

Benchmarking the Union post-Brexit: Analysing the impact of Brexit on Scottish voters' attitudes towards independence



Peter Bristow

MPhil in Politics: European Politics and Society

Thesis submitted in partial fulfilment of the requirements for the degree of Master of Philosophy (MPhil) in Politics: European Politics and Society in the Department of Politics and International Relations at the University of Oxford

Trinity Term 2023

Word Count: 29,298

Abstract

Brexit has both complicated and reignited the Scottish independence debate but its effect on public opinion is uncertain. This study seeks to address this empirical question and further our understanding of support for Scottish independence by assessing the over-time effect of Brexit on independence attitudes during the Brexit negotiation period. To do this, it exploits British Election Study panel data and uses a series of change-on-change and fixed effects models to estimate the relationship between voters' Brexit evaluations and independence attitudes over the Brexit process period. In so doing, it also investigates heterogeneity between sub-groups of Scottish voters. Its findings suggest that voters' assessments of Brexit's success/failure (particularly regarding its economic consequences) did influence their independence attitudes over this period. They also show that Brexit mattered most to those voters whose support in a future independence referendum will prove decisive – i.e., previously uncertain and unattached voters. This thesis attributes these findings to the “benchmarking” approach which conceptualises public opinion about constitutional change in rational, relational and dynamic terms. Using BES panel data to look through the lens of relative government performance assessments and an original online survey experiment to look through the lens of relative economic performance evaluations, it demonstrates that the “benchmarking” mechanism can be applied to the Scottish setting. Thus, it argues that the “benchmarking” approach not only serves as a useful theoretical tool to better understand the dynamics of independence support but also provides a plausible explanation for the link between Brexit and independence attitudes. In so doing, this thesis contributes to the literature on Brexit and Scottish nationalism, fills a gap in the literature regarding sub-group heterogeneity and, by applying ‘benchmark’ theory to the sub-national context, speaks to the larger literature on the dynamics of support for separatist movements within multinational states.

Acknowledgements

If this thesis reads coherently and if it makes even the tiniest contribution to the political science literature, it does so in no small part due to the support, guidance and encouragement of many. Whilst I shall not list all these names, there are a few people whom I would like to especially acknowledge. Firstly, I would like to thank my supervisor Prof Jane Green for her unwavering kindness as well as for sharing her invaluable insights into British politics and words of advice throughout this process. I would also like to especially thank Dr Leonardo Carella for teaching me all the R I know and for the time he spent answering my emails about econometric minutia; much of the empirical analysis outlined in this thesis would not have been possible without his invaluable guidance. Moreover, I would also like to thank the entire SES team, most especially Prof Rob Johns, Prof Ailsa Henderson, Dr Fraser McMillan and Dr Jac Larnier for not only accepting my survey experimental plan and for running it in their SCOOP survey, but also for the support and encouragement they gave me along the way. I learnt a great deal about Scottish politics, surveys and academic research from the conversations we had together which will stay with me long beyond this thesis project.

To my fellow course mates: thank you for accepting me as the token home student in the cohort and for the encouragement and friendship you have shown over the last 2 years. In particular, I would like to give a shout-out to Jacek Sagatowski and Max Lehmann for your help in proof-reading and for keeping me sane during the late nights and early mornings in the department. The memories made in Tirana straight after submitting are truly ones to cherish and marked a fitting end to our studies in European politics. To Mary: thank you for your love and support and for bearing with me throughout the writing and re-writing process. And most importantly, to my parents and family without whom nothing like this would have been remotely possible: your love and support has been immeasurable in so many ways for so many years and so, this thesis is dedicated to Mum and Dad and to Grandma June who we sadly lost during my time at Oxford.

Table of Contents

ABSTRACT	2
ACKNOWLEDGEMENTS	3
LIST OF TABLES	6
LIST OF FIGURES	7
CHAPTER 1: INTRODUCTION	8
CHAPTER 2: BREXIT, SUPPORT FOR SCOTTISH INDEPENDENCE AND THE “BENCHMARKING” MECHANISM	12
2.1: EXISTING LITERATURE.....	12
2.1.1: <i>Determinants of support for Scottish independence</i>	12
2.1.2: <i>The impact of Brexit on independence support</i>	17
2.2: WHY SHOULD BREXIT MATTER, AND FOR WHOM SHOULD IT MATTER? INTRODUCING “BENCHMARK” THEORY	20
2.3: RESEARCH GAPS	24
2.4: RESEARCH QUESTIONS AND HYPOTHESES	26
CHAPTER 3: DATA AND METHODS	29
3.1: CAUSAL IDENTIFICATION CHALLENGES.....	29
3.2: EMPIRICAL STRATEGY 1 - PANEL CHANGE-ON-CHANGE MODEL	31
3.2.1: <i>Estimating the impact of Brexit evaluations on independence attitudes</i>	32
3.2.2: <i>Estimating sub-group heterogeneity</i>	35
3.2.3: <i>Estimating the impact of relative assessments on independence attitudes</i>	37
3.3: EMPIRICAL STRATEGY 2 - PANEL FIXED EFFECTS MODEL.....	42
3.3.1: <i>Estimating the impact of Brexit evaluations on independence attitudes</i>	43
3.3.2: <i>Estimating the impact of relative assessments on independence attitudes</i>	44
3.3.3: <i>Limitations of my Panel Data Analysis</i>	45
3.4: EMPIRICAL STRATEGY 3 – ONLINE SURVEY EXPERIMENT	46
3.4.1: <i>Experimental Design</i>	47
3.4.2: <i>Estimating the average treatment effect</i>	50
3.4.3: <i>Estimating treatment effect heterogeneity</i>	52
3.4.4: <i>Experimental Assumptions and Limitations</i>	53
CHAPTER 4: RESULTS PART I	55
THE ASSOCIATION BETWEEN BREXIT EVALUATIONS AND INDEPENDENCE ATTITUDES OVER TIME	55

4.1: CHANGE-ON-CHANGE METHOD.....	55
4.2: PANEL FIXED EFFECTS METHOD.....	59
4.3: ARE LEADER EVALUATIONS DRIVING THIS ASSOCIATION?	62
4.4: MAIN FINDINGS	64
CHAPTER 5: RESULTS PART II	65
SUB-GROUP HETEROGENEITY – FOR WHOM DOES BREXIT MATTER?	65
5.1: PREVIOUSLY CERTAIN VS UNCERTAIN VOTERS.....	65
5.2: PREVIOUSLY ATTACHED VS UNATTACHED VOTERS	69
5.3: CROSS-PRESSURED VS ALIGNED VOTERS.....	70
5.4: MAIN FINDINGS	72
CHAPTER 6: RESULTS PART III.....	73
TESTING THE UNDERLYING “BENCHMARKING” MECHANISM.....	73
6.1: THE ASSOCIATION BETWEEN RELATIVE GOVERNMENT PERFORMANCE ASSESSMENTS AND INDEPENDENCE ATTITUDES	73
6.2: EXPERIMENTAL FINDINGS – THE EFFECT OF VARYING THE RELATIVE APPEAL OF THE SQ VS AS.....	77
6.3: EXPERIMENTAL FINDINGS – HETEROGENEOUS TREATMENT EFFECTS.....	82
6.3.1: <i>Attached vs unattached voters</i>	82
6.3.2: <i>Certain vs uncertain voters</i>	83
6.3.3: <i>Believers vs non-believers</i>	83
6.4: MAIN FINDINGS.....	86
CHAPTER 7: DISCUSSION AND CONCLUSION	87
7.1: SUMMARY OF KEY FINDINGS	87
7.2: IMPLICATIONS AND CONTRIBUTIONS	88
7.3: LIMITATIONS AND AVENUES FOR FUTURE RESEARCH.....	93
7.4: CONCLUSION	94
BIBLIOGRAPHY	97
APPENDIX.....	103
SECTION A: FIXED EFFECTS MODELS ESTIMATING THE OVER-TIME BREXIT EFFECT	103
SECTION B: SUB-GROUP HETEROGENEITY	106
SECTION C: DETAILS OF BES DATA USED.....	115
SECTION D: MODELS ESTIMATING THE IMPACT OF RELATIVE GOVERNMENT PERFORMANCE ASSESSMENTS ON INDEPENDENCE ATTITUDES	128
SECTION E: ONLINE SURVEY EXPERIMENT.....	134

List of Tables

Table 1: OLS Regression of Change in independence happiness score on Change in overall Brexit evaluations (wave 11-wave 17)	57
Table 2: OLS Regression of Change in independence happiness score on Change in economic Brexit evaluations (wave 11-wave 17)	58
Table 3: Summary of Fixed Effects results – Overall Brexit evaluations	60
Table 4: Summary of Fixed Effects results – Economic Brexit evaluations	60
Table 5: OLS Regression of Wave 11-Wave 17 Change in independence happiness score with sub-group interaction terms – Overall Brexit evaluations	67
Table 6: OLS Regression of Wave 11-Wave 17 Change in independence happiness score with sub-group interaction terms – Economic Brexit evaluations	68
Table 7: Multinomial Logit Model of Change in indyref vote intention on Change in relative UK vs Scottish govt performance evaluations [wave 7 - wave 17]	76
Table 8: Multinomial Logit Model of Change in indyref vote intention on Change in relative UK govt vs EU performance evaluations [wave 7 - wave 10]	76
Table 9: OLS Regression of Independence happiness score on treatment status conditional on prior certainty, prior attachment and believability	85
Table A1-A6: Fixed Effects Logit Regression Models – Full tables	103
Table B1: Full regression table investigating sub-group heterogeneity – Overall Brexit evaluations	113
Table B2: Full regression table investigating sub-group heterogeneity – Economic Brexit evaluations	114
Table C2: Details of variables and coding of BES survey data	118
Table D1: Multinomial Change-on-Change model estimating the impact of “Scottish government performance premium”	128
Tables D2.1-D2.3: Fixed Effects Logit Regression Models estimating the impact of “Scottish government performance premium”	129
Tables D3.1-D3.3: Multinomial Change-on-Change Models estimating the impact of “Scottish government competence evaluations” – Covid case study	131
Table D4: Multinomial Change-on-Change model estimating the impact of “EU performance premium”	133
Table E5: Survey Experiment Balance Test 1 [Multinomial Logit Model]	141
Table E6: Survey Experiment Balance Test 2 [Multinomial Logit Model]	143
Table E8: Full Experimental Results: OLS Regression of Happiness Score on treatment condition	146
Table E10: Multinomial Logit model of Follow-up Q response	148
Table E11: Details of variables and coding of SES survey data	149

List of Figures

Figure 1: Ridgeline plot of survey experimental results.....	79
Figure 2: Survey Experiment Coefficient Plots.....	81
Figure B1: Interaction plot of previously uncertain and change in overall Brexit evaluations.....	106
Figure B2: Interaction plot of previously uncertain and change in economic Brexit evaluations	107
Figure B3: Interaction plot of previously unattached and change in overall Brexit evaluations.....	108
Figure B4: Interaction plot of previously unattached and change in economic Brexit evaluations...	109
Figure B5: Interaction plot of Yes Remainer and change in overall Brexit evaluations	110
Figure B6: Interaction plot of Yes Leaver and change in overall Brexit evaluations	110
Figure B7: Interaction plot of No Leaver and change in overall Brexit evaluations.....	111
Figure B8: Interaction plot of Yes Remainer and change in economic Brexit evaluations.....	111
Figure B9: Interaction plot of Yes Leaver and change in economic Brexit evaluations	112
Figure B10: Interaction plot of No Leaver and change in economic Brexit evaluations	112
Figure E7: Histograms of Raw Experimental Results by sub-group.....	145
Figure E9: Histograms of Follow-up question response by sub-group [that received it].....	147

Chapter 1: Introduction

The United Kingdom's (UK) decision to leave the European Union (EU) has both complicated and brought new energy to Scotland's constitutional debate. According to the Scottish National Party (SNP), it provides yet another illustration of how Scotland's democratic wishes are oftentimes side-lined within the Union given that Scotland was obliged to exit the EU despite voting to 'Remain' by 62% to 38% (Curtice, 2022a; McEwen, 2018; Sturgeon, 2020). It also, they argue, constitutes a "significant and material change" to the circumstances in which Scotland voted against independence in 2014 and as such, repeated calls for a second independence referendum have been made in order to "secure Scotland's place in Europe" (Smith, 2023; Sturgeon, 2016). On the other hand, independence post-Brexit is now a very different prospect to that which was presented to the Scottish electorate in 2014 and so Brexit has also created a raft of new challenges for the nationalist movement (Macwhirter, 2020). For instance, assuming that re-joining the EU's economic institutions remains the official goal of the "Yes Scotland" campaign, independence would now necessitate some form of customs border between Scotland and its largest trading partner, England (Curtice, 2017; Hepburn et al., 2021; Paun et al., 2021). Thus, the overall directional effect of Brexit on Scottish public opinion about independence, if indeed there is any, is not intuitively obvious.

It is also empirically uncertain. Indeed, whilst previous research has exploited cross-sectional polling data to identify patterns in 'Yes' support in recent years, there remains a lack of consensus as to whether Brexit has had a meaningful impact on voters' attitudes towards independence. For instance, whilst some studies pointed towards a spike in aggregate independence support in the immediate aftermath of the EU referendum (Curtice, 2016a, 2016b), other more recent studies maintain that, contrary to the expectations of many nationalists, Brexit did not result in a sustained increase in support for independence (Henderson et al., 2022; Montagu, 2019; Swan, 2017). Further, whilst many scholars have argued that the Brexit process did influence voters' independence attitudes *over time* (as its consequences began to sink in) and as a result changed the composition of the nationalist and unionist movements, these results predominantly rely on descriptive analyses of cross-sectional data (Curtice & Montagu, 2020; Ford & Sobolewska, 2020; Henderson et al., 2022; Johns, 2022). Hence, the link between the Brexit process and voters' independence attitudes remains contested and worthy of further empirical investigation.

On top of this, the existing literature on Brexit and Scottish nationalism also lacks a thorough investigation of which sub-groups of Scottish voters have been most and least impacted by the Brexit process in terms of their propensity to support secession. This matters because, in a context where Scotland's constitutional future hangs in the balance, this could shine a light on the groups of voters who might prove pivotal in determining the direction of any future vote on independence. It could also offer us a more general insight into which sub-groups' constitutional preferences are typically more susceptible to changing economic conditions.

Therefore, to fill this gap and further our understanding of Scottish public opinion in light of Brexit, this research uses both observational and experimental methods to assess the following research question:

Has Brexit had an impact on Scottish voters' support for independence, and if so, how, to what extent, why and for whom?

To do so, I first exploit data from the British Election Study's (BES) Internet Panel to estimate the extent to which variation in voters' evaluations of the perceived success/failure of Brexit explained the variation in their independence attitudes over the Brexit process period (defined as the period from June 2016 to January 2020, when the consequences of Brexit became clearer). Through a series of change-on-change and panel fixed effects models, I show that there was a strong negative association between voters' evolving Brexit evaluations and independence attitudes over this period and particularly when Brexit assessments are defined in relation to its economic consequences. Therefore, given that the panel data analysis techniques used allow me to weed out time-invariant individual-specific confounders and isolate within-individual effects over time, my findings suggest that the Brexit process did have an influence on voters' independence attitudes at the individual level. Moreover, through a series of interaction estimations, I also find that voters who were previously uncertain about their independence support and those who did not identify with either the 'Yes' or 'No' side at the start of the Brexit process period were most impacted by short-term fluctuations in their Brexit evaluations.

As a potential explanatory mechanism for these findings, this thesis proposes an application of the "benchmarking" approach. Initially formulated as a way of understanding Euroscepticism across Europe, this theoretical approach conceptualises public opinion about constitutional

changes as a rational evaluation of the *relative* costs/benefits of the ‘status quo’ (SQ) versus the ‘alternative state’ (AS) (De Vries, 2018). To test whether this “benchmarking” mechanism has empirical leverage in the Scottish context, I first use BES data to look through the lens of *relative* government performance evaluations. In particular, I analyse the impact of *relative* government performance assessments in general and in relation to the handling of the Covid-19 pandemic. My findings reveal that there is a significant association between voters’ *relative* assessments of government quality in the SQ (proxied by Westminster evaluations) versus the AS (proxied by Holyrood and Brussels evaluations) and their independence attitudes. Beyond this, I also test the validity of the “benchmarking” mechanism through an original online survey experiment which randomly primed respondents with different hypothetical future scenarios that varied the *relative* economic performance between the SQ and AS. My experimental findings demonstrate that *relative* assessments have a significant effect on independence attitudes. In particular, they reveal that being primed with positive information about the economic prospects of the AS does not increase support for independence if it is also accompanied with equally positive information about the SQ – independence support only changes if the *relative* appeal changes. And so, this thesis argues that the “benchmarking” mechanism can be applied to the Scottish setting to help connect the dots between voters’ Brexit evaluations and independence attitudes. Brexit, it would seem, changed the nature of the SQ *relative* to the AS and as a result, Scottish voters (most especially those who were previously uncommitted to the nationalist or unionist cause) adjusted their independence attitudes. Specifically, those who believed Brexit increased (decreased) the *relative* appeal of the AS became more (less) supportive of independence.

Why is this research important? Firstly, it contributes to the literature on Brexit and Scottish nationalism by revealing how the EU dimension has become deeply intertwined with Scotland’s constitutional debate. It fills a gap in the literature by using panel data to expose the *over-time* effect of voters’ Brexit evaluations over the Brexit process period. Beyond this, both my observational and experimental findings confirm the popular argument that economic evaluations are central to the independence debate. Moreover, by providing the first systematic analysis of sub-group heterogeneity in the relationship between Brexit and independence assessments, this research not only plugs a gap in the existing literature but also indicates that Brexit is a potential factor which could mobilise the pivotal undecided voters to support secession. In a context where independence support is hovering around 50% and where a

second independence referendum is, if not likely, then certainly possible in the not-too-distant future, this is a highly relevant and important finding (What Scotland Thinks, 2023).

Furthermore, this research also makes a significant contribution by demonstrating that the “benchmarking” approach provides a compelling theoretical framework through which to understand the dynamics of separatist attitudes in Scotland. In so doing, it not only builds on existing studies by applying this approach to the sub-national level, but it also tells us that *relativity* matters in shaping voters’ constitutional preferences. Hence, it demonstrates the importance of both Scottish and UK-wide government performance on the likelihood of secession and implies that governmental leaders hold a degree of agency in shaping Scotland’s constitutional future. More broadly, it also shines a light on the psychology of voters’ decision-making regarding Scottish independence. In particular, it reveals that independence preferences are not just driven by symbolic/emotional concerns but also by instrumental/rational considerations and hence it speaks to the wider literature on the psychology of voters’ constitutional decision-making. Thus, although I focus exclusively on the Scottish case, the insights acquired from this research could also have wider generalisability in the literature on public support for separatist movements in multi-national states.

This thesis is structured as follows. Chapter 2 sets the scene by reviewing the existing literature and identifying the gaps I intend to fill. It also describes the “benchmarking” theoretical framework and outlines my specific research questions and hypotheses. Chapter 3 describes in detail the methodology employed to answer the research questions. The next three chapters then present my empirical findings. Chapter 4 reports the results of the panel data analysis of the impact of Brexit evaluations on independence attitudes. Chapter 5 reveals the extent of sub-group heterogeneity. And Chapter 6 presents the results of my observational and experimental research testing the validity of the “benchmarking” mechanism. Lastly, Chapter 7 concludes this thesis with a discussion of the implications of my findings and potential avenues for future research.

Chapter 2: Brexit, support for Scottish independence and the “benchmarking” mechanism

This chapter outlines the empirical puzzle I intend to address, narrowly defines my research questions and hypotheses and locates this thesis within the wider academic literature. As a starting point, it briefly reviews the existing literature on the drivers of Scottish voters’ secessionist attitudes and the extent to which Brexit has affected support for Scottish independence. It then describes the theoretical framework used throughout this thesis to better understand why and the ways in which Brexit might have affected independence attitudes – i.e., the “benchmarking” mechanism. Next, it summarises the unanswered questions and gaps in the literature that this thesis intends to address. It then concludes by precisely defining my research question and the sub-questions I use to answer this research question along with my specific hypotheses derived from the “benchmarking” framework.

2.1: Existing Literature

2.1.1: Determinants of support for Scottish independence

In seeking to further our understanding of the impact of Brexit on Scottish voters’ separatist attitudes, I build on a large body of existing literature which offers numerous competing explanations of the underlying drivers of independence support. These can broadly be categorised into three competing schools, namely the ‘identity’, ‘materialist’ and ‘consequentialist’ approaches, as outlined below.

Identity approach

Firstly, some scholars have focused on identity as the key, deeply-rooted driver of independence support (Jolly, 2014; Marr, 2016; Moreno, 2006; Sorens, 2005). They argue that what underlies secessionist support is a wish amongst those who hold a strong attachment to the Scottish nation combined with a weak affinity towards the collective British nation for their distinctive sense of nationhood to be expressed and politically recognised via independent statehood (Gellner, 1983; Keating, 2017). In other words, it is all about how you feel and what

you feel closer to. Indeed, the main hypothesis that arises from this ‘identity school’ – i.e., that those who feel more Scottish and less British are more likely to support independence and vice versa – is supported by a wealth of empirical evidence (Bond, 2015; Curtice, 2013). For instance, Henderson et al. (2022) find that those voters who felt most Scottish and least British on a relative territorial identity (RTI) scale near uniformly voted ‘Yes’ in 2014 (> 90%) whilst those who felt most British and least Scottish near uniformly voted ‘No’ (> 99%). Moreover, more recent Scottish Social Attitudes (SSA) survey data reveal that 77% of those who responded “Scottish, not British” to the ‘Moreno question’¹ in 2019 supported independence compared to only 23% of those who felt “more British than Scottish/British, not Scottish” (Scholes & Curtice, 2020). Curtice (2013) and Bond & Rosie (2010) also point out that, despite levels of exclusive national identity in Scotland remaining relatively stable over time, the association between identity and support for independence has become increasingly robust in the last decade. Indeed, SSA data show that the difference in independence support between those who feel “Scottish, not British” and those who feel “more British than Scottish/British, not Scottish” increased from +37 in 2010 to +54 in 2019 (Scholes, 2021). On top of this, others have also found that Scottish ethnocentric attitudes (and most especially Anglophobic attitudes) are strongly associated with independence support (Ford & Sobolewska, 2020; Stephenson & Reid, 2020).

Although the other side of the same coin, other scholars have put a greater emphasis on voters’ sense of British identity in explaining their constitutional preferences. For instance, Denver & Johns (2010) and Henderson et al. (2022) argue that because “Scottishness” is more ubiquitous and thereby less politicised, it is their sense of “Britishness” that really divides the Scottish electorate. Their empirical analyses of voting behaviour in the 2007 Scottish Parliament election and the 2014 independence referendum respectively confirm the empirical power of “Britishness” in predicting attitudes towards further devolution as well as independence. Further, Scottish Election Study (SES) data also find that voters’ attachment to Britain is consistently one of the three most popular reasons cited by ‘No’ supporters when prompted in an open-ended question to justify their constitutional position (McMillan, 2022b). Indeed, Ford & Sobolewska (2020) even attribute the 2014 ‘No’ vote to the strong attachment to Britain felt by elderly Scottish voters (over 90% of whom turned out to vote). Hence, although these studies

¹ This asks whether respondents feel “Scottish, not British”, “More Scottish than British”, “Equally Scottish and British”, “More British than Scottish” or “British, not Scottish” (Moreno, 2006).

do not prove the direction of causality between identity and constitutional preferences, the identity approach evidently has strong empirical foundations.

Materialist approach

Secondly, other scholars have instead argued that a materialist/interest-based explanation lies at the heart of Scottish voters' secessionist attitudes. In other words, this body of literature claims that those who have benefitted most from the Union in material terms (i.e., the wealthy, middle classes, elderly and migrants from the rest of the UK) should be less likely to support an independent Scotland since they have more to lose from such political and economic destabilisation (Curtice, 2013; Keating, 2015; Neville & Dickie, 2014). Indeed, a negative correlational relationship between income and independence support has been shown by Neville & Dickie (2014) and McLean & Thomson (2014), supporting this materialist approach. Moreover, using SSA data from 1990 to 2012, McLean and Thomson (2014) also find evidence of a strong association between socio-economic class (based on occupational groups) and support for independence - they find that employers, managers and professionals are 10 percentage points less likely to support secession than those Scots with routine or semi-routine occupations.

Scholars have also identified a strong negative correlation between age and independence support (Schneider, 2014; SES, 2022). Indeed, although there is a debate in the literature about whether this association is explained by life-cycle or cohort-driven effects (Schneider, 2014; Henderson et al., 2022), SES data from 2022 demonstrate that support for independence amongst Millennials was roughly 65% compared with roughly 35% amongst Boomers. Whilst it is true that younger Scots are also less likely to hold a strong British identity (Ford & Sobolewska, 2020), given the huge inter-generational inequities in Scotland with regard to income, wealth and property ownership, these data would seem to corroborate a materialist explanation (Gibb & Judge, 2019).

Moreover, Ford and Sobolewska (2020) also demonstrate that country of birth is a significant explanatory factor, with support for secession among those born in the rest of the UK at "half the level expressed among those born in Scotland". Whilst this relationship could be driven by a weaker Scottish identity amongst these migrants (Ford & Sobolewska, 2020), it could also be viewed through the materialist approach since a migrant from England, Wales or Northern

Ireland has evidently already benefited from the Union and arguably has far more to lose from independence which could make travel and trade arrangements across the Anglo-Scottish border more difficult. Thus, the materialist approach which conceptualises independence support as the inverse of how much each individual has ‘to lose’ from secession also has empirical support.

Consequentialist approach

Thirdly, others have argued that perceptions of the material/economic consequences of independence (both for Scotland and the individual) are strong determinants of voters’ constitutional preferences (Curtice, 2013, 2014; Henderson et al., 2014, 2022; Jolly, 2014; Kopasker, 2014; McLean & Thomson, 2014). For example, Curtice (2013) shows that 73% of those who believe independence would make the Scottish economy “a lot better” support secession as opposed to only 3% of those who believe it would make it “a lot worse”, concluding that “expectations matter above and beyond identity” and that the independence debate is evidently “more than just an issue of the heart”. In addition, Henderson et al. (2014) demonstrate that voters’ concerns about the currency issue are strongly associated with their constitutional preferences; in fact, the results of their survey experiment suggest that when respondents are primed with the hypothetical scenario in which an independent Scotland ceases to use pound sterling, independence support drops significantly (by 14 percentage points). Further, experimental data from ScotCen Social Research and Henderson et al. (2014) also demonstrate that independence support greatly depends on how voters believe it will affect their personal finances (Neville & Dickie, 2014). Specifically, Henderson et al. (2014) find that a hypothetical £500 personal cost of independence increases No’s lead from 8 to 18 percentage points.

Moreover, expectations about the impact of independence on inequality and the welfare state are also shown to be associated with constitutional preferences (Henderson et al., 2022; Niedzwiedz & Kandlik-Eltanani, 2014). The SNP and the ‘Yes Scotland’ campaign have long argued that independence would allow the Scottish government to create a fairer, more equal society and a body of literature shows that voters’ evaluations of this claim are strongly associated with independence support (Henderson et al., 2022). For instance, SSA data reveal that voters who believe independence would make the gap between rich and poor “a lot smaller” are 72 percentage points more likely to support independence than those who believe

it would make it “a lot bigger”, whilst the corresponding gap between those who expect independence to lead to a “lot more” investment in public services and those who believe it would lead to a “lot less” is 75 percentage points (Curtice, 2014). Beyond this, others argue that voters’ assessments of the uncertainty surrounding independence are also strong determining factors. Indeed, Henderson et al. (2022) demonstrate that voters who were more certain about the consequences of independence were significantly more likely to vote ‘Yes’ in 2014 and that, according to voters, the most convincing argument against independence was about the extent of uncertainty that a ‘Yes’ vote would deliver. Henderson et al. (2014) also corroborate this result and find that voters’ expressed uncertainty about the consequences of independence was the most influential variable in their multivariate study.

Related to this, other scholars argue that voters’ underlying risk aversion is crucial in determining their independence attitudes since it affects their assessments of the costs and benefits of secession. For instance, Henderson et al. (2014) and Liñeira & Henderson (2021) show using pre- and post-referendum survey data that voters who are less tolerant to risk in other aspects of life (e.g., in financial matters or on the roads) are significantly less likely to support independence and this negative association between risk aversion and independence support is strongest amongst those who have lower levels of political knowledge. Indeed, once risk aversion is controlled for, the observed gender gap in ‘Yes’ support (men are more likely to support ‘Yes’) is shown to disappear since women are, on average, more risk averse than men (Henderson et al., 2014). Moreover, on a related note, some scholars have asserted that prospect theory can help explain independence support (Henderson et al., 2022). This stipulates that those who perceive themselves to be in a ‘losing frame’ are more willing to take risks than those in ‘winning frames’ (Kahneman & Tversky, 1979). Hence, this might explain why the most economically disadvantaged Scots are more inclined to support constitutional change; from their standpoint, it is “unlikely to worsen their relative economic standing” (McLean and Thomson, 2014). Thus, the consequentialist approach, which emphasises voters’ perceptions of the likely costs and benefits of independence and the risks associated with it, is also widely cited in the literature.

2.1.2: The impact of Brexit on independence support

To quote Henderson et al. (2022), Brexit has “fundamentally changed the nature of the status quo” and has “reignited the independence debate”. Given the stark divergence between the EU referendum results north and south of the Scottish border, many nationalists have taken the view that Brexit has been/will be a catalyst for greater ‘Yes’ support (Curtice, 2016a; Dickie, 2020). In response, a literature has quickly emerged seeking to empirically test this claim. There is, however, a lack of consensus as to whether Brexit has had a meaningful impact on independence support, often because of the variety of timescales used to define the independent variable (i.e., what “Brexit” specifically refers to).

Brexit’s immediate impact

In the aftermath of the EU referendum, a number of scholars and polling analysts investigating Brexit’s *immediate* impact identified a post-Brexit boost for the ‘Yes’ campaign (Curtice, 2016a, 2016b; Daily Record, 2016). Indeed, Curtice (2016a) and Henderson et al. (2022) show that the first three national opinion polls after the June 23rd referendum showed clear majority support for independence, the first time ever that three consecutive polls had delivered this result. However, despite this, more recent studies maintain that the Leave vote did not result in a sustained increase in overall levels of independence support (Curtice, 2017, 2022a; Curtice & Montagu, 2020; Henderson et al., 2022; Montagu, 2019; Swan, 2017). As Curtice (2019) and Henderson et al. (2022) point out, ‘Yes’ support quickly returned to pre-Brexit levels and hence, from a longer-term perspective, it seems the Brexit result had a negligible *immediate* impact on aggregate support for independence.

The most compelling explanations of this in the literature are threefold. Firstly, constitutional preferences have become deeply entrenched in Scotland ever since the 2014 referendum (McMillan, 2022a; McMillan & Lerner, 2022). Indeed, Henderson et al. (2022) demonstrate the extent of opinion-based affective polarisation along Scotland’s constitutional divide by showing not only that the vast majority (>90%) of Scots express a “very strong” or “fairly strong” independence identity but also that a majority display signs of in-group favouritism and are reluctant to even admit that the out-group has some strong arguments. The fact is many voters are now simply “immoveable” on the constitutional question, regardless of Brexit

(Johns, 2022). Secondly, despite Scotland's overwhelming vote to 'Remain' and the near consensus amongst the Scottish political elite in favour of EU membership in 2016, the majority of Scottish voters remained softly-Eurosceptic and levels of Euroscepticism in Scotland were not too dissimilar to elsewhere in the UK. Hence, despite the hopes of the SNP leadership, Brexit was simply not enough for Scotland's soft 'Remainers' to shift their independence position (Curtice, 2017). And thirdly, to the extent that Brexit did lead to some immediate shifts amongst Remainers towards Yes and amongst Leavers towards No, they broadly cancelled each other out and hence the overall immediate effect on independence support was negligible (Henderson et al., 2022).

Brexit's longer-term impact

More recently, however, scholars have turned their attention to the *over-time effect* of the Brexit process (i.e., not just the immediate time-specific effect on 24th June 2016). Many have pointed out that the initial post-referendum 'Yes' lead in the polls was quickly reversed and that polling data consistently showed majorities against independence throughout the entirety of the Brexit process period (Henderson et al., 2022; Johns, 2022); in fact, it was not until mid-2020 that a sustained 'Yes' lead reappeared in the polls (McMillan, 2022c). Hence, many have claimed that the longer-term effect of the Brexit process was, just like its immediate effect, negligible (Henderson et al., 2022). However, other studies suggest that over time, as the reality of Brexit and its consequences began to sink in, the dial did start to shift. For instance, Daniels & Kuo (2021) claim a causal link between Brexit salience/hardness and constitutional preferences via a 2019 survey experiment. They find that the prospect of a 'clean break' from the EU significantly increased independence support, particularly among 'Remainers'. In addition, Curtice & Montagu (2020) argue that "more recently the pursuit of Brexit has served to increase support for leaving the UK". Using SSA data, they find that voters who were relatively favourably disposed towards the EU became increasingly supportive of independence between 2016 and 2019, driving this overall effect. They argue that Brexit has somewhat reduced the perceived risks associated with independence relative to the risks associated with Union membership, particularly in the minds of 'No Remainers' who might have rejected independence in 2014 on the basis of its supposed economic risks. Hence, they argue, given that 'No Remainers' constituted over a third of the Scottish electorate in 2016, that this No-Yes switching tilted the overall dial towards 'Yes' over time (Curtice & Montagu, 2020).

Moreover, regardless of whether or not the Brexit process has increased *overall* levels of ‘Yes’ support, many scholars argue that it has changed the nature of Scotland’s constitutional debate. For instance, Thiec (2021) and Henderson et al. (2022) argue that the SNP’s narrative regarding independence has changed in light of Brexit. Even though a sizeable share of prior SNP and ‘Yes’ supporters voted ‘Leave’ in 2016, Brexit has made the SNP especially keen to associate itself and independence with the kind of progressive and internationalist politics that reacted so strongly against the UK-wide Leave vote (Henderson et al., 2022). Further, numerous scholars argue that the Brexit process has changed the composition of the nationalist and unionist coalitions as it has led to a re-alignment along the Europhile-Eurosceptic divide (Curtice, 2022a; Ford & Sobolewska, 2020; Henderson et al., 2022; Johns, 2022; Montagu, 2019). For instance, using SSA data, Curtice and Montagu (2020) show that, whilst EU attitudes had no discernible impact on how people voted in the 2014 referendum, they have become an increasingly important determinant of independence support as the Brexit process has unfolded. In fact, they find that whilst 44% of Europhiles and 49% of Eurosceptics voted Yes in 2014, by 2017, the independence and European debates had become significantly more intertwined with 60% of Europhiles expressing support for independence compared to only 40% of Eurosceptics. Using SES data, Henderson et al. (2022) and Johns (2022) also corroborate this view by demonstrating that the ‘Yes’ coalition has become significantly more pro-EU since the EU referendum (with the proportion of ‘Yes’ supporters backing Remain increasing from 68% in 2016 to 87% in 2021) whilst the ‘No’ coalition has, conversely, become substantially more Brexit-leaning (with the proportion of ‘No’ supporters backing Remain falling from 63% to 44% over the same period).

These studies also argue that this re-alignment is the result of a “sorting process” which has led Remainers towards ‘Yes’ and Leavers towards ‘No’, bringing the two constitutional debates into line. In fact, they reveal that the proportion of Yes Remainers increased from 30% in 2016 to 40% in 2021 predominantly at the expense of No Remainers almost a quarter of whom switched to become Yes Remainers. At the same time, the proportion of No Leavers increased from 21% to 30% predominantly at the expense of Yes Leavers about one in five of whom switched to become No Leavers (Henderson et al., 2022; Johns, 2022). Hence, there is already some existing evidence in the literature that Brexit has changed the face of Scotland’s constitutional divide by strengthening the association between EU and independence attitudes such that Scottish politics has increasingly become a bipolar battle between Yes Remainers and No Leavers (Henderson et al., 2022). However, it should be noted that although these studies

describe the evolution of Scotland’s four “constitutional tribes” – i.e., “Yes Remainers”, “Yes Leavers”, “No Remainers” and “No Leavers” - over the Brexit process period, we do not know for certain whether this aforementioned switching was driven by evaluations of the Brexit process or some other factors. As discussed in more detail below, by systematically analysing the effect of changing Brexit assessments on independence attitudes at the individual voter level, this research intends to address this question.

2.2: Why should Brexit matter, and for whom should it matter?

Introducing “benchmark” theory

In many ways, one might not expect Brexit to have a large impact on voters’ independence attitudes. This is because it did not change many of the underlying drivers of secessionist support previously identified in the literature. According to the polls, it did not seem to make the Scottish electorate identify as more Scottish or as more British and it did not change the fact that English-born, richer and more elderly Scots have a deeper investment in the Union (What Scotland Thinks, 2023b). In addition, as Henderson et al. (2022) point out, levels of engagement with the EU referendum debate were significantly lower than with the constitutional debate two years earlier as, whilst a majority were in favour of continued EU membership in line with virtually all political elites, Scottish voters were not particularly animated by the EU question. Many perceived the EU referendum as an English affair, far less important than the debate about independence and as such, turnout was 17.4 points lower in June 2016 (67.2%) than in the independence referendum two years earlier (84.6%) (Henderson et al., 2017, 2022). Hence, given that voters’ Yes/No identities have become so strong in recent years, there is a limit to how far the EU issue – or anything else for that matter – can shift voters’ independence attitudes. As Henderson et al. (2022) put it, the independence and EU debates were a “boulder and a pebble in the loch of Scottish politics”, and so one might not expect the pebble to dent the tidal waves released by the boulder.

On the other hand, one might expect the Brexit process to have affected voters’ independence attitudes because it has fundamentally changed the nature of the Yes/No vote choice calculus and the risks associated with each constitutional option (Curtice & Montagu, 2020; Hepburn et al., 2021). Not only has Brexit arguably corroborated the nationalist argument that Scotland’s democratic wishes are oftentimes overturned by English voters but it has also fundamentally

changed the nature of the SQ (McEwen, 2018; Curtice, 2017). Despite one of the central arguments of the 2014 ‘Better Together’ campaign being that the only way of guaranteeing Scotland’s EU membership was to vote against independence (Better Together, 2014; Curtice, 2017; SNP, 2016), Scottish voters now find themselves in the Union but outside the EU and its economic institutions. However, Brexit has also fundamentally changed the political economy in which an independent Scotland would fare and hence the option of independence is now a very different prospect post-Brexit (Hepburn et al., 2021). For instance, assuming an independent Scotland were to re-join the EU’s economic institutions (as is the goal of the SNP), independence would now necessitate some form of customs border between Scotland and its largest trading partner, England (Curtice, 2017; Hepburn et al., 2021; SNP, 2023). How this might play out in practice is the subject of intense debate but Brexit has undoubtedly heightened the complications that might arise as a result of independence and the uncertainty that surrounds it (Gordon, 2022; Grant, 2022; Paun et al., 2021). Hence, given that Brexit has changed the context of Scotland’s constitutional debate so profoundly – by changing both the status quo (SQ) and the alternative state (AS) of independence – I propose that “benchmark theory” is a useful way to understand how and why Brexit might impact voters’ independence attitudes.

Formulated by De Vries (2018), “benchmark” theory is principally a theory of Euroscepticism and contends that EU support/scepticism does not depend solely on attitudes towards the EU or attitudes towards the national political context, but on how they fare when directly compared by voters. Public opinion, she argues, is driven by voters’ evaluations of the perceived costs/benefits of the SQ (EU membership in her case) versus the AS (leaving the EU) (De Vries, 2018). The core idea, building on the notion of reference point dependent preferences, is that individual voters use their assessment of the domestic context (e.g., domestic economic performance and national government competence) to inform their evaluations of what the AS (EU withdrawal) might look like and then benchmark these perceptions against their evaluations of the SQ (EU membership) (De Vries, 2017, 2018). And if some external shock results in the SQ becoming more appealing *relative* to the AS, the average voter’s appetite for constitutional change is reduced and vice versa if such a shock makes the AS more attractive *relative* to the SQ. In this way, the “benchmarking” approach conceives of public opinion about constitutional changes as rational (it is based on a cost-benefit analysis at the individual level), relational (it is not about the perceived costs/benefits of the AS or the perceived costs/benefits

of the SQ, but the relative evaluation of both factors) and dynamic (the cost-benefit calculus is conditional on external shocks).

Hence, transposing the “benchmarking” framework to the Scottish context suggests that Scottish public opinion about independence is a function of voters’ rational evaluations of the perceived costs/benefits of Union membership (SQ) *relative* to the perceived costs/benefits of independence (AS). In other words, it is not voters’ evaluations of what an independent Scotland might look like nor their evaluations of how well the Union is faring that principally matters for their independence attitudes, but the combination and relative evaluation of both of these factors.

Using the language of De Vries (2018), each individual voter derives benefits from the SQ and AS and when forming their constitutional preferences, they compare the current SQ to the potential losses and gains of the AS; formally, if their *Union differential* [$evaluations_{SQ} - evaluations_{AS}$] is positive, they will support “No” but if their *Union differential* is negative, they will support “Yes”. This “benchmarking” framework, therefore, provides us with an explanation for why Brexit should have an effect on independence attitudes. This is because Brexit, by changing voters’ perceptions of the costs/benefits of the SQ and AS, has surely had an effect on voters’ *Union differentials*, making the SQ more or less attractive *relative* to the unknown AS depending on voters’ EU preferences and their over-time assessments of Brexit’s success. For instance, pro-EU voters who strongly support free movement of people and prioritise restoring access to the EU’s Single Market are likely to have experienced a drastic fall in their *Union differentials* as a result of Brexit whilst Eurosceptic voters wary of the consequences of a trade border between Scotland and England are likely to have experienced an increase in their *Union differentials*. Equally, voters who believe Brexit has been positive/negative for the economy are likely to have experienced an increase/decrease in their *Union differentials*. The “benchmarking” mechanism, therefore, explains why Brexit should matter and provides the logic for why fluctuations in voters’ Brexit evaluations should impact their independence attitudes.

Moreover, this approach can also be used to draw inferences about which sub-groups of Scottish voters should be most/least responsive to short-term fluctuations in their assessments of Brexit’s success/failure. In particular, I extend this framework to propose that uncertain

voters and voters who are less attached to their independence position should be more responsive to the Brexit process than their more committed counterparts. These voters will likely have *Union differentials* that are small in magnitude and volatile in contrast to more hard-line Yes and No supporters whose *Union differentials* will likely be greater in magnitude (in either direction) and stickier. Hence, a change in their assessments of Brexit is more likely to affect their *Union differentials* and is more likely to be the decisive factor which shifts their constitutional position one way or another.

In addition, I also draw on the “benchmarking” approach to hypothesise that constitutionally *cross-pressured* voters (i.e., No Remainers and Yes Leavers) should be more responsive to the Brexit process than constitutionally *aligned* voters (i.e., Yes Remainers and No Leavers). *Cross-pressured* voters are those who, as a result of Brexit, are now torn by two contrasting constitutional preferences. They have been nudged by their Brexit preference to switch their Yes/No affiliation and they have also become somewhat politically homeless in recent years with no major political party espousing an explicitly Yes Leaver or No Remainer position (except perhaps the Scottish Liberal Democrats) (McMillan, 2021). And so, one would expect their assessments of Brexit to have a greater effect on their *Union differentials* than constitutionally *aligned* voters who do not face such a nudge from their EU preferences. The fact that *cross-pressured* voters also tend to hold their Brexit and independence identities more lightly – Henderson et al. (2022) find that only 29% feel strongly about *both* identities compared to 57% of Yes Remainers and 52% of No Leavers – also corroborates this hypothesis by suggesting that the *Union differentials* of *cross-pressured* voters are likely to be more susceptible to change. Hence, the “benchmarking” approach provides the logical mechanism for why fluctuations in Brexit evaluations should matter for independence attitudes and, by extending this framework, I hypothesise that short-term fluctuations in Brexit assessments should have a greater influence on *uncertain*, *unattached* and *cross-pressured* voters.

However, does this “benchmarking” approach have any empirical backing? Firstly, turning to the existing literature on EU support/scepticism, it would seem that “benchmark” theory does have some empirical support. For instance, De Vries (2017)’s experimental results find that when citizens of the remaining 27 EU member states are presented with information that reflects badly on their own country’s domestic political or economic performance, which thus makes the AS of EU withdrawal less appealing *relative* to the SQ of EU membership, support for European integration is higher than in the control group, consistent with the

“benchmarking” approach. Moreover, in a similar survey experiment, Hobolt et al. (2022) find that, when EU citizens are presented with positive information about the consequences of Brexit for the UK (e.g., greater control over laws, money and migration), they are more optimistic about their own country’s prospects outside the EU (the AS). De Vries (2017) also shows that the post-Brexit fall in Euroscepticism amongst citizens of the remaining 27 member states was especially pronounced amongst those who believed the consequences of Brexit will be negative for the UK, demonstrating that Brexit was a significant “benchmark” which altered voters’ perceptions of the AS and hence their views regarding their own country’s EU membership, in line with “benchmark” theory.

Secondly, turning to the literature on public support for Scottish independence, some studies have argued that voters look at how well the devolved administration at Holyrood is functioning at present, use this to inform their evaluations of the unknown AS (independence) and benchmark this against their evaluations of the SQ, in line with “benchmark” theory (Johns & Mitchell, 2016; Macfarlane, 2021; McMillan, 2022c). Consistent with this approach, Macfarlane (2021) finds that more positive competence assessments of the Holyrood government than the Westminster government during the Covid-19 pandemic “softened unionist dislike of the nationalist side”. Using SES data, McMillan (2022c) also finds that the Scottish government’s relative advantage in net government approval ratings in the aftermath of the infamous ‘mini-budget’ in autumn 2022 was correlated with an increase in independence support, particularly amongst previously undecided voters. Thus, there is some suggestive evidence in support of the “benchmarking” approach.

2.3: Research Gaps

Having reviewed the existing literature on the impact of Brexit on independence support as well as on the theoretical framework of “benchmarking”, there remain a number of unanswered questions and gaps in the literature. Firstly, the over-time effect of voters’ evolving assessments of the Brexit process on independence attitudes is not particularly well understood. Indeed, much of the literature on the longer-term impacts of Brexit (discussed in section 2.1.2) is descriptive in nature and often relies on (repeated) cross-sectional data (such as SSA or SES data) over particular time periods within the Brexit process period to reach its conclusions. This

research fills this gap by using panel data to address this question, the details of which are discussed in Chapter 3.

Secondly, whilst the existing literature does well to inform us which groups of Scottish voters are most and least likely to support secession, it remains unclear which sub-groups of voters have been impacted most and least by the Brexit process in terms of their propensity to support independence. Based on previous studies, it seems intuitive that not all Scottish voters should behave in the same way to short-term changes in their Brexit evaluations. Indeed, as Henderson et al. (2022) and McMillan (2023) point out, some voters are more malleable than others on the constitutional question (even though a majority are perceived to be immovable) and for some voters and not others, Brexit has made their EU and independence preferences misaligned/cross-pressured, perhaps nudging them to re-think one of their constitutional positions. Henderson et al. (2014) also show that some voters are more risk-averse than others and so, given that Brexit has changed the risks associated with both the Union and independence, it seems intuitive that not all voters would be affected equally by Brexit. And yet, no prior studies have formally investigated this question of sub-group heterogeneity with regard to the effect of evolving Brexit evaluations on independence attitudes. This thesis fills this gap by investigating very closely which groups of voters were most and least likely to update their independence attitudes as a result of short-term fluctuations in their Brexit assessments.

Thirdly, whilst previous studies have identified an association between Brexit preferences and independence attitudes as well as an association between political leader evaluations and independence support (Curtice & Montagu, 2020; McMillan, 2022c), it remains unclear the extent to which leader evaluations (i.e., voters' perceptions of the UK Prime Minister and Scotland's First Minister) are running through Brexit evaluations or whether they, in fact, totally absorb the effect of Brexit assessments on independence attitudes. This thesis cannot fully disentangle these two effects. However, it does take a first step at filling this gap in the literature by providing an indication of the degree to which the effect of Brexit assessments was subsumed by the effect of leader evaluations throughout the Brexit process period.

In addition, a formal empirical investigation of the "benchmarking" mechanism in the post-Brexit Scottish context is also absent from the literature. Notwithstanding the few empirical studies mentioned above in section 2.2, there has not been a huge volume of scholarly work

seeking to directly test the leverage of the “benchmarking” approach, the mechanism which I argue explains the association between Brexit assessments and independence attitudes. Further, there have been even fewer studies that have utilised this conceptual framework in the Scottish context and the ones that have done so have relied upon cross-sectional data and correlational evidence to reach their conclusions. Indeed, McMillan (2022c) acknowledges that the nature of the data used means that “we cannot directly estimate the full causal impact ... on independence support”. This thesis fills this gap in the literature by testing, both observationally and experimentally, the leverage of this underlying “benchmarking” mechanism.

Moreover, to the best of my knowledge, the “benchmarking” mechanism has not yet been investigated in the Scottish context through the lens of *relative* prospective economic performance evaluations. As such, it remains unclear whether voters’ attitudes towards independence are solely affected by their perceptions of an independent Scotland’s future economic performance or whether it is their assessments of Scottish economic performance net of the rest of the UK’s economic performance post-independence that matters. Put another way, whether voters’ support for independence increases if they are primed that Scotland will be $x\%$ better off with independence (where $x > 0$) or whether it only increases if this is also accompanied with information that the rest of the UK will be $< x\%$ better off following independence remains an unanswered question in the existing literature. This thesis fills this gap.

2.4: Research Questions and Hypotheses

Having located this thesis in the wider academic literature, outlined the logic of my proposed explanatory “benchmarking” mechanism and discussed the gaps in the literature that motivate my research, I now summarise my research question(s) and hypotheses.

To recap, the main research question of this thesis is as follows:

Overall Research Question: Has Brexit had an impact on Scottish voters’ support for independence, and if so, how, to what extent, why and for whom?

To tackle this overarching research question, I will empirically address three sub-questions, specified as follows:

RQ1: To what extent does variation in Brexit's perceived success explain variation in support for Scottish independence over the Brexit process period?

RQ2: Which sub-groups of Scottish voters are most and least impacted by Brexit in terms of their independence support? Is the impact of fluctuating Brexit evaluations on independence attitudes greater amongst uncertain, unattached and cross-pressured voters?

RQ3: To what degree can this be explained by voters' relative assessments of Scotland and the rest of the UK's fortunes?

Derived from the implications of the “benchmarking” approach laid out above in section 2.2, my specific expectations in response to these sub-questions are the following:

H1 (the Brexit evaluations hypothesis): A positive (negative) shift in voters' Brexit assessments over time leads to a negative (positive) shift in independence attitudes.

H2 (prior uncertainty hypothesis): The independence attitudes of individuals who were more uncertain about their independence support at the start of the Brexit process were more responsive to a change in their Brexit evaluations.

H3 (prior unattachment hypothesis): The independence attitudes of individuals who were not attached to either side of the Yes/No divide at the start of the Brexit process were more responsive to a change in their Brexit evaluations.

H4 (cross-pressured preferences hypothesis): No Remainers and Yes Leavers were more responsive to a change in their Brexit evaluations than Yes Remainers and No Leavers.

H5 (relative assessments hypothesis): Relative assessments of the SQ and AS explain support for independence in post-Brexit Scotland. Independence support increases (decreases) when the AS becomes relatively more (less) appealing vis-à-vis the SQ.

Addressing these three sub-questions and testing the validity of these five hypotheses is the objective of this research's empirical analysis. I now turn to how this was conducted.

Chapter 3: Data and Methods

In this chapter, I describe the methodology employed to answer the research questions. As a starting point, to provide the context behind my choice of empirical methods, I discuss the causal identification challenges associated with these research questions. Next, I outline in detail the three empirical strategies I have used to address these concerns in turn. First, I describe how I employed a series of panel change-on-change models (which are equivalent to “first difference” models with two waves) to address my three research questions. Second, I report how a series of individual fixed effects models were used to complement this analysis. Third, a detailed description of my original online survey experiment and how it was used to test the “benchmarking” mechanism is presented. Throughout, I discuss the benefits and limitations of each of my empirical methods as well as outline my selected data sources, operationalisation of key variables and model specifications.

3.1: Causal identification challenges

In tackling the aforementioned research questions, one faces challenges in attempting to infer causal effects. Firstly, when estimating the effect of Brexit evaluations on independence attitudes, inferring causality is difficult because simple correlational analysis on cross-sectional data incurs the potential issues of endogeneity, omitted variable bias and reverse causation (Imai, 2017; Longhi & Nandi, 2015). Indeed, there are a number of potential observable variables which could confound this relationship. For instance, voters’ prior independence attitudes are strong drivers of subsequent independence attitudes and are also likely to affect how voters perceive the success/failure of Brexit given that elite cues from all major pro-independence parties have consistently been negative about Brexit (Barker, 2023; Thiec, 2021). Voters’ Scottish identity and personal financial circumstances are also potential confounders not to be neglected given they are likely to be associated with both my predictor and dependent variables (Goodwin & Heath, 2016; McCrone, 2020; McLean & Thomson, 2014). Further, voters’ evaluations of key political leaders (e.g., Nicola Sturgeon and Boris Johnson) might also confound this relationship. In Scotland’s highly polarised political environment, voters tend to cluster as either pro-independence, pro-Nicola Sturgeon, anti-Boris Johnson and anti-Brexit or the opposite (Henderson et al., 2022), and so it is plausible that leader evaluations are

driving any observed association between Brexit assessments and independence attitudes, not the Brexit process. This brief list of potential observable confounders is by no means exhaustive. Indeed, numerous other individual-specific factors may also confound this relationship, many of which might be unobservable to researchers (such as voters' personality traits), undermining a causal interpretation of the Brexit assessment effect. Beyond this, there is also a potential reverse causality issue to be aware of when seeking to empirically address RQ1. This is the problem that a strong association between these two variables could equally indicate that voters' evolving attitudes towards independence are driving the way in which they perceive the success/failure of Brexit and not the other way around.

For similar reasons, it is also difficult to infer causality when seeking to address RQ3. This is because, just as above, voters' national identity and personal material circumstances could be affecting both their *relative* assessments and independence support, creating confounding bias. Voters' prior partisan alignments could also confound this relationship as could numerous other unobservable individual-specific factors (e.g., ability or "taste"). Hence, the existence of potential endogeneity also presents an obstacle to credible causal identification when assessing the leverage of the "benchmarking" mechanism. In addition, as above, there is also a potential reverse causality issue associated with this empirical question. Indeed, it could well be the case that any association between *relative* assessments and independence attitudes is being driven by voters' independence attitudes (i.e., support for independence makes voters assess the AS more favourably *relative* to the SQ) and not the other way around as the "benchmarking" mechanism would predict.

Whilst acknowledging these identification challenges, this research employs three empirical strategies – two observational and one experimental – to address these concerns to the greatest extent possible and answer my research questions.

3.2: Empirical Strategy 1 - Panel Change-on-Change Model

What is it and why is it appropriate?

As my first empirical strategy, I use a change-on-change/first-difference model with a pair of waves from panel public opinion data. This “before-and-after” model estimates the association between the *change* in one variable from one period to another and the *change* in another variable over the same time period, using data on the same individuals over time. Formally, it takes the form: $\Delta Y_i = \alpha + \beta_1 \Delta X_i + \beta_2 \Delta Z_i + \varepsilon_{i,t}$, where Δ represents the change/difference between two waves (not necessarily consecutive waves), X_i represents the independent variable of interest, Z_i represents a time-varying control variable and $\varepsilon_{i,t}$ represents the error term which can be broken up into its time-invariant and time-varying components – i.e., $\varepsilon_{i,t} = \alpha_i + u_{i,t}$ (Longhi and Nandi, 2015).

Beyond producing easily interpretable coefficients, this strategy has a number of advantages. Firstly, the nature of the change-on-change model means that the time-invariant component of the error term capturing individual-level characteristics drops out of the model – i.e., $\alpha_i = 0$ (Longhi & Nandi, 2015; Stock & Watson, 2015). This is because panel data allows me to track the same pool of respondents over time and hence when assessing the wave-on-wave *change*, individual-specific variables that do not vary over time are effectively cancelled out (Cunningham, 2021; Liker et al., 1985). This strategy, therefore, allows me to estimate the impact of a wave-on-wave change in the predictor variable on the wave-on-wave change in independence attitudes taking into account the effect of observable and unobservable time-invariant individual-level heterogeneity (e.g., prior vote choices or personality traits). And so, by eliminating this potential source of endogeneity, this means that the model’s estimated changes in independence attitudes can only be driven by time-varying factors, such as voters’ Brexit evaluations or *relative* assessments of the SQ versus AS. Secondly, by including time-varying control variables into the model - i.e., Z_i – this strategy can also be used to account for variation in observable time-varying factors, such as voters’ identity levels, economic circumstances and leader evaluations and thus it allows me to address to a considerable extent the potential endogeneity issues described above. Thirdly, the change-on-change model also provides easily interpretable estimates of the effect of a *change* independent variable (e.g., within-individual changes in Brexit evaluations) conditional on *level* variables (e.g., prior

attachment) and so it allows for the investigation of sub-group heterogeneity, addressing RQ2. Beyond this, it is also a valuable approach if there is reason to believe that there is consistent measurement bias in the key variables of interest across panel waves (e.g., because voters consistently err when objectively evaluating their economic circumstances) since it eliminates all such time-persistent biases.

3.2.1: Estimating the impact of Brexit evaluations on independence attitudes

Firstly, to address RQ1 and estimate the over-time effect of the Brexit process on voters' independence attitudes, I exploit data from the BES Internet Panel. This panel dataset includes data on various measures of voters' Brexit assessments and independence attitudes collected across multiple waves throughout the Brexit process period and so it allows me to run a series of change-on-change models estimating the average marginal effect of a *change* in Brexit evaluations.

Choice of Waves

My ideal change-on-change model would track changes from wave 7 (April/May 2016) to wave 17 (Nov 2019) since this captures the whole Brexit process period from just before the EU referendum to just before the December 2019 general election. This was the period when the outcome of Brexit became gradually clearer to voters. Even though the final outcome admittedly still remained somewhat uncertain in December 2019, Scottish citizens had a much clearer idea of what Brexit would 'mean' for them in wave 17 than they did in wave 7, and hence analysing changes over this wide time period would allow for the best possible analysis of the impact of the Brexit process on independence attitudes. However, some of the key Brexit evaluation variables are not available in wave 7 and so I investigate the wave-on-wave changes from wave 11 (April/May 2017) to wave 17. Although not perfect, this still provides ample opportunity for switching and captures the general trend over a crucial time period. Indeed, although then-Prime Minister Theresa May did set out her negotiating "red lines" in the January 2017 Lancaster House speech (which made the outcome more certain by setting the UK on the path towards an economically "hard" Brexit) (Asthana et al., 2017; Bulmer & Quaglia, 2018), the final outcome was still largely unclear to voters in wave 11 and so, by looking at changes from wave 11 to wave 17, I am still capturing the impact of the Brexit process on individual-level independence attitudes.

Empirical Estimation

To estimate the over-time effect of Brexit evaluations on independence attitudes, my dependent variable takes the form of the wave 11-wave 17 *change* in voters' happiness if Scotland became independent – i.e., the happiness score in wave 17 minus wave 11. Specifically, the survey question used to measure this asks respondents “*How happy or how disappointed would you be if Scotland left the United Kingdom?*” and the response options take the form of a Likert scale between 0 and 10 where 0 represents “*extremely disappointed*” and 10 represents “*extremely happy*”. My dependent variable, therefore, ranges from -10 (the maximum shift away from Yes) to +10 (the maximum shift towards Yes). I chose this particular outcome variable because its (approximately) continuous nature allows me to identify the more granular over-time changes in voters' independence attitudes that would not necessarily be detected by the traditional categorical vote intention variable. It also provides me with greater switching in the outcome variable and, therefore, allows me to more easily identify any systematic effects. On the other hand, the key explanatory variable – the wave 11-wave 17 *change* in voters' Brexit evaluations - is operationalised in two different ways using two distinct measures. First, a measure of voters' overall satisfaction with Britain's departure from the EU is used. Specifically, this survey question asks respondents “*How happy or how disappointed are you that the UK voted to leave the European Union?*” and has a parallel Likert response scale from 0 to 10 and so this predictor variable also ranges from -10 to +10. Second, to isolate voters' *economic* evaluations of Brexit, an ordinal measure of voters' evaluations of the economic impact of Brexit is used. Specifically, this question asks respondents “*Do you think the general economic situation in the UK would/will be better, worse, or about the same if/after the UK leaves the EU?*” where respondents can choose between the following responses: “*1 = Much worse*”, “*2 = Worse*”, “*3 = About the same*”, “*4 = Better*” and “*5 = Much better*”. In this case, the predictor variable ranges from -4 to +4.

With these variables, I run two ordinary least squares (OLS) linear regression models. This is because my outcome variable ranges from -10 to +10 and given that previous studies show that Likert scales with at least 11 intervals are decent approximations of continuous variables (Wu & Leung, 2017), this seems an appropriate model. The first model uses over-time changes in *overall* Brexit evaluations to predict over-time changes in independence happiness scores whilst the second uses over-time changes in voters' *economic* evaluations of Brexit as the key

predictor variable. Further, I also include the wave 11-wave 17 *change* in voters' Scottish identity levels and personal financial circumstances as control variables since these are the most obvious alternative time-varying explanations of independence support identified by the literature that could potentially confound my relationship of interest. To do this, Scottish identity is measured on a 1-7 Likert scale where 1 indicates that respondents feel "*Not at all Scottish*" and 7 indicates that respondents feel "*Very Strongly Scottish*" and personal financial circumstances are measured on a 1-5 ordinal scale of voters' retrospective evaluations of how their household's finances have changed in the last year where "*1 = Got a lot worse*", "*2 = Got a little worse*", "*3 = Stayed the same*", "*4 = Got a little better*" and "*5 = Got a lot better*".

On top of this, I also control for the wave 11-wave 17 *change* in leader evaluations. These are measured by how much respondents like or dislike Nicola Sturgeon and, separately, the UK Prime Minister (Theresa May in wave 11 and Boris Johnson in wave 17) on a 0-10 scale where 0 represents "*Strongly dislike*" and 10 represents "*Strongly like*". It must be noted, however, that there is a risk of introducing post-treatment bias by adding leader evaluations to the model as it could be argued that leader evaluations are instead *caused* by Brexit evaluations and so controlling for them might have the effect of controlling away the useful variation in Brexit evaluations. Much of the 'valence politics' literature, however, uses leadership evaluations as independence variables and as such, I argue that they should not be neglected in this analysis (Clarke et al., 2004, 2011). Another concern, however, is given that Nicola Sturgeon and Theresa May/Boris Johnson tend to represent polar opposite positions on most of the major dimensions of contemporary Scottish politics, there is also the risk of collinearity issues if both are included in the model. To account for this, I run separate models excluding leader evaluation variables, including each variable separately and including both together. I also investigated the correlation between these variables and found that whilst these approval measures are strongly co-linear in any given wave (e.g., the correlation coefficient in wave 17 is -0.5), the *changes* in these variables do not seem to move very precisely together (the corresponding correlation coefficient is -0.1), assuaging this problem. For further details, see Section C1 of the Appendix.

The specification for these OLS regression models (with all controls included) is presented below, where "Brexit evaluations" are defined as (i) *overall* Brexit evaluations and (ii) *economic* Brexit evaluations and where ε_i represents the error term. Note that further details

regarding these variables including their coding specifications are outlined in Table C2 in the Appendix.

$$\begin{aligned}
(1): [Wave\ 11 - Wave\ 17\ Change\ in\ independence\ happiness\ score]_i \\
= \alpha + \beta_1 [Wave\ 11 - Wave\ 17\ Change\ in\ Brexit\ evaluations]_i \\
+ \beta_2 [Wave\ 11 - Wave\ 17\ Change\ in\ Scottishness]_i \\
+ \beta_3 [Wave\ 11 - Wave\ 17\ Change\ in\ personal\ financial\ circumstances]_i \\
+ \beta_4 [Wave\ 11 - Wave\ 17\ Change\ in\ likePM]_i \\
+ \beta_5 [Wave\ 11 - Wave\ 17\ Change\ in\ likeSturgeon]_i + \varepsilon_i
\end{aligned}$$

Note that, having run a White test, I detected a significant degree of heteroskedasticity in these models, violating the OLS assumption that the variance of the residuals is constant across all levels of the independent variable (White, 1980). As a result, I chose to introduce heteroskedasticity-robust standard errors to these models; this has the effect of inflating the magnitude of my standard errors and thereby makes a causal interpretation of my estimated coefficients more compelling.

3.2.2: Estimating sub-group heterogeneity

In addition to estimating the average marginal effect of a change in Brexit evaluations, I also use this strategy to investigate interaction effects for my sub-groups of interest. In particular, in parallel with the two models described above, I also run a further series of OLS linear models with the independence happiness score as my dependent variable. However, in these models, I also add three interaction terms to estimate the extent to which the impact of a change in Brexit evaluations is heterogeneous between *previously certain* and *previously uncertain* voters, between *previously attached* and *previously unattached* voters and between Scotland's four constitutional tribes. This allows me to investigate which sub-groups are most and least responsive to short-term changes in Brexit assessments and thereby directly answer RQ2.

To do this, I first subset the overall sample into those who were initially uncertain about their independence support and those who were initially certain. This is measured using the response to the independence referendum vote intention question in wave 11 (the start of my period of analysis). In particular, voters who selected "Don't Know" are defined as "previously uncertain" in my analysis whilst those who selected "Yes" or "No" are defined as "previously

certain”. Next, I subset respondents into previously attached and previously unattached voters using the independence identity question which asks respondents “*Thinking about the Scottish independence debate, do you think of yourself as closer to the Yes side or the No side?*”. Specifically, those who selected “Neither” in wave 10 (the closest available wave to the start of my period of analysis) are defined as “previously unattached” whilst those who selected either “the Yes side” or “the No side” are defined as “previously attached”. To investigate sub-group heterogeneity between the four constitutional tribes, I also subset the sample into “Yes Remainers”, “Yes Leavers”, “No Remainers” and “No Leavers” using respondents’ stated 2014 independence referendum and 2016 EU referendum vote choices to do so. Further details regarding these variables including the specific BES question wordings and coding specifications are outlined in Table C2 in the Appendix.

With this selection of sub-group dummy variables, I run a series of OLS change-on-change models – for both *overall* and *economic* Brexit evaluations, as above – which include my set of control variables and sub-group interaction terms, as shown in the three specifications below.

$$\begin{aligned}
 (2): [\text{Wave 11} - \text{Wave 17 Change in independence happiness score}]_i \\
 = \alpha + \beta_1[\text{Wave 11} - \text{Wave 17 Change in Brexit evaluations}]_i + \beta_2\Delta\mathbf{Z}_i \\
 + \beta_3\text{Uncertain}_i \\
 + \beta_4[\text{Uncertain} * (\text{Wave 11} - \text{Wave 17 Change in Brexit evaluations})]_i + \varepsilon_i
 \end{aligned}$$

$$\begin{aligned}
 (3): [\text{Wave 11} - \text{Wave 17 Change in independence happiness score}]_i \\
 = \alpha + \beta_1[\text{Wave 11} - \text{Wave 17 Change in Brexit evaluations}]_i + \beta_2\Delta\mathbf{Z}_i \\
 + \beta_3\text{Unattached}_i \\
 + \beta_4[\text{Unattached} * (\text{Wave 11} - \text{Wave 17 Change in Brexit evaluations})]_i \\
 + \varepsilon_i
 \end{aligned}$$

$$\begin{aligned}
 (4): [\text{Wave 11} - \text{Wave 17 Change in independence happiness score}]_i \\
 = \alpha + \beta_1[\text{Wave 11} - \text{Wave 17 Change in Brexit evaluations}]_i + \beta_2\Delta\mathbf{Z}_i \\
 + \beta_3\text{Yes Remainer}_i \\
 + \beta_4[\text{Yes Remainer} * (\text{Wave 11} - \text{Wave 17 Change in Brexit evaluations})]_i \\
 + \beta_5\text{Yes Leaver}_i + \beta_6[\text{Yes Leaver} \\
 * (\text{Wave 11} - \text{Wave 17 Change in Brexit evaluations})]_i \\
 + \beta_7\text{No Leaver}_i + \beta_8[\text{No Leaver} \\
 * (\text{Wave 11} - \text{Wave 17 Change in Brexit evaluations})]_i + \varepsilon_i
 \end{aligned}$$

Note that $\Delta\mathbf{Z}$ is a matrix of individual-level wave 11-wave 17 changes in the aforementioned control variables (Scottishness, personal financial circumstances, PM approval and Sturgeon approval) and β_3 is the corresponding vector of coefficients. Note also that, for the same reasons as in equation (1), heteroskedasticity-robust standard errors are employed in these models.

3.2.3: Estimating the impact of relative assessments on independence attitudes

Furthermore, this research also employs this empirical strategy to test the leverage of the “benchmarking” mechanism and thereby answer RQ3. It does so by running a series of multinomial logistic change-on-change models estimating the average marginal effect of a change in voters’ relative government performance evaluations on a change in their independence attitudes over time. Exploiting data from the BES Internet Panel, it investigates how relative evaluations of UK versus Scottish government performance (both in general and specifically regarding the handling of the Covid-19 pandemic) and relative evaluations of UK government versus EU performance impact independence attitudes.

Scottish government performance premium

Firstly, to estimate the impact of *relative* UK versus Scottish government performance evaluations, my dependent variable takes the form of the wave 7-wave 17 *change* in voters’ independence referendum vote intention. Note that the quasi-continuous outcome variable (independence happiness score) is not available in wave 7 and so this categorical alternative is used. This is based on the survey question “*If there was another referendum on Scottish independence, how do you think you would vote?*” to which respondents could select “Yes”, “No” or “Don’t Know [DK]”². The outcome variable, therefore, has seven potential outcomes: “Yes-No”, “Yes-DK”, “DK-No”, “DK-Yes”, “No-DK”, “No-Yes” and “No Change”, where “A-B” indicates that someone has shifted from A to B from wave 7 to wave 17. On the other hand, the key independent variable in this analysis is the *change* in the voters’ “Scottish government performance premium” from wave 7 to wave 17, which is defined as voters’ evaluations of how much better the Scottish government is performing than the UK

² “Will not Vote” responses were removed from this analysis for simplicity

government. This is operationalised by taking the difference between voters' approval rating of the Scottish government on the following scale: “1 = *Strongly disapprove*”, “2 = *Disapprove*”, “3 = *Neither approve nor disapprove*”, “4 = *Approve*”, “5 = *Strongly approve*” and their approval rating of the UK government on the exact same scale. The “Scottish government performance premium” in each wave, therefore, ranges from -4 to +4 whilst the *change* in the “Scottish government performance premium” – my key independent variable - ranges from -8 to +8. Note that because all these variables are available in wave 7 and wave 17, this model allows me to identify all changes that took place over the *entire* Brexit process period.

With these newly created change variables, I run a multinomial logistic regression model estimating the effect of a unit change in the “Scottish government performance premium” on the log-odds of experiencing a particular switch in independence preferences. I also include the wave 7-wave 17 change in Scottishness and personal financial circumstances as control variables since these are time-varying factors that could potentially influence both voters' *relative* assessments of UK versus Scottish government performance and independence attitudes. However, I do not control for leader evaluations in this model since these are likely to be post-treatment variables, heavily influenced by voters' government performance assessments.

Specifically, for each of the six possible “change” outcomes of the dependent variable (“Yes-No”, “Yes-DK”, “DK-No”, “DK-Yes”, “No-DK”, “No-Yes”) I estimate the log-odds of an individual i returning that outcome relative to the log-odds of returning the baseline outcome of “No Change”. For instance, for “Yes-No”, the outcome is modelled as:

$$\begin{aligned}
 (5): \ln \frac{P(Y_i = \text{"Yes-No"})}{P(Y_i = \text{"No Change"})} &= \\
 &= \alpha + \beta_1[\text{Wave 7 – Wave 17 Change in Scot govt performance premium}]_i \\
 &+ \beta_2[\text{Wave 7 – Wave 17 Change in Scottishness}]_i \\
 &+ \beta_3[\text{Wave 7 – Wave 17 Change in personal financial circumstances}]_i + \varepsilon_i
 \end{aligned}$$

More generally, given a vector of outcomes $J = \{j_1, j_2 \dots j_7\}$ where j_7 is the “No Change” option and a matrix ΔX of independent variables (computed as individual-level differences

between the two waves) along with its corresponding vector of coefficients β , the model estimates

$$\ln \frac{P(J_i = j_n)}{P(J_i = j_7)} = \alpha + \beta \Delta \mathbf{X}_i + \varepsilon_i$$

for $n < 7$, such that the probability of a given outcome is

$$P(J_i = j_n) = e^{\alpha + \beta \Delta \mathbf{X}_i + \varepsilon_i} P(J_i = j_7).$$

Secondly, since overall government approval ratings can seem vague and abstract, I also investigate this relationship and thereby address RQ3 with a particular case study in mind - the Covid-19 pandemic. In particular, I use BES data from wave 20 (June 2020) to wave 21 (May 2021) to estimate the impact of a change in voters' *relative* UK versus Scottish government competence evaluations regarding the handling of the pandemic. This case study was chosen because it was by far the most important issue for voters during this period of analysis (Ipsos, 2020). It also provides us with symmetrical BES variables across the UK and Scottish government cases, making it easy to compute *relative* competence evaluations. Plus, whilst it could be argued that overall government approval ratings are somewhat 'baked in' due to voters' partisan biases, Covid competence evaluations are less clearly endogenous to political preferences; hence, investigating the effect of *relative* assessments through this case study is a worthwhile complementary analysis.

To do this, I again use the wave-on-wave *change* in the categorical independence referendum vote intention variable as my dependent variable because the quasi-continuous alternative is not available in these waves. As my independent variable, I use the wave 20-wave 21 *change* in the "Scottish government competence premium" regarding the handling of Covid which is defined as voters' evaluations of how much better the Scottish government has handled the pandemic than the UK government. It is operationalised by taking the difference between how well voters think the Scottish government has handled the pandemic on the following scale: "*1 = very badly*", "*2 = badly*", "*3 = neither well or badly*", "*4 = fairly well*", "*5 = very well*" and how well they think the UK government has handled the pandemic on the exact same scale. The "Scottish government competence premium" in each wave, therefore, ranges from -4 to

+4 whilst the *change* in the “Scottish government competence premium” - my independent variable – ranges from -8 to +8.

In particular, to assess the impact of a change in the “Scottish government competence premium”, I alternately use three variables capturing different dimensions of the Covid-19 response, namely the handling of lockdown, PPE provision for health workers and Covid testing. With these variables, I run a series of multinomial logistic regression models across the three different dimensions of pandemic response. Specifically, I estimate the log-odds of an individual experiencing each of the six possible “change” outcomes relative to the log-odds of not switching. For instance, for “Yes-No”, the outcome is modelled by the following expression which includes all the same control variables.

$$\begin{aligned}
 (6): \ln \frac{P(Y_i = \text{'Yes-No'})}{P(Y_i = \text{'No Change'})} = \\
 &= \alpha + \beta_1[\text{Wave 20 – Wave 21 Change in Scot govt competence premium}]_i \\
 &+ \beta_2[\text{Wave 20 – Wave 21 Change in Scottishness}]_i \\
 &+ \beta_3[\text{Wave 20 – Wave 21 Change in personal financial circumstances}]_i + \varepsilon_i
 \end{aligned}$$

EU performance premium

Moreover, I also test the “benchmarking” mechanism and thereby address RQ3 by investigating the impact of voters’ *relative* UK government versus EU performance assessments. This is based on the assumption that voters believe that the AS will involve re-joining the EU and hence, they use their assessments of the EU’s performance to inform their perceptions of the AS. To do this, I again use the *change* in the categorical independence referendum vote intention variable as my dependent variable, but due to data availability constraints, I am only able to investigate this relationship from wave 7 (April/May 2016) to wave 10 (Nov/Dec 2016) – i.e., the first few months of the Brexit process period. As my key independent variable, I use the wave 7-wave 10 *change* in the “EU performance premium” which is defined as voters’ evaluations of how much better the EU is performing than the UK government. This is operationalised in the same way as above, by taking the difference between voters’ approval of EU performance on a 1-5 scale and their approval of UK government performance on the exact same scale. Hence, the “EU performance premium” ranges from -4 to +4 in each wave whilst the wave-on-wave *change* – the independent variable - ranges from

-8 to +8. As in (5) and (6), I use these newly created *change* variables to run a multinomial logistic regression model estimating the effect of a change in the “EU performance premium” on the log-odds of experiencing a particular switch in independence preferences (as opposed to not changing). This model is parallel to those above and so the outcome for “Yes-No” is modelled by the following expression:

$$\begin{aligned}
 (7): \ln \frac{P(Y_i = \text{'Yes-No'})}{P(Y_i = \text{'No Change'})} = \\
 &= \alpha + \beta_1[\text{Wave 7} - \text{Wave 10 Change in EU performance premium}]_i \\
 &+ \beta_2[\text{Wave 7} - \text{Wave 10 Change in Scottishness}]_i \\
 &+ \beta_3[\text{Wave 7} - \text{Wave 10 Change in personal financial circumstances}]_i + \varepsilon_i
 \end{aligned}$$

3.3: Empirical Strategy 2 - Panel Fixed Effects Model

What is it and why is it appropriate?

As my second strategy, I use the individual (within-subject) fixed effects regression method. This strategy, like the change-on-change method, uses panel data to control for all unit-specific time-invariant omitted variables. However, unlike strategy 1, it utilises data for each individual across more than two waves. Formally, the individual/entity fixed effects (“within”) estimator takes the form: $Y_{i,t} = \alpha_i + \beta_1 X_{i,t} + \beta_2 Z_{i,t} + u_{i,t}$, where β_1 is the coefficient of interest, $Z_{i,t}$ represents a time-varying control variable, $u_{i,t}$ is the error term and α_i are individual fixed effects – i.e., individual-specific intercepts. Note that this is equivalent to having $n-1$ binary variables in the regression model to denote every individual’s fixed effect (Stock & Watson, 2015). Specifically, I use this empirical strategy as a robustness check for the change-on-change analysis described above. Using the same BES data, I run a series of individual fixed effects models in parallel to the change-on-change models to estimate the very same relationships. The difference with this strategy, however, is that more than two waves of data are used and only those observations where the dependent variable changes are used for the estimation. This has multiple advantages over strategy 1.

Firstly, although the change-on-change strategy does provide easily interpretable estimated coefficients and takes a good first step at addressing my research questions, the fixed effects method exploits much more information from many more waves of data and so is more likely to identify systematic effects. Secondly, whereas the change-on-change method only captures the *overall* change between the pair of waves analysed (e.g., from wave 11 to wave 17), the fixed effects strategy captures *all* changes that happen within this time period. Therefore, it provides me with potentially many more examples of switching which would be missed under strategy 1. For example, if an individual were to switch from 5 to 4 on the Brexit evaluation variable and from ‘No’ to ‘Yes’ between wave 11 and wave 12 but then revert back to their initial responses by wave 13, the fixed-effects strategy would use both these changes to estimate the over-time impact of Brexit evaluations on independence attitudes. In contrast, the change-on-change strategy investigating *overall* changes from wave 11 to wave 17 would codify this individual as “not changing” and so potentially valuable information would be lost (Cunningham, 2021; Stock & Watson, 2015). The fixed effects strategy is, therefore,

particularly suitable for answering RQ1 because the Brexit process was a dynamic (not a time-specific) event and hence, by assessing the impact of voters' Brexit evaluations on their independence attitudes as they developed over time, it allows me to more fully unpack the impact of the Brexit process and should increase the causal credibility of my empirical analysis.

3.3.1: Estimating the impact of Brexit evaluations on independence attitudes

To answer RQ1 using the fixed effects method, I use the same Brexit evaluation variables as described in section 3.2.1 but, since the independence happiness score variable is not consistently available across all waves in my period of interest, I use the categorical referendum vote intention variable as my outcome variable. With these variables, I construct two sets of fixed effects models. The first uses data from waves 10, 11, 13, 14 and 17 to estimate the impact of voters' *overall* Brexit evaluations on independence attitudes over time whilst the second uses data from waves 7, 10, 11, 13, 14, 15, 16 and 17 to estimate the over-time impact of voters' *economic* Brexit evaluations. Ideally, of course, these models would include data from all waves within the Brexit process period – i.e., waves 7-17. However, because not all variables are available in every wave, this is not possible. Nonetheless, these models still draw on multiple waves of data within the Brexit process period, providing me with many opportunities for switching.

Specifically, I re-code the outcome variable into three sets of binary outcomes - “Yes” vs “No”; “Yes” vs “DK” and “DK” vs “No” where the first is coded as ‘1’ and the second as ‘0’ - and run a series of fixed effects logistic regression models estimating the impact of both *overall* and *economic* Brexit evaluations on the log-odds of holding a particular vote intention over another. As in specification (1), I control for Scottishness, personal financial circumstances and leader evaluations since these are the most obvious potential time-varying confounders identified in the literature. Thus, for each of the binary variables, the log-odds of obtaining the outcome coded as ‘1’ (e.g., choosing “Yes” in the case of the “Yes-vs-No” dependent variable) are modelled as:

$$\begin{aligned}
(8): \ln \frac{P(Y_{i,t} = 1)}{1 - P(Y_{i,t} = 1)} \\
= \alpha_i + \beta_1[\text{Brexit evaluations}]_{i,t} + \beta_2[\text{scottishness}]_{i,t} \\
+ \beta_3[\text{personal financial circumstances}]_{i,t} \\
+ \beta_4[\text{likePM}]_{i,t} + \beta_5[\text{likeSturgeon}]_{i,t} + \varepsilon_{i,t}
\end{aligned}$$

$\alpha_i = \text{individual fixed effects}$

Note that, since I am working with multiple observations per individual, the OLS assumption that residuals are independent of each other is unlikely to hold in these fixed effects models; instead, regression errors are likely correlated within individuals (Cameron & Miller, 2015; Konrad, 2021). As a result, to account for any such autocorrelation of residuals, I make sure to use standard errors clustered at the individual level. Specifically, this allows for heteroskedasticity and autocorrelation of residuals within individuals but treats the error terms as uncorrelated between individuals (Cunningham, 2021).

3.3.2: Estimating the impact of relative assessments on independence attitudes

Moreover, to complement the change-on-change analyses described in section 3.2.3, I also address RQ3 with a series of fixed effects models. However, since there were only two waves of data available for voters' "Scottish government competence premiums" regarding the handling of Covid (waves 20 and 21) and voters' "EU performance premiums" (waves 7 and 10), I do not repeat these analyses. This is because the fixed effects estimator is equivalent to the first difference estimator if the number of time periods is two and so there is no more information to be gained in doing so (Wooldridge, 2001). On the other hand, there are many more waves of data available regarding voters' "Scottish government performance premiums". As such, I run a series of individual fixed effects logistic regression models that, analogous to specification (5), introduce the "Scottish government performance premium" as the key independent variable and control for Scottishness and personal financial circumstances. Specifically, I use data from waves 7, 10, 11, 14, 15, 16 and 17 and I again use the re-coded independence referendum vote intention variable as my three binary outcome variables – i.e., "Yes" vs "No", "Yes" vs "DK" and "DK" vs "No". For each of the binary variables, the log-odds of obtaining the outcome coded as '1' are modelled as:

$$\begin{aligned}
(9): \ln \frac{P(Y_{i,t} = 1)}{1 - P(Y_{i,t} = 1)} \\
= \alpha_i + \beta_1[\textit{Scottish govt performance premium}]_{i,t} + \beta_2[\textit{scottishness}]_{i,t} \\
+ \beta_3[\textit{personal financial circumstances}]_{i,t} + \varepsilon_{i,t}
\end{aligned}$$

$\alpha_i = \textit{individual fixed effects}$

3.3.3: Limitations of my Panel Data Analysis

However, despite providing a more reliable estimation than the change-on-change method, the fixed effects estimator still has some shortcomings that must not be overlooked. Firstly, although it reliably nets out time-invariant individual-specific confounders, there is still the problem of potential omitted variable bias arising from individual-specific time-varying factors (i.e., those that vary both across individuals and over time) (Stock & Watson, 2015). To address this, my models control for some of the most obvious time-varying covariates that have been identified in the literature (e.g., personal economic circumstances, Scottish identity and leader evaluations). Despite this, however, there may still be unobservable time-varying individual heterogeneity which is correlated with both my independent and dependent variables and if this is the case, then the omission of these factors will bias the estimator, making causal inference less reliable (Stock & Watson, 2015; Cunningham, 2021). On top of this, both of these panel methods cannot rule out the potential reverse causality issue (Liker et al., 1985). In other words, since they cannot determine for certain whether a change in Brexit evaluations takes place before or after a change in independence attitudes, it might be the case that these methods wrongly attribute an association between these two variables to an effect of Brexit evaluations on independence attitudes when the direction of causality is, in fact, the other way around. Intuitively, this might seem unlikely given that Brexit was a big shock to the SQ; however, these panel methods cannot rule it out. Likewise, they cannot rule out the possibility of reverse causality with regard to RQ3. Indeed, they cannot determine for certain whether a change in relative assessments is driving a change in independence attitudes or vice versa. And so, to overcome these particular challenges when testing the “benchmarking” mechanism, I also use an experimental method, to which I now turn.

3.4: Empirical Strategy 3 – Online Survey Experiment

To further test the “benchmarking” mechanism’s validity in the contemporary Scottish context and address RQ3, my third empirical strategy takes the form of an original online survey experiment. This experiment assesses the importance of “benchmarking” and relative assessments through the context of *relative* economic performance evaluations. It does so by asking a representative sample of Scottish voters about their support for independence whilst experimentally manipulating the question prompts that they receive. Specifically, it primes respondents at random with different hypothetical future scenarios that vary the *relative* economic performance prospects of the SQ and AS. Hence, it enables me to assess whether independence support is at least partially driven by a *rational* and *relative* evaluation of the perceived costs/benefits of the Union versus independence, as the “benchmarking” mechanism predicts.

This experiment enhances my research agenda in three principal ways. Firstly, unlike my previous retrospective observational analyses which use data from 2017 to 2021, this experiment, conducted in November 2022, tests the “benchmarking” mechanism in a *contemporary* setting. A number of significant events have occurred in Scottish and British politics since 2021 (e.g., the Covid-19 vaccine rollout and the re-opening of society post-pandemic, the ‘party-gate’ scandal, the Truss premiership and the cost-of-living crisis to name but a few) and so a contemporary analysis is worthwhile. Secondly, the randomisation of treatment assignment in this experiment allows me to overcome the shortcomings of my panel data analysis described above. This is because, since respondents can in no way self-select into receiving a particular treatment arm and hence each sub-group is identical in expectation bar their treatment assignment, the problem of omitted variable bias is eliminated. Thirdly, given that it allows for the manipulation of treatments, this experimental strategy also removes the possibility of reverse causation. And so, by its very nature, this strategy provides me with a credible estimate of the *causal* effect of providing information about the *relative* economic appeal of the AS versus SQ on independence support (Angrist & Pischke, 2015).

3.4.1: Experimental Design

Fielded online between 22nd and 25th November 2022, this experiment formed part of the Scottish Election Study's November 2022 Scottish Opinion Monitor (SCOOP) survey. The sample had a size of 1210 and was drawn by YouGov who used targeted quota sampling combined with post-fieldwork weighting to create a representative sample of Scottish residents aged 16 and over. For a full list of the socio-demographic and political characteristics used by YouGov in their sampling and weighting process, see Section E1 of the Appendix. The survey experiment involved randomly assigning respondents with equal probability (0.2) to five different sub-groups, each of which received a different question prompt. These primed respondents to consider different hypothetical scenarios about the *relative* economic standing of Scotland versus the rest of the UK five years following independence before answering how happy or unhappy they would feel (on a 0-10 scale) if Scotland voted to become independent. Specifically, respondents were randomly assigned³ to receive one of the following five treatment conditions: (i) the *control* which did not mention the economic consequences of independence and simply asked respondents how happy or unhappy they would be if Scotland voted to become independent; (ii) the *placebo* which primed respondents to consider the scenario in which average incomes in both Scotland and the rest of the UK remain unchanged, (iii) *treatment arm 1* which primed respondents with the scenario in which average incomes in Scotland remain unchanged but rise by 10% in the rest of the UK, (iv) *treatment arm 2* which primed respondents with the exact reverse scenario and (v) *treatment arm 3* which primed respondents with the scenario in which average incomes in both Scotland and the rest of the UK increased by 10%. The specific question wordings and response options can be found in Section E2 of the Appendix. This design, therefore, by varying the *relative* appeal of the SQ versus AS, allows for clean and simple comparisons across the treatment groups to identify whether *relative* (hypothetical) assessments affect independence support in line with the “benchmarking” mechanism. I now turn to my design justification.

Sample size and power analysis

The choice to have five different experimental conditions (with sample sizes equal to 244, 248, 243, 217 and 258 respectively) was made based on the trade-off between sample size

³ Via *simple* randomisation

availability and experimental completeness. To inform this choice, I conducted a power analysis calculation to estimate the necessary sample size in each sub-group in order for my expected results to be statistically significant. To do this, I estimated the mean response of the independence happiness score (the outcome variable) to be 5 and the standard deviation to be 3.5. This makes sense intuitively given that the Scottish electorate is split roughly down the middle on the constitutional question and opinion is extremely polarised (i.e., clustered at the poles) (Johns, 2022). However, this estimate was primarily based on existing survey data which have asked respondents similar questions. For instance, wave 21 of the BES asked respondents this exact same question and a mean of 4.5 and standard deviation of 4.2 was found. Further, when the SES asked respondents to place themselves on a 0-10 scale where 0 represented “Abolish the Scottish Parliament” and 10 represented “Independence for Scotland”, they found a mean of 7.1 and a standard deviation of 3.5 (SES, 2021).

To estimate the expected treatment effect, I exploited data from Henderson et. al. (2014) which asked respondents how they would vote in a potential independence referendum under different scenarios regarding their personal finances. They found that if independence were to make voters £500 better off, the estimated increase in Yes support would be 7 or 9 percentage points, depending on how it was measured. It is from this that I derived my estimated treatment effect of 0.8 – i.e., being primed with the scenario in which average incomes in Scotland (and not the rest of the UK) increase by 10% leads to a 0.8-point increase in mean independence happiness scores. Of course, this previous study is not easily comparable to my survey experiment and so this only provides a rough estimation to guide the power analysis calculation. Nevertheless, using these estimated parameters along with the conventional $\beta \geq 0.8$ (power = 80%) and $\alpha \leq 0.05$, I found that a sample size of at least 237 is required in each sub-group for this estimated effect to be significant under a one-sided test. Hence, five sub-groups allowed me to maintain sufficient statistical power whilst at the same time test the effects of multiple different question prompts. For full details of this power analysis, see section E3 of the Appendix.

Topic choice

I focus on the topic of **average incomes** because it is easily understandable and a good proxy for the general economic performance of a country. According to the “benchmarking” approach, assessments of the general state of the national economy should inform perceptions of the SQ and AS and so this is a simple way of encapsulating this idea in a way which is

relatable to respondents (De Vries, 2018). In addition, the topic of *average incomes* is also an appropriate one not only because economic concerns are amongst the most salient topics in the independence debate but also because this debate has often been specifically framed around how much independence would harm/benefit the *average* Scottish household's income (Curtice, 2013; HM Treasury, 2013). On top of this, and very importantly, average incomes are also a handy topic through which one can directly test the leverage of the "benchmarking" mechanism in this setting because it is evidently quantifiable and higher average incomes are perceived as *objectively superior* to lower average incomes; hence, it makes measuring the power of "benchmarking" analytically straightforward.

Choice of hypothetical scenarios

Regarding my specific question prompts, I use various combinations of "no change" and "a 10% increase" in average incomes as my hypothetical future scenarios. This is because (i) they are simple round numbers which respondents will easily be able to interpret and (ii) there is a meaningful difference between them. In particular, I decided to use a "10% increase" as opposed to a "10% decrease" in average incomes based on the results of a pilot study. This asked a convenience sample which scenario they believed was more likely: a 10% increase or a 10% decrease in average incomes in both Scotland and the rest of the UK in the five years following independence. The results revealed that a "10% increase" was seen as more plausible; hence, I decided to use this in my survey experiment in order to make my hypothetical scenarios as believable as possible whilst still having the same ability to measure the power of "benchmarking". See Section E4 of the Appendix for further details regarding this pilot study.

Alleviating the pre-treatment problem

A key threat to the internal validity of this experiment is the problem of pre-exposure to the treatment. Given the extremely salient and polarising nature of the debate, most Scottish voters have heard the economic arguments for and against independence before and already have strongly-held opinions on the matter. And so, there is a risk that my experimental subjects may simply not believe the hypothetical scenarios presented to them and may, therefore, ignore them when responding to the question. To alleviate this problem, I chose to start each question prompt (apart from the *control*) with the phrase "*There are many important issues in the debate*

about Scottish independence, including its potential impact on the Scottish economy". This is a common technique often used to try to minimise pre-treatment bias – i.e., by reminding respondents that there are *many* issues in the debate, this preamble should hopefully prompt respondents to leave their other strongly-held opinions about independence (e.g., about Scottish sovereignty) to one side and solely consider the consequences of independence for the Scottish economy. Whilst it is, of course, impossible for subjects to be fully immune to such outside influences, this question preamble was included to at least somewhat alleviate this problem.

Moreover, I also chose to ask respondents (except those in the *control* group) a follow-up question in order to address this pre-treatment problem. Specifically, this asked respondents whether they found the hypothetical post-independence scenario presented to them plausible and, if not, in which direction their disbelief lay. The purpose of this was to provide an explainer in the case of null experimental results by identifying whether the pre-treatment problem was to blame. Without it, it would be impossible to tell from a set of null results whether the “benchmarking” mechanism is not valid or whether it is valid but the treatments were simply disbelieved by respondents and this is why they did not respond to them in any particular way. However, by including this follow-up question, I am able to identify whether respondents *could* have believed the hypothetical scenarios or whether their prior judgements about independence made them effectively ‘immune’ to the treatments. For the specific wording of the follow-up question and its response options, see section E2 of the Appendix. I now turn to how this experimental strategy was used to test the “benchmarking” mechanism.

3.4.2: Estimating the average treatment effect

To estimate the impact of my experimental treatments – i.e., the average treatment effects (ATEs) – I first conduct a series of ‘balance tests’ to check that randomisation has been successful. To do this, I run a multinomial logistic regression model predicting the log-odds of being assigned to any one of the five treatment groups based on a variety of socio-demographic and political characteristics. In particular, I test for balance in the following covariates: age, gender, personal income, education level, political party identity, Brexit (Leave vs Remain) identity, 2014 independence referendum vote choice and strength of Scottish identity. In addition, since the experiment was in the field before and after the UK Supreme Court ruling that the Scottish Parliament does not hold the power to legislate for an independence referendum (announced at 9.45am on 23rd November 2022), I also check for balance across

each sub-group in the proportion of respondents who completed the survey before/after the ruling (The Supreme Court, 2022). All these variables could plausibly affect respondents' independence attitudes and so, to isolate the effect of my treatments, they need to be balanced across all sub-groups; otherwise, some groups may be systematically more supportive of independence than others in which case the experimental outcomes will reflect both the effect of the treatments and the effect of non-random assignment, undermining a causal interpretation of the ATE (Stock and Watson, 2015).

Next, I regress the outcome variable (independence happiness score) on a set of dummy variables representing each treatment condition (using the *placebo* as the reference group) to estimate the ATEs – i.e., the average causal effect of being primed with a particular treatment scenario as opposed to the *placebo*. Assuming perfect randomisation, each slope coefficient in this OLS linear model is equivalent to the *difference-in-means* estimator, an unbiased and consistent estimator of the average *causal* effect (Angrist & Pischke, 2015; Imai, 2017). To improve the efficiency of the estimator, I also include all variables that are not found to be perfectly randomised in the balance test (Z_i) into the regression model, as shown in the specification below:

$$\begin{aligned} (10): \text{Independence happiness score}_i &= \beta_0 + \beta_1 \text{treatment } 1_i + \beta_2 \text{treatment } 2_i + \beta_3 \text{treatment } 3_i + \beta_4 \text{control}_i \\ &+ \beta_5 Z_{1i} + \dots + \beta_n Z_{(n-4)i} + u_i \end{aligned}$$

Specifically, the inverse of β_4 identifies the average *causal* effect of receiving the *placebo* as opposed to the *control* – i.e., the effect of being primed with some neutral information about the consequences of independence for average incomes. Moreover, β_1 , β_2 and β_3 reveal the average *causal* effect of each of my treatments over and above the effect of being provided with information about future economic performance prospects. These coefficients can then be compared to the following "benchmarking" hypotheses. Specifically, given that treatment 1 makes the SQ appear more appealing vis-à-vis the AS, the "benchmarking" approach would expect a negative β_1 . Conversely, since treatment 2 makes the AS relatively more appealing, a positive β_2 is predicted. However, even though treatment 3 makes the AS seem more appealing, it does not change the *relative* appeal of the SQ vis-à-vis the AS and so β_3 is expected to be indistinguishable from zero. By testing these specific hypotheses, I use this experimental strategy to directly test the "benchmarking" mechanism.

3.4.3: Estimating treatment effect heterogeneity

Beyond estimating these ATEs, I also use this strategy to investigate the extent of treatment effect heterogeneity. As discussed in section 2.2, I propose, using the “benchmarking” logic, that some groups of voters should be more likely to update their independence attitudes than others in response to a change in economic conditions since they have smaller and more volatile *Union differentials*. Specifically, I expect a larger treatment effect – i.e., β_1 and β_2 – amongst *previously uncertain* and *previously unattached* voters. I also expect those respondents who actually believed the hypothetical scenarios to respond more severely to the treatments. This is because, if you believe the treatment, you are more likely to update your perceptions of the SQ and AS and hence are more likely to respond, whereas if you do not believe it, you will probably not update your perceptions of the SQ and AS. And so, to test this, I also investigate the interactions between my various treatments and whether voters are *uncertain*, *unattached* or *believers*.

To do so, I first subset my sample into *previously certain* and *uncertain* subjects using “don’t know” responses to the independence referendum vote intention question asked earlier in the survey as a proxy for *prior uncertainty*. Note that since this question came *before* the experiment in the SCOOP survey, it captures voters’ uncertainty prior to receiving the treatment and hence is a useful measure of prior uncertainty. Next, I subset my sample into *previously attached* and *unattached* subjects. This is measured using respondents’ expressed identity (or lack thereof) to either side of the Yes/No divide earlier in the survey. Note again that this independence identity question was asked *before* the experiment and hence this variable provides a valid measure of voters’ prior attachment. Lastly, to subset my sample into *believers* and *non-believers*, I use responses to the follow-up question. I classify those respondents who believed that the hypothetical scenario presented to them was “about right” as *believers* and those who did not as *non-believers*. Note that the exact question wordings associated with these variables are reported in Table E11 in the Appendix. With this selection of newly-created dummy variables, I run a further set of OLS linear regression models estimating the effect of each treatment condition along with each of these interaction terms. In this way, by investigating potential heterogeneity in the ATEs, I provide a further test of the “benchmarking” mechanism.

3.4.4: Experimental Assumptions and Limitations

However, it is important to acknowledge that, for this experiment to be an internally valid test of the ‘benchmarking’ approach, there are three key assumptions that must hold. The first is that all respondents regard higher average incomes as objectively superior to lower average incomes, a rather innocuous assumption. Second, it is assumed that voters use the information provided about Scotland’s future economic performance post-independence to inform their perceptions/expectations of the AS. Third, it is also necessary to assume that respondents perceive average income growth in the rest of the UK as an accurate reflection of average income growth in Scotland if the SQ remains— i.e., Scotland will achieve the same average income growth as the rest of the UK if it stays in the Union. These last two assumptions are less innocuous due to the aforementioned pre-treatment problem that respondents enter the experiment with strongly-held beliefs about the issue of Scottish independence and so may not fully internalise the treatments. And whilst I have taken steps to address this concern as described above, it remains a problem, especially given the salience of the subject matter and the polarisation which surrounds it. Further, the experiment’s placement at the end of the SCOOP survey is also a cause for concern because it means the experiment was not undertaken on a blank canvas. By the time respondents received the treatments, they had already been asked their independence referendum vote intention as well as other questions relating to the independence debate. And so, these previous questions, by making subjects consider themselves as either ‘Yes’ or ‘No’ supporters, might have impacted the way in which they responded to the treatments, exacerbating the pre-treatment problem.

Moreover, the external validity of this priming experiment is also somewhat constrained. This is because, given that the information provided in the question prompts is only hypothetical, it is not able to manipulate respondents’ *actual* evaluations of relative economic performance which is the key independent variable needed to assess the validity of the ‘benchmarking’ mechanism. Whilst I do expect my hypothetical treatments to have a causal effect on expressed independence attitudes, there is no guarantee that such an effect would be replicated if voters’ *actual* evaluations of Scotland’s post-independence economic prospects relative to the rest of the UK shifted – i.e., if the hypothetical world became reality. And so, even though this survey experiment provides a reliable estimate of the average *causal* effect of being primed with information that varies the relative appeal of the SQ vis-à-vis the AS, this is not necessarily the same as the average *causal* effect of voters shifting their actual relative assessments.

Nonetheless, this experimental strategy, combined with the change-on-change models regarding voters' relative government performance assessments, still provides suggestive evidence of the validity of the underlying "benchmarking" mechanism.

Having outlined in detail the three methods used to address my research questions, I now turn to present the results of this empirical analysis.

Chapter 4: Results Part I

The association between Brexit evaluations and independence attitudes over time

This chapter is the first of three presenting my main empirical findings. It reports the results from the panel change-on-change and individual fixed-effects models investigating the association between voters' Brexit assessments and independence attitudes over the Brexit process period. Hence, it directly addresses RQ1.

4.1: Change-on-Change Method

Tables 1 and 2 present the results of the OLS change-on-change regression models estimating the association between a *change* in voters' Brexit evaluations and a *change* in independence attitudes from April/May 2017 (wave 11) to November 2019 (wave 17). Table 1 reveals that a positive shift in voters' *overall* Brexit evaluations is associated with a negative shift in their independence happiness score over time, in line with H1; indeed, all five models find a negative association. Model 2, in particular, shows that when changes in Scottishness and financial circumstances are taken into account, the average marginal effect of a 1-unit more positive shift in overall Brexit assessments is a 0.066 more negative shift in independence attitudes and this coefficient is found to be significant at the 0.05 level even with heteroskedasticity-robust standard errors. Although this may appear marginal, this translates into an estimated increase of 0.66 in the Scottish independence happiness score (a 170.5% increase) if a voter shifted from being "*extremely happy*" to "*extremely disappointed*" about Brexit over the Brexit process period. Further, Models 3, 4 and 5 demonstrate that even after controlling for a change in leader evaluations (i.e., voters' assessments of Theresa May/Boris Johnson and Nicola Sturgeon), there is still a negative association between Brexit assessments and independence attitudes in line with H1, even though the estimated coefficients are weaker and less significant, perhaps implying that shifting leader evaluations are at least partially driving this association (more on this later).

Moreover, the results reported in Table 2 provide further evidence in support of H1 and show that voters' over-time economic assessments of Brexit are strongly associated with their over-time independence attitudes in the hypothesised direction. Indeed, Model 2 shows that once changes in identity and financial circumstances are taken into account, the average marginal effect of a 1-unit more positive shift in economic evaluations of Brexit is a 0.266 more negative shift in independence attitudes; this coefficient is also highly significant at the 0.01 level and hence the probability of finding this result by chance is negligible. Substantively, this means that, on average, a Scottish voter who shifted from saying that Brexit will make the UK's general economic situation "much better" in April/May 2017 to "much worse" in November 2019 had an independence happiness score that became 1.064 points higher on the 0-10 scale (a 275% increase). Further, this result also remains robust to the inclusion of leader evaluations in the model. Indeed, Models 3, 4 and 5 reveal that the negative association between a shift in voters' *economic* Brexit assessments and a shift in their independence attitudes remains strong and somewhat significant even after all control variables are included in the model, suggesting that shifting leader evaluations over the Brexit process period was not the only driving force behind this observed association.

Thus, the results of these change-on-change models provide empirical evidence in support of H1, suggesting that Scottish voters' Brexit evaluations did have an influence on their independence attitudes over the Brexit process period. In particular, they show that voters' *economic* evaluations of Brexit – i.e., how beneficial/costly they believe Brexit will be economically - are especially important; they seem to have a much more substantial and significant effect on independence attitudes than *overall* Brexit assessments. These findings, therefore, seem to corroborate the argument that economic considerations are central to the independence debate and since wave-on-wave changes in identity and personal financial circumstances are both found to strongly correlate with independence attitudes over time, they also provide evidence in favour of the 'identity' and 'materialist' schools. Nevertheless, it should be noted that in every model in Table 2, voters' *economic* Brexit evaluations had a larger coefficient than identity or financial circumstances.

Table 1: OLS Regression of Change in independence happiness score on Change in overall Brexit evaluations (wave 11-wave 17)

	Model 1	Model 2	Model 3	Model 4	Model 5
Change in Brexit happiness score	-0.069** (0.030)	-0.066** (0.030)	-0.047· (0.030)	-0.030 (0.026)	-0.015 (0.027)
Change in Scottishness		0.143** (0.071)	0.139** (0.069)	0.108· (0.068)	0.105· (0.067)
Change in personal financial evaluations		-0.145*** (0.054)	-0.127** (0.054)	-0.125** (0.050)	-0.110** (0.050)
Change in PM approval			-0.105*** (0.024)		-0.089*** (0.022)
Change in Sturgeon approval				0.304*** (0.048)	0.294*** (0.048)
Constant	0.384*** (0.055)	0.387*** (0.056)	0.285*** (0.058)	0.368*** (0.053)	0.281*** (0.056)
R ²	0.005	0.013	0.029	0.077	0.088
Adj. R ²	0.004	0.011	0.026	0.074	0.085
Num. obs.	1406	1406	1406	1406	1406
RMSE	2.055	2.048	2.032	1.982	1.970

***p < 0.01; **p < 0.05; *p < 0.1; ·p < 0.15 [Standard errors = Heteroskedastic-Robust SEs]

Table 2: OLS Regression of Change in independence happiness score on Change in economic Brexit evaluations (wave 11-wave 17)

	Model 1	Model 2	Model 3	Model 4	Model 5
Change in economic evaluation of Brexit	-0.278*** (0.103)	-0.266*** (0.103)	-0.209** (0.101)	-0.180* (0.096)	-0.135 (0.095)
Change in Scottishness		0.115 [·] (0.071)	0.110 [·] (0.069)	0.083 (0.069)	0.080 (0.067)
Change in personal financial evaluations		-0.137** (0.056)	-0.121** (0.055)	-0.117** (0.052)	-0.105** (0.052)
Change in PM approval			-0.099*** (0.024)		-0.083*** (0.023)
Change in Sturgeon approval				0.320*** (0.051)	0.311*** (0.050)
Constant	0.343*** (0.056)	0.351*** (0.057)	0.270*** (0.059)	0.348*** (0.055)	0.280*** (0.057)
R ²	0.010	0.016	0.030	0.088	0.098
Adj. R ²	0.009	0.014	0.027	0.086	0.095
Num. obs.	1331	1331	1331	1331	1331
RMSE	2.047	2.042	2.028	1.966	1.956

***p < 0.01; **p < 0.05; *p < 0.1; ·p < 0.15 [Standard errors = Heteroskedastic-Robust SEs]

4.2: Panel Fixed Effects Method

As a robustness check for this analysis, Tables 3 and 4 present a summary of the results of my fixed effects logistic regression models estimating the same relationship. For my full regression tables, see section A of the Appendix. Firstly, Table 3 reveals the association between voters' *overall* Brexit assessments and independence attitudes over time. Focusing on Model 2 which takes into account Scottishness and personal financial circumstances, it shows that there is a marginal association in the hypothesised direction. Indeed, a unit increase in voters' *overall* Brexit assessments is, on average, associated with a 5.07% decrease in the odds of responding 'Yes' as opposed to 'No', a 9.61% reduction in the odds of responding 'Yes' as opposed to 'Don't Know' and a 16.6% decrease in the odds of responding 'Don't Know' as opposed to 'No'. However, it must be acknowledged that none of these coefficients are statistically significant at conventional thresholds. This is most likely a result of the relatively small sample sizes available for this analysis. Due to data availability constraints, only 6 waves of data (waves 10, 11, 13, 14, 15 and 17) were employed in these models and given that the fixed effects method only utilises observations where there is a change in the dependent variable (and discards the rest), this left relatively few observations for the analysis. Note also that clustered standard errors are reported in each of these fixed effects models, raising the effective significance thresholds. Beyond this, it must also be acknowledged that in each of these models, once leader evaluations are included (Models 3-5), the negative association between Brexit assessments and independence attitudes seems to disappear, perhaps implying that the effect of *overall* Brexit assessments on independence attitudes is somewhat absorbed by how voters' judge their political leaders (more on this later). And so, this set of panel fixed effects models focusing on *overall* Brexit evaluations provides only very weak directional evidence to support H1.

Table 3: Summary of Fixed Effects results – Overall Brexit evaluations

Logit Regression Models of Scottish indyref vote intention on <i>overall</i> Brexit evaluations with individual fixed effects					
	Model 1	Model 2	Model 3	Model 4	Model 5
Binary Yes = 1 vs DK = 0 outcome					
<i>Brexit happiness score coefficient</i>	-0.054	-0.052	-0.059	0.066	0.050
<i>N = 451</i>					
Binary Yes = 1 vs DK = 0 outcome					
<i>Brexit happiness score coefficient</i>	-0.099	-0.101	-0.063	-0.018	0.025
<i>N = 421</i>					
Binary DK = 1 vs No = 0 outcome					
<i>Brexit happiness score coefficient</i>	-0.103	-0.182	-0.100	-0.082	0.012
<i>N = 388</i>					

Table 4: Summary of Fixed Effects results – Economic Brexit evaluations

Logit Regression Models of Scottish indyref vote intention on <i>economic</i> Brexit evaluations with individual fixed effects					
	Model 1	Model 2	Model 3	Model 4	Model 5
Binary Yes = 1 vs DK = 0 outcome					
<i>Economic evaluation of Brexit coefficient</i>	-0.415***	-0.352**	-0.290*	-0.405**	-0.325*
<i>N = 1312</i>					
Binary Yes = 1 vs DK = 0 outcome					
<i>Economic evaluation of Brexit coefficient</i>	-0.380*	-0.388**	-0.333+	-0.357+	-0.275
<i>N = 941</i>					
Binary DK = 1 vs No = 0 outcome					
<i>Economic evaluation of Brexit coefficient</i>	-0.605***	-0.607***	-0.471**	-0.519**	-0.374*
<i>N = 951</i>					

*** p<0.01; ** p<0.05; * p<0.1; + p<0.15 [Standard Errors clustered at individual level]

NB: Model 1 has no controls; Model 2 controls for Scottishness and personal finances; Model 3 controls for Scottishness, personal finances and PM approval; Model 4 controls for Scottishness, personal finances and Sturgeon approval; Model 5 controls for all 4 variables

Secondly, Table 4 reveals the over-time association between voters' *economic* Brexit evaluations and independence attitudes. It demonstrates that more negative assessments of Brexit's impact on the economy were strongly associated with pro-independence attitudes. Indeed, this effect is substantial, in the hypothesised direction and highly significant and hence this provides strong evidence in support of H1. Specifically, after Scottishness and material circumstances are taken into account, Table 4 shows that a 1-unit increase in voters' *economic* Brexit assessments was, on average, associated with a 29.7% reduction in the odds of responding 'Yes' as opposed to 'No', a 32.2% reduction in the odds of responding 'Yes' as opposed to 'Don't Know' and a 45.5% reduction in the odds of responding 'Don't Know' as opposed to 'No'. Further, all these coefficients are highly significant even with clustered standard errors, and hence the probability of finding this result by chance is negligible. Moreover, unlike in Table 3, this result is also robust to the inclusion of leader evaluations in the model. Indeed, even when both leader evaluation variables are added to the model (Model 5), the negative association between *economic* Brexit assessments and independence attitudes remains substantial and significant. In fact, a unit increase in voters' *economic* Brexit assessments is still, on average, associated with a 27.7% reduction in the odds of responding 'Yes' as opposed to 'No' and a 31.2% reduction in the odds of responding 'Don't Know' as opposed to 'No' when both leader evaluations are included in the models; these coefficients also remain significant at the 0.1 level. Thus, the findings presented in Table 4 are entirely consistent with H1 and corroborate the results from the change-on-change model in Table 2.

Overall, therefore, the results of my fixed effects models largely corroborate the change-on-change analysis above. Whilst I find weaker evidence in the case of *overall* Brexit evaluations (perhaps due to the smaller available sample size), I find a substantial and highly significant negative association between voters' *economic* Brexit evaluations and independence attitudes over the Brexit process period, even after controlling for time-invariant factors, Scottish identity, material circumstances and leader evaluations.

4.3: Are leader evaluations driving this association?

I now turn to discuss the impact of leader evaluations more closely. Unsurprisingly, I find a strong and highly significant association between voters' leader evaluations and independence attitudes in the expected direction – i.e., higher Nicola Sturgeon/lower UK Prime Minister approval ratings are associated with greater support for independence and vice versa – in both my change-on-change and fixed effects models^{4,5}. In particular, I find that voters' Nicola Sturgeon evaluations seemed to have the strongest association with independence attitudes⁶, perhaps unsurprisingly given that Nicola Sturgeon is evidently more associated with the independence debate than Theresa May or Boris Johnson. These very strong associations, however, tell us nothing about the direction of causality between leader evaluations and independence attitudes and in this instance, it would seem highly likely that voters' leader evaluations would be influenced by their independence attitudes. This is an intriguing causal question; however, it is not directly related to my hypotheses. Nonetheless, the inclusion of these leader evaluation variables in the models prompts an important and difficult question: are voters' leader evaluations running through their Brexit evaluations and hence driving my observed association between Brexit evaluations and independence attitudes?

To address this question, I chose to incrementally add the “leader like” variables to both the fixed effects and change-on-change models. In so doing, I also ensured the same sample was used across all models. This allowed me to accurately isolate the effect of each of these leader evaluation variables (holding Brexit evaluations constant) and, therefore, assess whether and to what extent they are absorbing my key association between Brexit evaluations (both *overall* and *economic*) and independence attitudes. In short, I find that leader evaluations do absorb

⁴ See section A of the Appendix for my fixed effects regression tables, including all controls.

⁵ As discussed in section 3.2.1, I chose to include both UK Prime Minister and Nicola Sturgeon approval ratings as control variables despite my initial concerns about their potential collinearity. In the change-on-change analysis, the collinearity issue is somewhat assuaged given that *changes* in leader evaluations are not very collinear. In the fixed effects analysis, whilst these “leader like” variables are collinear, the substantive results are essentially equivalent irrespective of whether each variable is included separately or together and thus I have made the fairly innocuous assumption that these variables' collinearity has no tangible impact on my findings.

⁶ Holding all other time-varying control variables as well as all time-invariant factors constant (including voters' prior views about Nicola Sturgeon)

some of this association, but not all of it; however, the extent to which this occurs differs between *overall* and *economic* Brexit evaluations.

Turning to voters' *overall* Brexit evaluations, Tables 1, A1, A2 and A3 reveal that adding each leader evaluation variable separately to the model substantially reduces the magnitude of the Brexit assessment coefficient⁷. Further, when both leader evaluation variables are included together, this effect is amplified. Specifically, Table 1 shows that including both leader evaluation variables in the change-on-change model reduces the magnitude of the Brexit evaluations coefficient by 77.3% whilst Tables A1-A3 demonstrate that adding both leader evaluation variables to the fixed effects models has the effect of eliminating the negative association between Brexit evaluations and independence attitudes altogether⁸. Therefore, one can conclude that at least a substantial proportion of the association between voters' *overall* Brexit evaluations and independence attitudes runs through their leader evaluations.

However, this effect is less severe with regard to voters' *economic* Brexit evaluations, as shown by Tables 2, A4, A5 and A6. They reveal that, although adding both leader evaluations to the models does weaken the magnitude of the *economic* Brexit evaluations coefficient by varying degrees (from 7.7% to 49.2%), it by no means totally absorbs the negative association between voters' *economic* Brexit evaluations and independence attitudes. Indeed, as identified above, a strong and somewhat significant negative association is still found in Model 5 in each table, even after both leader evaluation variables are held constant. And so, one can conclude that, although leader evaluations did absorb some of the impact of voters' *economic* Brexit assessments on their independence attitudes, they did not remove all of it.

⁷ especially when the Nicola Sturgeon approval variable is added

⁸ Model 5 in each table even reports a marginally positive coefficient

4.4: Main findings

Overall, the main empirical finding presented in this chapter is that voters' Brexit evaluations were negatively associated with their independence attitudes over the Brexit process period, in line with H1. In particular, I find that, whilst overall Brexit evaluations were weakly correlated with independence attitudes, the association was much stronger and more significant when Brexit evaluations are defined in relation to its economic consequences. This result was largely consistent across both the change-on-change and fixed effects models which take into account all individual-specific time-invariant heterogeneity as well as a host of time-varying covariates. Moreover, unlike the effect of overall Brexit evaluations, the effect of *economic* Brexit evaluations was also largely robust to the inclusion of leader evaluations in the model, suggesting that these assessments do not totally absorb this effect. Thus, these findings provide suggestive evidence that the Brexit process *did* have an influence on independence attitudes at the individual voter level.

This thesis attributes this result to the “benchmarking” mechanism. Put simply, this approach argues that Brexit changed the nature of the SQ (economically and otherwise) and hence the Yes-No calculus facing voters. Therefore, if they believed Brexit was bad (particularly if they believed it was bad for the economy), their relative perceptions of the SQ vis-à-vis the AS declined and as a result, they became more supportive of independence. Conversely, if they believed Brexit was going well and that it would be good for the UK (particularly the economy), their relative perceptions of the SQ vis-à-vis the AS improved, decreasing their independence support. The results of my analysis directly testing the leverage of this “benchmarking” mechanism are presented in Chapter 6. The next chapter, however, is dedicated to answering RQ2.

Chapter 5: Results Part II

Sub-group heterogeneity – for whom does Brexit matter?

This chapter reports the findings of two further OLS change-on-change models which investigate the impact of voters' Brexit assessments - both *overall* and *economic* - on independence attitudes whilst also including a set of interaction terms to assess the extent of heterogeneity between various sub-groups in the Scottish electorate. It takes each dimension of investigated sub-group heterogeneity in turn.

5.1: Previously certain vs uncertain voters

Firstly, I find that *previously uncertain* voters had, on average, a more positive shift in independence attitudes from wave 11 to wave 17 than those who were certain about their Yes/No position from the offset. In fact, Tables 5 and 6 show that, on average, those who responded “don’t know” to the referendum vote intention question in wave 11 had a 0.316 and 0.404 more positive change in independence happiness score over the Brexit process period respectively, holding all other variables constant, corresponding to a 120.6% and 154.8% increase over the average *previously certain* voter. However, due to the fairly sizeable standard errors, neither coefficient is very significant⁹. Nevertheless, these results are intriguing and perhaps suggest that the marginal or ‘persuadable’ 10% who typically answer “don’t know” to the constitutional question have become more Yes-leaning over recent years due to the tumultuous Brexit process. This finding, therefore, provides suggestive directional evidence that corroborates Macfarlane (2021)’s and McMillan (2023)’s findings that the pro-independence side now commands greater sympathy amongst those who have not entirely made up their minds. Given that these are the voters who currently hold the balance of power in Scotland’s constitutional debate, this is a potentially important finding.

⁹ Without heteroskedasticity-robust standard errors, however, the *previously uncertain* coefficient in Table 6 is significant at the 0.1 level.

Secondly, Tables 5 and 6 also suggest that *previously uncertain* Scots were more likely to shift their independence attitudes as a result of a change in their short-term Brexit assessments than those who previously held a stronger Yes/No position. In particular, the interaction terms between the *previously uncertain* dummy and the change in Brexit evaluation variables provide suggestive evidence that those who responded with uncertainty in wave 11 were more responsive to shifting Brexit assessments. In fact, Table 5 reveals that the magnitude of the negative *overall* Brexit assessment coefficient increased by 0.065 amongst *previously uncertain* voters, whilst Table 6 reveals that the magnitude of the negative *economic* Brexit assessment coefficient increased by 0.235 amongst this sub-group. Note again, however, that these interactions are not statistically significant most likely due to the fact that only 133 respondents selected “don’t know” in wave 11. Nevertheless, these findings provide some suggestive directional evidence in support of H2.

Note that these findings are also presented graphically by the interaction plots in section B of the Appendix. Indeed, Figures B1 and B2 show not only that *previously uncertain* voters (displayed in blue) had, on average, a larger estimated wave 11–wave 17 increase in independence support but also that they were, on average, more responsive to a change in Brexit evaluations.

Table 5: OLS Regression of Wave 11-Wave 17 Change in independence happiness score with sub-group interaction terms – Overall Brexit evaluations

	Model 1	Model 2	Model 3	Model 4
Change in Brexit happiness score	-0.015 (0.027)	-0.011 (0.028)	-0.008 (0.026)	-0.009 (0.038)
Previously Uncertain		0.316 (0.299)		
Change in happiness score about Brexit*Previously Uncertain		-0.065 (0.145)		
Previously Unattached			0.614** (0.278)	
Change in happiness score about Brexit*Previously Unattached			-0.234** (0.103)	
Yes Remainer				-0.015 (0.132)
Yes Leaver				-0.089 (0.244)
No Leaver				-0.042 (0.134)
Change in happiness score about Brexit*Yes Remainer				0.002 (0.063)
Change in happiness score about Brexit*Yes Leaver				0.067 (0.087)
Change in happiness score about Brexit*No Leaver				-0.122 (0.086)
Constant	0.281*** (0.056)	0.262*** (0.058)	0.244*** (0.057)	0.310*** (0.104)
R ²	0.088	0.089	0.094	0.092
Adj. R ²	0.085	0.085	0.090	0.085
Num. obs.	1406	1406	1383	1406
RMSE	1.970	1.970	1.927	1.970

***p < 0.01; **p < 0.05; *p < 0.1; ·p < 0.15 [Standard errors = Heteroskedastic-Robust SEs]

NB: All models control for a change in Scottishness, personal financial circumstances, PM approval and Nicola Sturgeon approval. See section B of the Appendix for the full results.

Table 6: OLS Regression of Wave 11-Wave 17 Change in independence happiness score with sub-group interaction terms – *Economic Brexit evaluations*

	Model 1	Model 2	Model 3	Model 4
Change in economic evaluation of Brexit	-0.135 (0.095)	-0.122 (0.098)	-0.074 (0.091)	-0.082 (0.137)
Previously Uncertain		0.404 (0.301)		
Change in economic evaluation of Brexit* Previously Uncertain		-0.235 (0.349)		
Previously Unattached			0.598** (0.268)	
Change in economic evaluation of Brexit* Previously Unattached			-0.931 (0.679)	
Yes Remainer				-0.050 (0.126)
Yes Leaver				-0.146 (0.220)
No Leaver				0.027 (0.141)
Change in economic evaluation of Brexit*Yes Remainer				0.151 (0.185)
Change in economic evaluation of Brexit*Yes Leaver				-0.399 (0.353)
Change in economic evaluation of Brexit*No Leaver				-0.032 (0.216)
Constant	0.280*** (0.057)	0.261*** (0.058)	0.242*** (0.058)	0.316*** (0.099)
R ²	0.098	0.101	0.104	0.103
Adj. R ²	0.095	0.096	0.099	0.095
Num. obs.	1331	1331	1314	1331
RMSE	1.956	1.955	1.915	1.956

***p < 0.01; **p < 0.05; *p < 0.1; ·p < 0.15 [Standard errors = Heteroskedastic-Robust SEs]

NB: All models control for a change in Scottishness, personal financial circumstances, PM approval and Nicola Sturgeon approval. See Section B of the Appendix for the full results.

5.2: Previously attached vs unattached voters

Moreover, I also find interesting and much more significant heterogeneity between *previously attached* and *previously unattached* voters which is entirely consistent with H3. Firstly, just as those voters who were *previously uncertain* had, on average, a more positive change in their independence attitudes over the Brexit process period, so did those voters who were *previously unattached* to either side of the Yes/No divide. In fact, Tables 5 and 6 show that those who did not identify with either the ‘Yes’ or ‘No’ side in wave 10 had a significantly more positive shift in independence attitudes from wave 11 to wave 17 than their counterparts who professed a ‘Yes’ or ‘No’ identity. Specifically, they reveal that, on average and holding all other variables constant, *previously unattached* voters had a 0.614 and 0.598 more positive shift in independence happiness scores, coefficients which are highly significant and represent an over-time shift roughly 2.5 times greater than that of the average *previously attached* voter.

Secondly, the interaction terms reported in Tables 5 and 6 also demonstrate that *previously unattached* voters were more likely to update their independence attitudes in response to a change in their short-term Brexit assessments than *previously attached* voters. Specifically, Table 5 shows that the magnitude of the negative *overall* Brexit assessment coefficient increased by 0.234 amongst *previously unattached* voters. In substantive terms, this means that, on average, a *previously attached* voter who shifts his/her overall assessment of Brexit from the most negative to the most positive from wave 11 to wave 17 will experience a 0.08 reduction in their independence happiness score whereas a *previously unattached* voter who similarly shifts his/her overall Brexit assessment will experience a very substantial 2.42-point reduction in their independence happiness score (on a -10 to + 10 scale). This interaction, despite the relatively few *previously unattached* voters in my sample (121), is also found to be highly significant with a p-value of 0.023. This interaction is also illustrated graphically by the interaction plot in Figure B3 which shows that, on average, *previously unattached* voters (displayed in blue) not only had a more positive shift in independence attitudes over time but were also significantly more responsive to a shift in their Brexit assessments than their *previously attached* counterparts. It also reveals the somewhat one-sided nature of this interaction in the sense that *previously unattached* voters differed most from their *previously attached* counterparts in response to a *negative* change in Brexit assessments. Whilst there was

not a very significant difference between *previously attached* and *previously unattached* voters in response to a positive shift in Brexit assessments, *previously unattached* voters were significantly more likely to upgrade their independence happiness scores in response to a negative change in Brexit assessments. See section B of the Appendix for further details.

Regarding the interaction between the change in voters' *economic* Brexit evaluations and prior unattachment, Table 6 reveals that the magnitude of the negative *economic* Brexit assessment coefficient was 0.931 points greater amongst *previously unattached* voters. This same finding is also displayed graphically in Figure B4. However, it should be noted that, unlike in Table 5, this interaction term is not very significant (p-value = 0.171), most likely due to the fact that very few *previously unattached* respondents actually shifted their *economic* Brexit assessment over this period (32). Overall, however, these findings are broadly consistent with H3. As hypothesised, those voters who were less committed to a particular side of the constitutional debate at the start of the Brexit process period (i.e., the pivotal voters in the Scottish independence debate) were more influenced by the Brexit process than committed nationalists and committed unionists.

5.3: Cross-pressured vs aligned voters

Lastly, I turn to the observed heterogeneity between Scotland's four "constitutional tribes". As shown in Tables 5 and 6, I find that the average wave 11–wave 17 change in independence attitudes was fairly similar across all four sub-groups. Whilst Yes voters (both "Yes Leavers" and "Yes Remainers") did have a slightly smaller mean increase in independence happiness score than "No Remainers" (the reference category), most likely due to a "ceiling effect" given that there is a limit to how much more pro-independence these prior-Yes supporters can become, these differences are not found to be significant.

Moreover, regarding the impact of a change in voters' Brexit evaluations, I also find no statistically significant difference between these four sub-groups, contrary to H4. In particular, Table 5 reveals that "Yes Remainers" and "No Remainers" responded in a very similar way to a shift in their *overall* Brexit evaluations. This finding is contrary to H4 which expected there to be a stronger effect amongst "No Remainers" (whose independence and Brexit preferences are *cross-pressured*) than amongst "Yes Remainers" (whose independence and Brexit

preferences are *aligned*). Similarly, Table 5 also reveals that “Yes Leavers” and “No Remainers” responded in a fairly similar way to a change in *overall* Brexit evaluations. Both these groups have *cross-pressured* preferences and so this is expected; however, the estimated effect of *overall* Brexit evaluations on independence attitudes is indistinguishable from zero in both sub-groups, contrary to H4 which predicts that these two sub-groups should be the most responsive. In addition, I find that “No Leavers” were, if anything, more responsive to a shift in *overall* Brexit evaluations than “No Remainers”. Specifically, Table 5 reveals that the magnitude of the negative *overall* Brexit assessment coefficient was 0.122 greater amongst “No Leavers” than amongst “No Remainers”, though this interaction term remains insignificant at conventional thresholds with a p-value equal to 0.156. This provides further evidence against H4 which expected “No Remainers” (whose constitutional preferences are *cross-pressured*) to be more responsive than “No Leavers” (whose constitutional preferences are *aligned*) and not the other way around.

Further, when Brexit assessments are defined in economic terms, Table 6 reveals that “Yes Remainers”, on average, were less likely to respond to a shift in Brexit assessments than “No Remainers”. This finding is in line with H4 since “No Remainers” have *cross-pressured* constitutional preferences and so Brexit should matter more to them than “Yes Remainers” whose constitutional preferences are *aligned*. However, this interaction term also remains insignificant at conventional thresholds and so I cannot conclude that there is a significant difference between these sub-groups in terms of how they responded to a shift in *economic* Brexit evaluations. Regarding “Yes Leavers”, Table 6 reveals that these voters were, on average, more likely to update their independence attitudes in response to a change in their *economic* Brexit assessments than “No Remainers”. Specifically, the magnitude of the negative *economic* Brexit assessment coefficient is 0.399 points greater amongst “Yes Leavers” than amongst “No Remainers”. However, even though this estimate is in line with H4 given that “Yes Leavers” hold *cross-pressured* constitutional preferences, the interaction term is also insignificant, most likely due to the fact that the absolute number of Yes Leavers who shifted their *economic* Brexit assessments is relatively small (95). Lastly, Table 6 also demonstrates that “No Leavers” and “No Remainers” responded in a very similar way to a shift in *economic* Brexit evaluations, contrary to H4 which expected “No Remainers” (whose preferences are *cross-pressured*) to be more responsive. Note that the corresponding set of interaction plots can be found in Figures B5-B10 in section B of the Appendix.

On the whole, therefore, the evidence from these change-on-change models weighs against H4. From this BES data at least, it seems that *cross-pressured* voters are not significantly more responsive to a short-term shift in Brexit evaluations than constitutionally *aligned* voters.

5.4: Main findings

Overall, the main empirical finding presented in this chapter is that some sub-groups of the Scottish electorate reacted differently to the Brexit process than others. In particular, I find that *previously uncertain* and *previously unattached* voters were significantly more likely to increase their independence support over the Brexit process period than their *previously certain* and *previously attached* counterparts whose constitutional preferences are by their nature more rigid. I also find that some groups of voters were more likely than others to update their independence attitudes as a consequence of a short-term change in their Brexit assessments. Specifically, I find that *previously unattached* voters were significantly more responsive to a shift in Brexit assessments than voters who were committed nationalists or committed unionists at the start of the Brexit process. This result is broadly consistent across different measures of Brexit assessments and hence provides empirical evidence in support of H3.

Regarding H2 and H4, however, my findings are more mixed. Whilst I do find suggestive directional evidence that Brexit mattered more to *previously uncertain* voters than to *previously certain* voters in line with H2, I find no evidence to suggest that constitutionally *cross-pressured* voters reacted more strongly to a shift in short-term Brexit assessments than constitutionally *aligned* voters, contrary to H4. Nonetheless, this thesis attributes the sub-group heterogeneity that I do identify to the “benchmarking” mechanism. I propose that the reason why prior unattachment is associated with a greater Brexit assessment effect is that *previously unattached* voters have smaller and more volatile *Union differentials* and so shifting perceptions of the SQ in light of Brexit are more likely to affect these voters’ independence attitudes. To test this mechanism in the Scottish context more directly, I conducted further observational and experimental analyses; I now turn to present the results of this research.

Chapter 6: Results Part III

Testing the underlying “benchmarking” mechanism

This chapter presents the results of my empirical analysis which tests the leverage of the “benchmarking” mechanism in the post-Brexit Scottish context. First, it reports the results of my observational research investigating “benchmarking” through the lens of voters’ *relative* government performance assessments. Second, it presents the results of my online survey experiment which investigated the power of “benchmarking” through the lens of *relative* economic performance prospects. Third, it reports the extent to which my experimental treatment effects were heterogeneous across various sub-groups of respondents as predicted by the “benchmarking” mechanism. In this way, it addresses RQ3 and directly tests H5.

6.1: The association between relative government performance assessments and independence attitudes

To test the power of the ‘benchmarking’ mechanism in the Scottish setting, I first investigated the association between voters’ *relative* UK versus Scottish government performance assessments and independence attitudes over time. Table 7 reports the main results of this change-on-change multinomial logistic regression model. It reveals that there was a strong and highly significant association between the change in voters’ *relative* Holyrood versus Westminster performance assessments and the change in their independence attitudes from wave 7 to wave 17 even after controlling for a change in Scottishness and personal financial circumstances. In particular, it shows that the log-odds (and therefore the probability) of shifting in a more Yes-leaning direction over the Brexit process period (i.e., from ‘No’ to ‘Yes’, from ‘No’ to ‘Don’t Know’ and from ‘Don’t Know’ to ‘Yes’) increased with voters’ assessments of Scottish government performance *relative* to UK government performance. In fact, a unit increase in the “Scottish government performance premium” (caused by an improvement in perceptions of Scottish government performance *ceteris paribus* or by a deterioration in UK government performance assessments *ceteris paribus*) led to a 100.4% increase in the odds of switching from ‘No’ to ‘Yes’. Conversely, an increase in the “Scottish government performance premium” decreased the log-odds (and hence the probability) of

shifting in a more No-leaning direction. For example, a unit increase in the “Scottish government performance premium” led to a 53.5% decrease in the odds of switching from ‘Yes’ to ‘No’. On top of this, all the relevant coefficients in Table 7 are highly significant (at least at the 0.05 level) and thus, this provides strong empirical evidence in support of H5.

My findings, therefore, imply that voters think in a rational and relative way when considering their position on Scottish independence, in line with the “benchmarking” mechanism. In other words, it is not solely Holyrood performance assessments that matter in shaping independence attitudes nor solely Westminster performance assessments, but the relative evaluation of both governments because this is what informs voters’ expectations about the SQ and AS. Furthermore, as a robustness check, I also repeated this analysis using a series of panel fixed-effects models over the same time period. The results show the same substantive findings – i.e., that voters’ “Scottish government performance premium” had a substantial and highly significant effect on independence attitudes even after controlling for time-invariant individual-level heterogeneity and key potential time-varying confounders¹⁰. For full details, see section D2 of the Appendix.

Beyond this, as a further robustness check, I also analysed the impact of voters’ *relative* Westminster versus Holyrood performance assessments via the lens of a particular case study, namely the handling of the Covid-19 pandemic - in particular, the handling of lockdown, the provision of PPE for health workers and Covid testing. In short, my findings are largely supportive of H5. Although many coefficients do not meet conventional significance thresholds largely due to the fact that a very small number of respondents (18.5%) switched their independence vote intention between wave 20 and wave 21, I find that a more positive “Scottish government competence premium” along each dimension of Covid competence did tend to increase the log-odds of shifting in a more Yes-leaning direction¹¹. This analysis, therefore, provides further evidence in support of the “benchmarking” mechanism and highlights how the cause of Scottish independence has become inextricably linked with the day-to-day performance/competence of the Scottish government. For further details, please see the results of the multinomial change-on-change models presented in section D3 of the Appendix.

¹⁰ Scottishness and personal financial circumstances

¹¹ Especially to and from the ‘Don’t Know’ position

Secondly, the effect of *relative* government performance assessments was also tested in the context of *relative* UK government versus EU performance evaluations. Table 8 reports the main results of a change-on-change multinomial logit model showing the impact of a wave 7 – wave 10 change in voters’ “EU performance premium” on a change in independence attitudes. It reveals that, even after controlling for a change in identity and material conditions, a change in voters’ approval of the UK government *relative* to the EU did impact voters’ independence attitudes in the hypothesised direction. Specifically, I find that a unit increase in the “EU performance premium” increased the log-odds (and hence the probability) of shifting in a more Yes-leaning direction. In fact, on average, a unit increase in the “EU performance premium” led to a 39.8% increase in the odds of shifting from ‘No’ to ‘Don’t Know’ and a 29.6% decrease in the odds of shifting from ‘Yes’ to ‘No’, both of which are highly significant coefficients at the 0.05 level. Thus, these findings are also consistent with H5. They suggest that, since Brexit has created a situation in which the SQ is now outside the EU and the AS is assumed to include EU membership (or at least the strong possibility of EU membership), a more positive evaluation of EU performance *relative* to UK government performance makes the AS more attractive vis-à-vis the SQ and hence encourages greater independence support. Overall, therefore, the results of these three observational analyses suggest that *relativity* in government performance assessments matters and that the ‘benchmarking’ mechanism can be reliably deployed to the post-Brexit Scottish context.

Table 7: Multinomial Logit Model of Change in indyref¹² vote intention on Change in relative UK vs Scottish govt performance evaluations [wave 7 - wave 17]

	Change in Scottish independence referendum vote intention					
	DON'T KNOW-NO	DON'T KNOW-YES	NO- DON'T KNOW	NO-YES	YES- DON'T KNOW	YES-NO
Change in Scot govt approval premium [Scot govt approval - UK govt approval]	-0.310** (0.139)	0.373*** (0.143)	0.556*** (0.110)	0.695*** (0.097)	-0.457*** (0.117)	-0.766*** (0.083)
Constant	-3.871*** (0.216)	-3.816*** (0.218)	-3.453*** (0.186)	-3.351*** (0.178)	-3.756*** (0.208)	-3.491*** (0.186)
Observations = 1394						

*p<0.1; **p<0.05; ***p<0.01

NO CHANGE = reference

NB: This model controls for a change in Scottishness and personal financial circumstances. See section D1 of the Appendix for the full results.

Table 8: Multinomial Logit Model of Change in indyref vote intention on Change in relative UK govt vs EU performance evaluations [wave 7 - wave 10]

	Change in Scottish independence referendum vote intention					
	DON'T KNOW-NO	DON'T KNOW- YES	NO-DON'T KNOW	NO- YES	YES-DON'T KNOW	YES- NO
Change in EU approval premium [EU approval - UK govt approval]	-0.028 (0.191)	0.262 (0.226)	0.335** (0.166)	0.115 (0.167)	-0.234 (0.175)	-0.351** (0.142)
Constant	-3.824*** (0.248)	-4.128*** (0.279)	-3.463*** (0.206)	- 3.489*** (0.205)	-3.582*** (0.219)	- 3.189*** (0.183)
Observations = 998						

*p<0.1; **p<0.05; ***p<0.01

NO CHANGE = reference

NB: This model controls for a change in Scottishness and personal financial circumstances. See section D4 of the Appendix for the full results.

¹² Independence referendum

6.2: Experimental findings – the effect of varying the relative appeal of the SQ vs AS

I now turn to report the results of my survey experiment which sought to more robustly test the validity of the ‘benchmarking’ mechanism in contemporary Scotland via the lens of *relative* economic performance prospects¹³.

Before estimating my average treatment effects (ATEs), however, it was first necessary to ensure that the allocation of respondents to the five experimental sub-groups was random. Table E5 in the Appendix reports the results of a balance test which confirms that, overall, randomisation was relatively successful¹⁴. Indeed, the vast majority of the observable covariates listed in section 3.4.2 had no predictive power in determining a respondent’s treatment status, including the most obvious potential confounder – 2014 independence referendum vote choice. However, there were two important covariates for which there was significant imbalance across the five treatment groups, namely personal income and party identity. For further details, see section E5 of the Appendix.

Turning to my experimental findings, Figure 1 presents a ridgeline plot of the raw experimental results. This shows the mean outcome as well as the Kernel density plot for each sub-group, providing a visualisation of the overall distribution of independence happiness scores by treatment status^{15,16}. It reveals that the scores tend to cluster at the poles of the Likert scale with the fewest responses in the middle, regardless of the treatment assignment. Given the polarised nature of Scotland’s constitutional debate, this is an unsurprising (though very interesting)

¹³ See section 3.4.1 for details of my experimental design and section E2 of the Appendix for the specific question wordings.

¹⁴ Table E6 in the Appendix also reports the results of a more detailed balance test with more observations. The substantive results, however, are equivalent.

¹⁵ Note that even though the range of possible independence happiness scores is restricted to the 0-10 scale, these density plots extend the x-axis beyond this range due to the application of Kernel smoothing. However, this does not change my substantive conclusions. Note also that the scale of the y-axis is identical across all five plots, making comparisons straightforward.

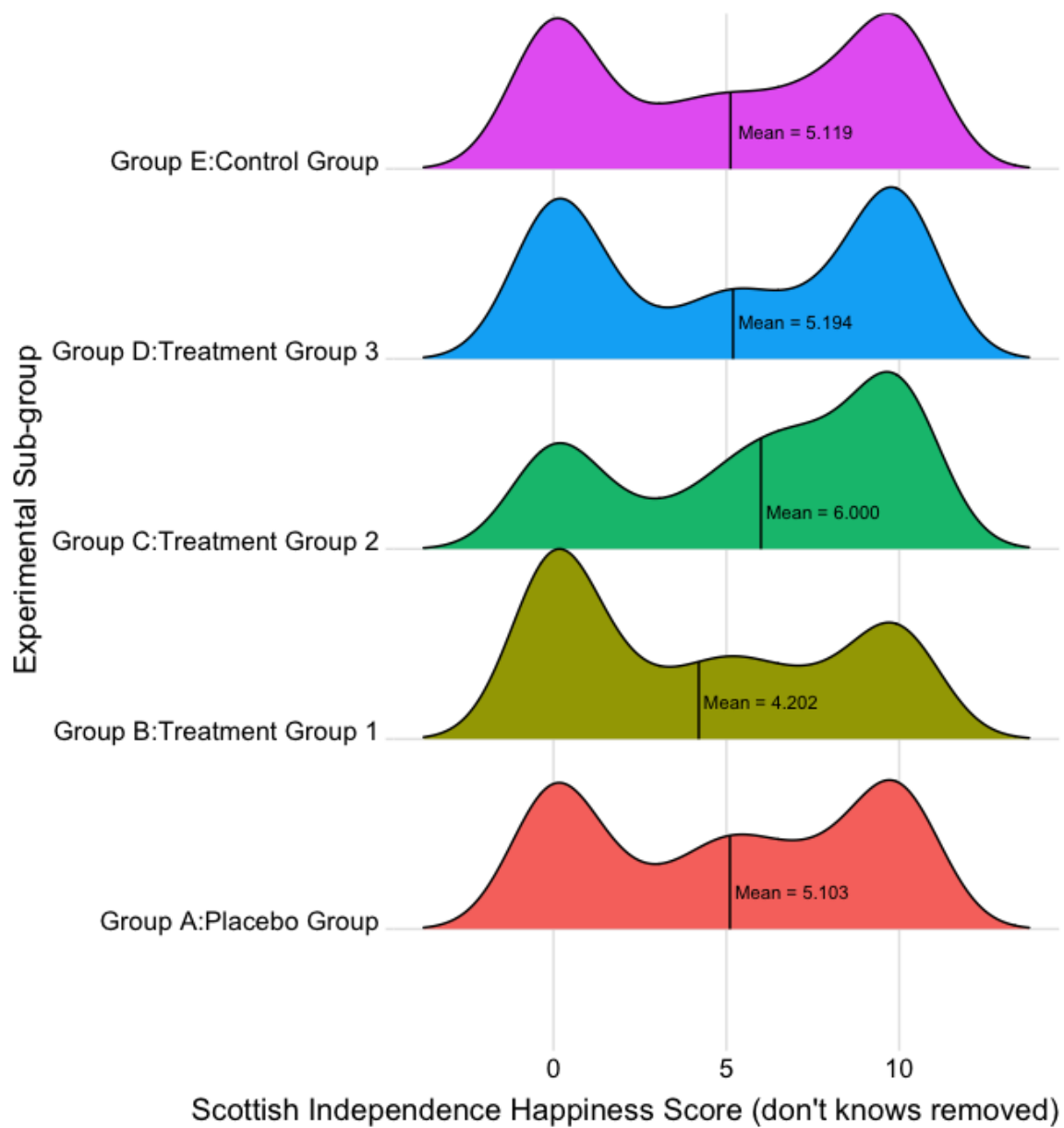
¹⁶ For greater detail about the breakdown of independence happiness scores in each sub-group, I have also reported histograms of these data in Figure E7 in the Appendix. Substantively, however, both visualisations tell the same story.

finding. More importantly for my thesis, however, Figure 1 also demonstrates the impact of my treatments. It shows that treatment 1 shifted the overall distribution of independence happiness scores to the left (i.e., voters become more disappointed if Scotland voted to become independent) whilst treatment 2 shifted the overall distribution to the right (i.e., voters become happier if Scotland voted to become independent). The mean lines also reveal that, as expected, compared to the placebo group mean (5.103), the mean independence happiness score was lower in treatment group 1 (4.202) and higher in treatment group 2 (6.000). Further, Figure 1 also demonstrates that, as expected, treatment 3 had little impact on independence happiness scores and that the placebo question prompt (which primed respondents with *no change* in average incomes in both Scotland and the rest of the UK) also had little impact on independence happiness scores when compared with the control (which had no prompt). Indeed, Figure 1 shows that the mean independence happiness scores in treatment group 3 (5.194) and in the control group (5.119) were roughly the same as in the placebo group (5.103) – indeed, the density plots for these three groups are virtually identical. Building on this raw data, I now turn to my empirical estimation of the ATEs.

To estimate the ATE for each treatment arm, I regressed the independence happiness score on treatment assignment where the placebo group is the reference category. As a result of the findings from the balance test, I also included “personal income” and “party ID” in the model. Assuming that all other potential confounders were perfectly randomised across the five experimental sub-groups, this should eliminate the possibility of selection bias arising from the imbalances described above. The coefficient plot in Figure 2 displays the key experimental findings¹⁷.

¹⁷ The full regression table showing my experimental results with all controls included is reported in section E8 of the Appendix.

Figure 1: Ridgeline plot of survey experimental results



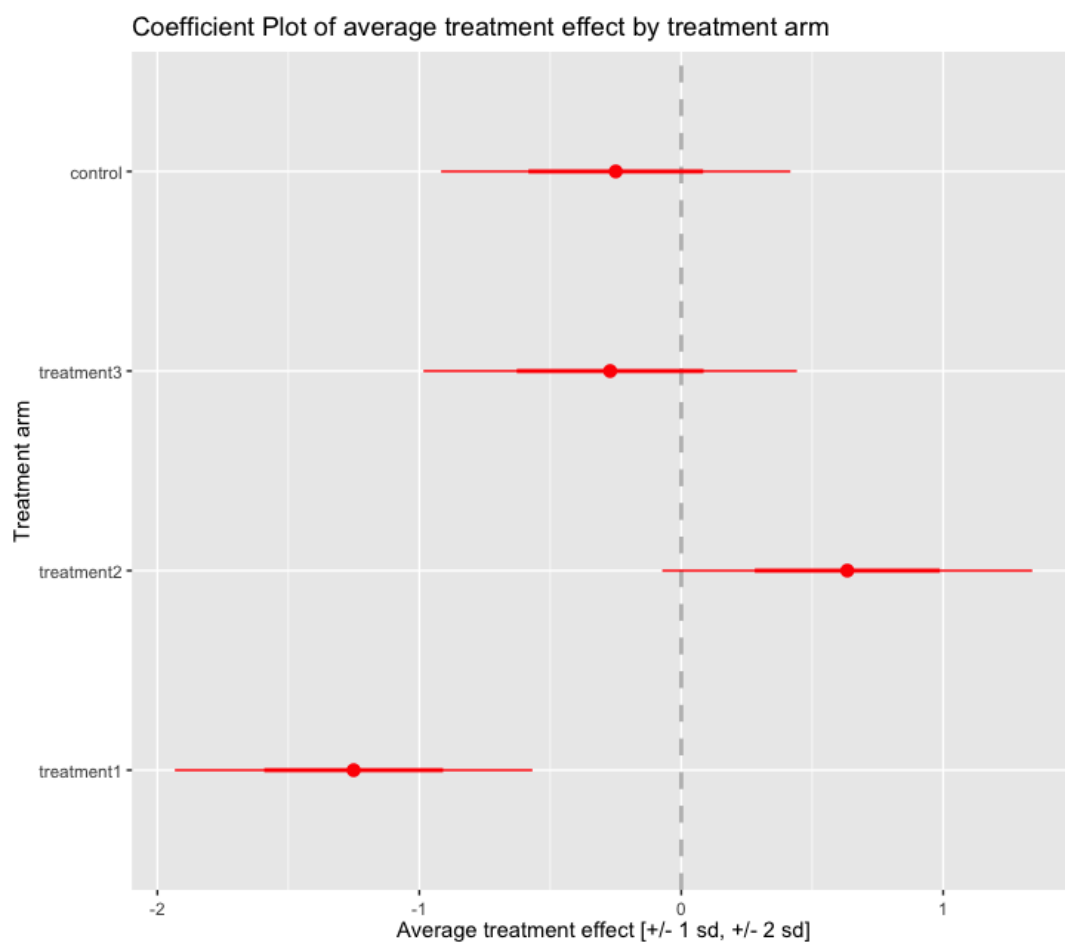
Firstly, I find that being exposed to treatment 1 had a substantial and significant negative effect on independence support; in particular, treatment 1 decreased the mean independence happiness score by 1.251 (a 22.1% reduction) holding all other variables constant, a result which is highly significant – the corresponding p-value is a mere 0.00264. This is consistent with the “benchmarking” hypothesis since the SQ is objectively superior in treatment 1 than in the placebo whilst the AS remains the same in both. Secondly, I find that being presented with treatment 2 increased support for independence. In fact, treatment 2 increased the mean independence happiness score by 0.634 (an 11.2% increase) holding all other variables constant. Whilst smaller than the effect of treatment 1, this is still a sizeable ATE which has a p-value equal to 0.073. Again, this is entirely consistent with the ‘benchmarking’ approach since treatment 2 makes the AS more attractive vis-à-vis the SQ when compared with the placebo. Thirdly, as hypothesized, being exposed to treatment 3 had no discernible effect on independence attitudes. Hence, being presented with a hypothetical scenario in which there was no *relative* change in the appeal of the SQ versus the AS had no significant impact on support for independence holding all other variables constant, a result which is again entirely consistent with the “benchmarking” hypothesis. Moreover, these findings also demonstrate that respondents’ independence attitudes were not affected simply by being primed to think about the economic consequences of independence. Indeed, Figure 2 shows that receiving the placebo (which primed respondents to consider the impact of independence on average incomes, even though the hypothetical scenario involved an equivalent SQ and AS) as opposed to the control (which involved no such priming) had zero effect on independence support.

Intriguingly, I also find that income had no significant impact on independence attitudes in my experiment. Despite some existing literature pointing towards a negative association between income and independence support (McLean & Thomson, 2014; Neville & Dickie, 2014), this experimental analysis does not find any such effect which is significantly distinct from zero. Unsurprisingly, however, it does find that being a Conservative partisan has a highly significant negative impact on independence support, being a Labour or Liberal Democrat partisan has a smaller but still significant negative impact, whilst being an SNP or Green partisan has a highly significant positive effect on independence support. For the full regression table with all controls included, see section E8 of the Appendix.

In sum, therefore, these experimental results demonstrate that the “benchmarking” mechanism does have leverage in explaining the dynamics of independence support in contemporary

Scotland. They show that when respondents are primed with information that varies the *relative* economic performance prospects of the SQ and AS, it has a significant impact on their independence attitudes whilst if the *relative* appeal of the SQ and AS does not change, there is no discernible impact on independence support. These results are, therefore, consistent with H5, suggesting that Scottish voters' independence attitudes are at least partially driven by a *rational* and *relative* evaluation of the SQ and AS.

Figure 2: Survey Experiment Coefficient Plots



6.3: Experimental findings – heterogeneous treatment effects

As discussed in section 3.4.3, my expectation, building on the “benchmarking” logic, was that *previously unattached* voters, *previously uncertain* voters and those who believed the treatment presented to them – *believers* – would be more responsive to the treatments. And so, to further analyse the leverage of the “benchmarking” mechanism, I also ran three OLS linear regression models to estimate the extent of sub-group heterogeneity in the ATEs. Table 9 reports the results¹⁸.

6.3.1: Attached vs unattached voters

Table 9 reveals a substantial degree of heterogeneity based on voters’ attachment to a side of the Yes/No divide. Specifically, it shows that, on average, *unattached* voters (i.e., those who expressed neither a “Yes” or “No” identity earlier in the survey) had a 0.758 points higher independence happiness score than their *attached* counterparts (in the placebo group). Substantively, this result is difficult to interpret and most likely reflects the fact that there were more “No” identifiers than “Yes” identifiers in the group of *attached* voters (by 462 to 437), but it could also suggest that *unattached* Scottish voters are today more likely to lean towards the “Yes” camp than the “No” camp, corroborating the findings of McMillan (2023). Regardless, it is an intriguing finding and one which is significant at the 0.1 level.

More importantly for testing “benchmarking”, the interaction terms in Table 9 also demonstrate that *unattached* voters were significantly more responsive to treatment arm 1 than *attached* voters. Specifically, the magnitude of the negative average effect of treatment 1 on independence happiness scores was 2.226 points greater (on a 0-10 scale) amongst *unattached* voters. This is a very substantial interaction effect which is also highly significant at the 0.01 level and hence it provides strong evidence in favour of the “benchmarking” mechanism. However, although my findings show that *unattached* voters were significantly more responsive to a treatment which lowered the attractiveness of the AS relative to the SQ - i.e., treatment 1 - it provides no corresponding evidence to suggest that they were also more responsive to a treatment which increased the appeal of the AS relative to the SQ. In fact, Table

¹⁸ For simplicity, these models, unlike in Table E8, do not control for personal income or party ID.

9 shows that the average effect of treatment 2 is not significantly different between *attached* and *unattached* voters, contrary to the expectations of “benchmark” theory. Thus, my experimental results reveal that *unattached* voters are more responsive than *attached* voters to changes in the *relative* appeal of the SQ versus the AS, but the nature of this sub-group heterogeneity is one-sided.

6.3.2: *Certain vs uncertain voters*

Table 9 also reveals that *uncertain* voters (i.e., those who responded “don’t know” to the independence referendum vote intention question earlier in the survey) were more responsive to treatment 1 than *certain* voters. Specifically, it shows that the magnitude of the negative effect of treatment 1 on the independence happiness score was, on average, 1.948 points greater amongst *uncertain* voters than amongst *certain* voters (p-value = 0.216). Further, Table 9 also suggests that the positive effect of treatment 2 was greater amongst *uncertain* voters. In fact, the ATE increased from 0.835 amongst *certain* voters to 1.247 [0.835 + 0.412] amongst *uncertain* voters. However, it should be noted that neither of these interaction terms is very significant most likely because very few respondents answered “don’t know” to the independence referendum vote intention question (99), such is the salience of Scotland’s constitutional divide. Nonetheless, they still provide some directional evidence to suggest that the effect of varying the *relative* appeal of the SQ versus the AS on independence attitudes is greater amongst *uncertain* voters, in line with the predictions of the “benchmarking” mechanism.

6.3.3: *Believers vs non-believers*

Lastly, Table 9 also reveals the extent of sub-group heterogeneity between *believers* and *non-believers* – i.e., between those who thought the hypothetical treatment scenario presented to them was “about right” (whichever treatment that was) and those who did not when asked specifically in the follow-up question. Regarding treatment 1, it shows that although there is directional evidence to suggest that *believers* reacted more strongly than *non-believers*, the interaction effect is very marginal and not very significant; hence, one should conclude that *believers* and *non-believers* reacted very similarly to treatment 1. However, these results do suggest that the effect of treatment 2 was greater amongst *believers* than *non-believers*.

Specifically, I find that whilst the average effect of treatment 2 amongst *non-believers* was 0.551, this rose to 2.088 [0.551 + 1.537] amongst *believers*. This positive interaction effect is also very nearly significant at the 0.1 level (p-value = 0.109) despite the very small absolute number of *believers* in the overall sample¹⁹. Thus, although by no means comprehensive, there is some suggestive evidence that *believers* are more likely than *non-believers* to respond to hypothetical information that improves the *relative* appeal of the AS by increasing their independence support, in line with the “benchmarking” mechanism.

Intriguingly, I also find that responses to the follow-up question (and hence voters’ perceptions of the economic consequences of independence) were strongly informed by respondents’ prior biases (or lack thereof) on the constitutional question. Unsurprisingly, I find that ‘Yes’ supporters were significantly more likely to disbelieve the treatment scenario presented to them (whichever that was) because they believed Scotland “would do better” *relative* to the rest of the UK and, conversely, ‘No’ supporters were significantly more likely to disbelieve the treatment because they believed Scotland “would do worse” relative to the rest of the UK. I also find that *uncertain* and *unattached* voters were significantly more likely to be *believers* than their *certain* and *attached* counterparts²⁰. Hence, the findings displayed in Table E10 also lend further weight to the idea that the least committed unionists/nationalists (the pivotal voters in Scotland’s constitutional debate) are more likely to respond to an external shock which changes the *relative* appeal of the SQ versus AS than staunch unionists/nationalists, in line with the “benchmarking” mechanism. Note that further details regarding my analysis of the follow-up question can be found in sections E9-E10 in the Appendix.

¹⁹ The raw results of the follow-up question (presented in Figure E9 in the Appendix) reveal that the vast majority of respondents did not believe that the hypothetical scenario presented to them was “about right” (regardless of which scenario that was) with a roughly similar proportion of *believers* in each of the four sub-groups that received the follow-up question. Treatment 3 was found to be the most believable with 21.2% of respondents saying it was “about right” whilst treatment 1 was found to be the least realistic with only 15.7% believing the hypothetical scenario.

²⁰ They were most likely to respond “Don’t Know” to the follow-up question but that option aside, they were significantly more likely to be *believers* or soft *non-believers*. See Table E10 in the Appendix for details.

Table 9: OLS Regression of Independence happiness score on treatment status conditional on prior certainty, prior attachment and believability

	Independence Happiness Score (1-11) (without DKs)		
Treatment 1	-0.804** (0.400)	-0.431 (0.427)	-0.873** (0.430)
Treatment 2	0.835** (0.415)	1.091** (0.439)	0.551 (0.445)
Treatment 3	0.204 (0.416)	0.362 (0.453)	-0.159 (0.452)
Control	-0.004 (0.382)	0.029 (0.380)	
Uncertain	0.698 (0.746)		
Uncertain*Treatment 1	-1.948 (1.573)		
Uncertain*Treatment 2	0.412 (1.297)		
Uncertain*Treatment 3	0.293 (2.188)		
Unattached		0.758* (0.451)	
Unattached*Treatment 1		-2.226*** (0.824)	
Unattached*Treatment 2		-0.814 (0.816)	
Unattached*Treatment 3		-1.131 (0.828)	
Believer			0.433 (0.674)
Believer*Treatment 1			-0.071 (0.984)
Believer*Treatment 2			1.537 (0.957)
Believer*Treatment 3			1.283 (1.000)
Constant	6.054*** (0.284)	5.922*** (0.297)	6.012*** (0.309)
Observations	1,052	1,065	821
R ²	0.022	0.026	0.042
Adjusted-R ²	0.014	0.019	0.034
Residual SE	4.068 (df = 1043)	4.055 (df = 1056)	4.019 (df = 813)
F-Statistic	2.905*** (df = 8; 1043)	3.555*** (df = 8; 1056)	5.093*** (df = 7; 813)

*p<0.1; **p<0.05; ***p<0.01

6.4: Main Findings

Overall, through the results of observational and survey experimental research, this chapter demonstrates that the “benchmarking” mechanism does have leverage in the post-Brexit Scottish context. Using BES survey data to look through the lens of *relative* government performance assessments, I found that voters’ evaluations of the quality of government in the SQ *relative* to the AS (proxied by their assessments of Holyrood and Brussels) are strongly associated with their independence attitudes, consistent with H5. Furthermore, using an original online survey experiment, I found that varying the *relative* appeal of the SQ versus the AS (via the question prompts respondents receive) has a significant effect on independence attitudes in the hypothesised manner and a greater effect amongst those least committed to Scotland’s constitutional debate, in line with the predictions of the “benchmarking” approach.

Hence, I conclude that the “benchmarking” mechanism is a useful theoretical tool to explain the dynamics of support for Scottish independence, particularly in response to external shocks which adjust voters’ assessments of the SQ and AS. Based on this evidence, I argue that the “benchmarking” mechanism can at least partially explain the association I have found in Chapter 4 between voters’ evolving Brexit assessments and independence attitudes over the Brexit process period as well as the sub-group heterogeneity I have identified in Chapter 5. Whilst I acknowledge that the results presented in this chapter are not directly related to Brexit, by highlighting the broader leverage of the “benchmarking” mechanism in the Scottish independence context, they still suggest that it is a plausible mechanism which could connect the dots between Brexit evaluations and independence support.

Chapter 7: Discussion and Conclusion

In this concluding chapter, I first summarise my most important findings. Second, I consider the key implications and contributions of these findings for the wider academic literature. Third, before concluding my thesis with some final remarks and key takeaways, I note the shortcomings of this study and consider some potential new avenues for future research.

7.1: Summary of key findings

This thesis set out to investigate the question of whether Brexit has had an impact on Scottish voters' support for independence and, if so, how, to what extent, why and for whom. It did so by first assessing the extent to which variation in voters' evolving evaluations of the success/failure of Brexit explained the variation in their independence attitudes over the Brexit process period. The results of several panel models presented in Chapter 4 demonstrate that there was a strong negative association between these variables, consistent with H1. In particular, my analysis shows that voters' *economic* evaluations of Brexit had the strongest impact on independence attitudes over this time period, more so than voters' *overall* Brexit evaluations. In fact, even after controlling for voters' Scottish identity, personal financial circumstances, leader evaluations and all unit-specific time-invariant factors, my findings indicate that shifting one's *economic* assessment of Brexit from the most positive to the most negative position increased one's independence happiness score by 0.54 points on a 0-10 scale (a 92.9% increase over the average voter whose *economic* assessments remained unchanged).

Secondly, this study also addressed the overriding research question by investigating which sub-groups of Scottish voters were most and least impacted by Brexit in terms of their independence support. My findings reveal that, on average, *previously unattached* voters were significantly more responsive to short-term fluctuations in their Brexit evaluations than Scottish voters who previously expressed an independence identity. Additionally, although the evidence for this is weaker and merely suggestive, the findings reported in Chapter 5 also indicate that *previously uncertain* voters were similarly more responsive than *previously certain* voters. However, rather surprisingly, I do not find any degree of heterogeneity between Scotland's four "constitutional tribes". Contrary to my expectation, "No Remainers" and "Yes

Leavers” (*cross-pressured* voters) reacted very similarly to “Yes Remainers” and “No Leavers” (*aligned* voters) in response to a change in Brexit evaluations. And so, even though my findings challenge H4, they confirm H3 and weakly corroborate H2.

Thirdly, this thesis also investigated the validity of the “benchmarking” approach which I argue provides a useful explanatory mechanism for the above findings. My results demonstrate that it does have empirical leverage in the post-Brexit Scottish context. In particular, looking through the lens of *relative* government performance assessments, I find a strong positive association between voters’ *relative* assessments of government quality in the AS (proxied by their approval of Holyrood and Brussels) and the SQ (proxied by Westminster assessments) and their independence attitudes. Moreover, looking through the lens of *relative* economic performance prospects, the results of my online survey experiment show that varying the *relative* appeal of the SQ versus the AS in question prompts concerning Scotland and the rest of the UK’s future economic performance has a strong and significant effect on independence attitudes. In fact, whilst priming respondents with the hypothetical scenario in which both Scotland and the rest of the UK experience a 10% boost to average incomes following independence had no discernible impact on independence attitudes, priming respondents with the scenario in which *only* the rest of the UK (or *only* Scotland) experienced this economic boost served to significantly decrease (or increase) independence support. Moreover, in line with the predictions of the “benchmarking” approach, this effect was even stronger amongst *unattached* voters who are less committed to a side of the constitutional debate. Thus, my findings confirm H5 and show that the “benchmarking” approach is a powerful theoretical tool which can be used to explain the dynamics of independence support in contemporary Scotland.

7.2: Implications and contributions

The implications of these findings are not only intriguing but are also numerous and wide-reaching. Firstly, they show that Scotland’s constitutional debate has become deeply intertwined with the EU dimension. Indeed, despite the findings of Henderson et al. (2022) that Scottish voters were not particularly animated by the EU question during the 2016 referendum campaign, these findings indicate that, although very rigid, Scottish voters’ independence attitudes were nevertheless influenced by their assessments (especially *economic* assessments) of Brexit over the subsequent negotiation period. This study, therefore, corroborates the

findings of Curtice & Montagu (2020), Daniels & Kuo (2021), Montagu (2019) and Ford & Sobolewska (2020). It also fills a gap in the existing literature by using panel data techniques to tease out the *over-time* effect of Brexit evaluations at the individual voter level. It, therefore, builds on previous research which has analysed trends in cross-sectional data and provides a potential explanation for why these studies, such as Johns (2022) and Curtice & Montagu (2020), have identified substantial switching between Scotland's four "constitutional tribes" in recent years and a re-alignment in the constitutional debate along the EU dimension.

Secondly, my findings reveal that Brexit evaluations especially mobilised those voters whose support in any future independence referendum will prove decisive – i.e., *previously unattached* and *uncertain* voters. They also show that these pivotal voters have predominantly been nudged towards the 'Yes' camp over the Brexit process period. Hence, it seems that Brexit is a factor which could encourage pivotal voters to support secession. Of course, the prospects of a second independence referendum taking place in the near future remain highly uncertain and will likely depend on the results of the next UK general election as well as the specific independence strategy adopted by the SNP's new leader, Humza Yousaf. Nonetheless, even in the absence of a looming second ballot, these findings indicate that Brexit has the power to have serious constitutional consequences and given the strong association between independence support and SNP voting in recent elections (Curtice, 2022b), may also be important to the SNP's electoral success. In so doing, this analysis of sub-group heterogeneity also provides a more general insight into which sub-groups' constitutional preferences are most and least susceptible to changing economic conditions. In particular, by showing that *previously uncommitted* voters are most responsive, it uncovers a conceptually important point which is not just relevant to the Scottish context.

Thirdly, they also tell us that economic considerations are of fundamental importance to Scotland's constitutional debate. Indeed, not only do my observational findings reveal how voters' assessments of the economic consequences of Brexit were strongly associated with their independence attitudes (more so than their general assessments of Brexit's success/failure) but my survey experimental results also demonstrate that voters' perceptions of economic performance post-independence (proxied by average incomes) substantially affect their independence support. This study, therefore, is consistent with the 'consequentialist' approach advocated by Jolly (2014), Henderson et al. (2014, 2022), Curtice (2013) and others and

underscores the idea that perceptions of the material consequences of independence for the Scottish economy at least partially determine constitutional preferences.

Furthermore, my finding that the “benchmarking” mechanism has empirical support in contemporary Scotland not only expands on the work of De Vries (2017, 2018) and Hobolt et al. (2022) by applying this theoretical framework to the sub-national level but also builds on existing studies in the Scottish independence literature which have previously investigated the explanatory power of *relative* Holyrood versus Westminster assessments with cross-sectional data, such as McMillan (2022c) and Macfarlane (2021). It also supports my argument that the “benchmarking” mechanism is a plausible explanation for the results we observe in Chapters 4 and 5. Given that the “benchmarking” mechanism enjoys broad empirical support, it seems reasonable to conclude that Brexit had an impact on voters’ independence attitudes because it produced a major external shock to their assessments (economic and otherwise) of the SQ *relative* to the AS and thereby altered the magnitude of their *Union differentials*. And since *previously unattached* voters had smaller and more volatile *Union differentials* to start with, the impact was greatest amongst these voters. Hence, although I acknowledge this link is not proven explicitly by my analysis, I argue that the results reported in Chapter 6 support the case that the “benchmarking” approach provides an explanatory mechanism for the association between Brexit and independence attitudes.

More broadly, these results also tell us that *relativity* matters to voters in Scotland’s constitutional debate. In other words, in deciding whether or not to support independence, voters do not simply consider what an independent Scotland (the AS) might look like (e.g., how rich it would be and how well it would be governed), but instead they consider how it might look *relative* to the rest of the UK (a proxy for the SQ). This finding has several implications. First, it indicates that the perceived competence of the Scottish *and* Westminster governments in managing Scotland’s economy is inextricably linked to independence support since they both help determine the merits of the AS *relative* to the SQ in the eyes of voters. Both the Holyrood and Westminster governments, therefore, through their public policy decisions and day-to-day management of Scotland’s economy, hold a certain degree of agency in shaping Scotland’s constitutional future. Second, this finding suggests what kind of independence campaign might be most effective at swaying undecided voters over to the Yes camp. In particular, it implies that the Yes campaign should champion the “sinking ship argument” which builds a narrative that independence will be a “lifeboat” for Scotland

allowing it to perform *better* (especially economically) than the failing rest of the UK. In other words, my findings suggest that focusing less on the benefits of independence to Scotland and more on how independence would produce *relatively better* results than the rest of the UK might prove a more effective strategy for the Yes campaign. Conversely, therefore, they also suggest that, in order to preserve the Union, unionists would be advised to tap into voters' *relative* assessments and make the case that the Union is truly *better* than the AS rather than simply arguing that Scotland is too poor to succeed alone.

Moreover, these findings also shine a light on the psychology of voters' decision-making regarding independence. In particular, they reveal that constitutional preferences are not just driven by symbolic – or emotional – concerns but also by instrumental – or rational – considerations. Indeed, while my findings show that Scottish identity is important, they also reveal that voters' *rational* and *relative* evaluations of the SQ versus the AS play a role in shaping constitutional preferences. This study, therefore, not only corroborates the 'consequentialist' approach but also demonstrates how economic/rational-choice voting models can be deployed to better understand the dynamics of constitutional decision-making in Scotland (Bartels, 2010; Downs, 1957). Beyond this, my experimental findings also indicate that voters are loss averse when making constitutional decisions under uncertainty. Indeed, Figure 2 demonstrates that the effect of a loss to the AS (relative to the SQ) was greater than that of an equivalent gain, consistent with much of the behavioural economics literature that argues that losses loom larger than gains (Barberis, 2013; Kahneman & Tversky, 1979). At the same time, however, my findings also indicate that Scottish voters are not inequality averse when inequality is conceptualised between Scottish workers and those in the rest of the UK, contrary to expectations from much of the economics literature (Carlsson et al., 2005). Considering the strong social and economic ties between Scotland and the rest of the UK, one might expect voters to prefer the situation where an independent Scotland co-exists with a strong rest-of-the-UK economy (i.e., treatment 3). However, the results of my survey experiment suggest otherwise, indicating that Scottish voters are not necessarily averse to unequal growth prospects north and south of the border.

This thesis, therefore, has numerous implications for the Scottish independence literature. However, its contributions also reach various other political science literatures. For instance, by analysing the impact of Brexit (the clearest example of European *disintegration*) on Scottish nationalism, it also contributes to the larger literature on the relationship between European

(dis)integration and regional autonomy movements. Scholars have long debated the impact of supranational integration on Europe's regional autonomy movements – for example, many have argued that it has emboldened nationalist movements by undermining national sovereignty and weakening the need for statehood (Dardanelli, 2013; Keating, 2004; Paquin, 2002) whilst others have claimed that regionalist/nationalist parties have embraced European integration because the wider European umbrella makes smaller states more viable (Csörgő & Goldgeier, 2004; Elias, 2009; Jolly, 2007, 2014). And so, by showing how Brexit has impacted support for Scottish independence, this study shines a light on how negative integration can also be somewhat beneficial for a separatist agenda. Hence, even though this research has focused exclusively on the Scottish case which is characterised by a strongly pro-EU nationalist movement, it perhaps reveals a more generalisable finding that if constitutional change at the EU level engenders a radical shift in voters' *relative* assessments of the SQ versus AS, it can breed greater support for further constitutional change at the sub-national level.

Beyond this, this study could also have wider implications for how scholars understand the dynamics of public support for nationalist and separatist movements more broadly. By demonstrating that De Vries' "benchmark" theory is a useful tool that can be reliably transposed from the supra-national to the sub-national setting, it implies that separatist attitudes in multi-level governance systems are not determined solely by sub-national issues/governance or national issues/governance, but by the *relative* evaluation of both of these factors. It also implies that voters' constitutional decision-making is not motivated exclusively by symbolic/expressive concerns but also by instrumental/rational considerations. Hence, even though this study has only focused on Scotland, it could have wider generalisability in other multi-national states with vibrant separatist movements.

7.3: Limitations and avenues for future research

However, despite these intriguing and potentially far-reaching contributions, my analysis has important limitations. Firstly, my empirical methodology does not allow me to conclude with absolute certainty that the over-time relationship found between Brexit evaluations and independence attitudes is *causal*. Indeed, the problem of omitted variable bias arising from unobservable or neglected time-varying confounders remains, as does the potential problem of reverse causality. The fact that relatively few observations were used in my fixed effects analysis of *overall* Brexit evaluations (reported in Tables 3, A1, A2 and A3) also renders a *causal* interpretation of my findings far from perfect. An additional limitation, already noted in section 3.4.4, is that my survey experiment suffers from a pre-treatment problem as well as imperfect external validity given that it cannot manipulate voters' actual perceptions. This means that any inference from my experimental results – which ultimately show the effect of *hypothetical* treatments – that a real-life change in voters' relative perceptions of economic performance post-independence causes a shift in independence support in line with “benchmark” theory should be taken with a pinch of salt. Beyond this, as already acknowledged above, although I argue that the “benchmarking” approach does constitute a plausible explanatory mechanism, my research design provides merely suggestive evidence in this regard and does not comprehensively demonstrate a *causal* link. Nevertheless, my panel data analysis and experimental research still provide valuable insights into the impact of Brexit and, by testing the “benchmarking” approach, offer the political science literature a fresh perspective through which to understand Scottish independence support.

To build on this research, future studies should use more recent data to investigate whether Brexit evaluations have continued to influence independence attitudes even after the UK's withdrawal. Also, extending my analysis of sub-group heterogeneity in the relationship between Brexit and independence attitudes would be an intriguing avenue for further research. Due to space and data availability constraints, there are several potentially interesting dimensions of heterogeneity left untouched by this study – for example, between those who really care about EU membership (or particular aspects of EU membership such as free movement) and those who do not – and so I hope this study stimulates a wider investigation of such sub-group heterogeneity.

To further our understanding of the validity and wider applicability of the “benchmarking” approach, it would also be worth replicating this survey experiment or De Vries (2017)’s vignette experiment (described in section 2.2) in other sub-national contexts where separatist movements enjoy a degree of popular support (e.g., Catalonia, Wales, Quebec, the Basque Country, Lombardy etc.). This would not only develop the body of literature empirically investigating “benchmarking” theory but would also identify whether my findings are unique to Scotland or whether they are generalisable to other regions where the separatist campaign might not be as immediately salient. Another direction of future research might involve investigating voters’ future expectations of the SQ and AS more closely. The results of my experiment’s follow-up question (reported in Figure E9 in the Appendix) revealed that none of my experimental treatments appeared very realistic to voters and so better understanding the nature of Scottish voters’ future expectations of the SQ and AS (regarding average income growth or otherwise) and how this is shaped by political identities is a worthy objective of future research.

7.4: Conclusion

This thesis has aimed to advance the literature by analysing whether Brexit has had a meaningful impact on Scottish voters’ attitudes towards independence. On the face of it, given that headline polling figures reveal that support for independence has been somewhat sticky between 45% and 50% in the seven years since the EU referendum (What Scotland Thinks, 2023a), it may appear that Brexit, contrary to the expectations of many nationalists, has had little impact on independence attitudes. However, this research suggests that, under the surface, Brexit has had a degree of influence on independence attitudes at the individual level.

Through panel data analysis, it has shown that voters’ evolving evaluations of Brexit were strongly negatively associated with their independence attitudes over the Brexit process period, holding all time-invariant individual-specific factors and a host of time-varying factors constant. It has also shown that this effect was strongest when Brexit assessments are defined in relation to its economic consequences. Hence, by using panel data techniques to expose the *over-time* effect of Brexit evaluations, this study builds on the existing literature and reveals that the EU dimension has become deeply intertwined with the Scottish independence debate in light of Brexit. Moreover, by contributing the first systematic analysis of sub-group

heterogeneity in the relationship between Brexit and independence attitudes, it not only plugs a gap in the literature but also reveals that Brexit mattered most to those voters whose support will be pivotal in any future vote on independence – i.e., *previously uncertain/unattached* voters. Perhaps, therefore, it shows that Brexit is a factor which could mobilise the undecided 10% to support secession and thereby nudge Scotland over the edge towards independence.

This thesis has also argued that the “benchmarking” mechanism provides an explanatory mechanism for these findings. Indeed, using both panel data analysis and an original online survey experiment to test this approach through different lenses, it has demonstrated this mechanism’s empirical leverage in the Scottish context. Hence, it has argued that Brexit had an influence on voters’ independence attitudes because it appeared to change the *relative* appeal of the SQ vis-à-vis the AS (predominantly in a negative direction) and as a result, Scottish voters have adjusted their independence attitudes based on their Brexit assessments.

In so doing, this research makes a valuable contribution by demonstrating that “benchmark” theory can be reliably applied to this sub-national context and hence, although sticky, voters’ independence preferences are subject to change depending on how the performance of the Scottish government/economy is perceived *relative* to the UK-wide government/economy in real-time. The future of the independence debate is, therefore, highly uncertain; it is contingent not only on whether the Yousaf administration can restore the SNP’s reputation as a competent party of government but also on whether the UK-wide government can re-connect with Scottish voters post-Brexit (Curtice, 2023). This study has also indicated that independence attitudes are not just driven by symbolic motivations but also by instrumentalist considerations; hence, it not only speaks to the literature on the relationship between EU (dis)integration and regional autonomy movements but could also have wider implications for how we understand voters’ constitutional decision-making in multi-national states. It does, however, have its limitations. And so, to develop this research further, future studies should exploit more recent data on voters’ Brexit and independence attitudes, extend my analysis of sub-group heterogeneity to other categories of voters and replicate my experimental analysis in other multi-national states to further our understanding of “benchmarking” at the sub-national level.

To close, therefore, did Brexit have an impact on voters’ attitudes towards independence? Although maybe not to the degree that many predicted in June 2016, the answer, it seems, is yes – and most especially amongst those pivotal unattached voters who hold the balance of

power in determining Scotland's constitutional future. It appears, therefore, that in severing ties with one supranational union, Eurosceptic politicians south of the border may have also unwittingly sat upon a prickly thistle which could, over time, puncture the very foundations of another 316-year-old Union.

Bibliography

- Angrist, J. D., & Pischke, J.-S. (2015). *Mastering 'Metrics*. Princeton University Press.
- Asthana, A., Stewart, H., & Elgot, J. (2017, January 18). *Brexit: May's threat to Europe: "no deal for Britain is better than a bad deal."* The Guardian.
<https://www.theguardian.com/politics/2017/jan/17/prime-minister-vows-to-put-final-brexit-deal-before-parliament>
- Barberis, N. C. (2013). Thirty Years of Prospect Theory in Economics: A Review and Assessment. *Journal of Economic Perspectives*, 27(1), 173–196.
<https://doi.org/10.1257/jep.27.1.173>
- Barker, D. (2023, January 31). *Greens and SNP describe Brexit as 'unmitigated disaster' for Scotland*. The Evening Standard.
<https://www.standard.co.uk/news/politics/brexit-snp-greens-boris-johnson-europe-b1056699.html>
- Bartels, L. M. (2010). The Study of Electoral Behavior. In J. E. Leighley (Ed.), *The Oxford Handbook of American Elections and Political Behavior* (pp. 239–261). Oxford University Press.
<https://doi.org/10.1093/oxfordhb/9780199235476.003.0014>
- Better Together. (2014, September 14). *EU can't trust them*. Bettertogether.Net.
<http://web.archive.org/web/20140914205737/http://bettertogether.net/blog/entry/eu-cant-trust-them>
- Bond, R. (2015). National Identities and the 2014 Independence Referendum in Scotland. *Sociological Research Online*, 20(4), 92–104.
<https://doi.org/10.5153/sro.3797>
- Bond, R., & Rosie, M. (2010). National Identities and Attitudes to Constitutional Change in Post-Devolution UK: A Four Territories Comparison. *Regional & Federal Studies*, 20(1), 83–105. <https://doi.org/10.1080/13597560903174931>
- Bulmer, S., & Quaglia, L. (2018). The politics and economics of Brexit. *Journal of European Public Policy*, 25(8), 1089–1098.
<https://doi.org/10.1080/13501763.2018.1467957>
- Carlsson, F., Daruvala, D., & Johansson-Stenman, O. (2005). Are People Inequality-Averse, or Just Risk-Averse? *Economica*, 72(287), 375–396.
<https://doi.org/10.1111/j.0013-0427.2005.00421.x>
- Clarke, H. D., Sanders, D., Stewart, M. C., & Whiteley, P. (2004). *Political Choice in Britain*. Oxford University Press. <https://doi.org/10.1093/019924488X.003.0001>
- Clarke, H., Sanders, D., Stewart, M., & Whiteley, P. (2011). Valence Politics and Electoral Choice in Britain, 2010. *Journal of Elections, Public Opinion & Parties*, 21(2), 237–253. <https://doi.org/10.1080/17457289.2011.562614>
- Colin Cameron, A., & Miller, D. L. (2015). A Practitioner's Guide to Cluster-Robust Inference. *Journal of Human Resources*, 50(2), 317–372.
<https://doi.org/10.3368/jhr.50.2.317>
- Csergo, Z., & Goldgeier, J. M. (2004). Nationalist Strategies and European Integration. *Perspectives on Politics*, 2(1), 21–37. <https://doi.org/10.1017/S153759270400060X>
- Cunningham, S. (2021). *Causal Inference: The Mixtape*. Yale University Press.
- Curtice, J. (2013). *Who supports and opposes independence-and why?*
<https://www.centreonconstitutionalchange.ac.uk/publications/who-supports-and-opposes-independence-and-why>
- Curtice, J. (2014). *Independence referendum: A question of identity, economics or equality?*
https://www.bsa.natcen.ac.uk/media/38115/bsa31_independence_referendum.pdf

- Curtice, J. (2016a, July 8). *Has Brexit Changed Voters' Minds About Indyref2?* . What Scotland Thinks. <https://whatscotlandthinks.org/2016/07/has-brexit-changed-voters-minds-about-indyref2/>
- Curtice, J. (2016b, September 18). *How Brexit Has – and Has Not – Made A Difference* . What Scotland Thinks. <https://whatscotlandthinks.org/2016/09/how-brexit-has-and-has-not-made-a-difference/>
- Curtice, J. (2017). From Indyref1 to Indyref2? The State of Nationalism in Scotland. In Scott. <https://www.ssa.natcen.ac.uk/media/38910/ssa16-2fr8m-1indyref-2-1ndyr8f-tw0-two.pdf>
- Curtice, J. (2019, September 18). *An Unresolved Question? The Independence Debate Five Years On*. What Scotland Thinks. <https://whatscotlandthinks.org/2019/09/an-unresolved-question-the-independence-debate-five-years-on/>
- Curtice, J. (2022a). Brexit and Scotland: Unfinished business? In S. Loussouarn (Ed.), *Brexit and its Aftermath*. Bloomsbury Academic. <https://doi.org/10.5040/9780755640829.0009>
- Curtice, J. (2022b, September 22). *How The Constitutional Question Has Become More Divisive - What Scotland Thinks*. What Scotland Thinks Blog. <https://www.whatscotlandthinks.org/2022/09/how-the-constitutional-question-has-become-more-divisive/>
- Curtice, J. (2023, April 11). *A Broken Link? Support for Independence and the SNP - What Scotland Thinks*. What Scotland Thinks Blog. <https://www.whatscotlandthinks.org/2023/04/a-broken-link-support-for-independence-and-the-snp/>
- Curtice, J., & Montagu, I. (2020). *Is Brexit fuelling support for independence?* <https://whatscotlandthinks.org/wp-content/uploads/2020/11/SSA-2019-Scotland-paper-v5.pdf>
- Daily Record. (2016, June 26). *Majority of Scots back independence after Brexit, poll finds*. Daily Record. <https://www.dailyrecord.co.uk/news/politics/majority-scots-back-independence-after-8284713>
- Daniels, L. A., & Kuo, A. (2021). Brexit and Territorial Preferences: Evidence from Scotland and Northern Ireland. In *Publius* (Vol. 51, Issue 2). <https://doi.org/10.1093/publius/pjab004>
- Dardanelli, P. (2013). *Between two unions : Europeanisation and Scottish devolution*. Manchester University Press.
- De Vries, C. E. (2017). Benchmarking Brexit: How the British Decision to Leave Shapes EU Public Opinion. *JCMS: Journal of Common Market Studies*, 55, 38–53. <https://doi.org/10.1111/jcms.12579>
- De Vries, C. E. (2018). *Euroscepticism and the future of European Integration* (1st ed.). Oxford University Press.
- Denver, D., & Johns, R. (2010). Scottish Parliament Elections: 'British Not Scottish' Or 'More Scottish Than British'? *Scottish Affairs*, 70 (First Serie(1), 9–28. <https://doi.org/10.3366/scot.2010.0003>
- Dickie, M. (2020, January 31). *Brexit will speed Scottish independence, says Nicola Sturgeon*. Financial Times. <https://www.ft.com/content/97c26b48-441c-11ea-a43a-c4b328d9061c>
- Downs, A. (1957). An Economic Theory of Political Action in a Democracy. *Journal of Political Economy*, 65(2), 135–150. <https://doi.org/10.1086/257897>
- Elias, A. (2009). *Minority Nationalist Parties and European Integration: A comparative study* (1st ed.). Routledge.

- Ford, R., & Sobolewska, M. (2020). *Brexitland: Identity, Diversity and the Reshaping of British Politics*. Cambridge University Press.
- Gellner, E. (1983). *Nations and Nationalism*. Cornell University Press.
- Gibb, K., & Judge, L. (2019). *HOUSING WEALTH INEQUALITY IN SCOTLAND SUMMARY REPORT*. <https://povertyinequality.scot/wp-content/uploads/2019/07/Poverty-and-inequality-housing-wealth-inequality-summary-report.pdf>
- Goodwin, M., & Heath, O. (2016). *Brexit vote explained: poverty, low skills and lack of opportunities*. <https://www.jrf.org.uk/report/brexit-vote-explained-poverty-low-skills-and-lack-opportunities>
- Gordon, T. (2022, February 3). *Brexit has 'profoundly changed' independence prospectus around border*. The Herald. <https://www.heraldsotland.com/politics/19894847.brexit-profoundly-changed-independence-prospectus-around-border/>
- Grant, A. (2022, October 19). *Scottish independence: Nicola Sturgeon urged to set out cost of "hard border" with England*. The Scotsman. <https://www.scotsman.com/news/politics/scottish-independence-nicola-sturgeon-urged-to-set-out-cost-of-hard-border-with-england-3884864>
- Henderson, A., Delaney, L., & Liñeira, R. (2014). *Risk and Attitudes to Constitutional Change*. <https://www.centreonconstitutionalchange.ac.uk/publications/risk-and-attitudes-constitutional-change>
- Henderson, A., Jeffery, C., Wincott, D., & Wyn Jones, R. (2017). How Brexit was made in England. *The British Journal of Politics and International Relations*, 19(4), 631–646. <https://doi.org/10.1177/1369148117730542>
- Henderson, A., Johns, R., Lerner, J. M., & Carman, C. J. (2022). *The Referendum that Changed a Nation: Scottish Voting Behaviour 2014-2019*. Springer International Publishing.
- Hepburn, E., Keating, M., & McEwen, N. (2021). *Scotland's New Choice: Independence after Brexit*. Centre on Constitutional Change. <https://www.centreonconstitutionalchange.ac.uk/publications/scotlands-new-choice-independence-after-brexit>
- HM Treasury. (2013, December 18). *Treasury analysis shows £1.6 billion funding gap in Scottish independence White Paper*. GOV.UK. <https://www.gov.uk/government/news/treasury-analysis-shows-16-billion-funding-gap-in-scottish-independence-white-paper>
- Hobolt, S. B., Popa, S. A., Van der Brug, W., & Schmitt, H. (2022). The Brexit deterrent? How member state exit shapes public support for the European Union. *European Union Politics*, 23(1), 100–119. <https://doi.org/10.1177/14651165211032766>
- Imai, K. (2017). *Quantitative Social Science: An Introduction*. Princeton University Press.
- Ipsos. (2020). *Ipsos Issues Index: June 2020 | Ipsos*. Ipsos. <https://www.ipsos.com/en-uk/ipsos-issues-index-june-2020>
- Johns, R. (2022). *The Constitutional Question in Scotland*. <https://ukandeu.ac.uk/wp-content/uploads/2022/02/UKICE-British-Politics-after-Brexit.pdf>
- Johns, R., & Mitchell, J. (2016). *Takeover: Explaining the Extraordinary Rise of the SNP*. Biteback Publishing.
- Jolly, S. (2014). Voting for Nation or State: Determinants of Independence Support in Scotland & Catalonia. In *APSA 2014 Annual Meeting Paper*. <https://ssrn.com/abstract=2452008>

- Jolly, S. K. (2007). The Europhile Fringe?: Regionalist Party Support for European Integration. *European Union Politics*, 8(1), 109–130. <https://doi.org/10.1177/1465116507073290>
- Jolly, S. K. (2014). Strange Bedfellows: Public Support for the EU among regionalists. In *Europe's Contending Identities* (pp. 81–99). Cambridge University Press. <https://doi.org/10.1017/CBO9781139567558.007>
- Kahneman, D., & Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk. *Econometrica*, 47(2). <https://doi.org/10.2307/1914185>
- Keating, M. (2004). European Integration and the Nationalities Question. *Politics & Society*, 32(3), 367–388. <https://doi.org/10.1177/0032329204267295>
- Keating, M. (2015). The Scottish independence referendum and after. *Revista d'estudis Autonòmics i Federals*.
- Keating, M. (2017). *Debating Scotland: Issues of Independence and Union in the 2014 independence referendum*. Oxford University Press.
- Konrad, M. (2021, May 18). *Clustered standard errors with R*. WZB Data Science Blog. <https://datascience.blog.wzb.eu/2021/05/18/clustered-standard-errors-with-r/#refs>
- Kopasker, D. (2014). The Role of Threat and Economic Uncertainty in Support for Scottish Independence. *Scottish Affairs*, 23(1), 103–124. <https://doi.org/10.3366/scot.2014.0007>
- Liker, J. K., Augustyniak, S., & Duncan, G. J. (1985). Panel Data and Models of Change: A Comparison of First Difference and Conventional Two-Wave Models. *Social Science Research*, 14, 80–101.
- Liñeira, R., & Henderson, A. (2021). Risk Attitudes and Independence Vote Choice. *Political Behavior*, 43(2), 541–560. <https://doi.org/10.1007/s11109-019-09560-x>
- Longhi, S., & Nandi, A. (2015). *A Practical Guide to Using Panel Data*. SAGE.
- Macfarlane, E. (2021). The Impact of the Coronavirus Pandemic on Support for the SNP and Scottish Independence. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3827168>
- Macwhirter, I. (2020, January 23). *Next week the SNP's slogan "Independence in Europe" becomes redundant. How do they remake the case?* | Iain Macwhirter. <https://iainmacwhirter.wordpress.com/2020/01/23/next-week-the-snps-slogan-independence-in-europe-becomes-redundant-how-do-they-remake-the-case/>
- Marr, A. (2016). *Scotland and the Battle for Britain*. BBC.
- McCrone, D. (2020, August 26). *Who do you say you are? The politics of national identity*. Centre on Constitutional Change. <https://www.centreonconstitutionalchange.ac.uk/news-and-opinion/who-do-you-say-you-are-politics-national-identity>
- McEwen, N. (2018). Brexit and Scotland: between two unions. *British Politics*, 13(1), 65–78. <https://doi.org/10.1057/s41293-017-0066-4>
- McLean, C., & Thomson, D. (2014). Characterisation of the Disadvantaged: Explaining Differences in Levels of Support for Independence by Income Levels, Economic Activity and Socio-economic Status. *Scottish Affairs*, 23(1), 125–147. <https://doi.org/10.3366/scot.2014.0008>
- McMillan, F. (2021, March 2). *Long Read: Scotland's Four Tribes*. Scottish Election Study Blog. <https://scottishelections.ac.uk/2021/03/02/long-read-the-four-tribes-what-are-they/>
- McMillan, F. (2022a, May 10). Affective Polarisation in Scotland. *Some Sate: Evidence from the 2021 Scottish Election Study*.

- https://www.gla.ac.uk/schools/socialpolitical/research/politics/stevensontrust/newsandevents/headline_850631_en.html
- McMillan, F. (2022b, May 13). *Risk and Reward – Why do People Support or Oppose Scottish Independence?* Scottish Election Study Blog.
<https://scottishelections.ac.uk/2022/05/13/risk-and-reward-why-do-people-support-or-oppose-scottish-independence/>
- McMillan, F. (2022c, December 14). *Scoop Monitor: Support for Scottish independence has risen, but why?* . Scottish Election Study Blog.
<https://scottishelections.ac.uk/2022/12/14/scoop-monitor-support-for-scottish-independence-has-risen-but-why/>
- McMillan, F. (2023, February 23). *Scoop Monitor: I'm That Poll* . Scottish Election Study Blog. <https://scottishelections.ac.uk/2023/02/23/scoop-monitor-im-that-poll/>
- McMillan, F., & Larner, J. M. (2022). *How Divided is Scotland?*
<https://ukandeu.ac.uk/wp-content/uploads/2022/02/UKICE-British-Politics-after-Brexit.pdf>
- Montagu, I. (2019, January 25). *Brexit and public opinion: Scotland*. UK in a Changing Europe. <https://ukandeu.ac.uk/brexit-and-public-opinion-scotland/>
- Moreno, L. (2006). Scotland, Catalonia, Europeanization and the 'Moreno Question.' *Scottish Affairs*, 54 (First Series)(1), 1–21. <https://doi.org/10.3366/scot.2006.0002>
- Neville, S., & Dickie, M. (2014, January 21). *Scotland's poorer more likely to favour independence* | *Financial Times*. Financial Times.
<https://www.ft.com/content/01cbc9ba-8292-11e3-9d7e-00144feab7de>
- Niedzwiedz, C. L., & Kandlik-Eltanani, M. (2014). Attitudes towards Income and Wealth Inequality and Support for Scottish Independence over Time and the Interaction with National Identity. *Scottish Affairs*, 23(1), 27–54.
<https://doi.org/10.3366/scot.2014.0004>
- Paquin, S. (2002). Globalization, European integration and the rise of neo-nationalism in Scotland. *Nationalism and Ethnic Politics*, 8(1), 55–80.
<https://doi.org/10.1080/13537110208428653>
- Paun, A., Sargeant, J., Kane, J., Thimont Jack, M., & Shuttleworth, K. (2021). *Scottish independence: EU membership and the Anglo-Scottish border*.
www.instituteforgovernment.org.uk
- Schneider, A. (2014). Age and Variations in the Attitude towards Scottish Independence – An Exploration of Cohort and Lifecycle Explanations. *Scottish Affairs*, 23(1), 55–78. <https://doi.org/10.3366/scot.2014.0005>
- Scholes, A. (2021, April 28). *The Changing Role of Identity and Values in Scotland's Politics - What Scotland Thinks*. What Scotland Thinks.
<https://whatscotlandthinks.org/2021/04/the-changing-role-of-identity-and-values-in-scotlands-politics/>
- Scholes, A., & Curtice, J. (2020). *The Changing Role of Identity and Values in Scotland's Politics*. <https://whatscotlandthinks.org/analysis/the-changing-role-of-identity-and-values-in-scotlands-politics/>
- SES. (2021). *Data – 2021 Scottish Election Study*. Scottish Election Study.
<https://scottishelections.ac.uk/data/>
- SES, [@ScotVoting]. (2022, September 26). *We've tracked support for independence by birth cohort across as many Scottish Election Study datasets as we can since the SNP came to power in 2007. Support jumped in all groups in 2014, but since then generational polarisation has become even stronger. [Tweet]*.
<https://twitter.com/ScotVoting>

- Smith, A. (2023). *Independence in Europe is Scotland's best chance of a greener, fairer and more prosperous nation — Scottish National Party*. SNP.Org. <https://www.snp.org/independence-in-europe-is-scotlands-best-chance-of-a-greener-fairer-and-more-prosperous-nation/>
- SNP. (2016, July 3). *Broken promises by Tories and No campaign since #IndyRef*. Snp.Org. <https://www.snp.org/broken-promises-by-tories-and-no-campaign-since-indyref/>
- SNP. (2023). *What is the SNP's position on rejoining the EU?*. Snp.Org. <https://www.snp.org/policies/pb-what-is-the-snp-s-position-on-rejoining-the-eu/>
- Sorens, J. (2005). The cross-sectional determinants of secessionism in advanced democracies. *Comparative Political Studies*, 38(3). <https://doi.org/10.1177/0010414004272538>
- Stephenson, J., & Reid, W. (2020, February 18). *Scottish nationalism is no more benign than its English equivalent* | Letters | *The Guardian*. The Guardian. <https://www.theguardian.com/politics/2020/feb/18/scottish-nationalism-is-no-more-benign-than-its-english-equivalent>
- Stock, J. H., & Watson, M. W. (2015). *Introduction to Econometrics* (3rd ed.). Pearson.
- Sturgeon, N. (2016, June 24). *First Minister: EU referendum result - gov.scot*. <https://www.gov.scot/publications/first-minister-eu-referendum-result/>
- Sturgeon, N. (2020, December 24). *Brexit deal: statement by First Minister Nicola Sturgeon - 24 December 2020 - gov.scot*. <https://www.gov.scot/publications/brexit-deal-statement-first-minister-nicola-sturgeon/>
- Swan, S. (2017, February 2). *Why has Brexit failed to boost support for Scottish independence?* | EUROPP. LSE Blog. <https://blogs.lse.ac.uk/euoppblog/2017/02/02/why-brexit-failed-to-boost-support-scottish-independence/>
- The Supreme Court. (2022, November 23). *REFERENCE by the Lord Advocate of devolution issues under paragraph 34 of Schedule 6 to the Scotland Act 1998 (Expedited)*. Supremecourt.Uk. <https://www.supremecourt.uk/cases/uksc-2022-0098.html>
- Thiec, A. (2021). The Impact of Brexit on the SNP's narrative of independence. *Observatoire de La Société Britannique*, 26, 103–126. <https://doi.org/10.4000/osb.5057>
- What Scotland Thinks. (2023a). *How would you vote in a Scottish independence referendum if held now? (asked after the EU referendum) - What Scotland Thinks*. Whatscotlandthinks.Org. <https://whatscotlandthinks.org/questions/how-would-you-vote-in-the-in-a-scottish-independence-referendum-if-held-now-ask/?removed>
- What Scotland Thinks. (2023b). *“Moreno” national identity - What Scotland Thinks*. Whatscotlandthinks.Org. <https://whatscotlandthinks.org/questions/moreno-national-identity-5/>
- White, H. (1980). A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity. *Econometrica*, 48(4), 817. <https://doi.org/10.2307/1912934>
- Wooldridge, J. M. (2001). *Econometric Analysis of Cross Section and Panel Data* (1st ed.). The MIT Press.
- Wu, H., & Leung, S.-O. (2017). Can Likert Scales be Treated as Interval Scales?—A Simulation Study. *Journal of Social Service Research*, 43(4), 527–532. <https://doi.org/10.1080/01488376.2017.1329775>
- YouGov. (2023). *YouGov | Panel Methodology*. Yougov.Co.Uk. <https://yougov.co.uk/about/panel-methodology/>

Appendix

Section A: Fixed effects models estimating the over-time Brexit effect

Tables A1-A6: Fixed Effects Logit Regression Models – Full tables

Table A1:

Panel Logistic Regression of Scottish indyref vote intention (binary outcome where Yes = 1 vs No = 0) on overall Brexit evaluations with individual fixed effects

	FE Model 1	FE Model 2	FE Model 3	FE Model 4	FE Model 5
Brexit happiness score	-0.054 (0.106)	-0.052 (0.107)	-0.059 (0.120)	0.066 (0.134)	0.050 (0.149)
Scottishness		0.030 (0.212)	-0.180 (0.250)	-0.094 (0.252)	-0.361 (0.297)
Personal financial evaluations		-0.269 (0.288)	-0.126 (0.324)	-0.207 (0.327)	-0.057 (0.359)
PM approval			-0.494*** (0.108)		-0.552*** (0.119)
Sturgeon approval				0.574*** (0.119)	0.659*** (0.155)
Num. obs.	451	451	451	451	451
Num. groups: Combined_BES_Waves_Scot.id	145	145	145	145	145
Deviance	559.988	558.440	501.087	502.918	445.403
Log Likelihood	-279.994	-279.220	-250.543	-251.459	-222.702
Pseudo R ²	-0.359	-0.363	-0.275	-0.278	-0.189

***p < 0.01; **p < 0.05; *p < 0.1; ·p < 0.15. [Standard errors clustered at the individual level]

Table A2:

Panel Logistic Regression of Scottish indyref vote intention (binary outcome where Yes = 1 vs DK = 0) on overall Brexit evaluations with individual fixed effects

	FE Model 1	FE Model 2	FE Model 3	FE Model 4	FE Model 5
Brexit happiness score	-0.099 (0.126)	-0.101 (0.126)	-0.063 (0.140)	-0.018 (0.128)	0.025 (0.143)
Scottishness		0.580* (0.348)	0.455 (0.353)	0.421 (0.353)	0.304 (0.344)
Personal financial evaluations		-0.308 (0.281)	-0.281 (0.279)	-0.337 (0.300)	-0.307 (0.295)
PM approval			-0.469*** (0.146)		-0.492*** (0.155)
Sturgeon approval				0.778*** (0.163)	0.810*** (0.164)
Num. obs.	421	421	421	421	421
Num. groups: Combined_BES_Waves_Scot.id	138	138	138	138	138
Deviance	526.468	517.550	487.933	460.722	432.906
Log Likelihood	-263.234	-258.775	-243.967	-230.361	-216.453
Pseudo R ²	-0.376	-0.368	-0.320	-0.274	-0.230

***p < 0.01; **p < 0.05; *p < 0.1; ·p < 0.15. [Standard errors clustered at the individual level]

Table A3:

Panel Logistic Regression of Scottish indyref vote intention (binary outcome where DK = 1 vs No = 0) on overall Brexit evaluations with individual fixed effects

	FE Model 1	FE Model 2	FE Model 3	FE Model 4	FE Model 5
Brexit happiness score	-0.103 (0.185)	-0.182 (0.161)	-0.100 (0.175)	-0.082 (0.163)	0.012 (0.177)
Scottishness		-0.471* (0.246)	-0.539** (0.262)	-0.426* (0.255)	-0.477* (0.269)
Personal financial evaluations		0.154 (0.317)	0.269 (0.353)	0.174 (0.357)	0.307 (0.404)
PM approval			-0.421*** (0.107)		-0.446*** (0.119)
Sturgeon approval				0.695*** (0.141)	0.714*** (0.147)
Num. obs.	388	388	388	388	388
Num. groups: Combined_BES_Waves_Scot.id	133	133	133	133	133
Deviance	499.156	493.337	464.502	452.202	423.787
Log Likelihood	-249.578	-246.668	-232.251	-226.101	-211.894
Pseudo R ²	-0.424	-0.420	-0.371	-0.348	-0.299

***p < 0.01; **p < 0.05; *p < 0.1; ·p < 0.15. [Standard errors clustered at the individual level]

Table A4:

Panel Logistic Regression of Scottish indyref vote intention (binary outcome where Yes = 1 vs No = 0) on economic evaluations of Brexit with individual fixed effects

	FE Model 1	FE Model 2	FE Model 3	FE Model 4	FE Model 5
Economic evaluation of Brexit	-0.415*** (0.154)	-0.352** (0.152)	-0.290* (0.160)	-0.405** (0.177)	-0.325* (0.188)
Scottishness		0.399*** (0.141)	0.320** (0.142)	0.144 (0.158)	0.061 (0.154)
Personal financial evaluations		-0.394*** (0.143)	-0.301** (0.146)	-0.267 (0.166)	-0.177 (0.177)
PM approval			-0.420*** (0.058)		-0.422*** (0.065)
Sturgeon approval				0.763*** (0.080)	0.745*** (0.081)
Num. obs.	1312	1312	1312	1312	1312
Num. groups: Combined_BES_Waves_Scot.id	291	291	291	291	291
Deviance	1443.378	1420.365	1310.891	1155.732	1080.943
Log Likelihood	-721.689	-710.182	-655.446	-577.866	-540.472
Pseudo R ²	-0.115	-0.104	-0.045	0.040	0.080

***p < 0.01; **p < 0.05; *p < 0.1; ·p < 0.15. [Standard errors clustered at the individual level]

Table A5:

Panel Logistic Regression of Scottish indyref vote intention (binary outcome where Yes = 1 vs DK = 0) on economic evaluations of Brexit with individual fixed effects

	FE Model 1	FE Model 2	FE Model 3	FE Model 4	FE Model 5
Economic evaluation of Brexit	-0.380 [*] (0.199)	-0.388 ^{**} (0.198)	-0.333 [·] (0.205)	-0.357 [·] (0.219)	-0.275 (0.230)
Scottishness		0.353 [*] (0.180)	0.266 [·] (0.180)	0.234 (0.185)	0.136 (0.183)
Personal financial evaluations		-0.132 (0.177)	-0.104 (0.183)	-0.172 (0.180)	-0.132 (0.181)
PM approval			-0.266 ^{***} (0.064)		-0.286 ^{***} (0.071)
Sturgeon approval				0.653 ^{***} (0.090)	0.666 ^{***} (0.091)
Num. obs.	941	941	941	941	941
Num. groups: Combined_BES_Waves_Scot.id	242	242	242	242	242
Deviance	1119.598	1110.671	1083.150	1013.058	987.306
Log Likelihood	-559.799	-555.335	-541.575	-506.529	-493.653
Pseudo R ²	-0.242	-0.238	-0.218	-0.164	-0.146

***p < 0.01; **p < 0.05; *p < 0.1; ·p < 0.15. [Standard errors clustered at the individual level]

Table A6:

Panel Logistic Regression of Scottish indyref vote intention (binary outcome where DK = 1 vs No = 0) on economic evaluations of Brexit with individual fixed effects

	FE Model 1	FE Model 2	FE Model 3	FE Model 4	FE Model 5
Economic evaluation of Brexit	-0.605 ^{***} (0.201)	-0.607 ^{***} (0.201)	-0.471 ^{**} (0.201)	-0.519 ^{**} (0.204)	-0.374 [*] (0.209)
Scottishness		-0.052 (0.144)	-0.019 (0.155)	-0.082 (0.156)	-0.045 (0.158)
Personal financial evaluations		-0.051 (0.176)	0.035 (0.184)	-0.040 (0.187)	0.058 (0.198)
PM approval			-0.264 ^{***} (0.064)		-0.277 ^{***} (0.067)
Sturgeon approval				0.504 ^{***} (0.080)	0.511 ^{***} (0.083)
Num. obs.	951	951	951	951	951
Num. groups: Combined_BES_Waves_Scot.id	242	242	242	242	242
Deviance	1103.304	1102.987	1073.255	1041.528	1012.628
Log Likelihood	-551.652	-551.493	-536.627	-520.764	-506.314
Pseudo R ²	-0.224	-0.227	-0.205	-0.181	-0.160

***p < 0.01; **p < 0.05; *p < 0.1; ·p < 0.15. [Standard errors clustered at the individual level]

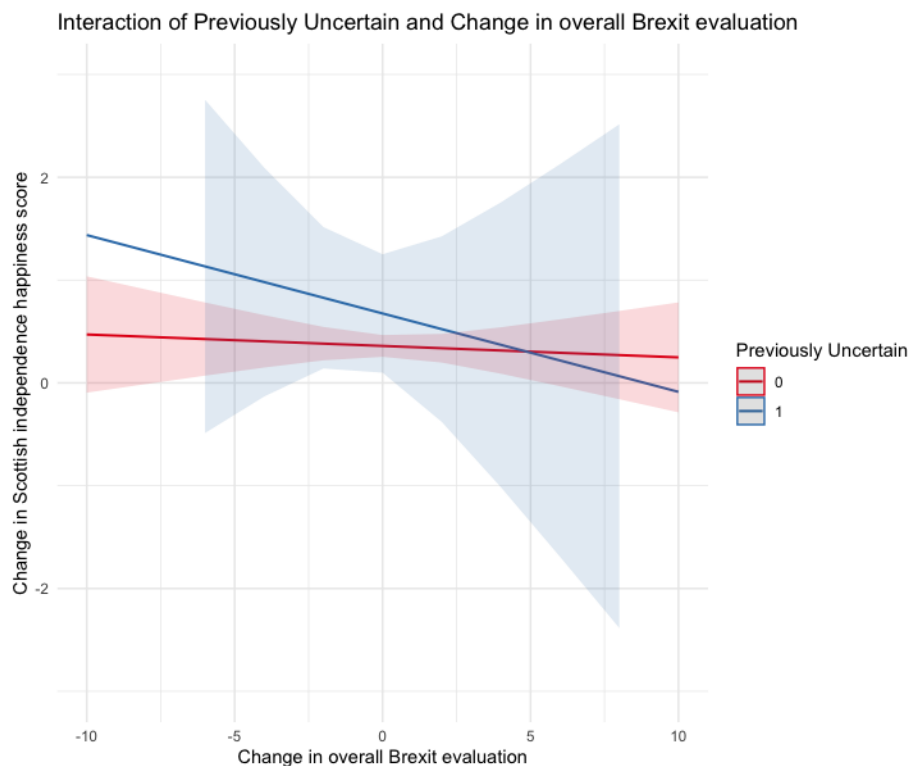
Section B: Sub-group heterogeneity

In this Appendix Section, I present all my interaction plots and the full regression tables investigating the extent of sub-group heterogeneity in the relationship between Brexit and independence assessments. The interaction plots below show how sub-group membership moderates the relationship between a change in Brexit evaluations and a change in independence happiness score from wave 11 to wave 17. Each interaction is displayed along with its corresponding 95% confidence interval.

Previously Uncertain vs Previously Certain voters

Firstly, the steeper blue line in Figures B1 and B2 (although not statistically distinct from the red line's gradient) suggests that *previously uncertain* voters were more likely to update their independence attitudes between wave 11 and wave 17 in response to a shift in their short-term Brexit assessments than *previously certain* voters, consistent with H2.

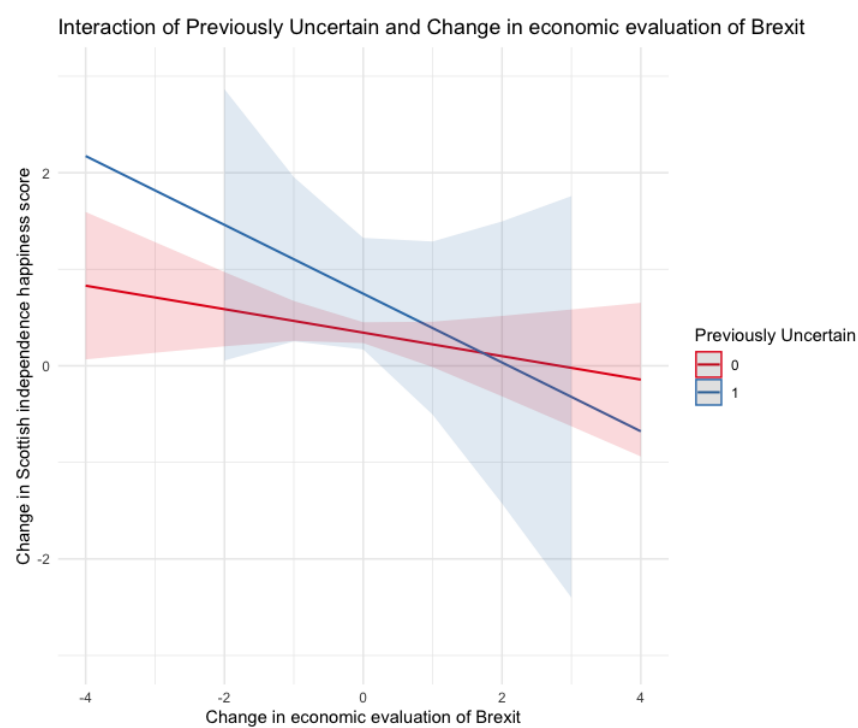
Figure B1²¹²²: Interaction plot of previously uncertain and change in overall Brexit evaluations



²¹ Note that the confidence intervals do not cover the full range of the x-axis in these interaction plots because there were not any *previously uncertain* respondents in the sample that radically shifted their Brexit assessments from one extreme to the other.

²² These confidence intervals are especially wide due to the small sample size of previously uncertain voters (only 133 out of a total of 1635).

Figure B2: Interaction plot of previously uncertain and change in economic Brexit evaluations



Previously Unattached vs Previously Attached voters

The steeper blue line in Figures B3 and B4 show that *previously unattached* voters were more likely to update their independence attitudes between wave 11 and wave 17 in response to a shift in their short-term Brexit assessments than *previously attached* voters, consistent with H3. The fact that the confidence intervals significantly diverge only in the negative domain shows the one-sided nature of this interaction. *Previously unattached* voters are significantly different to *previously attached* voters *only* in response to a negative shift in their Brexit evaluations.

Figure B3: Interaction plot of previously unattached and change in overall Brexit evaluations

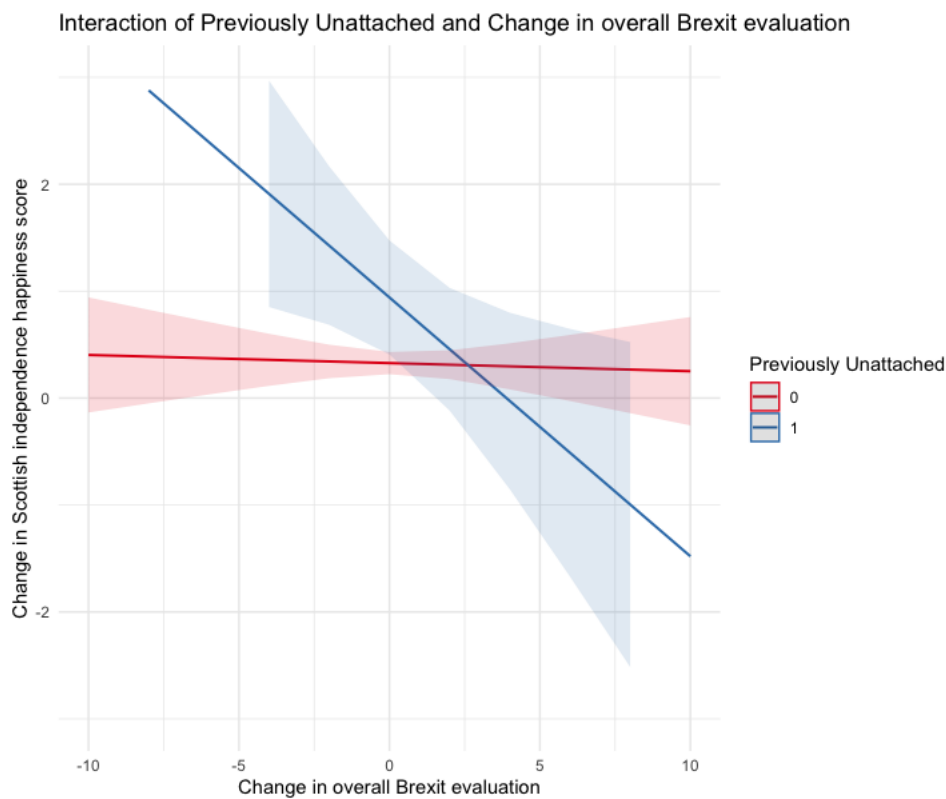
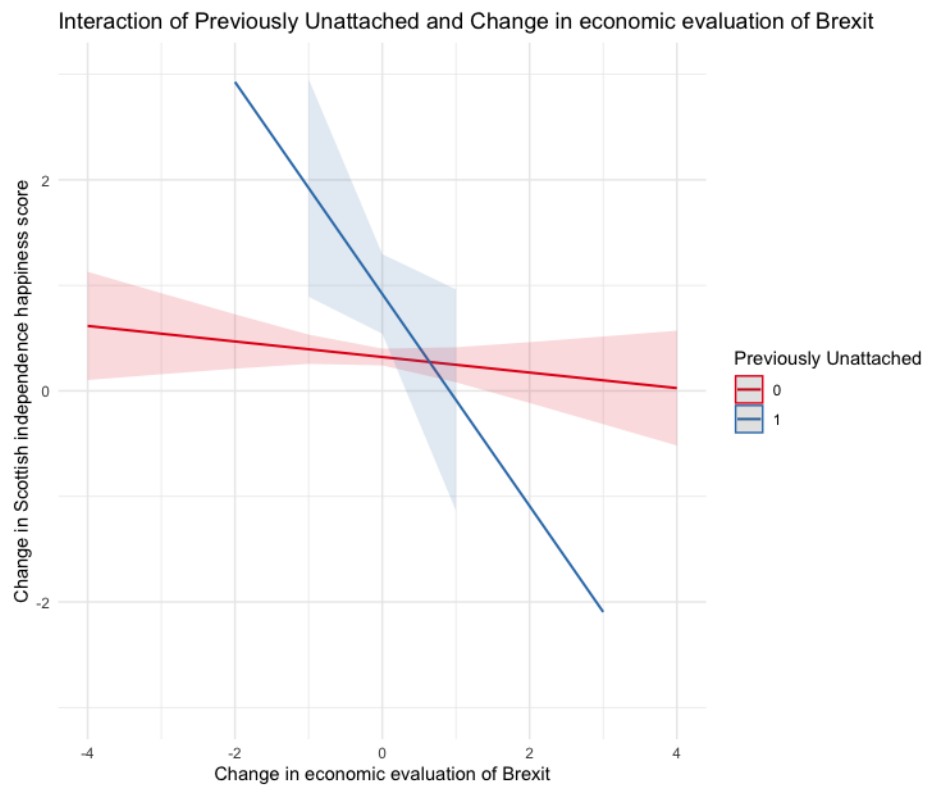


Figure B4²³: Interaction plot of previously unattached and change in economic Brexit evaluations



²³ Note that the fit line in this interaction plot is an extrapolation from a very small number of *previously unattached* respondents who shifted their economic Brexit assessment from wave 11 to wave 17. In fact, there were only 32 *previously unattached* respondents whose change in *economic* Brexit assessments was non-zero; 12 respondents increased their assessment by 1 point, 18 decreased their assessment by 1 point and 2 decreased their assessment by 3 points. Note also that because of this very small sample, 85% confidence intervals are displayed in this interaction plot in order to graphically illustrate the confidence intervals.

Scotland's four constitutional tribes

These interaction plots reveal that there was no significant difference between Scotland's four constitutional tribes in terms of their responsiveness to a change in Brexit evaluations over time.

Figure B5: Interaction plot of Yes Remainer and change in overall Brexit evaluations

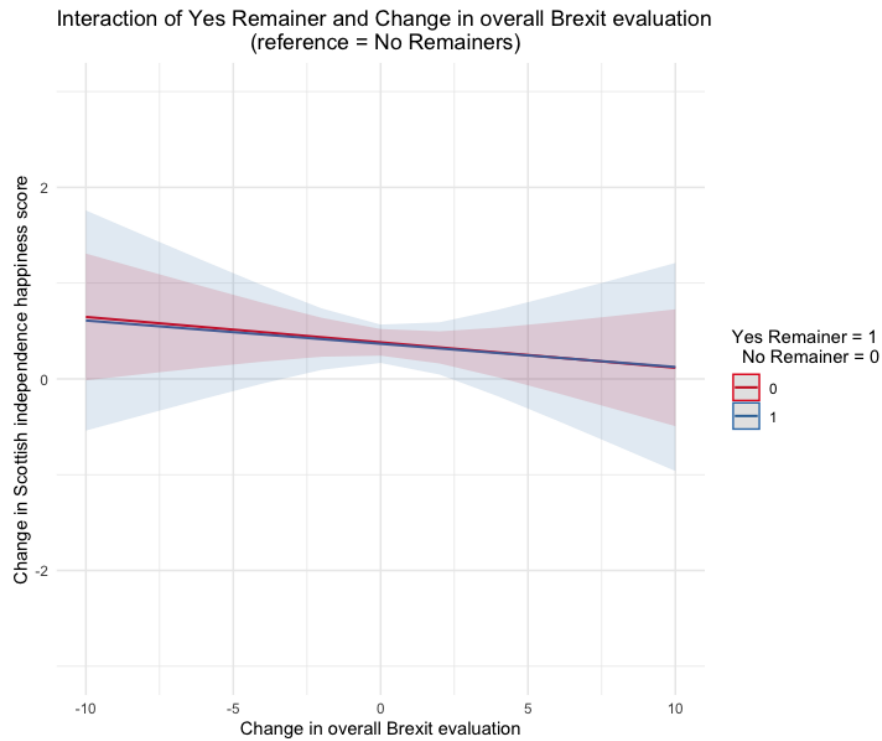


Figure B6: Interaction plot of Yes Leaver and change in overall Brexit evaluations

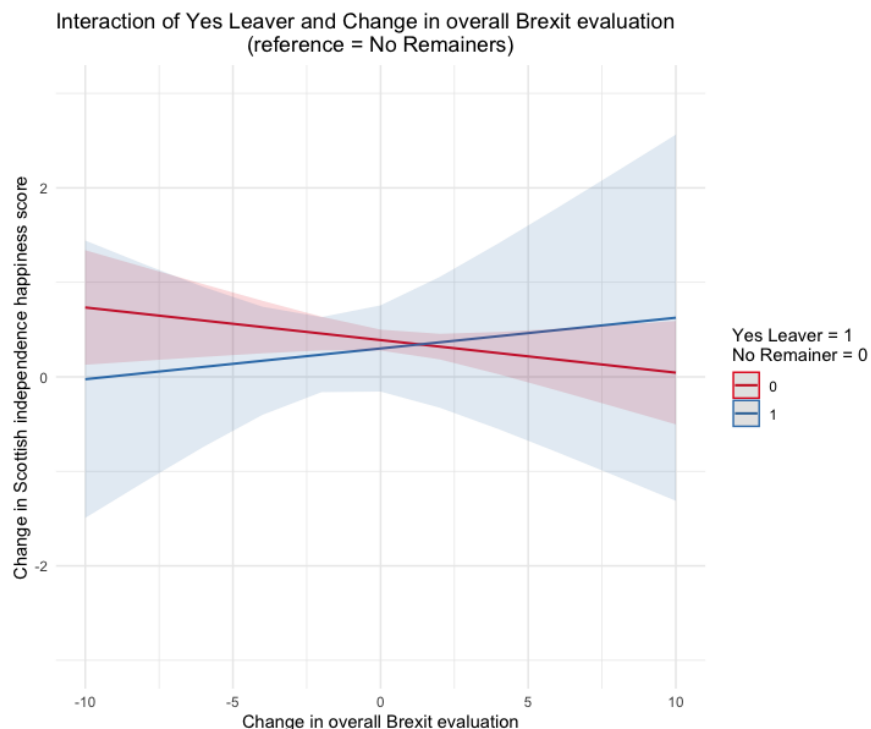


Figure B7: Interaction plot of No Leaver and change in overall Brexit evaluations

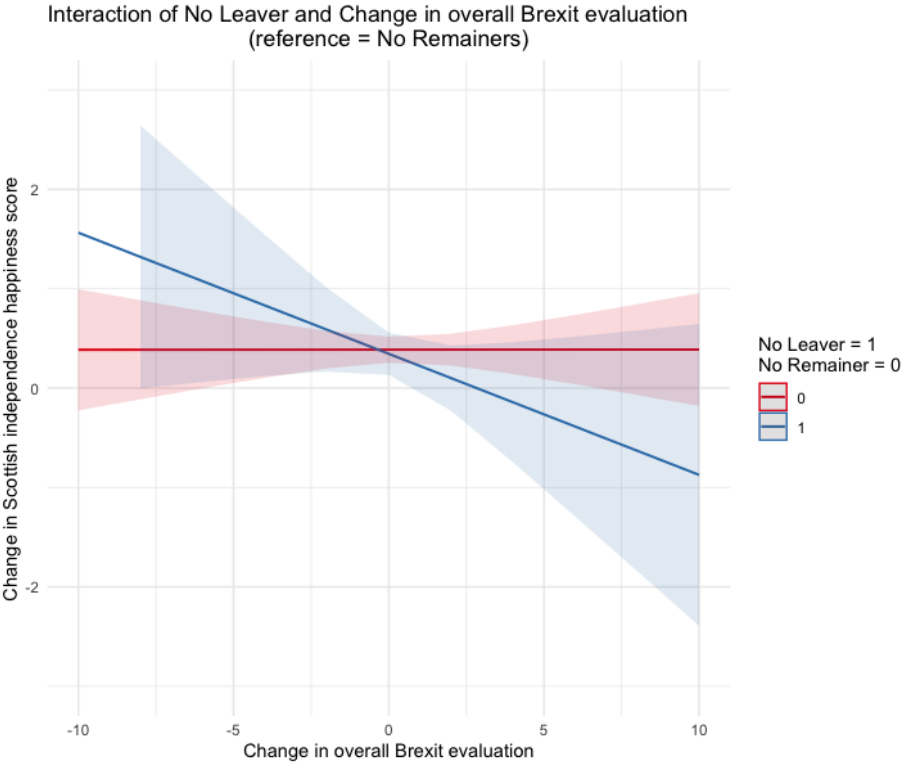


Figure B8: Interaction plot of Yes Remainer and change in economic Brexit evaluations

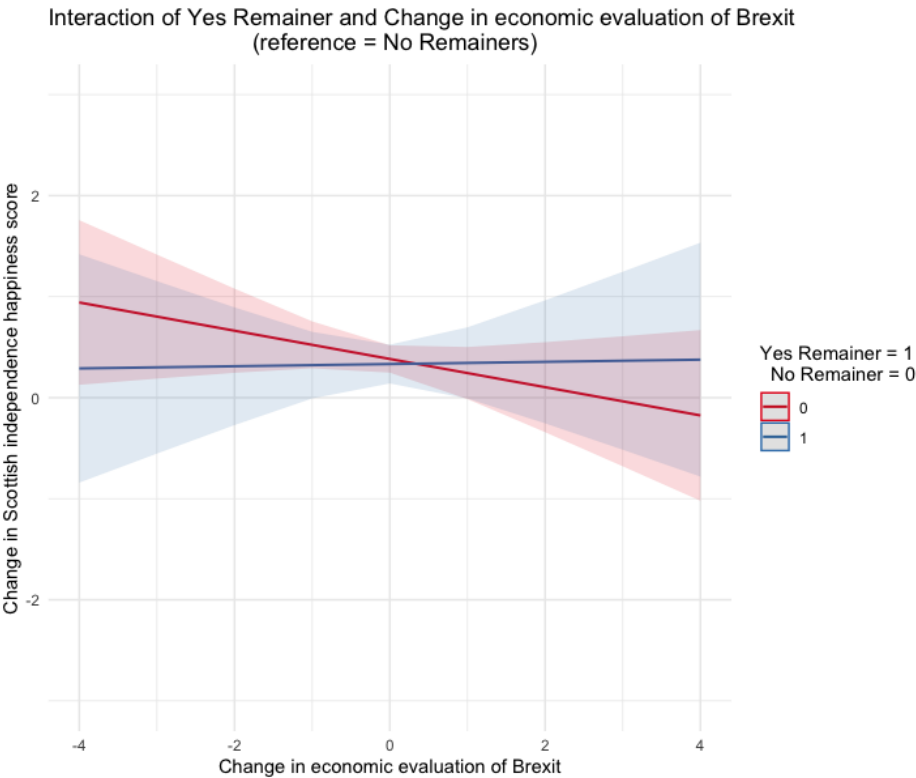


Figure B9: Interaction plot of Yes Leaver and change in economic Brexit evaluations

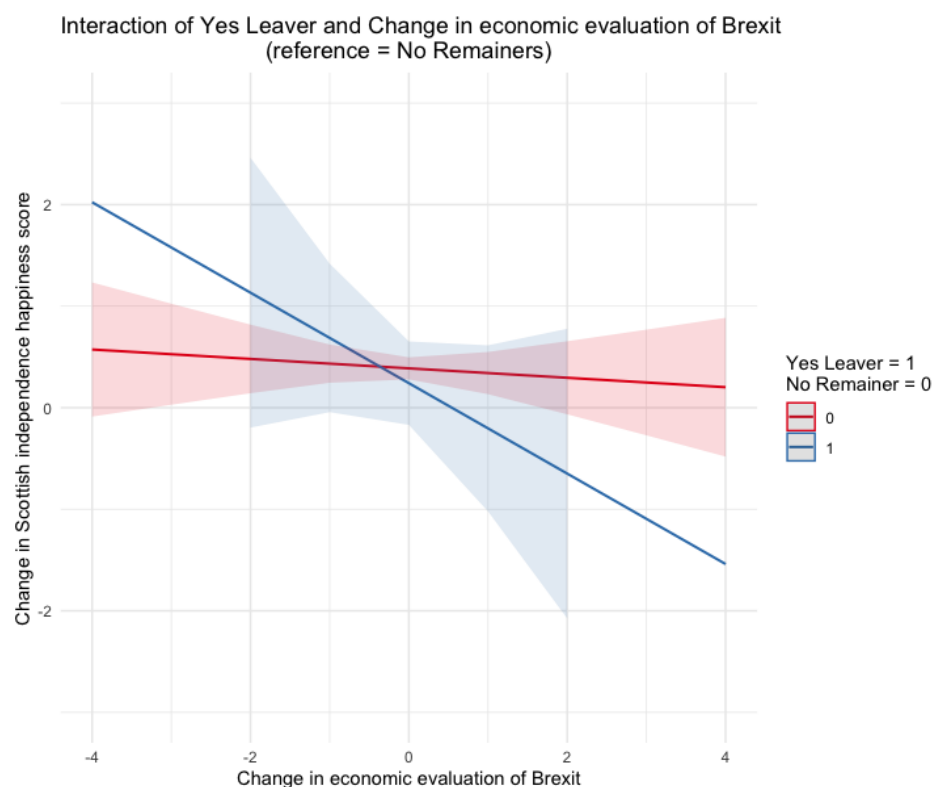


Figure B10: Interaction plot of No Leaver and change in economic Brexit evaluations

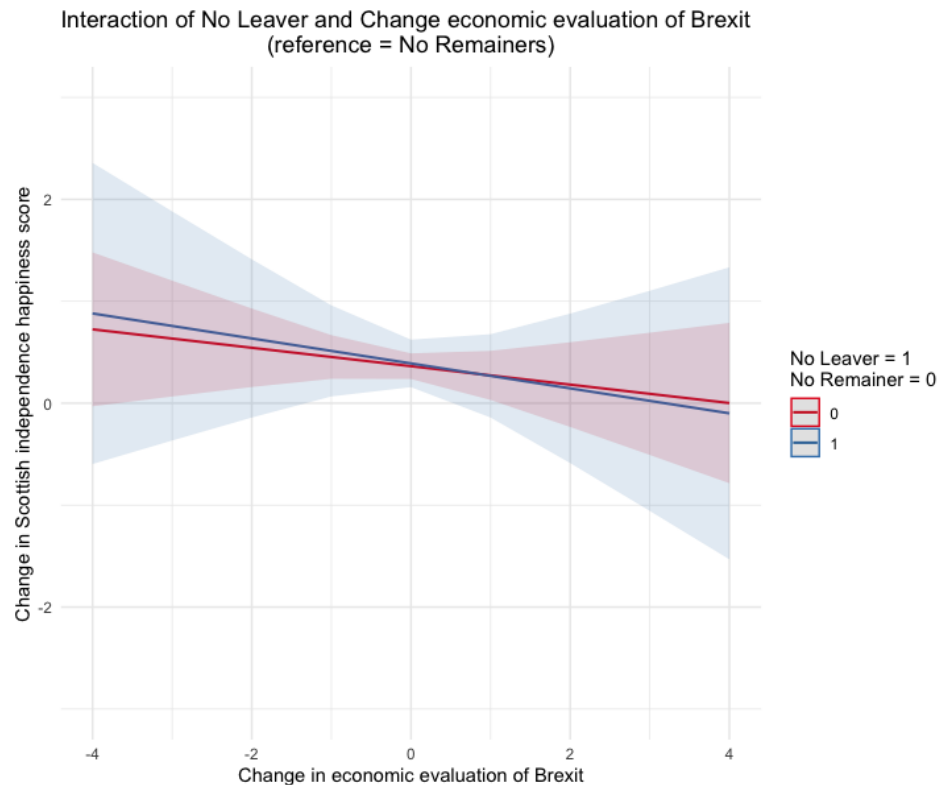


Table B1: Full regression table investigating sub-group heterogeneity – Overall Brexit evaluations

OLS Regression of Change in independence happiness score (Wave 11 - Wave 17)				
	Model 1	Model 2	Model 3	Model 4
Change in Brexit happiness score	-0.015 (0.027)	-0.011 (0.028)	-0.008 (0.026)	-0.009 (0.038)
Change in Scottishness	0.105 [·] (0.067)	0.104 [·] (0.067)	0.079 (0.068)	0.110 [·] (0.068)
Change in personal financial evaluations	-0.110 ^{**} (0.050)	-0.109 ^{**} (0.050)	-0.108 ^{**} (0.050)	-0.105 ^{**} (0.050)
Change in PM approval	0.294 ^{***} (0.048)	0.289 ^{***} (0.048)	0.294 ^{***} (0.048)	0.287 ^{***} (0.047)
Change in Sturgeon approval	-0.089 ^{***} (0.022)	-0.091 ^{***} (0.023)	-0.077 ^{***} (0.022)	-0.085 ^{***} (0.024)
Previously Uncertain		0.316 (0.299)		
Change in happiness score about Brexit*Previously Uncertain		-0.065 (0.145)		
Previously Unattached			0.614 ^{**} (0.278)	
Change in happiness score about Brexit*Previously Unattached			-0.234 ^{**} (0.103)	
Yes Remainer				-0.015 (0.132)
Yes Leaver				-0.089 (0.244)
No Leaver				-0.042 (0.134)
Change in happiness score about Brexit*Yes Remainer				0.002 (0.063)
Change in happiness score about Brexit*Yes Leaver				0.067 (0.087)
Change in happiness score about Brexit*No Leaver				-0.122 (0.086)
Constant	0.281 ^{***} (0.056)	0.262 ^{***} (0.058)	0.244 ^{***} (0.057)	0.310 ^{***} (0.104)
R ²	0.088	0.089	0.094	0.092
Adj. R ²	0.085	0.085	0.090	0.085
Num. obs.	1406	1406	1383	1406
RMSE	1.970	1.970	1.927	1.970

***p < 0.01; **p < 0.05; *p < 0.1; ·p < 0.15 [Standard errors = Heteroskedastic-Robust SEs]

Table B2: Full regression table investigating sub-group heterogeneity – Economic Brexit evaluations

OLS Regression of Change in independence happiness score (Wave 11 - Wave 17)				
	Model 1	Model 2	Model 3	Model 4
Change in economic evaluation of Brexit	-0.135 (0.095)	-0.122 (0.098)	-0.074 (0.091)	-0.082 (0.137)
Change in Scottishness	0.080 (0.067)	0.076 (0.067)	0.051 (0.068)	0.075 (0.068)
Change in personal financial evaluations	-0.105** (0.052)	-0.105** (0.052)	-0.103** (0.052)	-0.107** (0.052)
Change in PM approval	-0.083*** (0.023)	-0.083*** (0.023)	-0.079*** (0.023)	-0.080*** (0.024)
Change in Sturgeon approval	0.311*** (0.050)	0.308*** (0.051)	0.298*** (0.051)	0.305*** (0.050)
Previously Uncertain		0.404 (0.301)		
Change in economic evaluation of Brexit* Previously Uncertain		-0.235 (0.349)		
Previously Unattached			0.598** (0.268)	
Change in economic evaluation of Brexit* Previously Unattached			-0.931 (0.679)	
Yes Remainer				-0.050 (0.126)
Yes Leaver				-0.146 (0.220)
No Leaver				0.027 (0.141)
Change in economic evaluation of Brexit*Yes Remainer				0.151 (0.185)
Change in economic evaluation of Brexit*Yes Leaver				-0.399 (0.353)
Change in economic evaluation of Brexit*No Leaver				-0.032 (0.216)
Constant	0.280*** (0.057)	0.261*** (0.058)	0.242*** (0.058)	0.316*** (0.099)
R ²	0.098	0.101	0.104	0.103
Adj. R ²	0.095	0.096	0.099	0.095
Num. obs.	1331	1331	1314	1331
RMSE	1.956	1.955	1.915	1.956

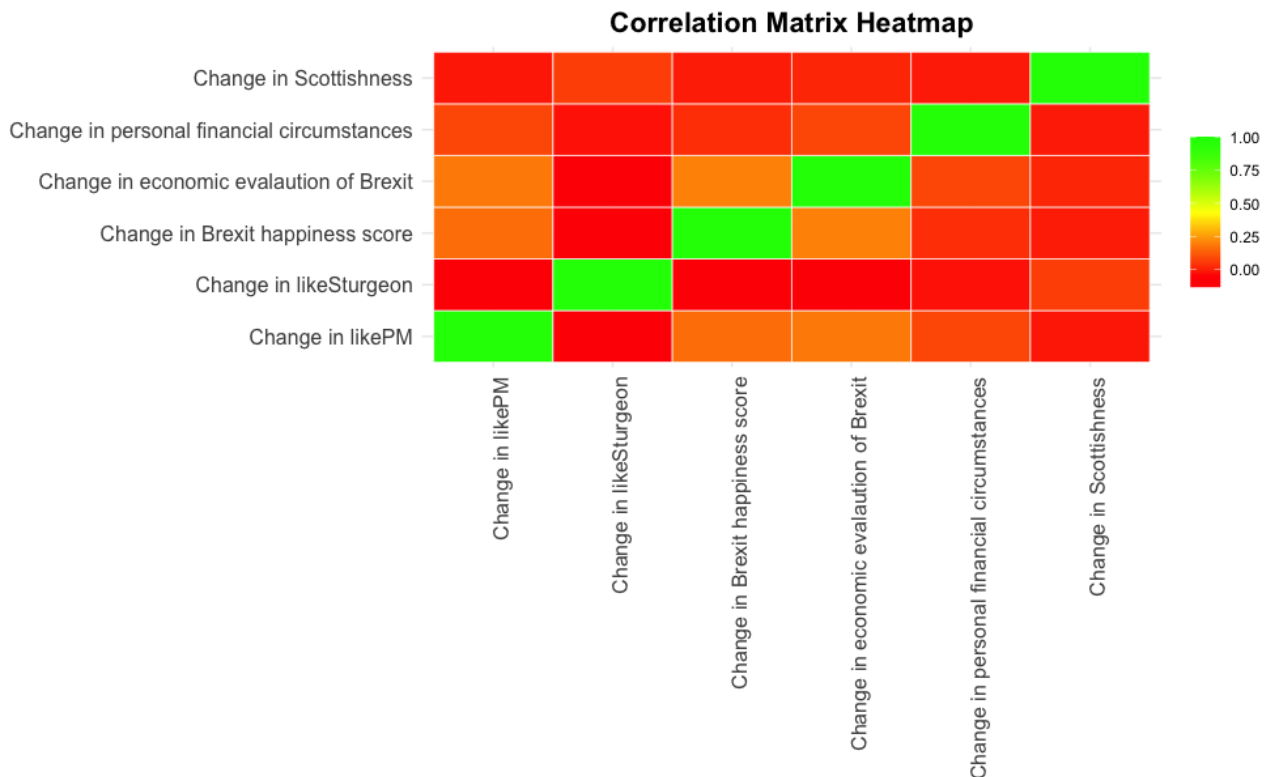
***p < 0.01; **p < 0.05; *p < 0.1; ·p < 0.15 [Standard errors = Heteroskedastic-Robust SEs]

Section C: Details of BES data used

C1: Correlational data between Brexit evaluation and leader evaluation variables:

First differences:

- I find that there is a negative and statistically significant correlation between the change in PM approval and change in Sturgeon approval variables. However, it is not very large in magnitude. In particular, the 95% confidence interval surrounding the correlation coefficient estimate is: [-0.164, -0.066]. Full details of all correlations are displayed in the correlation matrix below.



Static variables:

- I find that there is a negative, substantial and statistically significant correlation between the static PM approval and Nicola Sturgeon approval variables. For example, in wave 17, the correlation coefficient between these two variables is -0.517 (3dp) and the 95% confidence interval surrounding this is [-0.542, -0.492]. Full details of all correlations between my variables of interest in wave 17 are displayed in the correlation matrix below.

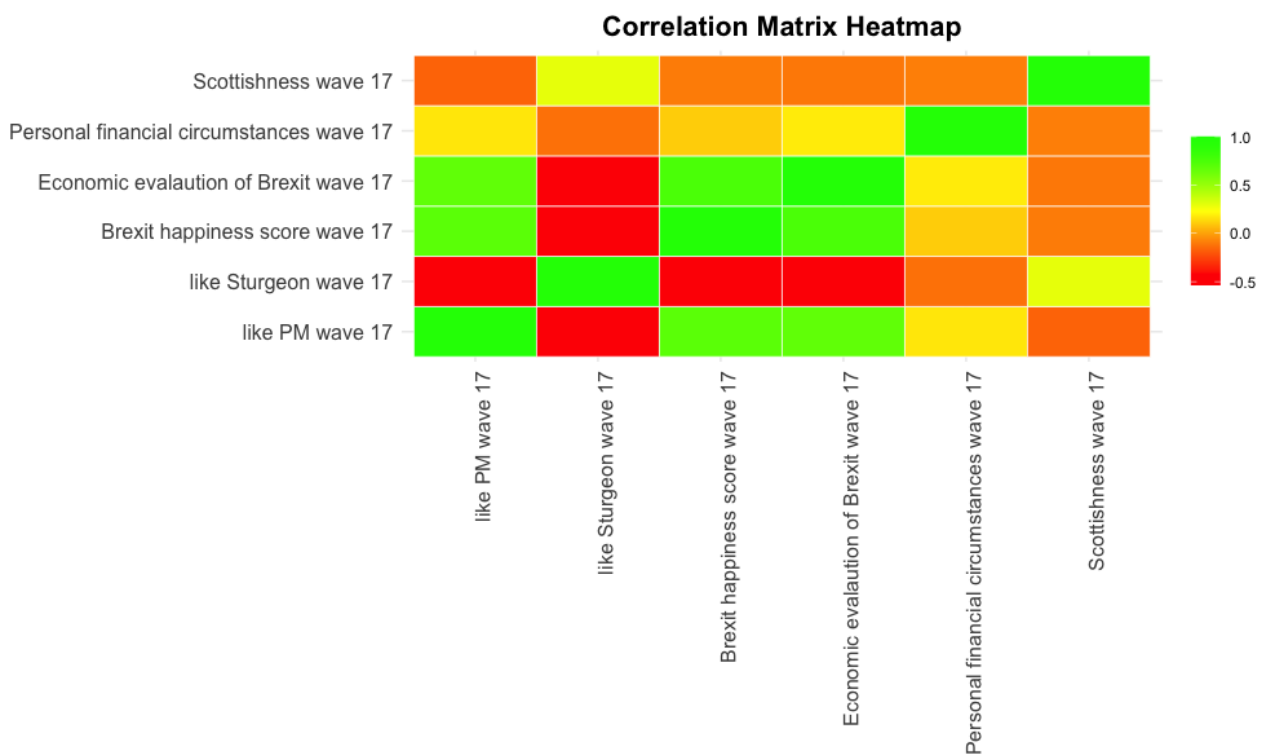


Table C2: Details of variables and coding of BES survey data

Measure	Waves measured	Question(s)	BES coding	Recodes (BES coding in brackets, where different) e.g. 1/5 = 1, 2, 3, 4, 5
<i>Dependent variables</i>				
Scottish independence referendum vote intention	W7 – W21	If there was another referendum on Scottish independence, how do you think you would vote? <i>scotReferendumIntention</i>	0 I would vote “No” (stay in the UK) 1 I would vote “Yes” (leave the UK) 2 Would not vote 9999 Don’t know	Would not votes dropped
DV1: Wave-on-wave change in Scottish independence referendum vote intention	N/A	Newly created variable	N/A	No Change (if W11 and W17 are the same) Yes – No (1 in W11 & 0 in W17) Yes – DK (1 in W11 & 9999 in W17) DK – Yes (9999 in W11 & 1 in W17) DK – No (9999 in W11 & 0 in W17) No – Yes (0 in W11 & 1 in W17) No – DK (0 in W11 & 9999 in W17)
Happiness score if Scotland left the UK	W11 & W17	How happy or how disappointed would you be if Scotland left the United Kingdom? <i>happyScotIndepResult</i>	0 Extremely disappointed 1 2 3 4 5 6 7 8 9 10 Extremely happy 9999 Don’t know	Don’t Knows dropped
DV2: Wave-on-wave change in	N/A	Newly created variable	N/A	happyScotIndepResultW17 – happyScotIndepResultW11

happiness score if Scotland left the UK				Scale runs from -10 (largest decline in expressed happiness) to +10 (largest increase in expressed happiness)
<i>Independent variables</i> <i>Brexit evaluation variables</i>				
Overall Brexit evaluations	W9, W10, W11, W13, W14 & W17	How happy or how disappointed are you that the UK voted to leave the EU? <i>happyEULeave</i>	0 Extremely disappointed 1 2 3 4 5 6 7 8 9 10 Extremely happy 9999 Don't know	Don't Knows dropped
IV1: Wave-on-wave change in overall Brexit evaluations	N/A	Newly created variable	N/A	happyEULeaveW17 – happyEULeaveW11 Scale runs from -10 (largest decline in overall Brexit evaluations) to +10 (largest increase in overall Brexit evaluations)
Evaluations of the economic impact of Brexit	W7, W8, W10, W11, W13, W14, W15, W16 & W17	Do you think the general economic situation in the UK would/will be better, worse, or about the same if/after the UK leaves the European Union? <i>effectsEUEcon</i>	1 Much Worse 2 Worse 3 About the same 4 Better 5 Much better 9999 Don't know	Don't Knows dropped

IV2: Wave-on-wave change in economic evaluations of Brexit	N/A	Newly created variable	N/A	effectsEUEconW17 – effectsEUEconW11 Scale runs from -4 (largest decline in economic evaluations of Brexit) to +4 (largest increase in economic evaluations of Brexit)
<i>Control variables</i>				
Strength of Scottish identity	W7 – W21	Where would you place yourself on this national identity (Scottishness) scale? How strongly do you feel Scottish? <i>Scottishness</i>	1 Not at all 2 3 4 5 6 7 Very strongly 9999 Don't know	Don't Knows dropped
Wave-on-wave change in strength of Scottish identity	N/A	Newly created variable	N/A	scottishnessW17/21/10/17 – scottishnessW11/20/7/7 Scale runs from -6 (largest decline in Scottishness) to +6 (largest increase in Scottishness)
Personal financial circumstances	W7, W8, W10, W11, W12, W13, W14, W15, W16, W17, W20, W21	Now, a few questions about economic conditions. How does the financial situation of your household now compare with what it was 12 months ago? Has it: <i>econPersonalRetro</i>	1 Got a lot worse 2 Got a little worse 3 Stayed the same 4 Got a little better 5 Got a lot better 9999 Don't know	Don't knows dropped
Wave-on-wave change in personal financial circumstances	N/A	Newly created variable	N/A	econPersonalRetroW17/21/10/17 – econPersonalRetroW11/20/7/7 Scale runs from -4 (largest decline in personal financial circumstances) to

				+4 (largest improvement in personal financial circumstances)
Theresa May (PM) approval	W7 – W16	How much do you like or dislike Theresa May? <i>likeMay</i>	0 Strongly dislike 1 2 3 4 5 6 7 8 9 10 Strongly like 9999 Don't know	Don't knows dropped
Boris Johnson (PM) approval	W17	How much do you like or dislike Boris Johnson? <i>likeJohnson</i>	0 Strongly dislike 1 2 3 4 5 6 7 8 9 10 Strongly like 9999 Don't know	Don't knows dropped
Wave-on-wave change in PM approval	N/A	Newly created variable	N/A	<i>likeJohnsonW17 – likeMayW7</i> Scale from -10 to +10
Nicola Sturgeon (FM) approval	W17	How much do you like or dislike Nicola Sturgeon? <i>likeSturgeon</i>	0 Strongly dislike 1 2 3 4	Don't Knows dropped

			5 6 7 8 9 10 Strongly like 9999 Don't know	
Wave-on-wave change in Nicola Sturgeon (FM) approval	N/A	Newly created variable	N/A	$likeSturgeonW17 - likeSturgeonW7$ Scale from -10 to +10
Uncertain about indyref vote intention in wave 11 (dummy)	N/A	Newly created variable	<i>scotReferendumintentionW11</i> : 0 I would vote "No" (stay in the UK) 1 I would vote "Yes" (leave the UK) 2 Would not vote 9999 Don't know	1: if <i>scotReferendumintentionW11</i> = 9999 0: otherwise
Scottish independence identity	W10	Thinking about the Scottish independence debate, do you think of yourself as closer to the Yes side or the No side? <i>scotRefID</i>	0 The Yes side 1 The No side 2 Neither 9999 Don't Know	Don't Knows dropped
Unattached in Scottish independence debate in wave 10 (dummy)	N/A	Newly created variable	0 The Yes side 1 The No side 2 Neither	1: If <i>scotRefID</i> = 3 0: otherwise
Yes Remainder (dummy)	(profile)	In the Referendum in 2016 on whether Britain should remain in or leave the European Union, which way did you vote, or did you not vote?	0 I voted to Remain 1 I voted to Leave 2 Don't know	1: if $p_{eurefvote} = 0$ & $p_{vote_scot_ref} = 1$ 0: otherwise

		<i>P_eurefvote</i> & In the Referendum in 2014 on whether Scotland should become independent, which way did you vote, or did you not vote? <i>P_vote_scot_ref</i>	& 0 I voted No 1 I voted Yes 2 Don't know	
Yes Leaver (dummy)	(profile)	In the Referendum in 2016 on whether Britain should remain in or leave the European Union, which way did you vote, or did you not vote? <i>P_eurefvote</i> & In the Referendum in 2014 on whether Scotland should become independent, which way did you vote, or did you not vote? <i>P_vote_scot_ref</i>	0 I voted to Remain 1 I voted to Leave 2 Don't know & 0 I voted No 1 I voted Yes 2 Don't know	1: if $p_eurefvote = 1$ & $p_vote_scot_ref = 1$) 0: otherwise
No Leaver (dummy)	(profile)	In the Referendum in 2016 on whether Britain should remain in or leave the European Union, which way did you vote, or did you not vote? <i>P_eurefvote</i> & In the Referendum in 2014 on whether Scotland should become	0 I voted to Remain 1 I voted to Leave 2 Don't know & 0 I voted No 1 I voted Yes	1: if $p_eurefvote = 1$ & $p_vote_scot_ref = 0$) 0: otherwise

		independent, which way did you vote, or did you not vote? <i>P_vote_scot_ref</i>	2 Don't know	
<i>Independent variables</i> <i>UK/Scottish</i> <i>government/EU</i> <i>performance</i> <i>evaluation variables</i>				
Approval rating for the job the UK govt is doing	W7, W10, W11, W14, W15, W16 & W17	Do you approve or disapprove of the job that the UK government is doing? <i>approveUKGovt</i>	1 Strongly disapprove 2 Disapprove 3 Neither approve nor disapprove 4 Approve 5 Strongly approve	Don't Knows dropped
Approval rating for the job the Scottish govt is doing	W7, W10, W11, W14, W15, W16 & W17	Do you approve or disapprove of the job that the Scottish government is doing? <i>approveScotGovt</i>	1 Strongly disapprove 2 Disapprove 3 Neither approve nor disapprove 4 Approve 5 Strongly approve	Don't Knows dropped
Approval rating for the job the EU is doing	W7 & W10	Do you approve or disapprove of the job that the European Union is doing? <i>approveEU</i>	1 Strongly disapprove 2 Disapprove 3 Neither approve nor disapprove 4 Approve 5 Strongly approve	Don't Knows dropped
Scottish govt performance premium	W7, W10, W11, W14, W15, W16 & W17	Newly created variable – relative UK/Scottish govt performance evaluation [Scottish govt performance evaluation] – [UK govt performance evaluation]	N/A	<i>approveScotGovt – approveUKGovt</i> Scale runs from -4 (Strongly approve of UK govt performance and strongly disapprove of Scottish govt performance) to +4 (Strongly disapprove of UK govt performance and strongly approve of Scottish govt performance)
Wave-on-wave change in Scottish govt performance premium	N/A	Newly created variable	N/A	<i>[approveScotGovt – approveUKGovt] W17 – [approveScotGovt – approveUKGovt] W7</i>

EU performance premium	W 7 & W10	Newly created variable – relative UK govt/EU performance evaluation [EU performance evaluation] – [UK govt performance evaluation]	N/A	$approveEU - approveUKGovt$ Scale runs from -4 (Strongly approve of UK govt performance and strongly disapprove of EU performance) to +4 (Strongly disapprove of UK govt performance and strongly approve of EU performance)
Wave-on-wave change in EU performance premium	N/A	Newly created variable	N/A	$[approveEU - approveUKGovt] W10 - [approveEU - approveUKGovt] W7$
<i>Independent variables</i> <i>UK/Scottish government competence evaluations variables</i>				
Evaluation of UK govt's handling of lockdown	W20 & W21	How well do you think the UK government has handled the coronavirus lockdown? <i>govtHandlelockdown</i>	1 Very badly 2 Fairly badly 3 Neither well nor badly 4 Fairly well 5 Very well 9999 Don't Know	Don't Knows dropped
Evaluation of UK govt's handling of the provision of PPE for health workers	W20 & W21	How well do you think the UK government has handled the provision of Personal Protective Equipment (PPE) for health workers? <i>govtHandlePPE</i>	1 Very badly 2 Fairly badly 3 Neither well nor badly 4 Fairly well 5 Very well 9999 Don't Know	Don't Knows dropped
Evaluation of UK govt's handling of Covid testing	W20 & W21	How well do you think the UK government has handled the testing of the population for coronavirus? <i>govtHandleTesting</i>	1 Very badly 2 Fairly badly 3 Neither well nor badly 4 Fairly well 5 Very well 9999 Don't Know	Don't Knows dropped

Evaluation of Scottish govt's handling of lockdown	W20 & W21	How well do you think the Scottish government has handled the coronavirus lockdown? <i>scotgovtHandlelockdown</i>	1 Very badly 2 Fairly badly 3 Neither well nor badly 4 Fairly well 5 Very well 9999 Don't Know	Don't Knows dropped
Evaluation of Scottish govt's handling of the provision of PPE for health workers	W20 & W21	How well do you think the Scottish government has handled the provision of Personal Protective Equipment (PPE) for health workers? <i>scotgovtHandlePPE</i>	1 Very badly 2 Fairly badly 3 Neither well nor badly 4 Fairly well 5 Very well 9999 Don't Know	Don't Knows dropped
Evaluation of Scottish govt's handling of Covid testing	W20 & W21	How well do you think the Scottish government has handled the testing of the population for coronavirus? <i>scotgovtHandleTesting</i>	1 Very badly 2 Fairly badly 3 Neither well nor badly 4 Fairly well 5 Very well 9999 Don't Know	Don't Knows dropped
Scottish govt competence premium regarding the handling of lockdown	W20 & W21	Newly created variable – relative UK/Scottish govt competence evaluation regarding handling of lockdown	N/A	<i>scotgovtHandlelockdown – govtHandlelockdown</i> Scale runs from -4 (UK govt doing very well and Scottish govt doing very badly) to +4 (UK govt doing very badly and Scottish govt doing very well)
Wave-on-wave change in Scottish govt competence premium regarding the handling of lockdown	N/A	Newly created variable	N/A	<i>[scotgovtHandlelockdown – govtHandlelockdown]</i> W21 – <i>[scotgovtHandlelockdown – govtHandlelockdown]</i> t/ W20
Scottish govt competence premium	W20 & W21	Newly created variable – relative UK/Scottish govt competence	N/A	<i>scotgovtHandlePPE – govtHandlePPE</i> Scale runs from -4 (UK govt doing very well and Scottish govt doing very

regarding the handling of PPE provision		evaluation regarding handling of PPE		badly) to +4 (UK govt doing very badly and Scottish govt doing very well)
Wave-on-wave change in Scottish govt competence premium regarding the handling of PPE provision	N/A	Newly created variable	N/A	$[scotgovtHandlePPE - govtHandlePPE] W21 - [scotgovtHandlePPE - govtHandlePPE] W20$
Scottish govt competence premium regarding the handling of testing	W20 & W21	Newly created variable – relative UK/Scottish govt competence evaluation regarding handling of testing	N/A	$scotgovtHandleTesting - govtHandleTesting$ Scale runs from -4 (UK govt doing very well and Scottish govt doing very badly) to +4 (UK govt doing very badly and Scottish govt doing very well)
Wave-on-wave change in Scottish govt competence premium regarding the handling of testing	N/A	Newly created variable	N/A	$[scotgovtHandleTesting - govtHandleTesting] W21 - [scotgovtHandleTesting - govtHandleTesting] W20$

Section D: Models estimating the impact of relative government performance assessments on independence attitudes

D1: Multinomial Change-on-Change model estimating the impact of voters' "Scottish government performance premium"

This section reports the full regression table complementing the summary results presented in Table 7. This includes all control variables.

Table D1: Multinomial Change-on-Change model estimating the impact of "Scottish government performance premium"

Multinomial Logit Model of Change in indyref vote intention on Change in relative UK vs Scottish govt performance evaluations (wave 7 - wave 17)

	Change in Scottish independence referendum vote intention					
	DON'T KNOW-NO	DON'T KNOW- YES	NO-DON'T KNOW	NO-YES	YES-DON'T KNOW	YES-NO
	(1)	(2)	(3)	(4)	(5)	(6)
Change in Scot govt approval premium [Scot govt approval - UK govt approval]	-0.310** (0.139)	0.373*** (0.143)	0.556*** (0.110)	0.695*** (0.097)	-0.457*** (0.117)	-0.766*** (0.083)
Change in Scottishness	0.044 (0.203)	0.141 (0.173)	-0.104 (0.148)	0.097 (0.124)	0.026 (0.182)	-0.128 (0.132)
Change in personal financial situation evaluations	0.126 (0.220)	-0.093 (0.200)	-0.277* (0.157)	-0.177 (0.139)	0.025 (0.201)	0.400*** (0.149)
Constant	-3.871*** (0.216)	-3.816*** (0.218)	-3.453*** (0.186)	-3.351*** (0.178)	-3.756*** (0.208)	-3.491*** (0.186)
Akaike Inf. Crit.	2,121.773	2,121.773	2,121.773	2,121.773	2,121.773	2,121.773
Observations	1394					

Note:

*p<0.1; **p<0.05; ***p<0.01
NO CHANGE = reference

D2: Fixed effects models estimating the association between relative UK versus Scottish government performance evaluations and independence attitudes

This section reports the results of the panel logistic regression models with individual fixed-effects which complement the multinomial change-on-change model reported in Table 7 in the main body of this thesis. In short, using data from waves 7, 10, 11, 14, 15, 16 and 17, they confirm the main finding that there was a substantial and significant association between voters' *relative* UK versus Scottish government performance evaluations and their independence attitudes over the Brexit process period - between wave 7 (April/May 2016) and wave 17 (November 2019). Specifically, Table D2.1 shows that, even after controlling for levels of Scottish identity, personal financial circumstances and all individual-specific time-invariant heterogeneity, the "Scottish government performance premium" had a significant positive impact on the odds of holding a 'Yes' position as opposed to a 'No' position. Similarly, Table D2.2 shows that a higher "Scottish government performance premium" also significantly increased the odds of holding a 'Yes' position as opposed to a 'Don't Know' position, whilst Table D2.3 reveals that a higher "Scottish government performance premium" also significantly increased the odds of holding a 'Don't Know' position as opposed to a 'No' position.

Tables D2.1-D2.3: Fixed Effects Logit Regression Models estimating the impact of "Scottish government performance premium"

Table D2.1:

Panel Logistic Regression of Scottish indyref vote intention (Yes = 1 vs No = 0) on voters' Scottish govt performance premium with individual fixed-effects

	FE Model 1	FE Model 2
Scottish govt performance premium	1.076*** (0.111)	1.043*** (0.114)
Scottishness		0.163 (0.144)
Personal financial evaluations		-0.365** (0.147)
Num. obs.	1482	1427
Num. groups: Combined_BES_Waves_Scot.id	322	311
Deviance	1403.888	1338.606
Log Likelihood	-701.944	-669.303
Pseudo R ²	0.003	0.006

***p < 0.01; **p < 0.05; *p < 0.1; ·p < 0.15. [Standard errors clustered at the individual level]

Table D2.2:

Panel Logistic Regression of Scottish indyref vote intention (Yes = 1 vs DK = 0) on voters' Scottish govt performance premium with individual fixed-effects

	FE Model 1	FE Model 2
Scottish govt performance premium	0.877*** (0.130)	0.881*** (0.141)
Scottishness		0.200 (0.166)
Personal financial evaluations		-0.143 (0.161)
Num. obs.	1266	1141
Num. groups: Combined_BES_Waves_Scot.id	312	282
Deviance	1409.806	1262.268
Log Likelihood	-704.903	-631.134
Pseudo R ²	-0.172	-0.172

***p < 0.01; **p < 0.05; *p < 0.1; ·p < 0.15. [Standard errors clustered at the individual level]

Table D2.3:

Panel Logistic Regression of Scottish indyref vote intention (DK = 1 vs No = 0) on voters' Scottish govt performance premium with individual fixed-effects

	FE Model 1	FE Model 2
Scottish govt performance premium	1.022*** (0.135)	1.109*** (0.138)
Scottishness		-0.020 (0.133)
Personal financial evaluations		-0.210 (0.161)
Num. obs.	1273	1143
Num. groups: Combined_BES_Waves_Scot.id	308	281
Deviance	1377.317	1214.469
Log Likelihood	-688.658	-607.234
Pseudo R ²	-0.147	-0.143

***p < 0.01; **p < 0.05; *p < 0.1; ·p < 0.15. [Standard errors clustered at the individual level]

D3: The association between *relative* UK versus Scottish government competence evaluations and independence attitudes – Covid-19 case study

This section reports the results of three multinomial logit change-on-change models investigating the impact of *relative* government competence evaluations on independence attitudes in the context of the Covid-19 pandemic. Firstly, Table D3.1 shows the impact of voters' *relative* assessments of each government's handling of Covid lockdowns. This shows that a unit increase in the "Scottish government competence premium" significantly decreased the odds of switching from 'Don't Know' to 'No' and significantly increased the odds of switching from 'No' to 'Don't Know' from wave 20 to wave 21. Secondly, Table D3.2 reveals the impact of voters' *relative* assessments of each governments' handling of PPE provision for health workers. This shows that a unit increase in the "Scottish government competence premium" significantly decreased the odds of switching from 'Don't Know' to 'No'. Lastly, Table D3.3 shows the results of the same analysis but instead focuses on voters' *relative* assessments of each government's handling of mass coronavirus testing. This tells a very similar story. Specifically, it shows that a unit increase in the "Scottish government competence premium" significantly decreased the odds of switching from 'Don't Know' to 'No' and from 'Yes' to 'Don't Know'. Hence, the results of these three models demonstrate that *relative* government competence assessments really mattered, in line with H5.

Tables D3.1 – D3.3: Multinomial Logit Change-on-Change Models estimating the impact of "Scottish government competence evaluations" – Covid case study

	Change in Scottish independence referendum vote intention					
	DON'T KNOW- NO	DON'T KNOW- YES	NO- DON'T KNOW	NO- YES	YES-DON'T KNOW	YES-NO
Change in Scottish govt competence premium: handling lockdown	-0.245*	0.173	0.342*	0.077	0.071	0.066
	(0.131)	(0.184)	(0.194)	(0.154)	(0.145)	(0.120)
Change in Scottishness	-0.198	0.411*	0.139	0.142	-0.366*	0.164
	(0.222)	(0.216)	(0.272)	(0.235)	(0.200)	(0.183)
Change in personal financial situation evaluations	0.114	0.393	0.063	-0.209	0.243	-0.347*
	(0.229)	(0.260)	(0.296)	(0.248)	(0.232)	(0.194)
Constant	-3.410***	-3.823***	-3.718***	-	-3.345***	-2.796***
	(0.246)	(0.296)	(0.276)	3.302***	(0.236)	(0.176)
Observations	756					

Note:

*p<0.1; **p<0.05; ***p<0.01
NO CHANGE = reference

Table D3.2:

	Change in Scottish independence referendum vote intention					
	DON'T KNOW- NO	DON'T KNOW- YES	NO- DON'T KNOW	NO-YES	YES-DON'T KNOW	YES-NO
Change in Scottish govt competence premium – handling PPE	-0.394** (0.168)	-0.189 (0.221)	0.322 (0.243)	0.124 (0.182)	-0.182 (0.179)	-0.205 (0.149)
Change in Scottishness	-0.252 (0.222)	0.379 (0.237)	0.359 (0.275)	0.132 (0.245)	-0.434** (0.205)	0.100 (0.204)
Change in personal financial situation evaluations	-0.013 (0.251)	0.455* (0.274)	0.185 (0.333)	-0.116 (0.256)	0.320 (0.248)	-0.257 (0.213)
Constant	-3.402*** (0.252)	-3.970*** (0.334)	-4.072*** (0.346)	-3.277*** (0.226)	-3.479*** (0.262)	-2.929*** (0.195)
Observations	676					
<i>Note:</i>					*p<0.1; **p<0.05; ***p<0.01 NO CHANGE = reference	

Table D3.3

	Change in Scottish independence referendum vote intention					
	DON'T KNOW-NO	DON'T KNOW-YES	NO-DON'T KNOW	NO- YES	YES- DON'T KNOW	YES- NO
Change in Scottish govt competence premium – handling Testing	-0.250* (0.151)	0.057 (0.197)	0.180 (0.207)	0.169 (0.163)	-0.373** (0.154)	-0.027 (0.131)
Change in Scottishness	-0.130 (0.226)	0.394* (0.236)	0.172 (0.295)	0.147 (0.238)	-0.393** (0.200)	-0.011 (0.198)
Change in personal financial situation evaluations	0.158 (0.232)	0.506* (0.263)	0.091 (0.305)	-0.133 (0.246)	0.226 (0.243)	-0.348* (0.199)
Constant	-3.374*** (0.250)	-3.891*** (0.317)	-3.714*** (0.282)	-3.187*** (0.216)	-3.656*** (0.288)	-2.783*** (0.181)
Observations	714					
<i>Note:</i>					*p<0.1; **p<0.05; ***p<0.01 NO CHANGE = reference	

D4: Multinomial Change-on-Change model estimating the impact of voters' "EU performance premium"

This section reports the full regression table complementing the summary results presented in Table 8. This includes all control variables.

Table D4: Multinomial Change-on-Change model estimating the impact of "EU performance premium"

Multinomial Logit Model of Change in indyref vote intention on Change in relative UK govt vs EU performance evaluations (wave 7 - wave 10)

	Change in Scottish independence referendum vote intention					
	DON'T KNOW-NO	DON'T KNOW-YES	NO-DON'T KNOW	NO-YES	YES-DON'T KNOW	YES-NO
	(1)	(2)	(3)	(4)	(5)	(6)
Change in EU approval premium [EU approval - UK govt approval]	-0.028 (0.191)	0.262 (0.226)	0.335** (0.166)	0.115 (0.167)	-0.234 (0.175)	-0.351** (0.142)
Change in Scottishness	-0.213 (0.226)	0.123 (0.295)	-0.438** (0.190)	0.220 (0.202)	-0.063 (0.231)	-0.189 (0.176)
Change in personal financial situation evaluations	-0.542* (0.281)	0.149 (0.347)	0.169 (0.250)	-0.177 (0.255)	0.494** (0.238)	0.349* (0.202)
Constant	-3.824*** (0.248)	-4.128*** (0.279)	-3.463*** (0.206)	-3.489*** (0.205)	-3.582*** (0.219)	-3.189*** (0.183)
Akaike Inf. Crit.	1,430.376	1,430.376	1,430.376	1,430.376	1,430.376	1,430.376
Observations	998					

Note:

*p<0.1; **p<0.05; ***p<0.01
NO CHANGE = reference

Section E: Online Survey Experiment

E1: Survey Experiment Sample

To achieve a representative sample of Scottish residents aged 16+ for the November 2022 Scottish Opinion Monitor (SCOOP), YouGov engaged in a process of “Targeted Quota Sampling”/ “Active Sampling”. This involves setting sampling ‘quotas’ for a range of sub-groups based on a set of socio-demographic and political characteristics and then randomly selecting units from each sub-group until the quota is met. In addition, once the survey is complete, the final data are then statistically weighted to further make sure that the final sample is representative. According to YouGov, their ‘quotas’ are derived from: the census, large scale random probability surveys, such as the Labour Force Survey, the National Readership survey and the British Election Study, national and regional election results as well as official ONS population estimates (YouGov, 2023).

Specifically, the socio-demographic and political characteristics used by YouGov to create the November 2022 SCOOP sample are the following:

Age
Gender
Education (highest qualification)
Social Grade
Region
Birthplace
Attention to politics
2014 Independence Referendum vote choice
2019 General Election vote choice

E2: Survey Experiment Question Wordings and Response Options

CONTROL:

How happy or unhappy would you be if Scotland voted to become an independent country?

0 – Very unhappy

1

2

3

4

5

6

7

8

9

10 – Very happy

Don't know

PLACEBO:

There are many important issues in the debate about Scottish independence. One concerns its potential impact on the Scottish economy. Suppose that, in the five years following independence, there was **no change** in average incomes in Scotland and also **no change** in average incomes in the rest of the UK.

How happy or unhappy would you be if Scotland voted to become an independent country?

0 – Very unhappy

1

2

3

4

5

6

7

8

9

10 – Very happy

Don't know

The previous question suggested that, in the five years following independence, there would be no change in average incomes in Scotland and also no change in average incomes in the rest of the UK.

Leaving aside whether you personally support or oppose independence, and thinking about the comparison between Scotland and the rest of the UK...

Do you think Scotland would do better or worse than this (compared to the rest of the UK), or is the description about right?

Much better than this

A little better than this

About right
A little worse than this
Much worse than this
Don't know

TREATMENT ARM 1:

There are many important issues in the debate about Scottish independence. One concerns its potential impact on the Scottish economy. Suppose that, in the five years following independence, there was **no change** in average incomes in Scotland but an **increase of 10%** in average incomes in the rest of the UK.

How happy or unhappy would you be if Scotland voted to become an independent country?

0 – Very unhappy

1

2

3

4

5

6

7

8

9

10 – Very happy

Don't know

The previous question suggested that, in the five years following independence, there would be no change in average incomes in Scotland but an increase of 10% in average incomes in the rest of the UK.

Leaving aside whether you personally support or oppose independence, and thinking about the comparison between Scotland and the rest of the UK...

Do you think Scotland would do better or worse than this (compared to the rest of the UK), or is the description about right?

Much better than this

A little better than this

About right

A little worse than this

Much worse than this

Don't know

TREATMENT ARM 2:

There are many important issues in the debate about Scottish independence. One concerns its potential impact on the Scottish economy. Suppose that, in the five years following independence, there was an **increase of 10%** in average incomes in Scotland but **no change** in average incomes in the rest of the UK.

How happy or unhappy would you be if Scotland voted to become an independent country?

0 – Very unhappy

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 – Very happy
- Don't know

The previous question suggested that, in the five years following independence, there would be an increase of 10% in average incomes in Scotland but no change in average incomes in the rest of the UK.

Leaving aside whether you personally support or oppose independence, and thinking about the comparison between Scotland and the rest of the UK...

Do you think Scotland would do better or worse than this (compared to the rest of the UK), or is the description about right?

- Much better than this
- A little better than this
- About right
- A little worse than this
- Much worse than this
- Don't know

TREATMENT ARM 3:

There are many important issues in the debate about Scottish independence. One concerns its potential impact on the Scottish economy. Suppose that, in the five years following independence, there was an **increase of 10%** in average incomes in Scotland and also an **increase of 10%** in average incomes in the rest of the UK.

How happy or unhappy would you be if Scotland voted to become an independent country?

- 0 – Very unhappy
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 – Very happy
- Don't know

The previous question suggested that, in the five years following independence, there would be an increase of 10% in average incomes in Scotland and also an increase of 10% in average incomes in the rest of the UK.

Leaving aside whether you personally support or oppose independence, and thinking about the comparison between Scotland and the rest of the UK...

Do you think Scotland would do better or worse than this (compared to the rest of the UK), or is the description about right?

Much better than this

A little better than this

About right

A little worse than this

Much worse than this

Don't know

E3: Survey Experiment Power Analysis

General Formula for necessary Sample Size in each sub-group:

$$N_1 \geq \{[(\sigma_1^2 + \sigma_2^2/K)(Z_{1-\alpha} + Z_{1-\beta})^2]/\Delta^2 \}$$

Δ = absolute difference between two means

σ_1, σ_2 = sd of group 1 and 2

n_1, n_2 = sample size for group 1 and group 2

α = probability of type I error

β = probability of type II error

Z = critical Z value for a given α or β

K = ratio of sample size for group 2 to group 1

Estimated Parameters:

$\Delta = 0.8$

$\sigma_1, \sigma_2 = 3.5$

$\alpha = 0.05$

$\beta = 0.8$

$K = 1$

$$N_1 \geq \{[(3.5^2 + 3.5^2/1)(1.644854+0.8416212)^2]/0.8^2 \} \\ = 236.676 \text{ (3dp)}$$

E4: Survey Experiment Pilot Study

A pilot study was carried out in October 2022 to ascertain whether Scottish voters find a *10% rise* in average incomes in both Scotland and the rest of the UK (in the five years following independence) more or less plausible than a *10% fall* in average incomes. Specifically, a convenience sample of 794 Scottish respondents was split into two groups: group 1 (N = 398) were asked how plausible they thought the “both rising” condition was on a 1-10 scale whereas group 2 (N = 396) were asked the same question about the “both falling” condition. The descriptive statistics from this pilot study are shown below. This shows the mean plausibility for both scenarios along with measures of spread for the data. It reveals that, on average, the “both rising” scenario was seen as more plausible than the “both falling” scenario.

Default Report							
Last Modified: 2022-10-07 16:30:55 GMT							
Q4a - Both rising							
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How plausible?	1	10	5.11	2.76	7.64	398
Default Report							
Last Modified: 2022-10-07 16:32:04 GMT							
Q4b - Both falling							
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How plausible?	1	10	4.84	2.54	6.45	396

Table E5: Survey Experiment Balance Test 1 [Multinomial Logit Model]

	Treatment Group 1	Treatment Group 2	Treatment Group 3	Control
Age	-0.003 (0.008)	-0.009 (0.008)	0.002 (0.008)	-0.004 (0.007)
Gender (female)	-0.180 (0.225)	0.005 (0.229)	0.166 (0.236)	-0.017 (0.222)
Personal income: linear	-0.042 (0.037)	-0.092** (0.039)	-0.061 (0.039)	-0.020 (0.036)
Education level: below GCSE	-0.469 (0.794)	-0.568 (0.862)	-1.310 (0.941)	-0.033 (0.743)
Education level: GCSE or equivalent	-0.405 (0.492)	-0.209 (0.526)	-0.548 (0.500)	0.100 (0.484)
Education level: A-levels or equivalent	0.124 (0.470)	0.335 (0.505)	-0.360 (0.484)	-0.179 (0.483)
Education level: undergraduate or equivalent	-0.557 (0.460)	-0.059 (0.491)	-0.476 (0.463)	-0.226 (0.461)
Education level: postgraduate or equivalent	-0.116 (0.579)	0.515 (0.601)	0.266 (0.570)	0.242 (0.570)
Party identity: Cons	-0.244 (0.437)	0.177 (0.403)	0.355 (0.420)	0.137 (0.395)
Party identity: Lab	0.654* (0.373)	0.395 (0.396)	0.542 (0.415)	0.790** (0.366)
Party identity: LD	0.056 (0.643)	0.724 (0.587)	0.795 (0.607)	0.388 (0.595)
Party identity: SNP	0.432 (0.305)	0.796** (0.318)	0.878*** (0.324)	0.431 (0.308)
Party identity: Greens	1.054* (0.587)	0.308 (0.714)	1.276** (0.603)	1.036* (0.593)
Party identity: Other	0.037 (1.031)	0.553 (0.956)	0.601 (1.036)	0.072 (1.029)
Brexit identity - Leaver	0.012 (0.361)	0.113 (0.372)	-0.078 (0.380)	0.231 (0.337)
Brexit identity - Remainer	0.143 (0.314)	-0.233 (0.336)	-0.156 (0.338)	-0.003 (0.295)
Brexit identity - neither	0.112 (0.358)	0.228 (0.369)	0.051 (0.376)	0.385 (0.329)
2014 independence referendum vote choice - Yes	0.281 (0.818)	0.269 (0.919)	0.138 (0.921)	-0.602 (0.708)
2014 independence referendum vote choice - No	0.447 (0.812)	0.937 (0.909)	0.471 (0.915)	-0.373 (0.698)
2014 independence referendum vote choice - did not vote	0.230 (0.825)	0.321 (0.924)	0.563 (0.923)	-0.537 (0.715)
Scottish identity	-0.019 (0.036)	-0.015 (0.036)	-0.029 (0.036)	-0.020 (0.035)
Post UK Supreme Court Ruling	0.238 (0.242)	-0.022 (0.240)	-0.120 (0.242)	0.184 (0.235)
Constant	0.267 (0.844)	0.109 (0.907)	-0.182 (0.908)	0.613 (0.780)
Akaike Inf. Crit.	2,927.641	2,927.641	2,927.641	2,927.641
Observations	879			

Note:

*p<0.1; **p<0.05; ***p<0.01
Reference Group = Placebo Group

The results of this balance test reveal that treatment group 2 was systematically poorer than the other 4 sub-groups. In fact, a 1-unit increase in the “personal income” variable²⁴ was associated with an 8.79% decrease in the odds of receiving treatment 2 as opposed to the placebo and this result was highly significant at the 0.05 level. This imbalance is a potentially important finding as it could undermine the idea that treatment 2 had a positive effect on independence attitudes if those receiving it were systematically poorer and hence more likely to support independence anyway (McLean & Thomson, 2014).

Moreover, it also shows that the sub-groups had a different partisan split – i.e., there was a greater concentration of some particular party supporters in some of the sub-groups. Specifically, there were systematically more Labour supporters in treatment group 1 and the control group than in the other 3 sub-groups. As such, it could be argued that any negative effect associated with treatment 1 is due to the fact that more Labour supporters (who are ultimately unionists) received this treatment and not due to the treatment itself. More importantly, Table E5 also reveals that there were systematically more SNP supporters in treatment group 2 and treatment group 3 than in the other 3 sub-groups. In fact, being an SNP partisan increased the odds of being in these treatment groups (as opposed to the placebo group) by 121.7% and 140.6% respectively. And so, it could also be argued that any positive effect associated with treatment 2 is due to the presence of more Yes-supporting SNP partisans in treatment group 2 and not a result of the treatment. Lastly, Table E5 also reveals that supporters of the Scottish Greens (a pro-independence party) were over-represented in treatment group 1, treatment group 3 and the control group compared with the other 2 sub-groups. Although we do not know for certain the extent to which this cancelled out or exacerbated the imbalances already described, one would expect the presence of more Green Party supporters to drag up the average independence happiness score in treatment group 1, in opposition to my treatment 1 which is expected to reduce independence support. Nevertheless, although perfect randomisation was not achieved for the reasons outlined, I conclude, based on the balance test results, that the five experimental sub-groups were largely balanced²⁵.

²⁴ Operationalised in annual income brackets – See Table E11 for details

²⁵ Note that the number of observations in Table E5 is only 879 (out of a possible 1210 respondents). This is primarily because a large number of observations were lost when dropping the “Don’t know” and “Prefer not to say” responses to the personal income variable for simplicity. To account for this, Table E6 presents a more detailed balance test with 1109 observations in which the personal income variable is defined as a categorical variable with “Don’t Know” and “Prefer not to say” responses included. The main conclusions are the same, however, across both tables.

Table E6: Survey Experiment Balance Test 2 [Multinomial Logit Model]

	Treatment group (1-5)			
	2 (1)	3 (2)	4 (3)	5 (4)
Age	-0.005 (0.007)	-0.013** (0.007)	-0.004 (0.007)	-0.006 (0.007)
Gender (female)	-0.181 (0.201)	-0.035 (0.202)	-0.013 (0.210)	-0.036 (0.199)
Personal income - under 5k	0.798* (0.462)	1.390*** (0.463)	0.778* (0.471)	1.162** (0.466)
Personal income - 5k-10k	-0.148 (0.341)	0.928*** (0.314)	0.336 (0.320)	0.665** (0.316)
Personal income - 10k-15k	-0.020 (0.298)	0.526* (0.302)	-0.064 (0.310)	0.424 (0.295)
Personal income - 15k-20k	0.111 (0.368)	0.607 (0.376)	0.254 (0.368)	0.753** (0.348)
Personal income - 20k-25k	0.487* (0.293)	0.807*** (0.302)	0.100 (0.320)	0.441 (0.315)
Personal income - 25k-30k	-0.264 (0.324)	0.361 (0.319)	-0.372 (0.341)	0.159 (0.320)
Personal income - 30k-35k	-0.360 (0.490)	0.482 (0.460)	0.409 (0.442)	0.927** (0.413)
Personal income - 35k-40k	0.031 (0.416)	0.331 (0.443)	-0.721 (0.526)	0.414 (0.420)
Personal income - 40k-45k	0.269 (0.475)	0.122 (0.560)	-0.121 (0.517)	1.290*** (0.429)
Personal income - 45k-50k	0.707 (0.619)	-0.747 (1.063)	0.538 (0.636)	-0.896 (1.062)
Personal income - 50k-60k	-0.209 (0.504)	-0.256 (0.591)	-1.040 (0.652)	0.226 (0.501)
Personal income - 60k-70k	-0.913 (1.101)	1.248* (0.691)	0.422 (0.749)	0.518 (0.787)
Personal income - 70k-100k	-0.013 (0.958)	1.266 (0.833)	0.470 (0.882)	1.802** (0.773)
Personal income - over 100k	-1.122 (0.802)	-9.702*** (0.0001)	-0.939 (0.799)	-9.670*** (0.0001)
Personal income - don't know	1.008* (0.526)	1.634*** (0.524)	0.708 (0.555)	1.249** (0.534)
Personal income - prefer not to say	-0.257 (0.274)	0.626** (0.260)	-0.070 (0.270)	0.362 (0.263)
Education level: below GCSE	-0.732 (0.724)	-0.228 (0.675)	-1.062 (0.784)	-0.180 (0.674)
Education level: GCSE or equivalent	-0.325	-0.271	-0.528	0.266

	(0.417)	(0.436)	(0.433)	(0.426)
Education level: A-levels or equivalent	-0.109 (0.396)	0.065 (0.413)	-0.364 (0.411)	-0.113 (0.422)
Education level: undergraduate or equivalent	-0.606 (0.385)	-0.223 (0.398)	-0.425 (0.389)	-0.018 (0.400)
Education level: postgraduate or equivalent	-0.209 (0.494)	0.240 (0.502)	0.195 (0.489)	0.263 (0.501)
Party identity: Cons	0.063 (0.390)	0.519 (0.360)	0.681* (0.384)	0.515 (0.364)
Party identity: Lab	0.475 (0.325)	0.290 (0.343)	0.194 (0.378)	0.726** (0.321)
Party identity: LD	-0.120 (0.627)	0.568 (0.566)	0.817 (0.587)	0.567 (0.564)
Party identity: SNP	0.121 (0.274)	0.544* (0.280)	0.669** (0.288)	0.365 (0.278)
Party identity: Grns	0.735 (0.548)	0.137 (0.650)	1.087* (0.558)	0.706 (0.558)
Party identity: Oth	-0.022 (1.034)	0.904 (0.899)	0.551 (1.029)	0.842 (0.899)
Brexit identity - Leaver	0.033 (0.302)	-0.019 (0.301)	0.182 (0.303)	0.011 (0.290)
Brexit identity - Remainer	0.008 (0.257)	-0.331 (0.266)	0.064 (0.260)	-0.245 (0.251)
Brexit identity - neither	0.064 (0.283)	-0.026 (0.286)	0.440 (0.279)	0.060 (0.268)
2014 independence referendum vote choice - Yes	0.649 (0.644)	0.585 (0.686)	-0.190 (0.605)	-0.121 (0.583)
2014 independence referendum vote choice - No	0.431 (0.636)	0.871 (0.675)	-0.329 (0.597)	-0.183 (0.571)
2014 independence referendum vote choice - did not vote	0.334 (0.650)	0.378 (0.691)	-0.198 (0.609)	-0.170 (0.588)
Scottish identity	-0.001 (0.033)	-0.018 (0.032)	-0.051 (0.033)	-0.012 (0.031)
Post UK Supreme Court Ruling	0.168 (0.219)	-0.063 (0.215)	-0.262 (0.217)	0.095 (0.214)
Constant	0.104 (0.662)	-0.376 (0.682)	0.686 (0.648)	-0.174 (0.635)
Akaike Inf. Crit.	3,708.676	3,708.676	3,708.676	3,708.676
Observations	1109			
<i>Note:</i> *p<0.1; **p<0.05; ***p<0.01 Reference Group = Treatment Group 1 (Placebo)				

Figure E7: Histograms of Raw Experimental Results by sub-group

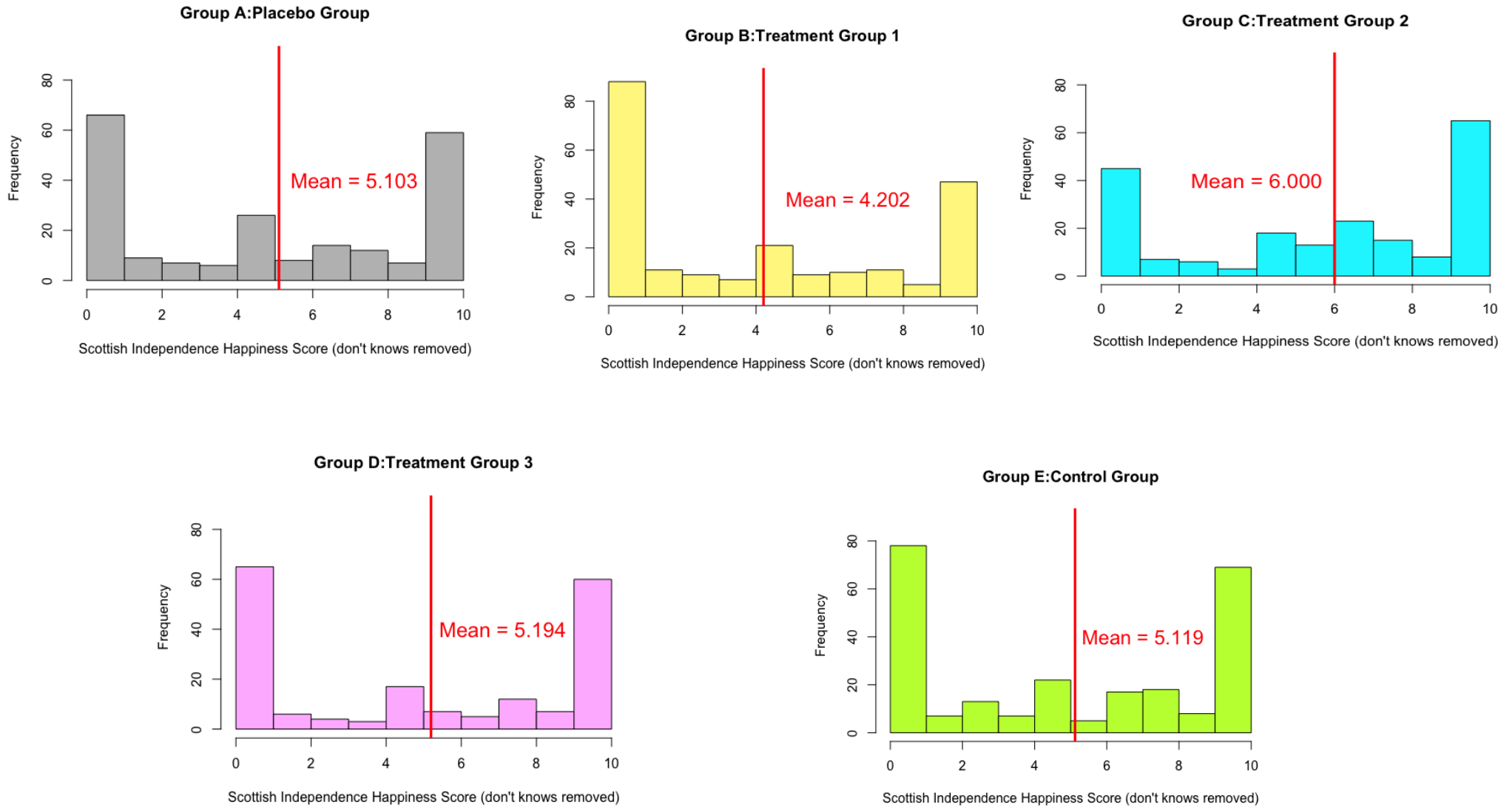


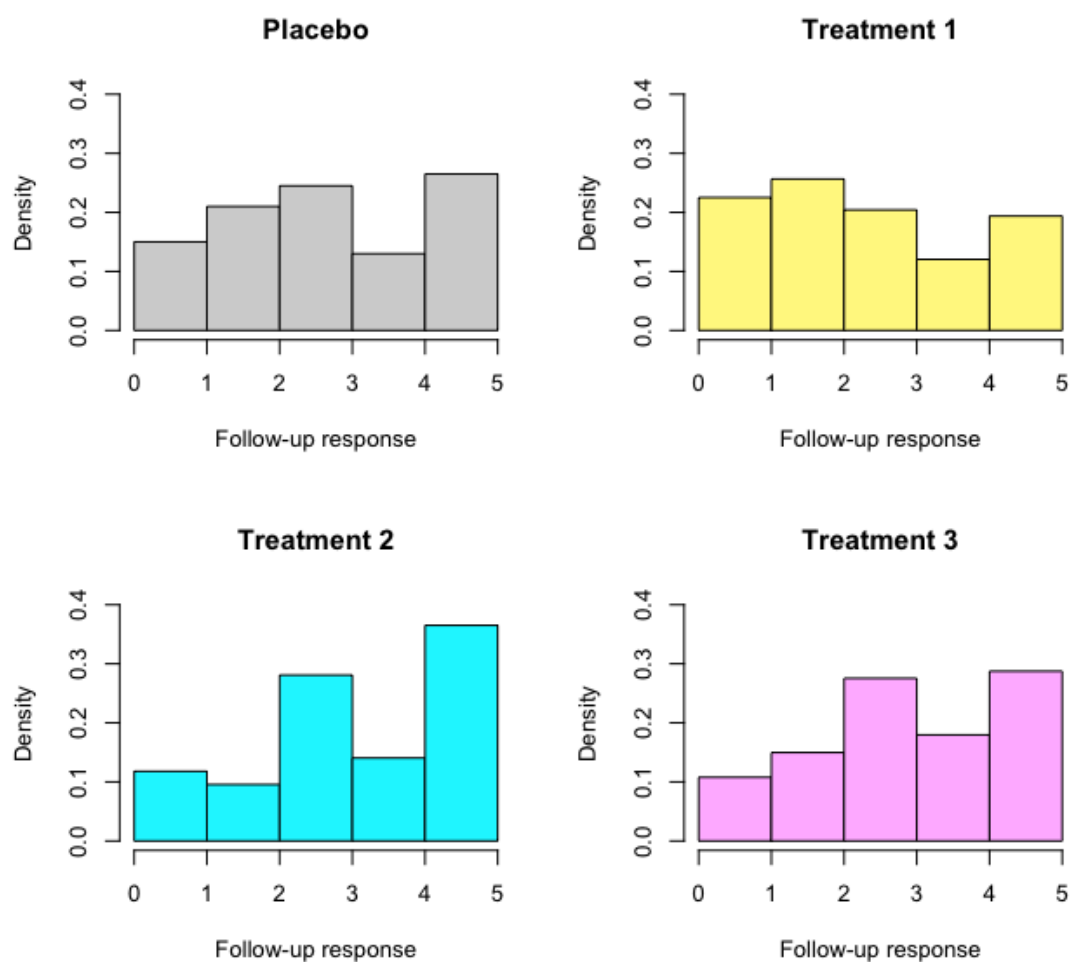
Table E8: Full Experimental Results: OLS Regression of Happiness Score on treatment condition

	Happiness score (1-11) if Scotland voted to become independent (without DKs)
	Independence happiness score
Treatment 1	-1.251*** (0.341)
Treatment 2	0.634* (0.353)
Treatment 3	-0.271 (0.356)
Control	-0.250 (0.333)
Personal Income: linear	-0.029 (0.035)
Party identity: Cons	-3.191*** (0.375)
Party identity: Lab	-1.127*** (0.358)
Party identity: LD	-1.144* (0.591)
Party identity: SNP	4.227*** (0.268)
Party identity: Greens	3.997*** (0.533)
Party identity: Other	-1.273 (1.054)
Constant	4.664*** (0.342)
Observations	816
R ²	0.433
Adjusted R ²	0.425
Residual Std. Error	3.104 (df = 804)
F Statistic	55.812*** (df = 11; 804)

Note:

*p<0.1; **p<0.05; ***p<0.01

Figure E9: Histograms of Follow-up question response by sub-group [that received it]



	Follow-up question response:
1	<i>Much better than this</i>
2	<i>A little better than this</i>
3	<i>About right</i>
4	<i>A little worse than this</i>
5	<i>Much worse than this</i>
6	<i>Don't Know</i>

E10: Predicting Follow-up question response

This section reports the results of a multinomial logistic regression model predicting respondents' responses to my experiment's follow-up question. It shows that, compared to selecting "Don't Know" (the reference category in this regression model), 2014 "Yes" voters were significantly more likely to select "Much better than this" or "A little better than this" whatever treatment they received whilst they were significantly less likely to select "A little worse than this" or "Much worse than this". Moreover, Table E10 also reveals that *uncertain* and *unattached* voters were significantly less likely to select "Much better than this", "A little worse than this" or "Much worse than this" than "Don't Know", "A little better than this" or "About right". Hence, *uncertain* and *unattached* voters were significantly more likely to be *believers* or soft *non-believers* than their *certain* and *attached* counterparts. Details of all SES variables used in this regression model can be found in Table E11.

Table E10: Multinomial Logit model of Follow-up Q response

	Follow-up Question response				
	1: Much better than this	2: A little better than this	3: About right	4: A little worse than this	5: Much worse than this
	(1)	(2)	(3)	(4)	(5)
Personal income	0.063 (0.055)	0.090* (0.050)	0.041 (0.049)	0.103* (0.055)	0.110** (0.048)
2014 indyref vote choice = Yes	2.013*** (0.459)	0.743** (0.318)	0.292 (0.292)	-1.304*** (0.385)	-2.202*** (0.369)
Scottishness	0.169** (0.073)	0.120** (0.056)	0.087* (0.048)	-0.004 (0.049)	0.001 (0.042)
<i>Uncertain</i> about independence	-2.104* (1.080)	-0.327 (0.508)	-0.382 (0.484)	-1.810* (1.073)	-1.753** (0.820)
<i>Unattached</i> to Yes/No side	-1.021* (0.541)	0.158 (0.353)	0.050 (0.330)	-0.772* (0.427)	-1.288*** (0.381)
Constant	-3.472*** (0.845)	-2.124*** (0.622)	-1.027* (0.532)	-0.257 (0.530)	0.598 (0.457)
Akaike Inf. Crit.	1,776.717	1,776.717	1,776.717	1,776.717	1,776.717

Note:

*p<0.1; **p<0.05; ***p<0.01
Reference Category = Don't Know

Table E11: Details of variables and coding of SES survey data

Measure	Question(s)	BES coding	Recodes (BES coding in brackets, where different) e.g. 1/5 = 1, 2, 3, 4, 5
<i>Dependent variable</i>			
Scottish independence attitudes (Happiness score if Scotland voted for independence)	*Randomised prompt*. How happy or unhappy would you be if Scotland voted to become an independent country? <i>bristonDV</i>	1 Very unhappy 2 3 4 5 6 7 8 9 10 11 Very happy 999 Don't know	Don't knows dropped
<i>Independent variable</i>			
Treatment condition (Outcome of simple random sampling) <i>bristonSplit</i>	N/A	1 Placebo 2 Treatment Arm 1 3 Treatment Arm 2 4 Treatment Arm 3 5 Control	N/A
Treatment 1 (dummy)	Newly created variable	N/A	1: if <i>bristonSplit</i> = 2 0: otherwise
Treatment 2 (dummy)	Newly created variable	N/A	1: if <i>bristonSplit</i> = 3 0: otherwise
Treatment 3 (dummy)	Newly created variable	N/A	1: if <i>bristonSplit</i> = 4 0: otherwise

Control (dummy)	Newly created variable	N/A	1: if <i>bristolSplit</i> = 5 0: otherwise
<i>Covariates</i>			
Age	What is your age in years? <i>age</i>	Age in years	N/A
Gender	Are you...? <i>gender</i>	1. Male 2. Female	N/A
Personal Income	What is your personal gross annual income? <i>incomePersonal</i>	1 under £5,000 per year 2 £5,000 to £9,999 per year 3 £10,000 to £14,999 per year 4 £15,000 to £19,999 per year 5 £20,000 to £24,999 per year 6 £25,000 to £29,999 per year 7 £30,000 to £34,999 per year 8 £35,000 to £39,999 per year 9 £40,000 to £44,999 per year 10 £45,000 to £49,999 per year 11 £50,000 to £59,999 per year 12 £60,000 to £69,999 per year 13 £70,000 to £99,999 per year 14 £100,000 and over 15 Don't know 16 Prefer not to answer	Don't knows dropped Prefer not to answers dropped

Education level	What is the highest educational or work-related qualification you have? <i>educationLevel</i>	1 No formal qualifications 2 Youth training certificate/skillseekers 3 Recognised trade apprenticeship completed 4 Clerical and commercial 5 City & Guilds certificate 6 City & Guilds certificate - advanced 7 ONC 8 CSE grades 2-5 9 CSE grade 1, GCE O level, GCSE, School Certificate 10 Scottish Ordinary/ Lower Certificate 11 GCE A level or Higher Certificate 12 Scottish Higher Certificate 13 Nursing qualification (e.g. SEN, SRN, SCM, RGN) 14 Teaching qualification (not degree) 15 University diploma 16 University or CNAA first degree (e.g. BA, B.Sc, B.Ed) 17 University or CNAA higher degree (e.g. M.Sc, Ph.D) 18 Other technical, professional or higher qualification 19 Don't know	(Categorical variable) No qualifications (1) Below GCSE (or equivalent) (2, 4, 8) GCSE (or equivalent) (3, 5, 9, 10) A-Level (or equivalent) (6, 7, 11, 12, 18) Undergraduate (or equivalent) (13/16, 18) Postgraduate (or equivalent) (17) Don't knows dropped Prefer not to says dropped
-----------------	---	--	---

		20 Prefer not to say	
Vote choice in 2014 independence referendum	Thinking about the referendum on Scottish independence in September 2014, did you vote “Yes”, “No” or did you not vote? <i>voteChoiceIndyref14</i>	1 I voted “Yes” 2 I voted “No” 3 Did not vote 4 Can’t remember	0 I voted “No” 1 I voted “Yes” Did not votes dropped Can’t remembers dropped
Strength of Scottish identity	How strongly do you feel “Scottish”? <i>rtiScottish</i>	1 Not at all 2 3 4 5 6 7 8 9 10 11 Very strongly 12 Don’t know	Don’t knows dropped
Party Identity	Some people think of themselves as usually being a supporter of one political party. Do you think of yourself as a supporter of one political party, and if so, which one? <i>partyID</i>	0 No, I do not 1 Scottish Conservative and Unionist 2 Scottish Labour 3 Scottish Liberal Democrats 4 Scottish National Party 5 Scottish Greens 6 Other	N/A
Brexit Identity	Following the EU referendum, some people began to think of themselves as belonging to one side of the debate. Do you think of yourself as a Leaver, a Remainer or as neither? <i>brexitID</i>	1 A Leaver 2 A Remainer 3 Neither	Neithers dropped 0 A Remainer 1 A Leaver
Post UK Supreme Court Ruling (dummy)	Newly created variable	N/A	0: if start-time was before 9.45am on 23 rd November 2022 1: if start-time was after 9.45am on 23 rd November 2022

Follow-up question	The previous question suggested that, in the five years following independence, there would be X change in average incomes in Scotland and Y change in average incomes in the rest of the UK. Leaving aside whether you personally support or oppose independence, and thinking about the comparison between Scotland and the rest of the UK... Do you think Scotland would do better or worse than this (compared to the rest of the UK), or is the description about right? (X and Y determined by treatment condition) <i>benchmarkCheck</i>	1 Much better than this 2 A little better than this 3 About right 4 A little worse than this 5 Much worse than this 9999 Don't know	N/A
Follow-up question “about right” <u>believer</u> <u>dummy</u>	Newly created variable <i>believer</i>	N/A	1: if <i>benchmarkCheck</i> = 3 0: otherwise
Independence identity	Following the first Scottish independence referendum in 2014, some people began to think of themselves as belonging to the Yes or No side. Do you think of yourself as belonging to the Yes side, the No side, or neither? <i>indyID</i>	1 Belonging to the Yes side 2 Belonging to the No side 3 Neither	N/A
Independence identity – <u>Unattached dummy</u>	Newly created variable	N/A	1: if <i>indyID</i> = 3 0: otherwise
Independence vote intention	If there was a referendum tomorrow on Scotland's future and this was the question: Should Scotland be an independent country? How would you respond? <i>voteIntentionIndy</i>	1 Yes 2 No 3 Would not vote 4 Don't Know	N/A
Independence vote intention – <u>Uncertain</u> <u>dummy</u>	Newly created variable	N/A	1: if <i>voteIntentionIndy</i> = 4 0: otherwise

Independence attitude scale	Thinking now about Scotland's constitutional status and a possible second referendum on independence, where would you place yourself on the following scale? <i>indyScale</i>	1 Definitely vote No to independence 2 3 4 5 6 7 8 9 10 11 Definitely vote Yes to independence 999 Don't Know	N/A
Independence attitude scale – Don't Know (dummy)	Newly created variable	N/A	1: if <i>indyScale</i> = 999 0: otherwise