

Degree Completion in the UK: Individual, institutional and contextual factors that explain students' chances of educational success in British Universities

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ABSTRACT

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Degree completion is as important as participation in higher education. To date, most of the research on this subject has investigated the association between socio-economic background and academic preparation to explain lower rates or non-completion. This thesis explores the role that individual, institutional and contextual factors have on degree completion chances.

The first empirical chapter uses an individual-level longitudinal dataset to study the role that attainment on entry and socio-economic background have on students' chances of completion. The chapter finds that attainment on entry significantly affects students' chances of degree completion. It also reveals, however, that attainment on entry does not completely explain the socio-economic differences in degree completion chances in the system.

The second empirical chapter examines the role that institutions have on students' chances of degree completion. Like the first chapter, this one draws on the individual-level longitudinal dataset. Although the analyses discover institutional effects, they show them to have a small effect on the system.

The third empirical chapter examines the role that teaching has on the probability that students complete their degrees in higher education. The findings show that teaching has a small but significant effect on students' chances of degree completion. Teaching effects take place only at the most selective institutions of the system.

The final empirical chapter examines the role that unemployment has on students' decisions to complete a university degree. Using data from the Labour Force Survey, the research finds that higher unemployment rates have a positive effect on students' chances of degree completion.

This thesis contributes to the field by showing that stratification of higher education also translates to degree completion. The results confirm that selectivity and institutional effects are strongly associated. In addition, they show that where the institutional framework is concerned, there is a gradient for class effect in educational outcomes.

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Chapter 1: Introduction

Mass participation in higher education is widely associated with many advantages, including enhancement of people's general well-being and of society's macroeconomic development (Shavit, Arum and Gamoran 2007). In particular, within the industrialised economies, higher education is considered crucial to economic competitiveness as well as to the promotion of social justice and social mobility (OECD 2008).

As the evidence shows, large gaps persist in terms of access to higher education. The expansion of higher education has not affected students from different socioeconomic and ethnic backgrounds equally (Blanden, Gregg and Machin 2005; Blanden and Machin 2004; Boliver 2011). Despite the fact that students from lower class backgrounds and ethnic minorities found new opportunities¹ to enrol in higher education as a consequence of the expansion of the system, evidence shows that those students are increasingly concentrated in lower-tier institutions (New Universities). The patterns of participation in different strata of higher education shows stark social class and ethnicity gradients, with the lower social classes and ethnic minorities over-represented in lower status institutions and severely under-represented in higher status institutions, especially those that comprise the Russell Group of universities (Archer, Hutchings and A. 2003; Blanden and Machin 2004; Boliver 2006; Boliver 2011).

¹ A recent report of the OECD revealed that the UK performs well across OECD countries in relation to the access to higher education of young people from disadvantaged families. On average in OECD countries, young people from families with low levels of education are less than half (odds of 0.44) as likely to be in higher education, compared to the proportion of such families in the population. The odds in the UK, however, are at 0.61, well above the OECD average, suggesting that disadvantaged youth enjoy better access to higher education in the UK. OECD. 2012. "Education at a Glance . OECD Indicators, Country Note.". Paris: OECD.

As important as participation in higher education is graduation from the system². Evidence reveals that approximately three quarters of students enrolled in first degree programmes complete their university degrees in the UK (NAO 2007; OECD 2011). As compared to other industrialized nations, the British system performs well in international rankings of retention rates³. The fact that one quarter of the students who enroll in degree programmes at universities do not graduate from the system is, however, a cause for concern.

There is some evidence⁴ suggesting that, as the sector has expanded in recent years, the rate of non-completion⁵ has risen (Blanden and Gregg 2004; Johnes and McNabb 2004; Johnes 1997; Powdthavee and Vignoles 2009). The expansion has not brought success for all students. Additional evidence indicates that the rise in dropout rates has tended to widen the socio-economic gap in degree completion probabilities, since poorer students drop out to a greater extent, even after allowing for their prior achievement (Blanden, Gregg and Machin 2005; Powdthavee and Vignoles 2009). Blanden et al. (2005), in a study that compared the educational attainments of students from different socio-economic backgrounds across different cohorts (1981-1993 and late 1990), found that, despite the expansion that has brought increases in attainment for students from all

² In this study, I use the terms degree completion, educational attainment, educational success and graduation interchangeably.

³ These aggregates hide considerable variations between students and institutions Ramsden, B. 2005. "Participation in Higher Education: A study to determine whether the higher education initial participation rate should be disaggregated." Department for Education and Skills

⁴ There are other studies that have indicated that the dropout rate in the UK is very low, so entry to higher education invariably implies graduation. NAO. 2007. "Staying the course: The retention of students in higher education." London: National Audit Office. Walker, Ian, and Yu Zhu. 2008. "The College Wage Premium and the Expansion of Higher Education in the UK*." *Scandinavian Journal of Economics* 110(4):695-709.

⁵ Non-completion rates are currently part of a range of indicators used by government to measure university performance. The Higher Education Statistics Agency (HESA) publishes performance indicators every year. These measures provide comparative data on the performance of institutions in widening participation, student retention, learning and teaching outcomes, research output and employment of graduates. All the publicly funded higher education institutions in the UK must give information about these areas to HESA.

backgrounds, educational inequality has risen in all of the periods. Young people from the poorest income groups increased their graduation rate by just three percentage points between 1981 and the late 1990s, compared with a rise in graduation rates of 26 percentage points for those with the richest 20 percent of parents.

Despite the social and economic relevance of graduation in higher education, the body of work about this topic is not as extensive as the research on access to higher education in the UK. With the focus on widening participation, policy debates and the research have not paid enough attention to the inequalities in degree completion rates.

It is an aim of this thesis to investigate how individual, institutional and contextual factors explain students' degree completion chances in higher education in the UK. In addition, the thesis pays attention to how institutions of higher education and contextual factors affect students from specific backgrounds, especially those who appear to be at greater risk of non-completion (students from lower class backgrounds and ethnic minorities).

Why is it important to study the phenomenon of degree completion from this perspective?

To date, most of the existing UK research attempting to explain non-completion or lower rates of completion has tended to focus only on the individual characteristics of students to understand the problem. The research has broadly described patterns of association between academic preparation, socio-economic background and degree completion chances. Poor academic preparation and students' lower socio-economic backgrounds have been identified as the main factors underlying low completion rates in the system

(Johnes 1997; Johnes and Taylor 1989; Smith and Naylor 2001; Yorke 1999; Yorke and Thomas 2003).

However, international research has revealed that academic preparation and students' background characteristics are significant but not sufficient⁶ to explain the disparities in completion rates. Institutional factors are another source of variation in educational attainment. It has been shown that students' academic experiences at their institutions also contribute to explain disparities in completion chances (Bowen, Chingos and McPherson 2009; Pascarella and Terenzini 1991; Pascarella and Terenzini 2005).

The empirical work on degree completion in the UK has been constrained by the limited availability of data. To date, most of the data used for analysing educational attainment in higher education have relied on individual information that covers small samples⁷ or on single institutional⁸ data. Research has analysed the effect of institutions and students on educational attainment in higher education separately. Only recently have scholars had access to large scale datasets that link institutional data to student data⁹ (NAO 2002; 2007; Powdthavee and Vignoles 2009; Smith and Naylor 2001).

⁶ In a recent book, Bowen et al. (2009) found, after controlling for a rich set of student characteristics, does not eliminate wide variation among postsecondary institutions in completion rates. Bowen, W., M. Chingos, and M. McPherson. 2009. *Crossing the finish line: Completing college at America's public universities*. Princeton: Princeton University Press.

⁷ Large-scale micro data on UK university students were not available until the Universities Statistical Records (USR) became accessible in 1995.

⁸ A significant number of studies in the UK that explored the role of institutions in students' persistence in higher education have been carried out either in single institutions or have not looked at the interplay of students and institutional characteristics in the phenomenon. Most of these studies have described as a series of institutional characteristics such as selectivity or type of institution, predict student's chances of degree completion.

⁹ These latter cases have used the Universities Students Record (USR) and administrative data from the Higher Education authority (HESA) to carry out their statistical analyses.

Using British register data¹⁰ that covers a national sample of institutions and students enrolled in higher education in 2004, this thesis aims to fill the gap in empirical studies in UK higher education analysing the impact that institutional/contextual and individual aspects have on student attainment. This thesis also uses aggregated data to estimate the effects of institutional and contextual factors on students' chances of degree completion. These data make possible to study the degree completion probabilities of the overall population and of different groups of students in higher education.

The analysis of how institutions affect students' educational outcomes has been widely studied in the USA, but not extensively in the UK. American research¹¹ has studied the role that institutional aspects such as type of institution, institutional enrolment, teaching, curriculum and learning resources have on students' decisions about withdrawal, persistence and degree completion. The American research is arguably of limited use in the British context, however, due to the differences in the structure of the system, length of programmes and general policy context¹². Hence, it is important to explore in this thesis, the role that institutions – and teaching in particular – might have on students' educational outcomes in the UK context. Institutions could potentially have a greater impact on improving the students' chances of success, providing quality teaching to their students.

¹⁰ These dataset has been used by a number of previous studies (including Connor et al. 2004, Leslie 2005, Wakeling 2005, HEFCE 2005a and Powdthavee et al. 2009)

¹¹ The research in the USA has historically been concerned about the low completion rates of the system. The studies have mostly considered the problem of non-completion as an issue in which institutions of higher education play a significant role along with students. The theoretical model devised by Vincent Tinto has influenced most of this research. This model suggests that the students' social and academic integration into the educational institution is the major determinant of completion and identifies some key influences on integration. Tinto, Vincent. 1975. "Dropout from Higher Education: A Theoretical Synthesis of Recent Research." *Review of Educational Research* 45(1):89-125.

¹² Degree completion is a public policy target within higher education in the UK. It is used for university funding (institutions are penalised for students who fail to complete) and as a performance measurement (performance indicator) within higher education.

Because of the stratified nature of the UK higher education system, a second motivation for studying institutions in this thesis is to analyse how different institutional contexts might affect students' chances of educational success. Recent evidence has taken account of how institutional differentiation in higher education is associated with inequalities in access across countries (Shavit, Arum and Gamoran 2007). The studies have revealed that, despite educational expansion, those from advantaged backgrounds continue to have an advantage over access to more prestigious institutions and programmes in several countries. It is a central concern in this thesis, to analyse how different types of institutional contexts might affect the chances of educational success of students from different backgrounds.

Alongside the lack of research on the impact of institutions on students' attainment in higher education in the UK, there is also little information about how alternatives to higher education, such as employment¹³ conditions, affect students' decisions about staying on and completing a degree (Smith and Naylor 2001). As research has shown, if people do not stay in education (after compulsory schooling), they might go to work or be unemployed (Duncan 1965; Mickelwright, Pearson and Smith 1990; Petrongolo and San Segundo 2002; Pissarides 1981; Reimer 2011; Rice 1987; Rice 1999; Wales 2010; Whitfield and Wilson 1991).

The interest of this thesis in analysing the effects of higher education institutions (hereby HEIs) and labour market emerges out of a broader theoretical interest in the role of structures in educational attainment.

¹³ The human capital theory also predicts that the opportunity cost of remaining at university rather than dropping out is likely to be affected by the probability of obtaining employment in the local labour market.

Finally, a fourth motivation for studying degree completion is related to policy and fairness. Evidence suggests that higher non-completion rates would have particularly adverse effects on students from less advantaged backgrounds. On the one hand, if students from disadvantaged backgrounds leave their programmes before completion, they will likely leave with more debt than wealthier students (Pennell and West 2005). On the other hand, non-completion might also especially affect the chances of disadvantaged students of achieving social mobility. The fact that there are class disparities in degree completion rates underlines the importance of ensuring financial and academic support for students from disadvantaged backgrounds in the higher education system. Hence, to analyse the role of institutions in this context is especially important.

The rest of the introductory chapter is organised as follows: the first section briefly presents the process of expansion and differentiation of higher education in the UK during the last decades. The second section presents two analytical frameworks that have analysed the role of higher education institutions and labour market conditions on educational decisions. The third section reviews the existing empirical research – especially in Britain – about degree completion. The last section presents a summary of the different research questions and chapters that comprise the thesis.

1.1 The structure of higher education in the UK: expansion and differentiation

To understand the structure of higher education in the UK, it is necessary to briefly describe the expansion and differentiation of the system during the last decades. The

mass expansion of higher education started in Britain in the post-war period. Historically, it is possible to distinguish two¹⁴ phases of mass expansion of the system.

The first phase, covering much of the 1960s, corresponds to the beginning of the 'binary phase' of higher education in the country. During this period, it was established a separate system of 'polytechnic' higher education institutions intended to run in parallel, but as a second tier to, the traditional university sector. Enrolment during this period rose from five percent in 1960 to 14 percent by the close of the decade; two thirds of this increase occurred in the newly-created polytechnic institutions.

The second phase, which ran from the late 1980s until the mid 1990s, corresponds to the beginning of what has been referred as the 'mass tertiary education' phase of expansion (Halsey 2000). During this period, the binary system started to be dismantled. In 1992, with the Further and Higher Education Act of 1992, the polytechnic institutions (vocational institutions) were upgraded to university status (New Universities) in an attempt to transform the system from a binary to a formally unified one (Shavit, Arum and Gamoran 2007). Similar to what occurred during the first stage of mass expansion during 1960s, much of the enrolment during this second period of expansion took place in the New Universities and in the colleges of further and higher education (Boliver 2010; Boliver 2011).

As a consequence of the expansion, enrolment rates increased dramatically during this period, from 15 percent in 1992 to 32 percent in 1998 (Universities 2005). A recent

¹⁴ Although the expansion started in the UK during 1950s, the process during this period was characterised by a very small increase in enrolment rates; most of the higher education students studying for degree-level were attending traditional universities (Old) and most students studying for sub-degrees were attending lower status institutions. Boliver, V. 2011. "Expansion, differentiation, and the persistence of social class inequalities in British higher education." *Higher Education* 61(3):229-42.

report of the OECD (2007) shows that between 1988 and 1996, while US higher education participation rose by only 15 percent, higher education participation in the UK rose by 93 percent.

The expansion process triggered a qualitative differentiation¹⁵ of the higher education system. Charles and Bradley (2002) refer to this process as comprising the horizontal dimension of education stratification¹⁶. It refers to qualitative differences between programmes (courses and fields of study) and institutions, which can be hierarchically classified according to their prestige (status), quality, their students' intake or other relevant characteristics.

In sum, as access to higher education becomes more democratised, internal differentiation and differential rates of completion appear to become more significant in relation to social differentiation (Duru-Bellat, Kieffer and Reimer 2008; Shumar 1997). The structure of the system is grounded in status/quality distinctions associated with divisions between longer established institutions and more recently established institutions; New Universities (former polytechnics) and colleges of further and higher education occupy the lower positions in the system, Old Universities occupy most of the middle-range positions within the hierarchy, and the "Russell Group of Universities"¹⁷ hold the higher status positions.

¹⁵ The differentiation of higher education is commonly regarded as a consequence of expansion of the system; however, it may also contribute to the expansion as new places become available in new segments of the education system. Shavit, Yossi, Richard Arum, and Adam Gamoran. 2007. *Stratification in Higher Education. A comparative Study*. Stanford, California: Stanford University Press.

¹⁶ Evidence shows that institutional quality and field of study (programme) are associated to different occupational returns in terms of wages, unemployment risks, and occupational status.

¹⁷ The Russell Group comprises 24 research-led institutions that account for more than 50 percent of the research funding allocated in the system. Within this group it is possible to find elite institutions, such as Cambridge and Oxford, as well as established, London-based universities such as University College London, London School of Economics and Imperial College.

1.2 Approaches to decision-making in higher education

This section reviews four theoretical frameworks¹⁸ from different disciplines that have analysed the demand for education. Despite they focus on the decision of continuing¹⁹ post-secondary education, they are intended to set up a baseline for the discussion about the decision of degree completion.

Theories linked to the economy, education and sociology are revised in this section. I start with the analysis of the economic approach (human capital) followed by a brief review of the educational approach (college/university effects). To finish, I review two sociological theories- the rational choice (the relative risk aversion approach) and the cultural reproduction theory.

1.2.1 The Economic approach: The Human Capital Model

Human capital is the most widely used framework for analysing how and why individuals decide to continue in education (Becker 1964, 1993). In order to explain why students choose to enter or abstain from education – especially in relation to postsecondary studies or higher education- the human capital approach (hereafter HC) states that people understand education as an investment decision that can be measured

¹⁸ In addition to use these general frameworks, each empirical chapter makes use of the existing empirical evidence in the field to guide and discuss the findings.

¹⁹ The educational approach is the only analytical framework that analyses the decision of persistence and degree completion

in terms of years of education. Consequently, income returns²⁰ or expected earnings from a degree are critical in motivating students' educational decisions.

The choice for or against education can be characterised as the result of a cost/benefit analysis. Under this approach, individuals are assumed to choose mainly from two alternatives: to continue investing in more education or training beyond the current level of education, or, to stop investing in formal schooling and hence to enter the labour market²¹. The decision to invest in education is undertaken if the benefits that individuals expect from the investment exceed the expected costs. Overall, individuals face two types of costs in their decision to invest in higher education: direct (extrinsic) and indirect (opportunity) costs. The extrinsic costs of undertaking higher education include tuition fees, accommodation and books, whereas opportunity costs may include forgone earnings and non-monetary costs. These costs are offset by expected benefits, including higher expected earnings, more secure and pleasant jobs, lower expected unemployment rates and non-monetary benefits (Johnes and Johnes 2004:487). In sum, students choose the educational option that maximizes their chances to achieve favourable incomes- net of direct and foregone costs associated to that educational option.

Initially, the human capital framework did not consider the uncertainty of educational investments, namely that students face the risk of unemployment (Reimer 2011). Latter developments incorporated the risk of unemployment to the theoretical model (Kodde

²⁰ There is empirical evidence showing that anticipated earnings play a substantial role in the process of choosing an educational trajectory in higher education. Wilson, Kathryn, Barbara Wolfe, and Robert Haveman. 2005. "The Role of Expectations in Adolescent Schooling Choices: Do Youths Respond To Economic Incentives?" *Economic Inquiry* 43(3):467-92.

²¹ The human capital theory has been used widely in the UK and the US. In the case of the UK in particular, it has been used to analyse how people at age 16 make their decision regarding their post-secondary education plans.

1988, Mickelwright, Pearson et al. 1990). The risk of unemployment is expected to change the calculus decision by changing the costs and benefits associated with a particular educational transition. In other words, the opportunity cost of remaining in education is likely to be affected by the probability of obtaining a job in the labour market. Unemployment is expected to generate, at least, two opposite effects on the demand for higher education (Reimer 2011). On the one hand, higher rates of unemployment might drive young people into further schooling because of the anticipated difficulties in finding a job and the low opportunity cost of additional education. On the other hand, high unemployment rate might reduce the expected income return and hence, the demand for education (Mickelwright, Pearson et al. 1990). Likewise, it might lead to lower financial family resources and hence reduce the uptake of the more cost-intensive higher education option (Reimer 2011).

Beyond the predictions, the HC approach presents some advantages but also some limitations for understanding degree completion decisions. Overall, the simplicity of its assumptions – the cost/benefit evaluation – allows the decision of degree completion to be easily modelled as a binary option (dropout/completion). On the other hand, the HC is particularly valuable because it clearly specifies the role that macro-socioeconomic factors such as the levels of unemployment- play in students' decision. This aspect is of crucial importance because it takes account of the opportunity cost that the higher education has for students.

The HC framework, however, does not address important group differences in relation to either the expected returns on investment or to the impact of unemployment conditions

on the educational decisions. The economic theory overlooks the possibility that students' background – as reflected by social class, ethnicity or gender – affects how the information about the income returns or labour market conditions are perceived and evaluated.

1.2.2 The Educational approach: College/university effects

Whereas the economic and sociological theories focus on the transition to higher education, the educational approach focuses on those who already made that transition. This literature focuses specifically on students' decisions regarding to stay or drop out of higher education (Pascarella and Terenzini 1991, Astin 1993c, Astin and Chang 1995, Pascarella and Terenzini 2005).

Tinto's model of student departure (1975, 1987, 1993) has had a significant influence on this literature. The explanatory theory underlying Tinto's model came from Durkheim's work on suicide (Durkheim 1961). The core of Tinto's model established that students' lack of academic and social integration²² to their universities explains their departure from higher education.

Following Tinto's (1975) seminal work, researchers interested in college/university effects -who were based primarily in the USA- carried out a series of studies in the years

²² Academic integration represents both satisfactory compliance with explicit norms and the normative academic values of the institution; whereas social integration represents the extent to which a student finds the institution's social environment to be congenial with his or her preferences. Social integration is often measured as a composite of peer-to-peer interactions and faculty-student interactions, while academic integration reflects satisfaction with academic progress and choice of subject (Kuh et al. 2006). Kuh, G. D., et al. (2006). What matters to students success: A review of the literature, National Postsecondary Education Cooperative.

leading up to the 1990s that analysed how a series of institutional mechanisms contributed to explain students' decision of completion/persistence/dropout. The literature initially analysed the impact of structural institutional mechanisms – as reflected by institutional control (public/private), type of college (two year/four year/community colleges), size (institutional enrolment) and institutional selectivity- on students' decisions of persistence and completion. Overall, the results showed that the impact of these mechanisms– with the exception of institutional selectivity – was small²³ on students' decisions (Pascarella and Terenzini 1991, Astin 1993c, Pascarella and Terenzini 2005). The scholar suggested that these institutional mechanisms were too remote or distant from the students' experiences to generate large effects on their educational outcomes

After the 1990s, the focus of the empirical literature reoriented toward the study of institutional mechanisms that more directly affected students' academic experiences. Hence, the research focused on the analysis of aspects such as teaching, peer effects, curriculum and learning resources. The researchers found that teaching along with peer group effects have largest effects on retention and students' degree completion chances, even when other factors are taken into account (Tinto 1975, Pascarella and Terenzini 1991, Astin 1993c, Kuh and Hu 2001, Pascarella and Terenzini 2005). Few of these investigations, however, have analysed whether the relationship between faculty and students is causal (Kuh, Kinzie et al. 2006).

²³ For instance, some research found that the effect of attending a private higher institution was indirect on student's persistence, mediated by other mechanisms such as size, selectivity, faculty and peer relations Kuh, G. D. and N. Vesper (1997). "A comparison of student experiences with good practices in Undergraduate Education between 1990 and 1994." The Review of Higher Education 21(1): 43-61.
, Pascarella, E. T., et al. (2006). "Institutional Selectivity and Good Practices in Undergraduate Education: How Strong Is the Link?" The Journal of Higher Education 77(2): 251-285.

The contribution of this framework to understanding the role of institutions on students' decisions with regards to persistence and completion is unquestionable. However, it should be also noted that the approach has some limitations. Firstly, its findings refer extensively to the American system of higher education, which differs widely from the British system. In second place, the research has not fully addressed the causal mechanisms (and their direction) behind the institutional effects on student's decisions. Finally, the approach does not address clearly group differences in relation to the impact of institutional aspects on students' educational choices/decisions.

1.2.3 Sociological theories

Whereas human capital theory focuses on expected returns to education to explain the demand for education, sociological theories focus on the social mechanisms that produce group differences in educational choices. These theories seek to explain the variation in educational choices between students from different social backgrounds and how these decisions contribute to generate inequalities in educational attainment.

The sociological literature has analysed widely as social and family characteristics such as social class, socioeconomic status, parental education or family type, among other aspects, are related to educational inequalities (Bourdieu and Passeron 1977, Mare 1980, Bourdieu and Passeron 1990, De Graaf and Ganzeboom 1993, Shavit and Blossfeld 1993, Erikson and Jonsson 1996b, De Graaf, De Graaf et al. 2000, Lauer 2003, Ayalon and Shavit 2004)

Rational choice and cultural reproduction theory are two of the main sociological theories that have documented educational inequalities in western societies. These theories have been often put in strong opposition against each other with regard to the explanation of stable or slightly decreasing class inequalities in education (Goldthorpe 1996).

In this section, I will briefly examine both perspectives, focusing my attention on describing the explanatory mechanisms behind inequalities in educational attainment/choices. Whereas the rational choice theory points out that those inequalities are related to between class variations in relative risk aversion behaviour; the cultural reproduction theory claims that these inequalities are explained by cultural reasons.

Despite it is not possible to test these mechanisms directly in this thesis (because of the lack of data), both theories will be used as potential explanations of the empirical findings.

1.2.3.1 The Rational Choice Theory

Rational choice has been widely used in empirical research in recent years to explain the persistence of educational inequalities across time and countries (Gambetta 1987, Goldthorpe 1996, Erikson and Jonsson 1996b, Breen and Goldthorpe 1997, Goldthorpe 1998, Morgan 1998, Goldthorpe 2000, Morgan 2001). The approach has focused on explaining why educational inequalities persist in western societies in spite universal educational expansion. Rational choice scholars have largely followed Boudon's (1974)

distinction between primary and secondary effects. According to Boudon²⁴, inequalities in educational attainment are the result of primary and secondary effects of social class. Whereas ‘primary effects’ refer to the effect of social class on academic ability; ‘secondary effects’ refer to the effect of social class on educational decisions/ambitions²⁵, net of students’ ability. Specifically, the ‘secondary effects’ refer to the costs and benefits that are associated with different educational choices and, how the evaluation of those costs and benefits varies across social classes. In other words, the ‘secondary effects’ explain any social class difference in educational participation (transition rates) that remains once has controlled for class differences in performance or academic ability at the previous stage.

One influential rational choice perspective is the theory of Relative Risk Aversion (RRA) developed by Breen and Goldthorpe (Goldthorpe 1996, Breen and Goldthorpe 1997, Goldthorpe 1998, 2000). There is a vast body of empirical research that has used the RRA approach, especially in relation to the study of class differences in transition/participation rates in post-compulsory education (Need and De Jong 2001, Davies, Heinesen et al. 2002, Van de Werfhorst 2002, Holm and Jaeger 2005, Van de

²⁴ Boudon differs from the standard human capital theory in relation to how individuals make their educational choices. Whereas Boudon argues that the rationality guiding educational choices is mainly social and associated to non-monetary aspects, the human capital theories assume that individuals only guide their decisions based on the calculations of the monetary returns associated to these choices (for instance, see Manski 1989; Lauer 2003) Manski, C. (1989). "Schooling as Experimentation: A Reappraisal of the Postsecondary Dropout Phenomenon." *Economics of Education Review* 8(4): 305-313.

, Lauer, C. (2003). "Family background, cohort and education: A French-German comparison based on a multivariate ordered probit model of educational attainment." *Labour Economics* 10(2): 231-251.

²⁵ Van de Werfhorst and Hofstede (2007) point out that the second effect of schooling is clearly linked to ambitions, as it consists of social variations in schooling decisions, independent of ability. It seems that, if people are concerned with class maintenance this affects their ambitions in schooling and work. According to the authors, if two students have the same achievements in primary school, and are enrolled in the same secondary school type, it is likely that they have different ambitions for their future educational career if they come from different social backgrounds.

Werfhorst and Andersen 2005, Breen and Yaish 2006, Van de Werfhorst and Hofstede 2007).

One of the central claims in the RRA theory is that people's values regarding education do not vary²⁶ among social classes. The main aim of individuals from different social backgrounds is to avoid downward social mobility (or to maintain the class position of their parents). Although the status maintenance motive applies to all social classes, the implications differ between social groups. Students from different social backgrounds slightly differ in their decisions²⁷ because of the differences in their relative risk behaviour. Inequalities in educational attainment are viewed as the result of a differential assessment of benefits and costs as well as probabilities of success associated with the available educational options (Reimer 2011:201).

Hence, members of different social classes require different levels of education in order to reach the same social class as that of their parents. Students from higher social classes stay in the educational system longer and pursue more prestigious²⁸ educational options than their lower class counterparts (with equal ability or talent) because they perceive that need more or better education to ensure class maintenance. For higher class students,

²⁶ According to the theory, only two conditions vary across social classes: average academic ability and economic resources (Breen and Goldthorpe 1997; Breen 1999). Variations in educational aspirations across social classes are then hypothesized to be reducible to differences in economic resources and opportunities. Breen, R. and J. Goldthorpe (1997). "Explaining Educational Differentials." Rationality and Society 9(3): 275-305.

, Breen, R. (1999). "Beliefs, Rational Choice and Bayesian Learning." Ibid. 11(4): 463-479.

²⁷ According to Holm and Jaeger (2005), for individuals from different social classes, educational choices constitute rational decisions based on a calculation of the social (and not purely economic) utility derived from making those choices relative to the risk to achieve a required level of education. Holm, A. and M. M. Jaeger (2005). Relative Risk Aversion and Social Reproduction in Intergenerational Educational Attainment: Application of a Dynamic Discrete Choice Model. Summer Meeting of ISA-RC28 (Social Mobility and Stratification). Los Angeles.

²⁸ The perceived benefits associated with the more demanding educational options are greater for the middle class students.

leaving education is a costly option, as they will not be able to meet their goal of class maintenance. Conversely, students from working class backgrounds tend to pursue less education or less demanding tracks to achieve an occupational position similar to their parents. They avoid taking riskier educational choices that may lead them to not complete a certain level of education and increase their chances of being unemployed.

There are several hypotheses that can be derived from the RRA framework. Boudon (1998), for instance, points out that the largest difference in school continuation rates is found among the average students. Among this group, students from higher social origins will be much more likely to continue than those from less advantaged social origins. On the other hand, among the brightest group of students, children of all social classes will have a high likelihood to continue schooling, whereas among the least talented, children from lower and higher social backgrounds will face difficulties if they continue schooling (Van de Werfhorst and Hofstede 2007:394). What these hypotheses suggest is that the secondary effects of class should be stronger among average students rather than among those who are at the top or bottom of the ability distribution. Among the latter groups, class differences in continuation decisions should disappear or shrink significantly.

Despite the rational choice approach presents some advantages for understanding degree completion decisions, it has some limitations. The assumption that class differences in the valuation of education are reducible to differences in socioeconomic resources is slightly restrictive. There is empirical evidence that has found a significant variation in beliefs and valuations of education among students from different socioeconomic backgrounds (Murphy 1981, Gambetta 1987). This evidence has shown that the

aspirations or ambitions of students from different backgrounds do not reflect solely economic conditions and constraints but also norms and other aspects.

1.2.3.2 The Cultural Reproduction Theory

The approach points out that the unequal distribution of cultural resources between social classes – transmitted over generations- explains the inequalities in educational attainment. According to Bourdieu and Passeron (1990), middle class parents pass on to their children cultural advantages that enable them to get better or higher educational credentials than working class students. Success in the educational system is facilitated by the possession of cultural resources –cultural capital and habitus²⁹- that are associated to middle class families.

Cultural capital is the most important capital for students in schools. It refers to the possession of legitimate knowledge that is valued in schools. It consists mainly of linguistic and cultural competence and that relationship of familiarity with culture which can only be produced by family upbringing when it transmits the dominant culture (Bourdieu and Passeron 1990:494). The unequal endowment of appropriate cultural capital explains that members of different social groups differ considerably in their understanding of how the educational system operates and know how to navigate through it. Hence, students from middle class families perform better in schools due to their familiarity with the dominant culture; whereas students from lower class families

²⁹ In relation to the habitus, Bourdieu (1977) posits that this is a set of attitudes, dispositions and values held by the dominant class towards education. It comprises investments in time, effort and money necessary to conserve and to increase cultural capital. Bourdieu, P. and J. C. Passeron (1977). Reproduction in Education, Society and Culture. London, Sage.

perform less well³⁰ because they lack those cultural resources that brings familiarity with the dominant culture found in schools.

There is a great body of quantitative empirical work that has supported the hypothesis that cultural capital affects students' educational achievements in schools (DiMaggio 1982, DiMaggio and Mohr 1985, Katsillis and Robinson 1990, De Graaf and Ganzeboom 1993, Kalmijn and Kraaykamp 1996, De Graaf, De Graaf et al. 2000, Sullivan 2001, Van De Werfhorst, Sullivan et al. 2003). In the field of higher education, the quantitative³¹ empirical research has shown that parents with experience in higher education helps students from middle classes to understand better the requirements of the system and its stratification (Davies and Guppy 1997, McDonough 1997, Ayalon and Yogev 2005). This collegiate cultural capital increases the middle classes' advantages in the educational system.

³⁰ Bourdieu adds that since the education system presupposes the possession of cultural capital, which few students in fact possess, there is a great deal of inefficiency and cultural arbitrariness in teaching. The author along with Saint-Martin, introduced the concept of the cultural arbitrary, to give account of another hurdle that lower class students' face in the educational system. They point out that the criteria of university examiners reflect the values of the dominant classes and that the vaguer the demands of the examiners are, the less chance lower-class pupils will have of adhering to those demands. Bourdieu, P. and M. Saint-Martin (1974). *Scholastic Excellence and the Values of the Educational System*. Contemporary Research in the Sociology of Education. J. Eggleston. London, Methuen.

³¹ There is a great body of qualitative work in England that have analysed the role of cultural capital and habitus in higher education choices and attainment (e.g. Reay 1998; Ball, Macrae et al. 1999; Reay 2001; Reay Ball, et al. 2002; Reay, Davies et al 2001; Ball, Davies et al 2002; Ball, Reay et al., 2002; Thomas 2002)

Reay, D. (2001). "Finding or losing yourself?: working-class relationships to education." Journal of Education Policy **16**(4): 333-346.

Thomas, L. (2002). "Student retention in higher education: the role of institutional habitus." *Ibid.* **17**: 423-442.

Reay, D. (1998). "'Always knowing' and 'never being sure': familial and institutional habituses and higher education choice." *Ibid.* **13**: 519-529.

Reay, D., et al. (2001). "Choices of Degree or Degrees of Choice? Class, 'Race' and the Higher Education Choice Process." Sociology **35**(4): 855-874.

Ball, S. J., et al. (2002). "'Ethnic Choosing': Minority ethnic students, social class and higher education choice." Race Ethnicity and Education **5**(4): 333-357.

Ball, S. J., et al. (1999). "Young lives, diverse choices and imagined futures in an education and training market." International Journal of Inclusive Education **3**(3): 195-224.

Ball, S. J., et al. (2002). "'Classification' and 'Judgement': Social class and the 'cognitive structures' of choice of Higher Education." British Journal of Sociology of Education **23**(1): 51-72.

Following Bourdieu's cultural reproduction theory, Ball, Davies et al. (2002) and Reay, David et al. (2005) built- on the basis of extensive ethnographic work in the UK- an ideal typology called 'the embedded/contingent choice' framework to describe how students from different backgrounds differed in their decisions about higher education. The scholars point out that this typology is class based, although it also has implications for ethnic minorities.

Embedded choosers (middle class students) have more information about higher education institutions and the system because they have parents who attended those institutions themselves. They manage information that helps them to make right (or better) choices as compared to contingent choosers. For the embedded choosers to attend higher education is a natural progression, part of a well-established 'normal biography'. For members of this group, university is often linked to particular career trajectories, entry into prestigious professions or highly paid commercial occupations. Hence, aspects linked to the nature of the courses, the type or statuses of the universities are important factors considered in their decision; whereas aspects such as location or costs are not important. It is expected that if necessary the student will move away from their parental home to get the 'right' course and the 'right' institution to pursue their studies (Ball, Davies et al. 2002:342).

In opposition, contingent choosers refer to a group of students that are rather unfamiliar with the higher education system. Neither their families nor the students have much

knowledge³² or expectations about higher education and the different forms³³ of higher education. For members of this group, getting a degree is a general category, something rather abstract not linked to any 'imagined future'. Aspects linked to the stratification of the system, such as the distinction between 'old' and 'new universities' is either not recognised or not viewed as significant by members of this group (Reay, David et al. 2005).

Bourdieu's cultural reproduction and Ball and Reay's typology offer useful frameworks for understanding how cultural and informational resources possess by the middle classes affect students' decisions about higher education. However, both have some limitations. Whereas the ideal type built by Ball and Reay et al. has all the crudities and disadvantages of such formulations, Bourdieu's cultural reproduction theory has some problems in relation to the applicability of its assumptions to a mass system of higher education.

Although Bourdieu's findings are compelling, they refer extensively to the French system of education. Bourdieu developed his theory in the context of the expansion of the French educational system, which differs widely from the current context of mass higher education. In the current context, it is difficult to think that a 'dominant culture'

³² Contingent choosers know little about the institutions they choose, even their first choice universities. The processes of information and gathering and choice are mostly left to the student (not their parents), who frequently on the basis of very limited information. Contingent choosers rely heavily on 'cold knowledge' (guides, prospectuses and websites, etc.) that their embedded counterparts. Ball, S. J. and C. Vincent (1998). "I Heard It on the Grapevine": 'Hot' Knowledge and School Choice." Ibid. 19(3): 377-400.

³³ In addition, the authors state that for many contingent choosers, the direct financial costs and opportunity costs of higher education are a considerable burden. Typically, such students are required to live at home, minimize the costs of travel and work part-time during term time. This not only creates a different kind of higher education experience but again produces risks in terms of course performance and completion. Reay, D., et al. (2005). Degrees of Choice: social class, race and gender in higher education Trentham Books.

linked to higher classes continue to be prevalent within the educational system. In my view, Bourdieu's theory is rather a theory of class inequalities at elite institutions or specific field of study- where higher classes continue to be predominant - than a general theory of class inequalities.

1.3 Empirical Research on Degree Completion

The review of the empirical literature shows that most of the research on the topic of degree completion has been carried out in the USA³⁴. This may reflect the fact that the non-completion rate is much higher in the USA (about 40 percent) than in the UK (about 15 percent). It may also be a consequence of the current focus of the policy and research agenda on widening participation in the UK. This situation may change, however, due to the increasing³⁵ rates of non-completion and inequalities in completion rates resulting from the expansion of the higher education system (Blanden and Gregg 2004; Johnes and McNabb 2004; Johnes 1997; Powdthavee and Vignoles 2009).

The review of the British empirical research on degree completion shows that most analyses in the field have focused on the study of how students' characteristics – family background and academic preparation – are associated with degree completion chances. Overall, the research has combined quantitative and qualitative methods to study the phenomenon. It is worth noting that most of the quantitative analyses have relied

³⁴ Kalsner, surveying the US literature on college dropout behaviour, found that in the US the decision to withdraw is typically based on personal, social and financial considerations, with only a small minority of departures resulting from academic dismissal. Kalsner, L. 1991. "Issues in College student retention." *Higher Education Extension Service Review* 3(1).

³⁵ Contrary to this evidence, a recent report by NAO (2007) found that non-completion rates have remained relatively stable throughout the years. NAO. 2007. "Staying the course: The retention of students in higher education." London: National Audit Office.

significantly on single level analyses (logit and probit models) to predict students' chances of completion. Few studies have carried out analyses that combine institutional and single level data in the UK.

A common finding of these studies is that attainment on entry has a large and significant effect on students' chances of degree completion (Johnes 1997; Johnes and Taylor 1989; Smith and Naylor 2001; Yorke 1999; Yorke and Thomas 2003). To give account of attainment on entry, the studies have mainly used two measures: scores on national examinations on entry to university and qualifications on entry to university. Overall, the evidence has shown that students with higher scores in national examinations on entry have higher chances of completion than those with lower scores on entry. In addition, some studies suggest that the most influential factor in predicting degree completion chances is type of qualification (NAO 2002; 2007). They found that students who access with A-levels – which is widely considered to be the traditional qualification to access university – are more likely to graduate than those who access with non-A-level or non-traditional qualifications.

The evidence has revealed that attainment on entry not only significantly predicts individual differences in completion chances, but also explains a large proportion of the variation in continuation rates across institutions (Curtis 2007; NAO 2002; NAO 2007).

In addition to attainment on entry, some studies have found that prior educational achievements and schooling are also important determinants of completion/non-completion rates (Fielding, Belfield and Thomas 1998; Johnes 1990; Smith and Naylor 2001). For example, Fielding et al. (1998) identified that prior educational achievement

of students was a major determinant of college non-retention for the 16-19 years age group. On the other hand, Johnes (1990) and Smith and Naylor (2001) found significant effects of school type on the probabilities of non-completion of students. In particular, they found a positive relationship between attendance at a grammar or independent school and students' persistence and completion chances.

Alongside students' academic preparation/schooling characteristics, researchers have highlighted the centrality of students' socioeconomic background as a significant influence on their chances of degree completion. Overall, social class has been identified as the main measure of the influence of students' socioeconomic background on degree completion chances (Blanden and Gregg 2004; Forsyth and Furlong 2000; Johnes and McNabb 2004; Johnes and Taylor 1989; Powdthavee and Vignoles 2009; Smith and Naylor 2001). Students with parents from skilled or unskilled manual occupations have lower rates of completion, whereas those with parents in managerial or professional positions have higher rates of completion.

These studies have pointed out that socioeconomic background is likely to influence not only the financial capacity of students to complete their studies, but also their preparedness and commitment to university and, related to this, their post-college occupational aspirations (Smith and Naylor 2001:389). Students' financial issues have frequently been identified as a barrier to completion, especially by students from lower socio-economic groups³⁶ (Archer, Hutchings and A. 2003; Callender and Kemp 2000;

³⁶ There is a consistent body of literature that posits that some dropout may be rational if students drop out when they find the costs exceed the potential benefits. Altonji, Joseph G. 1993. "The Demand for and Return to Education When Education Outcomes are Uncertain." *Journal of Labor Economics* 11(1):48-83. Manski, Charles. 1993. "Adolescent Econometricians: How do youth infer the returns to schooling " in *Studies of Supply and Demand in Higher Education* edited by Charles T. Clotfelder and Micheal Rotschid: University of Chicago Press.

Commons 2009; Dogson and Bolam 2002; NAO 2002; NAO 2007; Ozga and Sukhnandan 1997; Thomas and Yorke 2002; Yorke 1999; Yorke et al. 1997; Yorke and Longden 2008). Lack of money, concern about debt (or actual levels of debt) and part time employment adversely affect retention and chances of completion, especially of students from lower class backgrounds.³⁷

Poor academic preparation is a significant factor affecting the probability of success of students from disadvantaged backgrounds in higher education (Chowdry et al. 2008; Fielding, Belfield and Thomas 1998; Smith and Naylor 2001). Overall, the evidence has revealed that students from less privileged backgrounds have lower qualifications and scores on entry to university than students from more advantaged backgrounds. In addition, qualitative research has added that they struggle with aspects of academic discipline, fail to adjust to the unfamiliar approaches to learning and teaching, fail assessments and feel unable to ask staff or peers for help (NAO 2007; Quinn et al. 2005; Thomas and Yorke 2002; Yorke et al. 1997; Yorke and Longden 2008).

More recent evidence, however, has shown that poor academic preparation does not solely explain the completion gap between students from different socioeconomic backgrounds. Controlling by prior academic attainment, the studies have found that students from lower socioeconomic backgrounds still have lower chances of completing a degree than those from more advantaged backgrounds. (Galindo-Rueda and Vignoles 2005; Powdthavee and Vignoles 2009).

³⁷ In addition, the research has found that students who continue to live at home whilst attending university (a proxy of student's socio-economic background) have higher rates of attrition compared with students who leave home and live in university campuses. Smith, J. P., and R. A. Naylor. 2001. "Dropping out of university: A statistical analysis of the probability of withdrawal for UK university students." *Journal of the Royal Statistical Society: Series A (Statistics in Society)* 164:389-405.

Ethnicity is another individual characteristic that significantly influences degree completion chances (Abbas 2003; Connor et al. 2003; 2004). The evidence is not, however, fully consistent regarding how ethnic groups perform in higher education in the UK. Where some studies have posited that almost all groups³⁸ of ethnic minority students – Black and Asian - are significantly less likely to dropout compared to White students (Powdthavee and Vignoles 2009), other studies have found that students from ethnic minorities are more likely to leave than White students, and Black students are more likely to dropout than Asian students (Connor et al. 2004; Rodgers 2009).

Among the reasons that explain the lower rates of completion by ethnic minorities, lower attainment on entry³⁹ – especially what refers to lower qualifications on entry– plays a crucial role (Connor et al. 2004). In addition to these findings, the research has also pointed out that the influence of ethnicity (in particular in the case of Indians) might have a positive effect on students' chances of graduation. The qualitative research found that aspects associated to a strong positive parental support and commitment to education increase the likelihood of success of students from ethnic minorities (Connor et al. 2004; Modood 1993).

Qualitative research has identified that choice of institution and course/subject, satisfaction with institutional facilities and students' academic and social integration⁴⁰ at

³⁸ These finding are consistent with a number of recent UK studies that have found that ethnic minority students make more progress academically, particularly in secondary school, than White students Wilson, D., S. Burgess, and A. Briggs. 2006. "The Dynamics of School Attainment of Englands Ethnic Minorities." London: Centre for Analysis of Social Exclusion, LSE..

³⁹ There are significant differences among ethnic minorities in relation to the type of qualifications that they attain on entry to university. Black students, alongside Pakistani and Bangladeshi students, tend to access to universities with lower qualifications than average White students. Indian and Chinese students are the most likely to take the traditional A level pathway to access universities.

⁴⁰ There is a large body of research in the US about institutional match and integration – the extent to which the institutions are perceived to meet the needs of the students and how far they feel part of the institution. Berger, J. B., and J. M. Braxton. 1998. "Revising Tinto's Interactionalist Theory of Student

their institutions are also significant aspects that contribute to students' decisions about degree completion/dropping out. Students who leave higher education often report that the programme they had enrolled in did not meet their expectations or that they were simply on the wrong course (NAO 2007; Quinn et al. 2005; Yorke and Longden 2008). Yorke et al. (2008), in a study which surveyed 7000 undergraduate students on their experiences in higher education in England, found that students who had information about their programmes or institutions before enrolling were less likely to drop out. The authors found that mismatched expectations often contribute to non-completion or change of programme.

Although to a lesser extent, research in the UK has also analysed the role that institutions of higher education have on student's degree completion chances. This research, however, has focused on establishing rates of withdrawal, retention, and completion at the institutional and national level, both generally and in relation to specific students groups or institutional types (Jones 2008).

Aspects such as type of institution, subject area, mode of study, and university selectivity have a significant influence on completion rates (Johnes and McNabb 2004; McGivney 1996; NAO 2007; Woodley and Parlett 1983). As part of its review of retention in the UK, NAO (2007) identified significant variation in continuation rates between subjects and institutions. Medicine and Dentistry subjects have the highest continuation rates (98 percent), whereas combined subjects have the lowest (83 percent). Similarly, there are variations in average continuation rates between the different types of higher education

Departure through Theory Elaboration: Examining the Role of Organizational Attributes in the Persistence Process." *Research in Higher Education* 39(2):103-19.
Tinto, Vincent. 1993. *Leaving College: Rethinking the causes and cures of students attrition* Chicago: University Chicago Press.

institutions, with the Russell Group of Universities having the highest average continuation rates in the system and the New Universities (post-1992 institutions) having the lowest average rate. Overall, the findings show that more selective institutions tend to have higher rates of graduation.

The research on how institutions affect retention and students' success in higher and further education is rather recent in the UK. Most of this research has been concerned with examining how to improve retention rates at the institutional level. In particular, it has analysed learning and teaching conditions as well as support provided by institutions (Crosling, Thomas and Heagney 2008; Davies 1999; Dogson and Bolam 2002; Johnes and McNabb 2004; Laing and Robinson 2003; Thomas and Yorke 2002). Davies (1999) carried out a survey within the FE context and found that issues relating to pedagogy, practical organisational issues and support provided have the most pronounced impact on retention rates. On the other hand, Thomas et al (2002) carried out focus groups with students in higher education and found that relations between students and faculty were very influential in students' decisions to remain in higher education.

In sum, the research seems to suggest that individual factors are a more significant source of variation in educational attainment than institutional factors. Confirming what the sociological and educational literature has documented, research in the UK has shown a strong association between individual factors (poor academic preparation and socioeconomic background) and low levels of educational attainment in higher education. These results cannot, however, be considered conclusive. Mainly due to the lack of multilevel research, existing analyses have not estimated to what extent

individual and non-individual factors explain the variance in educational attainment/degree completion chances.

1.4 Thesis outline

The central questions that I aim to address in this thesis are:

- Do attainment on entry and students' background characteristics affect their chances of completing a degree at British Universities?
- Does socio-economic background affect students' chances of degree completion after taking into account differences in attainment on entry to university?
- Do institutions affect student's chances of completing a degree at British Universities?
- Does teaching affect student's chances of degree completion at British Universities?
- Does local unemployment affect students' chances of degree completion?

In addition, the analyses will focus on interaction effects between individual and institutional/contextual aspects. The main aim of these analyses is to analyse the variation of the effect of individual characteristics across different institutional contexts.

I expect to address the following supplementary questions:

- Are there conditional effects of institutions on different student populations?
- Are there conditional effects of teaching on different groups of students?
- Are there conditional effects of local unemployment on different groups of students?

The thesis addresses these questions in four quantitative chapters. A data and methods chapter and a conclusion chapter are also included. In total, the thesis consists of seven chapters.

Chapter 2: Data and Methods

This chapter reviews the data and variables employed in the thesis. The chapter is divided in three sections. The first two sections describe the datasets used in the empirical analyses: the student-level data used in all of the empirical chapters and the aggregated level data sources employed in Chapters four to six. The third section offers a detailed description of the construction of the variables used in the empirical analyses.

Chapter 3: The different chances of degree completion

This chapter describes the role that attainment on entry and socio-economic background characteristics have on students' chances of completing a degree in the British higher education system. Consistent with the literature, the chapter finds that attainment on entry significantly affects students' chances of degree completion. It also reveals, however, that attainment on entry does not completely explain the socio-economic differences in degree completion chances. Class, in particular, affects student's chances of degree completion, even once attainment on entry has been taken into account.

Chapter 4: The effect of institutions on students' chances of degree completion

This chapter examines the role that institutions have on students' chances of degree completion. Following the college effect literature, this chapter assesses the extent to which institutional characteristics affect students' chances of completion. Drawing, as in the preceding chapter, on the HESA dataset, the analyses pay special attention to the impact of different types of institutions on students from different class and ethnic backgrounds. The findings show the existence of institutional effects but its effect is small. Selectivity and graduation rates are strongly associated. In addition, the findings reveal that students from upper middle class backgrounds (professional and managerial) have higher chances of completion at selective institutions than lower class students, even after controlling for attainment on entry.

Chapter 5: The role of teaching on students' chances of degree completion

This chapter explores the role that institutions of higher education have on students' decision to complete their degrees from a different perspective. As in the preceding chapter, the first part of the chapter reviews the existing literature on the impact of teaching on the probability that students complete degrees in higher education. The findings show that teaching has a small but significant effect on students' chances of degree completion. Teaching effects take place only at the most selective institutions of the system. There are no significant conditional effects of teaching on different students' subpopulations.

Chapter 6: The effect of unemployment on students' chances of degree completion

Chapter 6, the last empirical chapter of the thesis, examines the extent to which local levels of unemployment affect students' decisions to complete a university degree. The evidence reveals that higher unemployment rates have a positive effect on students' chances of degree completion. These results support the view that slack local labour market conditions – understood as higher unemployment rates – are likely to encourage students to stay in education. Higher unemployment rates most strongly affect students from lower class backgrounds.

Chapter 7: Conclusions

The concluding chapter of this thesis brings together the main findings of the empirical chapters presented in chapters three to six. I discuss these results in terms of their contribution to the empirical knowledge and theoretical understanding of degree attainment in higher education. In addition, some policy implications of the research are discussed.

Chapter 2: Data Sources and Variables Construction

2.1 Introduction

This chapter describes the data sources and variable construction used in this thesis. The chapter is divided in three sections. The first section describes the individual data source and research population. The second section reviews the aggregated data sources (institutional and contextual datasets). Finally, the third section gives a detailed description of the construction of the variables used in the empirical analyses.

2.2 Individual Datasets

2.2.1 Higher Education Statistics Agency Student Records

The Higher Education Statistics Agency⁴¹ (HESA) register is the main source of quantitative data for the statistical analysis in this thesis. These data are a census of all students⁴² in all publicly funded⁴³ UK higher education institutions. This is an

41 HESA is the official agency for the collection, analysis and dissemination of quantitative information about higher education in the UK. It was set up by agreement between the relevant government departments, higher education funding councils and universities and colleges in 1993, following the White Paper “Higher Education: a new framework”, which called for more coherence in HE statistics, and the 1992 Higher and Further Education Acts, which established an integrated higher education system throughout the UK.

42 For the purposes of HESA's data collection, higher education students are those students on courses for which the level of instruction is above that of level 3 of the Qualifications and Curriculum Authority (QCA) National Qualifications Framework (NQF) (e.g. courses at the level of Certificate of HE and above).

individualised record for students that have been collected annually since 1994-1995 in the UK. Coverage extends to all of the students who are undertaking a course or programme that leads to the award of a qualification or institutional credit in the UK⁴⁴.

For the purposes of this research, HESA supplied the academic records⁴⁵ of all the students enrolled at British Universities between 2004 and 2007⁴⁶. These records contain information about three different levels: i) student (socio-demographic/academic characteristics); ii) course/programme (subject/subjects that the student is undertaking); and, iii) institution of higher education⁴⁷ (type and location of the institution that the student is attending). Additionally, for each academic year the data provide information about whether the student stays on or drops out of her/his university programme. These data allow me to follow the students'⁴⁸ academic progression throughout the years, from when they enrolled in 2004 to when they completed their programmes at the end of the academic year 2006/2007.

43 For 2004/2005 only, data for London Metropolitan University (formerly The University of North London and London Guildhall University) and Liverpool Hope University were not released in individual form at the institutions' request. The dataset also includes the University of Buckingham, which is privately funded.

44 The record excludes those studying overseas even when they are formally registered at a UK-based higher education institution. The higher education institution at which a student is registered is responsible for submitting the data about that student to HESA, drawing on information held within its administrative system.

45 HESA charges for data provided to academic researchers. The cost of purchase was met from a grant provided from the Department of Sociology at the University of Oxford.

46 Given the high cost of the administrative records, it was not possible to buy more than three years of data. This period comprises three academic years: the academic years 2004/2005, 2005/2006 and 2006/2007. HESA's registration year runs from 1 August to 31 July.

47 HESA allocates a unique identifier number to each institution of higher education (UKPRN) and to each student enrolled in a university in the UK (HUSID).

48 Each student in the dataset is assigned a unique identification number (HUSID). Through this unique number, HESA can accurately track the academic progression of the student throughout the years. If the student changes programme but stays in the same institution in which they initially enrolled, the student will maintain the same identification number. On the contrary, if the student decides to interrupt her/his studies and leaves the system temporarily, he or she will not be assigned the same number once he/she returns to the system.

Broad coverage⁴⁹ and longitudinal character are the major strengths of these data. Nonetheless, as with most of the administrative sources used in social sciences, HESA's records also have some drawbacks. Because the data are collected for official/administrative rather than social scientific purposes, there are a series of issues related the quality, conceptualisation and validity of the data (Hakim 2000; Judson and Popoff 2005).

HESA data is collected directly from institutions of higher education, which are contractually obliged⁵⁰ to provide information about their students on an annual basis. There are known variations⁵¹ in institutional practice with regard to the coverage of these records (Wakeling 2005). Additionally, the evidence suggests that those institutions that have a higher proportion of students who accessed university without using the UCAS admission process also have higher levels of missing data.

⁴⁹ This dataset has been used by a number of previous studies (including Connor et al, 2004; HEFCE, 2005a; Leslie, 2005; Wakeling, 2005a, 2007).
Wakeling, P. (2007). "White Faces, Black Faces: Is British Sociology a White Discipline?" Sociology **41**(5): 945-960.

Wakeling, P. (2005). "La noblesse d'état anglaise? Social class and progression to postgraduate study." British Journal of Sociology of Education **26**(4): 505-522.

Leslie, D. (2005). "Why people from the UK's minority ethnic communities achieve weaker degree results than whites." Applied Economics **37**(6): 619 - 632.

Connor, H., et al. (2004). Why the difference? A closer look at higher education minority ethnic students and graduates Institute for Employment Studies.

HEFCE (2005a). Young participation in Higher Education. Bristol, Higher Education Funding Council. **03**.

⁵⁰ The submission of the data is part of publicly funded institutions' statutory obligations under their funding contract with the relevant national funding councils. HE Funding Bodies and government education departments and devolved administrations ('statutory users') use the information to support the allocation of state funding and the formulation and monitoring of higher education policy.

⁵¹ HESA performs various quality and consistency checks on the data. Institutions are subject to audit on their returns, with the possibility of financial sanctions where there are errors or discrepancies.

In terms of the reliability of the variables used by HESA, it is also necessary to note that the measures of socioeconomic characteristics are potentially subject to errors arising from misreporting on the part of the respondents. The most problematic case is what occurs with ethnicity. HESA uses self-identification⁵² methods to collect information about ethnicity. Students are asked to select⁵³ the ethnic group to which they consider themselves to belong from a list of categories. It is widely documented that self-identification⁵⁴ methods have some problems regarding reliability and quality of the data. Additional issues arise if the rates of ‘unknown’ or ‘not classified’ categories in some of the socioeconomic variables are particularly high. A more detailed description of these issues will be covered in the section about variables construction.

Alongside data quality, HESA’s records have also some limitations in terms of the scope of the data collection⁵⁵. In particular, these records contain limited information about

⁵² The ethnicity data used in the UK national statistics relies on individuals’ self-definition

⁵³ The literature points out two factors determining the ethnic group that is recorded for each respondent: first, their own choice of how they view their ethnicity, and, second, the list of options presented to them (Hakim 2000; Connor et al. 2004). The first alternative is the most straightforward; the ethnic group that each person chooses as his or her own is intrinsically the ethnic group of self-identity, rather than being ascribed by anyone else. However, the second consideration is apparently not so clear-cut. The ethnic group options presented to the respondent are not completely the ones of self-identity; hence, the respondent is likely to be obliged to choose between a number of the different alternative ethnic groups presented to them. Therefore, the freedom the respondent has to select their own group is constrained and influenced by the options presented to them. Hakim, C. 2000. *Research Design. Successful designs for social and economic research*. New York: Routledge.

Connor, Helen, Claire Tyers, Tariq Modood, and Jim Hillage. 2004. "Why the difference? A closer look at higher education minority ethnic students and graduates ": Institute for Employment Studies, Hakim, C. 2000. *Research Design. Successful designs for social and economic research*. New York: Routledge.

⁵⁴ Some additional issues can arise with self-reported categories when combining data from more than one source. In this case, there might be some differences in the way that the same question is answered, coded or presented in the analyses, leading to potential inaccuracies. Given that this thesis only uses contextual data sources to supplement the statistical analyses, it might not be affected by this problem.

⁵⁵ Likewise, these records contain restricted information about students’ academic performance in their programmes. There is no detailed information about students’ grades, although HESA does provide data about degree classification, which is conditional on students having completed their academic programmes or subjects.

students' socio-economic backgrounds. Although social class and funding status⁵⁶ are reported in the data, no information is supplied about parental education or family income. Therefore, unfortunately, it is necessary to infer the mechanisms that are at work in the decision-making process about degree completion from the variables used.

Despite their drawbacks, the HESA student records are to date the most comprehensive⁵⁷ source about higher education in the UK. They allow me to draw firmer conclusions than I would not be able to draw if I were working from a sample.

2.2.2 Research Population

Given that HESA's records comprise different academic qualifications, I chose to work with a more restricted sample to conduct the empirical analyses in this thesis. The research population was defined on the basis of the following criteria:

- i) The student cohort that commenced the first year of their programmes in the academic year 2004/2005;
- ii) Students enrolled in first-degree programmes. This group of students represented approximately 75 percent of all students studying for a

⁵⁶ Although HESA's data provides information about funding status, it is rather incomplete. Its information reveals only whether the students have funding for their tuition fees, nor whether they have funding for their maintenance.

⁵⁷ There are other comprehensive student records, however, that are more limited in coverage than HESA's records. The Universities and Colleges Admissions Service (UCAS) is another source of information about students and higher education institutions in the UK. As part of the admission process, UCAS collects information on students applying to full-time, first-degree and some sub-degree courses. UCAS statistics are based on numbers of applications and acceptances on courses, whereas HESA statistics refer to students who actually enrolled in courses. Additionally, HESA's records also include students who apply directly to universities without using the UCAS admission process.

qualification in the higher education system in 2004. Excluded from the sample were students enrolled in any other⁵⁸ undergraduate programme;

- iii) Students undertaking programmes with duration⁵⁹ of up to three⁶⁰ years. This group of students represents 70 percent of all students who commenced their studies in 2004/2005. This group was selected mainly on the basis of the availability of data and the impossibility of following students who were pursuing programmes that exceeded three years in duration;
- iv) Students enrolled in full-time programmes. Overall, this group represents 86 percent of the first year first-degree entrants in 2004 and 45 percent of the full-time, first-degree students in higher education. Part-time students were excluded from the sample because, the expected duration of their programmes would extend beyond availability of the data;
- v) Students domiciled in the UK. Students whose domicile -previous to their enrolment in a British university –was placed in an address (postcode) in the UK. This group represents 94.81 percent of full-time, first-degree students enrolled in higher education in the UK in 2004.
- vi) Students whose nationality is British.

⁵⁸ These latter programmes include qualifications aimed below degree level, such as foundation degrees, diplomas in HE with eligibility to register to practice with a Health or Social Care regulatory body, Higher National Diploma, Higher National Certificate, Diploma of Higher Education, Certificate of Higher Education, foundation courses at HE level, NVQ/SVQ level 4 and 5, post-degree diplomas and certificates at undergraduate level, other undergraduate diplomas and certificates including post-registration health and social care courses, other formal HE qualifications of less than degree standard, institutional undergraduate credit and no formal undergraduate qualifications.

⁵⁹ HESA provided information about the expected length of the programmes (duration) by year's interval. The classification is as follows: < 5 weeks; >= 5 weeks and < 24 weeks; >= 24 weeks and <= 1 year; > 1 year and <= 2 years; > 2 years and <= 3 years; > 3 years and <= 4 years; > 4 years and <= 5 years; > 5 years and <= 6 years; more than 6 years. Unfortunately, the data did not specify the number of years that the programmes last.

⁶⁰ In the United Kingdom the bachelor's degree is usually a three-year programme with a number of important exceptions. Programmes such as Medicine, Dentistry and most of those offered by Scottish Universities have not been included in the analyses, as the expected length of these programmes is four or more years.

Considering all of these criteria, the research population that will be used in this thesis comprises 201,846 students enrolled in first-degree, full-time programmes of up to three years of duration who are domiciled in the UK.

2.3 Institutional and Contextual Data Sources

In conjunction with the student records, I use aggregate level data to carry out the statistical analyses. Three aggregated sources are used in this thesis. Two of them refer to institutional⁶¹ data about higher education institutions, and the third data source supplies information about labour market conditions.

2.3.1 Higher Education Performance Indicators

The Higher Education Performance Indicators (hereafter PIs) are one of the institutional resources used in this thesis. The Higher Education Statistics Agency (HESA) compiles this data on behalf of the Higher Education Funding Council (HEFCE). The indicators are based on student, staff and finance data returns that all higher education institutions are required to give to HESA each year.

PIs provide comparative data⁶² on the performance of British universities (that are publicly funded) in five main areas: (i) access and participation; (ii) retention and

⁶¹ The institutional data is linked to the student level data using the universities' unique identification numbers.

⁶² HESA points out that performance indicators are designed to provide reliable information on the nature and performance of the higher education sector in the UK and a consistent set of measures of this performance.

progression; (iii) research; (iv) employability; and, (v) learning and teaching resources. For the purposes of this thesis, I make use of the indicators related to the areas of access and participation and learning and teaching resources during the academic year 2004/2005. These indicators provide information about aspects including library resources, academic research resources, and institutional size (number of students enrolled). They are employed as proxies of the infrastructure, equipment and learning resources offered by universities to their students.

Despite the rich information that PIs provide about institutions of higher education and their potential comparability, it is widely accepted that their use requires some caution. The literature suggests that performance indicators are potentially misleading if based only on crude output measures. In other words, their use should be interpreted in conjunction with information about the characteristics of students' intake at universities (Bratti et al. 2003; Johnes and McNabb 2004; Johnes and Taylor 1989; Smith and Naylor 2001; Smith, McKnight and Naylor 2000).

2.3.2 National Student Survey

I make use of the National Student Survey⁶³ (NSS) as a second source of institutional data in this thesis. The NSS⁶⁴ is a census of undergraduate students in the final year of their programmes that gathers feedback about their overall satisfaction with their universities and courses (Cheng and Marsh 2010; O'Leary, Hindmarsh and Kingston 2006; Surridge 2009).

⁶³ The NSS was developed as part of the revised Quality Assurance Framework for higher education conducted by the Quality Assurance Agency for Higher Education.

⁶⁴ The NSS is administered by an independent agency – IPSOS MORI – commissioned by the Higher Education Funding Council (HEFCE). The data collection, analysis and reporting is conducted by IPSOS Mori on behalf of HESA.

The NSS has collected information on an annual basis since 2005 at higher education institutions in England, Wales and Northern Ireland. Some institutions in Scotland joined the survey in 2006 and 2007. In total, the survey comprises 22 questions in six main domains⁶⁵: teaching, assessment and feedback, academic support, organisation and management, learning resources and personal development. Additionally, there is an overall satisfaction rating 'Overall, I am satisfied with the quality of course'. Participants responded to each question on a five-point-likert scale ranging from one, meaning 'definitely disagree', to five, meaning 'definitely agree'.

For the purposes of this research, I use the results of the NSS in 2005⁶⁶. The survey sample in that year consisted of over 220,000 final year students in 128 institutions. Approximately 65 percent of the sample responded the survey in 2005. This 65 percent is a good response rate for survey research at universities; however, it also masks a degree of variation across institutions. According to data provided by HESA (n.d), the institutional response rates in 2005 ranged from 41.8 percent to 80.1 percent. This variation in response rates raises several questions about the validity⁶⁷ of comparisons between institutions based exclusively on these scores.

⁶⁵ Additionally, the questionnaire includes a few questions about students' personal development, but these will not be included in the analyses in Chapter 5 because they do not directly measure institutional actions or performance.

⁶⁶ The examination of the NSS results during the period 2005-2007 shows stability of the NSS results throughout the years.

⁶⁷ In a recent study, Surridge (2009) did not find evidence that suggested that NSS scores would be different given higher response rates. The author analysed the results of three consecutive years of NSS results (2005-2007) in her study. On the basis of these results, she points out that non-respondents to the survey have similar experiences to 'late' respondents to the survey, hence, the scores with higher responses rates should not change through time. Surridge, P. 2009. "The National Student Survey Three Years on: What Have we Learned." York: The Higher Education Academy, *ibid*.

NSS ratings are often used to rank universities and courses in the University League Tables. These Tables are published annually in The Times/Sunday Times Good University Guide and in the Guardian Newspaper. The evidence seems to indicate that different stakeholders of the higher education system increasingly rely on these ratings; institutions of higher education use them as performance indicators and applicants use them to inform their choice⁶⁸ of university.

NSS ratings are known to have a number of shortcomings. One limitation is that they incorporate a substantial amount of random error, which is rarely reported in League Tables (Cheng 2010). Overall, the research points out that if NSS ratings are used to compare universities or departments, they should incorporate the substantial error variance⁶⁹, taking into account in the analysis students' intake characteristics and/or disciplines. Furthermore, some questions have been raised in relation to the capacity of NSS responses to accurately measure differences in teaching effectiveness across institutions. It has been argued that the survey items are too generic to capture real institutional differences across the system (Cheng 2010; Cheng and Marsh 2010; Marsh et al. 2011).

Additional questions are raised regarding issues of validity and reliability of NSS responses. These issues will be discussed in detail in Chapter 5 of this thesis.

⁶⁸ In addition, the NSS results are published via Unistats. This is a website – oriented to applicants to HEIs – that provides comparative information on university and college courses across the UK. The site draws together comparable information on those areas that students have identified as important in making decisions about what and where to study.

⁶⁹ Recent research has highlighted the importance of employing multilevel models to estimate the variance error in the models.

2.3.3 Labour Force Survey

The Labour Force Survey (LFS) is the third contextual data source used in this thesis. The LFS is a quarterly⁷⁰ sample survey of households living at private addresses in the UK. Its main purpose is to provide information on unemployment and economic activity conditions in the UK. The Office for National Statistics (ONS) manages the LFS in Great Britain and the Central Survey Unit of the Department of Finance and Personnel manages it in Northern Ireland on behalf of the Department of Enterprise, Trade and Investment (DETINI).

The LFS sample consists of about 50,000 responding households in Great Britain, representing⁷¹ about 0.1 percent of the population. According to the ONS (n.s), during the period 2004-2006, the household response rate⁷² for Great Britain fluctuated between 61 percent and 64 percent.

One of the advantages of the LFS is that it provides detailed information about the conditions of the labour market at the national, regional and local level. For the purposes of this thesis I will use the labour market information at the local⁷³ level. Specifically, I

⁷⁰ The LFS in Great Britain has run as a quarterly survey since 1992, whereas in Northern Ireland the survey has run since 1994/1995. Until spring 2006, the survey operated on a seasonal quarter basis. In May 2006, the LFS moved to calendar quarters. The quarterly survey has a panel design, whereby 80 percent of the individuals stay in the sample for five consecutive quarters and a fifth of a sample is replaced each quarter (about 11000 households in the UK).

⁷¹ In addition, a sample of 2000 responding households in Northern Ireland (also representing 0.1 percent of the population) is considered alongside the British sample

⁷² The LFS allows interviewers to take answers to questions by proxy if a respondent is unavailable. In general, the answers are taken from a related adult who is a member of the same household. About a third of the LFS responses are collected by proxy.

⁷³ The LFS supplied information about levels of unemployment for three different geographical units at the local level: Super Output Areas, Wards and Local authorities/Unitary authorities. Super Output Areas (SOAS) are the smallest geographical unit for data collection and publication of statistics in the UK. They include areas where there is a minimum population of 1000 inhabitants (Lower Layer Super Output Areas) or a minimum population of 5000 inhabitants (Middle Layer Super Output Areas). Wards are the second largest unit at the local level, whereas Local Authorities represents the largest areas at the local level.

will use information about unemployment conditions for local authority⁷⁴ districts and unitary authorities (LADs/UA) in Great Britain, which refer to the largest geographical unit at the local level. They include non-metropolitan districts, metropolitan districts, unitary authorities and London boroughs in England, unitary authorities in Wales, council areas in Scotland, and district council areas in Northern Ireland.

Working with local authority data has both advantages and drawbacks. An important advantage is that local authority data provides a better proxy about how economic conditions might affect people's lives – and hence, student's decisions – than regional or national data. Scholars have suggested that local unemployment levels are more relevant factors for students' decisions than what occurs with national or regional levels of unemployment (Clark 2002; Gray, Jesson and Tranmer 1993; 1994; 2001; McVicar and Rice 2000; Rees and Mocan 1997; Rice 1987; Rice 1999; Rivkin 1995; Smith and Naylor 2001; Wales 2010).

An important shortcoming of local authority data, however, is that they do not provide the most disaggregated level of information about the labour market conditions. LADs represent the largest areas at the local level. The economic conditions of some large counties might be more heterogeneous than it is represented by a single index of unemployment. Taking into account these limitations, the LFS will be used as a proxy of the conditions of unemployment at the local level.

⁷⁴ HESA's records supplied information about the students' domicile in the form of postcodes, which were mapped to counties, unitary authorities and local authorities using the National Statistics All Fields Postcode Directory.

2.4 Variable Construction

2.4.1 Dependent Variable: Degree Completion⁷⁵

Degree completion is coded as a binary variable comprising the categories dropout v/s degree completion. The dependent variable is coded with a value of '0' for those who drop out before completion and, with a value of '1' for those who complete their degrees (or are on course to completion).

The dropout category includes all of the students who started a full-time, first-degree, three-year programme in 2004 and were registered in the programme neither in 2005 nor in 2006. On the other hand, completion is understood as the proportion of students that started a first-degree, full-time, three-year programme in 2004 and i) completed their programme within the three-year period; or ii) were registered in the third year of their programme but had not yet completed the programme at the end of the three year period⁷⁶.

Of the student cohort registered in first-degree programmes in 2004, 84.85 percent completed⁷⁷ or were on course to complete their programme at the end of the academic

⁷⁵ Degree completion comprises students who enrolled in a programme at a specific institution. It does not consider students who transfer to a different institution. Unlike in the USA, transfer between institutions is not usual in the UK. According to Vignoles et al. (2009), the percentage of people that transfer between institutions is fewer than three percent. Powdthavee, N., and A. Vignoles. 2009. "The socio-economic gap in university drop-outs." *The B.E. Journal of Economic Analysis & Policy* 9(1).

⁷⁶ The descriptive statistics show that the percentage of people who failed to complete their degrees in the third year of their programmes is close to two percent. Hence, it is very unlikely that this percentage will substantially increase for those cases who have not finishing their programmes at the end of the third year.

⁷⁷ HESA defines completion rates as the proportion of starters in a year who continue their studies until they obtain their qualification.

year 2006/2007 (third year), whereas 15.15 percent did not complete or dropped out of their programme before completion.

2.4.2 Individual Variables

This section describes the individual variables used in the empirical chapters of this thesis and provides a detailed account of how these variables are coded and constructed. Additionally, it supplies descriptive statistics for each variable.

I use the individual variables as independent variables in Chapter 3 to explain the unequal chances of degree completion of different groups of students. Subsequently, these variables are used as controls in the remaining chapters – Chapters 4, 5, and 6 –, to estimate the effect of aggregate measures (institutional and contextual factors) on the students' chances of degree completion. Aggregated variables are not covered in this chapter as they are explained in detail in the empirical chapters 4, 5 and 6.

2.4.2.1 Socioeconomic variables

Social Class: This measure is a categorical variable that conceptualises parental socio-economic group, based on occupation and employment status (Goldthorpe, 2007). HESA, following the National Statistics Socio-Economic Classification (NS-SEC), uses coded class positions with seven categories⁷⁸ plus a category of not classified or not known occupations: (1) higher managerial and professional occupations, (2) lower

⁷⁸ In the Chapters 4, 5 and 6, I use a recoded version of this variable, comprising only three categories plus one missing category. These categories are as follows: i) Salariat that includes higher and lower managerial and professional occupations; ii) Intermediate that comprises intermediate occupations, small employers and own account workers and lower supervisory and technical occupations; iii) Working that comprises semi-routine and routine occupations.

managerial and professional occupations and higher technical and supervisory occupations, (3) intermediate occupations, (4) small employers and own account workers, (5) lower supervisory and technical occupations, (6) semi-routine occupations, (7) routine occupations and (8) not classified or not known occupation (which also includes missing values). Students from ‘higher and managerial professions’ are taken as the reference category, which is contrasted with the seven remaining categories of social class.

Although the level of disaggregation of this grouping allows me to analyse in detail the relationship between socio-economic groups and educational attainment, it also presents some problems. A shortcoming of the data is that a significant proportion of the research population had missing, unknown or unclassifiable social class. The descriptive statistics presented in Table 2.1 show that, in total, 26 percent⁷⁹ of the cases of the sample⁸⁰ had missing or unclassified social class. Unfortunately, it was not possible to impute these missing values since the dataset does not provide complementary information about students’ socioeconomic conditions, such as parental education or family income.

⁷⁹ The descriptive statistics confirmed that 60 percent of the students who have class missing or unknown/not-classified values did not access to universities through UCAS. In these cases, institutions are encouraged to report socioeconomic information about their students, but this is not compulsory.

⁸⁰ Comparison of the characteristics of the subgroups of the research population according to whether social class is known or not known showed an interesting pattern. I found larger differences when comparing whether social class is known or unknown, according to type of university, ethnicity and age. Regarding type of university, New Universities reported a higher proportion of students with unknown social class than either Old or Russell Group Universities (33 percent compared with 21 percent and 14 percent respectively). In relation to ethnicity, the descriptive showed that ethnic minorities have higher levels of reported unknown or missing class as compared to white students (around 40 percent for each ethnic minority group compared to 19 percent). Finally, in relation to age, mature students reported higher levels of unknown or missing class as compared to younger students (54 percent compared to 21 percent).

Table 2.1: Frequencies and Percentages of Social Class

Social Class	Frequency	Percentage
Higher managerial and professional occupations	34321	16.96
Lower managerial and professional occupations	50320	24.94
Intermediate occupations	22889	11.34
Small employers and own account workers	10509	5.21
Lower supervisory and technical occupations	6971	3.45
Semi-routine occupations	17656	8.75
Routine occupations	7410	3.67
Class Missing	51792	25.67
Total	201846	100

Ethnicity: this variable covers students with British citizenship, whose domicile⁸¹ is located in the UK. HESA initially employed the ethnic categories used by the 2001 Census⁸². However, in 2002 some variations were adopted in both Scotland and Northern Ireland, which determined that the coding frame was revised⁸³. The revised ethnic groupings are as follows : (i) White (includes White British, White Irish and White other), (ii) Black (Black or Black British-Caribbean, Black or Black British-African, and other Black background); (iii) Asian (Asian or Asian British-Indian, Asian or Asian British-Pakistani, Asian or Asian British-Bangladeshi, Chinese, and other Asian background); and, (iv) Other⁸⁴ ethnic background. ‘White’ is taken as the reference category, which is contrasted with the three remaining categories of ethnicity.

⁸¹ It excludes foreign students from minority ethnic groups, from European countries or overseas, who are classified as foreign students for fee-paying purposes in the system.

⁸² The Census 2001 includes the following ethnic categories: (i) White (includes White British, White Irish and Any other White background); (ii) Mixed (White and Black Caribbean, White and Black African, White and Asian, Any other Mixed background); (iii) Asian or Asian British (Indian, Pakistani, Bangladeshi, Any other Asian background); (iv) Black or Black British (Caribbean, African, Any other Black background); (v) Chinese or other ethnic group (Chinese and Any other ethnic background); (vi) Not stated

⁸³ Slightly different categories were employed in the Census in Scotland and Northern Ireland, as compared with England and Wales, to reflect local differences (ONS, n.d).

⁸⁴ This last category comprises two categories: ‘other’ and ‘unknown’ ethnicity.

This grouping comprises very broad measures of ethnic origin and, hence, presents some limitations for the analysis in this thesis. The ‘Asian’ group is a misleading and unhelpful term since it includes groups with very dissimilar characteristics. The Asian group includes Indians, who according to Census data are over-represented in the system, Chinese, who are highly successful in secondary education, and some of the most disadvantaged groups, such as Pakistanis and Bangladeshis (Broecke and Nicholls 2007; Connor et al. 2003; Connor et al. 2004; Richardson 2008).

Table 2.2 shows that more than 80 percent of students’ population is White, whereas around a 9 percent define themselves as Asian. A six percent of cases in the sample had unknown or unclassified ethnicity.

Table 2.2: Frequencies and Percentages of Ethnicity

Ethnicity	Frequency	Percentage
White	147759	80.84
Black	7730	4.23
Asian	16546	9.05
Other	10734	5.87
Total ⁸⁵	182769	100

Age: Age ranges from 16 years old to 65 years old⁸⁶. The descriptives show that almost 50 percent of the student population enrolled in first-degree, full-time programmes in 2004 are 18 years old or younger, whereas 15 percent of students were older than 21 years old (mature).

⁸⁵ This total does not include the students not domiciled in the UK. Students whose domicile is not placed in the UK are 19.000 and represents 9.5% of the research population.

⁸⁶ In Chapters 4, 5 and 6, I use a collapsed version of age (dummy variable), comprising ‘mature’ students (above 21 years old) and ‘young’ students (younger than 21 years old).

Gender: ‘Female’ is taken as the reference category with ‘Male’ as the contrast. Examination of the data showed that around 58 percent of students enrolled in first-degree programmes were female. No missing data is found in this variable.

Domicile⁸⁷: HESA provided information about the student’s domicile in the form of postcodes. These postcodes were mapped to unitary authorities and local authorities using the National Statistics All Fields Postcode Directory. In total, 168 Local Authority Districts and Unitary Authorities (LADs/UAs) were identified in the research population.

Distance travelled: This variable is calculated using the student’s domicile postcode and postcode of the institution, where it is available. The difference between the northings and eastings (obtained using the National Statistics All Fields Postcode directory) of domicile and institution are then squared and added together. The square root of the result provides the distance travelled between the two in a straight line.

This variable was collapsed into three categories, following the methodology employed by Frenette (2006). This variable delineates whether the student lives within commuting distance or out of commuting distance from university. The distance was broken down into three groups: 0–40 km (within commuting distance), 40–80 km (possibly out of commuting distance, depending on whether the student has access to a car), and 80 km or more (out of commuting distance).

Table 2.3 confirms that most of the students’ population are enrolled in universities out of commuting distance.

⁸⁷ I will discuss this variable in detail in the Chapter 6

Table 2.3: Frequencies and Percentages of Distance Travelled

Distance	Frequency	Percent
Within commuting distance	66649	32.82
Possibly out of commuting distance	30414	12.88
Out of commuting distance	102658	54.29
	199721	100

2.4.2.2 Academic background and schooling

Tariff points: This is one of two pre-entry attainment measures used in this thesis. This is a continuous variable that gives account of the standardised score obtained in different types of qualifications by all of applicants who apply to universities through the Universities and Colleges Admissions Service (UCAS).

Tariff points were introduced in 2002/2003⁸⁸ in order to make possible comparisons between different pre-higher education qualifications in a numerical format (single points system). With the use of tariff points, different qualifications were converted into a single points system that universities use to evaluate applications and make conditional offers. Each year, UCAS calculates a total tariff score for each student in the application process based on data provided to them by the examination boards. The qualifications covered by the tariff points system are: A/AS Levels, Scottish Highers qualifications, Vocational A and AS Levels, and key skills and Scottish core skills (HESA, 2007).

Until 2002, UCAS used a system which covered only A and AS levels, assigning them up to 10 and up to 5 points, respectively.

UCAS assigns a tariff score zero to students whose highest qualification is different to A/AS level. Students who applied to university with VCE AS levels, VCE A levels, CACHE qualifications and, BTEC National Advanced Extension Awards are assigned a score zero. On the contrary, the tariff score is greater than zero if the student applied with a combination of GCE AS levels, GCE A levels, Scottish Highers or Scottish Advanced Higher. The tariff scores indicate the total score of the best three A-level/Highers or A-level/Highers equivalent.

Tariff points range between 0-998 points. The mean score on entry was 224.57 points, with a standard deviation of 176 points. The evidence presented in Table 2.4 shows that a thirty percent of the sample accessed the system with qualifications different to A/AS level (tariff points equal to zero) and more than 54 percent of the sample got scores higher than the mean.

Table 2.4: Frequencies and Percentages of Tariff Points⁸⁹

Points	Frequency	Percentage
0	58472	28.97
1-224	34535	17.11
225-360	60715	30.08
361-998	48124	23.84
Total	201846	100

Tariff points are generally seen as an improvement on the previous arrangement (which coded different qualifications separately). Their use is appropriate for assessing – based

⁸⁹ For simplicity, the variable tariff score was collapsed in a new variable with four categories. These four categories represent four quartiles of score distribution. Although not shown, I carried out complementary analyses with a variable with eleven categories. The analyses, presented in the Appendix B did not show significant differences between using four and eleven categories for conducting the statistical analyses.

on a single scale- whether variations in entry qualifications are responsible, in whole or in part, for variations in the academic success of students from different backgrounds.

However, the system has a number of shortcomings. With the conversion of different qualification into a single system, it loses some vital information regarding actual attainment. For instance, it is not clear how to assess a one-unit increase on this measurement scale, given that tariff score does not provide information about the attainment associated to that score.

Qualification on entry: This is the second measure of pre-entry attainment used in this thesis. This measure refers to the highest qualification that the student holds on entry to university. The variable was collapsed⁹⁰ into five categories to simplify the analyses: (1) sub-degrees in higher education (foundation degree, certificate or diploma of education, etc.); (2) A-levels/As or equivalent (Scottish Highers and Irish Highers); (3) Vocational degrees (ONC or OND, BTEC, SCOTVEC equivalents, etc.); (4) O-level or equivalent (GCSE/CSE); and, (5) Other/No formal qualification/Unknown. A level (and equivalent) qualification is taken as the reference category in contrast to the four remaining categories.

Table 2.5 shows that 78 percent of students accessed to universities with an A level/As qualification. The percentage of students who accessed universities with qualifications lower than A level was around 18 percent.

⁹⁰ HESA provided this variable with 32 categories. With the purpose of simplifying the analysis, this variable was collapsed into 5 categories.

Table 2.5: Frequencies and Percentages of Qualification on Entry

	Frequency	Percentage
Non other qualification	3785	1.92
O level or equivalent	20662	10.47
Vocational	9347	4.74
A level	153897	77.99
Sub-degrees in HE	9648	4.89
Missing	4507	2.23
Total	201846	100

Type of school attended: This measure refers to the institution (school) attended before enrolment in first-degree programmes in 2004. This variable is coded in three categories: i) private schools, ii) state schools, and iii) unknown type of school. Private schools are funded by private sources, predominantly in the form of tuition charges. Private schools are the most expensive and exclusive group of independent schools in the country. Private schools do not have to follow the National Curriculum and their teachers are not required or regulated by law to have official teaching qualifications. On the other hand, state schools refer to government-funded schools that provide education free of charge to students. Students from sixth-form or further education colleges, are included as being from state schools. The vast majority of state-funded schools are under the control of local councils and they have to follow the National Curriculum. ‘Private school’ is taken as the reference category and the contrasts are: ‘state school’ and ‘unknown school’.

The level of disaggregation of this grouping does not allow me to analyse in detail the relationship between type of school and educational attainment. The data do not provide rich information about the differences between different types of schools.

Table 2.6: Frequencies and Percentages of School Attended

Type of School	Frequency	Percentage
Private	20440	10.13
State funded	145868	72.27
Unknown	35538	17.61
Total	201846	100

Chapter 3: Degree Completion at British Universities

3.1 Introduction

This chapter is the first of the four empirical sections that comprise this thesis. The focus here is on the analysis of how students' background characteristics and attainment on entry explain their chances of degree completion. The chapter is divided in two sections: first, I present briefly some descriptive information about the individual variation in completion rates across the university system. Subsequently, I carry out some statistical analyses to estimate the influence of students' socioeconomic characteristics and academic preparation on entry on their degree completion probabilities.

3.2 Literature review

As described in the introductory chapter, most of the literature has highlighted the centrality of attainment on entry – as reflected by scores on national tests and qualifications on entry to university – to explain individual differences in completion probabilities across universities. The literature has identified that A-level qualifications, and their Scottish and Irish equivalent (AS-levels), are the most appropriate route to succeed in higher education due to their stronger academic emphasis and, consequently, are the standard against which all other pre-entry qualifications are to be judged. Likewise, the research has found that students with higher scores in national examinations on entry have higher chances of completion than those with lower scores

on entry (Johnes and McNabb 2004; Johnes 1997; Johnes and Taylor 1989; NAO 2002; NAO 2007; Smith and Naylor 2001; Yorke 1999; Yorke and Longden 2004; Yorke and Thomas 2003).

In addition, the research has pointed out that differences in academic preparation on entry to university are strongly associated to socioeconomic –class and ethnic – differences in completion rates. Students from more disadvantaged backgrounds enter universities with poorer academic preparation as compared to students from more privileged backgrounds (Chowdry et al. 2008; Fielding, Belfield and Thomas 1998; Smith and Naylor 2001). On the other hand, the literature has added that students’ socioeconomic/family background might also affect their chances of completion. Their lack of financial resources and concerns about debt in the future seem to adversely affect lower class students’ chances of completion (Callender and Kemp 2000; Dodgson and Bolam 2002; NAO 2007; Ozga and Sukhnandan 1997; Thomas 2002; Yorke 1999; Yorke et al. 1997; Yorke and Longden 2008).

Few studies in the UK, however, have analysed the relationship between socioeconomic/ethnic background⁹¹ and degree completion chances, after fully taking into account students’ academic preparation (Powdthavee and Vignoles 2009; Smith and Naylor 2001). In a recent study, Powdthavee and Vignoles (2009) found that the socioeconomic gap in non-completion probabilities reduces substantially after controlling for students’ prior achievement. Their results suggest that some of the differences between more and less affluent students is actually attributable to differences in their academic preparation for higher education and/or their ability, as indicated by earlier measures of

⁹¹ Powdthavee and Vignoles (2009) in their study included measures related to the test scores in Key stage 2 and Key stage 3. These test data were supplemented by scores in GCSEs (capped point scores) and A-levels (uncapped point scores).

educational achievement (Powdthavee and Vignoles 2009). Nevertheless, their results showed that significant differences in drop-out rates remain across the different measures of socio-economic background, even after controlling for pupil characteristics and prior achievement.

Despite the fact that the evidence is rather recent, the results of these studies point out that a higher rate of non-completion by lower class students should be seen as problematic⁹²; particularly if students with similar levels of prior achievement (low or high) from different socio-economic backgrounds achieve different levels of completion.

3.3 Research Questions

The central concern of this chapter is to assess the effect of socio-economic background and attainment on entry on student's chances of degree completion.

- 1) Does attainment on entry affect students' chances of degree completion?
- 2) Does class background affect students' chances of degree completion after taking into account differences in attainment on entry to university?
- 3) Does ethnic background affect students' chances of degree completion after taking into account differences in attainment on entry to university?

⁹² Dearing, R. (1997). Higher education in the learning society National Committee of Inquiry to Higher Education, Norwich, HMSO.

Robertson, D. and J. Hillman (1997). Widening Participation in Higher Education for Students from Lower Socio-Economic Groups and Students with Disabilities. London: The Stationary Office, National Commission of Enquiry to Higher Education.

3.4 Descriptives

The evidence reveals that 84 percent of undergraduate students enrolled in full-time first-degree programmes in 2004/2005 completed their degrees at the end of the 2006/2007 academic year. This figure placed the UK in a very good position in international league tables of student retention (NAO 2007)⁹³. However, a more detailed examination of the evidence revealed a significant variation in completion rates across different groups of students. Specifically, the descriptive statistics show important differences in completion rates of students based on their academic preparation. Confirming the findings presented in the literature review, the evidence shows a consistent association between a student's qualification on entry and his or her chances of completing a degree ($\chi^2 = 2.5e+03$, $df=4$). While 87 percent of students who enter university with A-levels complete their degrees, only 77 percent of students who enter university with other types of qualifications attain their degrees. As expected, there is also a consistent association between a student's scores on entry and his or her chances of completing a degree ($\chi^2 = 7.2e+03$, $df=388$).

In addition, the evidence shows significant differences by socioeconomic background as well as gender in completion rates. Alongside these differences, the evidence shows significant variation of completion rates by type of university and/or institutional selectivity. The latter differences are of considerable interest and I will look at them in detail in Chapter 4.

⁹³ This figure is higher than recent official figures provided the National Audit Office (NAO). In a report published in 2007, NAO estimated the retention rate for the UK at 75 percent. It is possible to attribute the differences in estimations to the fact that my research is focused on people who are pursuing first degrees, whereas NAO reports the figures for people enrolled in any type of degree in higher education. It is well documented that students pursuing first degrees have higher probabilities of success as compared to those who pursue any other type of degrees

3.4.1 Social class and completion rates

Overall, the evidence reveals a consistent association between a student's social class and his or her chances of completing a degree ($\chi^2 = 3.8e+03$, $df=7$). There are substantial differences between the completion rates of students from managerial/professional class backgrounds and those from manual class backgrounds: while 91 percent of students from managerial/professional backgrounds complete their degrees, only 83 percent of students from 'routine work' class backgrounds attain their degrees.

Further analyses revealed that the effects of socioeconomic differences are more pronounced for male students than for female students.

The descriptive statistics presented in Table 3.1 confirm the existence of socioeconomic differences in the attainment of students on entry to university. Whereas 88 percent of students from more affluent backgrounds enter university with A-levels, only 78 percent of lower class students do so.

Table 3.1: Attainment on Entry by Social class⁹⁴ in 2004/2005**(Column percentages)**

Individual Variables	Higher	Intermediate	Lower	Missing
* Scores on entry				
Lowest Quartile (0 score)	15.2	19.3	26.6	60.1
Second quartile (1-235 points)	12.0	16.4	20.2	13.8
Third quartile (236 -360 points)	34.5	36.5	33.3	16.8
Fourth Quartile (361-998 points)	38.3	27.9	20.0	9.3
**Qualification on entry				
Without qualification	0.5	0.8	1.1	5.7
O level or equivalent	5.3	6.5	10.6	22.5
Vocational qualification	3.2	4.6	6.0	6.7
A-level/As level	87.8	84.5	77.9	56.1
Sub-degrees HE	3.3	3.6	4.3	9.0
* Chi square = 40000, DF=9, p. <001				
* Chi square = 22000, DF=12, p. <001				

Additional analyses showed that socioeconomic differences in completion rates are slightly larger at the most selective group of institutions than they are at the least selective or more recently established universities. The evidence shows that 94 percent of students from professional and managerial backgrounds complete their degrees at the Russell Group of universities, whereas only 89 percent of students from lower class background finish their programmes at these institutions. The socioeconomic differences are smaller at New Universities, where 84 percent of higher class students and 82 percent of lower class students complete their degrees.

⁹⁴ For simplicity in presentation, the variable class was collapsed in a new variable with three categories plus the category missing. I followed the classification employed by Erikson, Goldthorpe et. al (2005) for defining this variable. 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):9730-33.

3.4.2 Ethnicity and completion rates

The descriptive statistics also reveal a robust association between students' ethnicity and their chances of completing a degree ($\chi^2 = 540.25$, $df=3$). White and Asian students achieve completion at very similar rates, whereas black students have the lowest rates of graduation in the university system. The evidence shows that only 78 percent of black students complete their degrees as compared to 86 percent of white students and 85 percent of Asian students. As Table 3.2 shows, there are significant differences in qualification and scores on entry to university between ethnic minorities and white students. Confirming previous findings, the evidence shows that a high proportion of Black students undertook O-level, or vocational qualifications, rather than A-levels to enter university (Connor et al. 2003; Connor et al. 2004; Modood 1993). In relation to scores, the evidence also shows that Black students obtained lower scores on entry to university. Differences associated with ethnicity are pronounced at New Universities but significantly less so at more established institutions.

Table 3.2: Attainment on Entry by Ethnicity in 2004/2005
(Column percentages)

Individual Variables	White	Black	Asian	Other
Scores on Entry*				
Lowest Quartile (0 score)	22.02	52.48	20.96	37.98
Second quartile (1-235 points)	13.89	22.19	26.42	15.82
Third quartile (235 -360 points)	33.5	19.17	33.46	25.99
Fourth Quartile (361-998 points)	30.58	6.16	19.16	20.21
Qualification on entry**				
Without qualification	1.35	2.62	1.46	4.46
O level or equivalent	6.43	23.15	5.33	13.6
Vocational qualification	4.57	7.48	3.36	5.99
A-level/As level	83.78	57.82	86.27	70.83
Sub-degrees HE	3.86	8.93	3.57	5.13
*Chi-square:8500, DF=9, p.<001				
**Chi-square: 5400, DF=12, p.<001				

3.5 Results

The central question that I will address in this section is whether the consistent relationship between students' background characteristics and graduation rates persists after taking into consideration differences in academic preparation on entry to university. The findings should reveal the extent to which completion probabilities are the result of associated differences in academic preparation and other student background characteristics. For example, if students from professional or managerial class backgrounds are substantially better prepared than lower class students the gap in completion rates between both groups should shrink after these differences are taken into account. A similar situation should occur with ethnic differences. Disparities in educational outcomes in secondary education are well documented among ethnic minority groups, so I expect to see the gap in graduation rates in higher education narrow once I account for differences in academic preparation.

I estimated a series of logistic regressions⁹⁵ in order to disentangle the effect of the different student socioeconomic variables from the impact of student academic preparation on degree completion chances. These analyses are presented in Table 3.3. Model 1 includes all the students' background characteristics and schooling (previous school attended). The results confirm that the probability of completion varies by socioeconomic background. Students who have parents in skilled or unskilled manual occupations have lower chances of completion as compared to those with parents in professional or managerial positions.

⁹⁵ Although not shown, survival analyses were conducted to explore whether the effects of background variables differed over the first, second and third years of students' programmes. The analysis showed that all of these background variables have a very similar effect throughout the years; there are no significant statistical differences between the effect of these variables on persistence (after the first year and second year) and on completion of a degree (after finishing the third year of a programme).

Alongside the class gradient in completion probabilities, the results show that there is also an ethnic dimension to degree completion chances. However, there is a more substantial heterogeneity among ethnic minority groups with regard to completion chances. Students of Black and other ethnicities are significantly less likely to complete a degree as compared to white students. British Asian⁹⁶ students, on the contrary, are more likely to complete a university degree than their White counterparts. These latter results are consistent with recent studies in the UK that have found that students from Asian backgrounds make more progress academically, particularly in secondary school, than White students (Wilson, Burgess and Briggs 2006) and in their transition and performance in higher education (Chowdry et al. 2008; Jackson, Jonsson and Rudolphi 2012).

In terms of other individual characteristics, the findings also show that there is a gender gap in degree completion probabilities. Male students have lower chances of degree completion than female students. Similarly, students from state-funded schools are, other things being equal, less likely to complete their degrees than those from private schools.

Models 2 and 3 added the measures of attainment on entry to university to the analysis. Specifically, I included a categorical variable for type of qualification on entry, with A-level as the reference category, and a continuous variable for scores on entry, whose range varies between 0-998 points. The results confirm that students who enter university with A-levels (or equivalent qualifications) are more likely to complete their degrees than those who enter university with any other type of qualifications (O-level/GSE,

⁹⁶ As it was noted in chapter 2, the category ethnicity does not distinguish the country of origin of the Asian students. However, based on complementary HESA and Census data, it is possible to point that the biggest group within the Asian category is Indians. Both data sources have pointed that Indians are over-represented in higher education, whereas young people of Bangladeshi or Pakistani origin are underrepresented.

vocational or sub-degrees in higher education). Likewise, they confirm that scores on entry provide a significant indication of an individual's chances of completing a university degree.

With the inclusion of the prior attainment measures, the coefficients on the socio-economic variables are reduced, though most of the socio-economic differences remain statistically significant. Class⁹⁷ differences persist even after accounting for differences in academic preparation. These findings confirm the results of Powdthavee and Vignoles (2009) who found that not all of the class gradient in dropout in the UK is attributable to the poorer prior academic achievement of students from lower classes.

⁹⁷ Unfortunately, the data provided by HESA does not offer information about students' background characteristics beyond the descriptive information that I have presented so far in this chapter. Because HESA uses the data for administrative purposes only, they do not collect particularly rich information about students' backgrounds, such as information about students' employment status, parental education or family income. Not having this data to include in the analysis is a limitation of this research. HESA does, however, provide information about one key aspect of students' socioeconomic situation: the student's domicile. Specifically, this variable refers to the location of the student's domicile (postcode). In Chapter 6, I will explore the extent to which location influences a student's chances of degree completion.

Table 3.3: Binomial Logistic Regression analyses for predicting Degree Completion

	Model 1		Model 2		Model 3	
	Log Odds	SE	Log Odds	SE	Log Odds	SE
Constant	2.76***	0.04	2.88***	0.04	1.77***	0.05
Student's Background						
Young (mature ref.)	0.18***	0.02	0.05**	0.02	-0.12***	0.02
	-					
Male (female ref.)	0.24***	0.01	-0.24***	0.01	-0.22***	0.01
Higher managerial/profess.(ref.)						
Lower managerial and professional occupations	-					
	0.22***	0.02	-0.21***	0.02	-0.14***	0.02
	-					
Intermediate occupations	0.25***	0.03	-0.24***	0.03	-0.14***	0.03
Small employers and own account workers	-					
	0.37***	0.03	-0.36***	0.03	-0.23***	0.03
Lower supervisory and technical occupations	-					
	0.42***	0.04	-0.40***	0.04	-0.27***	0.04
	-					
Semi-routine occupations	0.46***	0.03	-0.44***	0.03	-0.27***	0.03
	-					
Routine occupations	0.55***	0.04	-0.52***	0.04	-0.35***	0.04
White (ref. category)						
	-					
Black	0.17***	0.03	-0.13***	0.03	-0.04	0.03
Asian	0.11***	0.02	0.10***	0.02	0.17***	0.02
	-					
Other	0.19***	0.03	-0.16***	0.03	-0.13***	0.03
Schooling (prev. school attended)						
Private (ref.)						
From state-funded school or college	-					
	0.38***	0.03	-0.34***	0.03	-0.13***	0.03
	-					
Unknown school type	0.80***	0.03	-0.72***	0.03	-0.31***	0.03
Attainment on Entry						
A-level (ref.)						
Non qualification			-0.72***	0.04	0.04	0.04
O level or equivalent			-0.36***	0.03	0.29***	0.03
Vocational			-0.54***	0.03	0.28***	0.03
Sub degrees in HE			-0.28***	0.03	0.48***	0.03
Scores on entry					0.003***	0.0002
N=	182681		179289		179289	

In addition, the results showed that measures of attainment on entry do not explain gender differences, whereas they only partially explain ethnic differences in completion

rates. When measures of academic preparation are added to the models, the effect of being black disappears, while the effect of being Asian persists and even slightly increases. In other words, these results confirm that black students' lower chances of degree completion are explained, to a large extent, by their poor academic preparation on entry to university. On average, black students enter university with lower scores and qualifications as compared to the rest of the population. These results seem to confirm the findings of recent studies that Black students' disadvantage in the educational system primarily stems from their poorer academic performance (Jackson, Jonsson and Rudolphi 2012).

In the case of Asian students the story is rather different. The results indicate that attainment on entry does not explain Asian students' higher chances of degree completion than White studies. The Asian advantage persists even after differences in academic preparation are accounted for. There is no simple explanation for this finding. On the one hand, there is vast body of research that has pointed out that Asians, especially South Asians, is more likely to complete their studies in higher education because they place a high value on higher education as a route to achieve upward social mobility. Their higher aspirations would explain their better performance in the system (Abbas 2003; Connor et al. 2003; Connor et al. 2004). On the other hand, there are other studies that have concluded that anticipated unemployment risks and discrimination in the labour market encourages minority students to stay in post-compulsory-education (Riach and Rich 2002, Payne 2003).

To illustrate better the magnitude of the socioeconomic differences – especially class differences- I estimated marginal effects using different combinations of social class and

attainment on entry. To estimate these effects, I re-estimated the models of Table 3.3, specifying representative values (from the population) for each variable in the equation.

The findings presented in Table 3.4 show the adjusted predictions for students from different class backgrounds, after controlling for scores on entry and qualifications on entry. It indicates that there remain differences in the probability of completion between students from working class backgrounds and those from other class backgrounds.

**Table 3.4: Predictions of degree completion by social class controlling
by attainment on entry
(Confidence intervals in parentheses)**

	1st quartile	2nd quartile	3rd quartile	4th quartile
Higher Managerial	0.73 [0.71-0.75]	0.88 [0.87-0.88]	0.92 [0.92-0.93]	0.95 [0.95-0.95]
Lower managers	0.73 [0.72-0.74]	0.86 [0.86-0.87]	0.9 [0.90-0.91]	0.94 [0.93-0.94]
Intermediate	0.74 [0.73-0.75]	0.87 [0.86-0.87]	0.9 [0.90-0.91]	0.94 [0.93-0.94]
Small employers	0.72 [0.69-0.74]	0.86 [0.85-0.87]	0.9 [0.90-0.91]	0.93 [0.93-0.94]
Lower supervisory	0.71 [0.68-0.74]	0.85 [0.84-0.86]	0.89 [0.88-0.90]	0.93 [0.92-0.94]
Semi-routine occupations	0.73 [0.72-0.75]	0.84 [0.84-0.85]	0.88 [0.88-0.89]	0.91 [0.92-0.94]
Routine occupations	0.71 [0.69-0.73]	0.84 [0.83-0.84]	0.88 [0.87-0.89]	0.90 [0.90-0.92]

So far the findings have revealed that socio-economic differences –especially class differences- in completion probabilities persist after controlling by attainment on entry measures. Some studies have suggested that, due to the sorting across higher education by socio-economic background, institutions and subjects might contribute to class differences (Powdthavee and Vignoles 2009). I conducted additional fixed effect analyses to estimate the potential effect of both factors on the socioeconomic background variables. These analyses are presented in Table 3.5. Model 4 includes dummy variables for each university (131 dummies) and Model 5 includes dummies for each subject (22 dummies). Using these dummies, I control for the unobserved institutional characteristics of universities and subjects that may impact on students' degree completion chances. Considering Model 3 (from Table 3.3) as the baseline, the results show that the inclusion of the university dummy variables produced only a marginal change in the coefficients of the socio-economic variables.

These results indicate that the socio-economic gradient in degree completion persists, even after controlling for attainment on entry, institutions and subjects. These findings suggest that the lower chances of completion of working class students are not by and large attributable to the type of subjects that they are pursuing and are only marginally attributable to the institutions in which they are enrolled. Similar results are found for ethnic minorities.

Table 3.5: Fixed effects⁹⁸ for predicting Degree Completion

	Model 4		Model 5	
	Log Odds	SE	Log Odds	SE
Constant	1.49***	0.09	2.10***	0.08
Student's Background				
Young (mature ref.)	-0.10***	0.02	-0.10***	0.02
Male (female ref.)	-0.25***	0.01	-0.20***	0.01
Higher managerial/professional(ref.)				
Lower managerial and professional occupations	-0.11***	0.02	-0.14***	0.02
Intermediate occupations	-0.09***	0.03	-0.13***	0.03
Small employers and own account workers	-0.17***	0.03	-0.22***	0.03
Lower supervisory and technical occupations	-0.21***	0.04	-0.27***	0.04
Semi-routine occupations	-0.22***	0.03	-0.27***	0.03
Routine occupations	-0.29***	0.04	-0.35***	0.04
White (ref.category)				
Black	-0.05	0.03	-0.02	0.03
Asian	0.13***	0.03	0.19***	0.03
Other	-0.16***	0.03	-0.11***	0.03
Schooling				
Private (ref.)				
From state-funded school or college	0.05	0.03	-0.12***	0.03
Unknown school type	-0.15***	0.03	-0.30***	0.03
Attainment on Entry				
A-level (ref.)				
Non qualification	-0.09**	0.04	0.03	0.04
O level or equivalent	0.14***	0.03	0.28***	0.03
Vocational	0.19***	0.03	0.27***	0.03
Sub degrees HE	0.35***	0.03	0.47***	0.03
Scores on entry	0.003***	0.002	0.003***	0.002
N=		179289		179289

The next two chapters- Chapters 4 and 5- are dedicated to examining the effect of institutions on student's chances of degree completion in greater detail.

⁹⁸ The coefficients of the dummies for subjects and institutions are not presented in the text.

3.6 Discussion

The results of this chapter showed that completion probabilities are the result of differences in academic preparation on entry to university and students' background characteristics. More interestingly, the findings confirmed that some of the socioeconomic and ethnic differences in degree completion chances are actually attributable to differences in students' academic preparation (reflected by qualifications and scores on entry to university). Nevertheless, they also revealed that class differences in degree completion chances are explained only in part by differences in academic preparation on entry to university. After controlling by attainment on entry measures, the results showed that there are still socioeconomic differences in degree completion probabilities.

What these results seem to suggest is the existence of secondary effects of social stratification operating in the decision of degree completion. Boudon (1974) points out that secondary effects refer to social class differences in educational choices that remains once has controlled for class differences in performance or academic ability.

In relation to the mechanisms that might explain the decision of degree completion by students from different social backgrounds, theories linked to the rational choice approach seem to offer a good explanation to these class differences. According the RRA framework, students from higher social origins are (on average) much more likely to complete a certain level of education than those from less advantaged social origins

because they need more and better education to ensure class maintenance. Boudon adds that these differences are larger among students of average ability.

Along with class differences, the findings also showed the existence of ethnic and gender differences in degree completion chances. In relation to gender differences, the findings revealed that there is a female advantage in degree completion chances that is not attributable to a better academic preparation on entry to university. In relation to ethnicity, the results seem to suggest that both primary and secondary effects are taking place to generate ethnic inequalities in degree completion probabilities. On the one hand, the results revealed that Black students have lower chances of degree completion because of their poor academic preparation on entry to universities. On the other hand, they showed that academic preparation does not explain the higher chances of completion by Asian students. Qualitative scholars have suggested that aspects associated to a strong positive parental support and commitment to education might be behind the success of students from Asian backgrounds (Modood 1993, Connor, Tyers et al. 2004).

In addition, the results of the chapter suggest that socio-economic and ethnic differences should be taken into consideration for policy makers and institutions as a matter of concern. Recent studies have revealed that the rates of non-completion have risen in recent years and the evidence suggests that this will tend to widen the socio-economic gap in degree completion, since poorer students drop-out to a greater extent than those from more affluent backgrounds.

Chapter 4: Do universities affect students' chances of degree completion?

4.1 Introduction

In this chapter, I study how institutions affect students' chances of degree completion. On the one hand, I analyse how different institutional characteristics explain students' chances of degree completion and, on the other hand, I examine whether different groups of students have the same chances of completing a degree within the same institutional context.

In light of the great expansion⁹⁹ of higher education in the UK, it is especially important to study the role that institutions¹⁰⁰ might have in educational outcomes. The literature points out that institutions- as one of the axes of the horizontal differentiation of the higher education system, has become a significant factor in the reproduction of social inequalities (Arum, Gamoran and Shavit 2007).

⁹⁹ Teichler (1988) has posited that the great expansion of higher education in recent decades has been accompanied by a diversification of course levels, fields of study, types of institutions, and educational sectors. Teichler, U. 1988. *Changing Patterns of the Higher Education system: The Experience of Three Decades*. London: Jessica Kingley.

¹⁰⁰ The evidence regarding the impact of institutions of higher education on educational outcomes in the UK is rather scarce. There is a greater number of studies that have analysed how institutional quality/prestige affects graduate occupational outcomes in several countries, including the UK, France, Italy and Sweden Brunello, Giorgio, and Lorenzo Cappellari. 2008. "The labour market effects of Alma Mater: Evidence from Italy." *Economics of Education Review* 27(5):564-74, Chevalier, Arnaud, and Gavan Conlon. 2003. "Does It Pay to Attend a Prestigious University?": IZA, Holmlund, Linda. 2009. "The Effect of College Quality on Earnings. Evidence from Sweden." Umea University, Vincens, Jean, and Ann Johnston. 1995. "Graduates and the Labour Market in France." *European Journal of Education* 30(2):133-56.

4.2 Literature review

The university/college effects literature has widely studied institutional characteristics that affect educational outcomes, such as persistence or graduation rates. A review of the literature shows that in the years leading up to 1990s the research examined the influence of institutional characteristics primarily on institutional persistence rates. Using the university as the unit of analysis, these studies found that institutional persistence rates were positively related to institutional selectivity (Kim, Rhoades and Woodard 2003; Marcus 1989; Saupe, Smith and Xin 1999) and institutional enrolment or size (Kamens 1971; Sjoberg 1999).

After 1990s, researchers interested in college/university effects began to estimate the impact of institutions on students' educational outcomes (Astin 1993c; Astin and Chang 1995; Pascarella and Terenzini 1991; 2005). These scholars (most of whom are based in the USA) carried out a series of studies that analysed how an array of university structural characteristics – such as type of college/university (two year/four year/community colleges), size (institutional enrolment), institutional control (public/private) and institutional selectivity – contributed to students' chances of degree completion and persistence.

Overall, the research found that the impact of these institutional characteristics- with the exception of selectivity- although statistically significant, tended to be small. Selectivity was found to have the greatest impact on educational outcomes; whereas type of university, institutional control and size did not explain more than two percent of the variance of students' educational outcomes. The scholars have suggested that these

features are too remote or distant from the students' experiences to generate large effects on their educational outcomes (Pascarella and Terenzini 2005).

4.2.1 Empirical research

The review of the literature shows that institutional selectivity¹⁰¹ - widely used as a proxy of institutional quality- is one of the most reliable institutional predictors of students' educational attainment in higher education (Adelman 1999; Alexander and Eckland 1977; Astin and Oseguera 1996; Bowen, Chingos and McPherson 2009; Bowen and Bok 1998; Ethington 1997; Kane 1998; Pascarella and Terenzini 2005; Stoecker and Pascarella 1991). Overall, the research found that the higher the selectivity of an institution, the greater the odds of an enrolling student completing a bachelor's degree. As it is well documented, more selective institutions, by definition, enrol students with stronger entering credentials who are more likely to graduate regardless of where they go to study.

However, the research has also pointed out that institutional selectivity may contribute to students' completion chances independent of the characteristics students bring with them to the institution. Bowen, Chingos and McPherson (2009), for instance, in a recent study of American public universities, found that substantial differences in graduation rates remain after controlling for students' attainment on entry (high school grades and SAT scores) and demographic characteristics.

¹⁰¹ The research has used different indicators to measure institutional selectivity: the average score of entering students (usually as reflected in admission test scores (SAT) and high school grade-point average), class rank and percentage of applicants accepted Bowen, William , and Derek Bok. 1998. *The shape of the river: Long-term consequences of considering race in college and university admissions*. Princeton, NJ: Princeton University Press.

The underlying causal mechanisms of this institutional effect, however, are much more difficult to describe. Scholars as Pascarella and Terenzini (1991) point out that among the potential explanations are increased student commitment to the institution and to degree completion as the institution's perceived prestige increases, higher faculty expectations, and the overall positive environmental effect of attending a selective institution (Pascarella and Terenzini 2005). In addition, Kane (1998) adds that institutional selectivity might reflect better learning opportunities, via better prepared classmates (peer effect) or better teachers. Bowen, Chingos and McPherson (2009) complement these hypotheses adding that the positive effect of institutional selectivity are due in part to the role of norms and expectations (at highly selective institutions with generally high graduation rates, there may be a widely shared expectation that essentially everyone will graduate) and access to better educational resources (faculty, laboratory and library resources). Nevertheless, the recent literature has not addressed the question of which hypothesis best explains the net positive impact of institutional selectivity on educational attainment.

The findings about the effects of type of university¹⁰² on educational attainment are much like those relating to institutional selectivity. Regarding the size of an institution, the research found that size is inversely related to students' persistence and degree completion chances (Astin 1993c; Stoecker and Pascarella 1991; Titus 2006). Larger institutions have a negative effect on students' educational outcomes. The findings reveal something of the underlying mechanisms that may be involved in student degree

¹⁰² Overall, the evidence has concluded that, after accounting for students' pre-entry characteristics, enrolling in a two year institution had statistically significant negative effects on educational attainment, compared with being enrolled in a four year college or university. These effects might be indirect and more closely related to other institutional characteristics such as size, research emphasis, faculty characteristics and peer effects. Pascarella, Ernest, and Patrick Terenzini. 1991. *How college affects students: Findings and insights from twenty years of research*. San Francisco: John Wiley & Sons, —. 2005. *How college affects students: A third decade of research*. San Francisco: John Wiley & Sons.

completion. Insofar as size is a significant factor, the researchers suggest that its influence may be negative but indirect. Size may be more important in its mediation of the effects of other, more influential, aspects of student's academic experience, such as student-faculty interaction¹⁰³ or social involvement/integration in their institutions.

Alongside identifying institutional predictors of educational success, the American literature has also found conditional institutional effects on different student subpopulations. Students with similar background and academic characteristics might achieve different outcomes in different institutional contexts (Alon and Tienda 2005; Bowen and Bok 1998; Christie and Hutcheson 2003; Crook and Lavin 1989; Lavin and Crook 1990; Pascarella and Terenzini 1991; Swanson 2002). These studies found that traditional students have higher chances of completion in more established institutions (four year institutions)¹⁰⁴ than in community colleges (or two year colleges). More recent studies focusing on minority students also found that these students thrive at selective postsecondary institutions despite their disadvantaged starting lines. Minority students' likelihood of graduating increases as the selectivity of the institution attended rises (Alon and Tienda 2005; Bowen and Bok 1998).

¹⁰³ The evidence shows that undergraduates in smaller institutions benefit from more frequent interactions with faculty, whereas those attending large institutions (especially research institutions) may have more difficulty gaining access to faculty. Kuh, George D., and Shouping Hu. 2001. "The effects of student-faculty interaction in the 1990s." *The Review of Higher Education* 24(3):309-32. Kuh, G. D., and N. Vesper. 1997. "A comparison of student experiences with good practices in Undergraduate Education between 1990 and 1994." *Ibid.* 21(1):43-61. The impact of size on student-faculty interaction will be analysed in detail in Chapter 5.

¹⁰⁴ For instance, Lavin and Crook (1990) estimated that traditional students beginning their college careers in a community college were 19 percentage points less likely to complete a bachelor's degree than similar students who entered a four year institution. Similarly, Christie and Hutcheson (2003), found that traditional students entering two year colleges (compared with their counterparts who enrolled initially in a four year institution) had a statistically significant decrease of 9 percent in the probability of earning a degree. Lavin, D.E., and D.B. Crook. 1990. "Open Admissions and Its Outcomes: Ethnic Differences in Long-Term Educational Attainment." *American Journal of Education* 98(4):389-425. Christie, Ray L., and Philo Hutcheson. 2003. "Net Effects of Institutional Type on Baccalaureate Degree Attainment of "Traditional" Students." *Community College Review* 31(2):1-20.

In addition to these findings some literature has also added that the type of subject that students pursue might also have an impact on their educational outcomes (Crook and Lavin 1989; Green 1994; Pascarella and Terenzini 2005). Nevertheless, the evidence regarding the effects of subjects and programs is rather scarce and mixed. Pascarella and Terenzini (2005) found that students pursuing subjects in the sciences, engineering, business and health-related areas are more likely to graduate than similar students in other fields of study. However, other researchers did not find a clear association between fields of study and educational attainment (Alexander and Eckland 1977; Pascarella et al. 1987). The evidence seems to be more consistent in relation to the fact that the subject mix of an institution also influences the non-completion rates. The subject mix of institutions has been shown to be related to inter-university variations in overall non-completion rates (Johnes 1997; Johnes and Taylor 1989). However, these studies did not identify the mechanisms that explain this variation.

4.2.2 Empirical research in the UK

Whilst the above studies are instructive, there are significant differences between the American and British systems of higher education in an array of areas - such as structure (type of universities), type and length of programmes, and general policy context- which make it difficult to draw conclusions about the British system based on American studies alone.

Unfortunately, compared to the American research, there is a paucity of evidence in the UK in relation to institutional effects. Most UK-based research is descriptive and has been concerned with examining how to improve retention rates at the institutional level.

The literature has identified some university characteristics that have an impact on institutional completion rates. Similar to the American findings, factors such as the type of institution and university selectivity were identified as the main university-level variables that have a significant influence on institutional completion rates (McGivney 1996; Woodley and Parlett 1983). More recent studies have added that universities which have high standards of quality in learning and teaching (based on the results of the Teaching Quality Assessment), and are strong in terms of research (based on the results of the Research Assessment Exercise) have lower dropout rates than other institutions that do not have the same standards (Johnes and McNabb 2004).

Recent evidence provided by the National Audit Office (2007) showed that there are significant variations in average continuation rates between the different types of higher education institutions, with the Russell Group of Universities having the highest average continuation rates in the system and the New Universities (post-1992 institutions) having the lowest average rate. Overall, the findings confirm that more selective institutions tend to have higher rates of graduation.

Additionally, Cheung and Egerton (2007) in their analysis of the National Child Development Study (NCDS) 1958 cohort found the existence of clear class differences in completion of higher education degrees. Despite the fact that they did not have specific information about the type of institution attended, their study revealed that where the institutional framework is concerned there was a gradient for class effect. They found that the class effect is strongest where selection is most pronounced, at the

top of the educational system (i.e., degree programs at universities) (Cheung and Egerton 2007:217).

Recent studies in European countries confirm the pattern identified by Cheung and Egerton. They show that institutional contexts have differential impact on the educational attainment of different groups of students. Students from the upper classes have a higher probability of entering or graduating from a Grande École in France, a 'Russell Group' university in the United Kingdom, or a top university in Germany, Sweden, and Finland (Amber and Neathery 1999; Boliver 2006; Deer 2005; Duru-Bellat, Kieffer and Reimer 2008; Duru-Bellat and Kieffer 2008; Givord and Goux 2007; Kivenen and Rinne 1991).

In relation to subjects, the variation in non-completion rates between subjects is well documented in the UK (De Rome and Lewin 1984; Johnes 1997; Johnes and Taylor 1989; Powell 1973; Robbins Report 1963; Smith and Naylor 2001; Wankowski 1972). A study conducted by Johnes and McNabb (2004) found that failure rates are relatively low in medicine, whereas non-completion rates are higher among students in the 'hard' science disciplines, such as mathematics, engineering and technology, and physical sciences. More recently, as part of its review of retention in the country, NAO (2007) identified that Medicine and Dentistry have the highest continuation rates (98 percent), whereas combined subjects have the lowest (83 percent). The review of the literature did not show the existence of evidence in relation to the effect of the mix of subjects on educational attainment.

4.3 Research Questions and Hypotheses

4.3.1 Research Questions

The following research questions are the focus of this study:

1. Do institutional aspects affect students' chances of degree completion?
2. Do more selective institutions increase students' chances of degree completion as compared to less selective institutions?
3. Do more selective institutions have a differential impact on students from different socio-economic backgrounds?
4. Does academic preparation on entry to university explain the socio-economic gap in completion probabilities at more selective institutions?

4.3.2 Hypotheses

Building on the literature previously discussed, I draw some hypotheses that will be tested in the statistical analyses:

H1: Attending a more selective institution increases a student's chances of completing a degree as compared to attending other types of university

H2: Class disparities in degree completion probabilities will be larger at the most selective institutions (Russell group of institutions). Students from professional and

managerial families will have higher probabilities of completing a degree than students from manual labour backgrounds at Russell Group universities because of their better academic preparation on entry

H3: Students from professional and managerial backgrounds will have higher probabilities of completing a degree than students from manual labour backgrounds at Russell Group institutions because the latter pursue programmes with lower rates of completion than lower class students

4.4 Methodology and Data

4.4.1 Data

As in the preceding chapter, I make use of the student-level longitudinal data provided by the Higher Education Statistics Agency (HESA) as the main data source to conduct the statistical analysis. This dataset offers information about two significant aspects of students' higher education experience: the university at which the students are enrolled and the subject they are pursuing.

This data source comprises information about 132 institutions of higher education and provides information about the type of university, location and enrolment. Regarding subjects, the dataset comprises information about 162 subjects which are classified according to the Joint Academic Classification of Subjects (JACS) used by HESA and the Universities and Colleges Admission Service (UCAS) in the United Kingdom. The

data offers information about the subject or combined subjects in which students enrolled in 2004 and whether or not they changed their subjects throughout the years.

4.4.2 Variables

4.4.2.1 Dependent variable

The dependent variable in this research is treated as a binary variable, distinguishing students who complete a university degree from those who drop out before completion.

4.4.2.2 Independent Variables

The independent variables included in the analysis are various measures related to institutional structural characteristics.

Type of Institution: The measure most commonly used to identify universities in the UK refers to the status hierarchical structure of the contemporary higher education system in the UK (Boliver, 2006). Three tiers can be identified within this structure: New, Old and Russell Group universities. At the top of the hierarchy are the ‘Russell Group’ of 23 research-intensive universities. This group comprises, on the one hand, long established institutions such as Oxford and Cambridge and, on the other hand, London-based institutions such as Imperial College, University College London and the London School of Economics. The middle tier of institutions comprises other ‘Old’ universities, established prior to the abolition of the 1992 binary divide between polytechnics and universities. The bottom tier of the hierarchy comprises low status

‘New’ universities; this group comprises all of the institutions created after 1992 in the UK, including the former polytechnics, and the colleges of higher and further education.

The full list of universities identified by type of institution is presented in Appendix A.

Institutional selectivity: The institutional selectivity measure was derived from the student-level data by computing the average tariff score on entry of students attending the same institution. This measure represents not only an indicator of the selectivity of the institution in its admission standards, but also a measure of the academic aptitude of the student body. Institutional selectivity is often used as a proxy for institutional quality in the institutional effect literature.

Institutional enrolment (size): Using student-level data, this measure was derived by adding the number of full-time and part-time equivalent students enrolled at each institution.

4.4.2.3 Subjects

I followed the Joint Academic Coding System (JACS) system used by HESA and UCAS that classifies academic programmes¹⁰⁵ in standard subject categories. This group of

¹⁰⁵ The JACS system became operational in UCAS and HESA systems for the year 2002/2003. An update took place in 2005 and JACS version 2 was introduced the academic year 2007/2008. A new version was introduced in 2012. A JACS code is assigned to every single subject studied in the system. The code consists of a letter and three numbers. The letter represents the broad subject classification (21 groups) and subsequent numbers represent further details, similar to the Dewey Decimal System.

23¹⁰⁶ subjects includes a variety of disciplines from academic and professional/vocational oriented areas: (a) education; (b) arts (fine art, design, music, drama, dance, cinematic and photography, crafts, creative writing); (c) social studies (sociology, social policy, politics, anthropology, human and social biography, and social work); (d) business and administration (business studies, management, financing, accounting, marketing); (e) law; (f) life sciences (biology, botany, zoology, genetics, microbiology); (g) physical sciences (chemistry, materials science, physics, geology, ocean sciences, physical and terrestrial geographical and environmental sciences and physical geography); (h) mathematics and statistics; (i) computer science (software engineering artificial intelligence) ; (l) engineering (civil, mechanical, aerospace, naval, chemical, production and manufacturing); (m) architecture (architecture, building and planning); (n) agriculture (agriculture, forestry, food studies); (o) nursing and other health subjects (including medical technology); (p) subjects allied to medicine and dentistry (anatomy, physiology and pathology, pharmacology, toxicology and pharmacy, nutrition, ophthalmic); (q) technologies (metallurgy, ceramics and glasses, polymers and textiles, materials technology); (r) media & communication studies (media studies and journalism); (s) linguistics, classics and related studies; (t) other languages (French studies, German studies, Italian studies, Hispanic studies, Scandinavian studies, Russian studies, Chinese studies and African studies) (u) history & philosophy (history by period, by area, history of art, archaeology, philosophy, theology and religious studies); (v) behavioural sciences (psychology), (w) economics, (y) veterinary, (z) combined. The advantage of using this disaggregated scheme is that it may reveal important within-field differences.

¹⁰⁶ Despite the initial grouping only consisting of 21 categories, later updates have assigned different codes to areas such as Mathematics and Computer Sciences and Agriculture and Veterinary

Dummy variables are included for each of the 23 standard degree subject groupings. The omitted dummy variable (reference category) in the models is subjects allied to medicine and dentistry.

4.4.2.4 Control Variables

As in the preceding chapters, I use a series of control variables to estimate the effect of institutional variables on students' chances of degree completion. Taking previous research into account,¹⁰⁷ I conduct most of the statistical analysis in this chapter controlling for students' background and attainment on entry.

4.4.3 Methods

I carry out the statistical analyses in this chapter using multilevel¹⁰⁸ models. I use multilevel methods to address the research questions related to the effect of institutions on students' chances of degree completion.

For simplicity, I started conducting a two level random intercept model for predicting the effect of different institutional characteristics on students' chances of degree completion.

The random intercept model specification is presented in Equation (4.1) as follows:

¹⁰⁷ Research has found that individual characteristics influence the variance components associated with university effects. Consequently, it is crucial to adjust by these characteristics to estimate the net effects of institutional variables. Similarly, in the school effects literature the models normally adjust for pupils' intake achievement and other pupil background characteristics that are known to affect educational achievement. Leckie, George, and Harvey Goldstein. 2009. "The limitations of using school league tables to inform school choice." *Journal of the Royal Statistical Society: Series A (Statistics in Society)* 172(4):835-51. —. 2011. "A note on 'The limitations of school league tables to inform school choice'." *Journal of the Royal Statistical Society: Series A (Statistics in Society)* 174(3):833-36. Kuh, George D., and Shouping Hu. 2001. "The effects of student-faculty interaction in the 1990s." *The Review of Higher Education* 24(3):309-32. Pascarella, Ernest, and Patrick Terenzini. 2005. *How college affects students: A third decade of research*. San Francisco: John Wiley & Sons.

¹⁰⁸ The multilevel models are implemented in Stata 12.0. In the case of multilevel models, I use the command `xtlogit` for random intercepts and `xtmelogit` for random coefficients

$$\text{Logit } \{\Pr(y_{ij}=1|x_{ij}, u_j)\} = \beta_0 + \beta_1 x_{ij} + \beta_2 x_{2j} + u_{0j} \quad (4.1)$$

where the model for the dichotomous outcome degree completion is modelled as: the function of an intercept (β_0), a vector (β_1) of fixed coefficients for individual variables, whereas (β_2) represents any university/institutional variable and, (u_{0j}) represents a random intercept for each university.

Additionally, I employ random coefficient models to estimate the effect of universities on different students' subpopulations. This type of model allows that student level variables vary¹⁰⁹ across universities. The random coefficient model specification is presented in Equations (4.2), as follows: equation (4.2a) presents a simple random coefficient model, whereas Equation (4.2b) adds a cross level interaction term into the model.

$$\text{Logit } \{\Pr(y_{ij}=1|x_{ij}, u_j)\} = \beta_0 + \beta_1 x_{ij} + \beta_2 x_{2j} + u_{0j} + u_{1j} x_{ij} \quad (4.2a)$$

$$\text{Logit } \{\Pr(y_{ij}=1|x_{ij}, u_j)\} = \beta_0 + \beta_1 x_{ij} + \beta_2 x_{2j} + \beta_3 x_{1ij} x_{2j} + u_{0j} + u_{1j} x_{ij} \quad (4.2b)$$

The term ($u_{1j} x_{ij}$) represents the random slope for any student-level variable; whereas the term ($\beta_3 x_{1ij} x_{2j}$) refers to any interaction between a student-level variable and an institutional variable.

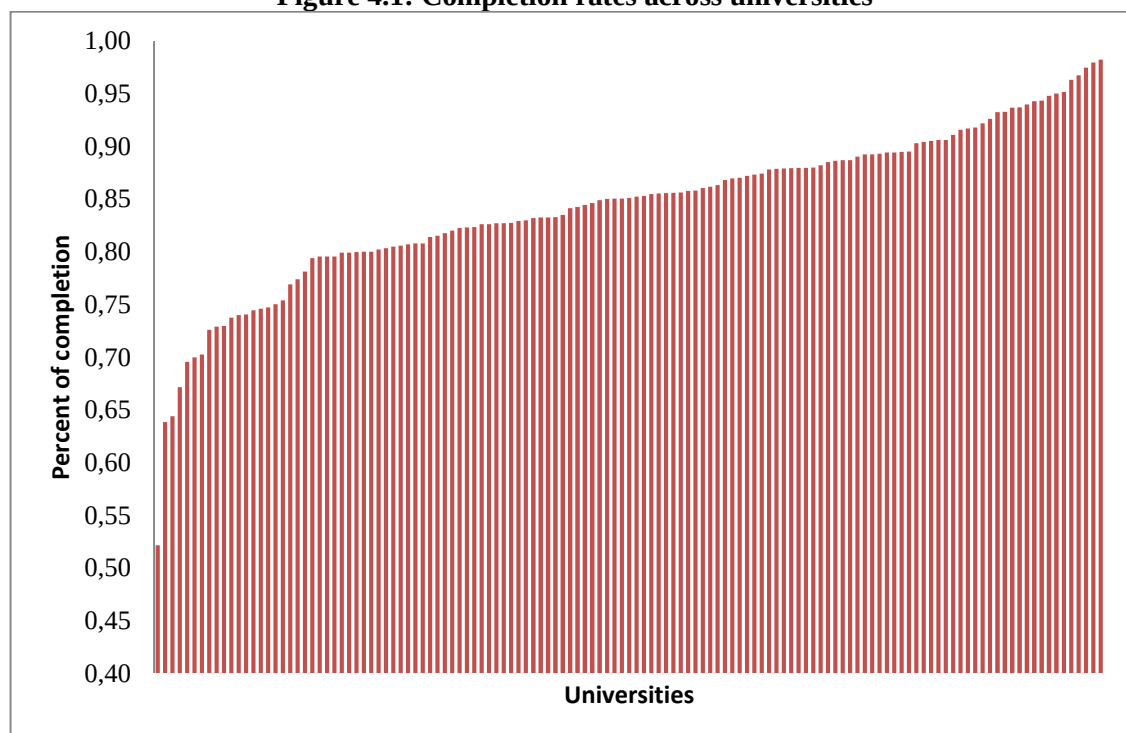
¹⁰⁹ In other words, the model allows the student level slopes to vary randomly across universities

4.5 Results

4.5.1 Completion rates across institutions

Before starting with the statistical analysis, I briefly review some descriptive statistics related to institutional variation in completion rates. Figure 4.1 shows that there is a significant variation in completion rates across institutions. The range of institutional completion rates¹¹⁰ varies from 52 percent to 98 percent across the university system. Confirming the findings previously reported by NAO (2007), the evidence also reveals that completion rates vary between the different types of universities with the Russell Group having the highest average completion rates (92 percent) and the universities created since 1992 (New universities) having the lowest average rate overall (80 percent) in the system.

Figure 4.1: Completion rates across universities



¹¹⁰ Completion rates by subjects and institutions are presented in Appendix D.

It is likely that part of the variation across institutions can be explained by differences in the characteristics of the students and programs across universities. To explore whether the institutional graduation rates are associated to individual/subject differences, Table 4.1 presents completion rates for different types of universities broken down by students' academic and socio-economic characteristics and subjects. As Table 4.1 reveals, the institutional graduation rate is higher when the students' attainments on entry (scores and qualifications) are higher. In addition, it shows that the completion rate has a social gradient. In relation to ethnicity, the completion rates are very similar for white and Asian students, whereas they are significantly lower for Black students.

Table 4.1: Institutional completion rates by students' intake characteristics

Individual Variables	Type of University		
	New	Old	Russell
Scores on entry ¹¹¹			
Lowest Quartile (0 score) ¹¹²	75.3	79.9	87.0
Second quartile (1-235 points)	78.9	81.9	85.0
Third quartile (235 -360 points)	85.0	88.2	90.0
Fourth Quartile (> 360 points)	89.4	93.1	95.1
Qualification on entry			
A level	74.7	79.9	85.6
Other qualification	82.2	89.3	93.3
Social class			
Professional/Managerial	84.0	90.3	94.0
Intermediate	83.2	89.0	92.4
Lower	81.7	87.1	89.5
Ethnicity			
White	81.3	88.0	92.6
Black	75.8	84.7	88.9
Asian	80.6	89.0	93.3

¹¹¹ Following the recommendations by Kingston and Smart (1990), I recoded the tariffscore variable in a categorical variable with four categories: low selectivity (lowest ability score quartile), second lowest quartile (second ability score quartile), middle selectivity (third ability score quartile), and high selectivity (highest ability score quartile)

¹¹² As it was described in chapter 2, students who access to universities with qualifications different to Alevel/As levels, are assigned a score 0 by UCAS.

4.5.2 Do institutions affect students' chances of degree completion?

In this section, I will address the main question that guides this chapter: do institutions influence students' chances of degree completion?

Before proceeding with the statistical analysis, I examined descriptive evidence about the institutional variables used in this chapter. The descriptive statistics concerning all of the variables used in this chapter are found in Appendix C. Table 4.2 presents the association between all of the variables used in this chapter. The descriptive statistics show that the correlation between graduation rates and institutional selectivity is strong (index of 0.78) and between graduation rates and Russell universities is more moderate (index of 0.62). As already noted, part of this high association reflects the fact that students who attend universities whose students have earned higher qualifications on entry (scores on admission test and qualifications) themselves rank higher on these measures and thus, are more likely to graduate no matter what university they attend (Bowen, Chingos and McPherson 2009:193). The key question is how strong the association is – if there is any association at all- after the models adjust for differences in students' academic characteristics and demographics.

Table 4.2: Correlation between students' entering characteristics, institutional variables and graduation rates

	Graduation rates	Institutional Selectivity	Size	New Universities	Old Universities	Russell Group
Institutional Selectivity	0.78					
Size	0.11	0.18				
New Universities	-0.7	-0.78	0.04			
Old Universities	0.2	0.21	-0.37			
Russell Group	0.62	0.71	0.4			
Universities Scores on entry	0.43	0.55	0.1	-0.43	0.11	0.39

I carried out further multilevel analyses to estimate the effects of institutional variables, on students' chances of degree completion. Before estimating the effect of these institutional variables, I began by conducting two models to explore the variance and the effects of individual control variables on the institutional variance. The initial model (Model 1) – an unconditional model or variance component model with no covariates – sought to assess whether there was sufficient between-university variance to justify further multilevel analyses. The analyses showed the existence of 38 percent of variance between universities with an intra-class correlation (ICC) of ten percent.

Additionally, I conducted a random intercept model including only individual controls (Model 2). This base model adjusts for differences in students' intake characteristics (attainment on entry and demographics). Controlling for these covariates can be understood as adjusting for the non-random assignment of students into universities, which is a major source of between-university differences in degree attainment chances. The addition of these individual control variables reduced the between-institutional variance by almost 50 percent (from 38 to 19 percent) and the intra-class correlation (ICC) by 40 percent (from 10 to 6 percent). Based on these results, I proceeded to conduct additional multilevel analyses to estimate the effect of institutions on students' chances of degree completion.

Models 3 to 5 present the estimation of the effects of each of the institutional variables used in this chapter. In addition, Model 6 presents all of the institutional variables of interest. Confirming previous findings, the analyses revealed that institutional selectivity and type of university are significant predictors of students' degree completion chances (Woodley and Parlett 1983; NAO 2007). Both factors have a significant positive effect

on students' educational outcomes. Attending both a more selective university and a Russell Group institution has a positive effect on student's chances of completing their degree.

Model 6 shows that the advantage of attending a Russell Group university is maintained regardless of the entering characteristics of students attending such institutions and other institutional features. What these results reveal is that the positive effect of attending a Russell Group university persists, beyond effects attributable to students' intake characteristics and, other institutional variables.

Table 4.3: Random Intercept Models for predicting the effect of institutions on students' chances of degree completion

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Log odds	S.E	Log odds	S.E	Log odds	S.E	Log odds	S.E	Log odds	S.E	Log odds	S.E
Fixed Part												
Intercept	1.79***	0.05	1.49***	0.08	1.74***	0.1	1.73***	0.06	1.69***	0.09	1.85***	0.1
Institutional Variables												
Type of University												
Old University (ref. category)												
New University					-0.19*	0.08					-0.16	0.1
Russell Group					0.4**	0.11					0.46***	0.13
Institutional Selectivity							0.002***	0.0004			0.0002	0.0005
Institutional Enrolment (Size)									0.00002	0.00004	0.00006	0.00004
Random part												
Between university variance	0.385		0.19	0.03	0.14	0.02	0.16	0.02	0.19	0.03	0.14	0.02
Intra-class correlation	0.105		0.06		0.041		0.045		0.054		0.04	
Number of Universities	132		132		132		132		132		132	
Number of Students	179889		179889		179889		179889		179889		179889	

Model 1 does not have covariates, whereas Models 2 to 6 adjust by individual controls. All the coefficients are estimated with *p < 0.05; **p < 0.001, ***p < 0.0001.

To illustrate better the results of Table 4.3, I estimated predicted probabilities of completion for each type of university. These results showed the existence of substantial institutional differences in graduation probabilities, even after controlling by students' intake characteristics. Students who attend New universities have 81 percent chance of finishing their degrees; whereas, students attending Russell universities have 93 percent probability of completing their degrees. It is worth mentioning the fact that the difference of 12 points in graduation rates persists, even after adjusting by students' intake characteristics.

4.5.3 Differential effects of institutions on students' outcomes

The fact that selectivity has been measured as the average or median score of entering students in this study, supposes that more selective institutions enrolled better prepared students. The positive effect of being in an environment in where interaction with other well prepared students takes place constitutes one of the major dimensions of the educational impact of an institution on their students. The positive effect of Russell Group universities –which represent the most selective institutions in the system- on students' chances of degree completion seem to suggest so.

The question that rises is whether everyone benefits from attending this type of institutions. As outlined at the beginning of this chapter, there is some evidence that suggests this type of institutions may have a differential influence on the educational outcomes of student from different socio-economic groups. In order to explore this potential differential effect of Russell Group universities, I carried out a series of random coefficient models for students from different social classes and ethnic

backgrounds. For conducting these analyses, the models included dummy variables for each class and ethnic group as well a cross interaction term.

Table 4.4 presents the results of the analyses for students from different social class background. The results of the analyses for ethnic minorities are presented in Appendix E. As Table 4.4 reveals, students from lower class backgrounds have lower chances of completing a degree at Russell Group institutions compared to those from professional or middle class backgrounds. Confirming previous analyses, the results show that the class effect is strongest where selection is most pronounced- at the top of the university system, which is represented by Russell group institutions (Cheung and Egerton 2007). It appears that the class gap in graduation rates widens as selectivity increases. These results are consistent with recent findings provided by European studies, that have pointed out that upper classes have higher chances of graduating from the most selective institutions than students from other class backgrounds (Amber and Neathery 1999; Boliver 2006; Deer 2005; Duru-Bellat, Kieffer and Reimer 2008; Givord and Goux 2007; Kivenen and Rinne 1991).

In order to interpret this interaction effect I computed predicted probabilities of degree completion, as an alternative technique to estimate the significance of the interaction coefficients. Figure 4.2 presents the plot of these predicted probabilities. The figure shows that the class differential in completion rates increases at Russell Group institutions as compared to other types of universities. Students from lower class backgrounds have lower probabilities of completion at Russell Group (88 percent) as compared to students from more advantaged backgrounds (91 percent); whereas at other types of universities, the class differential in completion probabilities shrinks (86 percent

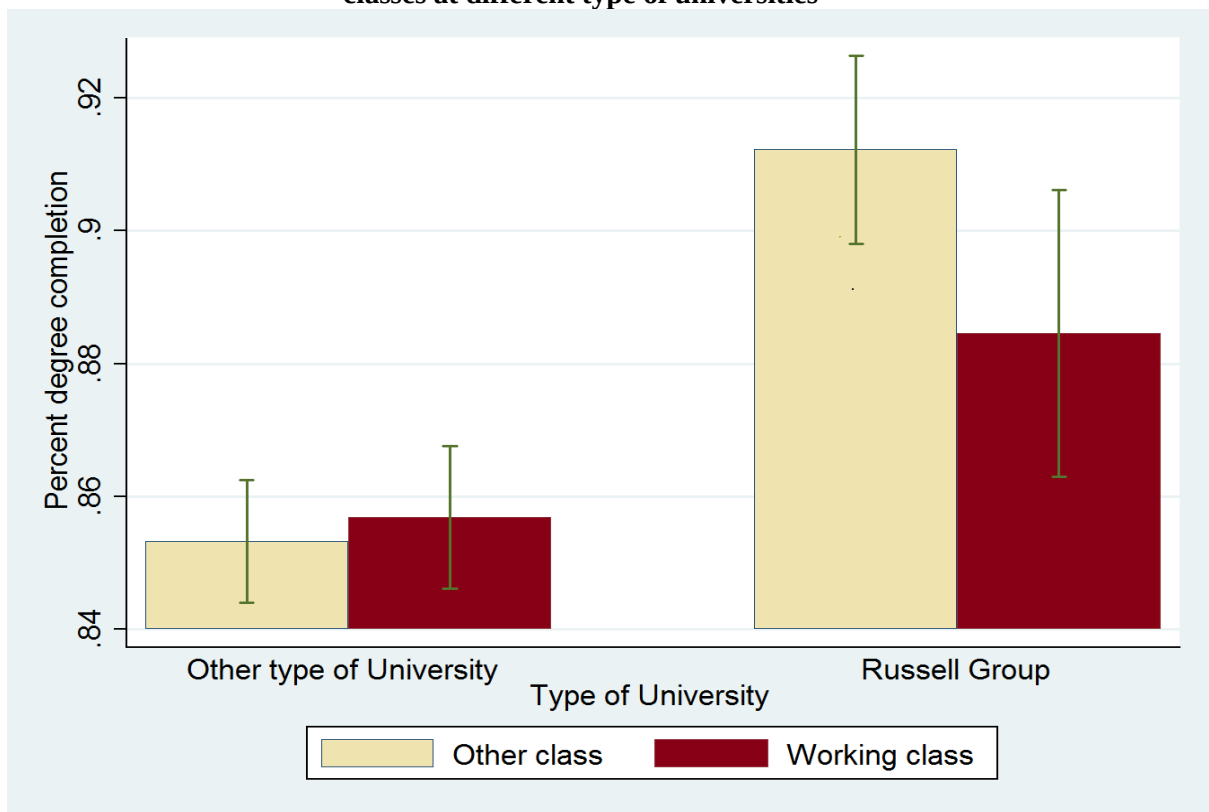
for both groups of students). However, the results also show that students from lower class backgrounds have higher chances of completion in Russell group institutions as compared to other universities. More selective institutions increases the students' chances of degree completion, regardless their socio-economic background.

Table 4.4: Random Coefficient Models for predicting the effect of Russell Group institutions on lower class students' chances of degree completion

	Model 7		Model 8	
	Log odds	S.E	Log odds	S.E
Fixed Part				
Intercept	1.60***	0.04	1.60***	0.04
Individual Variables				
Lower Class (dummy)	-0.17***	0.03	-0.14***	0.03
Institutional Variables				
Type of University				
Russell Group Universities (dummy)	0.61***	0.10	0.61***	0.10
Cross Interaction				
Lower class * Russell Group Universities			-0.26***	0.07
Random part				
Lower class variance	0.02	0.001	0.01	0.001
Between university variance	0.14	0.04	0.14	0.04
Number of Universities	132		132	
Number of Students	179889		179889	

The models adjust by individual controls. All the coefficients are estimated with* p < 0.05; **p < 0.001, ***p < 0.0001

Figure 4.2: Predicted probabilities of degree completion for students from different social classes at different type of universities



Although informative, these findings are based on comparisons of students attending institutions that differ in the selectivity of their admissions, which fall short of demonstrating a causal link between institutional selectivity and students' outcomes.

To overcome this problem, I conducted further analyses only considering universities with similar indexes of selectivity. To compare universities with similar selectivity indexes, such as the Russell Group, provides a better context to study the potential reasons for differences in completion rates between students from different class backgrounds.

To start this analysis I looked at the impact of students' attainment on entry –scores on entry and qualifications- on the class gap. It is often claimed that the gap between

students from different socio-economic backgrounds in university graduation rates (and other educational outcomes) is due to differences in their credentials on entry into university. In particular, it is presumed that lower class students enter universities with lower scores and qualifications than students from more privileged backgrounds

To assess this assertion, I examined firstly, the distribution of the attainment on entry measures by socio-economic group and type of university. As Table 4.5 reveals, lower class students' average test scores on entry to Russell group universities are marginally below the respective institutional average (17 points lower), whereas students from more privileged backgrounds have average scores above the institutional average (28.8 points higher). The evidence also shows that, regardless of their socio-economic background, students who are enrolled in Russell group institutions enter their universities with A-levels. Interestingly, the descriptive statistics show more pronounced socio-economic differences in attainment on entry among students who attend less selective institutions (non-Russell group). There is a greater variation in the scores and qualification on entry among students from different socio-economic backgrounds in less selective institutions as compared to Russell group universities.

Table 4.5: Institutional Scholastic Achievement by socio-economic groups

	Russell Group	Non Russell Group
Institutional Mean	345.5	185.4
(SD)	(168.7)	(159.7)
% in Top decile	26.8	4.6
% in Top quartile	59.4	15.8
% A-levels on entry	91.3	78.9
Higher Class		
Averaged Scores	374.3	245.3
% in Top decile	31	7.6
% in Top quartile	66.2	24.1
% A-levels on entry	94.5	88.8
Intermediate Class		
Averaged Scores	359.2	216.3
% in Top decile	26	4.9
% in Top quartile	60.2	17.8
% A-levels on entry	95	85.2
Lower Class		
Averaged Scores	328.5	185.7
% in Top decile	22	3.5
% in Top quartile	52.3	13.1
% with A-levels	90.8	79.3

These simple descriptive statistics, however, cannot provide definitive evidence on the causes of the class differences in completion probabilities. To provide more robust evidence, I carried out further random coefficient analyses to estimate the effect of attainment on entry (scores) on the class gap within Russell group institutions. I examined different groups of students, defined by their scores on entry to university, focusing my analysis specifically on those students who obtained the highest scores on entry to university (third and fourth ability quartile). These groups represent around 80% of the students enrolled in Russell institutions. The Models presented in Table 4.6 show that only the interaction between the highest ability group (fourth quartile) and working class students is statistically significant at the 5% level. Complementary analyses showed

that these differences were sustained among students who obtained scores in the top decile of the distribution (90 percentile).

Table 4.6: Random Coefficient Models for predicting the effect of higher scores on the class differential at Russell Group institutions

	Model 9		Model 10		Model 11		Model 12	
	Log odds	S.E	Log odds	S.E	Log odds	S.E	Log odds	S.E
Fixed Part								
Intercept	1.44***	0.13	1.1***	0.22	1.41***	0.22	1.1***	0.22
Individual Variables								
Lower Class (dummy)	-0.45***	0.07	-0.34***	0.08	-0.42***	0.07	-0.16*	0.08
Scores								
Third quartile	-0.37***	0.04	-0.4***	0.04				
Fourth quartile					0.64***	0.04	0.71***	0.04
Interactions								
Lower Class * Third quartile scores			0.19	0.12				
Lower class* Highest scores (fourth quartile)							-0.27*	0.11
Random part								
Lower Class variance	0.01	0.007	0.01	0.007	0.01	0.007	0.01	0.007
Between university variance	0.11	0.04	0.11	0.04	0.12	0.04	0.12	0.04
Number of Universities	132		132		132		132	
Number of Students	179889		179889		179889		179889	

The models adjust by individual controls and institutional median score. All the coefficients are estimated with* p < 0.05; **p < 0.001, ***p < 0.0001

To interpret this interaction effect more clearly, I computed predicted probabilities of degree completion for the different combinations of ability and class background. As Figure 4.4 shows, the class differential is especially pronounced among students in the highest ability quartile (fourth quartile). There is a difference of three percentage points in completion probabilities between students from lower and more privileged class backgrounds at Russell Group institutions (92 percent for lower class students and 95 percent for students from managerial/professional backgrounds).

The existence of this socio-economic difference in graduation rates among students of comparable academic ability should be a cause for concern. Although this difference might be considered small, a simple estimation reveals that the figure is not that small. Considering the overall population of lower class students enrolled at Russell group institutions, this three percent difference means that 130 students from this background are not graduating at the end of their academic programmes.

Figure 4.3: Predicted probabilities of degree completion for students from different ability groups (quartiles) and social classes at Russell group universities



The fact that the class gap persists in graduation rates, even after comparing universities with similar selectivity indexes and students of comparable academic ability suggests that there might be other factors at play. It might be the case that students from lower class backgrounds are enrolled in subjects that have higher rates of non-completion than students from more privileged backgrounds. To control by these factors, I included a series of dummy variables for each subject (22 dummies) in the models.

The results presented in Table 4.7, show that after taking subjects into account, the socio-economic gap at Russell group institutions still persists. Working class students' lower chances of completion at Russell group institutions are not attributable to the types of subjects that they are pursuing. To complement these findings, further random coefficient analyses were carried out to estimate the effect of each subject on the class gap within Russell group institutions.

Table 4.7: Random Coefficient Models for predicting the effect of subjects¹¹³ on lower class students' chances of degree completion at Russell institutions

	Model 13		Model 14	
	Log odds	S.E	Log odds	S.E
Fixed Part				
Intercept	1.6***	0.04	1.81***	0.07
Lower Class (dummy)	-0.14***	0.03	-0.13***	0.03
Subjects allied to Medicine				
Nursing			-0.18*	0.07
Biological Sciences			-0.21***	0.07
Veterinary			-0.1	0.17
Physical sciences			-0.31***	0.07
Maths			-0.39***	0.09
Engineering			-0.43***	0.08
Technology			-0.32**	0.11
Architecture			-0.25***	0.08
Social Studies			-0.27***	0.07
Law			-0.25***	0.07
Business			-0.32***	0.07
Media			-0.35***	0.07
Linguistics			-0.38***	0.07
Other languages			-0.51***	0.11
History			-0.28***	0.07
Arts			-0.18**	0.07
Education			-0.17**	0.07
Combined			-0.62***	0.1
Computing Sciences			-0.49***	0.07
Psychology			-0.3***	0.07
Agriculture			-0.3**	0.13
Economics			-0.34***	0.08
Institutional Variables				
Institutional Selectivity	0.004***	0.0002		
Size				
Cross Interaction				
Lower class* Russell Univ.	-0.26***	0.07	-0.26***	0.07
Random part				
Lower Class variance	0.02	0.007	0.02	0.007
Between university variance	0.16	0.04	0.15	0.04

¹¹³ I conducted additional cross classified models to assess how subjects contributed to explain the variance. These analyses confirmed that the variance across subjects is explained substantially by individual characteristics. Fifty percent of the variance across subjects is explained by individual characteristics. Hence, it is possible to conclude that differences in completion rates by subject are likely to reflect, in part, differences in characteristics of students across subjects.

4.6 Discussion

The findings of this chapter show that institutional selectivity and graduation rates are strongly associated. Confirming empirical research by the college effects literature, the results revealed that institutional effects only take place in a small group of institutions. The Russell group of universities- which represent the most selective institutions in the British system of higher education – have a marked positive effect on students probabilities of success in higher education. Students who attend this group of institutions are more likely to complete their degrees as compared to those who attend less selective institutions. These results are worth mentioning since they show the benefits of attending elite or the most selective institutions.

These results call for more research to identify further mechanisms that produce this institutional advantage. Russell group institutions may provide better learning opportunities for students not only via better prepared classmates (peer effects), but also better teachers or more teaching resources (teaching effects), research activities, etc. It might also be the case that these institutions have smaller classes and facilitate strong mentoring (teaching and learning resources effects). These may be the more proximate mechanisms through which the general institutional effects of Russell group universities operate to increase students' chances of degree completion. The next chapter takes up the task of exploring the effect of teaching resources on students' completion probabilities at Russell Group institutions.

More interestingly, the evidence also uncovered about the larger socio-economic differences within Russell group universities. Confirming previous analyses, the findings showed that among those studying at Russell group institutions (the elite institutions);

students from lower class backgrounds have lower chances of graduation as compared to students from more affluent backgrounds. The further analyses conducted demonstrated that the lower rates of completion by working class students are not attributable either to their academic preparation on entry or the types of subjects they are pursuing.

A potential explanation of these class differences at elite institutions is provided by Bourdieu's theory of cultural reproduction. According to this theory, inequalities in educational attainment are explained by the unequal distribution of cultural resources- transmitted from parents to children- among social classes. Students from middle class backgrounds possess cultural resources- as reflected by their "collegiate" cultural capital- that working classes don't. This cultural capital reflects a better knowledge and understanding of how institutions work and their requirements. Due to this knowledge, students from middle class backgrounds navigate through the elite institutions with ease, and increase their academic advantage in relation to lower class students.

Other scholars suggest that middle class students do better at elite institutions not only because they have the cultural capital required by these institutions but also because they have direct¹¹⁴ or family experience of success at elite institutions. Nathan (2010), for instance, points out that entering universities with fewer personal or family experiences of successful interactions with elite institutions, would explain why working class students encounter further difficulties as expectations for college diverge from actual experiences (Martin 2010:333). Swartz (1997), on the other hand, adds that students' decision to complete higher education depends on their practical expectations of the likelihood that people of their social class, will succeed academically. Students from

¹¹⁴ Despite the data used in this thesis did not provide information about parental education, it is plausible to expect that students from middle class families have parents with higher education degrees or (at least) experience in the system.

middle class families have higher expectations of succeeding in higher education, since many of their acquaintances have had successful experiences at the educational system.

The existence of this socio-economic gap in graduation rates among students of comparable academic ability- who represents the better prepared academically in the system- should be a cause for policy concern. Support mechanisms should be put in place to assist students from less advantaged socio-economically backgrounds to graduate from the most selective institutions in the system.

Chapter 5: Does teaching affect students' chances of degree completion?

5.1 Introduction

The previous chapter showed how different institutional contexts explained differences in students' chances of degree completion. In this chapter, I approach to the study of institutions from a different perspective. I study the influence of internal aspects of universities on students' chances of degree completion. Specifically, I analyse the impact of teaching on students' attainment. Teaching is, of course, only one of many institutional mechanisms that affect students' chances of finishing their degrees. As a wide range of literature has suggested, however, teaching may be among the factors that have the greatest impact on improving students' chances of degree completion (Pascarella and Terenzini 2005).

To explain how teaching may affect students' chances of degree completion, this study relies mainly on the university/college effect literature on educational attainment. Additionally, this chapter aims to identify specific teaching aspects that may improve the chances of degree completion of different groups of students.

5.2 Literature review

The university/college effects literature points out that aspects related to the internal organization of institutions of higher education- such as faculty, teaching organization and curriculum- are central aspects of the effect of universities on students' educational outcomes (Pascarella and Terenzini 2005:18).

Within the college effect literature, research analysing the effects of teaching¹¹⁵ on educational outcomes has become more common over the last decades. The study of how teaching affects students' educational outcomes, however, has been widely developed in the USA, but not extensively in the UK. The American research is arguably of limited use in the British context, however, due to the differences in the structure of the system, length of programmes and general policy context. Hence, it is important to explore in this chapter, the role that teaching might have on students' educational outcomes in the British context. Institutions could potentially have a greater impact on improving the students' chances of success, providing quality teaching to their students.

Overall, the research has found that teaching has a great influence on students' persistence and graduation rates (Astin 1993c; Davies 1999; Kuh and Hu 2001; Laing and Robinson 2003; Pascarella and Terenzini 1991; Pascarella and Terenzini 2005; Rhodes and Nevill 2004; Thomas 2002; Tinto 1975).

¹¹⁵ The study of how institutional factors such as faculty and teaching organization and policies influence educational outcomes has replaced the analysis of how institutional features such as type of university (control), size or institutional selectivity influence students' outcomes. Terenzini, Patrick, Hyun Kyoung Ro, and Alexander C. Yin. 2010. "Between-college effects on students reconsidered." in *Association for the Study of Higher Education*. Indianapolis..

A review of the evidence indicates that research on teaching effects has focused on two main fields: the frequency of student-faculty interaction and the types of interaction between students and faculty. The student-faculty ratio has been widely used in college effect research as a proxy of the 'frequency of student-faculty interaction', on the grounds that a lower ratio connotes more opportunities for students to interact personally and directly with academic staff. The ratio of students to faculty provides an indication of workload for teaching as well as support for academic-related staff in higher education.

There is a significant relationship between the amount of time students spend interacting with faculty and their educational outcomes. Increased time/access with faculty has a positive effect on students' educational outcomes. The studies found that the interaction between students and staff can be much more influential in students' decisions to remain in higher education than other institutional features (Alexander and Eckland 1977; Astin 1977; Astin 1984; Pascarella and Terenzini 1991; Pascarella and Terenzini 2005; Thomas 2002).

Academic interactions¹¹⁶ between students and faculty, rather than non-academic ones, have a significant positive effect on students' chances of degree completion (Astin 1993c; Kuh and Hu 2001; Lau 2003; Pascarella and Terenzini 1991). The research points out that interacting with faculty – whether in the classroom, the laboratory, office hours,

¹¹⁶ There is large body of research that has yielded additional evidence that student-faculty interactions also enhance academic performance (Anaya, 1992, 1999; Astin, 1993). Student-faculty interactions appear to facilitate academic achievement as measured by student report gains, performance on standardised tests, and university grades. Anaya, Guadalupe, and Darnell G. Cole. 2001. "Latina/o Student Achievement: Exploring the Influence of Student-Faculty interactions on College Grades." *Journal of College Student Development* 41(1):3-14, Astin, A.W. 1993c. *What matters in college: Four critical years revisited*. San Francisco: Jossey-Bass.

or other venues – is among the key university experiences associated with students' educational success in higher education.

Alongside the study of the frequency of interaction, research has also – although to a lower extent – analysed the impact of different types of interaction between students and faculty on students' educational outcomes. Using data drawn from national surveys of students¹¹⁷, most of these studies have assessed students' satisfaction with different types of faculty interaction (Bank, Slavings and Biddle 1990). A review of the literature shows that three scopes are the most representative types of interaction between students and faculty: teaching organization, faculty feedback, and establishing a mentoring relationship with faculty (Anaya and Cole 2001; Cole 2007). Conceptually, each type of student-faculty interaction is useful for distinguishing different patterns of relationships between students and faculty.

In relation to teaching organisation, the evidence reveals that, clarity of instruction, organisation and teaching structure¹¹⁸ are aspects used to measure the effect of teaching within the classroom. These findings have shown that all of these aspects have significant and positive effects on students' outcomes (Davies 1999; Feldman 2007; Machell and Saunders 2007; Murray 1991). For instance, Davies (1999) found that issues relating to pedagogy and teaching organisation have the most pronounced impact on retention rates. Similarly, Feldman (2007) found that – after controlling for a series of individual

¹¹⁷ In Australia, for instance, the National Study of Student Learning asked students to indicate the extent to which the overall instruction they received at their institution was characterised by pedagogical skill and clarity (for example, instructors give clear explanations, instructors made good use of examples) and by organization and preparation (for example, presentation of material is well organised, class time is used effectively).

¹¹⁸ Murray (1991) points out that teacher organisation involves, among other aspects, putting the outline of a lecture on the blackboard, giving a preliminary overview of the lecture and signalling transition to a new topic. Murray, H.G. 1991. "Effective teaching behaviours in the college classrooms." Pp. 135-72 in *Higher Education: Handbook of theory and research*, edited by J.C.Smart. New York: Agathon..

factors¹¹⁹ – organisation-preparation has modest but statistically significant positive effects on students' attainment.

On the other hand, the scope of advice and feedback¹²⁰ from faculty, though largely portrayed as negative, also has significant positive effects on students' attainment in higher education. Faculty feedback refers specifically to offering students advice or criticism about their class assignments and other course-related projects. The empirical research suggests that faculty feedback and the dialogue that occurs as a result of that feedback has a great impact on students' persistence in higher education (Stipek 2002).

Lastly, mentoring relationship refers to discuss career plans with faculty, provision of general guidance and support to the students. According to the literature, this type of student-faculty interaction has a greater capacity of engaging students both academically and personally than the previous two dimensions of interactions. However, their effects on students' persistence or chances of completion have not been fully tested (Cole 2007).

Few of these investigations, however, have analyzed whether the relationship between faculty and students is causal. So far, the research has not addressed whether more satisfied students are more confident in seeking out faculty members, rather than becoming more satisfied because of such contacts. There is not clear evidence that explains whether those students who are better prepared academically interacted more

¹¹⁹In his study, Feldman (1997) used as controls factors such as pre-university test scores, race, academic motivation, patterns of course taken, place of residence and work responsibilities, to analyse the effect of teaching on students' educational outcomes. Feldman, K. 2007. "Identifying Exemplary Teachers and Teaching: Evidence from Student Ratings." Pp. 93-143 in *The Scholarship of Teaching and Learning in Higher Education: An Evidence-Based Perspective*, edited by Raymond Perry and J.C. Smart: Springer Netherlands.

¹²⁰ The evidence found that getting feedback from faculty members is the most academically and intellectually relevant to students' gains in class, though they also posed potential threats to students' intellectual self-confidence well beyond the confines of the course Astin, A.W. 1993c. *What matters in college: Four critical years revisited*. San Francisco: Jossey-Bass., 1993)

frequently with faculty members because they were more assertive in seeking out faculty members or because faculty members offered cues inviting them to make contact (Kuh, Kinzie et al. 2006).

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5.2.1 Teaching Interaction effects

A review of the literature revealed that most of the initial research documenting the positive effect of student-faculty interaction on students' educational outcomes used aggregate student samples (Kim and Sax 2007). However, more recently, research focused on the effects of student-faculty interaction in the broader context of class, race/ethnicity or gender inequalities. These latter studies revealed that the impact of student-faculty interaction was not the same for all types of students (Pascarella and Terenzini 2005).

In particular, research has focused on analysing how the effects of student-faculty interaction on academic outcomes vary across race/ethnicities (Astin 1993c; Cole 2007; Lundberg and Schreiner 2004). Overall, the findings show that ethnic minority students may exhibit a particular need¹²¹ for frequent and meaningful interaction with faculty at their universities. In a study carried out by Terenzini et al. (1994), the authors found that minority students were more concerned with interacting with faculty as compared to their non-minority peers, who placed more emphasis on establishing friendships and peers while in university.

¹²¹ Additional studies have pointed out that aspects such as meeting with instructors outside of class and being satisfied with personal contact with instructors were linked to gains in academic grades (GPA). Eimers (2000), for instance, found that, for minority students, increased satisfaction with their interactions with faculty was associated with increases in intellectual and skill development to a higher extent than that witnessed for their white counterparts. Eimers, Mardy T. 2001. "The impact of student experiences on progress in college: an examination of minority and nonminority differences." *Journal of Student Affairs and Research and Practice* 38(3):386-409

Minority students, however, may experience limited access to faculty. A significant number of studies have revealed that ethnic minorities, experience a lack of interaction, guidance and support from faculty (Arnold 1993; Chang 2005; Hurtado 1994; Kuh and Hu 2001; Lundberg and Schreiner 2004). Asian American students, in particular, are one of the most studied groups among the ethnic minorities. Although several studies have documented differences in the levels of student-faculty interaction for Asian American students, few studies – Chang’s 2005 study being an exception – have attempted to explain how these lower levels of student interaction with faculty affect students’ outcomes. Given Asian American students’ relatively high aggregate levels of achievement, such findings call into question whether or not student-faculty interaction plays a meaningful role in the persistence/completion process of Asian Americans.

Concerning socioeconomic differences in student-faculty interaction, the evidence is much scarcer than in relation to ethnicity. Arum and Roksa (2011), in a recent study carried out across public and private universities in the USA, found that students’ satisfaction with faculty were associated with their individual social background along various dimensions. Students from families with lower levels of parental education were more likely not to have met with faculty. On the contrary, students from families with more highly educated parents were more likely to meet faculty and, furthermore, to have a positive assessment of their professors. In addition, students’ prior academic preparation was associated with perceptions of faculty. The authors found that the greater the prior academic preparations of students, the more likely students were to describe their interactions with faculty in positive terms. Students who entered university with

lower initial academic ability were more likely to report having had no contact with faculty inside or outside of class.

5.3 Research Questions and Hypotheses:

5.3.1 Research Questions

The following research questions are the focus of this study:

1. Does the student-faculty ratio affect students' chances of degree completion?
2. Does students' satisfaction with teaching quality affect student's chances of degree completion?
3. Does the student faculty ratio affect different groups of students in their decisions about completing a degree?
4. Does students' satisfaction with teaching quality affect different groups of students in their decisions about completing a degree?

5.3.2 Hypotheses

Building on the literature previously discussed, I draw some hypotheses that will be tested in this chapter:

H1: A higher student-faculty ratio will have a negative effect on students' chances of degree completion, since it affects the access of students to faculty at universities. A

higher number of students per faculty member will restrict the opportunities of interaction between faculty and students, which will have a detrimental effect on students' chances of degree completion.

H2: Higher levels of student satisfaction with teaching organisation, feedback and learning resources will have a positive effect on students' chances of degree completion at their universities.

H3: A higher student-faculty ratio will have a negative impact on students from professional/managerial backgrounds' chances of degree completion. Given students from professional and managerial backgrounds tend to benefit more from faculty interaction than those from lower-class backgrounds; a restricted access to faculty is more detrimental for the chances of completion of this group than for lower class students.

H4: A higher student-faculty ratio will have a negative effect on students from ethnic minorities' chances of degree completion. Given students from ethnic minorities tend to benefit more from faculty interaction than those from white backgrounds; a restricted access to faculty is more detrimental for the chances of completion of this group than for white students.

5.4 Methodology and Data

5.4.1 Data¹²²

To conduct the statistical analysis in this chapter I use three data sources. These data sources combine student-level and aggregated level data. As in the preceding chapters, HESA's student-longitudinal dataset is the main source of individual information in this chapter.

In addition, I use two new data sources that provide institutional/aggregated-level data. Primarily, I employ data provided by HESA that offer comparative information (performance indicators) about universities in the UK. This data provides rich information about faculty at universities. The second institutional data source used in this chapter is the National Student Survey (NSS). As it was previously described, this survey annually gathers feedback from final year undergraduate students about their overall educational experience in universities – which includes, but is not limited to, students' evaluation of teaching quality. For the purposes of this chapter, I make use of the 2005¹²³ survey results. In that year, 65 percent of the final year students registered in higher education courses in universities and colleges in the UK answered the survey.

¹²² The three datasets used in this chapter were merged via the unique university identifier assigned by HESA to each institution.

¹²³ Evaluations of the same teachers given by successive cohorts of students are highly stable over time. No significant changes were observed in the responses during the period 2005-2007

5.4.2 Variables

5.4.2.1 Dependent Variable

As in the preceding chapters, the dependent variable is treated as a binary variable, distinguishing students who complete a university degree from those who drop out before degree completion.

5.4.2.2 Independent Variables

The explanatory variables of interest in the study cover different measures related to faculty and students' satisfaction with teaching quality at universities in the UK. The variables that I use to estimate the effect of teaching on students' chances of degree completion are:

Student-faculty ratio: I built this ratio variable considering the number of full time equivalent students (FTE) divided¹²⁴ by full time equivalent faculty (FTE) at each university.

To calculate the number of full time equivalent students (FTE), I summed full time and part time students at each university, using a factor of 0.5 for part time students (or 50 percent of full time students) and a factor of 1 for full time students. To calculate full time academic staff at universities, I considered in the analysis only faculty engaged in teaching and teaching-research activities. I excluded from the calculation academic staff engaged exclusively in research activities, since they do not have any contact with undergraduate students.

¹²⁴ I followed the same methodology employed by the Higher Education Statistics Agency (HESA) in the UK in the construction of the variable.

Students' Satisfaction with Teaching Quality: Using the questions drawn from the NSS, I carried out factor analysis to identify the dimensions of students' satisfaction with teaching quality at British Universities. In the methodology section, I describe in detail the methods employed and the dimensions that I identified for evaluating teaching satisfaction.

Institutional selectivity: To build this variable, I calculated the average institutional tariff score of the students who enrolled in 2004 for each university. As I mentioned in Chapter 4, this measure represents not only an indicator of the selectivity of the institution in its admission standards, but also a measure of the academic aptitude of the student body.

Type of Institution: Universities are classified in three different categories: New, Old, Russell Group. New Universities comprise all of the institutions created after 1992 in the UK (ex-polytechnics). Old institutions, on the other hand, comprise all the universities created before 1992 in the UK; these institutions are a mix of teaching and research universities. Finally, the Russell Group is a group of 24 research universities that comprise the most selective institutions within the system.

Institutional enrolment (size): The measure of size¹²⁵ used in this analysis is the number of full time and part time equivalent students enrolled at each institution in 2004.

¹²⁵ Different scholars found that size does not have any significant direct effect on educational attainment. Its influence may be negative but indirect on educational outcomes, with larger enrolments tending to suppress students' level of social and academic integration. The researchers suggest that institutional size, although it does not have a statistically significant effect on educational attainment, has an indirect influential role as mediator of the effects of other variables. The evidence shows that undergraduates in smaller institutions benefit from more frequent interactions with faculty, whereas those attending large

5.4.2.3 Control variables

As in the preceding chapters, I use a series of control variables¹²⁶ to estimate the effect of the variables of interest- teaching variables- on student's chances of degree completion. Students' background characteristics and attainment on entry to university are considered as controls in the models. It is of central importance to control for individual student characteristics, especially when using NSS ratings to compare universities or discipline-within-university groups in order to avoid potential biases.

5.4.3 Methods

I make use of two different methods to conduct the statistical analysis in this chapter. In a first stage, I use factor analysis to identify the main dimensions of students' satisfaction with teaching quality; subsequently, I use multilevel models to estimate the effect of teaching variables on students' chances of degree completion.

institutions (especially research institutions) may have more difficulty gaining access to faculty. Students at large universities might encounter at least two potential challenges to faculty access: first is the large student-faculty ratio that inherently limits opportunity for direct interaction with faculty, and second is an emphasis on research which can focus faculty attention on graduate students at the expense of undergraduates. Astin, A.W. 1993c. *What matters in college: Four critical years revisited*. San Francisco: Jossey-Bass, Kuh, George D., and Shouping Hu. 2001. "The effects of student-faculty interaction in the 1990s." *The Review of Higher Education* 24(3):309-32, Stoecker, Judith L., and Ernest T. Pascarella. 1991. "Women's Colleges and Women's Career Attainments Revisited." *The Journal of Higher Education* 62(4):394-406.

¹²⁶ Research found that individual characteristics influence the variance components associated with university effects. Hence, it is central to adjust by these characteristics to estimate the net effects of institutional variables. Similarly, in the school effects literature the models normally adjust for pupils' intake achievement and other pupil background characteristics that are known to affect educational achievement. Leckie, George, and Harvey Goldstein. 2009. "The limitations of using school league tables to inform school choice." *Journal of the Royal Statistical Society: Series A (Statistics in Society)* 172(4):835-51, —. 2011. "A note on 'The limitations of school league tables to inform school choice'." *Journal of the Royal Statistical Society: Series A (Statistics in Society)* 174(3):833-36. Kuh, George D., and Shouping Hu. 2001. "The effects of student-faculty interaction in the 1990s." *The Review of Higher Education* 24(3):309-32, Pascarella, Ernest, and Patrick Terenzini. 2005. *How college affects students: A third decade of research*. San Francisco: John Wiley & Sons.

5.4.3.1 Factor analysis

I carried out a series of factor analysis with the questions drawn from the National Student Survey (NSS) with the purpose of identifying the main dimensions of students' satisfaction with teaching quality across British universities. Factor analysis allows me to establish if the groups of items form their proposed scales. This is a useful “data reduction” procedure that identifies individual survey items that correlate highly with one another, indicating that they may be measuring the same (or similar) constructs.

Specifically, I carried out exploratory factor analysis to evaluate whether the *a priori* design¹²⁷ of the NSS – which has 21 items designed to measure six specific domains (teaching, assessment and feedback, academic support, organisation and management, learning resources, and personal development) and an additional “overall” satisfaction item – provided the most appropriate structure to analyse the NSS data.

The factor analysis was carried out with the 132 universities that comprise the sample of this study. It is also important to mention that I conducted the analysis with only eighteen of the 21 questions that comprise the National Student Survey. Questions related to personal development and overall satisfaction with university were excluded from the factor analysis because these questions do not evaluate teaching aspects directly.

I started by using principal axes analysis to conduct the exploratory factor analysis. To determine how many factors I should consider in the analysis, I evaluated the percent of variance explained by each factor. If the eigenvalue was greater than 1, I retained the number of factors (Kaiser 1960). I plotted the factors against the size of the eigenvalues

¹²⁷ There is a significant body of research that have discussed the reliability of this type of surveys. For instance, Richardson (2005) and Marsh (2010) in interim reports prepared to HEFCE, concluded that the items and scales perform well.

using a “scree plot” –presented in Appendix F-, which confirmed that three factors have eigenvalues greater than 1 (Cattell 1966)¹²⁸. To clarify these factors, I also carried out orthogonal and oblique rotation (varimax and promax) analysis. This analysis showed the existence of three and four-scale solutions. These results are in Appendix G.

I chose to work with a three-factor solution because it better represented the critical areas of teaching evaluation. To select the components of each dimension, I selected the items with rotated factors loading greater than 0.4. In one case, the item loading was below 0.4, so this item was discarded from the scale. Once the scales were initially developed, I used Cronbach’s alpha estimates to evaluate their internal consistency and reliability. This estimation has been commonly used to test the reliability of the NSS scales (Marsh et al. 2011). Alpha reflects the extent to which a scale’s items are correlated and, consequently, whether the scale is internally consistent, thereby indicating that respondents who answer one item higher or lower tend to answer other items in the scale higher or lower in a consistent fashion.

As Table 5.2 shows, the first dimension of students’ satisfaction with teaching quality refers to the organisation/preparation of teaching. The second dimension refers to advice and feedback provided by teachers, and the third dimension refers to learning resources. The analysis showed that the scale referring to teaching organisation/preparation contained eight items with an alpha equal to 0.9, whereas the dimension referring to the advice/feedback scale had six items with an alpha equal to 0.88. Finally, the learning resources scale had three items and an alpha equal to 0.88.

¹²⁸ Cattell suggested that an appropriate number of factors to retain can be identified by the point on the scree plot where the decrease of eigenvalues appears to level off to the right of the plot. The idea of the scree plot is to retain a sufficient number of factors so that subsequent factors add little to the variance explained and, therefore, is the recommended number of factors in the examined questionnaire. From the figures, it can be seen that the recommended number of factors is four.

The three dimensions of teaching quality satisfaction refer not only to different aspects of teaching, but also to direct/indirect forms of student-faculty interaction. Whereas the dimensions of organisation and feedback are directly related to students' experience in their courses or programmes, the dimension of learning resources refers to more general institutional aspects. Teaching organisation refers to formal aspects of teaching (clarity, organisation, preparation), whereas the dimension of feedback/advice is more related to a specific type of student-faculty interaction, namely, whether the students receive feedback about their assignments and other class-related projects. The literature in the field has pointed out that the latter, though largely portrayed as negative, has been identified as the most academically and intellectually relevant aspect to students' attainment (Astin 1993). Finally, in relation to learning resources, the dimension refers to the infrastructure/equipment that makes possible the development of teaching activities at universities.

Table 5.1: Factor Analysis for Identifying the Dimensions of Students' Satisfaction with Teaching Quality

Questions	Dimensions of Teaching quality		
	Factor 1	Factor 2	Factor 3
	Teaching organisation/ preparation	Advice/feedback from teachers	Learning resources
The staff are good at explaining things	0.89		
The staff have made the subject interesting	0.62		
The staff are enthusiastic about what they are teaching	0.76		
The course is intellectually stimulating	0.83		
I have been able to contact staff when I needed to	0.84		
The timetable works efficiently as far as my activities are concerned	0.68		
Any changes in the course or teaching have been communicated effectively	0.78		
The course is well organised and is running smoothly	0.83		
The criteria used in marking have been clear in advance		0.54	
Feedback on my work has been prompt		0.67	
I have received detailed comments on my work		0.92	
The feedback on my work has helped me clarify things I did not understand		0.93	
I have received sufficient advice and support with my studies		0.74	
Good advice was available when I needed to make study choices		0.74	
The library resources and services are good enough for my needs			0.77
I have been able to access general IT resources when I needed to			0.73
I have been able to access specialised equipment, facilities or room when I needed to			0.81
Percentage of variance captured	47%	34%	19%
Alpha Cronbach	0.92	0.88	0.88
N=132			

5.4.3.2 Multilevel models

To estimate the effects of teaching variables on the dependent variable, I carried out a series of multilevel analysis¹²⁹. For simplicity, I started conducting two level random intercept models for predicting students' chances of degree completion, where I treat students as nested within universities. The random intercept model specification is presented in Equation (5.1), as follows:

$$\text{Logit } \{\text{Pr}(y_{ij}=1|x_{ij}, u_j)\} = \beta_0 + \beta_1 x_{1ij} + \beta_2 x_{2j} + \beta_3 x_{3j} + u_{0j} \quad (5.1)$$

where the model for the dichotomous outcome degree completion is modelled as: the function of an intercept (β_0), a vector of fixed coefficients for individual variables (β_1), a vector of fixed coefficients for institutional variables (β_2), whereas (β_3) represents any teaching variable, and (u_{0j}) represents a random intercept for each university.

In a second stage, I extend the analysis to random coefficient models. This type of model allows that student level variables vary across universities. The random coefficient model specification is presented in Equations (5.2) as follows: equation (5.2a) presents a simple random coefficient model, whereas Equation (5.2b) adds a cross level interaction term into the model.

$$\text{Logit } \{\text{Pr}(y_{ij}=1|x_{ij}, u_j)\} = \beta_0 + \beta_1 x_{1ij} + \beta_2 x_{2j} + \beta_3 x_{3j} + u_{0j} + u_{1j} x_{1ij} \quad (5.2a)$$

$$\text{Logit } \{\text{Pr}(y_{ij}=1|x_{ij}, u_j)\} = \beta_0 + \beta_1 x_{1ij} + \beta_2 x_{2j} + \beta_3 x_{3j} + \beta_4 x_{1ij} x_{2j} + u_{0j} + u_{1j} x_{1ij} \quad (5.2b)$$

¹²⁹ I carried out all the analysis in Stata, using the command xtlogit for the random intercept models and xtmelogit for the random coefficient models.

The term $(u_{1j}x_{ij})$ represents the random slope for any individual variable, whereas the term $(\beta_4x_{1ij}x_{2j})$ refers to any interaction between a student-level variable and a teaching variable

5.5 Results

Before proceeding with the statistical analysis, I examined descriptive evidence about the institutional variables used in this chapter. The evidence shows that there are important differences in the distribution of teaching resources and students' satisfaction with teaching aspects across the university system. The descriptive statistics concerning all of the institutional variables used in this study are found in Appendix H.

Table 5.2 presents the association between all of the institutional variables – conventional/structural characteristics and teaching aspects – used in this investigation. The descriptive evidence shows that the teaching measures analysed - student-faculty ratio and student satisfaction with teaching quality- are moderately associated to institutional graduation rates. Students' satisfaction with teaching feedback is the only aspect that is weakly associated to institutional graduation rates.

In addition, the descriptive statistics reveal that student faculty ratio is negatively associated with graduation rates, whereas satisfaction with teaching organization and learning resources are positively associated with graduation rates. Noteworthy is the fact that the teaching measures are weakly or moderately associated to type of university.

Supplementary analyses revealed that the Russell Group of universities offer more teaching resources to their students than any other type of university in the system. The figures show that, on average, the number of students per faculty member is 17.6 at Russell institutions, 18.6 in Old universities and, 24.3 in New universities. Overall, students are more satisfied with aspects associated to teaching organization and learning resources at Russell institutions than in Old and New universities. However, students at Russell group institutions show the lowest levels of satisfaction with teaching feedback in the system. To explore how these institutional factors might affect students' chances of completion; I carry out further multilevel analyses to estimate their effects.

Table 5.2: Correlation between Institutional Variables and Institutional Graduation Rates

University variables	Graduation rates	Student-faculty ratio	Satisfaction with teaching organisation	Satisfaction with teaching feedback	Satisfaction with learning resources	Institutional Selectivity	Size
Student-faculty ratio	-0.53						
Satisfaction with teaching organisation	0.58	-0.45					
Satisfaction with teaching feedback	-0.05	0.07	0.38				
Satisfaction with learning resources	0.46	-0.37	0.49	0.10			
Institutional Selectivity	0.78	-0.57	0.72	-0.06	0.54		
Size	0.11	0.03	-0.16	-0.42	0.29	0.18	
New Universities	-0.64	0.58	-0.59	0.13	-0.33	-0.70	0.02
Old Universities	0.16	-0.28	0.35	0.10	0.07	0.18	-0.32
Russell Group Universities	0.62	-0.41	0.43	-0.29	0.45	0.71	0.40

Before starting with the estimation of teaching effects, I assessed the relative contribution of institutional structural variables to the variance between universities. As Table 5.3 shows, the addition of these structural variables reduced the between university variance in three percent from 19 percent to 16 percent. The models revealed that five percent of the variance is potentially attributable to institutional factors. Once I estimated the magnitude of the effect of institutional structural variables, I proceeded to conduct additional random intercept analyses to estimate the effect of teaching variables on individual completion chances.

The results presented in Table 5.3 show that student faculty ratio and NSS factors are not significant predictors of students' degree completion chances across the university system. They explained only a very small amount of the between institutional variance in students' degree completion chances. Contrary to the findings reported in the American literature, these findings do not confirm that teaching aspects had a greater effect on students' completion chances than conventional structural characteristics.

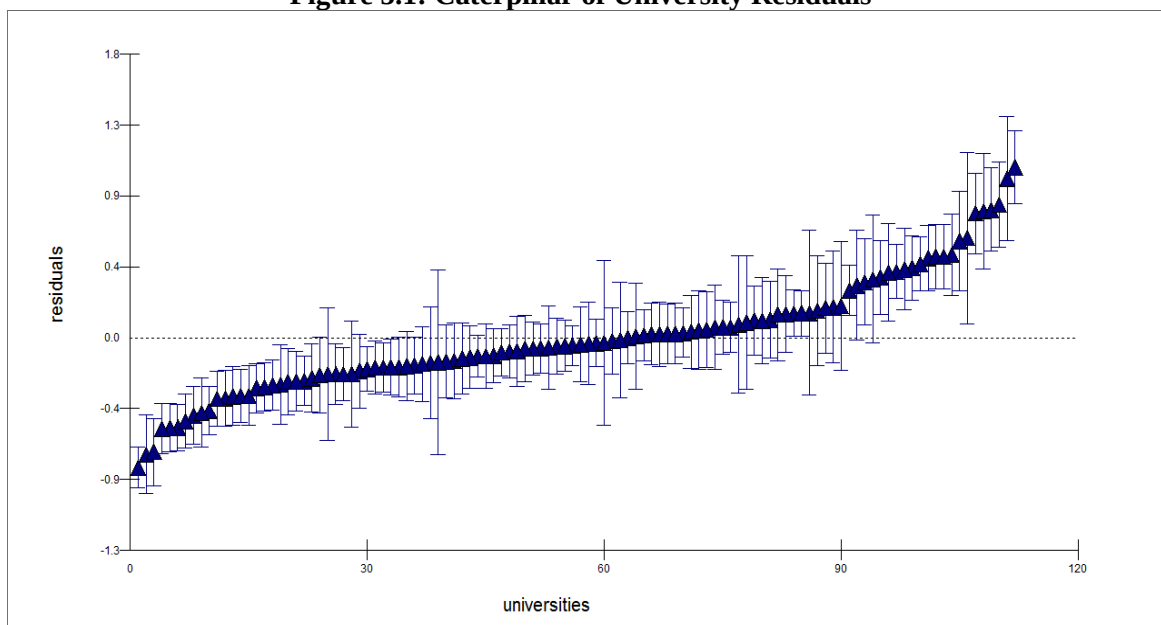
Some literature has suggested that teaching indicators might not necessarily represent the differences in educational outcomes between universities. It is very likely that there are substantial differences in outcomes across different UK universities, but these differences may not necessary translate into student satisfaction ratings or student-faculty ratios. In particular regarding the NSS, some literature have mentioned, that the survey might not be capable of measuring differences in teaching effectiveness that do exist in the system (Cheng 2010; Cheng and Marsh 2010).

Table 5.3: Random Intercept Models for Predicting the Effect of Teaching Variables on Students' Chances of Degree Completion

	Model 0		Model 1		Model 2		Model 3	
	Log odds	S.E.	Log odds	S.E.	Log odds	S.E.	.Log odds	S.E.
Fixed Effects								
Intercept	1.91***	0.08	2.02***	0.08	2.13***	0.15	2.1***	0.15
Institutional Variables								
Institutional Selectivity			0.002***	0.0004	0.002***	0.0004	0.002***	0.0004
Size			0.00002	0.00004	0.00002	0.00004	0.00002	0.00004
Teaching Variables								
Student-Faculty ratio					-0.006	0.006	-0.006	0.006
Students' satisfaction with Teaching Quality								
Teaching organisation							0.05	0.06
Feedback from professors							0.05	0.05
Learning resources							0.06	0.05
Random part								
Between university variance	0.19	0.05	0.16	0.02	0.16	0.02	0.14	0.02
Intra-class correlation	0.054		0.046		0.045		0.041	
Number of Universities	132		132		132		132	
Number of Students	179289		179289		179289		179289	
All the models adjust by individual controls. All the coefficients are estimated with * p < 0.05, **p < 0.001, ***p < 0.0001								

Figure 5.1 plots¹³⁰ the results presented in Table 5.3. The figure shows that there is little differentiation between universities in relation to teaching effects. The figure shows that the majority of the institutions have confidence intervals that cross the zero line, and are therefore not statistically significant. There is only a small group of institutions at each end of the chart, whose confidence interval is below or above zero. These results suggest that teaching effects would be only taking place in a small group of institutions.

Figure 5.1: Caterpillar of University Residuals



Note: the figure show the overall residuals in 132 British universities ranked in ascending order. Results show that the error bars (95% confidence intervals) for each university contained the overall mean (scaled to be zero across all universities).

To explore where teaching effects are taking place in the system, I conducted further multilevel analyses. The random intercept analyses presented in Table 5.4, show that teaching aspects are significant only at a limited group of institutions: the Russell Group of universities. As it is well known, this group of universities represents the most selective institutions in the system. These findings confirm that, alongside recruiting the

¹³⁰The performance of each institution is referred as residuals. What the institutional residual tell us is, having controlled for all the individual characteristics, whether the institution perform than expected, as well as expected, or worse than expected.

best-prepared students, these type of institutions also have a positive influence on the attainment of their students. More teaching resources and better conditions for learning positively influence students' chances of degree attainment.

The fact that teaching effects take place only at the most selective institutions confirm the highly stratified nature of the university system in the UK. Better-prepared students receive better support from their institutions to stay and graduate from their programmes. The findings show that student-faculty ratio has a significant but small effect on students' chances of completion in higher education. A higher number of students per faculty have a negative effect on students' chances of success in Russell Group universities, since affects the access and the possibilities of interaction between students and faculty.

Additionally, the results showed that NSS results have also a robust—although small—influence on students' chances of degree completion. Feedback, in particular, has a modest influence in explaining students' chances of degree completion across Russell Group Universities. Students who are satisfied with the feedback that they receive from faculty members in relation to their class assignments, coursework and other course-related projects or have higher chances of degree completion. Consistent with previous findings, these results suggest that faculty feedback and the dialogue that occurs as a result of that feedback has an impact on students' degree completion chances at Russell institutions (Stipek 2002).

Table 5.4: Random Intercept Models for Predicting the Effect of Teaching Variables for Students Enrolled at Russell Group and New Universities

	Russell Group				New Universities			
	Model 4		Model 5		Model 6		Model 7	
	Log Odds	S.E.	Log Odds	S.E.	Log Odds	S.E.	Log Odds	S.E.
Fixed Effects								
Intercept	2.07***	0.38	2.53***	0.43	1.95***	0.24	1.99***	0.25
Institutional Variables								
Institutional Selectivity	0.005***	0.0003	0.003***	0.0001	-0.001	0.003	-0.002	0.003
Size	0.00002	0.00004	0.00002	0.00004	0.00002	0.00004	0.00002	0.00004
Teaching Variables								
Student-faculty ratio	-0.05**	0.02	-0.04*	0.02	-0.008	0.009	-0.01	0.009
Students' satisfaction with Teaching Quality								
Teaching organisation			-0.22	0.25			0.03	0.08
Feedback from professors			0.31*	0.15			0.03	0.09
Learning resources			0.004	0.13			-0.02	0.13
Random Part								
Between university variance	0.08	0.02	0.05	0.02	0.14	0.03	0.13	0.02
Intra-class correlation	0.024		0.014		0.042		0.038	
Number of universities	132		132		132		132	
Number of students	179289		179289		179289		179289	

All the models adjust by individual controls. All the coefficients are estimated with * $p < 0.05$; ** $p < 0.001$, *** $p < 0.0001$

5.5.1 Teaching Interaction Effects

In this section, I carry out further analyses with cross level interactions, with the purpose to identify specific teaching aspects that might be affecting the chances of degree completion of different groups of students. My analyses focused on the effects of teaching on two specific groups of students: ethnic minorities and students from different class backgrounds. Because students from these groups have, on average, lower chances of degree completion (except for Asians) than the general student population, it is important to look at the potential impact that teaching may have on them.

Specifically, I carried out random coefficient models with cross interaction terms for students from each one of the groups identified above. To examine whether this cross-level interaction explains the individual differences in degree completion chances across universities, I compared the variance of the models with and without cross interactions. A significantly non-zero coefficient in the interaction term would imply that individual differences in degree completion will depend on teaching aspects at universities.

First, the analyses focused on the estimation of the teaching effects for different ethnic minority groups. To investigate interactions for ethnic minorities, I simplify my analysis using a binary variable indicating whether students have Asian or Black background.

As Table 5.5 shows, no interaction effects are found between these two minority groups and the student faculty ratio. There is no indication that student faculty interaction explained either Asian students or Black students' chances of degree completion. I carried out additional analyses (although not shown) with the NSS results, which also showed no interaction effects. These results are noteworthy since they show that for students with high (Asian) and low (Black) levels of completion, teaching aspects do not seem to play a role in their achievements. On the other hand, these results did not confirm previous findings by the American literature that have pointed out about the significant negative effect of higher student staff ratios for students from ethnic minorities.

After estimating the effect of teaching variables for ethnic minorities, I focused my analysis on students from different class backgrounds. For conducting these analyses, I included a dummy variable for students from lower class backgrounds in the models. As Table 5.6 shows, there is no statistically significant interaction effect between students from lower class background and student-faculty ratio. Similar to what I found with ethnic minorities, there is no differential effect of faculty access between students from different socio-economic backgrounds.

Table 5.5: Random Coefficient Models for Estimating the Effect of Student-Faculty Ratio on Ethnic Minorities' Chances of Degree Completion

	Model 8		Model 9		Model 10		Model 11	
	Log Odds	S.E.	Log Odds	S.E.	Log Odds	S.E.	Log Odds	S.E.
Fixed effects								
Intercept	2.23***	0.32	2.20***	0.15	2.07***	0.38	2.12***	0.38
Individual Variables								
Black (dummy)	-0.02	0.20	0.11	0.86				
Asian (dummy)					0.15	0.10	-0.09	0.40
Institutional Variables								
Teaching Variables								
Student-faculty ratio	-0.004*	0.002	-0.003	0.003	-0.005	0.003	-0.006*	0.003
Interactions								
Black *Student-Faculty Ratio			-0.007	0.005				
Asian *Student-Faculty Ratio							0.001	0.002
Random Part								
Black students variance	0.29	0.06	0.29	0.01				
Asian students variance					0.04	0.02	0.04	0.02
Between university variance	0.09	0.01	0.09	0.01	0.08	0.02	0.08	0.02
Number of Universities	132		132		132		132	
Number of Students	179289		179289		179289		179289	
All the models adjust by individual controls. All the coefficients are estimated with * p < 0.05; **p < 0.001, ***p < 0.0001								

Table 5.6: : Random Coefficient Models for Estimating the Effect of Student-Faculty Ratio on Lower class students' chances of Degree Completion

	Model 12		Model 13	
	Log Odds	S.E.	Log Odds	S.E.
Fixed effects				
Intercept	2.2***	0.36	2.12***	0.36
Individual Variables				
Lower class (dummy)	-0.40***	0.07	-0.79**	0.34
Institutional Variables				
Teaching Variables				
Student-faculty ratio	-0.06***	0.02	-0.06***	0.02
Cross level Interactions				
Lower Class * Student-faculty ratio			0.002	0.002
Random Effects				
Lower class variance	0.01	0.02	0.01	0.01
Between university variance	0.07	0.03	0.07	0.03
Number of Universities	132		132	
Number of Students	179289		179289	

All the models adjust by individual controls. All the coefficients are estimated with * p < 0.05; **p < 0.001, ***p < 0.0001

5.6 Discussion

The results of this chapter offer some lights to understand the role of institutions in student's chances of completion. Overall, the results showed a lack of differentiation among universities based on the teaching variables used in this chapter. Across the university system, institutional differences in academic experiences seem not necessary translate into students' satisfaction ratings or student-faculty ratios.

The finding confirmed that teaching effects only take place in a small group of institutions: the Russell Group of universities. Specifically, the results revealed that teaching is one of the mechanisms through which Russell group institutions – the most selective universities- improve the probabilities of their students of getting a degree. These results confirmed the evidence obtained by scholars in the USA (Tinto 1975, Pascarella and Terenzini 1991, Astin 1993c, Kuh and Hu 2001, Pascarella and Terenzini 2005).

Two aspects related to teaching were identified as having an impact on students' chances of degree completion within this group of institutions. On the one hand, the results revealed that access to faculty has a positive effect on students' chances of degree completion. An institution where there is a higher student-faculty ratio - as reflected by a high number of students per faculty member- has a negative impact on students' chances of degree completion. On the other hand, the results showed that students' satisfaction with feedback received from faculty members have a significant albeit small positive effect on students' degree completion chances.

These results, however, leave some open questions in relation to the causality in the relationship between students and faculty members. It is likely that different mechanisms are working in the student-faculty interaction. For instance, it might be the case that more satisfied students at Russell group institutions –who are better prepared academically and devoted more time to their studies- are more confident in seeking out faculty members (and their feedback), rather than becoming more satisfied because of such contacts. On the other hand, it might be suggested that faculty members at those institutions offered signals to their students inviting them to make contact, such as writing laudatory comments in the margins of a student's paper suggesting they talk further about the topic (Kuh, Kinzie et al. 2006:41). Most likely, both forms of student-faculty interaction are operating (Bean and Kuh 1984).

On the other hand, I did not find evidence of conditional teaching effects on the completion chances of different groups of students. The evidence did not show any significant effect of the student-faculty ratio for ethnic minorities. Contrary to the findings by the American scholars, the empirical evidence showed that ethnic minorities' chances of degree completion are not affected by their access to faculty members at their universities. The results are noteworthy since they reveal that for students from different ability groups, teaching aspects- do not play a role in their educational achievements.

Similarly, the evidence did not reveal conditional effects of faculty access for students from different-socioeconomic backgrounds. The access to faculty members is not a factor that helps to explain class differences in degree completion chances. These latter findings seem to reject Bourdieu's claim about the cultural arbitrary in teaching at universities.

These results suggest that there might be other institutional mechanisms operating to explain the socio-economic and ethnic gap in completion chances. Alternatively, it might be suggested that differences in academic experiences might not necessary translate into student-faculty ratios or student's satisfaction with their faculty.

The overall findings of this chapter raise some questions about the opportunities of different groups of students to interact with faculty members. If access to faculty is one of the most important ways that institutions can improve students' chances of completion, then the findings of this study suggest that a significant number of students – those who study at non-selective institutions- are missing key educational opportunities to improve their chances of degree completion in the system.

Chapter 6: Does local unemployment affect students' chances of degree completion?

6.1 Introduction

The preceding chapters revealed how institutions were associated with different students' chances of degree completion. In this chapter, I estimate the effect that the labour market conditions, in particular local unemployment levels, have on students' degree completion chances. In addition, I look at how the effect of local economic conditions varies across different student populations.

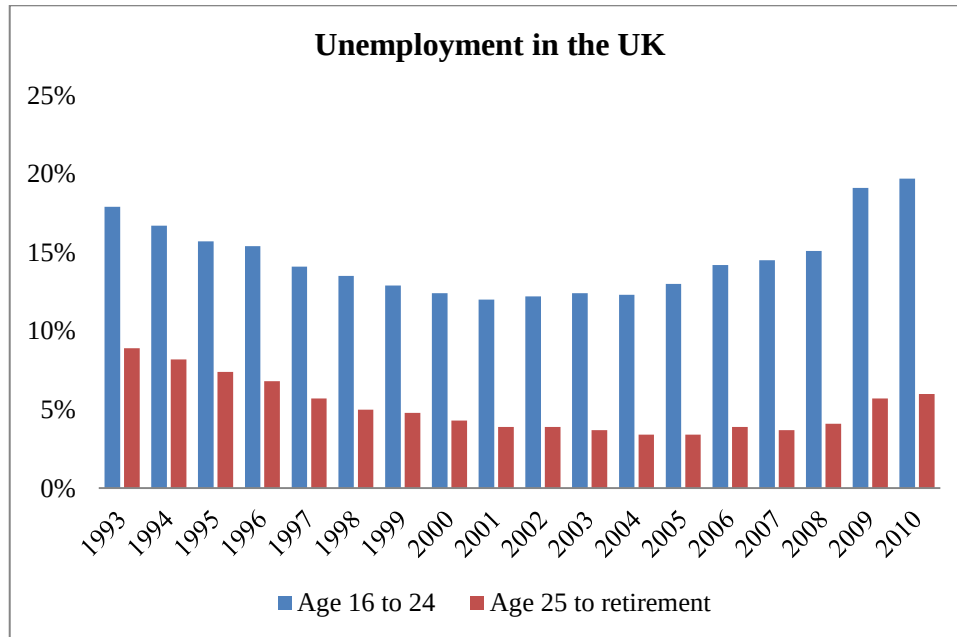
6.1.1 The relevance of unemployment

The expansion of higher education in the UK, especially since 1990s, has allowed a substantial proportion of young people from different backgrounds to access tertiary education.

While a higher proportion of young people are now entering higher education, a higher proportion of young people are also at risk of being unemployed. Since the beginning of the millennium youth unemployment has been steadily rising in the UK (ONS 2010). As Figure

6.1 shows, unemployment among people aged 18-24 increased¹³¹ as a share of total unemployment since the beginning of the decade.

Figure 6.1: Unemployment rates in the UK



Source: Office of National Statistics (ONS), Labour Force Survey (LFS)

Youth unemployment is especially prevalent among those aged 18-24 who have lower qualifications or no qualification, as well as among ethnic minorities. According to the evidence provided by the Labour Force Survey (2008) unemployment rates for those aged 18-24 without qualifications was at 28.9 percent. These rates increased to 47.4 percent for blacks and 38.3 percent for Asians.

¹³¹ One way to explain this phenomenon is that youth unemployment rates are more sensitive to business-cycle conditions than the adult unemployment rate; hence, when there are recession conditions young people are more affected by higher rates of unemployment. (OECD, 2008)

Although youth unemployment is particularly acute for young people with lower qualifications, recent evidence has shown that youth unemployment is also affecting those with higher qualifications. A recent report by the ONS (2010) showed that graduate unemployment reached its highest level since 1995 in 2010. The figures show that graduate unemployment has risen faster (from 10.6 percent to 20 percent) than the overall unemployment rate for the UK (from 5.2 percent to 7.9 percent). Graduate unemployment, in particular, nearly doubled during the last economic recession. As Bell and Blanchflower (2010a) noted, especially during recession conditions, just over a third of the unemployed have A-levels or higher qualifications. This situation contrasts sharply with what happened during the 1980s, when more than half of the unemployed did not have qualifications.

This evidence shows that youth unemployment affects those with lower as well as those with higher qualifications, and affects the latter especially during recession times. Given the increasing incidence of youth unemployment in the UK, it is important to study whether students consider unemployment conditions in their decisions about degree completion. The evidence shows that in most European countries a traditional response of young people to rising unemployment or recession has been to stay on in education or to withdraw from the labour force (Blanchflower and Freeman 2000; Rice 1999).

The aim of this chapter is to investigate empirically the role of local unemployment on students' decisions to complete their university degrees in the UK. Specifically, I examine whether students' decisions are influenced by unemployment rates (overall unemployment and youth unemployment) in their county of prior residence and in the county where their

university is located. For the empirical analyses I make use of individual and aggregate level data related to students' socioeconomic conditions.

The remainder of the chapter is structured as follows. In section 6.2 I briefly describe human capital approach, which provides the main analytical framework for examining students' decisions about their educational careers. Section 6.3 reviews the empirical literature in the field. In section 6.4 I turn to a description of the methodology and data. In section 6.5 I describe the main results of the analyses. Finally, in section 6.6 I briefly discuss the main results of the chapter.

6.2 Literature review

6.2.1 Human capital approach

In order to explain why students choose to enter or abstain from post-secondary education, human capital approach¹³² assumes that income and employment returns to education are crucial in motivating students' decisions. Educational decisions are therefore understood as investment decisions. The decision to invest in education can be understood as a cost/benefit analysis. Students make their decisions based on whether the benefits they expect from the investment exceed the expected costs. Overall, the decision about education presumes a

¹³² Human capital theory has rarely played a role in retention or completion studies. In this study, however, I argue that students make similar decisions about enrolment each year when they decide whether or not to return to their programmes. Hence, it is possible to extend this theory to the decisions to complete a degree in higher education.

choice from two alternatives: to invest in more education beyond the current level of education, or, to stop investing in formal schooling and enter the labour market.

The expected benefits (returns) associated with pursuing higher education include higher expected earnings, more secure and pleasant jobs, lower expected unemployment rates and non-monetary benefits. Students face two types of costs associated with a decision to invest in education: direct (extrinsic) and indirect (opportunity costs). The extrinsic costs of undertaking higher education include tuition fees, accommodation, books, *etcetera*. The opportunity costs are forgone earnings and non-monetary costs.

According to human capital approach, an individual's academic ability plays a significant role in his or her decision to invest in more education (Becker 1993). Individuals with higher ability will have a greater demand for more education since they are better able to get the benefits from investment in post-compulsory education. Similarly, those from more affluent backgrounds will demand more education because they have lower marginal costs of investment (Bradley and Nguyen 2004:487). The approach suggests that, in the presence of constraints in the capital market, students from wealthier families will invest more in education and/or training, since for them the investment is less costly than for those from less affluent backgrounds.

Although the approach did not initially take into consideration the uncertainty of educational investments, namely the risk of unemployment, later developments – possibly as the result of rising unemployment rates during the 1980s – extended the traditional human capital

framework by incorporating the risk of unemployment (Reimer 2011). With the inclusion of the risk of unemployment in the model two opposite effects were expected to affect the demand for post-secondary (higher) education. On the one hand, higher unemployment rates might encourage young people to stay in education or go into further education because of the anticipated difficulty of finding a job. Students would prefer to continue in education because a higher degree offers important advantages relative to being unemployed and because of its lower opportunity costs. On the other hand, the unemployment rate can also affect the demand for education through its effect on anticipated future unemployment. Hence, higher rates of unemployment that affect both those who left school and those who acquired a tertiary degree would reduce the return to education and hence the demand for tertiary education (Mickelwright, Pearson and Smith 1990).

6.2.2 Empirical research

The studies that have analysed the impact of labour market conditions on educational decisions can be divided in two groups: first, those that study the effect of national unemployment conditions and, secondly, those that study the impact of local unemployment conditions.

Within the first group, the findings show a small but significant effect of national unemployment on the decision to continue in post-compulsory education. Whereas only a few studies found a negative relationship (Mickelwright, Pearson and Smith 1990), a significant number of studies found a positive relationship between unemployment and the decision to stay on in further/higher education (Duncan 1965; Petrongolo and San Segundo

2002; Pissarides 1981; Whitfield and Wilson 1991). Overall, these latter studies revealed that poor macroeconomic conditions increase the probability of students staying on in education.

For instance, Pissarides (1981) found a positive effect of the aggregate adult rate of unemployment on enrolment rate into post-compulsory education in Britain. He added that the overall national unemployment rate (for men) and wages (for men and women) affected post-compulsory participation decisions. In addition, Pissarides found that enrolment rates seem almost unaffected by the youth unemployment rate. Whitfield and Wilson (1991) drew on Pissarides' work and found that staying in education was significantly related to a variety of social and economic variables, among which unemployment played a significant role. In a more recent study, Petrongolo and San Segundo (2002) found that high youth unemployment rates drive young people to postpone their entrance into the labour market by reducing the expected gains from a job search and, therefore, the opportunity cost of their educational investment.

Most of these studies have not tested group differences in the effect of national unemployment on educational decisions. Only recently, a study carried out by Reimer (2011) revealed robust class and gender differences in the effect of national unemployment on educational decisions. Reimer found that female students from lower class backgrounds appear to be more responsive to changes in unemployment rates than their higher-class peers, whereas women from service classes seem to be relatively indifferent to changes in

the unemployment rates. Reimer points out that women are more responsive to changes in unemployment rates than men due to anticipated career interruptions.

Alongside the study of the effects of national unemployment rates, a significant number of studies have estimated the effects of local economic conditions on students' decisions to stay in education. Scholars have suggested that the local unemployment rate and wage¹³³ levels are more relevant factors for students' decisions than what occurs in the national labour market (Clark 2002; Gray, Jesson and Tranmer 1993; 1994; 2001; McVicar and Rice 2000; Rees and Mocan 1997; Rice 1987; Rice 1999; Rivkin 1995; Smith and Naylor 2001; Wales 2010).

Like the studies that estimated national unemployment effects, research on local labour market conditions found an overall positive effect of local unemployment rates on students' educational decisions. Higher unemployment rates in the local economies have an overall significant positive effect on the decision to stay in post-compulsory education.

¹³³ Alongside the risk of unemployment, some studies have analysed how the fear of debt also plays a role in students' decisions (Weko 2004; NAO 2007; Yorke and Longden 2008). These studies found that finance and employment-related issues were particularly likely to influence the non-continuation rates of mature, male and ethnic minority students. Students may also drop out of university because they conclude that the cost of continuing – their mounting debts and the wages that they are foregoing – are simply greater than the benefits they will derive from completing their degrees. Weko, T. 2004. "New Dogs and Old Tricks: What can the UK teach the US about University Education." Oxford: Higher Education Policy Institute. NAO. 2007. "Staying the course: The retention of students in higher education." London: National Audit Office, Yorke, M., and B. Longden. 2008. "The first year experience of higher education in the UK." York: Higher Education Academy.

The general positive effect of local unemployment on students' decision contrasts with the negative effect observed by Gray, Jesson and Tranmer (1993); Gray, Jesson and Tranmer (1994)¹³⁴.

In contrast to earlier studies of national unemployment research on the effect of local unemployment on students' decisions has tested group differences more extensively. For instance, Rivkin (1995) found strong evidence that a higher local unemployment – overall unemployment and youth unemployment – raises the probability of people choosing schooling and non-participation as opposed to choosing work. The author found that young people build their labour market expectations on the wages and employment rates of adult workers (20 to 49 years old) in their communities. Likewise, his results¹³⁵ showed that unemployment's effects tend to be larger for men than for women.

Similarly, Rice (1987; 1999) found that less favourable conditions in the local market encourage people, in particular young men with weaker academic qualifications, to stay on in education. Young men with poor qualifications – especially white men¹³⁶ – postpone their entry into the labour market and choose instead to stay in education to improve their

¹³⁴ McIntosh and Dickerson (2009) point out that the explanation for the difference is that while Gray et al. used cross-sectional data, studies that found a positive effect used panel data. With cross-sectional data, local unemployment effects are masked by their correlation with the socio-economic characteristics of an area. However, when a time series element is introduced, as in panel data, then variation in local unemployment rates over time within areas reveals the positive impact of local unemployment on post-compulsory participation. McIntosh McIntosh, S., and A. Dickerson. 2009. "Post-16 Educational Choices in Rural Areas." Sheffield: University of Sheffield.

¹³⁵ In addition, his findings revealed that the impact of fewer job opportunities offsets the influence of lower average socioeconomic backgrounds on the college attendance of Black students.

¹³⁶ Rees and Mocan (1997), in a study carried out in the USA, found the existence of significant differences in how White, Hispanic, and Black students respond to changes in the unemployment rates. Whereas White and Hispanic students are less likely to leave school as economic conditions worsen, Black students are more likely to leave school. Exactly what motivates these behavioural differences is unclear.

qualifications. In a later study, McVicar and Rice (2001; 2000) found that poorly qualified men from ethnic minorities were less affected or less sensitive to local labour market signals than poorly qualified white men.

On the other hand, Smith and Naylor (2001), in one of the few studies that have analysed the impact of local unemployment on degree completion decisions, found that unemployment in the county of prior residence was especially influential for poorer male students. In contrast to previous researchers, however, they found a negative effect of unemployment on the decision to complete. They found that, on average, an increase in the local unemployment rate of five percentage points raises the dropout probability by around one percentage point.

For male students from lower class backgrounds the effect of local unemployment is more than twice as large, implying that the on-going participation of such students at university is more sensitive to local labour market conditions (Smith and Naylor 2001:403). This result seems to suggest that higher unemployment rates in the local market leads to a low expected rate of return on investment in human capital for lower class students. Under economic constraints, lower class students face significant direct as well as opportunity costs of attending university.

6.3 Research Questions and Hypotheses

6.3.1 Research Questions

The following research questions are the focus of this study:

1. Does local unemployment at the students' domicile affect students' decisions about completing a university degree in Britain?
2. Does local unemployment at the university location affect students' decisions about completing a degree?
3. Does local unemployment affect different groups of students in their decisions about completing a degree?

6.3.2 Hypotheses

Building on the literature previously discussed, I can draw some hypotheses:

H1: I expect an overall positive effect of higher rates of unemployment at students' domicile (county of prior residence) on students' decisions about completing a degree. Slack labour market conditions will encourage students to stay on in higher education and complete their degrees.

H2: I expect a positive effect of higher rates of unemployment at the university location on students' decisions about completing a degree. Specifically, I expect that slack labour market conditions at the university location will affect the decision of those who live in the

vicinity of their universities. For those who study near their hometowns, higher levels of unemployment should encourage them to complete their degrees in higher education.

H3: I expect that the effect of local unemployment varies inversely with socioeconomic background. Hence, there will be a positive effect of higher rates of unemployment on the decision to complete a degree for students from lower class backgrounds. Students from less privileged backgrounds are more sensitive to the variations of the labour market than their peers from more advantaged backgrounds. The fear of being unemployed will encourage lower class students to stay on in higher education and complete their degrees.

H4: Similar to the hypothesis 3, I expect a positive effect of local unemployment on students from ethnic minority backgrounds. Students from ethnic minorities are more sensitive to the variations of the local labour market because they expect to face labour market discrimination in the future.

6.4 Methodology and Data

6.4.1 Data

In this chapter I use three data sources to conduct the statistical analyses. These data sources combine student-level and aggregate-level data. As in the preceding chapters, HESA's student-longitudinal dataset is the main source of individual information in this chapter. These data sources provide detailed information about students' domiciles and university

location. The domicile and university location information is supplied in the form of postcodes (for all UK domiciled students).

I also use two related aggregate-level data¹³⁷ sources: the Labour Force Survey (LFS) and the Annual Population Survey¹³⁸ (APS). Both are survey data administered by the Office for National Statistics (ONS) that supply detailed information about the conditions of the labour market at the national and local level. There are limitations of the data that imposed some constraints on the modelling procedures and especially on the interpretation of the results. Firstly, the dataset refers solely to students who entered university; it contains no information about individuals who did not attend university. Consequently, I have not been able to address the issue of selection into university.

Secondly, it might be argued that graduate unemployment is a better proxy than overall or youth unemployment to measure the effect of unemployment on students' decision of degree completion. Given that the research population is enrolled in higher education, it might be argued that higher levels of graduate unemployment would affect them more directly than the overall conditions of unemployment. Unfortunately, the graduate unemployment data are only available at the national level and there is no existing information at the local level.

¹³⁷ Using the location of students' university and domicile (LADs/UAS) as reference points, I linked data at the local authority level with the students' level dataset.

¹³⁸ Specifically, the Annual Population Survey (APS) provides survey data about unemployment conditions at local authority level. The APS's sample covers in England at least 510 economically active persons for each Unitary Authority (UA)/Local Authority District (LAD) and, at least 450 economically active persons in each Greater London Borough. In combination with local LFS boost samples from Wales (WLFS) and Scotland (SLFS) the survey provides estimates for a range of indicators down to Local Education Authority (LEA) level across the UK.

6.4.2 Variables

6.4.2.1 Dependent Variable

As in the preceding chapters, the dependent variable is treated as a binary variable, distinguishing students who complete a university degree from those who drop out before degree completion.

6.4.2.2 Independent Variables

The explanatory variables of interest in the study cover one individual measure related to the distance between university/student's domicile and two different measures related to unemployment conditions in the local level in the UK. The unemployment variables are measured at two different spatial points: the students' domicile (prior to their enrolment in university) and the university location. Both measures of unemployment were provided by the LFS/APS.

Overall adult unemployment¹³⁹ rate: The overall unemployment rate is calculated by dividing the unemployment level for those aged 16 and over by the total number of economically active people aged 16 and over. Unemployment measures people without a job who have been actively seeking work and are available to start work if a job is offered.

¹³⁹ The number of unemployed people in the UK is measured through the Labour Force Survey (LFS) following the internationally agreed definition recommended by the International Labour Organisation (ILO). Unemployed people are considered those without a job that have actively sought work in the last four weeks and are available to start work in the next two weeks, or are out of work, or who have found a job and are waiting to start it in the next two weeks.

Youth unemployment rate: The youth unemployment rate is calculated by dividing the unemployment level for those aged between 15-24 years old by the total number of economically active people aged 15-24. Overall, the unemployed youth comprise all persons between the age of 15 and 24 who, are (a) without work; i.e. had not worked for even one hour in any economic activity (paid employment, self-employment, or unpaid work for a family business or farm); (b) currently available for work; and (c) actively seeking work; i.e. had taken active steps to seek work during a specified recent period.

Distance between students' domicile and university: HESA calculated this variable using the student's domicile postcode and the postcode/location¹⁴⁰ of the institution. The difference between the northings and eastings (obtained using the National Statistics All Fields Postcode directory) of domicile and institution were then squared and added together. The square root of the result provides the distance travelled between the two in a straight line.

To simplify the analyses, I collapsed this variable into a new categorical variable. Following the methodology employed by Frenette (2006), I defined the threshold of commuting distance between university and a students' domicile. The aim of this new variable was to delineate whether the student lived within commuting distance or out of commuting distance from her/his university. All results were thus broken down into three groups: 0–40 km (within commuting distance), 40–80 km (possibly out of commuting distance, depending on

¹⁴⁰ The allocation of institution is done by reference to the administrative centre of that institution.

whether the student has access to a car), and 80 km or more (out of commuting distance)¹⁴¹. The threshold selected in this study – set at 80 km – is one beyond which it may be very difficult, if not impossible, for the vast majority of students to be able to commute on a daily basis. Living between 40 and 80 km appears to be a sufficient deterrent to attending university for many students, although some of these students are obviously within commuting distance. The main focus, however, will be on the distinction between living within 40 km and beyond 80 km from a university. The analysis will focus on whether unemployment conditions affect those who live within commuting distance differently in relation to those who study beyond commuting distance.

6.4.2.3 Control Variables

To assess the net effects of unemployment conditions at the local level, all the models adjust by students' background characteristics (age, gender, ethnicity and social class) and attainment on entry to university (scores and qualifications on entry to university).

141 Frenette (2006), conducted a study about the impact of distance in the choice of university in Canada. According to the author, it might be very difficult, if not impossible, for the vast majority of students to be able to commute a distance above 80 km on a daily basis. Frenette, Marc. 2006. "Too Far to Go On? Distance to School and University Participation." *Education Economics* 14(1):31-58.

6.4.3 Methods

In this chapter I employ multilevel models¹⁴² to estimate the effect of local unemployment on students' chances of completing a degree. Two types of models are used in the statistical analyses: random intercept models (or mixed models) and cross-classified models. The selection of the models depends upon the nested or non-nested structure of the data used in the analysis.

First, I carry out random intercept models to estimate the effect of unemployment where the university is located on the student's likelihood of completing a degree. The random intercept model probability specification is presented in Equation (6.1) as follows:

$$\text{Logit } \{\Pr(y_{ij}=1|x_{ij}, u_j)\} = \beta_0 + \beta_1 x_{ij} + \beta_2 x_{2j} + u_{0j} \quad (6.1)$$

Additionally, I employ random coefficient models to allow that student level variables vary randomly across universities and, also, to estimate the effect of unemployment measures on these student level variables. Equation (6.2a) shows the random coefficient model specifications, whereas Equation (6.2b) adds a cross level interaction.

$$\text{Logit } \{\Pr(y_{ij}=1|x_{ij}, u_j)\} = \beta_0 + \beta_1 x_{ij} + \beta_2 x_{2j} + u_{0j} + u_{1j} x_{ij} \quad (6.2a)$$

$$\text{Logit } \{\Pr(y_{ij}=1|x_{ij}, u_j)\} = \beta_0 + \beta_1 x_{ij} + \beta_2 x_{2j} + \beta_3 x_{1ij} x_{2j} + u_{0j} + u_{1j} x_{ij} \quad (6.2b)$$

¹⁴² The random intercept and cross-classified models are implemented in Stata 12.0. In the case of random intercept models, I use the command `xtlogit` and `xtmelogit` for random coefficients. For cross-classified models I use the command `xtmelogit`. All the cross-classified models are estimated using Laplace estimation

It is also of central importance in this study to estimate the effect of unemployment at a student's domicile on their chances of degree completion. To do this, however, it is not appropriate to use random intercept models because students' domiciles and universities are not nested. Domiciles and universities are crossed, hence the use of cross-classified models to estimate this type of analysis. Cross-random models allow simultaneous estimation of the effect of unemployment at students' prior residence and university location.

Similarly to the strategy followed for conducting random intercept models, I initially estimate cross-classified¹⁴³ models without random slopes, and then include random coefficients/random slopes in the models. The first model- presented in equation (6.3)- estimate fixed effects for individual-level variables, whereas for universities and students' domicile the estimates are random. The cross-classified model can be written as the following:

$$\text{Logit} \{ \Pr(y_{ij}=1|x_{2i}, x_{3j}, \zeta_{1i}, \zeta_{2j}) \} = \beta_0 + \beta_1 x_{ij} + \zeta_{1i} + \zeta_{2j} \quad (6.3)$$

where the logit of the probability of degree completion is modelled as the function of an intercept (β_0) and a vector of fixed coefficients (β_1), along with random intercepts for university (ζ_{1i}), and students' domicile (ζ_{2j}). Within the cross-classified framework, students are modelled as being exposed to two or more random factors that are not hierarchically related. In this case, students are exposed to both conditions, the locality of their domiciles and the university location.

¹⁴³ The Laplace approximation is one of the most frequently used for generalized linear mixed models because of its good quality and computational efficiency.

In a second stage, the models relax the assumption that student level variables are fixed and estimate random effects for individual-level measures. The additional parameter $\zeta_{1i} * X$ represents a random coefficient at the university. In this case, I am estimating, on one hand, the effect of a student level variable across universities and, on the other hand, how much this effect varied by university.

$$\text{Logit} \{ \Pr(y_{ij}=1 | x_{2i}, x_{3j}, \zeta_{1i}, \zeta_{2j}) \} = \beta_0 + \beta_1 x_{ij} + \zeta_{1i} + \zeta_{2j} + \zeta_{1i} * X \quad (6.4)$$

I also estimate random coefficient models where the variation is estimated by student domicile, which can be written as the following:

$$\text{Logit} \{ \Pr(y_{ij}=1 | x_{2i}, x_{3j}, \zeta_{1i}, \zeta_{2j}) \} = \beta_0 + \beta_1 x_{ij} + \zeta_{1i} + \zeta_{2j} + \zeta_{2j} * X \quad (6.5)$$

Where the additional parameter $\zeta_{2j} * X$ represents a random coefficient at the student's domicile level. Similarly to equation (6.4), I estimate the effect of a student-level variable across localities (counties) and how much this effect varies by locality.

6.5 Results

6.5.1 Unemployment in the UK

Before starting the analyses, I begin by exploring the outline of unemployment across the UK. The analysis of the data provided by the Office of National Statistics (ONS) reveals three salient facts about the unemployment in the UK. First, there was little variation in overall and youth unemployment rates during the decade 1995-2005 in the UK. The data reveals that the levels of unemployment were relatively stable during this decade until 2006.

A second interesting fact is the great geographical variation of unemployment rates across UK. At the regional level, there is a great North-South divide in levels of unemployment. The highest rates of unemployment are found in London and the North of the UK, and in regions including the South-East of Wales, West Scotland and the North-East of England. The lowest rates of unemployment are found in the South, especially in the South West of England.

Higher youth unemployment rates are found in the regions that have the highest overall rates of unemployment (Merseyside, South Yorkshire and Inner London) and *vice versa*. The rates of overall and youth unemployment are highest in the Northern regions and London.

Beyond the North-South divide, the data reveals that there is a large variation of unemployment rates at the local level. Values are shown in Table 6.1. Levels of overall unemployment as well of youth unemployment are very dissimilar across local counties and

local authority districts. Counties located within a same region have very uneven rates of unemployment. For example, the data shows that in places like East Sussex or Slough, located in the South of England, youth unemployment rates are higher than 10 percent; these figures are two or three times higher than the regional unemployment rate. Similarly, in places as Lancashire and Cheshire, both of which are located in the North West of England, the unemployment rates are two times lower than the regional rate of unemployment. This evidence confirms that the choice of local levels of unemployment as the explanatory variables in this study is justified because of their larger variance. The significant variation of unemployment rates at the local level make it possible to gain a real sense of unemployment's effects on students' chances of degree completion.

Finally, a third fact to be highlighted is that unemployment affects young people more severely than the rest of the population. On average, the figures show that the proportion of people affected by youth unemployment¹⁴⁴ is at least two times higher than the proportion affected by the overall unemployment in the UK. Younger people are more affected by unemployment than older people. I will explore in this study whether youth unemployment rates have a greater effect on students' chances of degree completion than overall unemployment rates.

¹⁴⁴ A recent report prepared by the ONS (2011) points out that youth unemployment has risen in each of the last three recessions and the years immediately following their end. The total of 1.04 million in 2011 compares with peaks of 924,000 in 1993 and 1.2 million in 1984. Excluding students, today's total of 731,000 (10 percent of the youth population) compares with 832,000 (12 percent) in 1993 and 1.1 million (14 percent) in 1984. However, because the number of students has been rising, just looking at young people not in full-time education, the unemployment proportion was 17.2 percent in the final quarter of 2011, the highest since records began.

Table 6.1: Means for labour market variables at the local level

		Mean	SD	Min	Max
Contextual Variables					
Economic indicators at the Student's domicile	N	Mean	SD	Min	Max
Youth unemployment rate	168	11.2	3.98	2.9	23.5
Overall Unemployment rate	168	4.9	1.86	1.4	12
Economic indicators at the University location					
	N	Mean	SD	Min	Max
Overall Unemployment rate	132	5.66	1.92	2.20	9.70
Youth Unemployment rate	132	13.78	4.43	3.40	23.00

Before analysing whether unemployment conditions contribute to improving or reducing students' chances of degree completion, I explore the association between all of the individual and contextual variables that will be included in the regression analyses. As it is possible to observe in Table 6.2, the association between the unemployment and socioeconomic (individual) variables is rather weak. On the contrary, I found a stronger association between some of the contextual measures. There is a strong association between overall and youth unemployment rates at the university location (correlation of 0.85) and a moderate association between overall and youth association at the students' domicile (correlation 0.66). Based on this evidence, I estimate the effects of overall and youth unemployment separately.

Table 6.2: Correlation between individual and contextual variables

Individual/Contextual Variables	Working Class	White	Black	Asian	Overall unemployment at the student's domicile	Youth unemployment at the student's domicile	Overall unemployment at university location
Overall unemployment at the student's domicile	-0.02	-0.2	0.15	0.11			
Youth unemployment at the student's domicile	0.01	-0.27	0.2	0.16	0.66		
Overall unemployment at the university location	0.01	-0.15	0.08	0.12	0.04	0.16	
Youth unemployment at the university location	0.02	-0.24	0.14	0.17	0.14	0.22	0.85

6.5.2 Does unemployment at the university location affect students' chances of degree completion?

I began estimating an unconditional model or variance component model with no covariates to assess whether there was sufficient between-university variance to justify further multilevel analysis. The analysis indicated that there was a variance of 38 percent between universities and an intra-class correlation (ICC) of 10 percent. After adding individual characteristics, the between-institution variance was reduced to 20 percent, with an intra-class correlation (ICC) of 5 percent. These results justified conducting the multilevel analyses to estimate the extent to which unemployment contributed to explaining the between-university unexplained variance in degree attainment.

To estimate the net effect of unemployment on students' chances of degree completion, all the models adjust for differences in students' academic entering characteristics (attainment on entry to university) and demographic variables (age, gender, ethnicity and social class). Controlling for these covariates can be understood as adjusting for the non-random assignment of students into universities, which is a major source of between-university differences in degree attainment.

A number of alternative specifications were considered for conducting the analysis. Alongside the inclusion of unemployment measures, I added in the models as an explanatory variable, a dummy variable that takes account whether the student is enrolled in a university in the vicinity of their domicile.

Table 6.3 shows the results of the analysis to estimate the effect of unemployment. Whereas Model 1 presents the estimate for overall unemployment, Model 2 presents the estimate for youth unemployment. Overall, the results show that students who study in the vicinity of their domiciles have lower chances of completing a degree than those who live out of commuting distance. More importantly, the findings reveal that unemployment rates—overall and youth – at the university location does not affect students’ chances of completing a university degree. Consequently, the addition of the unemployment measures to the models did not produce a significant reduction in the variance. The between university variance was only reduced from 20 percent to 19 percent.

Table 6.3: Random Intercept Models for predicting the effect of unemployment at the university location on students' chances of degree completion

Variables	Model 0		Model 1		Model 2	
	Log odds	S.E	Log odds	S.E	Log odds	S.E
Fixed Effects						
Intercept	1.79***	0.05	2.11***	0.14	2.11***	0.14
Stay in the vicinity of their domicile			-0.06***	0.02	-0.06***	0.02
Contextual variables						
Overall unemployment			0.025	0.02		
Youth unemployment					0.01	0.009
Random Part						
Between University Variance	0.38	0.05	0.19	0.03	0.19	0.03
ICC	0.1		0.05		0.05	
Number of Universities	132		132		132	
Number of students	179289		179289		179289	

All the models control by individual characteristics. All the coefficients are estimated with * p < 0.05; **p < 0.001, ***p < 0.0001

One explanation of the finding that unemployment at the university location does not affect students' chances of graduation is that just a small proportion of students live in the vicinity of the universities. Examination of the data shows that around 70 percent of students enrolled in university programmes in the academic year 2004/2005 in British universities lived beyond possible¹⁴⁵ commuting distance, whereas only 30 percent lived within commuting distance (less than 40 km). It is plausible that only those who live close to the location of their universities would be concerned about the situation of unemployment in their local labour market.

Whether students stay in their hometowns or move far away to pursue their university studies is strongly associated with their socioeconomic background. The results show that around 70 percent of students from professional and managerial backgrounds live beyond commuting distance, whereas 40 percent of students from lower class backgrounds study in universities out beyond commuting distance. Differences between students from ethnic and non-ethnic minority backgrounds are also pronounced. More than a 70 percent of students from ethnic minorities (Black and Asian) live in the vicinity of their universities (within commuting distance), whereas 60 percent of students from white backgrounds live out of commuting distance.

Studying at a university within commuting distance provides a more affordable educational alternative for all the students. Attending a university in the vicinity of their hometowns is a

¹⁴⁵ 54 percent of the students live beyond 80 kms from their universities, whereas 13 percent live between 40-80 kms from their institutions. Frennette (2006) posits that for those who live beyond 40 km from their universities, it is almost unfeasible to commute on a regular basis without a car. Hence, it is better to consider the group of students whose domiciles are between 40-80 kms distant from their universities as living out of possible commuting distance.

cost-saving option for students since they avoid the added living and moving costs associated with leaving their parents' homes/hometowns. As the literature has pointed out, living 'out of commuting distance' is especially hard for students from lower-income families (Frenette 2006) . For this group of students, economic constraints are among the main reasons for studying in universities close to their hometowns. Conversely, students from upper-income or middle-income families that can afford to pay for living and moving costs in a new place do not have a problem leaving the nest to attend a university.

To confirm whether local unemployment is a factor considered by students who study in the vicinity of their domiciles, I replicated the random intercept models presented in Table 6.3. In Table 6.4, I compare the effect of overall and youth unemployment on students' chances of degree completion only for the sample of those who study in the vicinity of their domiciles.

The results presented in Table 6.4 reveal that, for this group of students, unemployment has a significant effect on their chances of degree completion. The outcomes are two times larger than its standard error, which indicates that it is highly significant. Whether with relation to overall or youth unemployment rates, students who live in the vicinity of their universities are sensitive to what occurs in the local labour market.

Table 6.4: Random Intercept Models for predicting the effect of unemployment at the university location for only those who study in the vicinity of their domiciles

Variables	Model 3		Model 4	
	Log odds	S.E	Log odds	S.E
Fixed Effects				
Intercept	1.6***	0.15	1.56***	0.16
University variables				
Overall unemployment	4.85*	2.18		
Youth unemployment			2.22*	0.94
Random Part				
Between University Variance	0.17	0.03	0.17	0.03
ICC	0.05		0.04	
Number of Universities	132		132	
Number of Students	54280		54280	

All the models control by individual characteristics. All the coefficients are estimated with * $p < 0.05$; ** $p < 0.001$, *** $p < 0.0001$

6.5.3 Does unemployment at the student's domicile affect the student's chances of degree completion?

In this section I focus my attention on assessing how the levels of unemployment at a student's domicile influence the student's chances of degree completion. Given the structure of the data – domiciles and universities are crossed rather than nested – I employ cross-classified models to estimate the statistical analysis.

Table 6.5 presents the results of the cross-classified model that estimated the effect of unemployment measures – overall and youth unemployment – at the students' domicile. To start the analysis, I began with an unconditional model (Model 5) with no covariates for assessing the variance between the students' domiciles (local authority districts). When I consider the crossed nature of domiciles and universities¹⁴⁶, the results revealed that the variance at the local level was only three percent. Controlling by individual characteristics, Model 6 shows that overall unemployment at a student's domicile is a significant predictor of the student's degree completion chances. The estimate is three times larger than its standard error, which indicates it is highly significant. Additionally, Model 7 revealed that youth unemployment at a student's domicile is also a significant predictor of degree completion.

Both measures of unemployment at a student's domicile are significant predictors of the student's chances of degree completion. The fact that both unemployment measures

¹⁴⁶ An important note regarding the cross-classified model refers to the model specification. To estimate the models, I specify the classification with fewer units (Universities = 132) as the one that is entered in the models as the series of random binary variables at level 3.

positively affect their chances of graduation offers support to the human capital hypothesis that slack labour market conditions have a positive effect on students' decisions to remain in education. Additionally, these results suggest that students build their labour market expectations on the unemployment rates of those who are of adult and young worker in their communities.

Table 6.5: Cross-Classified Model for predicting the effect of overall and youth unemployment on students' chances of degree completion

Variables	Model 5 (unconditional)		Model 6		Model 7	
	Log odds	S.E	Log odds	S.E	Log odds	S.E
Fixed Effects						
Intercept	1.77***	0.06	1.9***	0.14	2.01***	0.15
University variables						
Overall unemployment			0.025	0.02		
Youth unemployment					0.007	0.009
Students' Domicile variables						
Overall unemployment			2.5***	0.85		
Youth unemployment					0.97***	0.38
Random Part						
Between domicile variance	0.03	0.005	0.02	0.003	0.02	0.003
Between university variance	0.36	0.05	0.18	0.025	0.18	0.025
Numbers of Local Authority Districts (LDAs)	168		166		162	
Number of universities	132		132		132	
Number of students	179289		179289		179289	

All the models control by individual characteristics. All the coefficients are estimated with * p < 0.05; **p < 0.001, ***p < 0.0001

I carried out cross-classified random effect models with cross interactions to test group differences in the effect of overall and youth local unemployment. The analyses focused on those groups that the literature has identified as the most likely to be affected by unemployment conditions: student from lower class backgrounds and ethnic minorities. Each one of the models, included an interaction term between the local unemployment and students' background characteristics (dummies for working class students and, also, dummy variables for Black and Asian students).

The findings revealed the existence of interaction effects for students from lower class backgrounds. Specifically, as Model 9 shows, there is a positive interaction effect between students from working class backgrounds and youth unemployment. What these findings seem to indicate is that the fear of being unemployed encourages lower class students to graduate from their programmes. Coming from areas where there are higher levels of youth unemployment prompts working class students to stay on in education and complete their university degrees.

However, further analyses did not show additional interaction effects. Interestingly, the results did not confirm that students from ethnic minorities are affected by the unemployment conditions in their hometowns. These results are somewhat unexpected because the literature has widely pointed out that students from ethnic backgrounds often fear facing discrimination in the labour market. Hence, they tend to stay in education and get qualifications in order to be better prepared for applying for jobs in the labour market.

Table 6.6: Cross-random effect with cross interaction for predicting the effect of youth unemployment on students from lower class backgrounds' chances of degree completion

Variables	Model 8		Model 9	
	Log odds	S.E	Log odds	S.E
Fixed Effects				
Intercept	1.94***	0.17	1.96***	0.18
Working Class (dummy)	-0.013	0.029	-0.19***	0.06
Domicile variables				
Youth unemployment	0.98*	0.4	0.76	0.4
Cross interaction				
Working Class*youth unemployment			1.6***	0.49
Random Part				
Between local variance	0.02	0.004	0.02	0.004
Between University Variance	0.19	0.026	0.19	0.026
Numbers of Local Authority Districts (LDAs)	162		162	
Number of students	171843		171843	

All the models control by individual characteristics. All the coefficients are estimated with * p < 0.05; **p < 0.001, ***p < 0.0001

Table 6.7: Cross-random effect with cross interaction for predicting the effect of youth unemployment on ethnic minorities' chances of degree completion

Variables	Model 10		Model 11	
	Log odds	S.E	Log odds	S.E
Fixed Effects				
Intercept	2.18**	0.076	2.17**	0.076
Individual Variables				
Asian (dummy)	0.14**	0.048	0.36**	0.139
Domicile variables				
Youth unemployment	0.58	0.432	0.70	0.428
Cross interaction				
Asians*youth unemployment			-1.92	1.124
Random Part				
Between local variance	0.04	0.022	0.04	0.021
Between University variance	0.02	0.005	0.02	0.005
Number of Local Authority Districts(LDAs)	162		162	
Number of students	171843		171843	

All the models control by individual characteristics. All the coefficients are estimated with * $p < 0.05$; ** $p < 0.001$, *** $p < 0.0001$

6.6 Discussion

This chapter has examined the impact of local labour market conditions on students' chances of completing a university degree in the UK. I found evidence that, in their educational decisions, students consider aspects related to local labour market conditions. The situation of unemployment at the student's domicile seems to play a role in their decisions about degree completion.

Overall, unemployment and youth unemployment were found to be significant predictors of students' degree completion chances. These results support the view that slack local labour market conditions are likely to encourage students to complete a degree. Higher rates of unemployment reduce the opportunity cost of students' investment in education. If a person believes that he/she is going to face higher rates of unemployment in the short to long term, that person would make further investment in education (Rice, 1999, 2000; Leslie and Drinkwater, 1999).

The results also confirm robust class differences in the effect of local unemployment. Students' position in the social hierarchy influences their response to labour market developments. Students from lower class backgrounds are mostly affected by unemployment; what occurs in their local counties influences their decisions about completing their studies. Economic considerations may be a significant reason to stay in education rather than dropping out. Without a qualification, the chances of being unemployed are higher than being employed.

Finally, it is important to mention that local unemployment rates do not seem to play any role for some groups of students' decisions about completion. Students from more privileged backgrounds and ethnic minorities do not seem to be concerned by the conditions of the labour market. It is plausible that students from middle class and more privileged backgrounds appear indifferent to the variations of the economy at the local level because they would look for job opportunities in areas where they find better job prospects. A majority of students in this group have already moved away from their hometowns to pursue their studies, hence, it is plausible that they would move again to another city or region in the country for better opportunities.

These results show the contrast between cosmopolitan and local choosers. Students' choices reflect different kinds of attachments to locality. Students that study in the vicinity of their domiciles consider what occurs with the local unemployment rates in making their decisions. In contrast, local unemployment rates do not affect the decisions of students who have migrated far away from their hometowns or parental homes to study. They will move away from their current location if the job opportunities are elsewhere.

Chapter 7: Conclusions

7.1 Introduction

Over the course of six chapters, I have explored the impact of students' intake characteristics, the institutions themselves and labour market conditions on degree completion probabilities in the UK. In this chapter, I briefly summarise the main findings of this research and discuss the ways in which it constitutes a contribution to the present state of empirical and theoretical knowledge about completion in higher education. The section concludes with suggestions for further research.

7.2 Research Aims reviewed

This thesis described the impact of students' background, institutions of higher education and labour market conditions on students' degree completion chances. Specifically, it aimed to answer the following three questions: Do students' background and attainment on entry affect students' chances of degree completion? Do institutions affect students' chances of degree completion? Does teaching affect students' chances of degree completion? Does local unemployment affect students' chances of degree completion? Additionally, it sought to answer supplementary questions related to the differential impact of institutions and labour market conditions on students from different socio-economic backgrounds.

The existing literature has paid little attention to these questions which probe the role that institutions of higher education or labour market conditions might have in generating individual differences in graduation/completion rates. This thesis, therefore, studies an under-researched niche within an increasingly important policy and research area.

7.2.1 Overall Findings

This section reviews the main findings from the empirical research that comprise this thesis. Four chapters are reviewed below.

Before moving to the research on the impact of institutions and labour market conditions, Chapter 3 analysed the impact of individual characteristics on degree completion chances. Using logistic regression analyses, I addressed the following questions: Does attainment on entry affect the chances of degree completion? Does socio-economic background affect students' chances of degree completion, even after taking into account differences in attainment on entry to university?

The results showed that the probability of completion is strongly associated to students' attainment on entry and socio-economic and ethnic background. Without controlling by attainment on entry to university, the analyses revealed the existence of socio-economic and ethnic differences in degree completion chances. Students who have parents in skilled or unskilled manual occupations have lower chances of completion as compared to those with parents in professional or managerial positions. In terms of ethnicity, Black students have lower chances of completion than White students, whereas Asian students have higher chances of completion than White students.

Class differences in completion probabilities persist even after accounting for differences in academic preparation on entry to university. The results confirmed that the class gradient in completion chances in the UK is strongly associated to differences in academic preparation on entry (as reflected by scores and qualifications) on entry to university but it is not fully attributable to them.

The net effect of class is larger among students with higher attainment on entry to university. In relation to ethnic differences, the results showed that these differences partially disappear after taking into consideration attainment on entry to university. Black students' lower chances of completion are mostly explained by their poor academic preparation on entry to university. However, the results did not offer a clear answer in relation to Asian students. Further fixed effect analyses were conducted to estimate the role that institutions and subjects might have in the class differential in degree completion chances across the system. The findings suggested that class differences were not by and large attributable to the types of subject that students pursue. Furthermore, they are only marginally attributable to the institutions in which students are enrolled.

Chapters 4 to 6 explored the role of institutions and labour market conditions on degree completion chances. Multilevel level analyses were carried out to estimate the role of these factors on degree completion chances. Chapter 4 analysed the effects of structural institutional characteristics, such as type of institution, selectivity and institutional enrolment (size), on students' chances of degree completion. Adjusting for differences in students' intake characteristics (academic and demographic), the multilevel analyses confirmed that attending Russell Group universities -- the most selective group -- has a

positive effect on students' chances of degree completion. The results revealed that there is a net positive effect of attending Russell Group institutions beyond effects attributable to students' intake characteristics.

Given the possibility that the effect of attending a Russell Group university might differ across different groups of students, I tested for interaction effects. The tests showed that regardless of their socio-economic background or attainment on entry, students have higher chances of graduation if they attend Russell Group institutions than any other type of university. The results also showed the existence of a differential effect of attending a Russell Group institution for students from different class backgrounds. Students from lower class backgrounds have lower probabilities of completion at Russell Group institutions as compared to students from more advantaged backgrounds. Further analyses confirmed that working class students' lower chances of completion at Russell Group institutions were attributable neither to the types of subjects that they are pursuing nor to differences in academic ability on entry to university.

Chapter 5 also analysed the effect of institutions, but from a different perspective. Instead of looking at structural institutional aspects, chapter 5 analysed the role of teaching and students' satisfaction with teaching quality at their institutions on students' degree completion chances. Specifically, chapter 5 tested the significance of access to faculty members – using the student-faculty ratio at each university as a proxy of access to faculty – and measures of students' satisfaction with teaching quality. The findings showed that the measures of students' satisfaction were not significant predictors of degree completion, whereas the student-faculty ratio was only significant within a small group of universities, the Russell Group.

The results showed that a higher student-staff ratio has a negative effect on students' chances of degree completion, since it affects their access and the possibilities of interaction with faculty members. Russell Group institutions have on average 17.6 students per lecturer (the lower student-staff ratio of the system), whereas New universities have on average 24.3 students per faculty member.

In this chapter, I also tested for differential effects of the teaching measures on students' probabilities of completion. The analyses did not show any indication that student faculty interaction explained the chances of degree completion of either Asian or Black students. These results are noteworthy since they reveal that for students with high (Asian) and low (Black) levels of completion teaching aspects do not seem to play a role in their educational achievements. A similar story was found for students from different class backgrounds. The findings revealed no interaction effect between the student-faculty ratio and students from different class backgrounds.

Finally, in chapter 6, I examined the role that labour market conditions, in particular local unemployment levels, have on degree completion. The results showed that unemployment – overall and youth unemployment – at a student's domicile is a significant predictor of her/his chances of completion.

As in the previous chapters, I tested for differential effects of local unemployment. The analyses focused on those groups that the literature had identified as the most likely to be affected by unemployment conditions: students from lower class backgrounds and ethnic minorities. The findings revealed the existence of significant interaction effects for students from lower class backgrounds. Coming from areas where there are higher levels

of youth unemployment prompts working class students to stay on in education and complete their university degrees. In contrast, unemployment seems to have little appreciable effect on the completion probabilities of ethnic minority students.

7.2.2 Overall summary

Taken as a whole, the empirical research has shown that individual factors are a more significant source of variation in educational attainment than institutional factors. Students' academic preparation on entry to university (attainment on entry) and socio-economic background explain a significant part of the variation in individual chances of degree completion across the system. The multilevel analyses – the variance analyses – revealed that 40 percent of the variation in individual probabilities of degree completion across the system is explained by scores on entry to university. Social class, on the other hand, explains around 15 percent of the variation in individual probabilities of completion.

The results also confirmed that attainment on entry to university and social class are strongly associated, but they also showed that there is a socio-economic gradient in degree completion chances that is not attributable to differences in academic preparation. In relation to institutions, the results obtained in this thesis indicate that selectivity and graduation rates are strongly associated. Hence, institutional effects are restricted only to a small segment of the student population. Institutional effects only takes place in a small number of institutions: the Russell Group of universities. Attending a Russell Group university has a positive overall effect on students' chances of completion. Overall, the analyses revealed that five percent of the variation in individual chances of completion is

attributable to Russell Group institutions. Some of the advantages of attending a Russell Group institution are associated to teaching resources. Access to faculty members is a positive determinant of degree completion chances.

Outside the institutional context of higher education, the results also revealed that the conditions of the local labour market affect students' decision to stay on in higher education. Higher levels of unemployment encourage students to stay in and complete their degrees in higher education. The positive effect of higher unemployment rates at the local level is especially relevant for students from lower class backgrounds.

7.3 Contributions to empirical and theoretical knowledge

7.3.1 On individual and institutional effects in higher education

The findings of this thesis confirmed that the stratification of higher education also translates to different chances of completion. There are socio-economic differences in degree completion chances that are not solely attributable to differences in students' academic preparation (reflected by qualifications and scores on entry to university). The results suggest the existence of secondary effects of social stratification operating in the decision of degree completion. In other words, there are social class differences in educational choices that remain, once has controlled for class differences in performance or academic ability.

On the other hand, the results of this thesis confirmed that selectivity and institutional effects are strongly associated. The positive effect of being in an environment in which interaction with other well prepared students takes place constitutes one of the major dimensions of the educational impact of an institution on their students. The positive effect of attending a Russell Group university on students' chances of degree completion seem to suggest this positive peer contextual effect.

However, it might also be the case that there are unobservable effects operating within the parameters of institutional selectivity. There might be an association between students being enrolled in the most selective institutions in the system and unobservable characteristics such as ambition or determination. It is also possible that the strong positive association between graduation rates and Russell Group institutions reflects to some degree the impact of more stimulating research environments in these institutions.

The second significant finding concerned the potential causes of the high graduation rates at Russell Group universities is related to teaching resources. This research showed that student-faculty ratio and (satisfaction with) faculty feedback are also associated to institutional selectivity. These teaching resources are the more proximate mechanisms through which the general institutional effects of attending a selective institution operate to increase students' chances of degree completion.

Russell Group institutions have a higher number of faculty members per student. It seems reasonable to suppose that a lower ratio of students per faculty member improves the access of students to faculty members. These results confirm previous findings by Bowen, Chingos et al. (2009), who identified this factor as a determinant of the advantages of attending more selective institutions in the USA.

These results, however, leave some open questions in relation to the causality in the relationship between students and faculty members. It is likely that different mechanisms are working in the student-faculty interaction. For instance, it might be the case that more satisfied students at Russell group institutions –who are better prepared academically and devoted more time to their studies- are more confident in seeking out faculty members (and their feedback), rather than becoming more satisfied because of such contacts. On the other hand, it might be suggested that faculty members at those institutions offered signals to their students inviting them to make contact, such as writing laudatory comments in the margins of a student's paper suggesting they talk further about the topic (Kuh, Kinzie et al. 2006:41). Most likely, both forms of student-faculty interaction are operating (Bean and Kuh 1984).

Likewise, this thesis confirmed that there is a gradient for social class effect with regard to the institutional framework. Larger class differences in completion rates were found where the selection is most pronounced in the university system, the Russell Group of institutions. Confirming previous studies, the results of this thesis showed that students from the managerial and professional classes have a higher probability of graduating from a Russell Group University than lower class students (Cheung and Egerton 2007). These results are similar to recent European studies that have found that upper middle class students have higher chances of completion in a Grande École in France or a top university in Germany, Sweden, and Finland (Kivenen and Rinne 1991; Amber and Neathery 1999; Deer 2005; Givord and Goux 2007; Duru-Bellat and Kieffer 2008; Duru-Bellat, Kieffer et al. 2008).

A potential explanation of these class differences at elite institutions is provided by Bourdieu's theory of cultural reproduction. According to this theory, inequalities in educational attainment are explained by the unequal distribution of cultural resources- transmitted from parents to children- among social classes. Students from middle class backgrounds possess cultural resources- as reflected by their "collegiate" cultural capital- that working classes don't. This cultural capital possessed by middle classes reflects a better knowledge and understanding of how institutions work and their requirements.

7.3.2 On the labour market effect on educational decisions

Even though a considerable number of studies have assessed the role of labour market conditions on educational decisions, few studies have tried to systematically test the effect of unemployment conditions by socio-economic background or other stratification variables.

The results of the analyses conducted in chapter 6 revealed robust class differences in the effect of local unemployment. A student's position in the social hierarchy influences their response to labour market conditions. Students from lower class backgrounds are more responsive to what occurs in their local counties. Economic considerations may be a significant reason to continue in education rather than drop out. Likewise, the findings showed the contrast between cosmopolitan and local choosers in higher education. Students' choices reflect different kinds of attachments to locality.

It is likely that anticipated unemployment risks and discrimination in the labour market encourage working class students to stay in university and complete their degrees. However, it was somewhat surprising that for ethnic minorities, traditionally portrayed as concerned about discrimination in the labour market (Riach and Rich 2002), labour market conditions seem to play no significant role in the decision to stay in university.

7.3.3 On the use of multilevel models and cross classified models

This study has been methodologically innovative within the study of higher education in the UK because it simultaneously drew on individual and aggregate level data (institutional and contextual information). Adjusting by students' intake characteristics, the thesis has estimated institutional effects. In addition, this research has been able to probe the interaction between individual and institutional aspects on degree completion chances. Each chapter of this thesis has explored cross level effects between individual background characteristics and institutional aspects, examining how the effect of determined institutional contexts affected different student populations, especially students from different class backgrounds. Similarly, the study of labour market effects employed cross classified models, which also considered the analyses of cross level effects, to analyse the effect of local unemployment on different student populations.

7.4 Further research

The results of this thesis have revealed that institutional effects do not take place independent of the academic preparation of the students enrolled in universities. More

teachers and contextual peer effects (better prepared students) are strongly associated to selectivity. However, some international literature has suggested that there are good practises in higher education that are essentially independent of the academic preparation of the students enrolled (Pascarella, Cruce et al. 2006). In other words, institutional effects are not exclusively linked to selectivity.

The research has concluded that those practices are amenable to the influence of institutional policies and practices (Kuh and Hu 2001). For instance, increased financial support and work opportunities, instructional clarity and organisation, preparation of classes, and other provisions seem to have a positive effect on students' outcomes (Pascarella and Terenzini 1991; Pascarella and Terenzini 2005; Bowen, Chingos et al. 2009).

More research is needed to identify the specific aspects related to teaching that improve students' chances of degree completion. For instance, further research should complement the findings of this thesis about the effect of the student-staff ratio. It is necessary to acknowledge that this measure is a raw indicator of the access to faculty. A recent report in the Times Higher Education (2012) showed that some of this data is not completely accurate. For instance, staff considered 'research-teaching academics' might be classed as spending all their time on teaching but actually devote as little as one day a week to it.

On the other hand, it would be advisable to pursue more research in relation to the socio-economic difference in graduation rates among students of comparable academic ability within Russell Group universities. More research needs to be done in order to explore the reasons for the underperformance of students from different backgrounds in the most selective institutions. It is especially important to identify the causes for this disparity

within selective institutions with the purpose of developing institutional strategies that might allow to those who come from less advantaged backgrounds to succeed in the system.

Appendices

Appendix A: List of institutions identified by type of university

The Russell Group

The University of Bristol
The University of Birmingham
The University of Cambridge
Cardiff University
The University of Edinburgh
The University of Glasgow
Imperial College, London
Kings College London
The University of Leeds
The University of Liverpool
London School of Economics
University of Manchester
The University of Newcastle
The University of Nottingham
The University of Oxford
The University of Sheffield
The University of Southampton
University College London
The University of Warwick

Old (pre-1992) HEI

University of Durham
University of Wales, Aberystwyth
The University of Wales, Lampeter
University of Wales, Bangor
The Queen's University of Belfast
The University of Leicester
The University of Exeter
The University of Hull
The University of Keele
The University of Reading
University of Wales, Swansea
Goldsmiths College
The School of Oriental & African Studies
Royal Holloway & Bedford New College
Queen Mary and Westfield College
The University of Aberdeen
The University of York
The University of Lancaster
The University of East Anglia
The University of Essex

New (post-1992) HEIs

The University of Westminster
Middlesex University
The University of Greenwich
London Guildhall University
University of North London
The University of East London
South Bank University
Thames Valley University
University of Surrey, Roehampton
The University of Plymouth
University of the West of England
Cranfield University
University of Gloucestershire
Bournemouth University
Oxford Brookes University
The University of Brighton
Kingston University
The University of Portsmouth
Sheffield Hallam University
The Nottingham Trent University
De Montfort University
University of Derby
The University of Lincoln
The University of Central England
Staffordshire University
Coventry University
The University of Wolverhampton
Anglia Polytechnic University
University of Hertfordshire
University of Luton
The University of Northumbria
The University of Teesside
The University of Sunderland
The Manchester Metropolitan University
Liverpool John Moores University
The University of Central Lancashire
University of Glamorgan
The University of Huddersfield
Leeds Metropolitan University
University of Ulster
Glasgow Caledonian University

The University of Sussex
The University of Kent at Canterbury
The University of Manchester (UMIST)
Loughborough University
The University of Bath
Aston University
The University of Surrey
Brunel University
City University
The University of Bradford
The University of Salford
The University of Dundee
Heriot-Watt University
The University of Strathclyde
The University of Stirling

Napier University
University of Abertay Dundee
The University of Paisley
The Robert Gordon University
Bath Spa University College
Buckinghamshire Chilterns University
College
University College Chichester
Harper Adams University College
University College Worcester
Canterbury Christ Church University
College
University College Northampton/Nene
Stranmills University College
Queen Margaret University College

Appendix B: Binomial Logistic Regression analyses for predicting Degree Completion using categorical variable for scores on entry (eleven categories)

	Log Odds	SE	Log Odds	SE
Constant	2.88***	0.04	1.99***	0.06
Student's Background				
Young (mature ref.)	0.05**	0.02	-0.08***	0.02
Male (female ref.)	-0.24***	0.01	-0.21***	0.01
Higher managerial/profess.(ref.)				
Lower managerial and professional occupations	-0.21***	0.02	-0.13***	0.02
Intermediate occupations	-0.24***	0.03	-0.12***	0.03
Small employers and own account workers	-0.36***	0.03	-0.21***	0.03
Lower supervisory and technical occupations	-0.4***	0.04	-0.25***	0.04
Semi-routine occupations	-0.44***	0.03	-0.25***	0.04
Routine occupations	-0.52***	0.04	-0.32***	0.04
White (ref. category)				
Black	-0.13***	0.03	-0.03	0.03
Asian	0.1***	0.02	0.2***	0.02
Other	-0.16***	0.03	-0.12***	0.03
Schooling (prev. school attended)				
Private (ref.)				
From state-funded school or college	-0.34***	0.03	-0.1***	0.03
Unknown school type	-0.72***	0.03	-0.33***	0.03
Attainment on Entry				
A-level (ref.)				
Non qualification	-0.72***	0.04	-0.22***	0.05
O level or equivalent	-0.36***	0.03	0.04	0.04
Vocational	-0.54***	0.03	-0.02	0.04
Sub degrees in HE	-0.28***	0.03	0.2***	0.04
Scores on entry (eleven categories)				
First (ref.category)				
Second			0.06	0.05
Third			0.04	0.03
Fourth			0.25***	0.04

Fifth		0.37***	0.04
Sixth		0.54***	0.03
Seventh		0.77***	0.04
Eight		0.93***	0.04
Ninth		1.2***	0.04
Tenth		1.27***	0.04
Eleventh		1.72***	0.05
N=	179289		179289

Appendix C: Means and standard deviations of Independent Variables

Explanatory Variables	Mean	St. Dev.	Min.	Max.
University Variables				
Type of Universities				
New Universities	0.53			
Old Universities	0.22			
Russell Group Universities	0.24			
Selectivity	2.09	97.20	-219.02	263.92
Size (number of students)	21526	8781	645	52890
Subjects				
Medicine/Dentistry	allied			
subjects	0.02			
Nursing	0.06			
Biological Sciences	0.06			
Veterinary	0.02			
Physical Sciences	0.04			
Maths	0.02			
Engineering	0.02			
Technology	0.05			
Architecture	0.02			
Social Studies	0.1			
Law	0.06			
Business/Administration	0.1			
Communication/Media	0.04			
Linguistic/Classic	0.06			
Other languages	0.005			
History/Philosophy	0.07			
Arts	0.13			
Education	0.04			
Combined	0.001			
Computing Sciences	0.03			
Psychology	0.05			
Agriculture	0.004			
Economics	0.03			

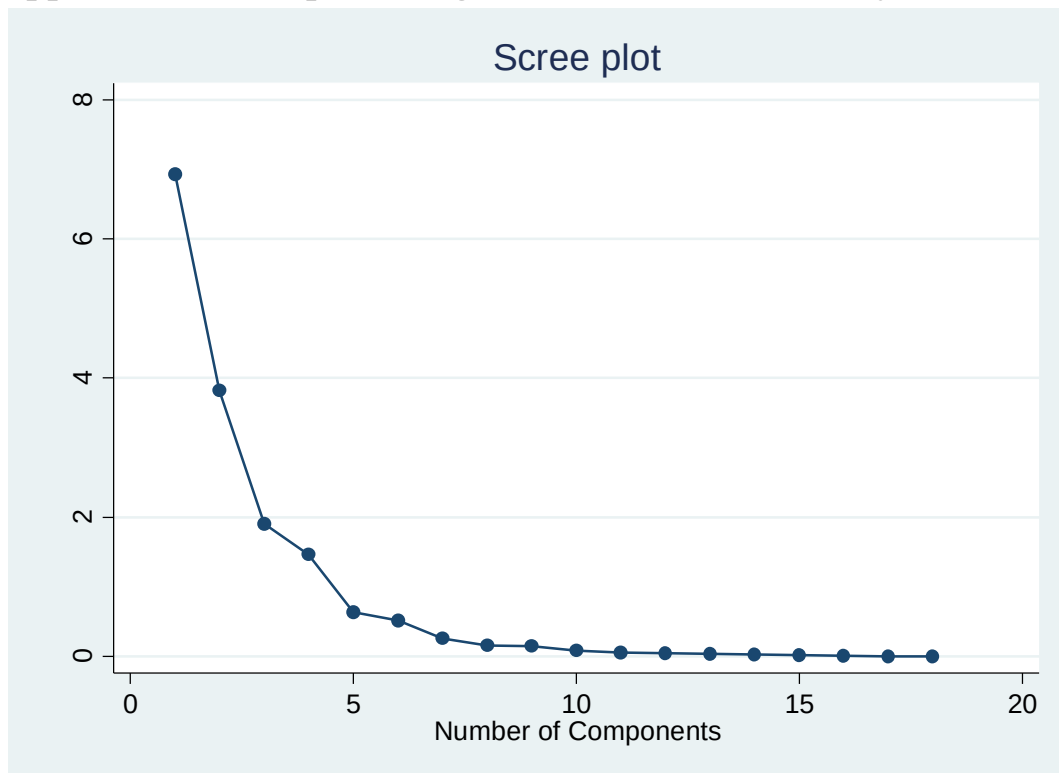
Appendix D: Completion rates by subjects and institutions in 2007

Programmes	Type of Universities			
	New Universities	Old Universities	Russell Group	Total
Subjects allied to				
Medicine/Dentistry	87.8	92.0	94.9	92.3
Nursing	81.1	84.9	87.5	83.1
Biological Sciences	80.9	88.1	92.7	86.0
Veterinary	81.4	87.5	93.2	85.5
Physical sciences	82.2	87.1	90.6	86.8
Maths	80.6	87.8	92.3	89.2
Engineering	76.5	80.1	87.9	81.2
Technology	78.9	87.8	90.2	83.1
Architecture	78.8	79.6	93.0	82.7
Social Studies	79.4	87.5	92.3	84.8
Law	82.6	90.6	95.2	88.2
Business/Administration	77.5	86.2	94.0	82.3
Media/Communication	80.3	87.2	91.7	82.0
Linguistic/Classics	78.4	90.2	94.6	87.4
Other languages	80.2	80.6	90.2	83.2
History/Philosophy	79.5	89.8	93.8	89.0
Arts	81.6	85.5	90.1	82.6
Education	83.2	87.2	88.4	83.9
Combined Subjects	77.9	77.9	90.9	79.9
Computing Sciences	73.8	81.4	85.2	78.2
Psychology	82.0	88.7	93.5	86.1
Agriculture	81.1	87.8	88.2	84.2
Economics	76.1	88.9	94.4	89.5
Total	80.24	87.45	92.47	84.85

Appendix E: Random Coefficient Models for predicting the effect of Russell Group Institutions on ethnic minorities' chances of degree completion

	Log odds	S.E	Log odds	S.E	Log odds	S.E	Log odds	S.E
Fixed Effects								
Intercept	1.98**	0.078	1.98**	0.078	1.98***	0.078	1.98***	0.078
Individual Variables								
Asian (dummy)	0.19***	0.05	0.20***	0.049				
Black (dummy)					-0.02	0.045	-0.03	0.046
University variables								
Russell group universities	0.50***	0.13	0.50***	0.133	0.49***	0.133	0.49***	0.133
Cross interaction								
Asians*Russell group			-0.04	0.120				
Black*Russell group							0.03	0.167
Random Part								
Asian Variance	0.08	0.024	0.08	0.024				
Black Variance					0.04	0.026	0.04	0.026
Between University Variance	0.14	0.020	0.14	0.020	0.14	0.020	0.14	0.020
Number of Universities	132		132		132		132	
Number of students	171909		171909		171909		171909	

Appendix F: Scree plot of Eigenvalues after factor analysis



Appendix G: Factor Pattern Loadings for Three and Four factor Solutions (NSS 2007 data)

	Three factor solution			Four factor Solution			
	1	2	3	1	2	3	4
1 The staff are good at explaining things	0.89	0.16	-0.04	0.46	0.62	-0.05	-0.10
2 The staff have made the subject interesting	0.62	0.46	-0.22	-0.08	0.87	0.21	-0.10
3 The staff are enthusiastic about what they are teaching	0.76	0.38	-0.09	0.02	0.92	0.12	0.01
4 The course is intellectually stimulating	0.83	-0.10	0.18	0.44	0.54	-0.27	0.13
5 The criteria used in marking have been clear in advance	-0.04	0.54	-0.02	0.22	-0.26	0.63	-0.13
6 The assessment arrangements and marking have been fair	0.35	0.39	0.24	0.57	-0.17	0.45	0.04
7 Feedback on my work has been prompt	0.16	0.67	0.29	0.11	0.00	0.69	0.25
8 I have received detailed comments on my work	-0.09	0.92	-0.21	-0.19	0.11	0.89	-0.16
9 The feedback on my work has helped me clarify things I did not understand	-0.02	0.93	-0.01	-0.15	0.10	0.91	0.03
10 I have received sufficient advice and support with my studies	0.49	0.74	-0.01	0.06	0.50	0.60	0.03
11 I have been able to contact staff when I needed to	0.84	0.16	0.12	0.37	0.62	-0.03	0.10
12 Good advice was available when I needed to make study choices	0.41	0.74	-0.04	-0.09	0.55	0.60	0.06
13 The timetable works efficiently as far as my activities are concerned	0.68	0.06	0.24	0.90	-0.04	0.03	-0.05
14 Any changes in the course or teaching have been communicated effectively	0.79	-0.04	0.29	0.90	0.06	-0.10	0.02
15 The course is well organized and is running smoothly	0.83	-0.03	0.26	0.96	0.08	-0.11	-0.04
16 The library resources and services are good enough for my needs	-0.01	-0.08	0.77	-0.07	-0.16	0.02	0.82
17 I have been able to access general IT resources when I needed to	0.13	-0.13	0.73	-0.02	-0.04	-0.07	0.79
18 I have been able to access specialized equipment, facilities or room when I needed to	0.30	-0.03	0.81	0.03	0.10	0.01	0.91

Extract Method: Iterated Principal Factor Analysis. Rotation Method: Oblique promax

Appendix H: Means and Values of Institutional Variables

Institutional Variables	Mean	SD	Min	Max
Structural Variables				
Size	21215	8754	645	52890
Institutional Selectivity	2.09	97.20	-219.02	263.92
Type of University				
New Universities	0.53			
Old Universities	0.22			
Russell Group	0.24			
Teaching Variables				
	Mean	SD	Min	Max
Teaching Resources				
Student faculty ratio	21.4	5.2	5.8	63.6
Students' satisfaction with teaching quality (NSS)				
Factor 1 (Teaching Organization/Preparation)				
	-0.2	1.02	-3.01	2.29
The staff are good at explaining things	0.87	0.04	0.70	0.95
The staff have made the subject interesting	0.78	0.05	0.65	0.94
The staff are enthusiastic about what they are teaching	0.82	0.05	0.71	0.94
The course is intellectually stimulating	0.81	0.06	0.66	0.96
I have been able to contact staff when I needed to	0.79	0.07	0.57	0.93
The timetable works efficiently as far as my activities are concerned	0.76	0.05	0.56	0.88
Any changes in the course or teaching have been communicated effectively	0.65	0.09	0.41	0.86
The course is well organized and is running smoothly	0.67	0.09	0.40	0.87
Factor 2 (Advice/Feedback from teachers)				
	-0.20	0.85	-4.15	2.50
The criteria used in marking have been clear in advance	0.69	0.06	0.44	0.82
Feedback on my work has been prompt	0.54	0.08	0.30	0.85
I have received detailed comments on my work	0.62	0.11	0.17	0.87
The feedback on my work has helped me clarify things I did not understand	0.55	0.07	0.25	0.81
I have received sufficient advice and support with my studies	0.70	0.06	0.51	0.88
Good advice was available when I needed to make study choices	0.67	0.05	0.45	0.88
Factor 3 (Learning Resource)				
	0.23	0.84	-2.12	2.55
The library resources and services are good enough for my needs	0.77	0.09	0.48	0.97
I have been able to access general IT resources when I needed to	0.84	0.06	0.63	0.96
I have been able to access specialized equipment, facilities or room when I needed to	0.73	0.07	0.54	0.93

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