is the weighted measure of cabinet voting power in the preceding year, developed in the chapter four and five. Data is available for the

Figure 7.1 – Enrolment and expenditure per student in 2005



Notes: Based on figures in table 7.1 and table 7.2.

twelve EU12 countries between 1989 and 2009 and for three EU15 countries between 1999 and 2009. To remind the reader, we first calculate the voting power of highly educated voters with respect to each party in the year of European election studies. These measures are then interpolated between surveys using simple linear interpolation. The cabinet measure is the average voting power of the parties in government, weighted by their share of seats in parliament.

Table 6.4 on page 260 summarises the distribution of this variable. Chapter six discusses this measure in more detail. As the table shows, there is substantial within and between country variation in the voting power of highly educated voters over cabinets. This variation will be used here to explain changes in higher education policy. As in the previous chapter, I express voting power as the difference in voting power between highly and lesser educated individuals, expressed as a percentage of average voting power over that party. The cabinet measure is the weighted average

Table 7.3 – Higher education rates in 14 European democracies, 1990-2005

Country	1990	1995	2000	2005
Austria			19.8	17.1
Belgium	20.7	24.6		
Denmark	41.2	51.2	62.0	62.1
Finland			40.8	49.8
France	17.5	22.9	36.7	32.7
Greece	15.2	18.1	32.1	38.6
Ireland	7.7	9.8	19.3	25.1
Italy	14.4	17.0	23.0	17.6
Netherlands	28.6	27.4	46.8	52.9
Portugal	8.0	11.2	18.7	24.7
Spain	13.8	17.2	30.0	21.6
Sweden			46.6	46.4
United Kingdom	11.9	13.8	23.1	23.1

Notes: Percentage of adult respondents who were in full time education until the age of 21. Authors own calculations based on European Election Studies data. Sample weights applied. Data interpolated between survey-years
Source: European Election Studies (1989, 1994, 1999, 2004, 2009)

of these voting power measures of the parties in cabinet.

7.3.3 Intervening variables

The relationship between individual education levels and higher education policy preferences is predicted to depend on several intervening variables. The probability of enrolling in higher education is modelled as the joint outcome of the enrolment rate, the parental enrolment rate and the strength of the parental education effect. Moreover, the wage premium of highly educated families is hypothesised to affect the contribution of highly educated parents to financing higher education, and consequently their level of support for expansions of enrolment and spending.

Parental education rates

Parental education rates are estimated from the same European Election Studies surveys as our voting power measure, and also interpolated for the years between surveys.[2] Highly educated voters are defined as those respondents who completed their education at age 21 or beyond. This is the same definition as used for calcu-

[2] Sampling weights are applied to estimate these measures.

Table 7.4 – Wage premium to higher education

Country	1990	1995	2000	2005
Austria			152.0	152.0
Belgium	127.7	127.7	127.7	132.7
Denmark	124.1	124.1	124.2	125.4
Finland			153.4	149.0
France	149.7	149.7	149.8	143.9
Greece				
Ireland	141.8	141.8	152.8	154.5
Italy	126.8	126.8	137.8	159.7
Netherlands	148.3	148.3	148.3	152.5
Portugal	176.8	176.8	177.8	177.4
Spain	144.1	144.1	133.9	133.9
Sweden			131.3	126.4
United Kingdom	157.0	157.0	160.4	157.9

Notes: Relative earnings of highly educated workers for 25-64 year-olds. Upper secondary and post-secondary non-tertiary education = 100. Available 1998-2008. Imputed at the latest value for years before 1998.
Source: OECD (2010)

lating the voting power of the highly educated group in the previous chapter. This estimate is bound to have some type I and type II errors. Those with non-tertiary post-secondary degrees will be categorised as highly educated (false inclusions), and some of those completing their undergraduate degrees very quickly may be categorised as lesser educated. Nevertheless, the variable should reasonably capture a substantial portion of the highly educated population. Better measures exist, but not for the right time-frame or countries. Such alternative measures include estimates of the percentage of the labour force or population with a tertiary degree from the OECD, the International Labor Organization (ILO) or Eurostat, the statistical office of the European Union. Table 7.3 on the preceding page summarises the distribution of the parental education level estimate.[3]

Wage premium of higher education

The wage premium is attained from the OECD (2010). It is defined as the earnings of those with tertiary education over those with non-tertiary upper secondary or post-secondary education for the working-age population (25-64 years old). Country-

[3]Because this measure is a survey-based estimate the measure is likely to have some errors. For example, it is likely that Spain's estimate of 30 percent and subsequent reduction to 21.6 percent is likely to be due to sampling error

year data is available for 1998 to 2008. For years in which no data is available the closest country-year estimate was used. Therefore the estimates for 1990 and 1995 are often similar.

Parental education effects

Parental education effects are estimated in chapter two. Table 2.2 on page 37 presents these measures. I remind readers that these figures are estimated odds ratios for the effect of having one highly educated parent on attaining higher education. For the present analysis we rely on the estimated odds ratio for the 1970s cohort. This means that the parental education effects are left time invariant. Methodologically it is difficult to measure changes by year because this reduces the sample size. This would increase the sampling error of our estimate. Substantially these effects, as demonstrated by their trends, are likely to be long-term patterns, affected by the structure of primary and secondary education.

7.3.4 Other Explanatory Variables

In addition, several other explanatory variables are included in the analysis that may also explain our two dimensions of higher education policy.

Government partisanship

To begin with, the main rival explanation from the literature – government partisanship – is included in the analysis. The various partisanship measures available were discussed in more detail in chapter five.[4] We rely here on an annual measure by Armingeon et al. (2011) of the percentage of total cabinet posts held by social-democratic and other left parties, weighted by days in government. As Powell (2000) notes, the percentage of cabinet posts generally reflects the seat-share of the coalition parties. This measure was chosen over alternative measures, such as

[4]For a further discussion see Huber and Powell (1994) and Rueda (2007)

manifesto and expert based "centre of gravity" measures, because of its availability until 2008 (as opposed to 2005). Of the other studies of higher education spending, Iversen and Stephens (2008) and Busemeyer (2009) both rely on a similar measure. Ansell (2008*b*, 2010*a*) uses a manifesto based measure of partisanship. In addition, to test and control for the conditional-partisanship effect hypothesised by Ansell I also include an interaction between partisanship and the enrolment rate.

Young population, debt and social-transfer generosity

Furthermore, a measure of the percentage of the total population aged 15-24 is included (derived from UNESCO Institute of Statistics data in the World Bank's Education Statistics database). This measure is included to control for demographic pressures on the enrolment rate. Baby booms and busts could substantially increase the demand side of higher education, unrelated to the other factors included in the model.

A measure of gross government debt is added. Countries with larger debts may be constrained in their ability to expand the higher education budget either by expanding enrolment or by expanding per-student spending. A measure of social-transfer generosity is included in the analysis of per-student spending. More generous welfare states may be spending more across the board, and higher education policy may just be one of these areas. The variable measures social security transfers as a percentage of GDP. Social assistance grants and welfare benefits paid by general government (benefits for sickness, old-age, family allowances, etc.). Both of these measures are obtained from Armingeon et al. (2011).

7.4 Methodology

7.4.1 Statistical methodology

Does the voting power of highly educated voters shape higher education policy? The theoretical expectations described above are confronted with panel data from 15 advanced industrial democracies between 1989 and 2009. For enrolment, the analysis extends from 1989 (the earliest year for which voting power data is available) to 2008 (the latest year for which enrolment data is available). For expenditure per student the data extends from 1992 to 2007 because of missing data for some years of the expenditure per student variable. The data's panel structure allows for properly testing hypotheses concerning policy change, exploring both the consequences of variations between countries and within countries over time. Additionally, panel data analysis allows for the control of time-invariant country characteristics and common year-specific heterogeneity (Baltagi 2008) To analyse these effects I first specify the data generating process that is expected to link voting power to higher education policy outcomes. While the pooled time-series cross-section nature of the data increases the observation and allows us to test more complex models, it also poses some challenges.

One such challenge is the dynamic nature of the data. Higher education policy is not rewritten from scratch at the beginning of each year, but instead follows a trend. We thus expect a strong lagged effect of policy in the previous year on policy today. In the absence of any political pressure to change, we would expect policy in one year (Y_t) to be heavily influenced by the policy in the previous year (Y_{t-1}). The tables above suggest that there is a substantial path dependent trend for both spending and enrolment. In addition, our measure of enrolment is an aggregation of several rounds of student intakes, hence a change in one intake cohort will affect our measure of enrolment until that cohort graduates. Moreover, the literature on historical institutionalism has provided us with a variety of insights on the reasons why policies can be expected to be sticky (Thelen 2004, Pierson 2000, 2004), such as increasing returns and other lock-in effects. Moreover, it is well known from the veto-player literature that the position of the status quo affects the direction and ability to change (Tsebelis 2002, Tsebelis and Garrett 2001). To address this property of the data generating process I include a lagged dependent variable.

A convenient way to model such processes is to use a single equation error correction model (Beck 2001, De Boef and Keele 2008). Error correction models directly estimate the rate at which the dependent variable changes to return to equilibrium following a change in the explanatory variable. Moreover, they estimate the impact of a change in the explanatory variable on the long-run equilibrium itself. The main advantages of such models are that 1) they allow us to estimate short term and long term effects of the variables of interest on the dependent variables, and 2) they are a solution to potential issues of non-stationarity in time-series data (De Boef and Keele 2008). An ECM estimates the first difference in the dependent explanatory variable as a function of the lagged dependent variable, a first difference of the explanatory variables of interest, and a lag of the explanatory variable of interest. Specifically, I estimate the following model

$$\begin{aligned}\Delta Y_{it} = \;& \alpha_0 + \alpha_1 Y_{i,t-1} + \beta_0 \Delta \mathrm{VP}_i + \beta_1 \mathrm{VP}_{i,t-1} + \textstyle\sum_k \left(\beta_{2k} \mathrm{IV}_{ik,t-1}\right. \\ & \left. + \gamma_{0k} \Delta(\mathrm{IV}_{ik} \times \mathrm{VP}_{ik}) + \gamma_{1k} \mathrm{IV}_{ik,t-1} \times \mathrm{VP}_{i,t-1}\right) + \textstyle\sum_l \lambda_l X_{il,t-1} + \mu_j + \epsilon_{it}\end{aligned} \tag{7.1}$$

where ΔY_{it} is the change in the dependent variable enrolment or per-student spending; $Y_{i,t-1}$ is the lagged dependent variablel $\Delta \mathrm{VP}_i$ and $\mathrm{VP}_{i,t-1}$ are the first difference and the lag of the voting power of higher educated individuals over the cabinetl $\mathrm{IV}_{ik,t-1}$, $\Delta \mathrm{VP}_{i,t-1} \times \mathrm{IV}_{ik,t-1}$ and $\mathrm{VP}_{i,t-1} \times \mathrm{IV}_{ik,t-1}$ are respectively the constituent term, the first difference and the lagged value of the interactions between voting power and the $k = 1, \ldots, K$ variables intervening in the relationship between voting power and policy change, $X_{il,t-1}$ are the lagged batch of $l = 1, \ldots, L$ control variables. $\mu_j + \epsilon_{it}$ are respectively the panel-specific and idiosyncratic error terms.

The coefficients for the first differences of voting power (β_0) and the interaction effect (γ_0) capture the short-run effect of voting power on higher education policy. I am interested, however, in the effect of voting power on the long-run equilibrium value of higher education policy. The slope of the lag of voting power (β_1) and the lag of the interaction term (γ_{1k}) capture this long term effect. We cannot interpret these coefficients of an interaction effect in isolation, however. Instead, we have to consider them jointly by looking at the implied coefficient and its standard error. The implied coefficient for the long term effect of voting power on higher education policy change is given by taking the derivative of equation (7.1) with respect to the voting power variable.

$$\frac{\partial \Delta Y_{it}}{\partial \mathrm{VP}_i} = \beta_1 + \sum_k \left(\gamma_{1k} \mathrm{IV}_{ik,t-1}\right) \tag{7.2}$$

Equation 7.2 exactly specifies a central argument of this dissertation, namely that the effect of highly educated voting power on higher education policy is conditional on intervening variables such as the parental education rate, the wage premium of higher education and the strength of the parental education effect. The standard errors of these marginal effects are conditional on the intervening variables as well, and calculated using conventional methods.[5]

How do we interpret this implied long-term coefficient? First, we can calculate the long term multiplier k_1, which is the effect of the variable of interest on the long-term equilibrium. We attain this by dividing the implied coefficient by $-\alpha_1$, the error correction rate (see De Boef and Keele 2008). Note that in error correction models α_1 typically takes on negative values between -1 and 0, where values close to -1 mean the model returns to equilibrium fairly quickly whereas values close to zero mean that the model will take many periods to reach equilibrium.[6] The long term multiplier is thus given by $([\beta_1 + \sum_k (\gamma_{1k} \mathrm{IV}_{ik,t-1})]/-\alpha_1)$. The effect of the first period is then $\beta_1 + \sum_k (\gamma_{1k} \mathrm{IV}_{ik,t-1})$, the effect in the second period $(-\alpha_1) \times [\beta_1 + \sum_k (\gamma_{1k} \mathrm{IV}_{ik,t-1})]$, etc. Therefore, our implied coefficient provides us directly with the first year step to achieving this long term adjustment, and – in combination with the error correction rate $(-\alpha_1)$ – with the lagged effects of voting power on higher education policy into the future.

[5]See for more details (Brambor, Clark and Golder 2006, Kam and Franzese 2007).

[6]Readers may be more familiar with autoregressive distributive lag (ADL) specifications of time series models of the kind $Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \beta_0 X_t + \beta_1 X_{t-1}$

Another issue with cross-sectional panel data, especially if the panels are unbalanced, is that heteroskedasticity tends to be panel specific. Beck and Katz (1995, 1996) have proposed a way to correct for this and the estimates presented here use their suggested method. To ensure that my results are not driven by this choice of correction, I also include tables with random-effect estimates in the appendix of this chapter.[7] In addition, I also test a more conventional autoregressive-distributive lag model which estimates levels of the dependent variable and includes a lag of the explanatory variables of interest. These robustness checks are included in the appendix at the end of this chapter in tables 7.7 and 7.8.

The following pages contain the results of the analyses for the two dependent variables enrolment and subsidies per student. The two regression tables (7.5 and 7.6) each present several models. I present coefficients with standard errors in parentheses. To facilitate the interpretation of coefficients and standard errors the significance levels are marked with asterisks following conventional notation (*** if $p<.01$, ** if $p<.05$, * if $p<.10$). The tables start with the coefficient for the lagged dependent variable at the top, followed by the coefficient for voting power. This is followed by the intervening variables and their interactions. The bottom of the table presents the results of other explanatory variables.

7.5 Results

7.5.1 The effects of voting power on enrolment policy

How does the voting power of highly educated citizens affect enrolment policies? In this section I test the hypothesis that the high voting power of highly educated citizens *increases* enrolment when enrolment is below a certain threshold and *decreases* enrolment when enrolment is above a certain threshold. The theoretical model developed in chapter three provides us with the predicted values for these thresholds (see table 3.2 on page 88). In addition, I test whether high wage inequality between

[7]See Baltagi (2008) for details on estimating random effects with panel data

Table 7.5 – The effect of highly educated voting power on enrolment

Variable	(1)	(2)	(3)	(4)
Lagged Enrolment Rate	-0.009	-0.004	-0.019	-0.016
	(0.009)	(0.014)	(0.015)	(0.015)
Δ Voting Power	0.104**	0.077*	0.167	0.207
	(0.045)	(0.045)	(0.163)	(0.189)
Voting Power$_{t-1}$	0.055***	0.060***	0.307***	0.356***
	(0.020)	(0.019)	(0.087)	(0.116)
Parental Education Rate$_{t-1}$	0.013	0.016	0.041**	0.026
	(0.016)	(0.015)	(0.016)	(0.017)
Δ Voting Power	-0.004***	-0.002*	-0.003**	-0.003**
$\times$ Parental Education Rate	(0.001)	(0.001)	(0.001)	(0.001)
Voting Power$_{t-1}$	-0.002***	-0.002***	-0.003***	-0.003***
$\times$ **Parental Education Rate**$_{t-1}$	(0.001)	(0.001)	(0.001)	(0.001)
Population 15-24	16.894*	20.738**	27.080***	17.501*
	(8.798)	(9.182)	(9.667)	(9.567)
Wage Premium$_{t-1}$			0.034**	0.045***
			(0.014)	(0.016)
Δ Voting Power			-0.000	-0.001
$\times$ Wage Premium			(0.001)	(0.002)
Voting Power$_{t-1}$			-0.002***	-0.002**
$\times$ **Wage Premium**$_{t-1}$			(0.001)	(0.001)
Parental Education Bias				-0.205*
				(0.105)
Δ Voting Power				0.003
$\times$ Parental Education Bias				(0.013)
Voting Power$_{t-1}$				0.010*
$\times$ **Parental Education Bias**				(0.006)
Δ Left Government		-0.131***	-0.131***	-0.127***
		(0.032)	(0.031)	(0.031)
Left Government$_{t-1}$		-0.008	-0.018	-0.010
		(0.016)	(0.017)	(0.017)
Δ Left Government		0.002***	0.002***	0.002***
$\times$ Enrolment		(0.001)	(0.001)	(0.001)
Left Government$_{t-1}$		0.000	0.000	0.000
$\times$ Enrolment$_{t-1}$		(0.000)	(0.000)	(0.000)
Sovereign Debt$_{t-1}$			0.016***	0.016***
			(0.005)	(0.005)
Constant	-0.701	-1.394	-8.195***	-6.999**
	(1.529)	(1.622)	(2.807)	(2.834)
Number of Observations	205	205	199	199
Number of Countries	14	14	14	14
R^2	0.121	0.191	0.221	0.247

Source: Various sources, see text for details
Notes: Dependent variable is the first difference in the gross enrolment rate in percentage points. All entries are OLS estimates with Panel-corrected standard errors. Variables in bold are the long-term effects of voting power of interest to the hypotheses tested. Standard errors are in parentheses. The asterisks signify conventional notations of statistical significance: * if $p < .10$, ** if $p < .05$, and *** if $p < .01$.

highly and lesser educated parents reduces the effect of the voting power of highly educated citizens, and whether a strong parental education effect increases the effect of highly educated voting power on enrolment. These hypotheses are tested against the main alternative hypotheses that explain higher education policy based on government partisanship.

As in the analysis of individual preferences in chapter three, parental enrolment rates and actual enrolment rates are highly correlated. Since including interactions of both current and parental enrolment rates is likely to lead to issues of multicollinearity, I instead rely on interactions with the parental enrolment rate only.[8] Table 7.5 on the preceding page presents the results for the determinants of enrolment policy in four models.

Model (1) includes the voting power of highly educated citizens, the parental education rate, an interaction between these two terms, and the percentage of the population of university going age – a straightforward control variable. The implied coefficient for the effect of highly educated voting power in model (1) is given by $.055 - .002 \times$ Parental Education Rate. This means that the effect of voting power is positive up to a parental enrolment threshold of 27 percent, and negative for parental enrolment rates above this threshold. Note that this predicted inversion point it very close to the threshold values predicted by the formal model in table 3.2 on page 88 in chapter three. The estimated threshold is somewhere in between the thresholds predicted for the marginal tax and the progressive tax scenarios of the formal model. How substantial are these effects of voting power on enrolment? At a low parental enrolment rate of 10 percent, a one percent increase in the voting power of highly educated citizens is associated with a .035 increase in the enrolment rate. The voting power measure for this sample, however, ranges from -59 to +56, with mean 7 and standard deviation 18. A one standard deviation change in voting power, therefore, will result in a .62 percent effect in the next period. The error correction

[8]The coefficient for the correlation between an interaction of voting power and parental enrolment and the interaction between voting power and the current enrolment rate is .95.

rate of the model – the rate at which higher education returns to equilibrium – is very low ($-\alpha_0 = .009$), meaning it takes a lot of future periods to arrive at the equilibrium. This means that our .62 percent effect will have substantial lagged effects. Consequently, this modest one period effect translates into a very high long-term multiplier effect of 71.4 percent, which will take many years to be reached. Since this lagged effect stretches beyond the sample (i.e. the mean and median lag lengths are far beyond the 20 years in the sample), I also calculate the effect of a standard deviation change over one decade.[9] This decade effect of a standard deviation change in the voting power of highly educated citizens over the cabinet is 6 percent. In other words, a standard deviation increase in the voting power of highly educated citizens over the cabinet increases the enrolment rate by 6 percent over the period of a decade.

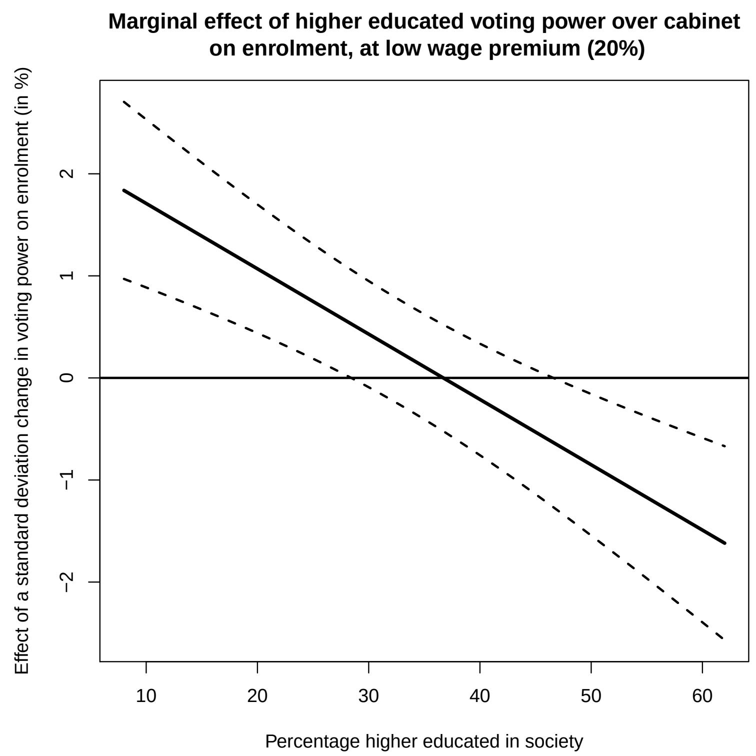
Model (2) introduces the main rival explanation, government partisanship. I include both a variable of left wing government, and the interactive term between the enrolment rate and left wing government. In addition, I include the sovereign debt variable as a measure of the constraints on the government's budget. Under these two model specifications, the effect of highly educated voting power and the interactive term maintain significance. Neither the long-term effect of the partisanship variable nor the long-term effect of the interactive term with enrolment are significant.[10] Surprisingly, the effect of sovereign debt is significantly positive. This is in the opposite direction of the expectation, as high debt was seen as a constraint. Nevertheless, as the recent debt crisis has taught us, increasing debt and increasing public spending may actually go hand in hand.

Model (3) introduces the additional interactive effect of the wage premium. The hypothesis is that a higher wage premium increases the tax costs of public higher education for highly educated families, and thus *reduces* the effect of the

[9] This is the sum of the series $18 \times \beta_1 + (1-\alpha)\beta_1 + (1-\alpha)^2\beta_1 + \ldots + (1-\alpha)^9\beta_1$ where β_1 is the implied coefficient for the long-run effect.

[10] The significant short term effects can be ignored as they have no long term substantial significance.

Figure 7.2 – Marginal effect of highly educated voting power on enrolment, low wage premium



Notes: The effect of a one standard deviation (18 percentage point) increase in voting power at different parental education rates and a low wage premium (20 percent). This is the effect for the first period only, see text for a discussion of long-term effects. Estimates based on model (3) in table 7.5

voting power of higher educated citizens on expanding enrolment. The coefficient for the wage premium and its interaction with highly educated voting power are both statistically significant. The implied coefficient of voting power is $.307 - .003 \times$ Parental Education Rate $- 002 \times$ Wage premium. Hence, the effect of the wage premium on the effect of voting power is in the expected direction: higher wage inequality reduces the effect of voting power on enrolment policy. How substantial is this effect of the wage premium on the effect of voting power? To provide an insight into the effects of highly educated voting power on enrolment at different wage premiums and parental education rates, figures 7.2, 7.3 and 7.4 plot the effect of a one standard deviation change in voting power (18) at different parental education rates for respectively the minimum, median and maximum wage premium.

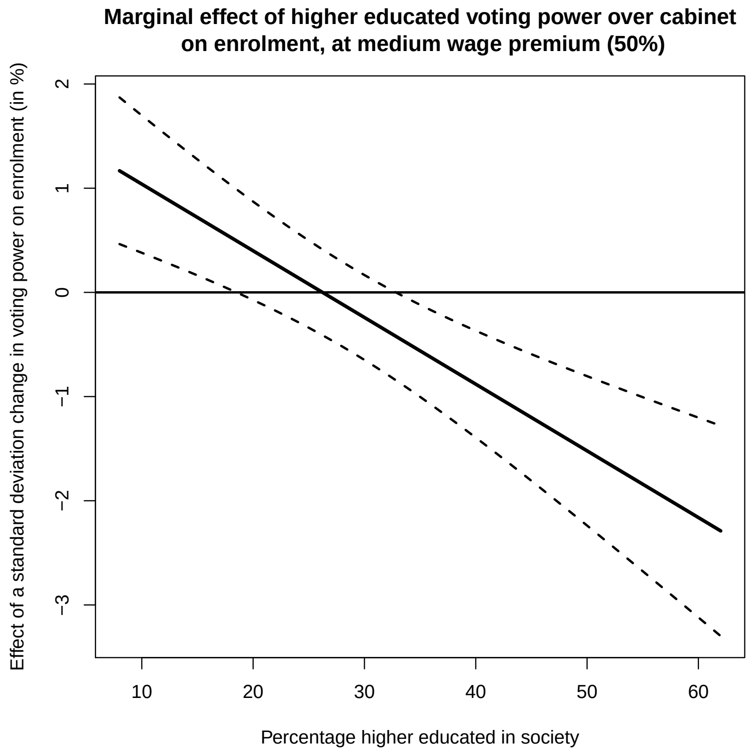
At the lowest wage premium (figure 7.2), the effect of highly educated voting power starts positive and declines to zero at a parental enrolment rate of 38 percent. The effect of highly educated voting power on enrolment then turns negative at parental enrolment rates above 48 percent. Under these model parameters, the prediction of the inversion point is very close to the theoretically expected inversion point for a country like Sweden, which has a very low wage premium. At the lowest rate of parental enrolment, the graph shows us that a standard deviation change in the voting power of highly educated citizens results in a first period effect of 1.8 percentage point increase in the enrolment rate. The lagged effect of such a change over a decade is a substantial increase of 16 percent in enrolment.[11] In contrast, at the higher rates of parental enrolment on the right side, the effect of a standard deviation increase in the voting power of highly educated citizens is predicted to result in a decline of -1.6 percentage points in the first period. Given the strong lagged effect this equals a substantial cumulative decline of -14 percentage points over a decade.

Moving on to the medium wage premium (figure 7.3), the predicted effect similarly starts out significantly positive but declines to zero at around 27 percent and turns significantly negative above 33 percent. Again, these inversion points are very close to the threshold parental enrolment rates predicted for medium wage premiums in table 3.2. The positive effect of a standard deviation change at the low end of the range of parental education rates is 1.2 percentage points for the first period, or a cumulative lagged effect of 11 percent over a decade. The negative effect at the high end of the range is -2.3, which equals a cumulative lagged decline of 21 percent over a decade.

Last, at the highest wage premium (figure 7.4) the effect of highly educated voting power starts at zero and declines to become significantly negative at parental enrolment rates above 23 percent. This inversion point is below the lowest inversion points predicted by the theoretical model in table 3.2. Moreover, no significant

[11]See footnote 9 for an explanation of how this figure is attained.

Figure 7.3 – Marginal effect of highly educated voting power on enrolment, medium wage premium



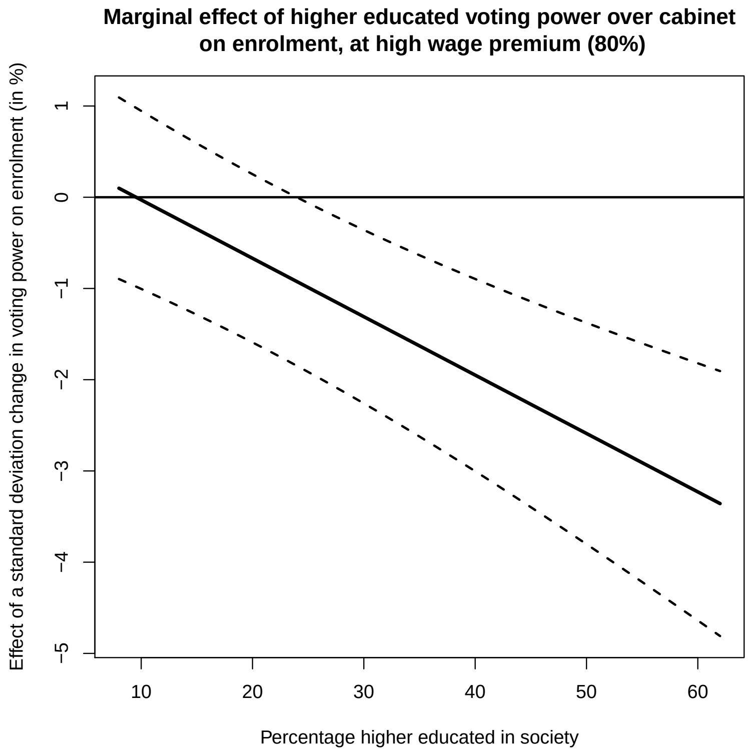
Notes: The effect of a one standard deviation (18 percentage point) increase in voting power at different parental education rates and a medium wage premium (50 percent). This is the effect for the first period only, see text for a discussion of long-term effects. Estimates based on model (3) in table 7.5

positive effect of voting power remains at the highest wage premium. Instead, parties over which highly educated citizens hold high voting power are associated with a decline in enrolment for parental education rates above 23 percent. This is more in line with the inversion points predicted by the theoretical model for Ireland and Portugal under progressive tax assumptions (i.e. $\alpha_h = 20$).[12]

In short, the data pattern closely resembles the predictions of the theoretical model for low and medium wage premiums. As wage inequality reaches its highest levels, however, the estimated effect of highly educated voting power is somewhat lower than predicted. While the model in chapter three predicts this negative effect of the wage premium, the results are somewhat stronger than expected. Poten-

[12] While these countries potentially had a positive effect of highly educated voting power at the lowest levels of parental enrolment, these rates are not included in the present sample.

Figure 7.4 – Marginal effect of higher educated voting power on enrolment, high wage premium



Notes: The effect of a one standard deviation (18 percentage point) increase in voting power at different parental education rates and a high wage premium (80 percent). This is the effect for the first period only, see text for a discussion of long-term effects. Estimates based on model (3) in table 7.5

tial explanations come in three forms. First, if tax systems are more progressive than a marginal tax then the effects of a high wage premium on the tax burden of highly educated citizens are substantially higher. Second, our measure of the wage premium gauges the difference between highly educated individuals and those with upper secondary and post-secondary non-tertiary degrees. This means that the actual educational level of non-higher educated workers is actually lower than the index of 100. After all, individuals without even upper-secondary education earn less than 100. Hence, the wage premium used to predict threshold values in chapter three (see table 3.2 on page 88) may actually underestimate the actual wage premium of higher education. Third, the reader may remember from the theoretical model that the predicted values for α_h^* in chapter three assume that the enrolment rate equals the parental enrolment rate. In actual fact, based on the tables presented earlier in this chapter, we find that actual enrolment rates are always higher than the parental enrolment rates. This will mean that the preferred direction of enrolment is lower than the values predicted by our theoretical model.

Last, model (4) introduces the strength of the parental education effect as a third intervening variable. At first, a strong parental education effect has a negative effect on enrolment. A strong parental education effect reduces the likelihood of children of lesser educated parents of attaining higher education, and therefore reduces their interest in expanding higher education at low levels of enrolment. Second, there is a weakly significant ($p<.10$) interaction effect between the strength of the parental education effect and voting power. Governments over which the highly educated hold voting power are more likely to expand enrolment when the parental education effect is strong. This conforms with the theoretical model's prediction that highly educated citizens are more in favour of expanding higher education when their children are more likely to benefit.

To sum up, the predictions of these four models of enrolment policy provide substantial support for the theory developed in this dissertation. Chapter four already found that highly educated citizens are in favour of expanding enrolment when parental education is below a certain threshold, and oppose expanding enrolment above that threshold. The analysis in this section further shows that parties that have incentives to cater to the interests of highly educated citizens – those over which highly educated citizens hold high voting power – pursue policies in line with this pattern of interests. Conversely, parties over which lesser educated citizens hold high voting power are likely to oppose expanding enrolment at low levels of enrolment and pursue expansions of enrolment once admission passes a certain threshold. The effect of the wage premium and the parental education effect, moreover, are in the expected direction: more inequality in the wages between the highly and lesser educated makes the highly educated less (and the lesser educated more) in favour of expanding enrolment. Last, a strong parental education effect increases the support for expanding enrolment amongst parties over which the highly educated hold voting power. This is because highly educated families benefit more from expanding enrolment when the system strongly favours their children. In contrast, once we control for the voting power of highly educated citizens, the main rival explanation of enrolment preferences – government partisanship – becomes insignificant. All these models of enrolment policy are replicated in table 7.7 on page 327 as random effects error correction models and autoregressive distributive lag (ADL) specifications. The results are robust to these alternative specifications.

7.5.2 The effects of voting power on expenditure per student

In this section I analyse the effects of voting power on the other dimension of higher education policy: expenditure per student. The theoretical and empirical analyses in chapter three and four teach us that highly educated citizens favour higher spending on university education than lesser educated citizens. Moreover, this is hypothesised to be the case for most enrolment rates and wage premiums. However, chapter three also predicts that this desire for increased higher education spending is not unlimited. Marginal diminishing returns to spending per student will reduce this preference for further expansion once expenditure reaches high levels. The level at which this maximum is achieved, in turn, is predicted to depend on the enrolment rate, the wage premium and the parental education effect. There is less data available for this dependent variable and the number of observations for these analyses ranges between 112 and 125 country-years.

Table 7.6 on the next page presents the results of several models of per-student spending. I remind the reader that expenditure per student is measured as the log of expenditure per student (measured as a percentage of GDP per capita). To begin with, model (1) presents the results for the cost-pooling model's prediction that parties over which highly educated individuals hold high voting power will always

Table 7.6 – The effect of highly educated voting power on spending per student

Variable	(1)	(2)	(3)	(4)
Lagged Expenditure per Student	-0.0505***	-0.1027***	-0.1092***	-0.1367***
(Log)	(0.0189)	(0.0329)	(0.0330)	(0.0380)
Δ Voting Power	-0.0002	-0.0117	0.0042	0.0014
	(0.0008)	(0.0117)	(0.0186)	(0.0201)
Voting Power$_{t-1}$	-0.0001	0.0152**	0.0410***	0.0436**
	(0.0004)	(0.0064)	(0.0145)	(0.0206)
Δ Voting Power		0.0037	0.0029	0.0040
× Expenditure per Student		(0.0036)	(0.0038)	(0.0048)
Voting Power$_{t-1}$		-0.0053***	-0.0066***	-0.0069**
× **Expenditure per Student$_{t-1}$**		(0.0020)	(0.0025)	(0.0029)
Enrolment Rate$_{t-1}$		-0.0010	-0.0016*	-0.0032**
		(0.0008)	(0.0009)	(0.0013)
Parental Education Rate$_{t-1}$		0.0019*	0.0030**	0.0037**
		(0.0011)	(0.0013)	(0.0014)
Δ Voting Power		-0.0000		-0.0001
× Parental Education Rate		(0.0001)		(0.0001)
Voting Power$_{t-1}$		0.0001***		0.0000
× **Parental Education Rate$_{t-1}$**		(0.0000)		(0.0001)
Population 15-24				
Wage Premium$_{t-1}$			0.0019**	0.0020
			(0.0009)	(0.0013)
Δ Voting Power			-0.0001*	-0.0001
× Wage Premium			(0.0001)	(0.0001)
Voting Power$_{t-1}$			-0.0001***	-0.0001
× **Wage Premium$_{t-1}$**			(0.0000)	(0.0001)
Parental Education Bias				0.0007
				(0.0054)
Δ Voting Power				-0.0008*
× Parental Education Bias				(0.0005)
Voting Power$_{t-1}$				0.0002
× **Parental Education Bias**				(0.0003)
Δ Left Government				-0.0029*
				(0.0017)
Left Government$_{t-1}$				-0.0028***
				(0.0011)
Δ Left Government				0.0000*
× Enrolment				(0.0000)
Left Government$_{t-1}$				0.0000**
× Enrolment$_{t-1}$				(0.0000)
Sovereign Debt$_{t-1}$		-0.0006	-0.0004	-0.0005
		(0.0006)	(0.0006)	(0.0006)
Social Transfers		0.0009	0.0005	0.0017
(% of GDP)$_{t-1}$		(0.0023)	(0.0022)	(0.0032)
Constant	0.1572**	0.3572***	0.0953	0.2524
	(0.0675)	(0.1237)	(0.1357)	(0.1687)
Number of Observations	1250	1220	1120	1120
Number of Countries	140	140	130	130
R^2	0.0340	0.1786	0.2190	0.2772

Source: Various sources, see text for details

Notes: Dependent variable is the first difference of the natural log of expenditure per student as a percentage of GDP per capita. All entries are OLS estimates with Panel-corrected standard errors. Variables in bold are the long-term effects of voting power of interest to the hypotheses tested. Standard errors are in parentheses. The asterisks signify conventional notations of statistical significance: * if $p < .10$, ** if $p < .05$, and *** if $p < .01$.

increase per-student spending. The coefficient for voting power is statistically insignificant. Therefore, there is no unconditionally positive effect of highly educated voting power on expenditures per student in this baseline model.

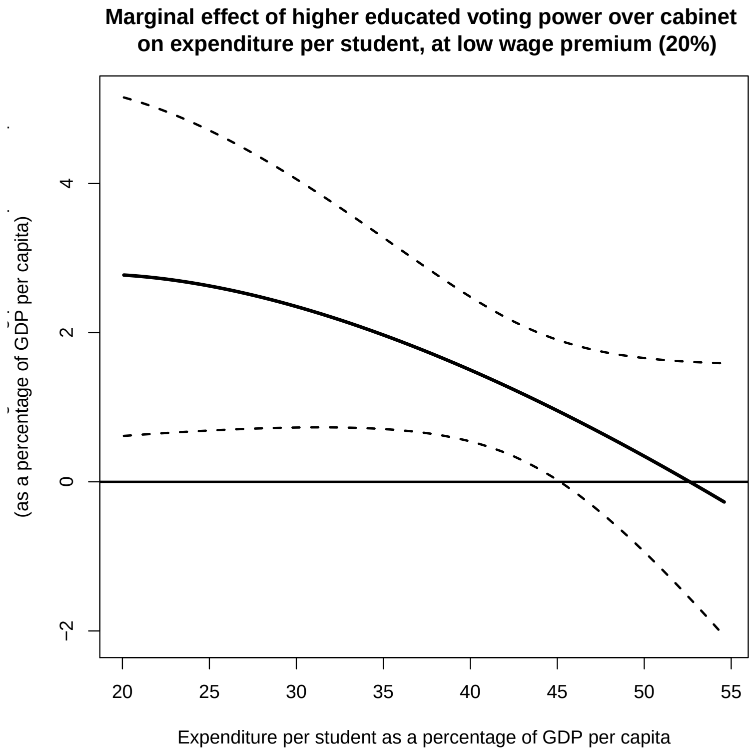
As was discussed above and in the labour market section of chapter three, however, preferences over per student spending are likely to be contingent on the current level of expenditure per student. Highly educated families may prefer higher spending only if current expenditure is not already high. I introduce this contingency to the model by introducing an interaction between the current level of expenditure per student (i.e. the lagged dependent variable) and the effect of voting power in model (2). Model (2) shows that highly educated voting power is associated with expansions of expenditure per student at low levels of expenditure, but that this effect reduces to zero at higher levels of expenditure. Moreover, model (2) includes the effect of the parental education rate and its interaction with the voting power of highly educated citizens. There is a significantly positive but substantively very small interaction between parental education and the voting power of highly educated voters.

The specification of model (3) includes the wage premium of higher education. In line with the hypotheses, there is a negative effect of the wage premium on the effect of highly educated voting power on per student spending. The higher the wage premium, the lower the effect of highly educated voting power on per student spending. Figures 7.5, 7.6 and 7.7 show the implied coefficient for the effect of a one standard deviation change in highly educated voting power on per student spending at low, medium and high wage premiums respectively. To facilitate interpretation, the coefficients are converted back to the percentage measure.[13]

At a low wage premium of 20 percent (figure 7.5), highly educated voting power over the cabinet is associated with significant increases in expenditure per student. Countries with low wage premiums for higher education include Sweden, Denmark,

[13]This conversion incorporates the level of expenditure per student, as a one unit increase in the log at a low level of expenditure is different from a one unit increase in the log at a high level of expenditure.

Figure 7.5 – Marginal effect of voting power on expenditure per student, low wage premium

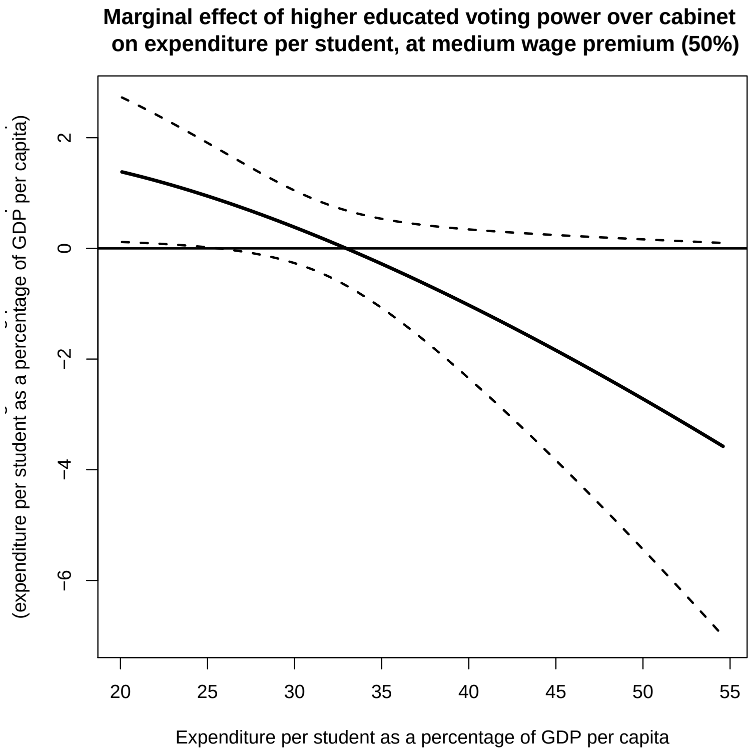


Notes: The effect of a one standard deviation (18 percentage points) increase in voting power at different parental education rates and a low wage premium (20 percent). This is the effect for the first period only, see text for a discussion of long-term effects. Estimates based on model (3) in table 7.6

Spain, Belgium and Italy. This is the case for expenditures up to 45 percent of GDP per capita. This means a standard deviation in voting power is associated with a 2.8 percent increase when current expenditure is low at 20 percent of GDP per capita (i.e. an increase of around 15 percent in one year). This effect is 2.3 percent when expenditure per student is 30 percent (i.e. an increase of 8 percent). Once enrolment reaches 40 percent expenditure per student increases with 1.5 percent (i.e. an increase of 3 percent). Because the error correction rate of this model is .11, these first period effects also have strong lagged effects. I again calculate the cumulate effect over a decade.[14] This results in a 24.6 percent increase over 10

[14]This is more meaningful given that the long-run multiplier will not be attained at these error correction rates over the period of 20 years included in the sample. The long-term effect is therefore the cumulative lagged effect realised within 10 years.

Figure 7.6 – Marginal effect of voting power on expenditure per student, medium wage premium

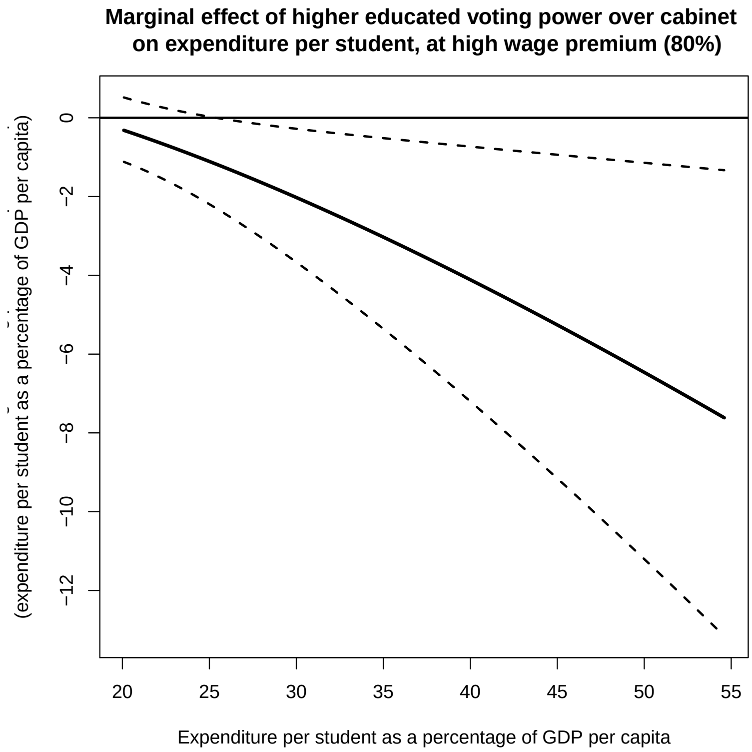


Notes: The effect of a one standard deviation (18 percentage point) increase in voting power at different parental education rates and a medium wage premium (50 percent). This is the effect for the first period only, see text for a discussion of long-term effects. Estimates based on model (3) in table 7.6

years when expenditure is at 20 percent (i.e. a 123 percent increase), a 17.5 percent increase over 10 years when expenditure is at 30 percent (i.e. a 58 percent increase) and a 9.8 percent increase over 10 years when expenditure is at 40 percent (i.e. a 25 percent increase). These are substantive long term effects of voting power on expenditure per student.

This story changes, however, when the wage premium reaches higher levels. First, the effect of voting power becomes insignificant at all levels of expenditure when the wage premium is at a medium level of 50 percent (figure 7.6). At a high wage premium, however, highly educated voting power is actually associated with reductions in expenditure per student (figure 7.6). This is the case for levels of expenditure above 25 percent. This negative effect of the wage premium on per

Figure 7.7 – Marginal effect of voting power on expenditure per student, low wage premium

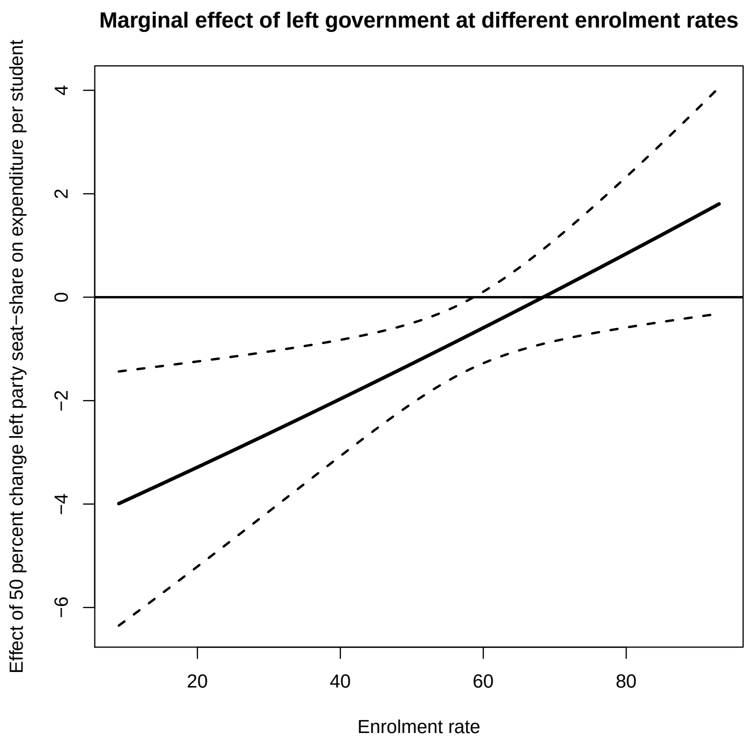


Notes: The effect of a one standard deviation (18 percentage point) increase in voting power at different parental education rates and a high wage premium (80 percent). This is the effect for the first period only, see text for a discussion of long-term effects. Estimates based on model (3) in table 7.6

student expenditure is stronger than predicted by the formal model. As discussed under the results of enrolment, the strong effect of the wage premium could be explained by progressive taxation as well as an underestimation of the actual wage premium by my OECD variable.

Last, model (4) introduces the parental education effect as an additional intervening variable. A stronger parental education effect means that access to higher education is more likely for the children of highly educated parents, and these children tend to disproportionately benefit from higher education spending. While the coefficient is in the expected direction, it is statistically insignificant. What is more, its inclusion renders other interactions, such as the wage premium, insignificant. The number of observations is restricted by the limited time-frame of our voting

Figure 7.8 – Marginal effect of left government on expenditure per student at different enrolment rates



Notes: The effect of a 50 percent change in the seat-share held by left wing parties in government on expenditure per student at different enrolment rates. This is the effect for the first period only. Estimates based on model (4) in table 7.6

power measure and our higher education spending data. Nevertheless, despite the inclusion of all these controls in model (4), high voting power of highly educated voters is still positively associated with increases in expenditure per student, albeit at a decreasing rate as expenditure expands.

Model (4) also includes the main rival explanation for expenditures per student: government partisanship. The implied coefficient of left wing government partisanship and its confidence interval are plotted in figure 7.8. Up to enrolment rates of 60 percent left wing government is associated with a decrease in expenditure per student. For enrolment rates above 60 percent the effect is insignificant. This challenges a common assumption that left wing parties are the champions of generous funding for higher education. It lends some support to Ben Ansell's left party inversion prediction i.e. that left wing parties will oppose generous funding for higher education when enrolment is at low levels. However, it does not support the claim that left wing parties turn into supporters of higher education spending at high levels of enrolment. All these models of expenditure per student are replicated in table 7.8 on page 328 as random effects error correction models and autoregressive distributive lag (ADL) specifications. The results are robust to these alternative specifications.

7.6 Conclusion

To conclude, this chapter provides a synthesis of the analyses of the preceding chapters. I combined the preference patterns revealed in chapters three and four with the voting power measure developed in chapters five and six to develop several testable hypotheses regarding higher education policy. Data from 14 European countries was used to test these hypotheses, resulting in strong support for those relating to enrolment and moderate support for the hypotheses relating to per student spending.

As predicted by the models in chapter three and confirmed by the empirical analysis in chapter four, the effect of the voting power of highly educated voters is found to be positive at low levels of parental enrolment but negative at higher levels of parental enrolment. Moreover, both the wage premium and the size of the parental education effect intervene in this relationship. Lower wage premiums extend the range of parental enrolment values over which the effect of highly educated voting power on enrolment is positive. Very high wage premiums, in contrast, remove the range over which highly educated voting power has a positive effect on enrolment. A high parental education effect is found to marginally extend the range of parental enrolment rates over which highly educated voting power has a positive effect on enrolment.

Highly educated voting power is associated with expansions of per student subsidies only when that spending is already low. Again, the wage premium intervenes in this relationship because it affects the tax bill faced by highly educated voters. In countries with a low wage premium, highly educated voting power is associated with large increase in per student spending, especially when that per student spending is itself still at low levels. However, when the wage premium is high, this association turns negative. Highly educated voting power is associated with a reduction of per student subsidies, especially when levels of per student spending are already high.

These results are the first test of a voting power model to explain a specific policy. Despite data limitations in terms of the time series of the explanatory variable and the availability of data of the dependent variables, the initial results are promising. Future research, however, is needed to test the approach fully. Two directions for further work stand out. First, the same voting power approach should be used to test hypotheses in other policy fields. Second, the time series and coverage should be expanded in order to test the model on larger datasets.

7.7 Appendix

Table 7.7 – Alternative specifications of enrolment models

	(1) ADL	(2) ECM	(3) ADL	(4) ECM	(5) ADL	(6) ECM	(7) ADL	(8) ECM
Lagged Enrolment Rate	0.983***	-0.009	1.000***	-0.004	0.988***	-0.019	0.970***	-0.016
	(0.012)	(0.010)	(0.015)	(0.014)	(0.017)	(0.016)	(0.019)	(0.016)
Δ Voting Power		0.104**		0.077*		0.167		0.207
		(0.043)		(0.045)		(0.223)		(0.231)
Voting Power$_{t-1}$	0.039**	0.055***	0.048**	0.060***	0.285**	0.307**	0.293**	0.356***
	(0.020)	(0.018)	(0.019)	(0.019)	(0.128)	(0.126)	(0.142)	(0.138)
Parental Education Rate$_{t-1}$	0.009	0.013	0.009	0.016	0.031*	0.041**	0.019	0.026
	(0.016)	(0.013)	(0.014)	(0.013)	(0.019)	(0.017)	(0.024)	(0.018)
Δ Voting Power		-0.004***		-0.002*		-0.003*		-0.003*
× Parental Education Rate		(0.001)		(0.001)		(0.002)		(0.002)
Voting Power$_{t-1}$	-0.002***	-0.002***	-0.002***	-0.002***	-0.003***	-0.003***	-0.002**	-0.003***
× Parental Education Rate$_{t-1}$	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Population 15-24	13.053	16.894*	14.420	20.738**	17.784*	27.080***	1.654	17.501*
	(10.504)	(9.201)	(9.816)	(9.101)	(10.586)	(9.720)	(13.174)	(10.380)
Wage Premium$_{t-1}$					0.032	0.034*	0.053**	0.045**
					(0.021)	(0.019)	(0.024)	(0.020)
Δ Voting Power						-0.000		-0.001
× Wage Premium						(0.001)		(0.002)
Voting Power$_{t-1}$					-0.002*	-0.002*	-0.002**	-0.002**
× Wage Premium$_{t-1}$					(0.001)	(0.001)	(0.001)	(0.001)
Parental Education Bias							-0.308**	-0.205**
							(0.137)	(0.093)
Δ Voting Power								0.003
× Parental Education Bias								(0.012)
Voting Power$_{t-1}$							0.010*	0.010**
× Parental Education Bias							(0.005)	(0.005)
Δ Left Government				-0.131***		-0.131***		-0.127***
				(0.033)		(0.034)		(0.034)
Left Government$_{t-1}$			0.012	-0.008	0.005	-0.018	0.011	-0.010
			(0.016)	(0.017)	(0.017)	(0.018)	(0.018)	(0.018)
Δ Left Government				0.002***		0.002***		0.002***
× Enrolment				(0.001)		(0.001)		(0.001)
Left Government$_{t-1}$			-0.000	0.000	-0.000	0.000	-0.000	0.000
× Enrolment$_{t-1}$			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Sovereign Debt$_{t-1}$					0.015**	0.016***	0.015*	0.016***
					(0.006)	(0.006)	(0.009)	(0.006)
Constant	0.311	-0.701	-0.563	-1.394	-6.649*	-8.195**	-4.444	-6.999*
	(1.749)	(1.514)	(1.658)	(1.537)	(3.997)	(3.781)	(4.611)	(3.783)
Number of Observations	206	205	206	205	200	199	200	199
Number of Countries	14	14	14	14	14	14	14	14
R^2	0.985	0.121	0.985	0.191	0.985	0.221	0.986	0.247

Source: Various sources, see text for details
Notes: Dependent variable is the gross enrolment rate in percentage points for the ADL (Autoregressive Distributed Lag) models, and the first difference for the ECM (Error Correction Model). All entries are OLS estimates with random-effects. Standard errors are in parentheses. The aterisks signify conventional notations of statistical significance: * if $p < .10$, ** if $p < .05$, and *** if $p < .01$.

Table 7.8 – Alternative specifications of expenditure models

	(1) ADL	(2) ECM	(3) ADL	(4) ECM	(5) ADL	(6) ECM	(7) ADL	(8) ECM
Lagged Expenditure per Student	0.889***	-0.111**	0.867***	-0.137**	0.888***	-0.106***	0.859***	-0.137***
(Log)	(0.045)	(0.045)	(0.049)	(0.053)	(0.036)	(0.037)	(0.040)	(0.043)
Δ Voting Power		-0.000		-0.014		0.004		0.001
		(0.001)		(0.010)		(0.015)		(0.017)
Voting Power$_{t-1}$	-0.000	-0.000	0.019***	0.015**	0.039***	0.041***	0.043***	0.044***
	(0.001)	(0.001)	(0.006)	(0.007)	(0.012)	(0.012)	(0.014)	(0.015)
Δ Voting Power				0.004		0.003		0.004
×Expenditure per Student				(0.003)		(0.003)		(0.004)
Voting Power$_{t-1}$			-0.006***	-0.005**	-0.007***	-0.006***	-0.007***	-0.007**
×Expenditure per Student$_{t-1}$			(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Enrolment Rate$_{t-1}$			-0.000	-0.000	-0.001	-0.001	-0.003*	-0.003*
			(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Parental Education Rate$_{t-1}$			0.002	0.001	0.003***	0.003***	0.003***	0.004***
			(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Δ Voting Power				-0.000				-0.000
× Parental Education Rate				(0.000)				(0.000)
Voting Power$_{t-1}$			0.000**	0.000			0.000	0.000
× Parental Education Rate$_{t-1}$			(0.000)	(0.000)			(0.000)	(0.000)
Wage Premium$_{t-1}$					0.001	0.002*	0.001	0.002*
					(0.001)	(0.001)	(0.001)	(0.001)
Δ Voting Power						-0.000		-0.000
× Wage Premium						(0.000)		(0.000)
Voting Power$_{t-1}$					-0.000***	-0.000***	-0.000**	-0.000**
× Wage Premium$_{t-1}$					(0.000)	(0.000)	(0.000)	(0.000)
Parental Education Bias					0.001	0.002	-0.002	0.001
					(0.004)	(0.004)	(0.005)	(0.006)
Δ Voting Power								-0.001
× Parental Education Bias								(0.001)
Voting Power$_{t-1}$							0.000	0.000
× Parental Education Bias							(0.000)	(0.000)
Δ Left Government								-0.003
								(0.003)
Left Government$_{t-1}$							-0.002	-0.003*
							(0.001)	(0.002)
Δ Left Government								0.000
× Enrolment								(0.000)
Left Government$_{t-1}$							0.000	0.000
× Enrolment$_{t-1}$							(0.000)	(0.000)
Sovereign Debt$_{t-1}$			-0.000	-0.000	-0.001	-0.000	-0.001	-0.001
			(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Social Transfers (% of GDP)$_{t-1}$			0.002	0.000	0.002	0.000	0.004	0.002
			(0.004)	(0.005)	(0.003)	(0.003)	(0.003)	(0.003)
Constant	0.360**	0.361**	0.392**	0.413**	0.185	0.095	0.336*	0.252
	(0.159)	(0.160)	(0.179)	(0.193)	(0.167)	(0.172)	(0.199)	(0.221)
Number of Observations	125	125	122	122	112	112	112	112
Number of Countries	14	14	14	14	13	13	13	13
R^2	0.931	0.034	0.939	0.136	0.946	0.220	0.949	0.277

Source: Various sources, see text for details
Notes: Dependent variable is the gross enrolment rate in percentage points for the ADL (Autoregressive Distributed Lag) models, and the first difference for the ECM (Error Correction Model). All entries are OLS estimates with random-effects. Standard errors are in parentheses. The aterisks signify conventional notations of statistical significance: * if $p < .10$, ** if $p < .05$, and *** if $p < .01$.

Chapter 8

Concluding remarks

This dissertation analysed the demand and supply sides of the politics of higher education. In this chapter I conclude accordingly with a summary of the main theoretical and empirical findings on the demand side, followed by a discussion of the main findings on the supply side. This summary of results is followed by a section in which I briefly reflect on how voting power can help us understand several recent cases of changes to higher education policy Britain, the Netherlands and Germany. I conclude with a discussion of avenues of future research.

8.1 The demand side of higher education politics

Who wants what kind of higher education policy? The crux of the predictions of my theoretical model of the distributive politics of higher education is that there is a strong positive relationship between the education level of parents and the probability of their children attaining higher education qualifications. Estimates of this association in several European countries were presented in chapter two. While there is cross-national variation in the strength of this association, the predominant observation is that in each country parental education exerts a powerful influence on their child's chances of going to university. Moreover, I reveal an emerging consensus in the literature that this effect of parental education is independent of, and stronger than, the effects of parental income and wealth.

This relationship between parental education and a child's fortunes in higher education affects preferences over subsidies to higher education. After all, the children of highly educated parents are much more likely to benefit from such subsidies than their peers from lesser educated families. The expected benefit of an increase in subsidies is therefore greater for highly educated families. However, these parents, on average, earn higher wages and pay more in taxes. How much more depends on the size of the wage premium of higher education. In chapter two I show through a simulation of real world values of parental enrolment rates, actual enrolment rates, wage premiums and parental education effect sizes that public subsidies to higher education are a net benefit for highly educated families under most conditions. However, at high wage premiums and high levels of enrolment, lesser educated families may become the net beneficiaries of higher education funding. Consequently, under most conditions, the highly educated are more likely to favour expanding subsidies to higher education. I find strong support for this hypothesis in an analysis of survey data from Britain, Sweden, Canada and Australia. Highly educated respondents are substantially more likely to favour no tuition fees and support increases in higher education spending. This contrasts with a negative effect of income on these preferences. Breaking down the effect of parental higher education into the direct effect of education and an indirect effect through income, I find that the direct effect of higher education trumps the negative indirect effect of income. The case of Sweden, however, demonstrates that the higher educated may stop favouring spending increases to higher education, but only once higher education reaches very high levels of enrolment.

Moreover, the relationship between parental education and a child's probability of going to university also affects preferences over expanding enrolment in a counter-intuitive way. I demonstrated in chapter three that initial expansions of enrolment beyond the parental rate of enrolment can in fact benefit highly educated families. The reasoning is as follows. If admission is maintained at the parental level of enrolment, then many but not all children of highly educated parents will attain higher education. Because the relationship between parental education and a child's probability of attaining higher education is probabilistic and not deterministic, some bright children of lesser educated parents will defy the general trend and enrol in university. If higher education subsequently expands, there will be relatively more children of highly educated parents at the next ability increment to be admitted into university. Hence, a one percent increase in enrolment can increase the probability to attaining higher education more for children of highly educated parents than for children of lesser educated parents. However, if enrolment expands further and passes a certain threshold level, children of lesser educated parents will start to benefit more from further expansions and the pattern of preferences reverses. The threshold at which this happens is a positive function of the strength of the parental education effect and a negative function of the size of the wage premium.

My analysis of British Social Attitudes Survey data demonstrates that this pattern of preferences is valid in the case of Britain. In surveys from the early 1980s and early 1990s, when enrolment was low, highly educated respondents were *more* likely to favour expanding enrolment than lesser educated respondents. In surveys beyond the mid 1990s, when enrolment started to expand beyond a 40 percent threshold, highly educated respondents became *less* likely to favour expanding higher education than their lesser educated compatriots. Income has a negative effect on preferences for enrolment. As in the case of tuition fees, the size of the direct effect of education was found to trump the effects of income. Moreover, there is additional effect of left-wing ideology – independent of income and education – on preferences over expansion of enrolment and per student spending.

These findings challenge the popular and academic misconception that expansions of higher education benefit outsiders (lesser educated families) instead of insiders (highly educated families). Instead, I show that initial expansions of higher education further entrench the interests of highly educated families and make the distributive effects of higher education more regressive. The popular notion that free higher education and generous subsidies are sought by those outside higher education is proven equally false. Instead, the probability of attaining higher education, driven by parental education levels, is the key factor predicting preferences in favour of generous higher education funding and low tuition fees.

The contributions of my demand side analyses are both theoretical and empirical. I have developed the first theory that accurately models enrolment expansions in line with empirically observed patterns. First, this probabilistic model results in hypotheses on preferences for expanding enrolment that run contrary to our intuition. Second, my model allows for the simulation of real-world parameters to derive the conditions under which highly educated families are the net beneficiaries of increased subsidies and expanding enrolment. Thus far, those who modelled access to higher education did so strictly as a function of income (Fernandez and Rogerson 1995, Ansell 2008*b*, 2010*a*). By using detailed questions included in the British Social Attitudes Surveys between 1985 and 2007, I was able to conduct the first thorough test of individual-level hypotheses about the political economy of higher education. The results from these tests offer strong support for the parental education based model of individual preferences developed in this dissertation.

8.2 The supply side of higher education politics

The demand side conclusion that the politics of higher education is a distributive struggle between highly and lesser educated groups poses a challenge for our understanding of the supply side of higher education. Which political actors benefit from delivering policies that favour the highly educated in society? At first sight, readers may have been inclined to think that highly educated voters earn higher wages and should therefore be the core constituents of parties of the Right. However, from casual observation we know that Green parties, central liberal parties and at times centre-left parties attract substantial numbers of highly educated voters. It turns out to be difficult to link the interests of the highly educated to specific partisan colours or, for that matter, to the interests of the median voter. I therefore had to look beyond the common instruments in the toolbox of students of comparative political economy.

Instead, I tackled this question theoretically and empirically by asking "how many votes do parties stand to gain or lose from catering to the interests of the highly educated?" To answer this question, I built a model of voting power for multi-party systems, inspired by Bartels (1998) work on voting power in the two-party context of American presidential elections. In my model, a party can win votes by conversion and mobilisation. Parties can convert individuals likely to turn out but not certain to support them. Alternatively, parties can either mobilise loyal supporters that are not certain to turn out, or "demobilise" loyal supporters of political opponents. All these choices are modelled as a function of the distribution of utilities that individuals associate with each party in a system. In particular, the model is built up of two random utility models: one for an individual's choice of party and one for an individual's decision to turn out. This set-up allows for the empirical estimation of the conversion and mobilisation values of respondents to election surveys. On the basis of this measure of individual voting power, I developed a measure of group voting power that estimates the expected gain or loss in vote-share resulting from redistributing resources from those outside a group towards those inside a group. I showed that size does not matter for group voting power. The votes gained from distributing to a large in-group are likely to be offset by the votes lost due to high costs imposed on the out-group.

In chapter six I use this model to empirically estimate the voting power of highly educated citizens and other socio-economic groups. Using 20 years of European Election Studies data, I estimated the conversion and mobilisation value of respondents with respect to the relevant parties in their polity. I found that by far most variation in voting power is due to conversion value. Most variation in conversion value, in turn, is due to variations in the convertibility of prospective voters rather than variations in their expected propensity to turnout . Mobilisation is a much weaker imperative than conversion. What is more, the distribution of voting power over the parties in parliament is highly unequal across individuals. In most countries and years, 20 percent of individuals together hold over 50 percent of the total stock of voting power. These findings are far removed from the democratic ideal of equal representation.

However, inequalities in individual level voting power are rather irrelevant in systems that cannot target individuals. What matters for industrialised democracies is how these inequalities aggregate across groups that can be targeted by government policy. First, I estimated the voting power of highly educated individuals over the parties in each of these European polities. The highly educated hold high voting power over Green and central liberal parties especially, but also – depending on country context – over centre-left and centre-right parties. Aggregating these party measures of voting power to the level of the legislature and the level of the cabinet reveals that the highly educated hold, on average, higher voting power over cabinets and parliaments than the lesser educated. This inequality is larger than the disparity in voting power found across income, gender and age groups. An interesting additional finding for students of inequality is that the highest incomes hold the highest voting power over both cabinets and legislatures and that the lowest incomes hold the least voting power. Whether this is a cause or consequence of inequality is a question deserving further research.

The contributions of chapter five and six are important for three main reasons. First, the measure allows us to analyse empirically the extent to which parties are incentivised to focus their efforts on mobilising core supporters or to persuade undecided swing voters. I show that the conversion imperative trumps the mobilisation imperative. I thereby provide an empirical answer to a long-standing theoretical debate in the political science literature. Second, as a dependent variable, this measure provides us with insights into inequalities that exist in the representation of different groups in society. My results show that this distribution is highly unequal at the individual level, and that the highly educated and rich, on average, hold more voting power than the lesser educated and poor. This lack of an electoral incentive to cater for the poor could contribute to a political explanation of the rise in inequality that has been observed across Europe over the past decades. Third, variations in the voting power of specific groups across countries and over time could help explain cross-national and temporal variations in a variety of redistributive policies.

Last, chapter seven tied the demand and supply sides of my analysis together. In that chapter, I use my newly created measure of voting power as an explanatory variable of higher education policy across EU member states. With respect to enrolment policy, the estimated results follows the predicted policy directions remarkably well. Cabinets over which highly educated citizens hold high voting power are associated with *increases* in enrolment at levels of enrolment below a given threshold and with *decreases* in enrolment above that threshold. Moreover, the wage premium, as predicted, lowers this threshold. The size of these effects is substantial too. Over the period of a decade, the effects of a standard deviation change in voting power can add up to changes in enrolment of up to 20 percent. For the case of spending per student, however, the supporting evidence is limited to contexts of low wage premiums. At low wage premiums and when expenditure per student is low, highly educated voting power is associated with increases in expenditure per student. The magnitude of the effect is again large. A standard deviation increase in the voting power of highly educated voters can increase expenditure per student up to 25 percent of GDP per capita.

8.3 Voting power and recent higher education policy changes

The empirical evidence presented in this dissertation is predominantly of a statistical nature. An obvious avenue for future research is to explore the workings of voting power in structured small-N case-studies that provide an in-depth comparison, thereby tracing the exact mechanisms by which voting power has shaped higher education politics across industrialised democracies. To provide the reader with some insights into the mechanisms proposed in this dissertation, I briefly discuss several recent cases of higher education policy change in Britain, the Netherlands and Germany in the light of the voting power framework. This is not intended to be a full qualitative test of the hypotheses, but rather as an illustration and to probe the plausibility of the theoretical mechanisms proposed in this dissertation.

In Britain, the Conservative-Liberal Democrat coalition government has recently decided to increase the tuition fees cap to 9,000 pounds while cutting public funding to higher education. This is a clear withdrawal of public funding to higher education. Why did this happen, and what were the political consequences for both parties? As becomes apparent from the voting power plots in figure 6.4 on page 245, the Liberal Democrats – running up to the May 2010 general election – were subject to increasing voting power from highly educated voters. Their campaign, accordingly, was clearly targeted at this section of the electorate. The party manifesto included a commitment to abolishing tuition fees altogether over a period of six years. Many Liberal Democrat MPs were photographed holding signed National Union of Students pre-election pledges to vote against increases in fees. After the May 2010 general election resulted in a hung parliament, the Liberal Democrats joined the Conservatives in a coalition government. My voting power measure in figure 6.4 shows that the Conservatives, in contrast to the Liberal Democrats, faced negative or neutral voting power from highly educated voters. At a time of budget cuts, therefore, the Conservatives had no particular electoral incentive to spare the interests of highly educated voters. This explains the push by the Conservative

Higher Education minister, David Willets, for tuition fees of up to 9,000 pounds and a significant cut in state funding to higher education. With only 62 seats compared to 306 Conservative seats, the Liberal Democrats are clearly the junior partner in this cabinet and most power was in the hands of the Conservatives. Coalition policies are generally seen to be dominated by Conservative policies, with the Liberal Democrats attaining a few sweeteners such as the (unsuccessful) referendum on electoral system change. The Liberal Democrat leadership took the principle of collective cabinet responsibility seriously, took a U-turn, and went on to defend the government's new policy on tuition fees.[1]

As discussed in chapter five, voters are likely to hold cabinet partners equally responsible for government performance. Embarrassingly, the pictures of Liberal Democrat MPs with their pre-election tuition pledges reappeared in the newspapers. The perceived betrayal of the highly educated interest, in addition to other budget cuts, cost the Liberal Democrats dearly. Having secured above 20 percent of the popular vote in polls around the time of the general election, the support for the Liberal Democrats had halved to 10 percent in opinion polls by May 2011.[2] The Barnsley Central by-election in March 2011 was also a disaster for the Liberal Democrats. Having held the second place in Barnsley Central in the general election, the Liberal Democrats found themselves in the 6th place 10 months later, with only 4.8 percent of the vote.[3] The Conservatives, in contrast, held rather steady, still polling above 35 percent one year into government, which was fairly close to their levels at the time of the general election. Most of the Liberal Democrat losses had been picked up by Labour, which increased its support from low 30s at the time of the general election to low 40s a year later. Labour, in contrast, had taken a strong stance against the government's rise in tuition fees.

This position of Labour has been perceived as hypocritical by some. After all,

[1] Alex Barker and Elizabeth Rigby "Lib Dem tribe remains united in spirit." *Financial Times* December 10, 2010

[2] YouGov election polls published on www.ukpollingreport.co.uk. Accessed 15 July 2011

[3] "Lib Dems slump to sixth as Labour win Barnsley poll." *BBC News Website.* 4 March 2011. http://www.bbc.co.uk/news/uk-politics-12643639

it was Labour that passed the first bills introducing tuition fees of £1000 in 1998 and £3000 in 2004. It should be noted, firstly, that this increase in fees was not accompanied by a cut in public higher education funding and was thus an increase in financial support for underfunded universities, paid for by fees. The size of this shift was of a very different nature and scale than the 9,000 pounds fees and overall cuts of the coalition government. Nevertheless, the introduction of fees was a departure from the prior dominance of public funding in higher education financing. More relevant for the present argument, we see in figure 6.4 that the voting power of highly educated voters over Labour had been increasing throughout Labour's tenure. While the highly educated had little to no voting power over Labour as it came to power and pursued these policies, their voting power substantially increased over the years. By 2010, highly educated voters had become an electorally powerful constituency for Labour. The case of Britain shows us that the voting power framework helps us understand the positioning of parties. The case of the Liberal Democrats, moreover, painfully demonstrates the consequences of not acting on voting power.

On the other side of the North Sea, in the Netherlands, cuts to higher education spending were first discussed in earnest during the 2006-2010 coalition government comprised of Labour (PvdA), Christian-democrats (CDA) and the small, orthodox protestant Christian Union. In discussions about possible cuts to higher education, the finance minister and leader of the PvdA, Wouter Bos, expressed his dismay over the fact that local butchers are being taxed to fund the degrees of a lawyers.[4] While a working group was set up under this government in 2009 to consider cuts to public higher education funding, no concrete cuts were proposed before the Labour government collapsed the coalition in early 2010. The June 2010 general election resulted in a right-wing minority government consisting of the centre-right, economically liberal VVD and the CDA. This new government was propped up in parliament by

[4]Bart Funnekotter. "Economische crisis bezegelt lot basisbeurs." *NRC Handelsblad.* November 13, 2009

Geert Wilders' populist, anti-immigrant and anti-Islamic PVV. The government's package of budget cuts included substantial cuts to higher education and other "left hobbies" such as museums, theatres and the arts. The government also introduced a levy on students taking longer to finish their degrees.[5] Most opposition to these cuts and policies comes from the Green-Left and the central socially-liberal D'66.[6] The Green-Left itself proposed to abolish fees, introduce a student wage, and "pay" for all this with a miniscule 1 percent graduate tax on above average incomes, which was likely to fall far short of covering the costs.[7]

This constellation of policy stances can be explained when we look at the distribution of highly educated voting power across parties in the Netherlands in figure 6.12 on page 249. The highly educated hold neutral voting power over the PvdA, CDA or VVD. Pursuing policies against the interests of highly educated voters is unlikely to cost these parties many votes. Moreover, the Christian Union, and especially the PVV, face negative highly educated voting power.[8] These parties thus actively stand to benefit from targeting policies at lesser educated groups at the expense of the highly educated. In contrast, highly educated voters hold very high voting power over the Green Left and D'66. It is therefore unsurprising that these two parties are the most visible opponents of cuts to higher education.

Last, moving further east, German higher education has witnessed moves in the opposite direction over the last 10 years. Political parties of most colours have been involved in increases in higher education funding. Starting in 1998, the incoming

---

[5] Dirk Wijnand de Jong. "Eerste Kamer keurt boete voor langstudeerders goed" NRC Handelsblad. 6 Juli 2011

[6] "Den Haag weer rustig na manifestatie studenten op Malieveld." NRC Handelsblad. 21 January, 2011.

[7] Bart Funnekotter. "GroenLinks wil studieloon en studietaks." *NRC Handelsblad weblog.* 10 November, 2009.
http://weblogs.nrc.nl/onderwijsblog/2009/11/10/groenlinks-wil-studieloon-en-studietaks/.
"pay" is in quotation marks because a 1 percent tax is very unlikely to cover all costs. Calculations in an unpublished presentation by the author for the UK have shown that a minimum graduate tax of around 5 percent would start to cover the costs of higher education. See Timo Idema "Distributive implications of graduate taxes versus graduate loans", April 2011 (unpublished presentation).

[8] The same holds for the SGP, a small, ultra-conservative Christian party that provided a necessary additional vote for the recent student charge in the Senate.

coalition government of the social-democratic SPD and the Greens substantially increased the BAFöG, the German system of student grants.[9] The next government, a grand coalition of SPD and the Christian-democratic CDU/CSU following the 2005 election, passed the Excellence Initiative, which gave a further boost in public funding to Germany's best universities. In 2008, this same grand coalition further increased student grants in 2008 and gave a substantial boost of 18 billion euros to extend the Excellence Initiative further.[10] The latest German government coalition to increase funding to German universities was the centre-right CDU/CSU - FDP coalition. This government announced an excellence scheme of student grants that will provide an additional 300 euros per month to up to 8 percent of students, based on merit.[11] From the model of access to higher education developed in chapter three we know that these benefits will accrue mainly to the children of highly educated parents, as their children are the most likely to populate the highest strata of the ability distribution.

Besides increasing public funding, the 2002 SPD-Green coalition also introduced a federal ban on tuition fees. only to be overturned by the Federal Constitutional Court in 2005 on purely constitutional grounds.[12] Most Länder, however, have chosen not to introduce such fees. In Badem Wurtermmberg, one of the few Länder where limited fees had been introduced, the first ever Green-led coalition government to head a government in a German Land was quick to ban fees and pledge an addition 135 million for higher education.[13]

While parties in the Netherlands and the United Kingdom have been polarised over cuts, German parties have been relatively united in their efforts to increase funding to higher education. Parties of both the traditional Left and the Right have

[9]"Mehr Geld vom Staat." *Die Zeit Online.* 9 November, 2007 http://www.zeit.de/campus/online/2007/45/bafoeg-erhoehung/komplettansicht
[10]See footnote 9
[11]"Geld für weniger Studenten" *Die Zeit Online.* 9 September, 2010 http://www.zeit.de/wissen/2010-09/deutschlands-erwaehlte
[12]Such a measure was not deemed to be within the sphere of competence of the federal government"Karlsruhe kippt Verbot von Studiengebühren" *der Spiegel.* 25 January, 2005.
[13]See footnote 5 on page 2

pursued increases in funding to universities. Looking at the pattern of the voting power of highly educated voters over German parties in figure 6.8 on page 247 proves insightful. Highly educated voters held high voting power over the parties across the spectrum. Indeed, of all European countries, highly educated voters in Germany hold the most voting power over the cabinet and the legislature in tables 6.4 and 6.4 in chapter six. The Greens are especially subject to high voting power from this group. This may help to explain their enthusiasm to cut tuition fees in Baden Wurttemberg. This high voting power across the board may also help to explain the relatively modest increases in enrolment that Germany has experienced in comparison to other countries. The theory presented in chapter three suggests that highly educated constituents are the main beneficiaries of such limited expansions.

In short, this snapshot of contemporary higher education politics in three case studies demonstrates the role of highly educated voting power in the politics of higher education. Policy positions do not follow predictably from the traditional colours of Left and Right. Rather, we see that differences in terms of voting power, or the absence thereof in the case of Germany, may help us to understand the different directions of higher education policy. Of course, this illustration is merely that, an illustration. A proper comparative study of historical patterns of voting power and higher education policy is a subject for future research.

8.4 Avenues of future research

What are the potential shortcomings of the analysis in this dissertation that should be addressed by future research? To begin with, it should be noted that any inferences from a statistical analysis rely crucially on the quality and availability of data. With respect to the individual-level analysis, the lack of available international survey data limited my study of higher education policy preferences to a few country surveys. Moreover, my estimation of voting power was limited to a maximum period of 20 years and 15 countries because of the availability of European Election Studies data. Many crucial higher education policy changes happened in the two decades before 1989 and in industrialised democracies that are not members of the EU. Future research should focus on extending the historical series of voting power, possibly using national election surveys. These surveys, however, may lack the kind of utility proxy-measure that was used in my analysis. Nevertheless, the more general specification of the party-choice model in chapter five allows for the use of other survey measures in the estimation, such as thermometer scores of parties, ideological distances and individual-specific characteristics. Since going back further in time reduces the number of highly educated respondents in our samples, such analyses may suffer from increased sampling error (Peduzzi et al. 1996).

Moreover, for the macro-level analysis of higher education policy in chapter seven, my analysis was limited by the availability of long time-series of accurate measures of enrolment and per-student spending. The availability of better measures of enrolment, expenditures per student and the public/private balance in the future will aid larger, more accurate analyses. These more precise measures have been recorded for approximately the last ten years so sufficient time-series will emerge soon (OECD 2010). Nevertheless, many of the interesting implications of my argument apply to events in the 1970s and 1980s, for which these new measures will not be available. Therefore, collecting more precise historical measures of higher education policy within specific countries could be an important area of future research.

As discussed in the previous section, my analysis relies largely on formal and statistical methods. While these methods bring great advantages, there are also some weaknesses that could be addressed by future research designs. The advantages of the formal methods, as discussed in the introduction, are that they make the underlying assumptions and logic explicit for the researcher and reader alike, and they can teach us the logic behind predictions that at first sight may seem counterintuitive. Generalisability, moreover, is one of the main advantages of our statistical methods.

On the demand side, these formal methods allowed me to make explicit the exact distributive effects of changes in spending and changes in enrolment. Moreover, statistical methods were used to test the many intermediate steps of the causal chain that followed from the formal model. In particular, I 1) estimated the effect of parental education on the probability of children attaining higher education qualifications across countries; 2) tested whether parents are actually aware of these probabilities, and 3) tested how the hypothesised individual characteristics such as income and education, in interaction with macro-level variations such as enrolment, shape group preferences over higher education policy. On the supply side, the formal methods were used to derive a measure of voting power, solidly grounded in a behavioural model of turn-out and vote-choice on the part of voters, and a model of seat-share maximising behaviour on the part of parties. Again, I estimated this measure empirically, and analysed the relative contribution of conversion and mobilisation imperatives in shaping voting power. Last, I used these estimates in another statistical analysis to predict higher education policy change. The advantages of this approach notwithstanding, there are benefits to the qualitative analysis of a wider range of case studies that are not achieved by my methods. These benefits of qualitative methods include a richer understanding of the context in which decisions were made and an observation of the actual causal processes at work. As discussed above, a future research design should incorporate historical case studies to zoom in on the specific causal pathways that link highly educated voting power over the cabinet to higher education policy outcomes. Given the nature of our voting power argument, such an analysis would have to involve measuring historical series of voting power, which again require older, country-specific election surveys.

It is also worthwhile to further explore the effects of an increasing stock of highly educated labour on wage inequality between the highly and lesser educated.

The wage premium figures presented in chapters three and six show substantial cross-national variations in the wage premium of higher education that are not necessarily related to the supply of highly educated workers. A brief review of the labour economics literature suggests that for a variety of reasons an increase in the stock of highly educated workers can leave the wage premium unaffected. The exact explanations of cross-national variations in the wage premium, however, remains insufficiently explained. Exploring the institutional and structural determinants of these cross-national variations, therefore, remains an important field for future research.

Another area for future research is to accurately model the effects of different electoral systems on voting power. While maximising vote-share is likely to be an accurate proxy for maximising seat-share, it is worthwhile to consider the additional effect that electoral systems may have on the voting power of certain groups. Chapter five sketches the contours of such voting power effects in more detail. Amongst other features, such extensions will need to weight voting power by the competitiveness of different districts for each of the relevant parties. Empirically, this will require further collection of survey data that provides geographic information about voters and the competitiveness of their districts.

Last, the estimates of the voting power of several socio-economic groups in chapter six bring us great insights into the electoral incentives on offer to parties. These observations, in turn, raise some new and important questions. What explains these patterns of voting power? Why do highly educated voters and the rich hold greater voting power? I proposed some prospective explanations in chapter six, but more research is required to fully explain these variations in voting power. For example, such research could focus on the characteristics of voters that makes them consider multiple parties. Moreover, it could also consider the role of the behaviour of parties. If most parties are more attentive to highly educated voters, then that in itself may make highly educated voters consider multiple parties, making them in turn more powerful. A potential explanation for such a bias in the behaviour of parties could relate to numerical overrepresentation of people from rich and highly educated backgrounds amongst representatives in the legislature (see for example Carnes forthcoming).

Other research questions would use voting power as an explanatory variable. What else can be explained by variations in voting power? In addition to the voting power of highly educated voters, I also estimated the voting power of different income groups, women and older voters.[14] With respect to income, for example, I found that the rich hold the most voting power and that the poor hold the least. Voting power may help political scientists to understand other unequal political outcomes. Furthermore, the voting power methodology can be used to estimate the power of any group included in an election survey. Combining measures of voting power with measures of public opinion can allow researchers to estimate "powerful opinions" in the electorate, allowing us to analyse how these differ from "average opinions." While many questions have been answered, some new questions have emerged.

Two normative insights follow from this study. First, building upon the words of Hansen and Weisbrod noted at the outset of this dissertation, despite substantial changes since the 1960s, public subsidies to higher education still "promote greater rather than less inequality among people of various social and economic backgrounds." Second, this unequal policy outcome is underpinned by another important inequality, namely the unequal distribution of voting power that leaves democratic systems of representation far removed from the ideal of "one person, one vote." By analysing many of the dynamics at play behind these inequalities, this thesis offers a starting point for ameliorating them.

[14]Chapter six provides a summary of these estimates. The full estimates are available in the web appendix of this dissertation.

Bibliography

Abramson, Paul R, John Herbert Aldrich and David W Rohde. 1994. *Change and continuity in the 1992 elections*. Washington, D.C.: CQ Press.

Acemoglu, Daron. 1998. "Why Do New Technologies Complement Skills? Directed Technical Change and Wage Inequality." *The Quarterly Journal of Economics* 113(4):1055–1089.

Acemoglu, Daron and Joshua D. Angrist. 2000. "How Large Are Human-Capital Externalities? Evidence from Compulsory Schooling Laws." *NBER Macroeconomics Annual* .

Achen, Christopher H. 1992. "Social psychology, demographic variables, and linear regression: Breaking the iron triangle in voting research." *Political Behavior* 14(3):195–211.

Achen, Christopher H. 2002. "Parental socialization and rational party identification." *Political Behavior* 24(2):151–170.

Aldrich, John H. 1983. "A Spatial Model with Party Activists: Implications for Electoral Dynamics." *Public Choice* 41(1):63–100.

Aldrich, John H. 1995. *Why parties?: the origin and transformation of political parties in America*. American politics and political economy series Chicago: The University of Chicago Press.

Aldrich, John H. and Forrest D. Nelson. 1984. *Linear probability, logit, and probit models*. Vol. no. 07-045 Beverly Hills: Sage Publications.

Aldrich, John H., James E. Alt and Arthur Lupia. 2008. The EITM Approach: Origins and Interpretations. In *The Oxford handbook of political methodology*, ed. Janet M. Box-Steffensmeier, Henry E Brady and David Collier. Oxford: Oxford University Press.

Aldrich, John H. and Michael D. McGinnis. 1989. "A Model of Party Constraints on Candidate Positions." *Mathematical and Computer Modeling* 12:437–50.

Alesina, Alberto, Edward Glaeser and Bruce Sacerdote. 2001. "Why doesn't the US have a European-style welfare system?" *NBER working paper* (8524).

Alesina, Alberto and Eliana La Ferrara. 2005. "Preferences for redistribution in the land of opportunities." *Journal of Public Economics* 89(5-6):897–931.

Alt, James E. 1985. "Political parties, world demand, and unemployment: domestic and international sources of economic activity." *The American Political Science Review* 79(4):1016–1040.

Alt, James E and K. Alec Chrystal. 1983. *Political economics.* Berkeley: University of California Press.

Alvarez, R. Michael., Geoffrey Garrett and Peter Lange. 1991. "Government partisanship, labor organization, and macroeconomic performance." *The American Political Science Review* 85(2):539–556.

Alvarez, R. Michael and Jonathan Nagler. 1998. "When Politics and Models Collide: Estimating Models of Multiparty Elections." *American Journal of Political Science* 42(1):55–96.

Alvarez, R. Michael and Jonathan Nagler. 2000. "A New Approach for Modelling Strategic Voting in Multiparty Elections." *British Journal of Political Science* 30(01):57–75.

Anderson, Christopher. 1995. *Blaming the government: citizens and the economy in five European democracies.* Armonk, N.Y.: M.E. Sharpe.

Anderson, Christopher J. and Jonas Pontusson. 2007. "Workers, worries and welfare states: Social protection and job insecurity in 15 OECD countries." *European Journal of Political Research* 46(2):211.

Ansell, Ben W. 2008*a*. "Traders, Teachers, and Tyrants: Democracy, Globalization, and Public Investment in Education." *International Organization* 62(02):289–322.

Ansell, Ben W. 2008*b*. "University Challenges: Explaining Institutional Change in Higher Education." *World Politics* 60(2):189–230.

Ansell, Ben W. 2010*a*. *From the Ballot to the Blackboard: The Redistributive Political Economy of Education.* Cambridge, U.K: Cambridge University Press.

Ansell, Ben W. 2010*b*. "Nest Eggs and Negative Equity: The Political Economy of Ownership." Unpublished Working Paper.

ANUpoll. 2008. "Public Opinion towards Higher Education: Results from the ANU Poll." Report no. 2.

Armingeon, Klaus, Romana Careja, Sarah Engler, Marlène Gerber, Philipp Leimgruber and Panajotis Potolidis. 2011. *Comparative Political Data Set III (35 OECD Countries and/or EU-member countries).*

Arrow, Kenneth Joseph. 1951. *Social choice and individual values.* New York: Wiley.

Atkinson, Anthony B. and Joseph E. Stiglitz. 1980. *Lectures on public economics.* London: McGraw-Hill Book Co.

Austen-Smith, David. 2003. "Majority preference for subsidies over redistribution." *Journal of Public Economics* 87(7-8):1617 – 1640.

Autor, David H., Lawrence F. Katz and Alan B. Krueger. 1998. "Computing Inequality: Have Computers Changed the Labor Market?" *Quarterly Journal of Economics* 113(4):1169–1213.

Autor, David H., Lawrence F. Katz and Melissa S. Kearney. 2006. "The polarization of the US labor market." *The American Economic Review* 96(2):189–194.

Bale, Tim and Danielle Caramani. 2010. "Political data in 2009." *European Journal of Political Research* 49(7-8):855–1212.

Bale, Tim and Ingrid van Biezen. 2007. "Political data in 2006." *European Journal of Political Research* 46(7-8):853–1155.

Bale, Tim and Ingrid van Biezen. 2008. "Political data in 2007." *European Journal of Political Research* 47(7-8):877–1175.

Bale, Tim and Ingrid van Biezen. 2009. "Political data in 2008." *European Journal of Political Research* 48(7-8):859–1154.

Baltagi, Badi H. 2008. *Econometric analysis of panel data*. 4th ed ed. Chichester, UK: John Wiley & Sons.

Bargsted, Matias A. and Orit Kedar. 2009. "Coalition-Targeted Duvergerian Voting: How Expectations Affect Voter Choice under Proportional Representation." *American Journal of Political Science* 53(2):307–323.

Baron, Reuben M. and David A. Kenny. 1986. "The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations." *Journal of personality and social psychology* 51(6):1173.

Bartels, Larry M. 1998. "Where the ducks are: Voting power in a party system." *Politicians and Party Politics* pp. 43–79.

Bartels, Larry M. 2002. "Beyond the running tally: Partisan bias in political perceptions." *Political Behavior* 24(2):117–150.

Bartels, Larry M. 2008. *Unequal democracy: the political economy of the new gilded age*. New York: Russell Sage Foundation.

Bartels, Larry M. and Henry E. Brady. 1993. "The state of quantitative political methodology." *Political science: The state of the discipline II* pp. 121–59.

Baum, Matthew A. and David A. Lake. 2003. "The Political Economy of Growth: Democracy and Human Capital." *American Journal of Political Science* 47(2):333–347.

Becher, Michael. 2010. "Constraining Ministerial Power: The Impact of Veto Players on Labor Market Reforms in Industrial Democracies, 1973-2000." *Comparative Political Studies* 43(1):33.

Beck, Nathaniel. 2001. "Time-series-cross-section data: What have we learned in the past few years?" *Annual Review of Political Science* 4:271–93.

Beck, Nathaniel and Jonathan N. Katz. 1995. "What to Do (and Not to Do) with Time-Series-Cross-Section Data in Comparative Politics." *American Political Science Review* 89(3):634–47.

Beck, Nathaniel and Jonathan N. Katz. 1996. "Nuisance vs. Substance: Specifying and Estimating Time-Series-Cross-Section Models." *Political Analysis* 6(1):1–36.

Belley, Philippe and Lance Lochner. 2007. "The Changing Role of Family Income and Ability in Determining Educational Achievement." *Journal of Human Capital* 1(1):37 – 89.

Beramendi, Pablo and David Rueda. 2007. "Social Democracy Constrained: Indirect Taxation in Industrialized Democracies." *British Journal of Political Science* 37(04):619–641.

Bergh, Andreas and Günther Fink. 2009. "Higher education, elite institutions and inequality." *European Economic Review* 53(3):376 – 384.

Berkson, Joseph. 1944. "Application to the logistic function to bio-assay." *Journal of the American Statistical Association* 39(227):357–365.

Bevia, Carmen and Inigo Iturbe-Ormaetxe. 2002. "Redistribution and Subsidies for Higher Education." *The Scandinavian Journal of Economics* 104(2):321–340.

Bickers, Kenneth N. and Robert M. Stein. 1996. "The Electoral Dynamics of the Federal Pork Barrel." *American Journal of Political Science* 40(4):1300–1326.

Bishop, John. 1977. "The Effect of Public Policies on the Demand for Higher Education." *The Journal of Human Resources* 12(3):285–307.

Black, Duncan. 1948. "On the Rationale of Group Decision-making." *The Journal of Political Economy* 56(1):23–34.

Blais, André and Christopher H. Achen. 2010. "Taking Civic Duty Seriously: Political Theory and Voter Turnout." Unpublished Working Paper.

Blais, André and Ignacio Lago. 2009. "A general measure of district competitiveness." *Electoral Studies* 28(1):94 – 100.

Boix, Carles. 1998. *Political parties, growth and equality: conservative and social democratic economic strategies in the world economy.* Cambridge, U.K: Cambridge University Press.

Borjas, George J. 1995. "The economic benefits from immigration." *The Journal of Economic Perspectives* 9(2):3–22.

Bowers, Jake and Katherine W. Drake. 2005. "EDA for HLM: Visualization when probabilistic inference fails." *Political Analysis* 13(4):301.

Bowles, Samuel, Herbert Gintis and Melissa Osborne. 2001. "The Determinants of Earnings: A Behavioral Approach." *Journal of Economic Literature* 39(4):1137–1176.

Brady, Henry E. 2008. Causation and explanation in social science. In *The Oxford handbook of political methodology*, ed. Janet M. Box-Steffensmeier, Henry E Brady and David Collier. Oxford: Oxford University Press.

Brady, Henry E and David Collier. 2004. *Rethinking social inquiry: diverse tools, shared standards.* Lanham, Md.: Rowman & Littlefield.

Brambor, Thomas, William R Clark and Matt Golder. 2006. "Understanding interaction models: Improving empirical analyses." *Political Analysis* 14(1):63.

Brooks-Gunn, J., F. Cunha, G. Duncan, J.J. Heckman and A. Sojourner. 2006. "A Reanalysis of the IHDP Program." *Unpublished manuscript, Infant Health and Development Program, Northwestern University* .

Brown, David S. and Wendy Hunter. 2004. "Democracy and Human Capital Formation: Education Spending in Latin America, 1980 to 1997." *Comparative Political Studies* 37(7):842–864.

Brug, Wouter van der, Cees Van der Eijk and Mark N Franklin. 2007. *The economy and the vote: economic conditions and elections in fifteen countries*. New York: Cambridge University Press.

Budge, Ian. 2000. "Expert judgements of party policy positions: Uses and limitations in political research." *European Journal of Political Research* 37(1):103–113.

Budge, Ian. 2001. *Mapping policy preferences: estimates for parties, electors, and governments, 1945-1998*. Oxford: Oxford University Press.

Buis, Maaren L. 2010. "Direct and indirect effects in a logit model." *Stata Journal* 10(1):11–29(19).

Burgoon, Brian. 2001. "Globalization and welfare compensation: disentangling the ties that bind." *International Organization* 55(03):509–551.

Busemeyer, Marius R. 2007. "Determinants of public education spending in 21 OECD democracies, 1980–2001." *Journal of European Public Policy* 14(4):582–610.

Busemeyer, Marius R. 2009. "Social democrats and the new partisan politics of public investment in education." *Journal of European Public Policy* 16(1):107–126.

Calvo, Ernesto and Maria Victoria Murillo. 2004. "Who Delivers? Partisan Clients in the Argentine Electoral Market." *American Journal of Political Science* 48(4):742–757.

Camerer, Colin, George Loewenstein and Matthew Rabin. 2003. *Advances in behavioral economics*. New York, N.Y.: Russell Sage Foundation.

Cameron, David R. 1978. "The expansion of the public economy: A comparative analysis." *The American Political Science Review* 72(4):1243–1261.

Cameron, Stephen V. and James J. Heckman. 2001. "The Dynamics of Educational Attainment for Black, Hispanic, and White Males." *The Journal of Political Economy* 109(3):455–499.

Carneiro, Pedro and James J. Heckman. 2002. "The Evidence on Credit Constraints in Post-Secondary Schooling." *The Economic Journal* 112(482):705–734.

Carneiro, Pedro and James J. Heckman. 2003. Human capital policy. In *Inequality in America: what role for human capital policies?*, ed. James J Heckman, Alan B Krueger and Benjamin M Friedman. Cambridge, Mass.: MIT Press.

Carnes, Nicholas. forthcoming. "Does the Numerical Underrepresentation of the Working Class in Congress Matter? Evidence from Roll Call Voting in the House of Representatives." *Legislative Studies Quarterly* .

Case, Anne. 2001. "Election goals and income redistribution: Recent evidence from Albania." *European Economic Review* 45(3):405 – 423.

Castles, Francis G. 1989. "Explaining public education expenditure in OECD nations." *European Journal of Political Research* 17(4):431–448.

Castles, Francis G. and Peter Mair. 1984. "Left–Right Political Scales: Some 'Expert'Judgments." *European Journal of Political Research* 12(1):73–88.

Coase, Ronald H. 1960. "The problem of social cost." *Journal of law and economics* 3:1–44.

Corneo, Giacomo and Hans Peter Grüner. 2002. "Individual preferences for political redistribution." *Journal of Public Economics* 83(1):83 – 107.

Cox, Gary W. 1994. "Strategic voting equilibria under the single nontransferable vote." *American Political Science Review* 88(3):608–621.

Cox, Gary W. 1997. *Making votes count: strategic coordination in the world's electoral systems.* Cambridge, U.K.: Cambridge University Press.

Cox, Gary W. 2006. Swing voters, core voters and distributive politics. In *Conference on Representation and Popular Rule, Yale University.*

Cox, Gary W. 2008. Electoral Institutions and Political Competition: Coordination, Persuasion and Mobilization. In *Handbook of new institutional economics*, ed. Claude Ménard and Mary M. Shirley. Berlin: Springer.

Cox, Gary W. and Mathew D. McCubbins. 1986. "Electoral Politics as a Redistributive Game." *The Journal of Politics* 48(2):370–389.

Creedy, John. 1995. *The economics of higher education: an analysis of taxes versus fees.* Aldershot, Hants, England: E. Elgar.

Creedy, John and Patrick Francois. 1990. "Financing higher education and majority voting." *Journal of Public Economics* 43(2):181 – 200.

Crewe, Ivor. 1986. "On the death and resurrection of class voting: some comments on How Britain Votes." *Political Studies* 34(4):620–638.

Cunha, Flavio and James Heckman. 2007*a*. "The Technology of Skill Formation." *The American Economic Review* 97:31–47(17).

Cunha, Flavio and James J. Heckman. 2007*b*. "The evolution of uncertainty in labor earnings in the US economy." *Unpublished manuscript, University of Chicago. Under revision* .

Cunha, Flavio, James J. Heckman, Lance J. Lochner and Dimitriy V. Masterov. 2006. Interpreting the Evidence on Life Cycle Skill Formation. In *Handbook of the economics of education*, ed. Eric A Hanushek and Finis Welch. Vol. 26 of *Handbooks in economics* Amsterdam: North-Holland.

Cusack, Thomas R. and Lutz Engelhardt. 2002. *The PGL File Collection: File Structures and Procedures.* Berlin: Wissenschaftszentrum Berlin für Sozialforschung.

Dahlberg, Matz and Eva Johansson. 2002. "On the Vote-Purchasing Behavior of Incumbent Governments." *American Political Science Review* 96(01):27–40.

Dalton, Russell J. 2008. *Citizen politics: public opinion and political parties in advanced industrial democracies*. 5th ed ed. Washington, D.C.: CQ Press.

De Boef, Suzanna and Luke Keele. 2008. "Taking Time Seriously." *American Journal of Political Science* 52(1):184–200.

Denemark, David. 2000. "Partisan Pork Barrel in Parliamentary Systems: Australian Constituency-Level Grants." *The Journal of Politics* 62(03):896–915.

Dhillon, Amrita and Susana Peralta. 2002. "Economic theories of voter turnout." *The Economic Journal* 112(480):F332–F352.

Dixit, Avinash and John Londregan. 1996. "The Determinants of Success of Special Interests in Redistributive Politics." *The Journal of Politics* 58(4):1132–1155.

Dixit, Avinash and John Londregan. 1998. "Ideology, Tactics, and Efficiency in Redistributive Politics." *The Quarterly Journal of Economics* 113(2):497–529.

Dow, Jay K. and James W. Endersby. 2004. "Multinomial probit and multinomial logit: a comparison of choice models for voting research." *Electoral Studies* 23(1):107 – 122.

Downs, Anthony. 1957. *An economic theory of democracy*. New York: Harper.

Duch, Raymond M. and Michaell A. Taylor. 1994. "A Reply to Abramson and Inglehart's" Education, Security, and Postmaterialism"." *American Journal of Political Science* pp. 815–824.

Duch, Raymond M. and Randolph T Stevenson. 2005. "Context and the economic vote: A multilevel analysis." *Political Analysis* 13(4):387.

Duch, Raymond M. and Randolph T Stevenson. 2006. "Assessing the magnitude of the economic vote over time and across nations." *Electoral Studies* 25(3):528–547.

Duch, Raymond M. and Randolph T Stevenson. 2008. *The economic vote: how political and economic institutions condition election results*. Political economy of institutions and decisions New York: Cambridge University Press.

Duch, R.M. and Michaell A. Taylor. 1993. "Postmaterialism and the economic condition." *American Journal of Political Science* pp. 747–779.

Duckworth, Angela L. and Martin E. P. Seligman. 2005. "Self-Discipline Outdoes IQ in Predicting Academic Performance of Adolescents." *Psychological Science* 16(12):939 – 944.

Dunning, Thad and Susan C. Stokes. 2008. Clientelism as Persuasion and as Mobilization. In *American Political Science Association annual meeting*. pp. 28–31.

Duverger, Maurice. 1954. *Political parties, their organization and activity in the modern state*. London: Methuen.

Efron, Bradley. 1979. "Bootstrap methods: another look at the jackknife." *The annals of Statistics* 7(1):1–26.

Erikson, Robert, John H. Goldthorpe, Michelle Jackson, Meir Yaish and D. R. Cox. 2005. "On class differentials in educational attainment." *Proceedings of the National Academy of Sciences of the United States of America* 102(27):9730–9733.

Erikson, Robert S, Michael MacKuen and James A Stimson. 2002. *The macro polity.* New York: Cambridge University Press.

Evans, Geoffrey. 1999. *The end of class politics?: class voting in comparative context.* Oxford: Oxford University Press.

Feinstein, Leon, Kathryn Duckworth and Ricardo Sabates. 2004. *A Model of the Inter-generational Transmission of Educational Success.* Centre for Research on the Wider Benefits of Learning, Institute of Education.

Ferejohn, John A. and Morris P. Fiorina. 1974. "The paradox of not voting: A decision theoretic analysis." *The American political science review* 68(2):525–536.

Fernandez, Raquel and Jordi Gali. 1999. "To Each According to...? Markets, Tournaments, and the Matching Problem with Borrowing Constraints." *The Review of Economic Studies* 66(4):799–824.

Fernandez, Raquel and Richard Rogerson. 1995. "On the Political Economy of Education Subsidies." *The Review of Economic Studies* 62(2):249–262.

Fink, Günther. 2007. "The Political Economy of Tertiary Education.".

Fiorina, Morris P. 1976. "The voting decision: instrumental and expressive aspects." *Journal of Politics* 38(2):390–413.

Fiorina, Morris P. 1981. *Retrospective voting in American national elections.* New Haven: Yale University Press.

Franzese, Robert J. Jr. 2005. "Empirical strategies for various manifestations of multilevel data." *Political Analysis* 13(4):430.

Freeman, Richard B and Lawrence F Katz. 1995. *Differences and changes in wage structures.* Chicago: University of Chicago Press.

Friedman, Milton. 1953. *Essays in positive economics.* Chicago: University of Chicago Press.

Gabel, Matthew J. and John D. Huber. 2000. "Putting Parties in Their Place: Inferring Party Left-Right Ideological Positions from Party Manifestos Data." *American Journal of Political Science* 44(1):94–103.

Gallagher, Michael and Paul Mitchell. 2008. *The politics of electoral systems.* Pbk. ed ed. Oxford: Oxford University Press.

García-Peñalosa, Cecilia and Klaus Wälde. 2000. "Efficiency and equity effects of subsidies to higher education." *Oxf. Econ. Pap.* 52(4):702–722.

Garrett, Geoffrey. 1998. *Partisan politics in the global economy.* Cambridge, UK: Cambridge University Press.

Gerber, Alan S and Donald P. Green. 1998. "Rational learning and partisan attitudes." *American Journal of Political Science* 42(3):794–818.

Gerber, Alan S. and Donald P. Green. 2008. Field Experiments and Natural Experiments. In *The Oxford handbook of political methodology*, ed. Janet M. Box-Steffensmeier, Henry E Brady and David Collier. Oxford: Oxford University Press.

Gilens, M. 2009. "Preference Gaps and Inequality in Representation." *PS: Political Science and Politics* 42(2):335–41.

Glomm, Gerhard and B. Ravikumar. 1992. "Public versus Private Investment in Human Capital: Endogenous Growth and Income Inequality." *The Journal of Political Economy* 100(4):818–834.

Golden, Miriam A. and Lucio Picci. 2008. "Pork-Barrel Politics in Postwar Italy, 1953–94." *American Journal of Political Science* 52(2):268–289.

Gottschalk, Peter and Timothy M. Smeeding. 1997. "Cross-national comparisons of earnings and income inequality." *Journal of economic literature* 35(2):633–687.

Greene, William H. 2008. *Econometric analysis.* 6th ed ed. Upper Saddle River, N.J.: Prentice Hall.

Grossman, Gene M and Elhanan Helpman. 2001. *Special interest politics.* Cambridge, Mass.: MIT.

Grynaviski, Jeffrey D. 2006. "A Bayesian learning model with applications to party identification." *Journal of Theoretical Politics* 18(3):323.

Hall, Peter A. and David W. Soskice. 2001. *Varieties of capitalism : the institutional foundations of comparative advantage.* Oxford: Oxford University Press.

Hansen, W. Lee and Burton Allen Weisbrod. 1969. *Benefits, costs, and finance of public higher education.* Markham series in public policy analysis Chicago: Markham Pub. Co.

Heckman, James J. 2000. "Policies to foster human capital." *Research in Economics* 54(1):3 – 56.

Heckman, James J. 2006*a*. "Catch 'em young." *The Wall Street Journal, A* 15.

Heckman, James J. 2006*b*. "Skill Formation and the Economics of Investing in Disadvantaged Children." *Science* 312(5782):1900–1902.

Heckman, James J. 2008. Schools, Skills, and Synapses. Working Paper 14064 National Bureau of Economic Research.

Heckman, James J, Alan B Krueger and Benjamin M Friedman. 2003. *Inequality in America: what role for human capital policies?* Cambridge, Mass.: MIT Press.

Heckman, James J., Jora Stixrud and Sergio Urzua. 2006. "The Effects of Cognitive and Noncognitive Abilities on Labor Market Outcomes and Social Behavior." *Journal of Labor Economics* 24(3):411 – 482.

Heckman, James J. and Peter J. Klenow. 1997. *Human capital policy.* Chicago, IL: University of Chicago.

Hedstrom, Peter. 2008. Studying mechanisms to strengthen causal inferences in quantitative research. In *The Oxford handbook of political methodology*, ed. Janet M. Box-Steffensmeier, Henry E Brady and David Collier. Oxford: Oxford University Press.

Hedstrom, Peter. 2010. "Causal Mechanisms in the Social Sciences." *Annual Review of Sociology* 36(1):49–67.

Hendel, Igal, Joel Shapiro and Paul Willen. 2005. "Educational opportunity and income inequality." *Journal of Public Economics* 89(5-6):841 – 870.

Herrnstein, Richard J and Charles A Murray. 1994. *The bell curve: intelligence and class structure in American life.* New York: Free Press.

Herron, Michael C. and Brett A. Theodos. 2004. "Government Redistribution in the Shadow of Legislative Elections: A Study of the Illinois Member Initiative Grants Program." *Legislative Studies Quarterly* 29(2):287–311.

Hibbs, Douglas A. 1987. *The political economy of industrial democracies.* Cambridge, Mass.: Harvard University Press.

Hibbs, Douglas A., Jr. 1977. "Political Parties and Macroeconomic Policy." *The American Political Science Review* 71(4):1467–1487.

Hicken, Allen. 2011. "Clientelism." *Annual Review of Political Science* 14(1):289–310.

Hotelling, Harold. 1929. "Stability in Competition." *The Economic Journal* 39(153):41–57.

Huber, E., C. Ragin, J.D. Stephens, D. Brady and J. Beckfield. 2004. "Comparative Welfare States Data Set, Northwestern University, University of North Carolina, Duke University and Indiana University." *Data available at http://www. lisproject. org/publications/welfaredata/welfareaccess. htm. Accessed April* 15:2005.

Huber, Evelyne and John D. Stephens. 2001. *Development and crisis of the welfare state: parties and policies in global markets.* Chicago: The University of Chicago Press.

Huber, John D. 1996. *Rationalizing parliament: legislative institutions and party politics in France.* Cambridge: Cambridge University Press.

Huber, John D and G. Bingham Powell. 1994. "Congruence between citizens and policymakers in two visions of liberal democracy." *World Politics* 46(3):291–326.

Huber, John D., Georgia Kernell and Eduardo L. Leoni. 2005. "Institutional context, cognitive resources and party attachments across democracies." *Political Analysis* 13(4):365.

Huber, John D and Ronald Inglehart. 1995. "Expert interpretations of party space and party locations in 42 societies." *Party Politics* 1(1):73.

Huckfeldt, R. and J. Sprague. 1993. "Citizens, contexts, and politics." *Political science: The state of the discipline II* pp. 281–303.

Huckfeldt, R. Robert and John D Sprague. 1995. *Citizens, politics, and social communication: information and influence in an election campaign.* Cambridge: Cambridge University Press.

Imai, Kosuke, Luke Keele and Teppei Yamamoto. 2010. "Identification, inference and sensitivity analysis for causal mediation effects." *Statistical Science* 25(1):51–71.

Iversen, Torben and David Soskice. 2002. "An Asset Theory of Social Policy Preferences." *American Political Science Review* 95(04):875–893.

Iversen, Torben and David Soskice. 2006. "New Macroeconomics and Political Science." *Annual Review of Political Science* 9:425–453.

Iversen, Torben and Frances Rosenbluth. 2006. "The Political Economy of Gender: Explaining Cross-National Variation in the Gender Division of Labor and the Gender Voting Gap." *American Journal of Political Science* 50(1):1–19.

Iversen, Torben and Frances Rosenbluth. 2010. *Women, Work and Politics: The Political Economy of Gender Inequality.* New Haven, CT': Yale University Press.

Iversen, Torben and John D. Stephens. 2008. "Partisan Politics, the Welfare State, and Three Worlds of Human Capital Formation." *Comparative Political Studies* 41(600–637).

Jackson, Gregory A. and George B. Weathersby. 1975. "Individual Demand for Higher Education: A Review and Analysis of Recent Empirical Studies." *The Journal of Higher Education* 46(6):623–652.

Jaeger, Mads Meier. 2006. "Welfare Regimes and Attitudes Towards Redistribution: The Regime Hypothesis Revisited." *European Sociological Review* 22(2):157–170.

Johansson, Eva. 2003. "Intergovernmental grants as a tactical instrument: empirical evidence from Swedish municipalities." *Journal of Public Economics* 87(5-6):883–915.

Johnson, George E. 1984. "Subsidies for Higher Education." *Journal of Labor Economics* 2(3):303–318.

Johnson, William R. 2006. "Are Public Subsidies to Higher Education Regressive?" *Education Finance and Policy* 1(3):288–315.

Kam, Cindy D. and Robert J. Franzese. 2007. *Modeling and interpreting interactive hypotheses in regression analysis.* Ann Arbor: University of Michigan Press.

Kedar, Orit. 2005. "How diffusion of power in parliaments affects voter choice." *Political Analysis* 13(4):410.

Kelley, Jonathan, Clive S. Bean M.D.R. Evans. 1991. "The National Social Science Survey, 1987-1988 Round." *National Social Science Survey Report 2 (6)* .

Kenworthy, Lane. 2010. "Rising Inequality, Public Policy, and America's Poor." *Challenge* 53(6):93–109.

Kenworthy, Lane and Jonas Pontusson. 2005. "Rising Inequality and the Politics of Redistribution in Affluent Countries." *Perspectives on Politics* 3(03):449–471.

Kerckhoff, Alan C. 1995. "Institutional Arrangements and Stratification Processes in Industrial Societies." *Annual Review of Sociology* 21(1):323–347.

Key, Valdimer Orlando and Milton C Cummings. 1966. *The responsible electorate: rationality in presidential voting, 1936-1960.* Cambridge: Belknap Press of Harvard University Press.

Kim, Heemin and Richard C. Fording. 1998. "Voter ideology in western democracies, 1946-1989." *European Journal of Political Research* 33(1):73–97.

Kim, Heemin and Richard C. Fording. 2003. "Voter ideology in Western democracies: An update." *European Journal of Political Research* 42(1):95–105.

King, Gary, Robert O Keohane and Sidney Verba. 1994. *Designing social inquiry: scientific inference in qualitative research.* Princeton, N.J.: Princeton University Press.

Kitschelt, Herbert. 1994. *The transformation of European social democracy.* Cambridge: Cambridge University Press.

Kitschelt, Herbert and Philip Rehm. 2006. New social risk and political preferences. In *The politics of post-industrial welfare states : adapting post-war welfare states to new social risks*, ed. K Armingeon and Giuliano Bonoli. 1st ed. New York, NY: Routledge.

Kselman, Daniel and Emerson Niou. 2010. "Strategic Voting in Plurality Elections." *Political Analysis* 18(2):227–244.

La Due Lake, Ronald and Robert R. Huckfeldt. 1998. "Social capital, social networks, and political participation." *Political Psychology* pp. 567–584.

Lake, David A. and Matthew A. Baum. 2001. "The Invisible Hand of Democracy: Political Control and the Provision of Public Services." *Comparative Political Studies* 34(6):587–621.

Larcinese, Valentino, James M. Jr. Snyder and Cecilia Testa. 2009. "Testing models of distributive politics using exit polls to measure voter preferences and partisanship.".

Laurier Institute for the Study of Public Opinion and Policy (LISPOP). 1991. *National Angus Reid Poll.* Toronto, Ontario.: Ipsos Reid Corporation.

Laver, Michael and Kenneth A Shepsle. 1990. "Coalitions and Cabinet Government." *American Political Science Review* 84(3):873–890.

Laver, Michael and Kenneth A Shepsle. 1996. *Making and breaking governments: cabinets and legislatures in parliamentary democracies.* Cambridge: Cambridge University Press.

Lazear, Edward. 1983. "Intergenerational Externalities." *The Canadian Journal of Economics / Revue canadienne d'Economique* 16(2):212–228.

Le Grand, Julian. 1982*a*. "The Distribution of Public Expenditure on Education." *Economica* 49(193):63–68.

Le Grand, Julian. 1982*b*. *The strategy of equality: redistribution and the social services.* London: G. Allen & Unwin.

Lewis-Beck, Michael S. 1988. *Economics and elections: the major western democracies.* Ann Arbor: University of Michigan Press.

Lewis-Beck, Michael S and Mary Stegmaier. 2000. "Economic Determinants of Electoral Outcomes." *Annual Review of Political Science* 3(1):183–219.

Lijphart, Arend. 1971. "Comparative politics and the comparative method." *The American Political Science Review* 65(3):682–693.

Lijphart, Arend and Don Aitkin. 1994. *Electoral systems and party systems: a study of twenty-seven democracies, 1945-1990*. Oxford: Oxford University Press.

Lindbeck, Assar and Jögen W. Weibull. 1987. "Balanced-Budget Redistribution as the Outcome of Political Competition." *Public Choice* 52(3):273–297.

Lindbeck, Assar and Jörgen W. Weibull. 1993. "A model of political equilibrium in a representative democracy." *Journal of Public Economics* 51(2):195 – 209.

Lindert, Peter H. 2004. *Growing public: social spending and economic growth since the eighteenth century*. Cambridge, UK: Cambridge University Press.

Linos, Katerina and Martin West. 2003. "Self-interest, Social Beliefs, and Attitudes to Redistribution. Re-addressing the Issue of Cross-national Variation." *Eur Sociol Rev* 19(4):393–409.

Loewenstein, George. 2007. *Exotic preferences: behavioral economics and human motivation*. Oxford: Oxford University Press.

Luce, R. Duncan. 1959. *Individual choice behavior: a theoretical analysis*. New York: Wiley.

Lynch, Julia. 2006. *Age in the welfare state : the origins of social spending on pensioners, workers, and children*. Cambridge: Cambridge University Press.

Manski, Charles F and Daniel McFadden. 1981. *Structural analysis of discrete data with econometric applications*. Cambridge, Mass.: MIT Press.

Margalit, Yotam M. 2011. "Ideology All the Way Down?" Paper presented at "Redistributive Preferences in Comparative Perspective" workshop, Merton College, Oxford.

McFadden, Daniel L. 1974. Conditional Logit Analysis of Qualitative Choice Behavior. In *Frontiers in econometrics*, ed. Paul Zarembka. Economic theory and mathematical economics New York: Academic Press pp. 105–142.

McIlrath, Lorraine and Iain MacLabhrainn. 2007. *Higher education and civic engagement: international perspectives*. Aldershot, England: Ashgate.

McKelvey, Richard .D. and Peter C. Ordeshook. 1972. A general theory of the Calculus of Voting. In *Mathematical applications in political science IV*, ed. James F Herndon and Joseph L. Bernd. University of Virginia Press pp. 32–78.

Meltzer, Allan H. and Scott F. Richard. 1981. "A Rational Theory of the Size of Government." *The Journal of Political Economy* 89(5):914–927.

Milanovic, Branko. 2000. "The median-voter hypothesis, income inequality, and income redistribution: an empirical test with the required data." *European Journal of Political Economy* 16(3):367 – 410.

Mood, Alexander McFarlane, Franklin A. Graybill and Duane C. Boes. 1974. *Introduction to the theory of statistics*. McGraw-Hill series in probability and statistics 3d ed ed. New York: McGraw-Hill.

Morton, Rebecca B. and Kenneth C. Williams. 2008. Experimentation in Political Science. In *The Oxford handbook of political methodology*, ed. Janet M. Box-Steffensmeier, Henry E Brady and David Collier. Oxford: Oxford University Press.

Mourshed, Mona, Chinezi Chijioke and Michael Barber. 2010. *How the world's most improved school systems keep getting better*. McKinsey & Company.

Myerson, Roger B. 1998. "Population uncertainty and Poisson games." *International Journal of Game Theory* 27(3):375–392.

Nagel, Jack H. 1975. *The descriptive analysis of power*. New Haven: Yale University Press.

Nemes, Szilard, Junmei Miao Jonasson, Anna Genell and Gunnar Steineck. 2009. "Bias in odds ratios by logistic regression modelling and sample size." *BMC medical research methodology* 9(1):56.

Nichter, Simeon. 2008. "Vote Buying or Turnout Buying? Machine Politics and the Secret Ballot." *American Political Science Review* 102(01):19–31.

Nugent, Michael A. 2004. *The transformation of the student career: university study in Germany, the Netherlands, and Sweden*. RoutledgeFalmer studies in higher education New York: RoutledgeFalmer.

OECD. 2010. *Education at a Glance 2010: OECD Indicators*. Paris: OECD.

Olson, Mancur. 1965. *The logic of collective action: public goods and the theory of groups*. Vol. v. 124 Cambridge, Mass.: Harvard University Press.

Peduzzi, Peter, John Concato, Elizabeth Kemper, Theodore R. Holford and Alvan R. Feinstein. 1996. "A simulation study of the number of events per variable in logistic regression analysis* 1." *Journal of clinical epidemiology* 49(12):1373–1379.

Peltzman, Sam. 1973. "The Effect of Government Subsidies-in-Kind on Private Expenditures: The Case of Higher Education." *The Journal of Political Economy* 81(1):1–27.

Persson, Torsten and Guido Enrico Tabellini. 2000. *Political economics: explaining economic policy*. Cambridge, Mass.: MIT Press.

Pfeffer, Fabian T. 2008. "Persistent Inequality in Educational Attainment and its Institutional Context." *Eur Sociol Rev* 24(5):543–565.

Pierson, Paul. 2000. "Increasing returns, path dependence, and the study of politics." *The American political science review* 94(2):251–267.

Pierson, Paul. 2002. "Coping with permanent austerity: welfare state restructuring in affluent democracies." *Revue française de sociologie* 43(2):369–406.

Pierson, Paul. 2004. *Politics in time: history, institutions, and social analysis*. Princeton: Princeton University Press.

Pigou, Arthur Cecil. 1920. *The economics of welfare*. London: Macmillan and co., ltd.

Pontusson, Jonas. 2000. Wage distribution and labor market institutions. In *Unions, employers, and central banks: macroeconomic coordination and institutional change in social market economies*, ed. Torben Iversen, Jonas Pontusson and David W. Soskice. Cambridge: Cambridge University Press.

Pontusson, Jonas, David Rueda and Cristopher R. Way. 2002. "Comparative political economy of wage distribution: The role of partisanship and labour market institutions." *British Journal of Political Science* 32(02):281–308.

Powell, G. Bingham. 2000. *Elections as instruments of democracy: majoritarian and proportional visions*. New Haven, CT: Yale University Press.

Psacharopoulos, George, Jee-Peng Tan and Emmanuel Jimenez. 1986. *Financing education in developing countries: an exploration of policy options*. Washington, D.C., U.S.A.: World Bank.

Psacharopoulos, Gerge and Harry A. Patrinos. 2002. "Returns to investment in education: a further update World Bank Policy Research Working Paper 2881." *World Bank: Washington* .

Rabe-Hesketh, Sophia, Anders Skrondal and Andrew Pickles. 2005. "Maximum likelihood estimation of limited and discrete dependent variable models with nested random effects." *Journal of Econometrics* 128(2):301–323.

Radner, R. and L. S. Miller. 1970. "Demand and Supply in U.S. Higher Education: A Progress Report." *The American Economic Review* 60(2):326–334.

Rehm, Philipp. 2009. "Risks and Redistribution: An Individual-Level Analysis." *Comparative Political Studies* 42(7):855–881.

Riker, William H. and Peter C. Ordeshook. 1968. "A Theory of the Calculus of Voting." *The American Political Science Review* 62(1):25–42.

Robertson, David Bruce. 1976. *A theory of party competition*. London: J. Wiley.

Romer, Thomas. 1975. "Individual welfare, majority voting, and the properties of a linear income tax." *Journal of Public Economics* 4(2):163–185.

Rosenthal, Thomas R Palfrey Howard. 1985. "Voter participation and strategic uncertainty." *The American Political Science Review* pp. 62–78.

Rowthorn, Bob. 1992. Corporatism and labour market performance. In *Social corporatism: a superior economic system?*, ed. Jukka Pekkarinen, Matti A Pohjola and Bob Rowthorn. WIDER studies in development economics Oxford: Clarendon Press.

Rudra, Nita and Stephan Haggard. 2005. "Globalization, Democracy, and Effective Welfare Spending in the Developing World." *Comparative Political Studies* 38(9):1015–1049.

Rueda, David. 2005. "Insider–Outsider Politics in Industrialized Democracies: The Challenge to Social Democratic Parties." *American Political Science Review* 99(01):61–74.

Rueda, David. 2007. *Social democracy inside out: partisanship and labor market policy in industrialized democracies*. Oxford: Oxford University Press.

Rueda, David and Jonas Pontusson. 2000. "Wage inequality and varieties of capitalism." *World Politics* 52(3):350–383.

Rutter, Michael. 2006. *Genes and behavior: nature – nurture interplay explained.* Malden, MA: Blackwell Pub.

Saint-Paul, Gilles and Thierry Verdier. 1993. "Education, democracy and growth." *Journal of Development Economics* 42(2):399 – 407.

Sanders, Mitchell S. 1998. "Unified models of turnout and vote choice for two-candidate and three-candidate elections." *Political Analysis* 7(1):89.

Sanders, Mitchell S. 2001. "Uncertainty and Turnout." *Political Analysis* 9(1):45–57.

Scheve, Ken and David Stasavage. 2006. "Religion and preferences for social insurance." *Quarterly Journal of Political Science* 1(3):255–286.

Schmitt, Hermann, Gabór Tóka, Michael Marsh, P. Matthew Loveless, Mark N. Franklin et al. 2005. "European Election Study 2004: Design, Data Description and Documentation.".

Schmitt, Hermann, Mark N. Franklin, Franz U. Pappi, Cees Van der Eijk, Evi Scholz et al. 1997. "European Election Study 1994: Design, Implementation and Results.".

Schneider, Silke L. 2008. "The International Standard Classification of Education (ISCED-97)." *Mannheimer Zentrum für Europäische Sozialforschung* .

Schneider, Silke L. 2010. "Nominal comparability is not enough:(In-) equivalence of construct validity of cross-national measures of educational attainment in the European Social Survey." *Research in Social Stratification and Mobility* 28(3):343–357.

Schwartz, Herman M. and Leonard Seabrooke. 2009. *The politics of housing booms and busts.* Basingstoke: Palgrave Macmillan.

Silver, B.D., B.A. Anderson and P.R. Abramson. 1986. "Who overreports voting?" *The American Political Science Review* 80(2):613–624.

Soroka, Stuart N. and Christopher Wlezien. 2005*a*. "Opinion–Policy Dynamics: Public Preferences and Public Expenditure in the United Kingdom." *British Journal of Political Science* 35(04):665–689.

Soroka, Stuart N. and Christopher Wlezien. 2005*b*. "Opinion Representation and Policy Feedback: Canada in Comparative Perspective." *Canadian Journal of Political Science/Revue canadienne de science politique* 37(03):531–559.

Soroka, Stuart Neil and Christopher Wlezien. 2010. *Degrees of democracy: politics, public opinion, and policy.* Cambridge: Cambridge University Press.

Soskice, David. 1990. "Wage determination: the changing role of institutions in advanced industrialized countries." *Oxford review of economic policy* 6(4):36.

Soskice, David. 1999. Divergent production regimes: coordinated and uncoordinated market economies in the 1980s and 1990s. In *Continuity and change in contemporary capitalism*, ed. Herbert Kitschelt. Cambridge, UK: Cambridge University Press.

Spence, Michael. 1973. "Job Market Signaling." *The Quarterly Journal of Economics* 87(3):355–374.

Spence, Michael. 2002. "Signaling in retrospect and the informational structure of markets." *American Economic Review* 92(3):434–459.

Stasavage, David. 2005. "Democracy and Education Spending in Africa." *American Journal of Political Science* 49(2):343–358.

Stein, Robert M. and Kenneth N. Bickers. 1994. "Congressional Elections and the Pork Barrel." *The Journal of Politics* 56(2):377–399.

Stephens, John D. 1979. *The transition from capitalism to socialism.* London: Macmillan.

Stiglitz, Joseph E. 1974. "The demand for education in public and private school systems." *Journal of Public Economics* 3(4):349 – 385.

Stimson, James A., Michael B. Mackuen and Robert S. Erikson. 1995. "Dynamic Representation." *The American Political Science Review* 89(3):543–565.

Stokes, Susan C. 2005. "Perverse Accountability: A Formal Model of Machine Politics with Evidence from Argentina." *American Political Science Review* 99(03):315–325.

Stokes, Susan C. 2009. "Pork, by Any Other Name...Building a Conceptual Scheme of Distributive Politics." *SSRN eLibrary* .

Stromberg, David. 2004. "Radio's Impact on Public Spending." *Quarterly Journal of Economics* 119(1):189–221.

Svallfors, Stefan. 1992. *Opinions about the Public Sector and Taxes 1986*. Göteborg, Sweden: Department of Sociology, Umea university and Swedish Social Science Data Service.

Svallfors, Stefan. 1995. *Opinions about the Public Sector and Taxes 1992*. Göteborg, Sweden: Department of Sociology, Umea university and Swedish Social Science Data Service.

Svallfors, Stefan. 2003. *Opinions about the Public Sector and Taxes 1997*. Göteborg, Sweden: Department of Sociology, Umea university and Swedish Social Science Data Service.

Svallfors, Stefan. 2004*a*. "Class, Attitudes and the Welfare State: Sweden in Comparative Perspective." *Social Policy & Administration* 38(2):119–138.

Svallfors, Stefan. 2004*b*. *Opinions about the Public Sector and Taxes 2002*. Göteborg, Sweden: Department of Sociology, Umea university and Swedish Social Science Data Service.

Teichler, Ulrich. 1993. Strutures of Higher Education Systems in Europe. In *Higher education in Europe*, ed. Claudius Gellert. Vol. 16 London: J. Kingsley Publishers.

Thelen, Kathleen Ann. 2004. *How institutions evolve: the political economy of skills in Germany, Britain, the United States, and Japan.* Cambridge: Cambridge University Press.

Train, Kenneth. 1993. *Qualitative choice analysis: theory, econometrics, and an application to automobile demand.* Vol. 10 Cambridge, Mass.: MIT Press.

Trow, Martin A. 1973. "Problems in the Transition from Elite to Mass Higher Education.".

Tsebelis, George. 2002. *Veto players: how political institutions work.* Princeton, N.J.: Princeton University Press.

Tsebelis, George and Geoffrey Garrett. 2001. "The institutional foundations of intergovernmentalism and supranationalism in the European Union." *International Organization* 55(2):357–390.

Van Biezen, Ingrid and Richard S. Katz. 2006. "Political data in 2005." *European Journal of Political Research* 45(7-8):1023–1301.

Van der Eijk, Cees, Mark N. Franklin, Erik Oppenhuis, Hermann Schmitt et al. 1993. "European Election Study 1989: Design, Implementation and Results.".

Van der Eijk, Cees, Mark N. Franklin, Klaus Schonbach, Hermann Schmitt, Holli Semetko et al. 2002. "European Election Study 1999: Data Description and Consise Documentation.".

Van der Eijk, Cees and Michael Marsh. 2007. "Don't expect me to vote for you just because I like you, even if you do make me feel warm inside: a comparison of the validity of non-ipsative measures of party support.".

Van der Eijk, Cees, Wouter van der Brug, Martin Kroh and Mark Franklin. 2006. "Rethinking the dependent variable in voting behavior: On the measurement and analysis of electoral utilities." *Electoral Studies* 25(3):424 – 447.

Van Egmond, Marcel H., Eliyahu V. Sapir, Wouter van der Brug, Sara B. Hobolt and Mark N. Franklin. 2010. *EES 2009 Voter Study – Advance Release Notes.* PIREDEU.

Vieira, M.B. and D. Runciman. 2008. *Representation.* Polity Pr.

Wilson, Carole J. 2009. "Considering the Alternatives: The Effects of the European and Left/Right Dimensions on Consideration Set Formation and Voting." Paper presented at the Annual Meeting of the Midwest Political Science Association.

Wilson, Shaun, Gabrielle Meagher, Rachel K. Gibson, David Denemark and Mark Western. 2004. "The Australian Survey of Social Attitudes, 2003." *[computer file]. Canberra: Australian Social Science Data Archive, Australian National University* .

Wilson, Shaun, Rachel K. Gibson, Gabrielle Meagher, David Denemark and Mark Western. 2006. "The Australian Survey of Social Attitudes, 2005,[computer file]." *Canberra, Australia: Australian Social Science Data Archive, The Australian National University* .

Wlezien, Christopher. 2004. "Patterns of Representation: Dynamics of Public Preferences and Policy." *The Journal of Politics* 66(1):1–24.

Woldendorp, Jaap, Hans Keman and Ian Budge. 2000. *Party government in 48 democracies (1945-1998): composition, duration, personnel.* Dordrecht, Netherlands: Kluwer Academic Publishers.

Wolfe, Raymond N. and Scott D. Johnson. 1995. “Personality as a Predictor of College Performance.” *Educational and Psychological Measurement* 55(2):177–185.

Wright, Gavin. 1974. “The Political Economy of New Deal Spending: An Econometric Analysis.” *The Review of Economics and Statistics* 56(1):30–38.