Socio-economic inequality in the early career:

the role of family and community

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Abstract

In this thesis I study how socio-economic background – seen as the socio-economic conditions while growing up and the resources someone has access to – affects the labour market outcomes of young adults. Through three distinct chapters I show that young adults from a disadvantaged background are substantially less likely to be employed and when employed tend to find worse jobs than their more advantaged peers, even when keeping education constant.

I first discuss how being out of work is transmitted over generations in the UK. Children whose father did not work are substantially less likely to be employed themselves and tend to work fewer hours, but are no different in earnings or contract. I show how this may be partly due to differences in how work is experienced. A disadvantaged background does not always pose the same limits to labour market opportunity. I show that in Germany background does not negatively affect labour market outcomes during good economic times, but becomes more important as labour market conditions worsen. In the final chapter I study ethnic penalties in the labour market. Ethnic minorities in the UK are highly qualified but even among British university graduates there are ethnic penalties in employment and – to a lesser extent – in earnings. Having access to support and assistance through socio-economically advantaged parents or a highly-skilled co-ethnic community can shelter young ethnic minority graduates. Those who lack these resources are at a substantial disadvantage.

It is important to recognise the different ways in which disadvantage affects young adults and that differences exist even among those with similar qualifications. The main hurdle the disadvantaged face is finding employment which is where additional help could be offered to the disadvantaged.

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Declarations

No part of this thesis has been submitted for another degree and all the work in this thesis is original and my own (as described here).

Versions of chapter 2 have been published as an ISER working paper “Where you go depends on where you come from: the influence of father’s employment status on young adult’s labour market experiences”, No. 2013-24 and as “The effects of father’s worklessness on young adults in the UK” in the IZA Journal of European Labor Studies of January 2015. In this chapter I use the Understanding Society dataset.

Chapter 3 has been published as an ISER working paper No. 2014-43 “A disadvantaged childhood matters more if local unemployment is high” and is now published at the European Sociological Review as “Crowding Out of Disadvantaged Young Adults in Germany: Background Matters Depending on Local Labour Market”. I use the German socio-economic panel study in this chapter.

Chapter 4 is co-authored with Simonetta Longhi. I have done the data management and analyses and produced the first drafts independently. We have worked together on the wording of the final version. This chapter is published as an ISER working paper No. 2016-02 “Labour market disadvantage of ethnic minority British graduates: university choice, parental background or neighbourhood”. The data used in this chapter is the Destination of Leavers of Higher Education dataset.

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Chapter 1: Overall introduction

1.1 Inequality over generations

The circumstances in which someone grows up can constrain their life chances and opportunities on the labour market, leading to a continuation of disadvantage over generations. This inequality matters greatly for people's lives, but also for society as a whole as wasted talent carries an economic cost with it (The Boston Consulting Group, 2010).

There is a lot of research on social mobility and social stratification, but much remains unknown about the ways in which someone's background affects them and how these mechanisms vary over time or by circumstances. Improving social mobility is high on the political agenda and ideas tend to focus on providing equal access to education, described as "the springboard to opportunity" (Cameron, 2015) by the previous UK prime minister. While this is a worthy goal in itself, increasing access to education will not create equal chances regardless of background if differences remain between people with the same formal qualifications.

The main question I address from different angles is how the early labour market outcomes of young adults are affected by their socio-economic background, on top of their qualifications. In a meritocratic society young adults with similar qualifications would be expected to have similar outcomes. This is rarely the case however and socio-economic background remains important (Bernardi and Ballarino, 2016a). This thesis addresses the extent to which parental background directly affects the early career and why this effect might differ by personal characteristics and depending on the context. Throughout all chapters I address possible mechanisms for this influence of parental background and use different measures of parental background. I present evidence using recent data from the UK and Germany.

In the next section I place this thesis within the literature on intergenerational social mobility and the transition from school to work. I then discuss the common themes in this thesis and the overall

research approach. Then I present the different chapters and the way in which they contribute to answering the research questions.

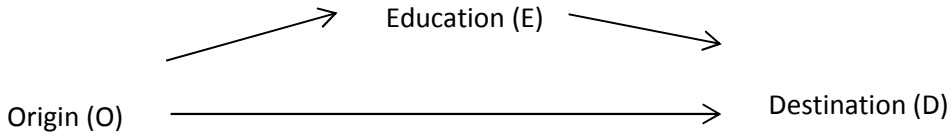
1.2 Conceptual framework

1.2.1 Direct effect of social origin

In the three empirical chapters I study inequality in labour market outcomes due to parental background. Growing up in a disadvantaged household is associated with a vast array of less desirable outcomes, such as lower educational attainment and aspirations, lower employment and lower wages (Bowles et al., 2005; Bukodi and Goldthorpe, 2013; Schoon et al., 2012; Stevens and Schaller, 2011). The transmission of labour market outcomes between parents and children is a long-standing area of research in the social sciences (e.g. (Becker and Tomes, 1994; Erikson and Goldthorpe, 1993; Goldthorpe and Llewellyn, 1977).

The classic approach to intergenerational social mobility studies the relation between social origin (O), meaning the socio-economic status of parents or the household where someone grew up; education (E); and destination (D) which is the socio-economic status of the respondent (Bernardi and Ballarino, 2016a; Blau and Duncan, 1967).

Figure 1-1: Origin-Education-Destination framework



The literature has mainly addressed the relation between origin and education (O-E) as well as the relation between education and occupational attainment (E-D), or the returns to education (Bernardi and Ballarino, 2016a). In this thesis I focus on the relation between social origin and occupational attainment (O-D) when accounting for education. This effect is called the direct effect

of social origin by Bernardi and Ballarino (2016a) in their recent book which studies this effect in 14 countries. They find that, while over half of the total intergenerational correlation in occupational status or income is mediated through education, a substantial direct effect of social origin remains in all the countries they study, which include Germany and the UK (Bernardi and Ballarino, 2016b). This is important as in a truly meritocratic society social origin would not affect labour market outcomes directly.

Empirical work in the UK by Bukodi & Goldthorpe (2011) found that inequality by background among the similarly qualified became more important over time. They studied the effect of parental class over time using three British birth cohort studies. While for children born in 1946 their parents' social class did not affect their probability of accessing the best jobs after accounting for qualifications, parental class did matter for children born in 1958 and 1970 while the relative effect of education as a springboard to opportunity declined. The question of deterioration over time is not in the scope of this research, but this work does highlight the importance of using recent data as previous findings may no longer hold.

It is important to understand to what extent parental background influences their children's labour market outcomes on top of education in order to truly increase social mobility. To this end a better knowledge of the effects and possible mechanisms is needed. I address this by analysing different aspects of the direct effect of social origin and by studying other factors that influence the salience of this direct effect.

1.2.2 School-to-work transition

Only in chapter four do I specifically consider the actual transition from school to work, but this literature is also relevant for the other chapters which study the early steps in the labour market after accounting for education.

Young adults who make the transition from school to work often experience a period of turbulence and difficulty in finding a well-matched job. This period can be characterised by high turnover, working on temporary contracts and working on jobs for which one is overqualified (Bukodi and Dex, 2010; Quintini et al., 2007; Scherer, 2004). An important question in the literature on the school-to-work transition is whether early non-optimal work is a stepping-stone to more stable and higher-quality positions or a trap to insecure and low-quality work. There is mixed evidence with some studies suggesting bad initial positions are more of a trap for women than men (Bukodi and Dex, 2010) and for those from less stable and socio-economically disadvantaged households (Schoon et al., 2009). It is generally found that adverse early experiences, such as unemployment or precarious and bad work, can set someone on a more negative trajectory and can have long-lasting negative effects for some (Kurz et al., 2005; Quintini et al., 2007; Scherer, 2004).

The mainly economic literature on scarring has also found that the effects of early unemployment and insecure work carry over throughout the career. This means that early experiences of unemployment or precarious and low-skilled work affect employment and wages later on in life (e.g. Arulampalam et al., 2000; Gregg and Tominey, 2005; Mavromaras et al., 2013; Mühleisen and Zimmermann, 1994).

In the study of these transition periods, it is important to take into account that experiences differ and are shaped by the institutional and labour market context as well as by personal characteristics and resources (Schoon and Silbereisen, 2009; Shanahan and Longest, 2009). This diversity of experiences is addressed in this thesis by studying the differences in the early career by socio-economic background in all chapters. This is further investigated in chapter three where the local labour market condition is taken into account and chapter four which studies differences depending on parental resources and the local area.

Successfully embarking on a career can also have long-lasting effects outside of the labour market. As young adults move from school to work this transition is closely related to changes in other

domains such as family formation and moving towards more independence. If things go awry in one of these domains they can cause delays in other domains, thereby impacting on the general transition towards becoming an adult (Schoon and Silbereisen, 2009).

By focusing on young adults I can also more easily isolate the effects of background and education from earlier labour market experiences which could in turn be affected by background. Interventions at this stage can then possibly diminish later inequality, especially when combined with interventions towards increasing equality in the access to education in the first place.

1.3 Research approach

Each chapter concerns itself with the question on how young adults are affected by their parental background after accounting for qualifications and studies different aspects of background to elucidate the mechanisms as well as the factors that can alleviate or aggravate inequality in labour market outcomes. Studies differ strongly in how parental background and labour market outcomes are measured, with economists focusing on the intergenerational transmission of income (Lee and Solon, 2009) or employment (Ekhaugen, 2009; Macmillan, 2012) and sociologists studying more occupation-based indicators such as prestige or social class (Erikson and Goldthorpe, 2010; Jonsson et al., 2009). While parental income and occupation are definitely related, the choice of how to measure them is not trivial and can lead to different conclusions about the extent or trends of social mobility (Blanden et al., 2007; Erikson and Goldthorpe, 2010). In this thesis I first study paternal employment (chapter two); then parental education, income and occupational status (chapter three); and finally social class (chapter four).

1.3.1 Aspects of background and mechanisms

In this section I provide an overview of how parental background and the socio-economic conditions while growing up can be expected to directly affect later labour market outcomes. I then discuss briefly how the local area may affect the transition to the labour market as well.

Part of the literature has studied to what extent parental background causes their children's outcomes or whether the relation is spurious, due for instance to genetic similarity or sharing a similar environment (Bowles et al., 2005). Establishing causality requires separating parental background from other unobserved characteristics such as shared environment, skills, interests or biology which can affect both parents and children. Studies have attempted to do this using several methods, such as long panel studies and fixed effects models assuming only parental socio-economic status changes (Andersen, 2013); simultaneously modelling outcomes for parents and children (O'Neill and Sweetman, 1998); using the timing of parental background by studying siblings or by using models related to instrumental variables (Ekhaugen, 2009; Gottschalk, 1996).

I do not use specifically causal methods in this thesis as good instruments to measure the effects of parental background are very rare and require stringent assumptions. In order to describe the ways in which parental background affects the early career I rely instead on a rich description using several outcomes and testing possible pathways directly. This does mean that the results in this work may be partially spurious. Even so, it is important to describe the extent to which young adults differ by parental background even when accounting for education and how this effect depends on context. While it is valuable to estimate whether an effect is causal or not, it is also important to study the association itself and provide evidence on the different mechanisms and modalities of these effects (Bernardi and Ballarino, 2016b).

As mentioned above an important part of how status is transmitted over generations is assumed to be through education. There are several other mechanisms that might differentiate between people with similar qualifications however which are addressed more in detail here as they form a substantial part of the work I carried out and are referred to throughout the thesis.

A first important channel is that parents with more money are able to invest more in their children. This increases their human capital which could then lead to a better performance in the labour market. An important example of this is sending children to private schools. In the UK this has been

shown to have persistent effects on later outcomes (Macmillan et al., 2015). In other countries such as Germany there is far less differentiation between public and private school.

There are also likely to be differences by origin in the type of qualifications obtained. Several studies, inspired by the work of Lucas (2001) on effectively maintained inequality, find that when access to qualifications becomes more equal there will be more differentiation in terms of the type or subject of those qualifications. This is part of the mechanisms through which the most advantaged retain their edge, either through vertical (quantity of education) or horizontal (quality of education) differences. Previous studies have found that even very detailed measures of qualifications do not explain away the intergenerational transmission of socio-economic status however (Bernardi and Ballarino, 2016b). In chapter four I use a dataset on British graduates with very detailed information on type of qualifications and also find that, even when comparing two very similarly qualified young adults, background factors still matter.

Second, family background, through direct investment or the environment created at home and in the neighbourhood, also affects cognitive and non-cognitive skills which are valued in the labour market even when accounting for education (Anger, 2012; Bernardi and Ballarino, 2016b; Cunha and Heckman, 2007; Farkas, 2003; Schoon et al., 2012). Cognitive skills refer to characteristics such as intelligence or problem-solving capabilities, while non-cognitive skills refer to personality and behaviour, as well as attitudes. It is also suggested that parents may influence their children's aspirations and therefore make them aim for better positions (Bernardi and Ballarino, 2016b).

Third, parental background may also affect children through social networks that the parents have access to (Barbieri et al., 2000; Flap and Völker, 2008). Many young adults rely on their parents' networks while searching for work as their own networks are not yet well developed (Corak and Piraino, 2011; Loury, 2006). The quality of information within a social network tends to be higher for the employed and for those with more high-status jobs (Cingano and Rosolia, 2012; Flap and Völker, 2008). Young adults from a more advantaged background will on average be better connected to

people with high status via their parents. That means they can rely on more help in getting good jobs than young adults from a disadvantaged background whose parents have a network with fewer high-status workers (Flap and Völker, 2008; Putnam, 2015).

Background may also directly influence employers' views. People of lower background may be stigmatized, for instance by being considered to be less productive based on preconceived notions; while those of higher background are favoured (Bernardi and Ballarino, 2016b; Jackson, 2009). Jackson (2009) carried out field experiments in the UK and found that applicants with elite characteristics, in terms of name, school attended and interests, were more likely to get a response and under some circumstances were also more likely to get a positive response.

Parental background is an important source of inequality between people, but not the only one. I also consider the role of the local context and area in chapters three and four. The literature discussing neighbourhood effects on labour market outcomes generally finds only small effects and is not generally conclusive on how much neighbourhood matters in and of itself (Page and Solon, 2003). However, there are several aspects through which the local community and area could affect labour market outcomes and may moderate family background by complementing parental resources or compounding upon disadvantage (Patacchini and Zenou, 2011; Putnam, 2015; Zhou, 2005).

The local economic area can shape the opportunities for work available to people (Feng et al., 2015; Galster et al., 1999). This in turn can affect employers' hiring decisions and modify the importance of parental background (Buttner et al., 2010; Galster et al., 1999). Besides shaping the opportunity structure, the local area can also provide resources in its own right to complement parental background (Patacchini and Zenou, 2011). These resources can take the form of community support to parents, providing role models and peer groups or enforcing cultural norms (Borjas, 1995; Sharkey, 2008; Vartanian et al., 2009; Zhou, 2005). Contacts in the local community can also provide information on available jobs or positions. This social network aspect is important as it means that

people living in areas where they are more likely to come in contact with employed neighbours who can provide valuable information may be more likely to hear about good jobs themselves (Bayer et al., 2008; Hellerstein et al., 2014).

Chapter four considers socio-economic background as well as differences by ethnicity in the UK. Ethnic minorities face substantial penalties in the labour market in the UK (Blackaby et al., 2005; Dustmann and Theodoropoulos, 2010). An important question is the extent to which social mobility differs by ethnicity and whether a lower socio-economic background compounds on ethnic penalties (Heath and McMahon, 2005; Platt, 2005; Zuccotti, 2015).

1.3.2 Comparison of UK and Germany

While chapters two and four deal with UK data, the third chapter focuses on Germany. This thesis is not a direct comparison of the two countries and the choice was mainly due to available datasets. Nevertheless, they are two interesting cases. Comparative studies that look at the correlation in labour market outcomes such as occupational status between children and their parents without accounting for education tend to find that this correlation is relatively high in Germany and relatively low in the UK. Bernardi and Ballarino (2016b) provide a ranking of 15 OECD member states and rank Germany the fourth least mobile and the UK the fourth most mobile; while Björklund and Jäntti (2000) compare similar outcomes in 10 Western countries and again estimate Germany to be the fourth least mobile and the UK to be the third most mobile. While neither are extreme cases, they do highlight a substantially different context. Intergenerational mobility in the UK is relatively high and the ideal of a meritocracy is quite strong, especially as driven by the growth in higher education (Ireland et al., 2009; Vandecasteele, 2016). It makes it a very interesting case to study the mechanisms through which society is stratified after taking education into account.

Bernardi and Ballarino (2016b) point out that when education is taken into account the correlation in outcomes in Germany drops substantially and is among the lowest of the countries they study. This follows findings that Germany has a close link between education and the labour market which

translates into generally reasonably smooth transitions from school to work (Gebel, 2009; Kurz et al., 2005). This tight coupling of education and the labour market, combined with strong intergenerational effects on education, means that most of the intergenerational correlation is assumed to go via education and the direct effect of social origins is rather low (Grätz and Pollak, 2016; Heineck and Riphahn, 2009). One of the reasons for studying the German case in chapter three is precisely that finding a direct effect of social origin and a higher sensitivity by origin to the labour market there indicates that this process is likely to also happen in countries where the direct effect of social origin is larger to start with, such as the UK.

1.3.3 Changes over time

One of the main topics in the literature on social mobility is whether the effects of family background have changed over time. Especially in the UK there has been a debate with a study by Blanden, Gregg and Macmillan (2007) finding that the association between childhood family income and later adult earnings had increased for the 1970 cohort compared to the 1958 cohort. This is contrasted with work by sociologists who generally find no change over time in relative mobility when studying classes (Erikson and Goldthorpe, 2010; Goldthorpe and Jackson, 2007). This again highlights the importance of the way in which origin and destination are measured. Bernardi and Ballarino (2016b) summarize the results of studies on how the effect of parental status on own occupational status changes over time in several countries, including Germany and the UK, and overwhelmingly find no change over periods in the intergenerational correlation in occupational status (Grätz and Pollak, 2016; Vandecasteele, 2016).

In general, labour market conditions for young adults seem to have worsened over time (Brückner and Mayer, 2005; Christopoulou and Ryan, 2009; Quintini et al., 2007; Schoon and Silbereisen, 2009). Bukodi and Dex (2010) study the change in the early career trajectories over time in Britain and find that especially for women prospects have become worse.

In this thesis I analyse the direct effects of social origin using recent data to add to the literature on social mobility. Chapter two uses data from 2009-2011 while chapter four uses data for university graduates from 2005 to 2012. Chapter three does take a longer time perspective as respondents are followed from 1984 to 2011. This longer timeframe is required as I study how the effects of family background on labour market outcomes depend on the local labour market. To do this I need as much variation over time and between localities as possible. Even in chapter three the change of social mobility over time is not the main focus, but rather the way in which the effects of social background changes with the business cycle.

1.3.4 Gender dimension

There might be gender differences in the way parental background affects labour market outcomes and there are differences in the occupational trajectories in the early career (Bernardi and Ballarino, 2016b; Bukodi and Dex, 2010; Schoon et al., 2009). It is suggested that the effects of parental background are smaller for women than for men, as for women a substantial part of the social reproduction happens through the husband (Vandecasteele, 2016). As this thesis deals with young adults using recent data that effect is expected to be less however.

All analyses would ideally be carried out separately by gender. This is the approach taken in chapter four. Chapters two and three have rather small sample sizes making this impossible however. For that reason gender is only controlled for in these chapters, although in both I include separate analyses by gender as a robustness test. Generally, these robustness tests indicate little difference between men and women.

1.4 Overview of the chapters

1.4.1 Research questions by chapter

In this section I provide an overview of how the different chapters in this thesis tie in together to answer the main research question and how they operationalise the origin-education-destination

framework. All chapters engage with the direct effect of social origin, either as a parent not working (chapter two) or more general socio-economic position, on labour market outcomes of young adults.

Rather than studying the intergenerational correlation in one outcome, I analyse how different labour market outcomes – including at least employment and wage – differ for those growing up in a disadvantaged household compared to their similar but more advantaged peers. By studying several outcomes, a better view of the mechanisms at work can be discerned. Chapter two goes beyond this by considering a wider array of possible outcomes including relative wage, job satisfaction and hours worked in order to test several mediators. Chapter three considers two further aspects of the quality of work by also analysing whether people work on a temporary contract and whether they are overqualified.

In all chapters education is controlled for so that the effect of social origin is determined among similarly educated young adults. Chapter four considers only university graduates and includes detailed information on the type of qualification obtained. Higher qualifications are seen as an equalizer and socio-economic background is then expected to not matter much anymore among the highly educated (Bernardi and Ballarino, 2016a; Torche, 2011). For this reason the higher and lower educated are considered separately in chapter three. In chapter two the sample size is too small to split people up by education, but a sensitivity test shows that the results are relatively similar among those with higher qualifications and those without. The relation between social origin and education is not considered in detail.

Chapters three and four specifically consider how the effect of social origin on labour market outcomes may be different depending on the local labour market context as in chapter three or by ethnic groups as in chapter four. This follows studies suggesting that ethnicity should be considered together with parental background as social origin (Heath et al., 2008; Zuccotti, 2015).

1.4.2 Description of each chapter

Previous studies have shown that children of workless fathers have lower aspirations either in education or in the labour market and also have a higher risk of being out of work themselves. The second chapter addresses this issue by looking at the effect of having a father who did not work when the children were aged 14 on multiple aspects of young adult's labour market experiences. By estimating the counterfactual where the father would have worked I control for the effect of paternal income and study how worklessness itself affects later outcomes by considering several pathways such as social networks, mental health and attitudes and behaviours. This chapter uses the first two waves of Understanding Society, a large UK panel study. I do not only study whether young adults are working, but also look at their job characteristics when employed. Growing up with a non-working father has negative effects on the labour supply of these young adults. They are substantially less likely to be employed and, when working, they work fewer hours per week. Young adults whose fathers did not work are also more likely to report dissatisfaction with their work, even though they do not earn less or have less secure job contracts. I carry out a sensitivity analysis showing that it is unlikely that these effects are spurious.

In the third chapter I study how the effects of family background on the early career may be shaped by the local conditions in which someone enters the labour market. I test how the direct effect of social origin (origin-destination) differs depending on the local labour market conditions. I analyse the labour market outcomes of West German young adults over time, using the German Socio-Economic Panel study to follow young adults since childhood and focus specifically on how the effect of family background differs depending on current local labour market conditions, in particular the local unemployment rate to capture the competition for work in the area. There are only small differences between young adults from different backgrounds at times of low local unemployment but as the labour market loosens the disadvantaged are more affected in their employment probability and job quality. This chapter takes into account how factors associated with socio-economic background, such as social networks or unobserved skills, differ in their effect depending

on the demand side. This highlights the importance of taking the hiring behaviour of employers into account as well, as suggested by Dex and Bukodi (2013). If there is more competition for a job employers are in a position to raise hiring standards. As a disadvantaged background may signal lower skills or be associated with worse connections, the disadvantaged may be crowded out of good jobs or out of the labour market altogether by their similarly qualified but more advantaged peers.

In the fourth chapter I compare school-to-work transitions of British graduates belonging to ethnic minorities to those of their white British peers. Ethnic minorities do on average less well in the labour market than the white British despite their on average much higher qualifications (Battu and Sloane, 2004; Blackaby et al., 2005; Dustmann and Theodoropoulos, 2010; Modood, 2005). To analyse possible reasons for this disadvantage I study ethnic penalties among university graduates. I use the Destination of Leavers of Higher Education (DLHE) study for graduates in England from 2005-2012 to study ethnic penalties in employment and wage after graduation. Ethnic minorities may be at a disadvantage compared to white British graduates if they possess less desirable degrees on average. They may also be at a disadvantage as ethnic minorities tend to be of lower socio-economic background and lack the resources and networks, through their parents or local community, to find good jobs initially. Six months after graduation ethnic minorities are substantially less likely to be employed than white British even after accounting for parental background, local area characteristics and detailed differences in qualifications. These early employment gaps can have long-lasting scarring effects. Resources obtained through parental background or the local area matter more for ethnic minority graduates than for white British. Minorities lacking these resources earn less and are less likely to be employed compared to white British while the differences are smaller for minorities who have a better background. A possible pathway for this is that ethnic minorities differ in their use of social networks to find a job. Background still matters a lot even among these more advantaged graduates. This chapter therefore studies how labour market

outcomes (destination) are affected by socio-economic background (origin) and ethnicity and considers the interaction of ethnicity and origin.

Chapter 2: The effects of father's worklessness on young adults in the UK

2.1 Introduction

The transmission of economic disadvantage over generations gains increasing political and academic attention. It is important to understand the mechanisms through which young adults are affected by their background, especially in more difficult economic times. This chapter studies the effect of paternal worklessness on different aspects of young adult's labour market experiences in the UK.

Most literature on intergenerational social mobility focuses on occupations or wages, ignoring unemployment and alternative aspects of job quality (Bowles et al., 2005; Erikson and Goldthorpe, 2010; Lee and Solon, 2009). A smaller literature shows a positive correlation between unemployment or worklessness of children and their parents (Johnson and Reed, 1996; Macmillan, 2010, 2012; O'Neill and Sweetman, 1998; Payne, 1987). These topics have been studied separately up until now, while unemployment and low job quality are dynamically linked (Stewart, 2007).

In line with the literature I consider the employment status of the father (Macmillan, 2014; O'Neill and Sweetman, 1998). This increases the comparability of my results with previous studies on the intergenerational transmission of worklessness, especially Macmillan (2014) who studies this for cohorts born in 1958, 1970 and in the late '70s. Another consideration is that being out of work for men is generally less likely to be voluntary and a clearer sign of disadvantage.

Understanding the mechanisms through which experiencing a father's worklessness can influence their children's further labour market outcomes is necessary to tackle the continuation of disadvantage over generations. Human capital investment, mental health and wellbeing, attitudes and a sense of stigma towards being out of work are mentioned in the literature as possible mediators, but have not yet been tested (Ekhaugen, 2009; Macmillan, 2010). A notable exception is the study by Macmillan (2013). She studies the role of several mediating mechanisms on the transmission of worklessness, using the British cohort study.

To study the mechanisms of how paternal worklessness affects children further, this study estimates the differences between advantaged and disadvantaged young adults on the probability of working as well as on the quality of the job. By using the Understanding Society dataset, a large panel study, more detailed prospective information on employment characteristics is available than in the often used cohort studies.

A disadvantaged family background is associated with a lower probability of being employed, as shown in previous work, but is also associated with working fewer hours and being less satisfied with work. The type of contract and wages do not seem to be affected by having experienced paternal worklessness however. By studying these different outcomes together the mechanisms are clarified, improving upon the literature. Young adults who experienced their father's worklessness are compared to similar young adults whose fathers worked, but had low wages. By using this control group it is unlikely that the differences are driven by financial capability and different possibilities of investing in children's human capital. In a sensitivity analysis I compare our results to those using all working fathers as a control group. Differences in human capital, as well as lower cognitive and non-cognitive skills would also affect wages and type of contract, making this a less likely story. Young adults whose fathers have been workless while growing up may experience worklessness differently and less negatively than those who lack this experience. This might lead to longer unemployment spells while searching for a good job (Tatsiramos, 2009). Further research into the experiences of work and worklessness is required.

2.2 How does paternal worklessness affect children

2.2.1 Effects of father not working

The literature on the transmission of unemployment over generations mainly focuses on establishing a causal relation, rather than working out the separate mediating mechanisms, with the exception of Macmillan (2013). She finds that parental worklessness increases the probability that their children

will experience some time being out of work. Around 12% of this effect can be explained through cognitive and non-cognitive skills, education and attitudes.

While the literature consistently finds that children of non-working fathers are less likely to be employed themselves not much is known about their work when employed. Schoon et al. (2012) show that experiencing father's worklessness is associated with educational outcomes and labour market aspirations, but they do not address labour market outcomes. Several other outcomes besides the child's employment can be influenced by father's worklessness.

This chapter addresses two aspects of the intergenerational transmission of economic disadvantage by looking at the effect of father's worklessness on young adults' labour supply and the characteristics of their work when employed. First of all the effect of experiencing a father being out of work when aged 14 on the probability of employment as well as the hours worked and whether the respondent works part-time are estimated. Following the idea of a segmented labour market children of non-working fathers are more likely to find themselves in less desirable jobs. The primary labour market offers better-paid jobs where employers aim to retain their employees for a longer time. The secondary labour market consists of less desirable jobs with fewer prospects (Leontaridi and Sloane, 2001). A less desirable position is marked by lower wages and less security through a fixed-term contract. The final outcome is the children's satisfaction with their job which captures a more subjective aspect of job quality. An understanding of the different aspects of work that are affected by paternal worklessness leads to a better knowledge of the mediating mechanisms.

This chapter also tests the mediation mechanisms through which paternal worklessness affects the young adult's probability of employment and job quality. No specifically causal estimation method is used, but a sensitivity analysis is carried out to test the robustness of the estimates to endogeneity and shows the results are robust.

2.2.2 Mechanisms

There are several possible reasons why children of non-working fathers are more at risk of not working themselves. First of all parents and children share many characteristics that may affect their labour market experiences. O'Neill and Sweetman (1998) name this a transmission of preferences or a transmission of constraints. Experiencing parents being out of work is rarely the only type of disadvantage to which these children are exposed while growing up. Other adversities such as parental ill-health, low education or poverty often accompany it (Schoon et al., 2012). A qualitative study by Shildrick et al. (2012) tests the presence of a 'culture of worklessness' within households where parents and their children experienced long periods out of work. They find no evidence for such a culture and state that the persistence of worklessness is often caused by multiple deprivations and not by a cultural adherence to worklessness.

Lack of work is accompanied by a lack in income which can influence the human capital investment in children. This lowers their labour market success (Becker and Tomes, 1994). Parental poverty rather than worklessness would then drive the association of disadvantage over generations. If this holds, children of non-working fathers are expected to be employed less often or for fewer hours as well as face worse conditions in terms of wage and job security than children of working fathers. By only comparing children whose fathers did not work to those whose fathers worked in a low paying job the difference in financial means is diminished and the importance of other mechanisms can be studied.

Parental worklessness could also lower children's success in the labour market by lowering wellbeing and mental health through stress in the household. Unemployment in the household is shown to lead to lower wellbeing for the children (Burchell, 1994; Larson et al., 1994). This lower psychological wellbeing of the child may influence their own labour market experiences as lower mental health is associated with a decrease in employment probability (Frijters et al., 2010). This pathway leads to

the same expected results as in the case of lower human capital investment. The childhood experience of worklessness would affect both labour supply and the quality of jobs.

A final pathway considered here is that experiencing a parent out of work influences the child's attitudes. A young adult who experiences parental worklessness could be less affected by the stigma attached to not working (Ekhaugen, 2009; Macmillan, 2010). By being less unhappy when out of work themselves they may therefore feel less pressure to accept just any job. If experiencing a father's worklessness changes the evaluation of work and the sense of stigma these young adults would work less or less often, but would not face worse conditions when working. Ekhaugen (2009) suggests that seeing a father not working may also lead the children to try harder to avoid unemployment. However, the literature has not shown negative correlations in worklessness between generations.

Attitudes towards being out of work are not measured directly in the dataset used here. It is well established however that not working, either in inactivity or unemployment is associated with lower life satisfaction (Green, 2011). This decrease in life satisfaction when not working can be an indication of the importance of work (Luthra et al., 2014). If children of workless parents do not derive as much of their self-value from work and if not working carries less of a stigma for them, they would suffer a smaller decrease in life satisfaction when out of work than children whose fathers did work.

Father's worklessness may also influence their children's experiences in the labour market through effects on general attitudes and behaviour. Experiencing parental worklessness impacts upon aspiration and attitudes towards education and the labour market (Schoon et al., 2012). Armstrong (2012) showed that children's belief in a just world influenced their education decisions and this was heavily determined by their parent's belief that hard work pays off. Being out of work could impact strongly on this belief for fathers and then affect their children. Similarly, Dohmen et al. (2012) show that parents and their children share a propensity to trust people or take risks which has strong

effects on labour market outcomes. These attitudes are formed while growing up and can be influenced by witnessing a father's worklessness. These general attitudes and beliefs would influence the labour supply as well as the working conditions through lowering motivation and reducing the general labour market success of these young adults.

The literature also suggests that fathers who are out of work have social networks that are less useful in job search. As many young adults rely on their parents' networks in their early career, children whose father did not work would be at a comparative disadvantage to those whose father worked and maintained a useful network (Corak and Piraino, 2011; O'Neill and Sweetman, 1998). As social networks depreciate when out of work and recover when re-employed social networks would only mediate the relation between parental worklessness and their children's outcomes at the time of being out of work. It is therefore not considered here (Bramoullé and Saint-Paul, 2010).

2.3 Data and methods

Data from the UK Household Longitudinal Study or "Understanding Society" (UKHLS) is used. This is a large household panel survey of around 40,000 households in the United Kingdom (McFall, 2013). The sample is restricted to respondents who answered in the first two waves (2009-2010 and 2010-2011) as some mediating variables were only asked in the first wave and all outcomes were measured in the second wave. The initial response rate was 81.8% and further attrition at wave 2 was 22.7% (Lynn et al., 2012). All outcomes are weighted to account for this attrition. The sample consists of 3,965 respondents who were born in the UK, aged 16-30 in the first wave and not in full-time education in the second wave.

The UKHLS has not yet been used to study the effects of paternal worklessness, as most British studies on this topic used the cohort studies. The UKHLS is used here because it contains information on variables concerning mental health and well-being which allow the study of this mediating mechanism. It also includes richer information on the type of employment. This study complements work using the cohort studies, such as Macmillan (2013).

In addition to the UKHLS the quarterly British Labour Force Survey (LFS) is used for the period 2002-2010. The LFS is a nationally representative sample in the UK of about 60,000 households, maintained by the Office for National Statistics (ONS). It is used here to calculate median hourly wages for different groups. The UK-wide unemployment rate as recorded by the OECD (http://stats.oecd.org/#, accessed on 31/04/2013) is also used.

The father's working status when the respondent was 14 is measured through three categories depending on whether the father worked and if so, in what occupation at the 3-digit level. These occupations are divided in two groups. Based on the LFS the weighted median hourly wage by occupation is calculated and ranked quarterly. These rankings are averaged between 2002 and 2010. Occupations with an average rank below the first quartile are classified as low-paying since the median wage in that occupation is among the 25% lowest. The results are robust to changes in the threshold for a low wage occupation from the lowest quartile to the lowest half and the lowest decile.

Table 2-1: description of main activity by parental work status

Main activity	**Father working, not in lower-paid occupation**	**Father working in lower-paid occupation**	**Father not working**
Employed	59.79%	56.46%	38.95%
Unemployed	7.07%	10.09%	18.76%
Maternity leave	1.52%	1.33%	1.75%
Family care	5.50%	8.76%	11.45%
Full-time student	24.40%	20.85%	24.96%
Other	1.72%	2.50%	4.13%
Total	*3,365*	*1,199*	*629*

Table 2-1 shows the main activity of young adults who were aged 16-30 in the first wave of Understanding Society by their father's working status. The main difference is that children of fathers who did not work are substantially less likely to be employed and more likely to be unemployed than those whose fathers worked. As expected the differences between children of workless fathers and those whose fathers worked in a lower paying position are smaller. There are

no large differences between the groups in the probability of being a full-time student. This indicates that the results will not be heavily biased by leaving students out of the sample.

To estimate the effect of having a father who did not work at age 14 we need to know their labour market outcomes if their father had worked. The difference between the observed outcome and these potential outcomes for children of workless fathers is the average effect of treatment for the treated (ATT) (Schafer and Kang, 2008). These potential outcomes can be estimated in several ways. I use a regression adjustment approach where the outcome for children whose fathers did not work is predicted through regressing the relevant outcome in the control group (Rubin, 1979; Schafer and Kang, 2008). This prediction is the estimate of the potential outcome given observed characteristics. The difference between the observed outcome for the treated group and their estimated potential outcomes is tested using a paired sample T-test. Equation 2-1 presents the calculation of the average treatment effect, with T indicating treatment and Y indicating the outcome for individual 'i'. $\widehat{Y_0}$ is the predicted outcome for the treated group based on the equation estimated in the control group (T=0). The control group consists of those whose fathers worked in lower paying occupations. This restriction means the difference in financial means between those whose fathers worked and those whose fathers did not work is smaller than when using all employed fathers.

$$ATT = \frac{\sum_i T_i(Y_i - \widehat{Y_{i0}})}{\sum_i T_i} \qquad \text{(Equation 2-1)}$$

This method allows for a non-additive treatment effect and for possibly different returns to other characteristics whereas including an indicator variable for paternal worklessness in a linear regression might not capture the full effect (Schafer and Kang, 2008).

2.3.1 Labour market outcomes

The effect of paternal worklessness is estimated on eight different outcomes. The sample varies depending on whether employment probability or job characteristics are the outcome as detailed below. The final sample for employment probability consists of 472 young adults whose fathers did not work and a control group of 856 young adults whose fathers worked in a low paying occupation.

When studying job characteristics the sample consists of 259 young adults whose fathers did not work and 622 young adults as controls.

As the effect of parental worklessness may be different for sons and daughters it is important to consider gender (Osterbacka, 2004; Vandecasteele, 2016). Ideally, the analyses would be carried out separately for men and women, but the sample size is too small to do this in the main analyses. I do split the analysis up by gender as a robustness test (see section 2.4.3) however and find the results are generally similar for sons and daughters. Higher qualifications are generally seen to diminish the effects of family background on labour market outcomes (Bernardi and Ballarino, 2016a). It may therefore be expected that paternal worklessness does not affect the more highly qualified or at least not as much as those with lower qualifications, once education is taken into account. As a robustness test I allow for different effects of paternal worklessness by education and find that there are fewer adverse effects for the more highly educated but the effect remains substantial.

The first outcome is the young adult's employment probability. The counterfactual is estimated through a binary logistic regression. Respondents are classified as employed if they did paid work in the last week or if they had a paid job despite not working in the last week. All other cases are classified as out of work and respondents in full-time education are not included. 3,019 (76.1%) of the respondents in the full sample were working. This includes the self-employed. Since a father and child can share many characteristics that make them both more likely to be employed or not the following control variables are included. First of all the respondent's gender, age and highest obtained educational qualification are controlled for. Whether the respondent is white or non-white and whether the respondent speaks English as a native language are also taken into account. Variables indicating whether the respondent is cohabitating or married and whether (s)he has children are included as this may influence labour supply. Having poor health is related to the transmission of socio-economic status and is therefore included (Bianchi et al., 2005; Smith, 2004). To account for the general employment situation when the child was aged 14 the UK-wide

unemployment rate in the year the child was aged 14 is included as this could influence the children's attitude towards unemployment (Ochsen and Welsch, 2011). Father's current age and whether the father and mother had a higher educational degree are included since parental education may influence the child's labour market outcomes (Andersen, 2013). Worklessness may also be associated with many other negative family events, including a higher likelihood of family dissolution, which can affect later labour market outcomes (Lampard, 1994; Schoon et al., 2012). To account for this to some extent we include a control variable for how often the respondents see their father, measured in six categories from daily to never, and whether the child lived with the father at age 16.

Hours spent working on average each week is another dependent variable capturing labour supply. This outcome is modelled through ordinary least squares (OLS) regression with the same control variables as when estimating the probability of being employed.

The final indicator of labour supply is a dummy variable for working part-time. This is regressed on the same control variables as when estimating the probability of employment, estimated through binary logistic regression.

Working on a fixed-term contract may increase job insecurity and is therefore an important part of the quality of the job. This is regressed, through binary logistic regression, on all control variables mentioned above, with the exception of whether the respondent cohabitates or has children. These two demographic variables are expected to influence labour supply but not the quality of employment. Socio-demographic background, family background and relation to father as well as unemployment rate when aged 14 are still included.

In order to assess the quality of employment a dummy indicating whether the respondent's earnings are lower than those of his/her peers is used. This relative wage can be an important indicator of job quality. It compares the individual wage to an appropriate peer group which the person him/herself

might take as a comparison as well. The median gross hourly wage is calculated by age category (16-19; 20-25; 26-30), gender and highest educational qualification. This is calculated from the LFS 2009 - 2010, weighted appropriately. A dummy variable indicates that the respondent's gross hourly wage, reported in the UKHLS, lies below the nationally representative median hourly wage for people of similar age, gender and educational qualifications. This dummy is regressed, through binary logistic regression, on all controls except cohabitating and being a parent. Working on a fixed-term contract and working part-time are also included as controls as someone's position in the wage distribution may depend on their type of contract.

The respondent's relative wage position was also calculated with regards to the hourly wage by age category, gender and 3-digit occupation instead of education, again using the LFS. This dummy indicates that the respondent has a wage in the lower half of earnings compared to people of the same age and gender who work in the same occupation. The counterfactual is estimated similarly to the wage position given age, gender and education.

The logarithmic transformation of the child's monthly labour market income serves as a straight-forward measure of labour market success. It relates directly to the financial dimension of job quality (Kalleberg, 1977). The counterfactual labour market income for children whose fathers did not work is estimated through an OLS regression of the logarithm of gross monthly labour market income on all control variables that are used in estimating whether someone works on a fixed-term contract, with the addition of the average hours worked per week.

The final labour market outcome is the self-reported job satisfaction of working respondents indicating how the young adult experiences their work (Kalleberg, 1977). Respondents in the UKHLS are asked how satisfied they are with their job and can respond from 1 completely dissatisfied to 7 completely satisfied. If respondents reported to be somewhat dissatisfied (3) or less this is classified as being dissatisfied on a dummy variable. The counterfactual job satisfaction is estimated using binary logistic regression using all controls used for monthly wage with the inclusion of all other

labour market outcomes. This variable complements the more objective job characteristics by adding the own evaluation of the job. It may indicate different expectations of a job and therefore different evaluations of the available work conditions on average.

Ideally the analyses should be carried out separately for men and women. This strongly reduces the sample however which is why gender is only controlled for. As a robustness test the analyses were separated by gender, showing small differences.

2.3.2 Mediation

Paternal worklessness is expected to affect a young adult's probability of employment at least partly through some other, mediating variables. I test mental health, wellbeing and attitudes as possible mediators in the transmission of worklessness.

To be mediators these variables must be influenced by father's worklessness and in turn affect the young adult's employment probability when controlling for father's worklessness (Mackinnon and Dwyer, 1993). The total effect of father's worklessness on the probability of employment is decomposed in a direct effect and an indirect effect. This indirect effect is the part that is accounted for by the mediator. The decomposition is not straight-forward when it involves binary outcomes and an extension of the method using counterfactuals is used (Breen et al., 2013). First of all the effect of paternal worklessness on the mediating variable is estimated as the difference between the average value of that variable in the treatment group and the counterfactual based on a prediction equation in the control group. This difference indicates the extent to which growing up with a workless father affects that mediator.

We are interested in whether these mediators explain some of the effect of growing up with a workless father on the employment probability. To do this the proportion of employed respondents in the treatment group is compared to two counterfactuals. The first counterfactual is estimated without accounting for the value of the mediator. This indicates the total effect. A second

counterfactual is based on a prediction equation in the control group where the mediator is included. The effect of paternal worklessness is then calculated based on the two counterfactuals. The difference between the effect of paternal worklessness when including the mediating variable and when excluding it indicates the part of the total effect due to an indirect effect through the mediator.

The first mediator is respondent's psychological wellbeing. It is measured through two dummy variables (Warr, 1990). The first one indicates the respondent scores in the top quartile of the general health questionnaire (GHQ). This is a validated scale for mental health status where a higher score indicates higher probability of mental problems (Goldberg et al., 1997). Another dummy indicates that the respondent felt completely, mostly or somewhat dissatisfied with life in general. The correlation between the two dummies is 0.31.

The second mediator consists of attitudes and non-cognitive skills and is captured by seven indicators. The first indicator is a factor built from seven items that indicate a positive outlook on life and self-confidence. These items are: 'feeling optimistic about the future'; 'feeling useful'; 'feeling relaxed'; 'dealing with problems well'; 'thinking clearly'; 'feeling close to others' and 'able to make up own mind'. The scale has a Cronbach's alpha of 0.86 and a higher score indicates a more positive outlook. The following three indicators capture sense of control. Three dummy variables indicate that someone feels moderate or strong powerlessness regarding life or occurrences at home and whether the respondent feels overwhelmed with demands (Armstrong, 2012; Groves, 2005). These dummies correlate at most 0.38 which is not problematic. Attitudes towards risk and trusting people can be influenced by parental experiences and influence economic outcomes (Dohmen et al., 2012). The fifth indicator is a dummy indicating the respondent does not believe most people can be trusted and the last two indicators are variables ranging from 0 to 10 capturing whether the respondent is prepared to trust strangers and prepared to take risks in general are included. These three variables correlate at most 0.38.

I also proposed that respondents whose fathers did not work experience worklessness differently than their peers whose fathers worked and that this may lead to a lower employment probability. While I cannot test this directly, I use the association of being out of work with overall wellbeing as an indirect indicator of the importance of employment. If young adults whose fathers did not work experience being out of work as less negative this would weaken the association between being out of work and dissatisfaction with overall life.

Being dissatisfied with life is logistically regressed on the control variables used for the employment equation. The respondent's employment status in both waves, the father's employment status when the father was aged 14 and the interaction of the respondent's employment status in the second wave and the father's employment status are also included. If being out of work is experienced differently in terms of dissatisfaction with life by respondents depending on their father's employment status while growing up the interaction term will be significant.

2.3.3 Missing observations

There are many missing observations among these variables which is problematic as the sample is small. To deal with the missing data I use 50 multiple imputations, estimated through chained equations (Royston and White, 2011). All control variables as well as the mediators and labour market outcomes in waves 1 and 2 are used in the imputation model. This method assumes that the data are missing at random, conditional on all variables that are used in the imputation model. This is superior to a complete cases analyses if responses are not missing completely at random (Enders, 2010).

2.4 Results

2.4.1 Estimated treatment effect of experiencing father's worklessness

Table 2-2 presents results where children whose fathers did not work are compared to their counterfactual outcomes had their father worked in a lower paying occupation. The full regression model is shown in table A2-1 in the appendix.

Table 2-2: Effect and standard error of father not working with counterfactual of father working in lower paid occupation

Outcome	**Average observed**	**Average counterfactual**	**Difference**
Working	0.55 (0.02)	0.69 (0.01)	-0.14 (0.02)***
Work part-time	0.37 (0.03)	0.27 (0.01)	0.10 (0.03)***
Hours/week	29.55 (0.73)	32.79 (0.24)	-3.23 (0.68)***
Low job satisfaction	0.18 (0.03)	0.12 (0.01)	0.06 (0.03)**
Fixed-term contract	0.13 (0.02)	0.10 (0.01)	0.03 (0.02)
Low hourly wage given occupation	0.56 (.04)	0.59 (0.01)	-0.03 (0.04)
Low hourly wage given education	0.62 (0.04)	0.60 (0.01)	0.02 (0.04)
Logarithm of gross monthly labour market income	6.79 (0.05)	6.85 (0.04)	-0.05 (0.04)
Gross monthly labour market income (calculated)	£891.6	£941.1	£49.5

**: p<0.1; **: p<0.05; ***: p<0.01, working or not is estimated on 472 respondents whose fathers did not work and 856 controls whose fathers worked in a lower paying occupation, while job characteristics are estimated for 259 young adults whose father did not work and 622 young adults whose fathers worked in a lower paying occupation.*

Experiencing paternal worklessness lowers the probability of working by 14 percentage points (p.p.). When employed having a workless father is associated with working 3 hours less per week and being 10 percentage points more likely to work part-time. Young adults whose father was out of work when they were aged 14 are 6 percentage points more likely to be dissatisfied with their job while working even when controlling for all the labour market outcomes studied here. This may indicate a different evaluation of objective job characteristics or it may indicate that there are some aspects, such a job security or environment in which they work that are not measured here but are worse for respondents whose fathers did not work. There are no statistically significant differences in the probability of working on a fixed-term contract, in hourly wage or in relative position of the hourly wage. This pattern of effects suggests that children whose fathers did not work are not necessarily seen as less skilled or less able as their wages and contract types are similar to those fathers did work. It is therefore unlikely that the effect is due to human capital or differences in skills.

Table 2-3 presents the proportion of the effect of paternal worklessness on the probability of being employed that can be explained through differences in wellbeing or attitudes. It presents the effect that father's worklessness at age 14 has on the mediating variable. It also shows the effect of paternal worklessness on being employed after accounting for the mediating variable and indicates what proportion of the total effect of 13.7 p.p. is explained.

Table 2-3: mediation between father's worklessness and respondent's employment

Mediators	**Effect father not working on mediator (s.e.)**	**Direct effect father not work, accounting for mediator (s.e.)**	**% effect father not working explained**
GHQ score high	0.00 (0.02)	-0.12 (0.02)***	10.2%
Low life satisfaction	-0.09 (0.02)***	-0.14 (0.02)***	1.5%
Wellbeing		**-0.13 (0.02)*** **	**8.8%**
Low trust	-0.08 (0.03)***	-0.14 (0.02)***	-0.7%
Control over life	-0.14 (0.02)***	-0.14 (0.02)***	-1.5%
Control at home	-0.11 (0.02)***	-0.14 (0.02)***	0%
Experience many demands	-0.16 (0.02)***	-0.14 (0.02)***	-0.7%
Positive outlook	-0.14 (0.04)***	-0.13 (0.02)***	7.3%
Prepared to take risks	-0.17 (0.14)	-0.13 (0.02)***	3.6%
Risk to trust	0.01 (0.13)	-0.14 (0.02)***	0%
Attitudes		**-0.13 (0.02)*** **	**8%**

**: p<0.1; **: p<0.05; ***:p<0.01, controlled for gender, age, education, race, born in UK, native English speaker, cohabitation, having children, having poor health, contact with father, lived home at age 16, unemployment rate when aged 14, age of father, father's education, mother's education. Standard errors are presented in parentheses. The sample consists of 472 young adults whose fathers did not work and the counterfactuals are constructed based on 856 young adults whose fathers worked in lower paying occupations. The direct effect is the difference between the observed proportion of employment and the counterfactual, taking the value on the mediator into account. The % effect father not working explained is the % change in the estimated effect of father's worklessness when the mediator is taken into account as opposed to when it is left out.*

While paternal employment is associated with life satisfaction and feelings of control, trust and general outlook, these variables do not explain a large part of the total effect. The most substantial contribution is made by including the GHQ score, indicating a low mental health. Controlling for mental health reduces the effect of paternal worklessness by around 10%. Growing up with a workless father does not contribute to mental health however, indicating that this does not mediate but could be spurious (Macmillan, 2013). The two variables indicating well-being explain a similar amount as the attitudes taken together, namely around 8%. All characteristics taken together explain slightly less than 11% of the effect of parental worklessness. This is small, but comparable to the 12% Macmillan (2013) finds using the British Cohort Study (BCS). She explains the intergenerational association in worklessness using non-cognitive skills, cognitive skills, behavioural outcomes and educational outcomes. Non-cognitive skills are most important in her model and play a similar role to the attitudes used here. This chapter suggests that psychological wellbeing may also play a role on top of these skills.

A final hypothesized pathway is that children whose fathers did not work experience being out of work as less negative. If children of workless fathers suffer less from being out of work a lower association between life satisfaction and being out of work is expected for them than for children whose fathers worked. This was tested through regressing a dummy for being dissatisfied with life on the interaction term between having a job and father's employment status at age 14. A different experience of worklessness should show as a significant interaction term. Table 2-4 presents these coefficients in odds ratios.

Table 2-4: Difference in experiencing being out of work in odds ratio

N=1,158	**Dissatisfied with life (s.e.)**
Have a job	0.63 (0.18)
Father did not work at age 14	0.61 (0.16)
Interaction employment and father's worklessness	2.55 (0.86)***

**: p<0.05, weighted and controlled for gender, age, education, race, born in UK, speaking English, cohabitation, having children, having poor health, contact with father, lived home at age 16, unemployment rate when aged 14, age of father, father's education, mother's education and employment in wave 1. Standard errors are presented in parentheses.*

The interaction term indicates that the association of employment and dissatisfaction with life differs significantly for respondents depending on whether their father worked when aged 14. The odds of being dissatisfied with life when employed are 0.63 times the odds when unemployed for children whose fathers worked, indicating they are more satisfied with life when working. For children whose fathers did not work the odds ratio is 1.61 [0.63*2.55] which indicates they are more satisfied with life when out of work. This may indicate that children whose fathers did not work at age 14 are already more familiar with being out of work and therefore suffer less when out of work themselves. This decreased stigma might then affect labour supply as remaining out of work while looking for a job is experienced less negatively (Tatsiramos, 2009). Another possible explanation of these results is that they face worse conditions on average resulting in work lowering their life satisfaction.

2.4.2 Sensitivity to inclusion of a binary unobserved confounder

Fathers and children share many unobserved characteristics that may influence their labour market success. This could be intelligence or motivation for instance (Ekhaugen, 2009; Macmillan, 2010). While this possible endogeneity is not dealt with directly the sensitivity of the results to unobserved characteristics is assessed.

This form of sensitivity analysis makes assumptions about the type of unobserved characteristics, such as the relation with the independent variable of interest and the strength of the relation with the outcome, to estimate the true effect of the treatment correcting for that confounder. By changing these characteristics the plausibility of an unobserved covariate of sufficient strength to change the conclusions regarding the treatment effect can be evaluated.

We use a method first proposed by Lin et al. (1998). They show a straight-forward correction factor to adjust the estimated effect of having a father who did not work, based on three parameters. First, the odds of the unobserved binary confounder on the outcome (Γ) in the treatment (1) and control group (0), which can be assumed to be the same; second, the probability that the confounder is present in the treatment group (P1); and third the probability that the confounder is present in the control group (P0). They show analytically that the true effect of the treatment, R, equals R*, the observed treatment effect in a reduced model without unobserved covariates, divided by an adjustment factor A, shown in equations 2-2 and 2-3 (Lin et al., 1998). The same adjustment factor can be used on the boundaries of the confidence interval so the statistical significance of the results can be assessed. This adjustment is applied to the logistic regression coefficients of having a father who did not work rather than worked in a lower paid occupation on the probability of being employed. Groenwold et al. (2010) state that this method is a more conservative estimate as the correlations between the unobserved covariates and the observed covariates are not taken into account.

$$R = {R^*}/{A} \qquad \text{(Equation 2-2)}$$

$$A = \frac{\Gamma_1 P_1 + (1 - P_1)}{\Gamma_0 P_0 + (1 - P_0)} \qquad \text{(Equation 2-3)}$$

The true effect of father's worklessness on their children's probability of employment is assumed to depend on the control variables, but also on an uncontrolled characteristic. This confounder has a given positive association with the child's employment probability and a negative association with

the probability of having a workless father (Groenwold et al., 2010; Lin et al., 1998). As a sensitivity analysis we estimate the odds ratio and standard error of having a father who did not work rather than working on a lower paid job including all controls. We then vary the strength of the unobserved confounder and its relation to the independent variable to assess the robustness of the effect of paternal worklessness on employment.

Assuming that someone with the unobserved confounder has odds of being in work that are twice as high as for someone without it (Γ=2), the unobserved confounder would have to be very unequally distributed to make the effect of having a father who did not work statistically insignificant. The estimated confidence intervals are shown in table A2-2 in the appendix. Only in the case where more than 80% of all those whose fathers worked have a certain skill that less than 10% of those whose fathers did not work have, would the effect be insignificant. As the model controls for education and other important characteristics such a disparity is quite unlikely. Assuming Γ to be 2 means that the unobserved confounder would have a stronger effect on employment than whether the father or mother had a higher degree or not (odds ratio of 1.05 and 1.51 respectively). If the association of the unobserved confounder with employment probability and the father's worklessness is as strong as the difference between having at most GCSEs and a university degree,[1] children of workless fathers are still estimated to have odds of being employed of 0.69 which is statistically significantly different from 0. While this does not mean there are no unobserved heterogeneity issues, these tests do indicate that the results are robust to strong unobserved factors.

2.4.3 Sensitivity to different specifications

In this chapter we only considered the effect of having a father who did not work compared to having a father who worked but still earned a low income. We do this to minimize the effect of

[1] The odds ratio (Γ) of being employed when having a university degree rather than only GCSEs is 6.24 and 29% of respondents whose fathers worked in low-paying occupations (p0) have a degree compared to 12% of those whose fathers did not work (p1).

paternal income. To estimate to what extent the effect of parental worklessness is due to income table 2-5 shows the estimated effect of parental worklessness when compared to having a father who worked in a highly paying job or in any job as well as the difference estimated using those working in lower paid jobs as shown in table 2-1. This shows that there is almost no difference in the estimated gaps indicating that the income does not play a big role. The only substantial differences are that the effect on job satisfaction is only statistically significant (at $p<0.05$) when comparing children whose fathers did not work to those who worked in lower paying jobs.

Table 2-5: Effect and standard error of father not working when using different control groups

Outcome	**Difference (low paid)**	**Difference (any job)**
Working	-0.14 (0.02)***	-0.14 (0.02)***
Work part-time	0.10 (0.03)***	0.12 (0.03)***
Hours/week	-3.23 (0.68)***	-2.99 (0.68)***
Low job satisfaction	0.06 (0.03)**	0.05 (0.03)*
Fixed-term contract	0.03 (0.02)	0.02 (0.02)
Low hourly wage given occupation	-0.03 (0.04)	-0.03 (0.04)
Low hourly wage given education	0.02 (0.04)	0.04 (0.04)
Logarithm of gross monthly labour market income	-0.05 (0.04)	-0.06 (0.04)

**: p<0.1; **: p<0.05; ***: p<0.01, the counterfactual for working is estimated from 3206 controls whose fathers worked (of whom 856 had fathers working in lower paid jobs) while the counterfactual for job characteristics is estimated on 2520 controls (of whom 622 had fathers working in lower paid jobs).*

Several other robustness tests in which one specification is changed are carried out and the results are shown in table A2-3 in the appendix. As already described the threshold of a low paying occupation is changed from the lowest 25% to the lowest 50% and the lowest 10%. Roughly the same effects as when using the lowest 25% are found. When restricting the outcome variable to being employed rather than unemployed, leaving out the inactive, the same results are found. This leaves 1,107 respondents of whom 78% are employed. Separating the analyses by gender it is found that father's worklessness is associated with lower employment probabilities and fewer hours for both. Sons of workless fathers were more likely to work part-time and daughters of working fathers were more likely to be dissatisfied with their job.

As a further test propensity score matching on the nearest neighbour is used to estimate the counterfactual outcomes rather than regression techniques. This method has been shown to be less biased than regression if large initial biases exist or if the functional relation between covariates and outcomes is incorrectly modelled (Caliendo and Kopeinig, 2008; Schafer and Kang, 2008). The results are also robust to this different estimation method. To conclude, the effect of father's worklessness on the probability of being employed is robust and strong. The employed children of workless fathers are consistently less satisfied with their jobs than they would have been if their father had worked.

The impact of parental background on labour market outcomes may differ by education as higher education may reduce the effects of disadvantage (e.g. (Torche, 2011). We therefore show the estimated effect of parental background separately for those with post-secondary qualifications and those with at most secondary qualifications. To increase efficiency the equation from which the counterfactual is created is still the full model including controls for education, but the average difference is estimated and tested for the subgroups by education. Only a small subset of the young adults whose fathers did not work are highly qualified. We find a very similar effect on the probability of employment, which is estimated to be 11p.p. lower than for their counterparts whose

fathers were employed. Among the higher qualified there is no effect on the probability of working part-time or on the hours worked however. This indicates that, while higher qualifications may limit the effects somewhat, parental worklessness is still associated with a substantially lower probability of employment.

2.5 Conclusion

The rising worklessness among young people highlights that studying job quality without taking employment into account risks missing a substantial aspect of economic disadvantage. This chapter shows that young adults whose father did not work when they were aged 14 are less likely to be employed themselves. When employed, they tend to work fewer hours and work part-time more often than their counterparts whose fathers did work. This difference remains even when comparing children whose fathers did not work with those whose fathers worked in a lower paying occupation.

Father's worklessness is not associated with having lower wages or less secure contracts. However, if a young adult's father did not work when he/she was younger they are less likely to be satisfied with their job. This could indicate that employment itself is experienced differently as similar objective conditions in terms of contract type and wage coincide with lower job satisfaction if someone's father did not work rather than if the father was employed. Alternatively, the experienced jobs could differ between those whose fathers worked and those whose fathers did not in characteristics that are not observed here.

Decreased wellbeing or differences in attitudes and behaviours account for at most 10% of the association between a father not working and his child being out of work when aged 16-30. There is some indication that young adults whose fathers did not work experience being out of work differently. While being out of work is on average associated with higher life dissatisfaction than working, this is actually the reverse for young adults whose fathers did not work. They are more likely to state being dissatisfied when employed than when out of work. Experiencing paternal

worklessness could thus lead to a different evaluation of being out of work and the importance of leisure time.

This chapter indicates the importance of taking family background into account when studying labour market experiences. It also shows that the high unemployment rates that occurred during the most recent economic crisis may have longer-term repercussions later on as these young adults have children of their own. A possible pathway through which experiences of worklessness while growing up can affect later labour market outcomes could be how work and being out of work is experienced. Experiencing paternal worklessness could affect the expectations of employment and the sense of failure when out of work which could affect further labour market outcomes.

Chapter 3: Crowding out of disadvantaged young adults in Germany: background matters depending on local labour market

3.1 Introduction

Social mobility has received a lot of political and scholarly interest. Inequality by background is detrimental for society and for the economy as a whole. Many studies have focused on the extent to which people's careers depend on their background and how this social reproduction is mediated by qualifications (Blau and Duncan, 1967). Background can still differentiate between people with similar qualifications however, through factors such as the access to high-status contacts, differences in cognitive or non-cognitive skills, or employer discrimination and favouritism (Anger, 2012; Bernardi and Ballarino, 2016b; Flap and Völker, 2008; Jackson, 2009).

What has not been considered is how inequality differs with the local labour market context. In this chapter I study the direct effect of parental background on labour market outcomes and the extent to which this effect depends on the local labour market context. This chapter suggests that the business cycle affects those from a disadvantaged household more than the more advantaged and thereby impacts on the extent of intergenerational mobility.

Whether a disadvantaged background leads to worse labour market outcomes depends on the hiring decisions of employers. During good economic times background might make little difference, on top of qualifications, as there are many jobs available. When conditions become worse there are more candidates for each job and employers are in a position to be more demanding (Devereux, 2002; Reder, 1955). This means that differences by background would become more salient. These differences could for instance be due to those growing up in a disadvantaged household being seen as less productive through lower cognitive and non-cognitive skills (Anger and Heineck, 2010; Bowles et al., 2005; Flap and Völker, 2008; Heineck and Riphahn, 2009); the disadvantaged being less able to make use of contacts to find work than their more advantaged peers (Flap and Völker, 2008; Kurz et

al., 2005); or employer prejudices or statistical discrimination coming more to the fore (Jackson, 2009).

This chapter focuses on young adults in West Germany in their early career between 1986 and 2011. Once education is taken into account, the German labour market is often considered to be meritocratic (Heineck and Riphahn, 2009). We indeed find that background does not matter much on top of education when conditions are good. On the other hand, as local labour market conditions worsen, those from a disadvantaged background are increasingly unlikely to find well-paying jobs or to find jobs at all and are crowded out of desirable jobs by their more advantaged counterparts.

This is important because the experiences during early career can have long-lasting scarring effects (Gregg and Tominey, 2005; Mavromaras et al., 2015). For the disadvantaged, having the bad luck of entering the labour market during a worse time can therefore have long-lasting effects and the transmission of this disadvantage over generations becomes all the more likely. Equally striking is that young adults from a more advantaged background are quite sheltered from adverse effects of the business cycle.

In this chapter I carry out separate analyses for the low and highly educated. There is a tight relation between education and the labour market in Germany which means experiences can differ strongly depending on qualifications (Kurz et al., 2005). Economic insecurity in the early career is also generally substantially different for the more and less highly educated, with those with lower qualifications being increasingly at a disadvantage and at risk (Bukodi and Dex, 2010; Jones, 2009; Schoon and Silbereisen, 2009). As higher education is often considered the great equaliser the effect of family background is expected to be higher among the lower qualified. In a recent study on the direct effect of social origin on labour market outcomes in Germany, Grätz and Pollak (2016) find no evidence of this however.

3.2 Conceptual framework

Parental disadvantage is associated with children's lower education which in turn affects their labour market success (Triventi, 2013). While this is an important channel, we focus on how family background differentiates between similarly qualified young adults. There are several possible mechanisms through which background can differentiate between people with similar qualifications (Bernardi and Ballarino, 2016b). In this chapter we address two possible mechanisms that are likely to affect labour market outcomes differently depending on the business cycle in more detail.

First, growing up in a more advantaged household is associated with higher cognitive and non-cognitive skills (Anger, 2012; Cunha and Heckman, 2007; Farkas, 2003; Schoon et al., 2012). Cognitive skills refer to characteristics such as intelligence or problem-solving capabilities, while non-cognitive skills refer to personality and behaviour, as well as attitudes. The latter are also valued in the labour market. For instance they have been shown to influence employment probabilities and wages when keeping education constant (Cunha and Heckman, 2007).

Second, growing up in a disadvantaged family affects the type of contacts young adults have access to through their social networks (Flap and Völker, 2008). Many young adults rely on their parents' networks while searching for work (Corak and Piraino, 2011). Besides reducing the cost of job search, recommendations through contacts also reduce uncertainty for employers and may lead to good jobs (Holzer, 1988). Young adults from a disadvantaged background may find it harder to get access to good jobs than their more advantaged peers, as their parental network will often not include high-status contacts (Flap and Völker, 2008).

Other possible ways in which parental background can affect labour market outcomes are for instance a direct transmission of assets or family businesses, differences in career aspirations, or a direct bias on the part of employers where they either favour the most advantaged or discriminate against disadvantaged applicants (Bernardi and Ballarino, 2016b; Jackson, 2009).

These differences can render young adults from a disadvantaged background less competitive on average than their more advantaged counterparts. The degree to which this matters depends on the importance employers place on this. Reder (1955) proposed that employers react to the business cycle by lowering their hiring standards when demand outstrips supply and by increasing the hiring standards when supply is larger than demand. Pollman-Schult (2005) and Buttner et al. (2010) confirm this for Germany.

These hiring standards can be anything that employers attach importance to, including discriminatory preferences as well as the perceived skills of the applicant (Reder, 1955). This is likely to affect the disadvantaged more than those from a more advantaged background. They can be perceived to be less skilled, for instance by having fewer extra-curricular activities on their c.v.; by the type and quality of schooling obtained or through the application and interview process. Besides actual differences in cognitive and non-cognitive skills, prejudice or statistical discrimination may also become more prominent during worse economic times (Birkelund et al., 2016; Humburg et al., forthcoming; Jackson, 2009).

Another way in which background may become more important as labour market conditions worsen and jobs become scarcer is that people may also depend more on their social networks to find out about opportunities. Employers may also rely more on recommendations as the uncertainty is higher (Kurz et al., 2005). This would then lead to a larger difference between people depending on the quality and extent of their social networks which can increase differences by background.

One paper that addresses a similar question is Macmillan (2014). She uses British longitudinal data to show that the transmission of unemployment from father to son is stronger if the local unemployment rate is higher. She explains this through a shared network with low information on jobs. This crucial finding indicates that the effects of family disadvantage are linked to the local labour market. We test this using German data but also add to this by specifically addressing a crowding-out mechanism among similarly qualified young adults.

In this paper, we address the question whether those from a disadvantaged background are more sensitive to the business cycle than their more advantaged counterparts. We expect that disadvantaged young adults are more at risk of becoming outsiders in the labour market as conditions worsen, as they are crowded out by their more advantaged peers (Buchholz et al., 2009). To gauge at labour market inclusion we study the type of job contract and the hourly wage attached to the job, besides considering whether someone is employed at all. A higher risk of unemployment and lower wages threaten economic security and can impact life chances strongly. A temporary contract entails less protection and therefore offers less stability than a permanent contract (Kurz et al., 2005). During times of high local unemployment the disadvantaged would be less likely to obtain jobs that pay as well or are as secure as they would have when conditions were good. The lower educated would be most at risk of being crowded out of employment altogether as more advantaged young adults are hired over them (Humburg et al., forthcoming; Reder, 1955).

3.3 Data and methods

3.3.1 Sample and method

The analyses are carried out using the German Socio-Economic Panel Study (SOEP) from 1984 to 2011 for West Germany.[2] This is a household panel study in which we observe the respondents' household situation while growing up and can link this to later outcomes in the labour market. The sample consists of 12,888 observations for 2,624 young adults, aged between 16 and 35 and not in full-time education or currently working on an apprenticeship. After restricting this to only the employed and using listwise deletion 9,641 observations for 2,049 employed young adults remain. Random intercept multilevel models are used, estimated through maximum likelihood. These allow for a person-specific residual term to capture time-invariant unobserved individual characteristics (Scherer, 2004; Singer and Willett, 2003).

[2] Socio-Economic Panel (SOEP), data for years 1984-2011, version 29, SOEP, 2013, doi:10.5684/soep.v29

Equation 3-1 shows the model for person 'i' at time 't', with the outcomes Y, discussed in section 3.3.2, depending on a vector of time-varying control variables X, including age, health status and potential experience; and time-invariant control variables Z including gender and migration status; family background FB; and local unemployment rate UE. u_i is a normally distributed person-specific error and ε_{it} is a white-noise residual. Family background interacts with the local unemployment rate to test the hypothesis that young adults from a disadvantaged background are more sensitive to the business cycle than their more advantaged peers. All these components are discussed in detail further on in this section.

$$Y_{i\,t} = \alpha_0 + \beta_1 X_{it} + \beta_2 Z_i + \gamma_1 * FB_i + \gamma_2 * UE_{it} + \gamma_3 * FB_i * UE_{it} + u_i + \varepsilon_{it} \quad \text{(Equation 3-1)}$$

The German labour market is characterized by a tight coupling with the educational system (Heineck and Riphahn, 2009; Müller and Pollak, 2004). As the effect of local labour market context can differ by education the model is estimated separately for the lower educated ("no degree", "basic secondary", "technical or general secondary" or "other secondary degree") and for those with at least some post-secondary qualifications ("apprenticeship or vocational qualification", "technical school", "other vocational", "technical college" or "university degree") while still controlling for each specific type of qualification.

Early labour market outcomes differ substantially for men and women in Germany (Scherer, 2001). Ideally the analyses would therefore be separated by gender. As the sample is not very large I only control for gender, but I do carry out separate analyses as a sensitivity check. I find that the way in which parental background affects early labour market outcomes and how this differs with the local labour market context is similar for men and women.

3.3.2 Dependent variables

To answer whether disadvantaged young adults are more sensitive to the business cycle and if so, why, I study two sets of dependent variables. A first set of dependent variables aims to capture the

extent to which those from a disadvantaged background are more likely to be outsiders in the labour market and how this worsens as the labour market slackens (Buchholz et al., 2009). This is measured by studying whether someone is employed (dummy: employment); and when employed I study the hourly wage and whether the contract is temporary rather than permanent (dummy: temporary). Employment and working on a temporary contract are measured as indicator variables and estimated using logistic regression, while the natural logarithm of hourly wage is modelled using a linear model.

3.3.3 Measuring family background

Family background (FB in eq. 3-1) is a multidimensional concept (Bukodi and Goldthorpe, 2013; Caro and Cortés, 2012). We measure three aspects of the socio-economic conditions of a household when the child was aged between 5 and 14. First, parent's education, measured as the average years of education of the highest educated parent when the child was aged between 5 and 14, is strongly linked to the child's cultural capital and education (Anger, 2012; Heineck and Riphahn, 2009). Second, parents' occupational status is closely related to social networks and values in the household (Flap and Völker, 2008; Jonsson et al., 2011). This is measured as the average occupational status, in the Treiman scale, of the parent with the highest status. The third aspect is the average household income over the observed period which accounts for the financial means of the family while growing up.

These three aspects taken together provide an overall view of the resources available to a household, be they financial, cultural or social. To provide an overview and for ease of interpretation all three aspects are combined in one average scale after standardisation. A principal component analysis shows that they can be reduced to one concept and the Cronbach's alpha of this scale is 0.79. The resulting scale is split up in the lowest 20%, seen as disadvantaged, the highest 20% who are advantaged and the middle 60%. The results are shown for this composite measure to capture the effects of general socio-economic disadvantage rather than focusing on one characteristic

(Jackson, 2009). We also present the main outcomes when using the separate aspects and while there are some differences these also support for our hypotheses, as discussed further in the results section (section 3.4.2).

Some other papers have combined family background in a similar fashion. Bukodi, Erikson and Goldthorpe(2014) consider parental status, class and education separately and then combine all three in a composite measure to capture overall disadvantage. Caro and Cortés (2012) use an approach similar to ours to construct a socio-economic status measure and they demonstrate its validity.

3.3.4 Local labour market

As the theoretical framework is concerned with the hiring behaviour of employers the unemployment rate (UE) at the moment of job entry is used for those who are employed. I aim to test whether the conditions at the entry of a job affect the type of job obtained differently for the disadvantaged and the advantaged, in line with the literature on crowding out (Devereux, 2002; Reder, 1955). For the unemployed the current unemployment rate is used. I also carry out the analyses using only the current unemployment rate to analyse the effect of the local labour market on the probability of being employed. This allows for the probability that the business cycle also affects the probability of leaving work and becoming unemployed differently depending on parental background. The results remain unchanged. The unemployment rate is centred on its mean for ease of interpretation of the main effects and the interaction term.

To approximate the climate of the labour market experienced by a job seeker the unemployment rate is measured at local level. The local labour market is not clearly defined geographically and its size depends on how willing to move or commute someone is. The unemployment rate is available at three distinct geographical levels from the employment office (Bundesagentur für Arbeit, 2014a, 2014b) and from the local data of the SOEP: the 11 West German states; the 75 smaller travel-to-work areas (“Raumordnungsregion”: ROR) which consist of an economic centre and the surrounding

area, taking commuting streams into account (Brueckner et al., 2002; Knies and Spiess, 2007); and the 'community' ("Kreis") level. Using information criteria the level at which the unemployment rate provides the best fit is chosen. The unemployment rate at the state level is most important for the higher educated group, while the travel-to-work area is more important for the lower educated group, in line with earlier findings that the higher educated are more geographically mobile than those with lower qualifications (Bauernschuster et al., 2014; Longhi and Brynin, 2007).

3.3.5 Control variables

We control for time-invariant differences (Z_i in equation 3-1) between people by including gender (dummy), migration status (dummy) and the sample group which have different selection probabilities in the survey design through a series of dummies.[3] To account for differences over time we include the following time-varying controls (X_{it} in equation 3-1). We include fixed effects for years and state of residence to account for institutional differences and shocks. We also include marital status (dummy) and the presence of children (dummy), age and age squared and the age of father and mother. As a proxy for health status, which is shown to correlate with having a disadvantaged background and can affect labour market outcomes (Palloni, 2006), we include satisfaction with health on a 10-point scale. We also include potential experience, which is the years someone is observed since leaving full-time education (Christopoulou and Ryan, 2009). Table A3-1 in the appendix shows the descriptive statistics by education and family background.

Children being present in the household, age and health satisfaction are possibly endogenous and are split up in the person-specific average and the deviations from that average (Bell and Jones, 2015). This method allows these variables to have different effects between and within individuals. The latter are shown to be equivalent to fixed effects coefficients and therefore limit the problem of

[3] The SOEP consists of several samples, including the original sample of West-Germans, booster samples for migrants, people on high income, an East German sample and several refreshment samples. These samples have different selection probabilities and it is therefore important to account for this.

endogeneity (Bell and Jones, 2015). The model is also estimated without these controls and the conclusions remain similar which indicates any potential bias is small.

3.3.6 Possible mechanisms

As an extension, we test two possible mechanisms for why the disadvantaged would be more sensitive to the labour market conditions than their more advantaged counterparts: namely a difference in perceived skills or a lack of social networks. We cannot test these directly, so we include two further outcomes which are indicative of the mechanisms. First, we attempt to approximate the employer perception by studying whether young adults work on jobs that match their qualifications. Following human capital theory, being formally overqualified can reflect the fact that people with similar qualifications differ in other characteristics such as cognitive and non-cognitive skills or how they are perceived by employers (Leuven and Oosterbeek, 2011). This interpretation is supported by research in the Netherlands (Allen and Velden, 2001) and in the UK (Chevalier and Lindley, 2009; Green and McIntosh, 2007). If differences in the sensitivity to the business cycle by background are due to differences in (perceived) skills we should also see that the disadvantaged are more at risk of being overqualified – controlling for other structural factors such as age, gender and career progression – than their more advantaged peers as the unemployment rate increases. While this measure is far from perfect it can provide indirect evidence, particularly because we are interested in changes due to the business cycle and not in the levels of overqualification per se.

We follow a method proposed by Scherer (2004) to measure statistical qualification mismatch where the person's own status is compared to the average status of those with similar qualifications. We classify someone as not matched if their occupational prestige, measured through the Treiman scale, lies in the lowest quartile of those of similarly qualified peers.

A limitation of this approach is that we cannot measure employers' decision making process directly. While the disadvantaged may lose out on jobs because they do less well on an interview or are less

productive, they may also lose out because of statistical discrimination or prejudice which can be exercised more freely when competition for jobs is higher (Birkelund et al., 2016; Humburg et al., forthcoming; Jackson, 2009).

Second, if the disadvantaged have a less efficient social network than the more advantaged and this network becomes more important as the labour market tightens, we expect them to be less likely to find a job through networks as the unemployment rate increases (Macmillan, 2014). If the networks of the more advantaged hold more information that leads to good jobs we expect this difference by background to increase with the unemployment rate.

We model this through a dummy variable indicating whether someone found their job through friends and relatives rather than another method of job search. This combines both strong and weak ties which may have different effects (Lin, 2001). A further issue with this variable is that it is only available for those who are working meaning we analyse differences in the efficiency of finding work through social networks rather than the use of networks in job search (Mouw, 2003). As this variable is only available from 1998 the analytical sample is restricted to 2,934 observations for 1,516 young adults.

To study whether part of the vulnerability to business cycle is due to job search or the likelihood of being seen as lowly skilled we do not only use these variables as an outcome but also include them in the models on working on temporary contracts and the hourly wage.

3.4 Results

3.4.1 Varying inequality by background in labour market outcomes

This section presents the estimates of the multilevel models for the different labour market outcomes. The estimates for employment probability and temporary employment are shown in odds ratios. Only the coefficients for family background, local unemployment rate and their interaction are shown in table 3-1. Table 3-2 presents the marginal effects of an increase in the local

unemployment rate on all outcomes, calculated at the grand margin. To interpret the results further the predicted outcomes, calculated at the grand margin, are presented graphically by background and unemployment rates. Full results of the main models are available in table A3-2 in the appendix.

Column 1 in table 3-1 presents the odds ratio of background interacted with the local unemployment rate on the probability of employment. As the local unemployment rate is centred the main effects of family background show the estimated differences between young adults of different backgrounds but with similar education and potential experience at an average local unemployment rate. At both levels of qualifications, those who grew up in a disadvantaged household are significantly less likely to be employed, but the effects in odds ratios are stronger among the lower qualified. The odds of employment decrease significantly (at $p<0.1$) for the disadvantaged as the local unemployment rate increases. Among the lower qualified, this effect is substantially different for the middle group but not the most advantaged. As the employment probabilities differ substantially by background a similar odds ratio can hide substantial differences in the outcome. Among those with higher qualifications the effects of local unemployment rate on employment are only statistically significantly ($p<0.05$) different between the disadvantaged and advantaged.

The sensitivity of employment probability to the business cycle is shown in column 1 of table 3-2 and in figure 3-1. While an increase in unemployment reduces the employment probability of all young adults with low qualifications, this effect is more than three times larger for the disadvantaged than for those of a middle or advantaged background. This difference results in there being little difference in employment probability by background when the local unemployment rate is very low but as the labour market slackens the disadvantaged are increasingly more likely to be unemployed and differences by background increase. Figure 3-1 shows the predicted employment probabilities depending on the local unemployment rate by background and the 90% confidence intervals.

Table 3-1: Effect (s.e.) of background and the unemployment rate on labour market conditions

Low Qualifications	1 Employment (odds ratio)	2 Log hourly wage	3 Temporary (odds ratio)
Middle (vs disadv.)	2.42	0.038	1.06
	(0.65)**	(0.041)	(0.33)
Adv. (vs disadv.)	6.90	0.151	0.54
	(3.03)**	(0.066)**	(0.29)
Unemployment rate	0.75	0.003	1.30
(ROR)	(0.05)**	(0.008)	(0.10)**
Middle *	1.15	0.003	0.85
Unemployment	(0.08)**	(0.008)	(0.07)*
Advantaged *	1.03	-0.002	0.96
Unemployment	(0.12)	(0.019)	(0.15)
Rho	*0.61*	*0.63*	*0.61*
N persons	*1370*	*754*	*754*
N observations	*4198*	*2503*	*2503*
High Qualifications			
Middle (vs disadv.)	1.56	0.03	0.99
	(0.37)*	(0.03)	(0.22)
Adv. (vs disadv.)	2.10	-0.03	1.62
	(0.76)**	(0.04)	(0.46)*
Unemployment rate	0.87	-0.02	0.82
(state)	(0.07)*	(0.01)**	(0.06)**
Middle *	1.11	0.02	1.11
Unemployment	(0.08)	(0.01)**	(0.08)
Advantaged *	1.26	0.02	1.11
Unemployment	(0.14)**	(0.01)**	(0.09)
Rho	*0.54*	*0.32*	*0.58*
N persons	*1845*	*1570*	*1570*
N observations	*8690*	*7138*	*7138*

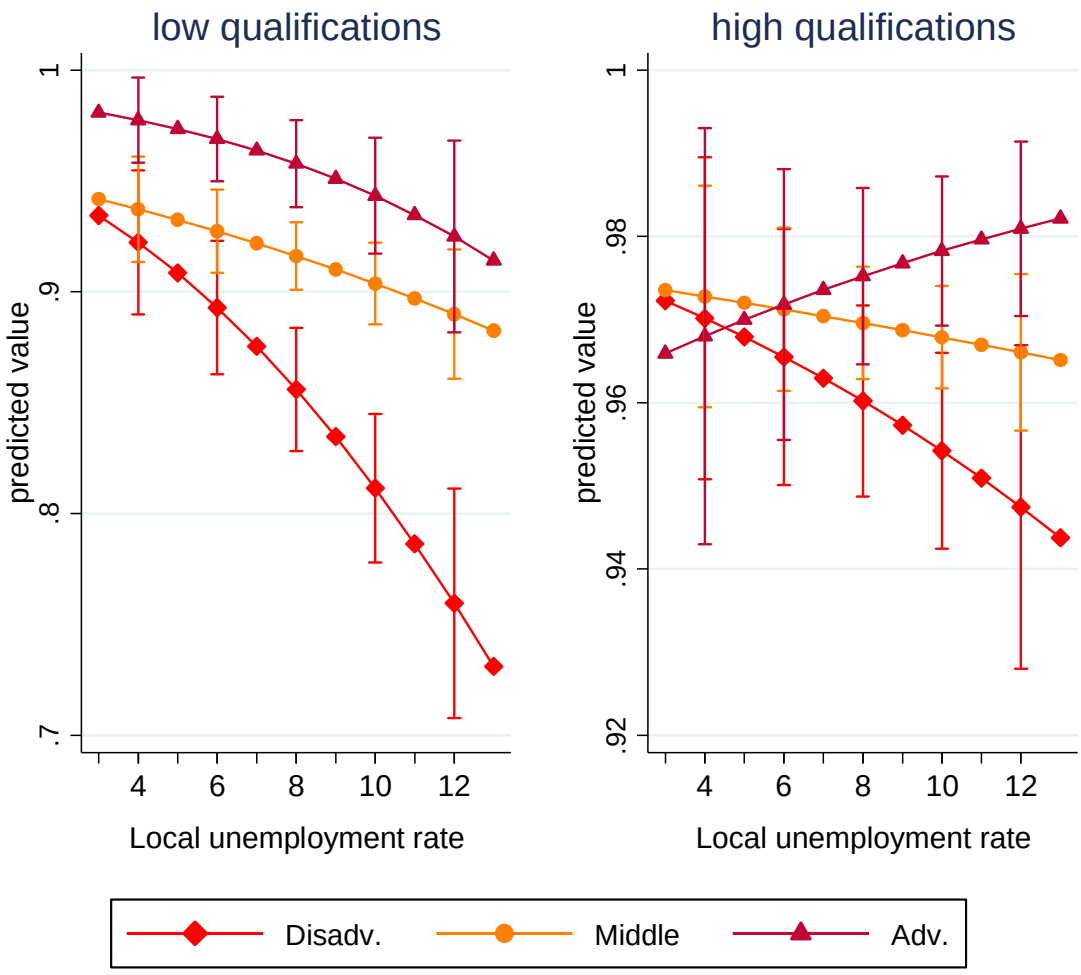
**: p<0.1, **: p<0.05, controlled for dummies for year, state, sample, school, gender, marital status, having a child, migrant status; and satisfaction with health, father birth year, mother birth year, potential experience. Rho indicates the proportion of residual variance that is due to unobserved person-specific characteristics.*

Table 3-2: Effect (s.e.) of unemployment rate on labour market outcomes by background

Low Qualifications	1 Employment	2 Log hourly wage	3 Hourly wage	4 Temporary
Disadvantaged	-0.027	0.003	0.017	0.024
	(0.006)**	(0.008)	(0.044)	(0.007)**
Middle	-0.007	0.007	0.036	0.009
	(0.003)**	(0.008)	(0.044)	(0.007)
Advantaged	-0.006	0.001	0.008	0.015
	(0.004)*	(0.018)	(0.112)	(0.011)
High Qualifications				
Disadvantaged	-0.004	-0.023	-0.154	-0.019
	(0.003)	(0.007)**	(0.049)**	(0.007)**
Middle	-0.001	-0.008	-0.053	-0.008
	(0.001)	(0.004)*	(0.030)*	(0.004)**
Advantaged	0.001	-0.002	-0.011	-0.011
	(0.001)	(0.006)	(0.040)	(0.007)

**: p<0.1, **: p<0.05, predicted marginal effects of local unemployment rate at the grand margin, showing the effect in percentage points for all binary outcomes. The effect on hourly wage is shown in log form and in pounds.*

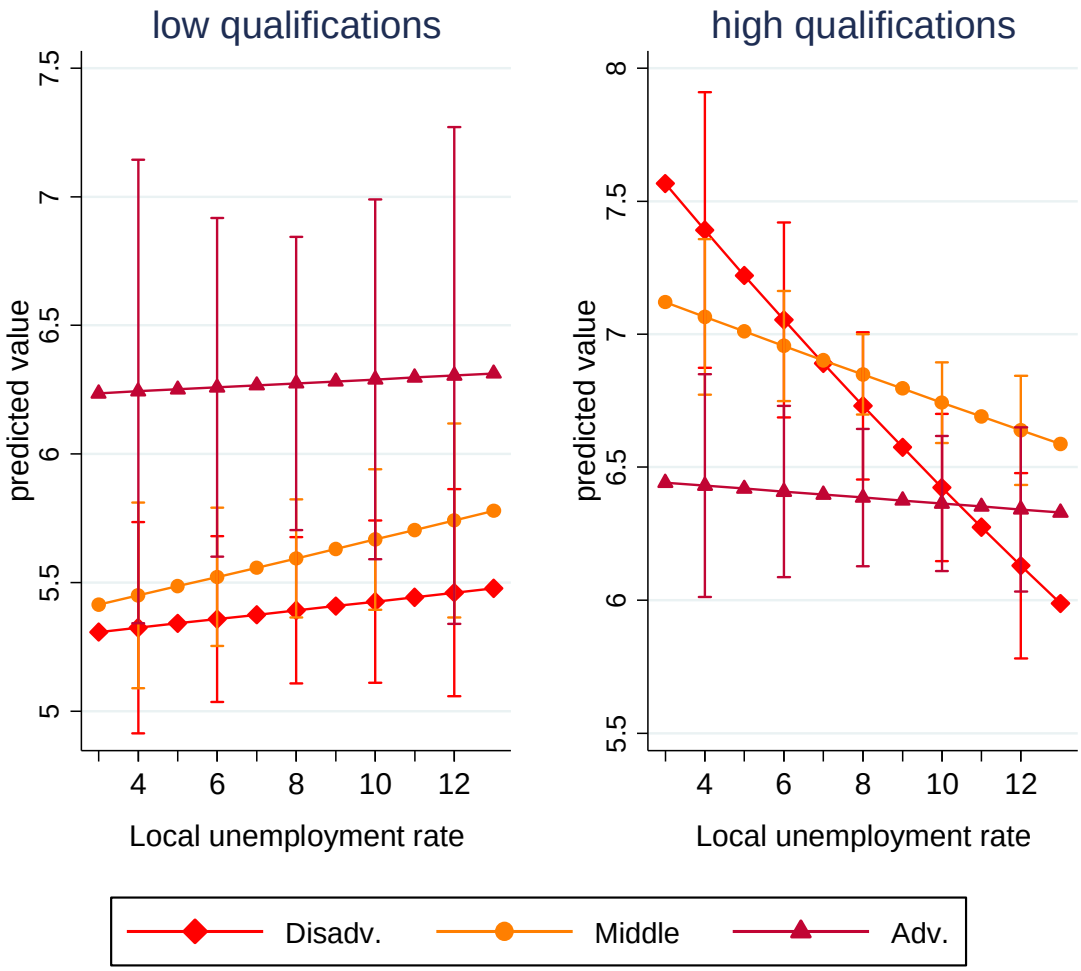
Figure 3-1: Predicted employment probability (90% C.I.) over unemployment rate



The left side of figure 3-1 shows the increasing difference in employment probability by background for the lower qualified. The right-hand side of figure 3-1 shows that among the higher qualified only the disadvantaged are negatively affected as the unemployment rate increases. When the local unemployment rate is above the median unemployment rate of 8 the difference between the advantaged and disadvantaged becomes statistically significant (at $p<0.1$), although the differences are small. Having post-secondary qualifications does protect against unemployment, but even in this group we find that facing adverse conditions while growing up increases the risk of unemployment more for the disadvantaged than the more advantaged.

If the disadvantaged get crowded out of good jobs we expect those young adults to work on less well paid jobs if the local unemployment rate is low at the time of entry. The coefficients for log hourly wage are shown in column 2 of table 3-1. The hourly wage of those with lower qualifications is not significantly affected by the local labour market conditions. This is possibly because most people in this group work in jobs that are already paying close to the minimum and are more strictly regulated. Worsening conditions would then affect labour supply rather than wage, consistent with our findings. Among those with higher qualifications there is no significant difference by family background when entering employment during a time of average unemployment, but the wage of the disadvantaged decreases at a significantly ($p<0.1$) higher rate than the wages of those from a middle or advantaged background as local unemployment increases. The lower panel of the 2nd column of table 3-2 shows that the estimated effect of a 1 p.p. increase in local unemployment on the log hourly wage of the disadvantaged is 0.02 while this effect is more or less 0 for the advantaged and insignificant (at $p<0.1$) for the middle group. For small numbers these coefficients can be interpreted as percentage differences. The 3rd column of table 3-2 shows the average effect of a 1p.p. increase in the local unemployment rate in pounds. For the disadvantaged this corresponds to a loss of around 15 pence per hour while it is 5 or 1 pence for those of a middle or advantaged background respectively. Figure 3-2 shows the predicted wage by background as it varies over the local unemployment rate. On the right hand it is shown that the wage for the more highly qualified disadvantaged is clearly most sensitive to the local labour market conditions upon job entry. At low levels of local unemployment the disadvantaged are actually estimated to earn more than the most advantaged. As the labour market slackens this reverses. During worse economic times the difference in wage between the middle group and the disadvantaged becomes statistically significant (at $p<0.1$).

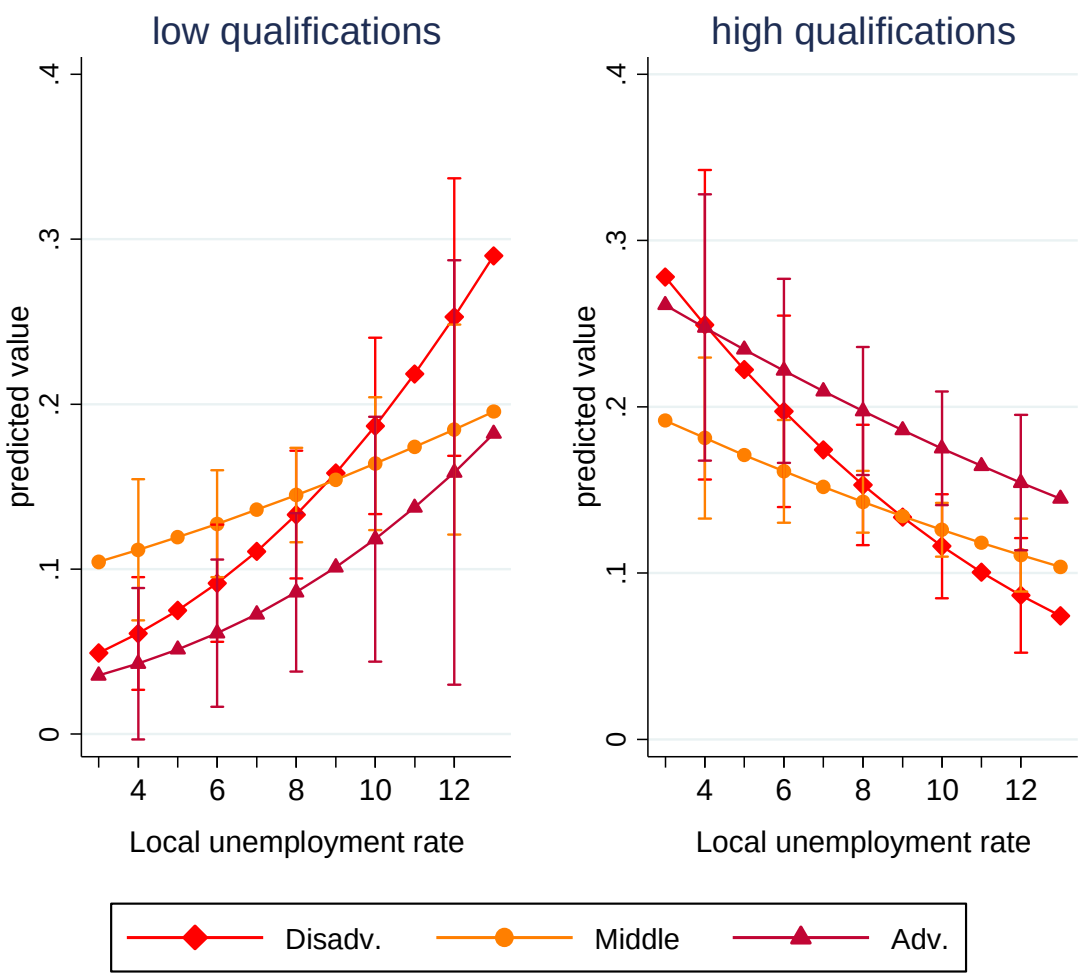
Figure 3-2: Predicted hourly wage (90% C.I.) over unemployment rate



Column 3 in table 3-1 presents the odds ratio of background and local unemployment rate on working on a temporary rather than a permanent contract. The degree to which background and the local unemployment rate influence the contract type differs substantially for the low and highly qualified. Among those with at most secondary qualifications a higher unemployment rate is associated with increasing odds of working on a temporary contract. Those from a middle or advantaged background are less affected although only the difference with those of middle background is statistically significant ($p<0.1$). Among the more highly qualified the probability of working on a temporary contract decreases with the unemployment rate. It does so most for the disadvantaged, but the differences by background are not statistically significant. The 4th column in

table 3-2 shows that among the lower qualified only the disadvantaged are affected by the labour market conditions as a 1 p.p. increase in the local unemployment rate is associated with an increase in the risk of working on a temporary contract of 2.5 p.p.. Among those with higher qualifications the most advantaged are affected most by the business cycle and those from a middle background least. This can also be seen in figure 3-3. The predicted probability of working on a temporary contract depends most on the business cycle for the disadvantaged but the effect differs depending on qualifications. When the local labour market is loose the disadvantaged with higher qualifications are estimated to be statistically significantly ($p<0.1$) less likely to work on temporary contracts than the advantaged while there are no differences during better economic times.

Figure 3-3: Predicted probability of a temporary contract (90% C.I.) over unemployment rate



Worsening labour market conditions increase the risk of working on temporary contracts for the lower qualified while this risk becomes smaller among the more highly qualified. Two additional models are estimated to explain this. The probability of being employed rather than unemployed is analysed for those who work on temporary contracts and for those who work on permanent contracts separately. The marginal effects of the local unemployment rate by socio-economic background in these analyses are shown in table 3-3. Among the lower qualified an increase in the local unemployment rate reduces the probability of working in both temporary and permanent positions. Among the higher qualified the probability of working on permanent contracts remains fairly constant as the local unemployment rate increases while the disadvantaged are statistically significantly less likely to work on temporary contracts as labour market conditions worsen. As temporary contracts then become scarcer for the disadvantaged with high qualifications they are increasingly more likely to work on a permanent rather than a temporary contract as labour market conditions worsen. This might indicate that in worse economic times employers either lay off temporary workers or not hire any more. The sort of job done on a temporary contracts and its desirability may also differ depending on education, consistent with work by Gebel (2009) and Kogan (2011) who find that the temporary jobs in Germany are found at the top and the bottom of the educational distribution. This could indicate that these jobs are more desirable for those with higher qualifications but less so for the lower qualified supporting the finding that the disadvantaged are again more likely to gain the less desirable positions the worse labour market conditions become.

Table 3-3: Effect (s.e.) of local unemployment on temporary or permanent contract rather than unemployment

	Low Qualifications		**High Qualifications**	
Family background	Temporary contract	Permanent contract	Temporary contract	Permanent contract
Disadvantaged	-0.026	-0.039	-0.020	-0.004
	(0.013)**	(0.008)**	(0.013)*	(0.003)
Middle	-0.012	-0.009	-0.004	-0.001
	(0.009)	(0.004)**	(0.007)	(0.001)
Advantaged	-0.008	-0.006	0.005	0.001
	(0.008)	(0.004)	(0.007)	(0.002)
N observations	*2034*	*3631*	*2784*	*7143*

**: p<0.1, **: p<0.05, predicted marginal effects of local unemployment rate at the grand margin, controlled for dummies for year, state, sample, school, gender, marital status, having a child, migrant status; and satisfaction with health, father birth year, mother birth year, potential experience.*

The findings discussed above indicate that growing up in a disadvantaged household increases the vulnerability to the local labour market in a way that is consistent with being crowded out of jobs by similarly qualified candidates from a more advantaged background. Those with higher qualifications are bumped down to jobs that pay less well. They are also less likely to work in temporary jobs which can afford a foothold to a better or more permanent job (Gebel, 2013; Scherer, 2004). Among those with lower qualifications the difference shows in a rapidly increasing risk of unemployment for the disadvantaged when compared to their more advantaged counterparts. They are also more likely to work on less secure temporary contracts as conditions worsen.

3.4.2 The separate aspects of parental background

This chapter uses a composite measure of disadvantage. While parental income, education and socio-economic status are related, they do not measure exactly the same thing and are expected to have separate effects (Bukodi and Goldthorpe, 2013). The rationale in combining them is to offer a

parsimonious measure of the general socio-economic conditions young adults faced while growing up, rather than isolate these aspects (Caro and Cortés, 2012; Jackson, 2009). Table 3-4 shows the marginal effects of the unemployment rate for groups when using each different aspect separately. As expected, the differences by background in the effect of the local unemployment rate on labour market outcomes depend on the aspect of family background used, but they point in the same direction. Among the lower qualified, all indicators point to those growing up in the least advantaged households being most affected in terms of finding work (column 1) or working on less secure temporary contracts (column 3). This holds regardless of whether the least advantaged are those with low educated parents, growing up in poverty, or with parents working low-status positions. Among those with higher qualifications there is more differentiation. Only when measuring household income is the risk of unemployment (column 4) more influenced by the unemployment rate for the disadvantaged than for the more advantaged. With regards to wage (column 5) it is only when measuring parental background through their occupational status that the disadvantaged are significantly more affected by the business cycle than the middle group, while always being more sensitive than the advantaged. This difference could indicate the specific role of occupational status as being more associated with social networks (Chan and Goldthorpe, 2004; Flap and Völker, 2008). This could then discriminate more between people as the labour market slackens. The type of contract (column 6) someone works on depends more on the business cycle for the disadvantaged than their more advantaged counterparts when defining disadvantage through household income or parental occupational status, but not when studying education.

Table 3-4: Effect (s.e.) of unemployment on labour market outcomes by different aspects of parental background

	Low Qualifications			**High Qualifications**		
	1 Employment	2 Log hourly wage	3 Temporary	4 Employment	5 Log hourly wage	6 Temporary
Education						
Disadv.	-0.023	-0.014	0.021	-0.001	-0.009	-0.004
	(0.009)**	(0.012)	(0.011)**	(0.003)	(0.014)	(0.014)
Middle	-0.015	0.011	0.016	-0.001	-0.011	-0.009
	(0.004)**	(0.007)	(0.006)**	(0.001)	(0.004)**	(0.004)**
Adv.	-0.005	-0.006	0.003	0.000	-0.002	-0.015
	(0.003)	(0.017)	(0.010)	(0.002)	(0.006)	(0.007)**
Income						
Disadv.	-0.021	-0.001	0.029	-0.007	-0.006	-0.017
	(0.007)**	(0.009)	(0.008)**	(0.003)**	(0.008)	(0.007)**
Middle	-0.013	0.004	0.009	-0.001	-0.011	-0.011
	(0.003)**	(0.007)	(0.006)	(0.001)	(0.004)**	(0.004)**
Adv.	-0.004	0.038	0.016	0.000	-0.001	-0.009
	(0.003)	(0.016)**	(0.011)	(0.001)	(0.007)	(0.007)*
Status						
Disadv.	-0.020	0.012	0.031	-0.001	-0.020	-0.020
	(0.007)**	(0.011)	(0.010)**	(0.002)	(0.007)**	(0.007)**
Middle	-0.015	0.017	0.005	-0.001	-0.007	-0.007
	(0.004)**	(0.008)	(0.007)	(0.001)	(0.005)	(0.005)*
Adv.	-0.006	-0.013	0.009	0.000	0.002	-0.015
	(0.004)	(0.018)	(0.012)	(0.001)	(0.006)	(0.007)**

**: p<0.1, **: p<0.05, predicted marginal effects of local unemployment rate at the grand margin. Each background characteristic estimated in a separate model, controlled for dummies for year, state, sample, school, gender, marital status, having a child, migrant status; and satisfaction with health, father birth year, mother birth year, potential experience.*

3.4.3 The role of social networks and skills differentials

Two possible drivers of the crowding out of disadvantaged young adults by their more advantaged counterparts are a different use of social networks in job search and a perceived or de facto difference in skills. We model the probability of working on a job that matches a person's qualifications in terms of social status and the probability of having found a job through friends and relatives. The main results are shown in table 3-5 and the estimated effects of the unemployment by background at the grand margin are shown in table 3-6. To test the extent to which being overqualified or finding a job through networks or friends affect the other labour market outcomes table 3-7 presents their effects on wage and working on a temporary contract.

Table 3-5: Effect (s.e.) of background and unemployment rate on networks and matched job

	Low Qualifications		**High Qualifications**	
	1 Network	2 Prestige matched	3 Network	4 Prestige matched
Middle	0.80	1.00	1.26	1.18
(vs disadv.)	(0.37)	(0.43)	(0.33)	(0.45)
Advantaged	1.17	1.26	0.99	4.17
(vs disadv.)	(0.84)	(0.92)	(0.32)	(2.11)**
Unemployment	0.86	0.86	0.81	0.88
rate (ROR)	(0.12)	(0.07)*	(0.12)	(0.08)
Middle *	1.14	1.19	1.08	1.06
Unemployment	(0.16)	(0.13)	(0.11)	(0.10)
Advantaged *	1.37	1.07	1.08	1.04
Unemployment	(0.31)	(0.24)	(0.12)	(0.13)
Rho	*0.46*	*0.72*	*0.36*	*0.84*
N persons	*376*	*754*	*1123*	*1570*
N observations	*563*	*2503*	*2045*	*7138*

**: p<0.1, **: p<0.05, controlled for dummies for year, state, sample, school, gender, marital status, having a child, migrant status; and satisfaction with health, father birth year, mother birth year, potential experience. Rho indicates the proportion of residual variance that is due to unobserved person-specific characteristics.*

Column 1 in table 3-5 shows that the probability of having found a job through friends and relatives is not affected by background or the business cycle in our models. Columns 1 and 2 in table 3-7 show that jobs found through social networks tend to be slightly better paid than those found through other means for the lower qualified while for the higher qualified a job found through friends and relatives is less likely to be temporary. While there are independent effects of the type of job search method on labour market outcomes we find no evidence for a mediation effect of socio-economic background.

Table 3-6: Effect (s.e.) of unemployment rate on networks and matched job by background

	Low Qualifications		**High Qualifications**	
	1 Network	2 Prestige matched	3 Network	4 Prestige matched
Middle (vs disadv.)	-0.025	-0.009	-0.026	-0.007
	(0.016)	(0.006)	(0.019)	(0.005)
Adv. (vs disadv.)	-0.002	0.001	-0.019	-0.003
	(0.016)	(0.006)	(0.016)	(0.003)
Unemployment rate (ROR)	0.025	-0.004	-0.017	-0.002
	(0.023)	(0.011)	(0.015)	(0.002)

**: p<0.1, **: p<0.05, predicted marginal effects of local unemployment rate at the grand margin, showing the effect in percentage points.*

The 2nd column of table 3-5 show that the probability of working on a job that matches someone's qualifications in terms of status decreases significantly (at p<0.1) for the lower educated from a disadvantaged background, while those from a more advantaged household are much less affected although the difference is not statistically significant. Among those with higher qualifications (column 4 in table 3-5) we see a similar pattern but the effect of the local unemployment rate is no longer statistically significant. This could indicate that having higher qualifications is a sufficient signal of skill to employers so that family background plays less of a role than it does among those

with lower qualifications, where the uncertainty may be higher. The 2nd column of table 3-6 shows that among those with low qualifications a 1 p.p. increase in the local unemployment rate reduces the probability of working on a job that is similarly prestigious to that of others with the same qualifications by 1 p.p. while there is no statistically significantly ($p<0.1$) effect for those from middle or advantaged backgrounds. Columns 3 and 4 in table 3-7 show that working on a job that matches qualifications is associated with a higher wage among those with higher qualifications. For the lower educated being over-educated is associated with a significantly higher probability of working on a temporary contract.

There is no significant effect of background interacting with the local labour market on the mediators. Including the mediators in the wage and temporary work models also does not change the coefficients or estimated marginal effects (in models not shown here but available upon request). This indicates that neither overqualification nor having found a job through networks mediates the higher effect of the business cycle on the disadvantaged. When re-estimating the results for working on a temporary contract as a linear probability model, as the mediation mechanism cannot strictly be tested with a binary outcome, there is also no evidence for mediation (Breen et al., 2013). This suggests that further research is necessary on the mechanisms through which a disadvantaged background increases sensitivity to the labour market.

Table 3-7: Effect (s.e.) of the mediating mechanisms on wage and working on temporary contract

Low Qualifications	1 Network: temporary	2 Network: wage	3 Prestige matched: temporary	4 Prestige matched: wage
Middle (vs disadv.)	1.43 (0.40)	-0.03 (0.06)	1.10 (0.35)	0.04 (0.04)
Adv. (vs disadv.)	0.56 (0.28)	0.04 (0.09)	0.55 (0.30)	0.15 (0.07)**
Unemployment rate (ROR)	1.21 (0.14)	-0.01 (0.02)	1.29 (0.10)**	0.003 (0.008)
Middle *un.	0.79 (0.10)*	0.03 (0.02)	0.85 (0.07)*	0.00 (0.01)
Adv.*un.	0.79 (0.17)	0.01 (0.03)	0.96 (0.16)	-0.00 (0.02)
Mediator	1.06 (0.30)	0.07 (0.05)	0.66 (0.15)*	0.02 (0.02)
Rho	*0.26*	*0.48*	*0.61*	*0.63*
N persons (obs.)	*376 (563)*	*376 (563)*	*754 (2503)*	*754 (2503)*
High Qualifications	Network: temporary	Network: wage	Match: temporary	Match: wage
Middle (vs disadv.)	0.98 (0.21)	0.03 (0.04)	0.98 (0.22)	0.03 (0.03)
Adv. (vs disadv.)	1.12 (0.30)	-0.05 (0.05)	1.62 (0.46)*	-0.04 (0.03)
Unemployment rate (state)	0.86 (0.09)	-0.02 (0.02)	0.82 (0.06)**	-0.02 (0.01)**
Middle *un.	1.04 (0.09)	0.02 (0.01)	1.11 (0.08)	0.02 (0.01)**
Adv.*un.	1.05 (0.10)	0.02 (0.02)	1.11 (0.09)	0.02 (0.01)**
Mediator	0.67 (0.10)	0.03 (0.02)	1.03 (0.14)	0.07 (0.01)**
Rho	*0.28*	*0.45*	*0.58*	*0.55*
N persons	*1123 (2045)*	*1123 (2045)*	*1570 (7138)*	*1570 (7138)*

**: p<0.1, **: p<0.05, controlled for year (dummies), state (dummies), sample (dummies), school (dummies), gender, marital status, child, migrant, satisfaction with health, birth year father, birth year mother, potential experience. Rho indicates the proportion of residual variance that is due to unobserved person-specific characteristics. The channel through which a job was found is only available from 1998 onwards. Coefficients for temporary work are in odds ratio.*

3.4.4 Sensitivity analyses

Finally, we present the main findings from some sensitivity analyses. The results are available in the appendix. As the German labour market is still very different for men and women separate analyses are carried out by gender, shown in table A3-3. We find very similar results as reported in table 3-1 with the exception of wage. The difference in wage sensitivity to the labour market between the disadvantaged and more advantaged groups is only statistically significant (at $p<0.05$) for women although similar patterns are present for men. Women with higher qualifications are more affected in their probability of working on temporary contracts than men. There are no significant differences by background in this.

In an additional test the sample is split up to analyse the first 5 years in which a person is observed and the later years, shown in table A3-4. There is no longer evidence of the disadvantaged being more sensitive to the business cycle in the later career. An exception is that in this group those from middle and advantaged backgrounds are estimated to earn a higher wage as conditions worsen while the disadvantaged are not positively affected. Among the higher qualified the differences identified are present in the early and later career, but the wage effect disappears in the later career.

The models are estimated using a subsample after the German reunification in 1991, showing the findings are robust, although among the higher qualified there is no difference by background in how employment probability is affected and the wage effects, while similar in size, are no longer statistically significant (at $p<0.1$).

To test selection effects in which the disadvantaged are more likely to work in sectors that are more sensitive to the labour market the industry of employment is accounted for. Including industry codes made no difference to the estimates. The findings on employment and on working on temporary positions are robust to several specifications, while the wage effect seems to mainly hold in the early stages of the career and for women. The coefficients for these two checks are shown in table A3-5.

This chapter tests how the conditions at the moment of entering a job affect later labour market outcomes and therefore uses the unemployment rate at the moment of job entry. When analysing the sensitivity to the labour market for employment this means two different employment rates are used: the one at job entry for the employed and the current one for unemployed job seekers. We finally test the robustness of our results to using the contemporary unemployment rate rather than the one at job entry. The estimated marginal effect of the local unemployment rate on the probability of employment is shown in table A3-6 in the appendix. There is no difference with the results when using the local unemployment rate at the moment of job entry for those that are employed, indicating the results are robust.

3.5 Conclusion

We study whether family background matters for early labour market success after accounting for education in West Germany and argue that to answer this question the local labour market context in which employers make hiring decisions must be taken into account. We show that young adults who grew up in a disadvantaged household are bumped down to worse jobs or out of work altogether as the unemployment rate increases. Their equally qualified but more advantaged counterparts are more likely to get the better positions. Among the higher qualified this means the better paid positions, as the disadvantaged face the fastest decline in wage as the unemployment rate rises. Among the lower qualified the probability of being in employment altogether is most affected. When employed, the disadvantaged are also most likely to work on a temporary contract. This crowding-out results in higher inequality by background when the local labour market is loose.

We proposed two possible explanations for this higher vulnerability of the disadvantaged, after accounting for education and work experience. As previous studies found that growing up in a disadvantaged household is associated with lower cognitive and non-cognitive skills this could be picked up by employers and be more relevant when competition for jobs is higher. Growing up disadvantaged may also affect the type of networks someone has access to. If the use of contacts

becomes more relevant during worse economic times this could also drive the increasing gap by family background. We find no clear evidence for these mechanisms mediating the higher sensitivity to the local labour market conditions of those growing up in a disadvantaged household.

We tested these mechanisms indirectly, by studying differences in the risk of being overqualified as an indicator of perceived skills differences by employers; and by studying whether a job was found by friends and relatives rather than through another job search method. These tests are therefore only indicative. We have no reliable information on the preferences of employers or on the specific ways in which networks may aid the job search. Another limitation is that these measures are only available for employed respondents. The models do indicate that the disadvantaged are more likely to be overqualified and less likely to have found work through networks as the labour market loosens, although the effects are not statistically significant. Further research should aim to test these mediating mechanisms more directly, for instance through studies of the hiring process (Jackson, 2009).

While we focus specifically on how the decisions of employers may bring about increasing inequality by background, it is important to consider that our findings may also be due to differences on the supply-side. It is for instance possible that the disadvantaged respond differently to the increasing uncertainty in the labour market due to facing higher constraints and therefore settle for any rather than no job.

Even in Germany, where the economy is strongly stratified by education, background still plays a role after accounting for objective measures such as education and work experience. Growing up in a disadvantaged household is not always equally bad however and is aggravated during economic downturns. These differences in the early career are important as they may scar the later careers. The sheer bad luck of entering during worse economic times is then much worse for the already vulnerable. Future research could focus on establishing the specific pathways through which disadvantaged young adults are affected more by the business cycle.

Chapter 4: Labour market disadvantage of ethnic minority British graduates: university choice, parental background or neighbourhood?

4.1 Introduction

Most ethnic minority groups in Britain are highly educated on average and more likely to attend university than white British people (Modood, 2005). It has been suggested that the comparatively higher level of education of ethnic minorities may result from strategic choices to signal the quality of the job seeker and to prevent expected (statistical) discrimination (Colding et al., 2009; Heath et al., 2008; Modood, 2005). Having higher qualifications increases the labour market success of ethnic minority workers, but does not eliminate the ethnic penalty altogether. For the UK, Rafferty (2012) shows that ethnic minority graduates are less likely to find employment than white British people, and are more likely to find jobs for which they are overqualified. Battu and Sloane (2004) and Lindley (2009) show that ethnic minority workers, including those born in the UK, are more likely to be over-educated for their jobs and are paid less than white British for their higher qualifications.

In this chapter we contribute to the literature on employment and earning inequalities of ethnic minorities by analysing the transition from university to the labour market of graduates who are British nationals. Besides establishing whether ethnic disadvantage persists among university graduates, we also address possible reasons for employment and earning penalties. We analyse the impact of three types of factors: educational choices, family background, and neighbourhood and test to what extent these explain possible ethnic penalties, both separately and together. The aim is to gain a deeper understanding of factors leading to labour market inequalities and of possible ways in which they can be reduced.

By focusing on graduates who are British nationals we exclude minorities who may face language barriers or lack familiarity with UK institutions and labour market. However, differences across ethnic groups remain in terms of parental background and resources in the neighbourhood, which may negatively affect their education and opportunities, and therefore labour market outcomes (see

e.g. (Crawford and Vignoles, 2014; Macmillan et al., 2015), who however do not study ethnic minorities). By using the Destination of Leavers of Higher Education (DLHE), a rich dataset on graduates in the UK, we can compare the contribution of educational choices, parental background and social class on ethnic penalties in employment and earnings both six months and three and half years after graduation. To the best of our knowledge this is the first work that accounts for the separate contribution of these factors and focuses on how ethnic disadvantage may affect the transitions to the labour market.

We further contribute to the literature by studying how the outcomes of ethnic minority graduates differ depending on resources such as information and support which they may have access to through parents or the local co-ethnic community. We also analyse whether these resources help ethnic minority graduates to find better work through social networks. If ethnic minority graduates lose out compared to their white British counterparts because they lack the right networks to find good jobs, then more guidance and support may be needed to facilitate their transition into the labour market. Finally, the analyses of outcomes of graduates six months after graduation allow us to focus on a homogeneous group of graduates at the start of their working career. By following a subsample again three and a half years after graduation we can study how these inequalities evolved after the career path has stabilised.

In the remainder of this chapter we first discuss the background provided by the existing literature (Section 4.2). We then describe the dataset in more detail and elaborate on how parental background, differences in qualifications and the local community are measured (Section 4.3). There is substantial variation between ethnic groups in the co-ethnic resources they have access to. We find that ethnic minority graduates are more likely to come from lower socio-economic background, grow up in more deprived areas, and attend less prestigious universities and obtain lower grades than their white British peers. Section 4.4 describes the methods and models used and the results are presented in section 4.5.

We find substantial employment gaps for ethnic minority graduates and a more varied picture when studying earnings. Earning gaps are substantially reduced when accounting for the differences in composition but employment gaps remain. We then show that the gaps between ethnic minority graduates and their white British peers differ depending on the resources available through parents and the local co-ethnic community. Ethnic minority graduates from a lower social class background and with a weaker co-ethnic community are at a substantial disadvantage while those from higher backgrounds and with a stronger community have labour market outcomes much more similar to those of their white British peers.

4.2 Ethnic differences among graduates

Ethnic minorities differ from the white British majority in the choice of university, subject of study and academic performance (Modood, 2005; Richardson, 2015): they are more likely to graduate from less prestigious universities and to obtain lower grades than white British students with similar test scores upon entry to university (Richardson, 2015). These choices and outcomes may have an impact on labour market outcomes of ethnic minorities if they are seen by employers as signalling lower quality job applicants (and may be mistaken as statistical discrimination when not included in the analysis). Modelling university choices and outcomes directly is beyond the scope of this chapter. Instead we focus on the extent to which ethnic minority penalties in the labour market are explained by differences in university choices.[4]

Ethnic minorities may also differ from white British graduates in their social networks. Using contacts is a common and often highly successful method of gaining a good job, especially for young adults who can use their parents' networks (Holzer, 1988; Kadushin, 2012; Patacchini and Zenou, 2012). Since ethnic minority graduates are less likely than white British graduates to be of high social class background their parents may lack information and resources to help them find a graduate level job

[4] Although ethnic minority applicants seem to be less likely to receive an offer or have an offer confirmed from pre-1992 and by more prestigious universities (Boliver, 2013; Shiner and Modood, 2002), there seems to be no difference by ethnicity in the tendency to apply to more prestigious universities once previous attainment is accounted for (Boliver, 2013; Shiner and Noden, 2015).

(Flap and Völker, 2008; Zuccotti, 2015). Having parents with more financial resources may also make it possible to search for longer and be more selective in accepting employment and (unpaid) internships.

Besides parental class, the local community may also be a source of potentially useful contacts and in that way account for differences in labour market outcomes between graduates. Patacchini and Zenou (2011) suggest that the human capital in the neighbourhood may help parents to improve their children's education and that this can be especially important for parents with fewer resources. Bayer et al. (2008) show that having neighbours with better socio-economic positions increases labour force participation and earnings. In addition, many ethnic minority graduates tend to work quite close to where they grew up (Abreu et al., 2015) and often live in less well-off areas which can affect their opportunities in the labour market (Feng et al., 2015).

The aim of our chapter is to analyse these three compositional factors, namely the type of qualifications obtained, parental background and resources in the local area where the graduate grew up, to ascertain how much they contribute to explaining ethnic penalties. We address whether differences in social networks play a role in the difference between majority and ethnic minorities. Finally, we consider whether some of these factors may be more important for ethnic minority graduates than for their white British peers.

Gaining high qualifications is one of the main pathways through which parental background may affect labour market outcomes (Torche, 2011; Triventi, 2013). UK studies have shown that ethnic minorities are more likely to enter university than white British regardless of their background. Hence, the correlation between parental background and own education is weaker for ethnic minorities (Jackson, 2012; Modood, 2005). In this case, parental social class should be more important for labour market outcomes among ethnic minorities than among their white British counterparts.

As parents of ethnic minority graduates are more likely to have a lower socio-economic background, ethnic minority graduates may be less likely than white British to have access to high-quality resources or networks. On the other hand, because of discrimination or because networks are more divided among ethnic lines (Dustmann, 2008; Zuccotti, 2015), ethnic minority and white British parents from the same social class may still have different quality networks. We test whether accounting for parental background explains ethnic differences in labour market outcomes and whether parental background is less important for white British than for ethnic minorities, but find no evidence of this.

Ethnic minorities have been shown to be highly influenced by their community (Dustmann, 2008) and to rely more often on social networks to find work than white British do (Battu et al., 2011; Dustmann et al., 2016). These social networks are often ethnic-specific which means that exchange of information is more likely to occur along ethnic lines than between (Patacchini and Zenou, 2012). Several qualitative studies have shown how a co-ethnic community can help instil cultural values and the importance of higher education in the younger generation (Shah et al., 2010; Zhou, 2005) while quantitative studies found correlations between the average education in the ethnic community and the education of co-ethnics (Borjas, 1992, 1995; Edin et al., 2003; Luthra and Soehl, 2015). In this chapter we include information on the local area where graduates grew up and account for the human capital of the co-ethnic community there. The opportunities in the area can affect labour market outcomes and for ethnic minority graduates we expect that growing up with a larger and more highly educated co-ethnic community increases the probability of finding a good job.

4.3 Data and descriptive statistics

4.3.1 The Destination of Leavers of Higher Education

The Destination of Leavers of Higher Education (DLHE) dataset is unique in combining administrative and survey data relating to students graduating from UK universities. The dataset includes administrative data collected when the graduate entered university together with data on their

university career such as the university attended and its postcode, the degree studied and the grades obtained. We use data from students graduating in 2005 to 2012 and all graduates are surveyed six months after graduation. Every other year (2005, 2007 and 2009) a subsample is selected to be re-interviewed three and a half years after graduation about their labour market status and job characteristics.

The subsample to be followed-up is drawn from those that responded to the early survey in two ways. A first group, sample A, is sampled deliberately and followed-up intensively. In 2008/09 HESA sampled 80,837 records out of the 354,728 early survey respondents. Sample A is chosen to represent all institutions and oversamples graduates from first degrees rather than post-graduates with the goal to allow separate statistical analyses of key groups. This sample is invited by email and then followed-up through text message, telephone and letters which resulted in a response rate of 44% for the 2002/03 longitudinal survey to 47% for the 2008/09 cohort. Sample B consists of all early survey respondents that were not drawn for sample A. They receive an email and are followed-up only by a text message invitation. This results in the much lower response rate of 13% for the 2008/09 cohort. These two samples are then combined to create the longitudinal sample (HESA, 2009; Shury and Vivian, 2013).

We exclude the heterogeneous group of mature students and restrict the sample to graduates younger than 24 (in their final year) who are British nationals and who lived in England before entering university. In line with previous studies we focus on the largest ethnic minority groups in the UK: Indian, Pakistani, Bangladeshi, black Caribbean, black African and Chinese and compare them to the white British. To exclude the gender gap we compare men to men and women to women.

Table 4-1 below shows the labour market participation rate and employment rate separately by gender and ethnicity six months and three and a half years after graduation. It clearly shows that for all groups the probability of being active and of being employed increase substantially over time. In

the sample three and a half years after graduation there are fewer differences between groups remaining. This may indicate a positive change towards more equality, but it may also reflect a more selective sample three and a half years after graduation given the relatively low response rate to the follow-up survey.

Table 4-1: Labour market participation and employment rate by gender and ethnicity

	six months after graduation		**three and a half years after graduation**	
Women	active	employed	active	employed
white	79.4%	92.3%	88.4%	97.8%
Black Caribbean	86.3%	88.4%	89.0%	94.5%
Black African	79.0%	83.4%	89.0%	92.9%
Indian	77.2%	84.9%	91.3%	95.8%
Pakistani	73.1%	77.2%	87.3%	89.0%
Bangladeshi	78.6%	80.0%	86.1%	91.7%
Chinese	72.4%	82.8%	82.4%	95.1%
Men	active	employed	active	employed
white	79.0%	86.7%	88.3%	96.3%
Black Caribbean	87.6%	84.3%	90.2%	99.1%
Black African	80.6%	79.6%	96.5%	90.5%
Indian	79.4%	80.1%	91.1%	93.9%
Pakistani	77.3%	76.6%	89.9%	91.8%
Bangladeshi	80.1%	77.1%	92.9%	93.4%
Chinese	69.8%	74.3%	82.1%	95.2%

We are interested in labour market outcomes of graduates and study employment status (having a job or not) and earnings. Yearly earnings, deflated to 2011 prices using the Consumer Price Index (CPI) provided by the Office for National Statistics (ONS), are provided for people in paid jobs only (excluding the self-employed). To eliminate possible outliers and coding errors we also exclude graduates in the highest and lowest 1% of observations for earnings. Yearly earnings are used without controlling for the type of job or hours worked in order to estimate the overall difference in labour market earnings, regardless of segregation into different sectors or employment contracts. Employment is measured by a dummy which is one for those who have a paid job or are self-employed, and zero for those who are unemployed, excluding the inactive from the whole analysis.

Table A4-1 in the appendix shows the activity status for respondents by parental class, university type and grades obtained. Around 30% of all graduates are inactive six months after graduation with most of them pursuing further studies. Three years later 17.5% of graduates are inactive. Graduates from a higher social class background, those who graduated from the most prestigious universities and with the highest grades are more likely to be inactive and far less likely to be unemployed, both six months and three and a half years after graduation. Six months after graduation, those who graduated with low grades are twice as likely to be unemployed than those who graduated with the highest honours. Three and a half years after graduation they are four times as likely to be unemployed.

4.3.2 Parental background

Descriptive statistics of all variables are shown in table A4-2 in the appendix. We analyse the impact of family background by means of information on parental social class and the type of high school the graduate attended. Parental social class is measured in four categories: managerial and professional occupations (high class); small self-employed, intermediate and lower supervisory and technical occupations (intermediate); semi-routine or routine occupations or long-term workless (working class). Self-employment is kept as a separate category because of its relevance among

ethnic minority groups (Light, 2005). We use parental class rather than education firstly because education is only measured through a dummy variable from 2008 onwards and secondly because we believe class to be more appropriate. As many of the parents of ethnic minority graduates are first generation migrants the correlation between their education and social class is likely to be low (Dustmann, 2008) and social class is generally more closely linked to social capital and financial resources than education (Platt, 2005).

We compute a dummy for having attended a private high school, which in the UK are usually rather expensive, rather than a publicly funded state school, which vary in quality. It is likely that those who attended private schools have more affluent parents and/or parents who highly value education as a mean to succeed in the labour market.

We show differences among ethnic groups in family background in our sample and the population in England in Table 4-2. We compare the distribution of parental class among graduates with the class distribution in the whole population from the 2001 English census – this is a more accurate representation of the population of parents for graduates in the sample than the 2011 census – to assess the degree of self-selection of graduates. While 59% of white British graduates have a high class background only 37% of white British in the population do. The discrepancies are substantially smaller among ethnic minority graduates, especially Indian, Bangladeshi and Chinese. More than a quarter of ethnic minority graduates come from a working class background, compared to only 14% of white British graduates. This higher drive for education among ethnic minority graduates of all backgrounds is consistent with Modood (2005).

Table 4-2: Parental background among graduates (DLHE) and in the population (census)

		white British	black Caribbean	black African	Indian	Pakistani	Bangladeshi	Chinese
Working class	Graduates	0.14	0.23	0.25	0.30	0.31	0.51	0.43
	Population	0.31	0.37	0.43	0.36	0.60	0.67	0.30
Self-employed	Graduates	0.07	0.04	0.03	0.10	0.24	0.21	0.15
	Population	0.09	0.05	0.04	0.10	0.11	0.07	0.19
Middle class	Graduates	0.20	0.25	0.18	0.22	0.15	0.08	0.11
	Population	0.22	0.25	0.18	0.18	0.12	0.13	0.14
High class	Graduates	0.59	0.48	0.53	0.38	0.30	0.20	0.31
	Population	0.37	0.33	0.35	0.35	0.18	0.14	0.38
Private school	Graduates	0.12	0.03	0.06	0.11	0.06	0.04	0.17
Observations	Graduates	451,458	4,862	5,048	22,772	7,693	2,436	4,117

Figures for graduates are computed from the 2005-2012 DLHE; figures for the population are computed using the 2001 census for England.

4.3.3 University choice

Earnings and the probability of finding a job may be higher for those who graduate from more prestigious universities or with higher grades or those who studied disciplines more valued in the labour market. As universities differ substantially in prestige and this affects labour market outcomes we differentiate between graduates from Russell-group universities,[5] those who graduate from former polytechnic institutes, and all others (Boliver, 2013). To account for differences in performance we include the grades obtained upon graduation: a first-class honour; an upper second-class honour (2:1) or any lower distinction (Richardson, 2015). To account for different disciplines we measure nine groups of subjects, categorised based on the joint academic coding system following Abreu, Faggian and McCann (2015).[6]

Consistent with Shiner and Modood (2002) and Boliver (2013) descriptive statistics on our data show that that Pakistani, Bangladeshi, black African and black Caribbean students on average graduate from less prestigious universities than their white British peers while Indian and Chinese students graduate from better universities. In addition 13% of white British and Chinese students graduate with first-class honours, but only 5% of black graduates and 7% to 9% of those of south-Asian ethnicity do so. Chinese, Indian, Pakistani and Bangladeshi graduates are more likely than white British to study a STEM (Science, Technology, Engineering and Mathematics) subject and black Caribbean and black African graduates least likely. These substantial ethnic differences in the type of degree obtained indicate that some observed differences in returns to qualifications may be due to such choices and outcomes.

Based on their types of degree, we may expect black Caribbean, black African, Pakistani and Bangladeshi students to have a more difficult transition to the labour market while Indian and

[5] The Russell group comprises 24 research-intensive highly ranked universities.

[6] 9 categories based on JACS codes: health sciences (A and B); biological sciences (C and D); physical sciences (F, G, H and J); social sciences (K, L and M); business (N); humanities (Q, R, T and V); creative arts (P and W); education (X); doing a combined degree.

Chinese students, who have similar educational attainments to the white British, should do similarly well.

4.3.4 Characteristics of the area of residence before entering university

The DLHE provides the postcode of the graduate at the time of applying so the area where the graduate lived prior to university can be identified. To measure the resources available in the community it is important to decide on an appropriate geographical level for the analysis. Most studies on social networks focus on the neighbourhood and use rather small geographical areas. However, larger areas are needed to capture labour market opportunities. We use local authority districts.[7] Ideally, we would measure the co-ethnic density and resources at a lower level to increase the possibility of personal contact. The local authority is the lowest level at which detailed information on ethnicity and educational qualifications is available through the census however. Patacchini and Zenou (2012) also measure ethnic density at the local authority level in order to test whether finding a job occurs through ethnic networks and still find a substantial effect. This indicates that, while the level is relatively aggregated, it may still capture ethnic networks.

The local area can influence labour market outcomes through the local opportunities available as well as through the local network which can help graduates with their job search. Although these can be personal networks, graduates entering the labour market are likely to rely heavily on their parents' networks (Holzer, 1988).

Ethnic minorities tend to come from less advantaged areas which can limit their opportunities in the labour market (Feng et al., 2015). To account for deprivation we include the indices of multiple deprivation (IMD), available from ONS. The IMD rank districts based on a weighted average of scores on seven domains of disadvantage including income, health and living conditions (McLennan et al., 2011). As the IMD are only available in 2004, 2007 and 2010 we assign the ranking on the IMD of the closest year for each year where it is not provided. We then group the ranked areas in five

[7] Between the 2001 and 2011 censuses some local authority districts have been aggregated; for consistency we use the 2009 administrative boundaries, resulting in 326 districts.

quintiles from least to most deprived. To better measure opportunities in the labour market we also use data on the share of claimants of job-seeker's allowance. These data are available yearly from the Department for Work and Pensions through the ONS.

Diversity in a community may reduce social capital overall (Schaeffer, 2014; Vervoort et al., 2010). We therefore include the Herfindhal index as a measure of ethnic diversity in each district. The Herfindahl index is computed as one minus the sum, over ethnic groups, of the square of the proportion of people belonging to each ethnic minority (Alesina et al., 2003). This index can be interpreted as the probability that two persons randomly drawn from the population of that district have the same ethnicity (Vervoort et al., 2010). The shares of each ethnic group in the local authority district, which are used to compute the Herfindhal index, are available by district through the census in 2001 and 2011 and the ethnic shares for the intra-census years are approximated through linear interpolation.

We account for the potential information available through networks in the local area. Studies have shown that information on jobs is more likely to be found through employed acquaintances and we therefore include the share of employed residents in the local authority (Cingano and Rosolia, 2012). As the type of information available in the network depends on the quality of the network and information on graduate level jobs is more likely to be available from other graduates we also compute the share of graduates in the local area (Bayer et al., 2008).

To account for the information possibly available through the co-ethnic community we compute three additional variables: the share of co-ethnics; the employment rate among co-ethnics; and the ratio of the share of graduates in the co-ethnic community to the share of graduates overall. The last variable is included in logs and aims to capture whether being part of an ethnic minority that is on average more (or less) highly educated than the average in the area has an effect on top of the average characteristics of the local area. If information on jobs travels faster along ethnic lines, being part of a more highly educated community would increase the chances of hearing about graduate-

level jobs (Borjas, 1995; Patacchini and Zenou, 2012). As the size of co-ethnic communities differs substantially across groups we centre the share of co-ethnics on its mean. We also compute the interaction between the share of co-ethnics and the ratio of graduates in the co-ethnic community to the average. This interaction term measures whether the quality of co-ethnic human capital matters more if the co-ethnic community is larger (Edin et al., 2003). White British are always by far the majority in each local authority district and make up the bulk of the averages at the local area. Therefore, to capture the effects of co-ethnic resources on ethnic minorities the indicators of co-ethnic resources are restricted to zero for white British.

The employment rates, share of graduates and share of co-ethnics are computed from the censuses of 2001 and 2011, obtained through NOMIS.[8] We use linear interpolation to calculate the employment rates, share of co-ethnics, and share of graduates for the intra-census years.

Before entering university, ethnic minority graduates were more likely to live in more diverse and in more deprived areas with higher rates of benefit claimants, but also in areas with a slightly higher share of graduates compared to white British (see table A 4-2). For Indian, Chinese and Black African graduates the ratio of the share of graduates among co-ethnics to the share of graduates in the district is higher than one, while the reverse is true for Black Caribbean and Bangladeshi graduates. If this influences the opportunities and information available through the co-ethnic network, it would lead to better outcomes for Indian, Chinese and Black African graduates and worse outcomes for Black Caribbean and Bangladeshi graduates on average.

4.4 Method and models

4.4.1 Ethnic gaps in the labour market

First, this chapter assesses whether parental background, the characteristics of the local area and differences in degrees account for ethnic differences in employment and earnings. To test their

[8] www.nomisweb.co.uk, a service provided by the Office for National Statistics to provide free access to official UK labour market statistics

importance these three factors are added sequentially to analyse the impact that each have on labour market inequalities, as shown in equation 4-1:

$$Y_i = \alpha + \beta E_i + \gamma X_i + \delta Z_i + \varepsilon_{1i} \quad \text{(Equation 4-1)}$$

Y is one of the labour market outcomes: either a dummy for employment or the log of labour market earnings, for individual "i". The employment models are estimated using binary logistic regressions while the wage models are estimated by OLS regressions. The results of the logistic regression are shown as marginal effects. The analyses are weighted by weights provided by the DLHE to account for graduates studying more than one degree. To account for the fact that local area characteristics are the same for people from the same district of origin the standard errors of all models are clustered by the local authority in which the respondent lived before university. All models are estimated separately for men and women; six months, and then three and a half years after graduation.

E contains dummy variables for ethnicity and β can be interpreted as the ethnic gaps in the outcome. X contains the explanatory variables included in all models: a dummy for whether the graduate has a disability and dummies for the year of graduation to control for cohort differences such as the business cycle upon graduation or the share of graduates entering the labour market. No additional controls are needed as the graduates are all between 21 and 24 years old and have essentially no work experience. Besides year and disability dummies, the wage models include a dummy for those who work in London. Minorities are concentrated in the capital and wages are higher than in the rest of the country (Dustmann and Theodoropoulos, 2010). While only those who enter the labour market straight after graduation are included in the models six months after graduation, the sample for the models three and a half years after graduation is more heterogeneous. In these models we also control for economic activity six months after graduation through four dummies: unemployed; unpaid employment; further study; other inactivity; with employed or self-employed as reference category.

Z includes the variables identifying family background, university choices, and the characteristics for the local area that are not ethnic-specific as explained in section 4.3.4. We first include these three sets of variables separately and then include them jointly. If the labour market disadvantage faced by ethnic minority graduates is partly mediated by their family background, university choices, or the characteristics of the community they come from, the inclusion of the variables in Z should result in β coefficients which are closer to zero (a coefficient of zero would indicate no ethnic gaps).

4.4.2 Resources affecting ethnic minorities differently than white British

In the previous section the role played by characteristics that are common to both ethnic minorities and the white British majority is considered. As mentioned above there are reasons to expect that resources which can help with job search – either through the family or the co-ethnic community – are especially important for ethnic minorities. Equation 4-2 expands on equation 4.1 by including factors that affect ethnic minorities differently than white British

$$Y_i = \alpha + \beta E_i + \gamma X_i + \delta Z_i + \zeta FB_i * M_i + \eta R_i + \varepsilon_{2i} \quad \text{(Equation 4-2)}$$

We include an interaction term between a dummy for belonging to an ethnic minority M and parental class FB, with the reference category being working class. A positive ζ coefficient indicates that the impact on labour market outcomes of being of a higher parental class than working class is larger for ethnic minority graduates than for white British graduates. We make the assumption that parental class affects all ethnic minorities in the same way.

R includes the characteristics of the co-ethnic community in the local area: the share of co-ethnics, employment rate of co-ethnics, the ratio of human capital in the co-ethnic community compared to the average and the interaction between the relative size and human capital of the co-ethnic community. If information 'travels faster' within an ethnic community we expect that the characteristics of the co-ethnic community affect employment probability and earnings even after controlling for the general share of graduates and employment rate within the local area. According

to Dustmann et al. (2016) co-ethnic networks are more likely to affect early matches and might have a stronger effect in the first six months than three and a half years after graduation.

4.4.3 Social networks

The final question addressed in this chapter is whether social networks are the driver of ethnic penalties among graduates. Parental class and the local community can influence the transition from university to the labour market through providing information about opportunities as well as advice and resources. The literature on ethnic enclaves suggests that co-ethnic communities can help ethnic minorities find work by sharing information about job opportunities within the local network (Dustmann et al., 2016; Patacchini and Zenou, 2012). The DLHE includes a question about the method through which the graduate found their job with one option being through friends and relatives. We can therefore test whether graduates from a higher socio-economic background and from an area with a higher share of graduates, especially within the co-ethnic community, are more likely to have found their job through friends and relatives. This analyses only addresses how the first job, six months after graduation, was found.

The use of social networks is tested through two models. The first model (equation 4-3) has the same explanatory variables as in equation 2 but the dependent variable is a dummy for having found the job through friends and relatives (S).

$$S_i = \alpha + \beta E_i + \gamma X_i + \delta Z_i + \zeta FB_i * E_i + \eta R_i + \varepsilon_{3i} \quad \text{(Equation 4-3)}$$

It is important to know whether social contacts lead to good jobs (Battu et al., 2011). The final model (equation 4-4) tests whether a job found through friends and relatives is on average better paid than jobs found through other methods.

$$Y_i = \alpha + \beta E_i + \gamma X_i + \delta Z_i + \zeta FB_i * E_i + \eta R_i + \theta S_i + \iota M_i * S_i + \varepsilon_{4i} \quad \text{(Equation 4-4)}$$

The dependent variable (Y) is the log of yearly earnings and all other variables are the same as in equation 3 with an interaction between belonging to an ethnic minority M and having found the job through social networks. The coefficient θ in this case indicates – for white British – whether jobs

found through social networks are on average better paid. The coefficient of the interaction term ι shows the difference in the returns from having found a job through social networks for ethnic minority graduates compared to their white British peers. A negative coefficient for ι indicates that for ethnic minorities jobs found through social networks are on average worse than those found through social networks by white British, thus indicating a disadvantage in ethnic minorities' transition to the labour market.

These models (equations 4-3 and 4-4) can indicate whether social networks are an important channel through which the early career of ethnic minority graduates differs from that of white British. However, as we only have information on successful job searches, these models are not informative on the extent to which ethnic minorities successfully use this search channel (Frijters et al., 2005; Giulietti et al., 2013).

4.5 Results

4.5.1 Ethnic gaps in the labour market

Employment gaps six months after graduation

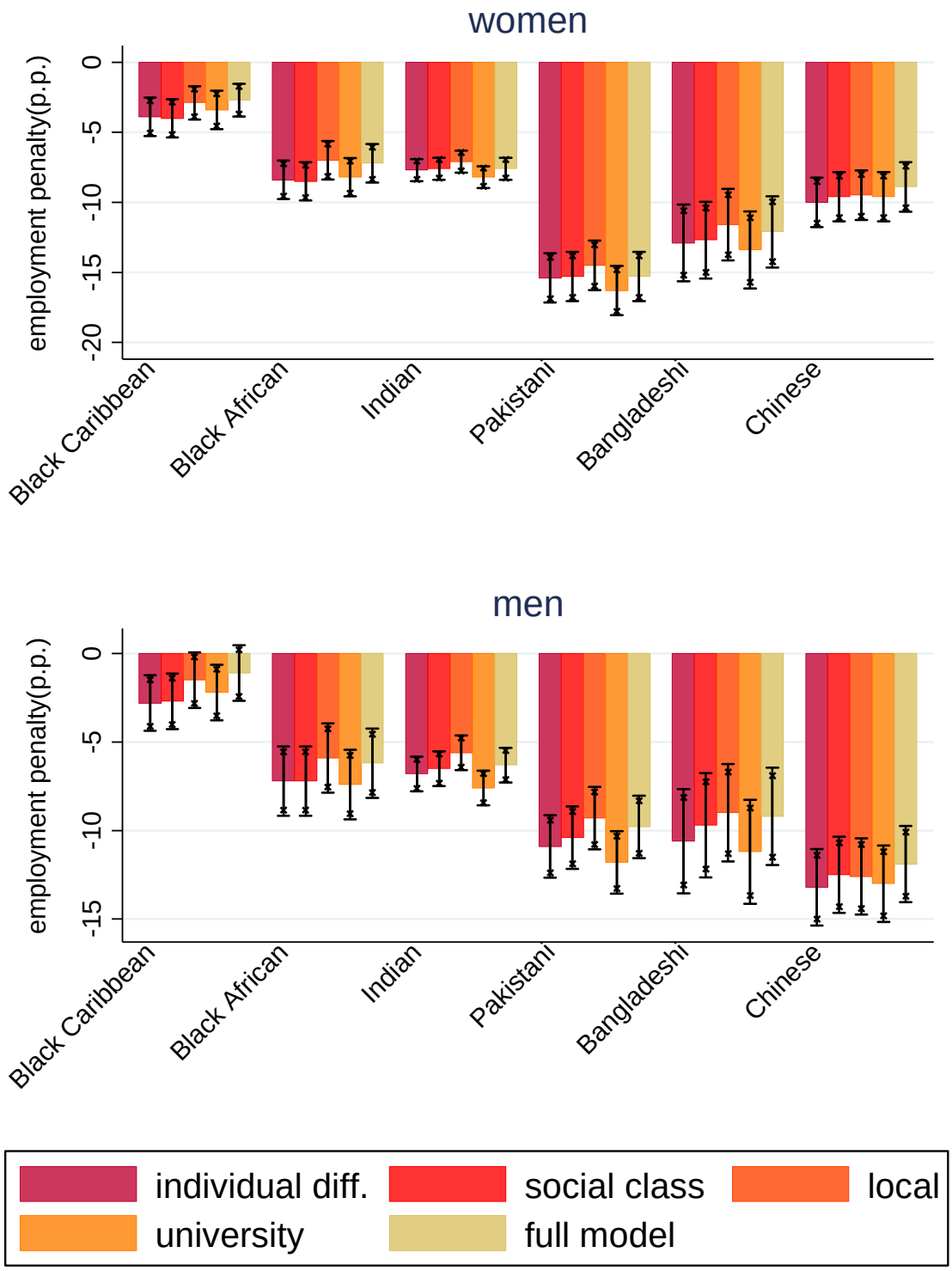
We first discuss the probability of employment six months after graduation and how ethnic minorities differ from white British. These probabilities are shown in figure 4-1. The full set of coefficients are shown in tables A4-3 and A4-4 in the appendix. As the results are similar for men and women we discuss them together. The baseline model (individual differences) shows employment gaps when only accounting for year of graduation and disability. Ethnic minority graduates are on average less likely to be employed than white British graduates. The employment gaps are slightly larger for women than for men although the patterns are the same. Black Caribbean graduates face the smallest gap of around 3-4 percentage points (p.p.) and Pakistani and Bangladeshi the largest gap as they are 10 to 15 p.p. less likely to be employed than white British graduates. While the existing literature, which includes people of various ages and education levels, normally finds the best labour market outcomes for Indian and Chinese minorities (Blackaby et al., 2005) here we find

that, compared to their white British counterparts, Indian and Chinese graduates experience similar employment gaps as the other minority groups.

Including controls for parental background (social class) does not reduce ethnic disadvantage in employment. Employment gaps remain in the third model (local) after controlling for the deprivation and resources in the area of residence before entering university. This includes the measures of ethnic diversity, general deprivation, employment rate, the share of people on jobseeker's allowance and the share of graduates in the local authority. The ethnic employment gaps are lowest in this model but are still only reduced by around 1 to 2 p.p. compared to the baseline model for all ethnic groups bar the Chinese; and this reduction is not statistically significant.

The last group of covariates (university) does not explain the lower employment probability of minorities either. Finally we show gaps estimated by the full model in which all these covariates are included together. The total employment gaps are only slightly reduced and are very similar to the models in which only the characteristics of the local area in which graduates grew up are included. However, in this model employment gaps for black Caribbean men are no longer statistically significant (at $p<0.05$).

Figure 4-1: Employment difference with white British six months after graduation



Note: Ethnic penalties controlling for different composition factors, showing 90 and 95% confidence intervals.

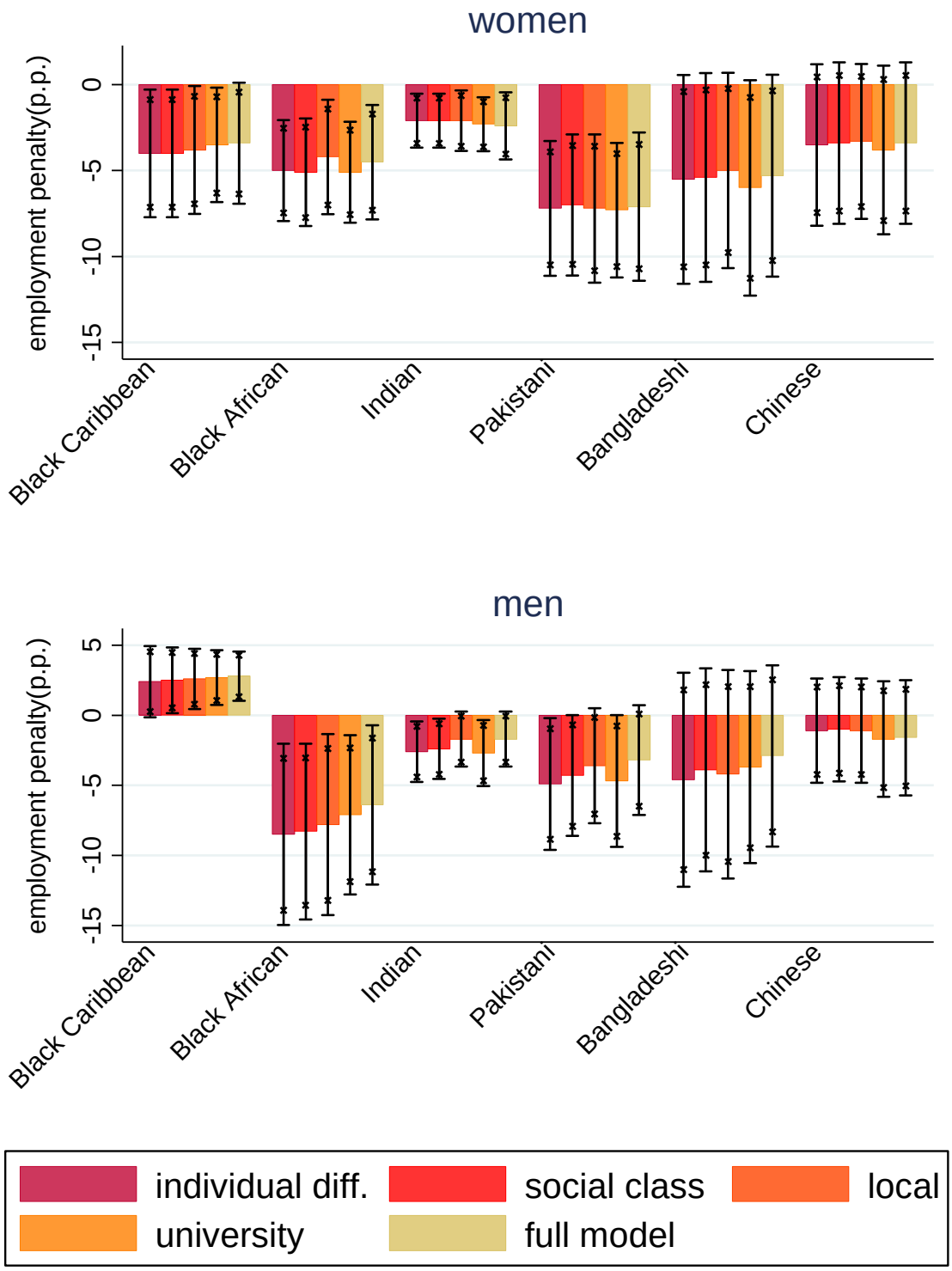
Employment gaps three and a half years after graduation

Graduates from different ethnic and socio-economic backgrounds may have different patterns of transitions into the labour market. For example, those from a more advantaged background may be more likely to take gaps years, afford to have longer job search spells and wait for a better job match, or take unpaid internships to boost their future careers. The comparison of labour market outcomes six months after graduation may be affected by these factors and underestimate ethnic penalties. Here we focus on ethnic gaps in employment three and a half years after graduation. At this point graduate careers should be more stable, but the analysis is based on a much reduced sample size (see section 4.3.1) and on a much more heterogeneous group in terms of family commitments on which data is not available (e.g. in terms of marital status, and presence of dependent children). Figure 4.2 shows the estimated employment gaps and full results can be found in tables A4-5 and A4-6 in the appendix.

The analysis is essentially the same as the one we presented for labour market outcomes six months after graduation except that in all models we also control for the activity status six months after graduation. As the samples are much smaller than those six months after graduation the estimates are less precise, especially for Bangladeshi graduates.

The activity status six months after graduation is strongly related to employment probabilities three and a half years after graduation with early employment being a good indicator of later employment. Those who were unemployed initially are 5-8 percentage points less likely to be employed three years later showing a scarring effect (as found by, among others Gregg and Tominey (2005)). Being inactive or pursuing further education six months after graduation is also associated with a slightly lower employment probability after three and a half years. The large employment gaps found six months after graduation for ethnic minorities can therefore have long-lasting effects.

Figure 4-2*:* Employment difference with white British three and a half years after graduation



Note: Ethnic penalties controlling for different composition factors, showing 90 and 95% confidence intervals.

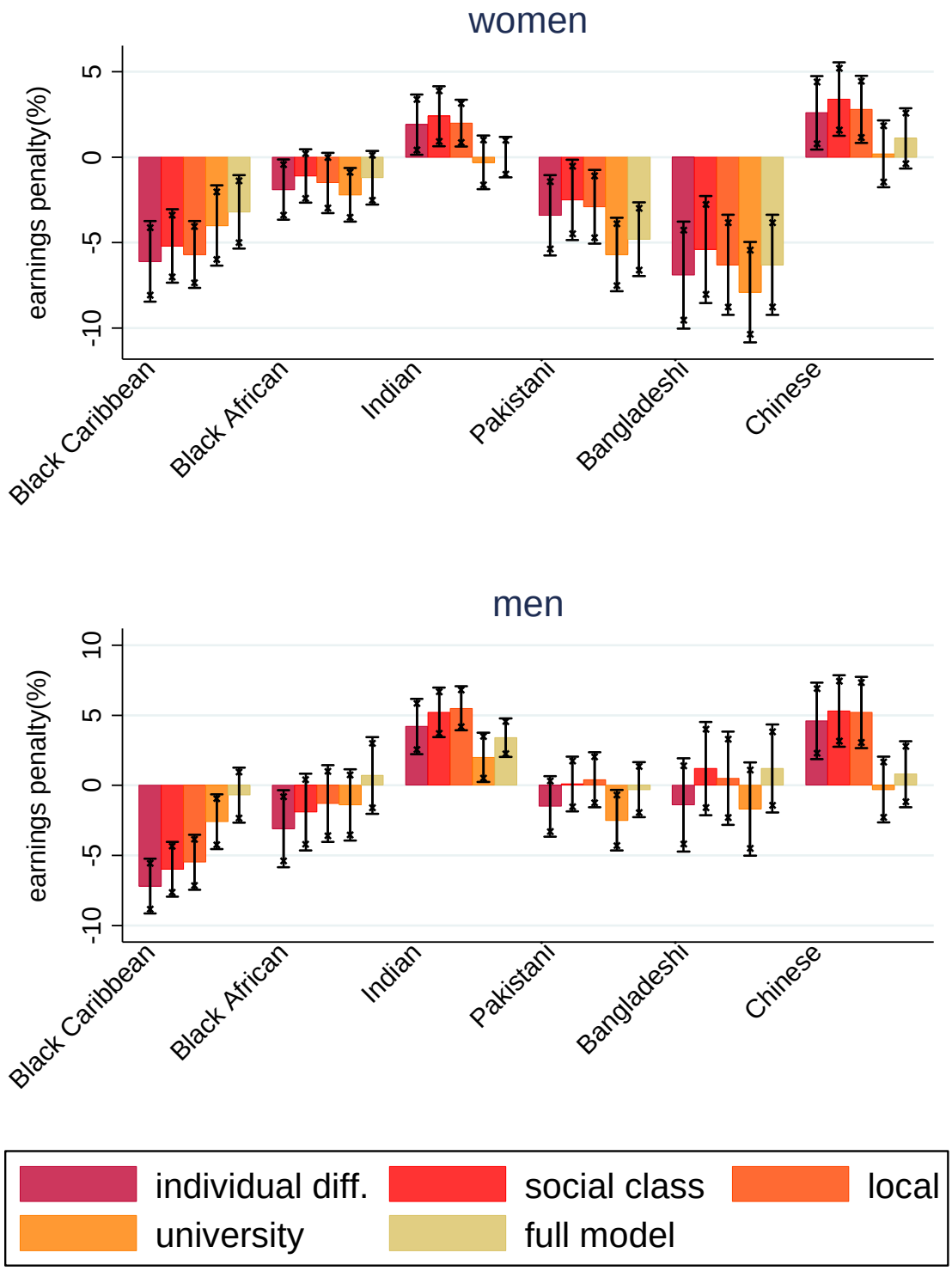
Employment gaps persist mainly among women where all groups bar Bangladeshi and Chinese are significantly less likely to be employed than white British. For men the largest gaps are for black African graduates who are still almost 9 p.p. less likely to be employed than their white British counterparts. On the other hand male black Caribbean graduates are around 3 p.p. more likely to be employed than their white British counterparts and for Bangladeshi and Chinese graduates no statistically significant differences remain. The different characteristics we include in the models have no significant impact on employment gaps three and a half years after graduation. Including local area characteristics reduces the ethnic gap slightly and renders employment gaps of Indian and Pakistani men statistically insignificant (at $p<0.05$).

This suggests that background characteristics may be less important three and a half years after graduation than six months after graduation. This fits with the idea that social networks, especially through the parents, are more important for young adults who have not built up their own networks yet (Holzer, 1988; Loury, 2006). In addition, finding employment soon after graduation has beneficial effects on the later career as well so it is important to address employment gaps early on.

Earning gaps six months after graduation

Figure 4-3 shows the estimated ethnic gaps for yearly earnings. The full models can be found in tables A4-7 and A4-8 in the appendix. As earnings are log transformed the gaps can be interpreted as the estimated percentage difference in earnings between ethnic minority graduates and their white British counterparts. The baseline (individual differences) shows the average difference in earnings by ethnicity when accounting for disability, year of graduation and whether the job is in London. Black African and black Caribbean graduates earn less on average than white British graduates, as do Pakistani and Bangladeshi women. The negative earning gaps range between 2% and 7% for men and women. Indian and Chinese graduates earn on average 2% to 5% more than white British graduates.

Figure 4-3: Earning difference with white British six months after graduation



Note: Ethnic penalties controlling for different composition factors, showing 90 and 95% confidence intervals.

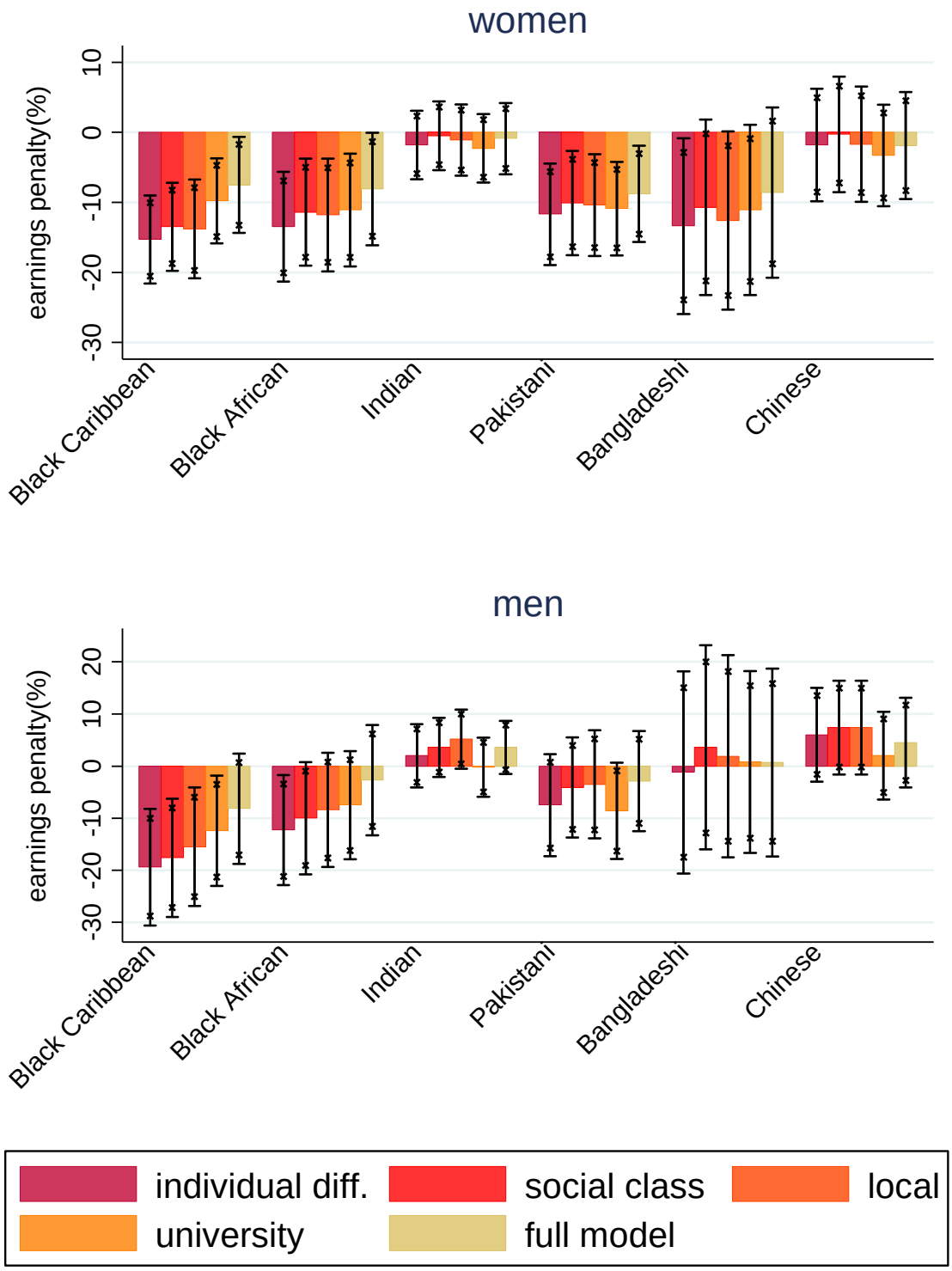
Accounting for parental background (social class) reduces the earning gaps for black African graduates which is statistically insignificant and reduces the gaps for Pakistani and Bangladeshi women by about 1 p.p.. This indicates that while parental background does not seem to explain the lower employment outcomes for ethnic minority graduates it nevertheless explains a part of the earning differences. Including the characteristics of the local area (local) changes women's gaps only little but clearly reduces gaps for black Caribbean and black African men. The type of degrees obtained (university) explains the advantage faced by Indian and Chinese graduates although there is still a statistically significant small positive effect for Indian men. Pakistani men and women and Bangladeshi women earn between 3% and 8% less than their white British peers and accounting for the types of qualifications does not explain anything of their lower wages.

When we account for all these factors together there are no earning gaps among men while Black Caribbean, Pakistani and Bangladeshi women earn between 3% and 6% less than similar white British graduates. Dustmann and Theodoropoulos (2010) estimate a wage disadvantage for native ethnic minority men and women of respectively 9% and 4% compared to white British if the education and age structure where identical. The average earning gaps estimated here among graduates are substantially lower than these, especially for men. So, at least initially in graduates' careers, there are fewer ethnic inequalities in earnings than in the population at large.

Earning gaps three and a half years after graduation

Figure 4-4 presents earning gaps three and a half years after graduation and full results are shown in tables A4-9 and A4-10 in the appendix. As with employment we find a scarring effect of early unemployment on earning. Graduates who were unemployed or who worked unpaid six months after graduation earn 20-25% less than those who were initially employed. Ethnic employment gaps early in people's careers can therefore have long-lasting effects. Due to the smaller sample size all gaps are very imprecisely estimated.

Figure 4-4: Earning difference with white British three and a half years after graduation



Note: Ethnic penalties controlling for different composition factors, showing 90 and 95% confidence intervals.

Ethnic minority women – with the exception of Chinese and Indian graduates – earn 12-15% less than white British women, while black Caribbean and black African men earn 19 and 12% less than white British graduates. There are no statistically significant earning gaps for the other minority groups (individual differences).

After accounting for parental background, the local area and the desirability of qualifications together the ethnic earning penalties for black Caribbean and black African men are no longer statistically significant (full model). The earning gaps for black Caribbean, black African, Pakistani and Bangladeshi women are also reduced. Only black Caribbean and Pakistani women have a statistically significant earning gap of 8 to 9%. The gap for black African women is only statistically significant at $p<0.1$.

In the full model, we find substantial earning gaps for female ethnic minority graduates, except Indian and Chinese, and to some extent also for black Caribbean men. This disadvantage seems to increase over time, and this may be due to working in jobs with less career progression. This is striking as our sample consists of the most advantaged ethnic minorities who have British nationality and hold a UK university degree. This highlights the importance of studying labour market outcomes longitudinally, especially for ethnic minorities.

Description of the covariates

This section briefly discusses the main findings from the other covariates of the previous models, shown in tables A4-3 to A4-10 in the appendix. The employment probability is affected by the 2008 financial crisis as graduating in 2008, 2009 or 2010 is associated with a lower employment probability than in other years. Real (entry) earnings of graduates have however increased consistently over time. Those who are employed earn 20-25% more if they work in London. Having a disability is associated with a lower employment probability and lower earnings both six months and three and a half years after graduation.

Socio-economic background has only a small effect on employment but is quite important for earnings. Graduates from a high rather than working class background are 0.5 to 1.2 p.p. more likely to be employed six months after graduation but there is no class difference three and a half years after graduation. Having attended a private school has a slightly negative effect for women six months after graduation but does not seem to affect employment later on. Being from high rather than working class background is associated with 3-7% higher earnings and having attended a private rather than state school is associated with 5-8% higher earnings. These effects are somewhat reduced but remain statistically significant when including local area and university characteristics, indicating that socio-economic background partly captures the effects of higher qualifications and better neighbourhoods.

The characteristics of the local area affect employment in different ways. Graduates who used to live in an area with more claimants of jobseeker's allowance are less likely to be employed six months after graduation but this does not have an effect three and a half years after graduation. For women, the share of graduates in the local area is associated with a lower employment rate both six months after graduation and three years later. Having lived in one of the 20% least rather than most deprived areas is associated with 5-9% higher earnings both six months and three and a half years after graduation.

Graduating with first-class honours rather than lower second-class honours or lower grades is associated with a 3p.p. to 7 p.p. higher employment probability and 10% to 15% higher earnings for women and men respectively. Three and a half years after graduation these graduates are still 2 p.p. more likely to be employed and the difference in earnings has increased to around 20%. Graduates from a Russell group university are slightly less likely to be employed but earn 2- 5% more than those from other old universities six months after graduation. Three years later this earning difference has increased to 6% and 8% for women and men respectively. Graduating from health sciences is associated with the highest employment probability both six months and three and a half

years after graduation while graduates from creative arts and the humanities are least likely to be employed. These same advantages and disadvantages are found in earnings both six months and three and a half years after graduation.

4.5.2 Minority-specific resources

The previous section shows gaps between ethnic minority graduates and their white British counterparts in earnings and employment after graduation. Ethnic minority graduates are less likely to be employed than white British graduates six months after graduation. This lower employment probability in turn affects the employment probability and earnings three years later. In general, both the employment and earnings gaps among graduates six months after leaving university are substantially smaller than the employment and earning gaps found among ethnic minorities in the UK as a whole (Blackaby et al., 2002, 2005). Ethnic differences in parental background, local area and qualifications obtained account for substantial parts of the earning gap but do not explain the employment gap.

Being from a higher class background or being able to rely on a stronger co-ethnic community may affect ethnic minorities positively and increase their resilience to disadvantage. We expect that ethnic minority graduates who have no resources and networks through their parents or the local area will have the largest gaps compared to white British. Table 4-3 shows the coefficients of the interaction term between parental class and belonging to an ethnic minority (equation 4-2). This tests whether parental class affects ethnic minorities differently than white British people. Table 4-3 shows only the interaction effects of parental class and being an ethnic minority indicating the difference in the effect of parental background between ethnic minorities and the white British majority. It also presents the impact of the co-ethnic community: the share of co-ethnics; their employment rate; the ratio of graduates in the co-ethnic community compared to average; and the interaction between the share of graduates and the size of the community, as explained in section 4.2.4. These only have an effect for minorities and are constrained to zero for white British

graduates. The full results are shown in the last columns in tables A4-3 through A4-10 in the appendix.

We first discuss employment and labour market earnings six months after graduation. We find that co-ethnic resources do not substantially affect the employment probability of men and women but do affect earnings. Living in an area with a higher co-ethnic employment rate increases earnings for women. Being part of a more highly educated ethnic minority is also associated with higher earnings, but this effect is only statistically significant for men. The share of co-ethnics is negatively associated with earnings for both men and women, consistent with previous studies suggesting that jobs found within the ethnic community are associated with lower wages (Hellerstein et al., 2014; Light, 2005; Semyonov and Herring, 2007). The effects of parental class on earnings are substantially larger for ethnic minority men than for their white British counterparts. The difference between a high rather than working class background is 5 p.p. higher for minority men than for white British. The earnings and employment probability of ethnic minority women are less positively affected by their parents being self-employed than white British. Three and a half years after graduation the differences in parental class disappear and the effects of co-ethnic resources become small. Differences in resources available through the family and the co-ethnic community seem to mainly affect the quality of work shortly after graduation.

Table 4-3: The effect of ethnic-specific resources on employment and labour market earnings

	Six months after graduation				Three and a half years after graduation			
	Employment[2]		Wage		Employment[2]		Wage	
	Women	Men	Women	Men	Women	Men	Women	Men
Self-employed[1]	-0.013 *	0.007	-0.025*	-0.001	0.005	0.000	-0.004	0.032
	(0.005)	(0.008)	(0.011)	(0.014)	(0.013)	(0.017)	(0.046)	(0.058)
Intermediate[1]	-0.005	0.002	0.005	0.036**	-0.018+	0.014	-0.012	-0.022
	(0.004)	(0.007)	(0.010)	(0.011)	(0.010)	(0.017)	(0.045)	(0.064)
High class[1]	0.002	0.005	0.013	0.049**	-0.011	0.023	-0.010	0.021
	(0.004)	(0.006)	(0.008)	(0.009)	(0.009)	(0.014)	(0.041)	(0.041)
Employment rate co-ethnics	-0.000	-0.000	0.001**	-0.000	0.001	-0.001	0.001	0.005+
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.002)	(0.002)
Share co-ethnics	-0.000+	0.000	-0.001*	-0.001+	0.000	-0.000	0.005+	-0.002
	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)	(0.003)	(0.003)
Ratio graduates co-ethnics	-0.001	0.009	0.015	0.036*	0.010	0.011	0.082	0.005+
	(0.007)	(0.01)	(0.015)	(0.017)	(0.010)	(0.016)	(0.057)	(0.002)
Interaction share and graduates	0.001*	0.001	0.000	-0.002	-0.002	0.001	0.001	-0.014*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.006)	(0.006)

*+: p<0.1; *: p<0.05; **: p<0.01*

1: the interaction term so the difference in the effect of class (relative to working class) for minorities relative to the effect for white British.

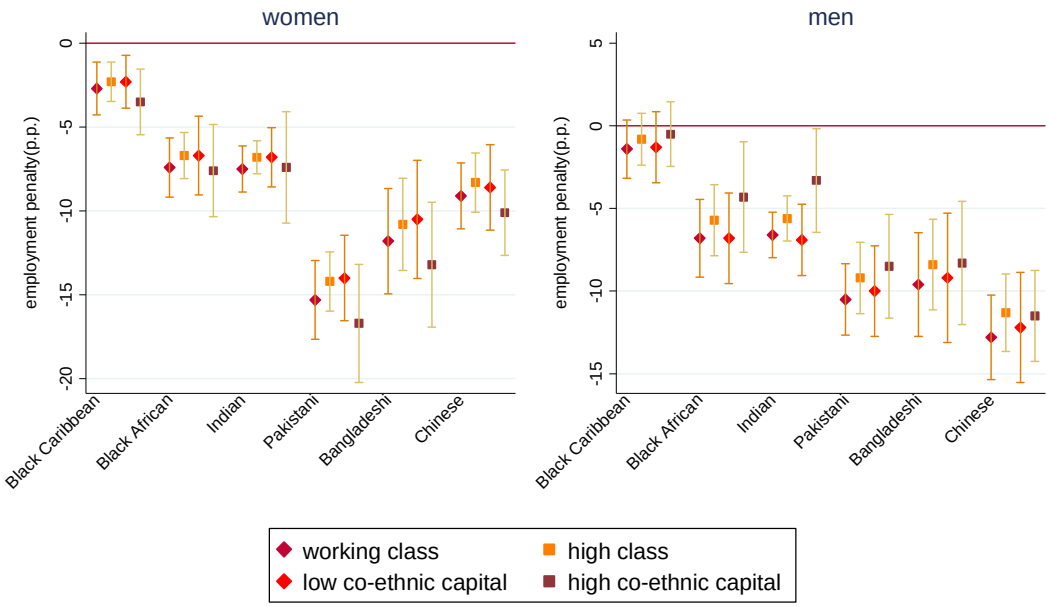
2: the effect is shown as marginal effects calculated from a binary logistic regression.

Figures 4-5 and 4-6 show the estimated employment and earning gap for an average graduate[9] in four different situations six months after graduation. The gaps are shown for graduates from a working class background and a high class background, at average levels of all other variables; and for respondents of middling parental background at a low level of co-ethnic capital (at the 10th ethnic-specific percentile for the ratios of co-ethnic graduates, co-ethnic size and co-ethnic employment rate) and at a high level (at the 90th ethnic-specific percentile for the ratios of co-ethnic graduates, co-ethnic size and co-ethnic employment rate). Figure A4-1 and A4-2 in the appendix show these results three and a half years after graduation.

The employment gaps of women remain relatively similar regardless of resources (figure 4-5). Pakistani and Bangladeshi female graduates in large and highly educated ethnic communities are less likely to be employed, although it is not significant however. For men the gap is smaller for those from higher parental class background and generally even more so for those from a strong and highly educated co-ethnic community. Indian men from a strong co-ethnic community are no longer less likely to be employed six months after graduation than white British. For men the both types of resources are important, whether they grew up in a higher class background or whether they are part of a larger and advantaged co-ethnic community.

[9] A graduate who does not work in London, graduated from social sciences with an upper second-class honour from an old but not Russell group university in 2009, attended a state school and grew up in an area with average deprivation, diversity, employment rate and share of claimants and graduates.

Figure 4-5: Ethnic gaps in employment 6 months after graduation by different resources

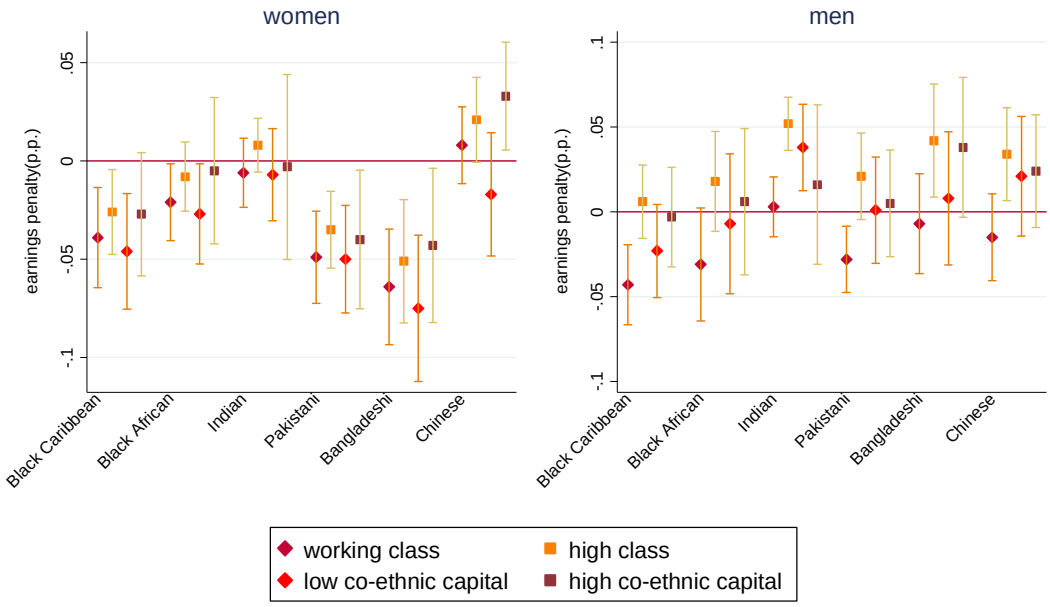


The figure shows 95% confidence intervals around the ethnic penalty for an average person from working class background or high class background; or for a person from intermediate background in an area with the ethnic-specific 10th percentile of share of co-ethnics, co-ethnic employment rate and share of graduates or 90th percentile of those factors.

Figure 4-6 shows that the wage gap for both men and women depends on the resources available to ethnic minorities. Those from low parental class background and those from disadvantaged co-ethnic communities tend to earn less than their white counterparts. Ethnic minority women from a less advantaged background – except Indian and Chinese women –earn significantly less. Those from a higher parental class background or a more advantaged ethnic community generally have the similar or even higher earnings than white British graduates from the same class. The exceptions are black Caribbean, Pakistani and Bangladeshi women who earn less than white British graduates regardless of their background. The difference is smallest for those from strong co-ethnic communities however and for black Caribbean women it is no longer statistically significantly different

from 0. For men the difference in ethnic penalty is generally larger for parental class than it is for the local are resources.

Figure 4-6: Ethnic gaps in wage 6 months after graduation by different



The figure shows 95% confidence intervals around the ethnic penalty for an average person from working class background or high class background; or for a person from intermediate background in an area with the ethnic-specific 10th percentile of share of co-ethnics, co-ethnic employment rate and share of graduates or 90th percentile of those factors.

This vulnerability of ethnic minority graduates from lower social class backgrounds and with a smaller and less advantaged co-ethnic community can indicate that they cannot access resources that similar white British have access to. Ethnic minorities who do have these resources seem to be able to avoid disadvantage in earnings. It is then important to ensure that ethnic minority graduates in a vulnerable position receive more additional help. If the problem is that they lack social networks to find well-paying jobs more active guidance towards labour market transitions can be offered, for instance by universities or career services. The next section analyses whether the probability of finding work through friends

and relatives differ between ethnic minorities and the white British. The aim is to test whether social networks are a plausible driver of these ethnic gaps in earnings.

4.5.3 The use of social networks

In this section we analyse indirectly how parental resources and the community help graduates gain jobs through social networks. Graduates from a higher class background and those who lived in an area with more graduates, especially within the co-ethnic community, are expected to be more likely to receive information on graduate-level jobs and therefore to find good jobs via those networks. The models are described in equations 4-3 and 4-4 as explained in section 4.3.

The full set of coefficients[10] is shown in table A4-11 in the appendix. Ethnic minority graduates are on average slightly less likely to have found their work through friends and relatives but this difference is not statistically significant (at $p<0.05$). Graduates from a high class rather than working class background or who attended private rather than state school are respectively 2 and 5 p.p. more likely to have found their job through friends and relatives. This supports the idea that those from a higher class background are more likely to successfully use their networks. This positive effect of high parental class on having found work through networks is present for white British women and ethnic minority men but not for ethnic minority women. Among women those from the most deprived areas are 3p.p. more likely to have found their job through social networks than those from the least deprived areas. Coming from an area with a higher share of graduates in general also increases the probability that the current job has been found via networks, which could indicate that graduates are more likely to have useful information on graduate level jobs if there are more graduates in their local community. These findings point to a duality where

[10] We do not include an interaction between the share of co-ethnics and their relative share of graduates as this coefficient is very small and statistically insignificant.

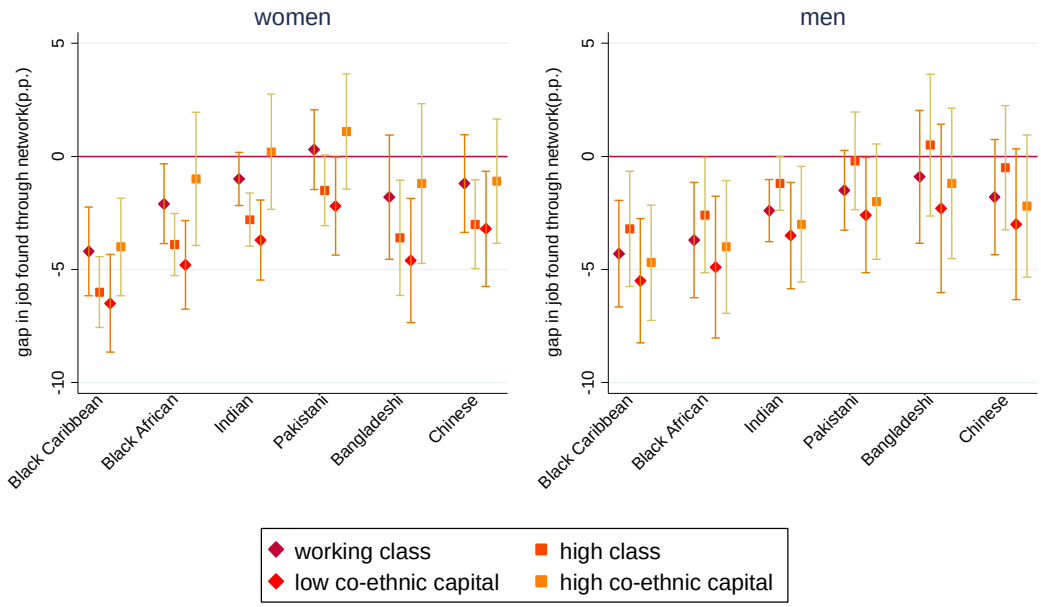
the more advantaged in terms of social background but also the least advantaged in terms of university characteristics are most likely to have used their social networks to find their job. Being part of a more highly educated ethnic community also increases the probability of having found the job through networks, but this is only statistically significant (at $p<0.1$) for women.

Figure 4-7 shows the gap in the probability of having found the job through friends and relatives for an average person from working class background (working class); for a person from a high background (high class); and for persons from intermediate parental class who grew up with low co-ethnic or high co-ethnic capital (10^{th} vs 90^{th} percentile in share of co-ethnics, co-ethnic employment rate and the ratio of co-ethnic graduates to the average). For women the gap in the probability that the job has been found through social contacts relative to their white British counterparts is larger for those from higher class rather than working class. Among men the gap is largest for those from a working class background indicating they are unlikely to have found their job through social networks. For Indian and Pakistani men this difference disappears among those from a higher class background. The local co-ethnic community also matters, especially among women. Ethnic minority women with low co-ethnic capital are 2 to 7 p.p. less likely than their white British peers to have found their job through social networks. This difference is substantial as on average only around 18% of similar white British graduate women found their job through social networks. If they grew up with a large and highly educated co-ethnic community there is no difference with white British in the probability of having found a job through social networks – except for black Caribbean women. For men the co-ethnic community is less important. This supports the idea that, while for men the most important resources come from their parental background – as also found in the earning models – women are more influenced by their local community (Feng et al., 2015). Ethnic minority graduates with fewer resources

are less likely, on average, to have found their work through social contacts than similar white British.

Graduates who found their jobs through friends and relatives earn 4% less and this is the same for white British or ethnic minorities. Hence, this cannot be the reason why ethnic minority graduates earn slightly less than white British on average. However, it is possible that these jobs have other benefits such as better career progression which make them desirable. It may also be that the alternative to finding these jobs through social contacts is not finding employment at all but as we have no information on the job search among unemployed graduates we cannot test this here.

Figure 4-7: Ethnic differences in network use by different values of resources



Note: Ethnic penalties controlling for all composition factors, showing 95% confidence intervals and estimated for an average graduate.

4.6 Conclusion

Higher education is often seen as a pathway to better outcomes and to social mobility (Lindley, 2009). As ethnic minorities in the UK are gaining higher qualifications regardless of their socio-economic background overall inequality in labour market outcomes is likely to decrease over time. In this chapter we focus on inequalities within the group of UK graduates, rather than in the whole population. Even among graduates there are substantial employment gaps and some gaps in earnings, consistent with a recent Runnymede report (Lessard-Phillips et al., 2015). The largest inequalities are in the probability of employment six months after graduation where the gaps range from 3-4 p.p. for black Caribbean women to 15 p.p. for Pakistani women. It is important to reduce employment gaps in the early career as we find that early unemployment significantly reduces the employment probability three and a half years after graduation by 5-8 p.p. compared to those who were

employed. Early unemployment is also associated with 20-25% lower earnings per year when employed. However, even after controlling for early employment status black Caribbean women, black African and Indian men and women and Pakistani women are still less likely to be employed than their white British counterparts three and a half years after graduation.

Gaps in earnings are more pronounced among graduate women than among graduate men (in contrast with what is found in the general population). Among men only black Caribbean men earn significantly less on average than white British 6 months after graduation. As opposed to employment gaps, earning differences increase substantially three and a half years after graduation for black African and Caribbean men and for all but Indian and Chinese women. This indicates that ethnic minority graduates experience less progression in their career than the majority.

This chapter analyses three factors that could account for these differences: socio-economic background; opportunities and networks gained through the local community; and differences in qualifications obtained. Neither parental background nor differences in qualifications can account for ethnic gaps in employment either six months or three and a half years after graduation and the fact that many ethnic minority graduates tend to come from disadvantaged areas accounts for only a small part of the employment differences. Ethnic penalties in employment are reduced somewhat three and a half years after graduation which indicates that the largest inequalities appear early in the transition to the labour market.

Earning differences six months after graduation are mainly due to ethnic differences in educational attainment. Differences in parental background and the local area are also relevant and indicate that background remains important even among university graduates.

We also analyse how resources, such as support and networks, can help people find work and may be especially important for ethnic minorities. Ethnic gaps in employment and earnings are substantially larger when ethnic minorities lack these resources. Graduates from a working class background who come from an area with a small and low educated co-ethnic community earn on average about 5% less than their white British peers six months after graduation while those whose parents are higher class and who can build on a strong local co-ethnic community earn the same or even more than their white British peers. We also find that ethnic minorities are on average less likely to have found their job through social contacts than white British. This again is especially the case for those who lack resources through their parents or through a stronger co-ethnic community.

This chapter highlights the importance of taking parental background and the resources available in the local community into account when considering labour market outcomes of ethnic minorities. It also points towards the fact that even among graduates ethnic minorities experience disadvantage and if they lack the right networks they may have to worse labour market outcomes compared to similar white British.

As ethnic penalties persist over time and after controlling for differences in socio-economic background, local resources, and the type of degree obtained, it is important to study what reasons drive this. It is especially important to study the extent to which these persistent penalties, particularly in employment probability, are due to discrimination. Correspondence tests consistently show that ethnic minorities are less likely to be called for an interview than their native counterparts (Zschirnt and Ruedin, 2016).

There are several important venues for further research. First it would be important to study whether these same patterns of resilience to disadvantage through the community and the family can be found in the population at large. It is also important to study the

career progression over time of ethnic minorities as we found indications that disadvantage in terms of earnings increase over time. Finally, further studies should address whether there are differences in the use of social networks among unemployed ethnic minorities and whether this can partly explain the observed employment gaps.

Chapter 5: Overall Conclusion

Those that grew up in less advantaged conditions – be it parental worklessness, growing up in a poor or lower educated household or as an ethnic minority – tend to do less well in the labour market than their similarly qualified but more advantaged peers. I find in this thesis that these differences would likely persist even if completely equal access to education could be attained. To increase social mobility it is important to decrease the hurdles faced by the disadvantaged in their transition to the labour market. In this conclusion I point out the main findings of my work and frame some general observations and venues for further research. First I discuss the findings of each chapter in the light of the questions put forward in the introduction. I then discuss the main findings regarding the effects of socio-economic background and what I learned about possible mechanisms.

5.1 Lessons from the chapters

The topic of this thesis is how parental background affects labour market outcomes of young adults even after accounting for their qualifications. I specifically focused on how different labour market outcomes are affected and how those patterns inform the possible mechanisms at work. A further question, addressed in chapters three and four, dealt with the conditions under which the direct effect of social origin might matter more or less. This section provides an overview of the answers provided in the different chapters.

In chapter two I study how growing up with a father who was out of work for some time affects labour market outcomes. Several studies already found that these children are less likely to be employed themselves (Macmillan, 2014). By not only studying whether they are more likely to be unemployed, but also studying what type of work they do, I bring new evidence concerning the possible ways in which worklessness is reproduced over generations. I find no difference between children of workless fathers and those whose

fathers did work in their wage or in the type of contract. On the other hand, children of workless fathers are a lot less likely to work themselves, and when working they work fewer hours and work part-time more often. Paternal worklessness therefore seems to affect labour supply or the probability of being hired at all or fulltime, but not the pay or other aspects that are often seen as comprising the quality of a job. Importantly, I show that these differences between children whose fathers did not work and those whose fathers did also persists when only comparing them to those whose fathers worked on low-paying jobs.

Being out of work therefore seems to affect children's future beyond the effects of low income and other types of socio-economic disadvantage. These findings support possible mechanisms such as paternal worklessness affecting their children through less useful social networks or through affecting a change in the experience of work while making it unlikely that the transmission of worklessness comes about through children of workless fathers being seen as less able through lower human capital or higher stress.

The question on how the direct effect of social origin differs depending on the local context is central in chapter three. I use data on West Germany between 1984 and 2011 and find that the degree to which a disadvantaged background affects young adults differs depending on the local labour market context. The positive message of this chapter is that, when the local unemployment rate is low, differences between similarly qualified young adults of different backgrounds are quite small. As conditions worsen the disadvantaged are affected more than their more advantaged counterparts and inequality increases. This is consistent with the disadvantaged being crowded out of good jobs by their similarly qualified but more advantaged peers as the competition for jobs increases. Important implications of this finding are that those that are already disadvantaged are affected more

strongly by adverse economic conditions while the more advantaged are shielded to an extent.

As parental background heavily affects educational outcomes in Germany and there is a tight coupling between the educational system and the labour market, the direct effect of social origin is generally found to be smaller in Germany than in other countries such as the UK (Bernardi and Ballarino, 2016b; Grätz and Pollak, 2016; Kurz et al., 2005). The findings of chapter three are therefore likely to also apply to countries where the direct effect of social origin is larger to start with, such as the UK. Future research should establish whether the finding that the effects of parental background on their children's labour market outcomes depend on the local employment context holds in other countries and over time.

If the direct effect of social origin is stronger under economically worse conditions this should be taken into account when comparing intergenerational social mobility over time or even across countries. It is important to consider the economic conditions in which young adults grow up as this may influence the extent to which their background constrains their opportunities. This would also mean that inequality by background might be higher among generations growing up in recessions.

In chapter four I study ethnic disadvantage as well as other background characteristics in the UK. I show that there are substantial differences in the transition to the labour market of British graduates by ethnicity. Ethnic minorities are at a substantial disadvantage on the labour market compared to their white British counterparts. While there are some differences in earnings, these are mainly due to differences in qualifications. Even after accounting for detailed qualifications, as well as socio-economic background, very large differences remain in the probability of employment however. This large employment gap is consistent with the literature (Blackaby et al., 2005; Dustmann and Theodoropoulos, 2010).

One of my contributions is that I show that the educational credentials or differences in socio-economic background, often mentioned as possible explanations for the worse outcomes of ethnic minorities, do explain some earning differences but explain almost nothing of the employment gap. In this chapter I was also able to study labour market outcomes at two points in time and find that ethnic disadvantage does not disappear over time. Especially for ethnic minority women there is a lack of progression which needs further explanation.

The remaining question is then why ethnic minority graduates are less likely to be employed even when compared to very similar white British. One possible reason could be that ethnic minorities are discriminated against and that this results in a lower probability of employment, but once employed few differences remain. Another possible mechanism is that ethnic minority graduates have less information about jobs through their social networks. We find some support for this lack of networks as the difference between white British and ethnic minority graduates is smaller for those groups that are more likely to have strong networks such as those with parents from higher class or those who are part of a stronger co-ethnic community. Again, this mainly affects wage and quality of work and only has a small effect on employment. More research is therefore needed.

I find that both family and neighbourhood background can serve as a protective factor for ethnic minorities. Ethnic minority graduates who are disadvantaged, in the sense that their parents are of lower social class and their local co-ethnic community is small and lacks resources, are substantially less likely to find employment than similar white British peers and when employed obtain lower wages. There are fewer ethnic penalties when comparing graduates from a higher social class and when ethnic minorities are part of a large and well-educated co-ethnic community. As in chapter two, this points to the importance of

considering context and recognising that adverse conditions affect the already disadvantaged more than their more advantaged peers.

I show in the three empirical chapters that there are substantial differences in opportunities and outcomes between similarly qualified young adults, depending on the conditions in which they grew up. Throughout these chapters I find that background mainly affects the probability of being employed rather than the conditions of employment. Problematically, most studies on intergenerational social mobility focus on the correlation in occupational status or wage, meaning that those who are long-term unemployed are not always considered.

5.2 Possible mechanisms

In this thesis, I also address possible mechanisms through which conditions while growing up affect the early career. In the introduction I mention four possible mechanisms that are most often put forward (Bernardi and Ballarino, 2016b). While I do not test the causal pathways directly I do reflect on the possible mechanisms.

A first possible mechanism is that more advantaged parents might invest more in the human capital of their children through investing in private schools or through helping them get qualifications that are more valuable on the labour market (Becker and Tomes, 1994; Lucas, 2001). In chapter two this is addressed by comparing children of fathers who did not work to those whose fathers worked in lower paying occupations. As this did not reduce the overall difference it is unlikely that financial differences are the reason for children whose fathers did not work to do less well. In chapter four we are able to compare young adults with similar qualifications from similar universities in the UK and find that this does not affect the lower employment probability of ethnic minorities at all, but it does affect earning

differences. While the effect of parental class is reduced when controlling for detailed qualifications it is not explained away.

A second possible pathway through which (dis-)advantage is transmitted over generations is that children of more advantaged parents may have higher cognitive and non-cognitive skills than their less advantaged counterparts (Anger, 2012; Cunha and Heckman, 2007). This could for instance come about through a more encouraging atmosphere and active support. Chapter two tries to capture this partly by using a set of variables on non-cognitive skills and finds no support for any mediation of the intergenerational transmission of worklessness. In chapter three I put this forward as a possible explanation for the higher sensitivity to the labour market of the disadvantaged, but I could not test this directly.

The third pathway that is often put forward is that children of more advantaged parents have access to those parents' networks, which can provide information and support in finding better jobs (Flap and Völker, 2008). This is a plausible explanation for many of the findings, as this would affect the probability of finding work more than the quality of work. In chapter three and four we test whether any of the effect is due to disadvantaged respondents being less likely to have found their job through networks, but we find no support for this. The reason might be that this question only includes respondents who are employed.

The final possible mechanism I mentioned in the introduction is that young adults of disadvantaged background may be discriminated against as employers might be prejudiced (Jackson, 2009). In the case of ethnic minorities this may be especially important (Zschirnt and Ruedin, 2016). It is also likely that this type of disadvantage affects the probability of employment more than the type of work. I cannot test this using this data however.

A better knowledge of the pathways through which disadvantage persists is important to tackle this inequality. Direct tests of mediating mechanisms showed little support for parental background affecting their children through their networks or cognitive and non-cognitive skills. Still, by using several outcome variables in chapter two and by allowing for heterogeneity in the effects of background in chapters two and three I found indications of channels – such as support and information about jobs – that are worth pursuing further. Often, better data is needed. Most large-scale surveys lack good measures of important channels such as the social networks someone has access to while looking for work or cognitive and non-cognitive skills. I believe clarifying these channels reliably is one of the most important ways to move this area of research forward.

5.3 Conclusion

The transition to the labour market seems to be a major hurdle which can then affect the further working life. These differences in the early career carry the risk that the disadvantaged end up socially excluded and with less secure employment. While I also find some differences by background in wages and in the type of job someone obtains these differences tend to be smaller.

In this thesis I highlight some of the complex ways in which parental background affects labour market outcomes. Background matters, but not always in the same way for everyone. In chapters three and four I find some evidence that background is most important under less advantageous conditions. I find that in Germany background matters more during times of higher unemployment; while in the UK socio-economic background matters more for ethnic minorities than for their more advantaged white British counterparts. This suggests that growing up disadvantaged reinforces other types of disadvantage, while those who grew up with more resources are shielded.

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Appendix

Table A 2-1a: regressions of labour market outcomes on control sample

Coefficients	Work (logit)	Job hours (OLS)	Part-time (logit)	Fixed-term (logit)
Age	-0.07	1.06**	-0.22**	-0.20**
Father age	0.002	-0.05	0.01	-0.01
Live age 16	0.15	-0.16	0.19	-0.10
English	0.53	-1.17	-0.28	0.67
White	-0.59 *	-1.12	0.04	0.59
Poor health	-0.86**	-0.95	0.63*	-0.36
Parent	-1.65**	-3.96	0.81	
Couple	0.28	-0.44	0.28	
Father education	0.15	0.47	0.004	-0.53
Mother education	0.18	-0.40	0.17	-0.35
Qual.: degree	Ref	Ref	Ref	Ref
Qual.: other high	-0.45	-1.94	0.48	-0.66
Qual.: A level	-1.21**	-2.21*	0.59	-0.51
Qual.: GCSE	-1.99**	-2.60**	0.78**	-0.97**
Qual.: other qual	-2.43**	-13.42**	0	0
Qual: none	-3.21**	0.55	0.59	0.35
How often see father	-0.09	-0.07	-0.10	0.08
Unemployment rate age 14	0.18	-1.60 **	0.34**	0.09
Male	1.05**	6.34**	-1.54**	-0.03
Constant	3.15	22.65	1.49	1.91
N	856	622	622	622

** significant at p<0.10, **: significant at p<0.05, controlled for appropriate controls and weighted*

Table A 2-1b: regressions of labour market outcomes on control sample

Coefficients	Low by occ. (logit)	Low by ed. (logit)	Log monthly wage (OLS)	Low job sat. (logit)
Age	-0.04	-0.05	0.08**	0.04
Father age	-0.01	-0.01	0.0002	-0.02
Live age 16	-0.29	-0.12	0.01	0.07
English	0.13	0.006	-0.11	-0.38
White	0.55	0.31	-0.10	-0.54
Poor health	0.52	0.56*	-0.09	0.50
Parent				
Couple				
Father education	0.05	0.09	0.04	0.21
Mother education	-0.22	-0.06	-0.03	-0.38
Qual.: degree	Ref	Ref	Ref	Ref
Qual.: other high	-0.11	-0.25	-0.22**	0.11
Qual.: A level	0.13	-0.36	-0.24**	-0.42
Qual.: GCSE	0.35	-0.21	-0.41**	-0.28
Qual.: other qual	0	0	0.51**	0
Qual: none	1.63**	0.33	-0.88**	-0.31
How often see father	0.04	0.007	-0.00	0.18
Unemployment rate age 14	0.31**	0.28	-0.08**	0.11
Male	-0.08	0.09	0.09*	0.40
Job hours			0.04**	0.01
Monthly wage				-0.0007**
Fixed-term	1.50**	0.97**		-0.06
Part-time	0.15	0.52**		0.37
Low by education				-0.11
Low by occupation				-0.38
Constant	-1.36	-0.04		-1.58
N	622	622	622	622

** significant at p<0.10, **: significant at p<0.05, controlled for appropriate controls and weighted*

Table A 2-2: 95% confidence interval for odds ratio of father not working on own employment at gamma 2

P1\P0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
0.10	[0.33-0.62]	[0.36-0.68]	[0.39-0.73]	[0.42-0.79]	[0.45-0.85]	[0.48-0.9]	[0.51-0.96]	[0.53-1.01]	[0.56-1.07]	[0.59-1.13]
0.20	[0.3-0.57]	[0.33-0.62]	[0.35-0.67]	[0.38-0.72]	[0.41-0.77]	[0.44-0.83]	[0.46-0.88]	[0.49-0.93]	[0.52-0.98]	[0.54-1.03]
0.30	[0.28-0.52]	[0.3-0.57]	[0.33-0.62]	[0.35-0.67]	[0.38-0.72]	[0.4-0.76]	[0.43-0.81]	[0.45-0.86]	[0.48-0.91]	[0.5-0.95]
0.40	[0.26-0.49]	[0.28-0.53]	[0.3-0.58]	[0.33-0.62]	[0.35-0.66]	[0.37-0.71]	[0.4-0.75]	[0.42-0.8]	[0.44-0.84]	[0.47-0.89]
0.50	[0.24-0.45]	[0.26-0.5]	[0.28-0.54]	[0.31-0.58]	[0.33-0.62]	[0.35-0.66]	[0.37-0.7]	[0.39-0.74]	[0.41-0.79]	[0.44-0.83]
0.60	[0.22-0.43]	[0.25-0.46]	[0.27-0.5]	[0.29-0.54]	[0.31-0.58]	[0.33-0.62]	[0.35-0.66]	[0.37-0.7]	[0.39-0.74]	[0.41-0.77]
0.70	[0.21-0.4]	[0.23-0.44]	[0.25-0.47]	[0.27-0.51]	[0.29-0.55]	[0.31-0.58]	[0.33-0.62]	[0.35-0.66]	[0.37-0.69]	[0.38-0.73]
0.80	[0.2-0.38]	[0.22-0.41]	[0.24-0.45]	[0.25-0.48]	[0.27-0.52]	[0.29-0.55]	[0.31-0.59]	[0.33-0.62]	[0.35-0.65]	[0.36-0.69]
0.90	[0.19-0.36]	[0.21-0.39]	[0.22-0.42]	[0.24-0.46]	[0.26-0.49]	[0.28-0.52]	[0.29-0.55]	[0.31-0.59]	[0.33-0.62]	[0.34-0.65]

This table presents the estimated effect (in odds ratio) of having a father who did not work rather than worked in a low-paying job, estimated from a binary logistic regression controlling for age, age of father, where lived when aged 16, English as first language, not born in UK, ethnicity, having children, health status, cohabitation status, education of parents, own education, how often see parents, unemployment rate when aged 14 and gender. The simulated binary confounder is assumed to have an odds ratio of 2 on the probability of being employed and varies in association with the categories as p0 (the proportion of people in the control group who have the unobserved confounder) and p1 (this proportion in the group whose fathers did not work).

Table A 2-3: Results from different sensitivity analyses

Difference:	Lowest 50%	Lowest 10%	Propensity score with lowest 25%	Lowest 25%, employed vs. unemployed	Men	Women	At most secondary qualifications	Post-secondary qualifications
Working	-0.14 (0.02)**	-0.15 (0.02)**	-0.12 (0.03)**	-0.14 (0.02)**	-0.18 (0.04)**	-0.10 (0.03)**	-0.14 (0.03)**	-0.11 (0.04)**
N treated	472	472	472	349	189	282	382	90
N control	1969	327	856	758	366	490	856	856
Work part-time	0.11 (0.03)**	0.13 (0.03)**	0.11 (0.04)**	0.10 (0.03)**	0.10 (0.05)**	0.11 (0.04)**	0.14 (0.03)**	0.03 (0.05)
Hours/week	-2.81 (0.69)**	-3.38 (0.73)**	-2.97 (1.07)**	-2.99 (0.71)**	-3.22 (1.31)**	-3.22 (0.09)**	-3.99 (0.85)**	-1.43 (1.03)
Low job satisfaction	0.05 (0.03)**	-0.82 (0.03)**	0.05 (0.04)	0.04 (0.03)*	-0.02 (0.04)	0.10 (0.04)**	0.06 (0.03)**	0.07 (0.05)
Fixed-term	0.02 (0.02)	0.05 (0.02)**	0.02 (0.03)	0.03 (0.02)	-0.01 (0.04)	0.02 (0.03)	0.03 (0.02)	0.04 (0.04)
Relative low wage by occupation	-0.04 (0.04)	-0.04 (0.04)	0.07 (0.05)	-0.03 (0.04)	-0.06 (0.07)	-0.04 (0.05)	-0.02 (0.05)	0.02 (0.07)
Relative low wage by education	0.03 (0.04)	0.02 (0.04)	0.07 (0.06)	0.02 (0.04)	-0.02 (0.07)	0.03 (0.05)	0.02 (0.04)	-0.05 (0.07)
Log gross monthly income	-0.04 (0.04)	-0.02 (0.04)	-0.02 (0.10)	-0.01 (0.03)	0.02 (0.08)	-0.10 (0.05)**	-0.06 (0.04)	-0.04 (0.07)
N treated	259	259	259	230	86	147	171	72
N control	1481	240	622	637	291	331	622	622

** significant at p<0.10, **: significant at p<0.05, controlled for appropriate controls and weighted*

Table A3-1: Mean (standard deviation) of main variables by education

Family background	**Disadvantaged**		**Middle group**		**Advantaged**	
Qualifications	Low	High	Low	High	Low	High
Employment	0.81 (0.39)	0.92 (0.28)	0.85 (0.35)	0.94 (0.23)	0.92 (0.26)	0.97 (0.16)
Temporary contract	0.19 (0.39)	0.16 (0.37)	0.22 (0.42)	0.20 (0.40)	0.19 (0.39)	0.30 (0.46)
Hourly wage	6.20 (3.01)	7.21 (3.44)	5.95 (3.74)	7.31 (3.75)	7.74 (8.49)	8.03 (4.90)
Job that at least matches qualification	0.80 (0.40)	0.81 (0.39)	0.80 (0.40)	0.77 (0.32)	0.81 (0.39)	0.76 (0.43)
Job search through friends or relatives	0.59 (0.49)	0.29 (0.45)	0.52 (0.50)	0.32 (0.46)	0.55 (0.50)	0.29 (0.45)
Age	24.33 (4.59)	26.33 (4.39)	22.92 (4.27)	25.86 (4.18)	20.73 (3.85)	26.24 (4.07)
Satisfaction health (10-point scale)	7.76 (1.94)	7.75 (1.74)	7.73 (1.91)	7.53 (1.87)	7.74 (1.78)	7.67 (1.78)
Male	0.59 (0.49)	0.59 (0.49)	0.55 (0.50)	0.49 (0.50)	0.55 (0.50)	0.51 (0.50)
Potential experience	6.14 (4.46)	8.15 (4.69)	4.89 (4.23)	7.79 (4.46)	3.08 (3.78)	8.29 (4.45)
No degree	0.23 (0.42)		0.20 (0.40)		0.53 (0.50)	
Basic sec.	0.71 (0.46)		0.67 (0.47)		0.24 (0.43)	
Technical or general sec.	0.03 (0.17)		0.10 (0.29)		0.23 (0.42)	
Other sec.	0.04 (0.19)		0.04 (0.19)		0.01 (0.10)	
Apprentice or voc. school		0.75 (0.44)		0.71 (0.45)		0.36 (0.48)
Technical school		0.09 (0.29)		0.08 (0.27)		0.04 (0.20)
Other voc.		0.03 (0.17)		0.02 (0.13)		0.02 (0.15)
Technical college		0.04 (0.20)		0.04 (0.19)		0.06 (0.24)
University		0.09 (0.28)		0.15 (0.36)		0.51 (0.50)

Married	0.34 (0.47)	0.28 (0.45)	0.15 (0.36)	0.19 (0.39)	0.05 (0.22)	0.11 (0.31)
Migration background	0.77 (0.40)	0.64 (0.48)	0.42 (0.49)	0.29 (0.45)	0.11 (0.32)	0.12 (0.32)
Child in the household	0.58 (0.49)	0.36 (0.48)	0.39 (0.49)	0.25 (0.44)	0.51 (0.50)	0.17 (0.37)
Father age	53.90 (7.28)	57.41 (7.57)	51.63 (6.93)	54.63 (6.99)	51.64 (7.15)	57.34 (6.74)
Mother age	50.81 (7.47)	53.18 (7.52)	48.32 (6.35)	51.41 (6.55)	48.88 (6.28)	53.74 (6.25)
Unemployment rate by ROR	8.30 (3.08)	8.59 (2.80)	8.32 (2.77)	8.30 (2.89)	8.34 (2.95)	8.63 (3.20)
Unemployment rate by state	8.25 (2.58)	8.72 (2.42)	8.80 (2.65)	8.90 (2.74)	9.24 (2.92)	9.40 (3.01)
Maximum years of education of parent while child grew up	8.55 (1.37)	9.06 (1.42)	10.95 (1.22)	11.10 (1.14)	15.98 (2.44)	15.74 (2.54)
Highest average status of parents while child grew up	27.99 (6.78)	27.97 (6.35)	41.18 (7.59)	42.41 (7.51)	58.97 (8.47)	58.84 (8.23)
Highest average household income of parents when child grew up	13,575.8 (3620.4)	14,501.0 (4155.2)	20,538.2 (6103.8)	21,208.9 (6112.6)	36,550.6 (14638.1)	35,488.7 (13816.4)
N observations (for employment)	*1380*	*1646*	*2288*	*5521*	*530*	*1523*

Table A3-2: Full models of employment, log hourly wage and temporary contract

Low Qualifications	Employment (odds ratio)	Log hourly wage	Temporary (odds ratio)
Constant	0.03 (0.05)	0.03 (0.32)	4852.93 (12874.24)
Age (between)	1.31 (0.11)	0.04 (0.01)	0.62 (0.06)
Age (within)	1.22 (0.10)	0.04 (0.01)	0.64 (0.06)
Age^2 (within)	1.00 (0.01)	-0.00 (0.00)	1.02 (0.01)
Male	0.99 (0.21)	0.07 (0.03)	1.19 (0.30)
Married	1.14 (0.28)	0.08 (0.03)	1.12 (0.32)
Child (between)	0.68 (0.23)	-0.04 (0.05)	0.77 (.32)
Child (within)	1.42 (0.28)	0.01 (0.02)	1.15 (0.27)
Migrant	1.02 (0.37)	0.13 (0.06)	2.04 (0.90)
Health (between)	1.23 (0.10)	0.06 (0.01)	0.79 (0.08)
Health (within)	1.08 (0.04)	0.00 (0.00)	1.06 (0.06)
Potential experience	0.91 (0.08)	-0.01 (0.01)	1.15 (0.11)
No degree (ref)	/	/	/
Basic/intermediate secondary	0.19 (0.05)	-0.08 (0.03)	3.60 (1.16)
Technical/general sec.	0.25 (0.09)	-0.10 (0.05)	8.43 (3.71)
Other secondary	0.08 (0.04)	-0.19 (0.07)	1.94 (1.30)
Father's age	1.03 (0.02)	-0.00 (0.00)	0.99 (0.03)
Mother's age	0.95 (0.03)	0.01 (0.00)	1.00 (0.03)
Middle (vs disadv.)	2.42 (0.65)	0.01 (0.09)	4.30 (3.33)
Adv. (vs disadv.)	6.90 (3.03)	0.17 (0.16)	0.78 (1.10)
Unemployment rate (ROR)	0.75 (0.05)	0.00 (0.01)	1.30 (0.10)
Middle * Unemployment	1.15 (0.08)	0.00 (0.01)	0.85 (0.07)
Adv. * Unemployment	1.03 (0.12)	-0.00 (0.02)	0.96 (0.15)
State fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Sample fixed effects	Yes	Yes	Yes
Rho	*0.61*	*0.63*	*0.61*
N persons	*1370*	*754*	*754*
N observations	*4198*	*2503*	*2503*

High Qualifications	**Employment (odds ratio)**	**Log hourly wage**	**Temporary (odds ratio)**
Constant	0.04 (0.08)	0.94 (0.23)	2854.54 (5938.47)
Age (between)	1.26 (0.09)	0.04 (0.01)	0.68 (0.04)
Age (within)	1.24 (0.09)	0.03 (0.01)	0.67 (0.04)
Age^2 (within)	0.99 (0.00)	-0.00 (0.00)	1.01 (0.00)
Male	0.75 (0.14)	0.09 (0.02)	1.24 (0.19)
Married	1.06 (0.24)	0.02 (0.01)	1.01 (0.18)
Child (between)	0.52 (0.16)	-0.02 (0.03)	0.83 (0.23)
Child (within)	0.69 (0.14)	0.00 (0.01)	1.20 (0.19)
Migrant	0.60 (0.18)	-0.00 (0.03)	1.06 (0.28)
Health (between)	1.12 90.08)	0.02 (0.01)	1.05 (0.06)
Health (within)	0.98 (0.04)	0.00 (0.00)	1.00 (0.03)
Potential experience	0.92 (0.06)	0.00 (0.00)	1.10 (0.06)
Schooling: Apprentice/vocational (ref)	/	/	/
-Technical school	1.70 (0.63)	0.06 (0.02)	0.63 (0.17)
-Other vocational	0.87 (0.47)	0.04 (0.05)	1.03 (0.53)
-Technical college	1.60 (0.71)	0.14 (0.03)	1.52 (0.48)
-University	6.87 (2.20)	0.06 (0.02)	3.44 (0.63)
Father's age	1.01 (0.02)	-0.00 (0.00)	1.02 (0.02)
Mother's age	1.01 (0.03)	0.00 (0.00)	0.97 (0.02)
Middle (vs. disadv.)	1.56 (0.37)	-0.11 (0.07)	0.38 (0.25)
Adv. (vs disadv.)	2.10 (0.76)	-0.23 (0.09)	0.66 (0.50)
Unemployment rate (state)	1.11 (0.08)	-0.02 (0.01)	0.82 (0.06)
Middle * Unemployment	1.26(0.14)	0.02 (0.01)	1.11 (0.08)
Adv. * Unemployment		0.02 (0.01)	1.11 (0.09)
State fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Sample fixed effects	Yes	Yes	Yes
Rho	*0.54*	*0.32*	*0.58*
N persons	*1845*	*1570*	*1570*
N observations	*8690*	*7138*	*7138*

Table A3-3: Main outcomes separated by gender

	Employment (odds ratio)		**Log hourly wage**		**Temporary (odds ratio)**	
Low Qualifications	Female	Male	Female	Male	Female	Male
Middle (vs disadv.)	2.67 (1.08)**	2.03 (0.74)*	-0.03 (0.05)	0.08 (0.06)	0.88 (0.39)	1.39 (0.60)
Adv. (vs disadv.)	7.99 (5.49)**	7.86 (4.85)**	0.18 (0.08)**	0.18 (0.09)*	0.86 (0.64)	0.44 (0.33)
Unemployment rate (ROR)	0.79 (0.07)**	0.70 (0.07)**	0.00 (0.01)	0.00 (0.01)	1.14 (0.11)	1.47 (0.17)**
Middle * Unemployment	1.10 (0.11)	1.19 (0.12)*	0.01 (0.01)	0.00 (0.02)	0.89 (0.11)	0.81 (0.10)*
Adv. * Unemployment	0.83 (0.14)	1.23 (0.22)	0.00 (0.02)	0.00 (0.03)	0.84 (0.18)	1.13 (0.27)
N persons	*634*	*736*	*343*	*411*	*343*	*411*
N observations	*1828*	*2370*	*1038*	*1465*	*1038*	*1465*
High Qualifications	Female	Male	Female	Male	Female	Male
Middle (vs disadv.)	1.34 (0.48)	1.77 (0.60)*	0.02 (0.04)	0.04 (0.04)	0.72 (0.24)	1.35 (0.42)
Adv. (vs disadv.)	1.46 (0.75)	3.52 (1.99)**	-0.06 (0.05)	-0.01 (0.05)	1.44 (0.60)	2.05 (0.81)*
Unemployment rate (state)	0.82 (0.11)	0.90 (0.11)	-0.03 (0.01)**	-0.02 (0.01)*	0.74 (0.09)**	0.90 (0.09)
Middle * Unemployment	1.22 (0.15)*	1.06 (0.11)	0.03 (0.01)**	0.01 (0.01)	1.10 (0.12)	1.13 (0.11)
Adv. * Unemployment	1.26 (0.20)	1.42 (0.26)*	0.03 (0.01)**	0.02 (0.01)	0.98 (0.12)	1.28 (0.15)**
N persons	*916*	*929*	*785*	*785*	*785*	*810*
N observations	*4247*	*4443*	*3521*	*3617*	*3521*	*3776*

**: p<0.1, **: p<0.05, controlled for year (dummies), state (dummies), sample (dummies), school (dummies), marital status, child, migrant, satisfaction with health, father birth year, mother birth year, potential experience. Unemployment rate measured at raumordnungsregion (ROR) or state*

Table A3-4: Main outcomes for first 5 years observed and later

	Employment (odds ratio)		**Log hourly wage**		**Temporary (odds ratio)**	
Low Qualifications	Early career	Late career	Early career	Late career	Early career	Late career
Middle (vs disadv.)	3.28 (1.05)**	1.02 (0.67)	0.03 (0.05)	-0.07 (0.06)	1.03 (0.52)	1.08 (0.50)
Adv. (vs disadv.)	13.85 (7.24)**	1.24 (1.55)	0.13 (0.07)*	0.05 (0.13)	0.50 (0.40)	0.23 (0.32)
Unemployment rate (ROR)	0.75 (0.07)**	0.70 (0.08)**	0.01 (0.01)	-0.01 (0.01)	1.58 (0.22)**	1.10 (0.13)
Middle * Unemployment	1.26 (0.11)**	1.15 (0.16)	-0.01 (0.01)	0.03 (0.01)*	0.82 (0.11)	0.99 (0.13)
Highest * Unemployment	1.30 (0.19)*	0.64 (0.20)	-0.02 (0.02)	0.06 (0.04)*	0.87 (0.21)	1.06 (0.51)
N persons	*1279*	*406*	*643*	*320*	*643*	*320*
N observations	*2584*	*1614*	*1302*	*1201*	*1302*	*1201*
High Qualifications	Early career	Late career	Early career	Late career	Early career	Late career
Middle (vs disadv.)	2.03 (0.73)**	1.58 (0.53)	0.03 (0.04)	-0.01 (0.03)	1.29 (0.48)	0.73 (0.22)
Adv. (vs disadv.)	4.26 (2.77)**	1.38 (0.66)	-0.06 (0.05)	-0.05 (0.04)	2.56 (1.29)*	1.32 (0.49)
Unemployment rate (state)	0.85 (0.12)	0.83 (0.10)*	-0.03 (0.01)**	-0.00 (0.01)	0.76 (0.09)*	0.75 (0.08)**
Middle * Unemployment	1.13 (0.14)	1.21 (0.13)*	0.02 (0.01)	-0.00 (0.01)	1.19 (0.14)	1.20 (0.12)*
Highest * Unemployment	1.44 (0.32)*	1.28 (0.18)*	0.03 (0.01)**	0.01 (0.01)	1.17 (0.16)	1.20 (0.13)*
N persons	*1289*	*1257*	*963*	*1135*	*963*	*1135*
N observations	*2792*	*5898*	*2145*	*4993*	*2145*	*4993*

**: p<0.1, **: p<0.05, controlled for year (dummies), state (dummies), sample (dummies), school (dummies), marital status, child, migrant, satisfaction with health, father birth year, mother birth year, potential experience. Unemployment rate measured at raumordnungsregion (ROR) or state*

Table A3-5: Models on subsample after 1991 and controlling for industry

	After reunification			**Industry (1-digit dummies)**	
Low Qualifications	Employment (odds ratio)	Log hourly wage	Temporary (odds ratio)	Log hourly wage	Temporary (odds ratio)
Middle (vs disadv.)	3.98 (1.42)**	0.01 (0.07)	1.25 (0.51)	0.03 (0.04)	1.02 (0.35)
Adv. (vs disadv.)	17.19 (9.56)**	0.10 (0.10)	0.64 (0.38)	0.14 (0.07)**	0.49 (0.28)
Unemployment rate (ROR)	0.81 (0.08)**	0.01 (0.02)	1.14 (0.13)	0.00 (0.01)	1.28 (0.11)**
Middle * Unemployment	1.13 (0.11)	0.01 (0.02)	0.77 (0.10)**	0.00 (0.01)	0.84 (0.08)*
Adv. * Unemployment	1.33 (0.22)*	-0.01 (0.03)	0.87 (0.16)	0.00 (0.02)	0.95 (0.16)
Rho	*0.59*	*0.72*	*0.48*	*0.63*	*0.64*
N persons (obs.)	*946 (2181)*	*444 (1035)*		*729 (2409)*	
High Qualifications					
Middle (vs disadv.)	1.83 (0.53)**	0.04 (0.04)	0.94 (0.26)	0.02 (0.03)	1.02 (0.23)
Adv. (vs disadv.)	3.32 (1.46)**	-0.02 (0.04)	1.37 (0.46)	-0.03 (0.03)	1.61 (0.46)*
Unemployment rate (state)	1.10 (0.13)	-0.02 (0.01)**	0.77 (0.07)**	-0.02 (0.01)**	0.80 (0.06)**
Middle * Unemployment	1.05 (0.10)	0.01 (0.01)	1.11 (0.10)	0.01 (0.01)**	1.11 (0.08)
Adv. * Unemployment	1.16 (0.16)	0.02 (0.01)	1.13 (0.11)	0.02 (0.01)**	1.11 (0.09)
Rho	*0.48*	*0.31*	*0.54*	*0.55*	*0.58*
N persons (obs.)	*1351 (5479)*	*1114 (4461)*		*1558 (7003)*	

**: p<0.1, **: p<0.05, controlled for year (dummies), state (dummies), sample (dummies), school (dummies), gender, marital status, child, migrant, satisfaction with health, father birth year, mother birth year, potential experience. After reunification includes only observations after 1991 and industry incorporates sic-2007 1-digit industry codes.*

Table A3-6: Effects of business cycle on employment probability using current unemployment rate

Family background	**Low Qualifications**	**High Qualifications**
Disadvantaged	-0.030	-0.005
	(0.007)**	(0.004)
Middle	-0.010	-0.002
	(0.004)**	(0.002)
Advantaged	-0.009	-0.000
	(0.005)*	(0.002)
N observations	4107	8690

**: p<0.1, **: p<0.05, predicted marginal effects of local unemployment rate at the grand margin, showing the effect in percentage points for all binary outcomes. The effect on hourly wage is shown in log form and in pounds.*

Table A 4-1: Employment status six months and three and a half years after graduation (row percentages) by background

	six months after graduation				three and a half years after graduation			
	Paid employment	Self-employed	Unemployed	Inactive	Paid employment	Self-employed	Unemployed	Inactive
Parental class								
working class	63.77	2.16	9.02	25.30	78.22	5.66	3.11	16.23
self-employed	61.17	2.79	8.64	27.60	77.71	5.05	3.57	13.85
Intermediate	62.55	2.04	7.72	27.90	77.98	2.39	2.59	17.18
High	59.14	2.47	7.20	31.46	76.12	3.38	2.42	18.31
University type								
former polytechnic	67.74	2.45	8.75	21.25	82.08	3.67	3.17	11.28
mid-range	63.80	3.10	7.37	26.06	78.88	3.89	2.96	14.42
Russell-group	51.04	1.57	7.00	40.63	72.18	2.36	2.03	23.65
Grades obtained								
At most lower second class honours	66.06	2.19	10.25	21.68	80.49	3.06	4.20	12.35
Upper second-class honours	59.92	2.30	6.97	31.06	78.07	3.09	2.44	16.55
First-class honours	52.56	2.92	5.20	39.68	68.25	3.66	0.99	27.55
Observations	429,107	16,717	54,341	209,254	25,857	1,073	881	5,891
Share (%)	60.64	2.36	7.68	29.57	76.86	3.19	2.62	17.52

Inactivity contains further education, unpaid work and otherwise inactive

Table A 4-2: mean (standard error) by ethnicity for all variables

Ethnicity:	White British	Black Caribbean	Black African	Indian	Pakistani	Bangladeshi	Chinese
Dummy: disability	0.09	0.09	0.07	0.05	0.05	0.04	0.04
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Dummy: men	0.43	0.33	0.38	0.47	0.47	0.45	0.48
	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
Private school	0.12	0.03	0.06	0.11	0.06	0.04	0.17
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
Parental background							
Working class	0.14	0.23	0.25	0.30	0.31	0.51	0.43
	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
Self-employed	0.07	0.04	0.03	0.10	0.24	0.21	0.15
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)
Intermediate	0.20	0.25	0.18	0.22	0.15	0.08	0.11
	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)	(0.00)
High	0.59	0.48	0.53	0.38	0.30	0.20	0.31
	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
home in London	0.03	0.38	0.52	0.10	0.09	0.28	0.15
	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)
Herfindahl index	0.18	0.54	0.53	0.49	0.44	0.44	0.31
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

Share of co-ethnics (%)	0	4.83	7.47	11.17	7.58	4.19	0.92
	constrained	(0.05)	(0.07)	(0.06)	(0.07)	(0.15)	(0.01)
Share claimants (%)	2.70	4.05	3.82	3.52	3.85	3.76	3.00
	(0.00)	(0.02)	(0.02)	(0.01)	(0.02)	(0.03)	(0.02)
Employment rate	74.91	70.05	70.87	70.57	69.52	69.48	73.05
	(0.01)	(0.08)	(0.07)	(0.04)	(0.07)	(0.13)	(0.09)
Employment rate co-ethnics	76.15	68.55	59.29	74.90	49.20	49.33	59.89
	(0.01)	(0.08)	(0.10)	(0.05)	(0.07)	(0.17)	(0.21)
Share graduates (%)	25.02	29.99	32.92	26.20	24.86	28.71	27.39
	(0.01)	(0.13)	(0.13)	(0.05)	(0.09)	(0.20)	(0.13)
Ratio co-ethnic graduates	1	0.89	1.33	1.43	0.94	0.72	1.49
	constrained	(0.00)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)
Index of multiple deprivation (5 groups)	2.90	4.10	4.04	3.72	4.03	3.90	3.25
	(0.00)	(0.02)	(0.02)	(0.01)	(0.01)	(0.03)	(0.02)
Distance home-work	111.78	62.28	83.48	62.86	39.06	40.82	90.82
	(0.14)	(1.02)	(1.15)	(0.46)	(0.66)	(1.36)	(1.35)
Distance university-work	91.39	55.16	73.25	59.35	40.58	41.54	75.57
	(0.17)	(1.27)	(1.53)	(0.61)	(0.93)	(1.83)	(1.85)
Distance home-work	57.34	25.35	30.51	27.95	23.87	20.89	55.05
	(0.15)	(0.88)	(1.05)	(0.44)	(0.76)	(1.17)	(1.75)
Grades							

At most lower second class honours	0.31	0.52	0.51	0.45	0.52	0.49	0.36
	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
Upper second-class honours	0.55	0.43	0.44	0.46	0.41	0.44	0.50
	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
First-class honours	0.13	0.05	0.05	0.09	0.07	0.07	0.13
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)
University							
Former polytechnic	0.34	0.50	0.40	0.46	0.50	0.56	0.31
	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
Russell group	0.30	0.10	0.17	0.26	0.17	0.14	0.44
	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)
STEM-subject	0.35	0.29	0.34	0.42	0.43	0.38	0.47
	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
Average tariff course	201.85	181.95	191.91	197.99	178.40	176.07	215.04
	(0.08)	(0.80)	(0.83)	(0.41)	(0.65)	(1.18)	(1.02)
Employed (six months)	0.90	0.87	0.82	0.83	0.77	0.79	0.79
	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)
Yearly salary (six months)	16,780.46	16,727.32	18,140.43	18,098.45	16,711.84	17,019.42	18,561.42

	(12.01)	(121.11)	(126.63)	(64.97)	(106.08)	(183.40)	(171.48)
qualifications not required	0.38	0.52	0.43	0.36	0.41	0.47	0.34
	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
temporary job	0.32	0.28	0.31	0.33	0.34	0.32	0.34
	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
part-time work	0.17	0.31	0.25	0.20	0.26	0.33	0.20
	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
job found through network	0.23	0.19	0.21	0.21	0.21	0.21	0.22
	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
work in London	0.15	0.41	0.50	0.27	0.16	0.31	0.30
	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)
employed (three and a half years)	0.97	0.96	0.91	0.95	0.90	0.92	0.95
	(0.00)	(0.01)	(0.02)	(0.01)	(0.02)	(0.03)	(0.02)
Yearly salary (three and a half years)	25,784.16	20,854.49	22,956.36	28,521.28	24,084.72	28,408.22	26,746.26
	(253.70)	(539.67)	(754.05)	(1,239.25)	(1,291.18)	(5,432.48)	(1,204.74)
Observations	450,570.00	4,857.00	5,041.00	22,749.00	7,688.00	2,435.00	4,109.00

Table A 4-3: women employed six months after graduation (marginal effects)

Obs = 281,832	Basic model	Family background	Local area	University	All	Co-ethnic resources
Dummy: disability	-0.027**	-0.026**	-0.027**	-0.025**	-0.024**	-0.024**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Year of graduation (ref. 2005)						
2006	0.007*	0.007**	0.008**	0.005*	0.006*	0.006*
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
2007	0.008**	0.009**	0.009**	0.007**	0.007**	0.007**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
2008	-0.022**	-0.022**	-0.018**	-0.024**	-0.021**	-0.021**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
2009	-0.035**	-0.035**	-0.026**	-0.038**	-0.030**	-0.030**
	(0.003)	(0.003)	(0.004)	(0.003)	(0.004)	(0.004)
2010	-0.023**	-0.023**	-0.015**	-0.026**	-0.020**	-0.020**
	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)
2011	-0.024**	-0.024**	-0.014**	-0.028**	-0.020**	-0.020**
	(0.003)	(0.003)	(0.004)	(0.003)	(0.004)	(0.004)
2012	-0.012**	-0.012**	-0.003	-0.017**	-0.009**	-0.009**
	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.003)
Ethnicity (ref. white British)						
black Caribbean	-0.039**	-0.040**	-0.029**	-0.034**	-0.027**	-0.008
	(0.007)	(0.007)	(0.006)	(0.007)	(0.006)	(0.016)
black African	-0.084**	-0.085**	-0.070**	-0.082**	-0.072**	-0.050**
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.019)
Indian	-0.077**	-0.076**	-0.071**	-0.082**	-0.076**	-0.046*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.022)
Pakistani	-0.154**	-0.153**	-0.145**	-0.163**	-0.153**	-0.123**
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.023)
Bangladeshi	-0.129**	-0.127**	-0.116**	-0.134**	-0.121**	-0.092**
	(0.014)	(0.014)	(0.013)	(0.014)	(0.013)	(0.023)
Chinese	-0.100**	-0.096**	-0.095**	-0.096**	-0.089**	-0.064**
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.020)
Parental class (ref. working class)						

self-employed	0.001			-0.000	0.003
	(0.002)			(0.002)	(0.003)
intermediate	0.004*			0.004*	0.005*
	(0.002)			(0.002)	(0.002)
high	0.004*			0.005**	0.005*
	(0.002)			(0.002)	(0.002)
Dummy: private school	-0.015**			-0.011**	-0.011**
	(0.002)			(0.002)	(0.002)
Ranking of multiple deprivation (ref. most deprived)					
least deprived (1st quintile)		0.002		0.001	0.001
		(0.004)		(0.004)	(0.004)
2nd quintile		-0.003		-0.004	-0.004
		(0.004)		(0.004)	(0.004)
3rd quintile		0.001		-0.001	-0.001
		(0.003)		(0.003)	(0.003)
4th quintile		0.002		0.001	0.001
		(0.002)		(0.003)	(0.003)
Rate of jobseekers' claimants		-0.004**		-0.004**	-0.004**
		(0.001)		(0.001)	(0.001)
Herfindahl index of diversity		0.004		0.004	0.005
		(0.005)		(0.005)	(0.006)
Share of graduates in local authority		-0.001**		-0.000**	-0.000**
		(0.000)		(0.000)	(0.000)
Employment rate in local authority		0.000		0.000	0.000
		(0.000)		(0.000)	(0.000)
Study subject (ref. health sciences)					
biological sciences			-0.043**	-0.043**	-0.043**
			(0.002)	(0.002)	(0.002)
physical sciences			-0.047**	-0.048**	-0.047**
			(0.002)	(0.002)	(0.002)

social sciences	-0.035**	-0.035**	-0.035**
	(0.002)	(0.002)	(0.002)
business	-0.028**	-0.028**	-0.028**
	(0.002)	(0.002)	(0.002)
humanities	-0.057**	-0.056**	-0.056**
	(0.002)	(0.002)	(0.002)
creative arts	-0.057**	-0.058**	-0.058**
	(0.002)	(0.002)	(0.002)
education	0.005*	0.005*	0.005*
	(0.002)	(0.002)	(0.002)
studying combined degree	-0.035**	-0.035**	-0.034**
	(0.007)	(0.007)	(0.007)
Grades obtained (ref. at most lower second-class)			
upper second-class honours	0.020**	0.019**	0.019**
	(0.001)	(0.001)	(0.001)
first-class honours	0.028**	0.027**	0.027**
	(0.002)	(0.002)	(0.002)
University attended (ref. other old)			
former polytechnic	-0.004**	-0.003*	-0.003*
	(0.001)	(0.001)	(0.001)
Russell group	-0.015**	-0.013**	-0.013**
	(0.002)	(0.002)	(0.002)
Share co-ethnics			-0.000+
			(0.000)
Log of ratio co-ethnic graduates			-0.001
			(0.007)
Employment rate co-ethnics			-0.000
			(0.000)
Interaction share and graduates co-ethnics			0.001*
			(0.001)

Parental class for minorities (ref. working class)	
self-employed	-0.013*
	(0.005)
intermediate	-0.005
	(0.004)
high	0.002
	(0.004)

*+: p<0.1; *: p<0.05; **: p<0.01, standard errors are clustered by local authority of origin.*

Table A 4-4: men employed six months after graduation (marginal effects)

Obs = 216,553	Basic model	Family background	Local area	University	All	Co-ethnic resources
Dummy: disability	-0.035**	-0.036**	-0.036**	-0.032**	-0.033**	-0.033**
	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)
Year of graduation (ref. 2005)						
2006	0.008+	0.008+	0.008+	0.006	0.006	0.006
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
2007	0.024**	0.024**	0.023**	0.021**	0.020**	0.020**
	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)
2008	-0.029**	-0.028**	-0.026**	-0.032**	-0.030**	-0.030**
	(0.004)	(0.004)	(0.005)	(0.004)	(0.005)	(0.005)
2009	-0.055**	-0.055**	-0.046**	-0.059**	-0.053**	-0.053**
	(0.004)	(0.004)	(0.005)	(0.004)	(0.005)	(0.005)
2010	-0.029**	-0.029**	-0.024**	-0.034**	-0.031**	-0.031**
	(0.004)	(0.004)	(0.005)	(0.003)	(0.005)	(0.005)
2011	-0.035**	-0.034**	-0.027**	-0.040**	-0.035**	-0.036**
	(0.004)	(0.004)	(0.006)	(0.004)	(0.005)	(0.005)
2012	-0.010**	-0.010**	-0.004	-0.019**	-0.014**	-0.015**
	(0.004)	(0.004)	(0.005)	(0.004)	(0.005)	(0.005)
Ethnicity (ref. white British)						
black Caribbean	-0.028**	-0.027**	-0.015+	-0.022**	-0.011	-0.006
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.022)
black African	-0.072**	-0.072**	-0.059**	-0.074**	-0.062**	-0.062*
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.024)
Indian	-0.068**	-0.065**	-0.056**	-0.076**	-0.063**	-0.060*
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.027)
Pakistani	-0.109**	-0.104**	-0.093**	-0.118**	-0.098**	-0.094**
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.023)
Bangladeshi	-0.106**	-0.097**	-0.090**	-0.112**	-0.092**	-0.082**
	(0.015)	(0.015)	(0.014)	(0.015)	(0.014)	(0.027)
Chinese	-0.132**	-0.125**	-0.126**	-0.130**	-0.119**	-0.121**
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.029)
Parental class (ref. working class)						

self-employed	0.003			-0.001	-0.003
	(0.003)			(0.004)	(0.004)
intermediate	0.008**			0.006*	0.006+
	(0.003)			(0.003)	(0.003)
high	0.014**			0.012**	0.011**
	(0.002)			(0.002)	(0.003)
Dummy: private school	-0.001			0.001	0.001
	(0.002)			(0.002)	(0.002)
Ranking of multiple deprivation (ref. most deprived)					
least deprived (1st quintile)		-0.006		-0.008	-0.009
		(0.006)		(0.006)	(0.006)
2nd quintile		-0.006		-0.007	-0.008
		(0.005)		(0.005)	(0.005)
3rd quintile		-0.002		-0.004	-0.004
		(0.005)		(0.005)	(0.005)
4th quintile		-0.003		-0.004	-0.004
		(0.004)		(0.004)	(0.004)
Rate of jobseekers' claimants		-0.006**		-0.005**	-0.005**
		(0.002)		(0.002)	(0.002)
Herfindahl index of diversity		-0.008		-0.010	-0.013
		(0.008)		(0.007)	(0.008)
Share of graduates in local authority		-0.000		0.000	0.000
		(0.000)		(0.000)	(0.000)
Employment rate in local authority		0.001+		0.001+	0.001+
		(0.000)		(0.000)	(0.000)
Study subject (ref. health sciences)					
biological sciences			-0.042**	-0.042**	-0.042**
			(0.005)	(0.005)	(0.005)
physical sciences			-0.066**	-0.066**	-0.066**
			(0.004)	(0.004)	(0.004)

social sciences	-0.045**	-0.046**	-0.046**
	(0.004)	(0.004)	(0.004)
business	-0.026**	-0.027**	-0.027**
	(0.005)	(0.005)	(0.005)
humanities	-0.083**	-0.083**	-0.083**
	(0.005)	(0.004)	(0.004)
creative arts	-0.081**	-0.081**	-0.081**
	(0.005)	(0.005)	(0.005)
education	0.023**	0.023**	0.023**
	(0.006)	(0.006)	(0.006)
studying combined degree	-0.056**	-0.056**	-0.056**
	(0.014)	(0.015)	(0.015)
Grades obtained (ref. at most lower second-class)			
upper second-class honours	0.036**	0.035**	0.035**
	(0.002)	(0.002)	(0.002)
first-class honours	0.068**	0.067**	0.067**
	(0.002)	(0.002)	(0.002)
University attended (ref. other old)			
former polytechnic	-0.012**	-0.010**	-0.010**
	(0.002)	(0.002)	(0.002)
Russell group	-0.023**	-0.024**	-0.024**
	(0.002)	(0.002)	(0.002)
Share co-ethnics			0.000
			(0.000)
Log of ratio co-ethnic graduates			0.009
			(0.010)
Employment rate co-ethnics			-0.000
			(0.000)
Interaction share and graduates co-ethnics			0.001
			(0.001)

Parental class for minorities (ref. working class)	
self-employed	0.007
	(0.008)
intermediate	0.002
	(0.007)
high	0.005
	(0.006)

*+: p<0.1; *: p<0.05; **: p<0.01, standard errors are clustered by local authority of origin.*

Table A 4-5: women employed three and a half years after graduation (marginal effects)

Obs = 15,825	Basic	Family	Area	University	All	Co-ethnic
Dummy: disability	-0.016**	-0.016**	-0.015**	-0.013**	-0.013**	-0.013**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Year of graduation (ref. 2005)						
2007	-0.007+	-0.007+	-0.006	-0.009*	-0.007*	-0.008*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
2009	-0.002	-0.002	-0.004	-0.003	-0.005	-0.006
	(0.003)	(0.003)	(0.005)	(0.003)	(0.005)	(0.005)
Ethnicity (ref. white British)						
black Caribbean	-0.040*	-0.040*	-0.038*	-0.035*	-0.034+	-0.116
	(0.019)	(0.019)	(0.019)	(0.017)	(0.018)	(0.125)
black African	-0.050**	-0.051**	-0.042*	-0.051**	-0.045**	-0.128
	(0.015)	(0.016)	(0.017)	(0.015)	(0.017)	(0.103)
Indian	-0.021**	-0.021**	-0.021*	-0.023**	-0.024*	-0.139
	(0.008)	(0.008)	(0.009)	(0.008)	(0.010)	(0.139)
Pakistani	-0.072**	-0.070**	-0.072**	-0.073**	-0.071**	-0.151
	(0.020)	(0.021)	(0.022)	(0.020)	(0.022)	(0.107)
Bangladeshi	-0.055+	-0.054+	-0.050+	-0.060+	-0.053+	-0.110
	(0.031)	(0.031)	(0.029)	(0.032)	(0.030)	(0.094)
Chinese	-0.035	-0.034	-0.033	-0.038	-0.034	-0.130
	(0.024)	(0.024)	(0.023)	(0.025)	(0.024)	(0.124)
Parental class (ref. working class)						
self-employed		-0.007			-0.009	-0.011
		(0.006)			(0.006)	(0.008)
intermediate		-0.001			-0.001	0.004
		(0.005)			(0.005)	(0.006)
high		-0.003			-0.003	-0.000
		(0.004)			(0.004)	(0.004)
Dummy: private school		0.003			0.003	0.003
		(0.004)			(0.005)	(0.005)
Ranking of multiple deprivation (ref. most deprived)						

least deprived (1st quintile)	0.010		0.011	0.010
	(0.009)		(0.009)	(0.009)
2nd quintile	0.002		0.002	0.002
	(0.008)		(0.008)	(0.008)
3rd quintile	0.004		0.004	0.003
	(0.007)		(0.007)	(0.007)
4th quintile	0.004		0.005	0.004
	(0.005)		(0.005)	(0.005)
Rate of jobseekers' claimants	0.002		0.002	0.002
	(0.003)		(0.003)	(0.003)
Herfindahl index of diversity	0.014		0.015	0.016
	(0.009)		(0.009)	(0.010)
Share of graduates in local authority	-0.001*		-0.001*	-0.000
	(0.000)		(0.000)	(0.000)
Employment rate in local authority	0.001		0.001	0.001
	(0.000)		(0.000)	(0.000)
Study subject (ref. health sciences)				
biological sciences		-0.007	-0.008	-0.007
		(0.006)	(0.006)	(0.006)
physical sciences		-0.009	-0.010	-0.010
		(0.006)	(0.006)	(0.006)
social sciences		-0.005	-0.005	-0.005
		(0.006)	(0.005)	(0.005)
business		0.001	0.001	0.001
		(0.005)	(0.005)	(0.005)
humanities		-0.016**	-0.016**	-0.016**
		(0.006)	(0.005)	(0.005)
creative arts		-0.020**	-0.020**	-0.020**
		(0.006)	(0.006)	(0.006)
education		-0.002	-0.002	-0.001
		(0.006)	(0.006)	(0.006)
studying combined		-0.025	-0.025	-0.024

degree				(0.024)	(0.024)	(0.024)
Grades obtained (ref. at most lower second-class)						
upper second-class honours				0.011**	0.011**	0.011**
				(0.004)	(0.004)	(0.004)
first-class honours				0.023**	0.023**	0.023**
				(0.004)	(0.004)	(0.004)
University attended (ref. other old)						
former polytechnic				0.004	0.004	0.004
				(0.003)	(0.003)	(0.003)
Russell group				0.002	0.003	0.003
				(0.004)	(0.004)	(0.004)
Activity status six months (ref. employed)						
Unpaid work	-0.004	-0.005	-0.004	-0.002	-0.003	-0.003
	(0.009)	(0.009)	(0.009)	(0.008)	(0.008)	(0.008)
Unemployed	-0.054**	-0.054**	-0.053**	-0.048**	-0.047**	-0.047**
	(0.009)	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)
Further study	-0.005	-0.005	-0.005	-0.006+	-0.006+	-0.006+
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Inactivity	-0.018*	-0.018*	-0.018*	-0.019*	-0.019*	-0.019*
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Share co-ethnics						0.000
						(0.001)
Log of ratio co-ethnic graduates						0.010
						(0.010)
Employment rate co-ethnics						0.001
						(0.000)
Interaction share and graduates co-ethnics						-0.002
						(0.002)
Parental class for minorities (ref. working class)						
self-employed						0.005

	(0.013)
intermediate	-0.018+
	(0.010)
high	-0.011
	(0.009)

*+: p<0.1; *: p<0.05; **: p<0.01, standard errors are clustered by local authority of origin.*

Table A 4-6: men employed three and a half years after graduation (marginal effects)

Obs = 11,902	Basic	Family	Area	University	All	Co-ethnic
Dummy: disability	-0.030**	-0.031**	-0.031**	-0.027**	-0.027**	-0.027**
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Year of graduation (ref. 2005)						
2007	-0.017**	-0.017**	-0.017**	-0.018**	-0.017**	-0.017**
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
2009	-0.009	-0.008	-0.013+	-0.010+	-0.016*	-0.016*
	(0.005)	(0.005)	(0.008)	(0.005)	(0.008)	(0.008)
Ethnicity (ref. white British)						
black Caribbean	0.024+	0.025*	0.026*	0.027*	0.028**	0.038*
	(0.013)	(0.012)	(0.011)	(0.010)	(0.009)	(0.016)
black African	-0.085**	-0.083**	-0.078*	-0.071*	-0.064*	-0.028
	(0.033)	(0.032)	(0.033)	(0.029)	(0.029)	(0.061)
Indian	-0.026*	-0.024*	-0.017+	-0.027*	-0.017+	0.016
	(0.011)	(0.011)	(0.010)	(0.012)	(0.010)	(0.037)
Pakistani	-0.049*	-0.043+	-0.036+	-0.047+	-0.032	-0.002
	(0.024)	(0.022)	(0.021)	(0.024)	(0.020)	(0.037)
Bangladeshi	-0.046	-0.039	-0.042	-0.037	-0.029	0.007
	(0.039)	(0.037)	(0.038)	(0.035)	(0.033)	(0.037)
Chinese	-0.011	-0.010	-0.011	-0.017	-0.016	0.009
	(0.019)	(0.019)	(0.019)	(0.021)	(0.021)	(0.038)
Parental class (ref. working class)						
self-employed		-0.007			-0.008	-0.009
		(0.008)			(0.008)	(0.010)
intermediate		-0.001			-0.002	-0.006
		(0.007)			(0.006)	(0.008)
high		0.005			0.003	-0.002
		(0.005)			(0.005)	(0.006)
Dummy: private school		0.007			0.004	0.004
		(0.005)			(0.006)	(0.006)
Ranking of multiple deprivation (ref. most deprived)						

least deprived (1st quintile)	-0.006		-0.007	-0.009
	(0.015)		(0.015)	(0.015)
2nd quintile	0.001		0.001	-0.001
	(0.012)		(0.012)	(0.012)
3rd quintile	0.011		0.011	0.010
	(0.010)		(0.009)	(0.009)
4th quintile	0.000		0.001	-0.000
	(0.007)		(0.007)	(0.007)
Rate of jobseekers' claimants	0.001		0.002	0.002
	(0.004)		(0.004)	(0.004)
Herfindahl index of diversity	-0.032*		-0.032*	-0.031*
	(0.013)		(0.013)	(0.014)
Share of graduates in local authority	0.001*		0.001*	0.001*
	(0.000)		(0.000)	(0.000)
Employment rate in local authority	-0.000		0.000	0.000
	(0.001)		(0.001)	(0.001)
Study subject (ref. health sciences)				
biological sciences		-0.020+	-0.021+	-0.021+
		(0.012)	(0.012)	(0.012)
physical sciences		-0.008	-0.008	-0.009
		(0.010)	(0.010)	(0.010)
social sciences		-0.017	-0.018+	-0.018+
		(0.011)	(0.011)	(0.011)
business		-0.008	-0.008	-0.009
		(0.011)	(0.010)	(0.010)
humanities		-0.034**	-0.035**	-0.036**
		(0.011)	(0.011)	(0.011)
creative arts		-0.018	-0.018	-0.019
		(0.012)	(0.012)	(0.012)
education		-0.002	-0.003	-0.003
		(0.022)	(0.022)	(0.022)
studying combined		-0.060	-0.063	-0.066

degree				(0.050)	(0.050)	(0.050)
Grades obtained (ref. at most lower second-class)						
upper second-class honours				0.011*	0.011*	0.011*
				(0.005)	(0.005)	(0.005)
first-class honours				0.030**	0.030**	0.030**
				(0.005)	(0.005)	(0.005)
University attended (ref. other old)						
former polytechnic				-0.004	-0.003	-0.003
				(0.005)	(0.005)	(0.005)
Russell group				0.009+	0.008	0.008
				(0.005)	(0.005)	(0.005)
Activity status six months (ref. employed)						
Unpaid work	-0.007	-0.007	-0.007	-0.005	-0.006	-0.005
	(0.014)	(0.014)	(0.014)	(0.013)	(0.013)	(0.013)
Unemployed	-0.077**	-0.076**	-0.076**	-0.067**	-0.066**	-0.066**
	(0.009)	(0.009)	(0.009)	(0.008)	(0.008)	(0.008)
Further study	-0.011*	-0.011**	-0.010*	-0.012**	-0.012**	-0.012**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Inactivity	-0.018+	-0.019+	-0.018+	-0.019+	-0.019+	-0.019+
	(0.010)	(0.011)	(0.010)	(0.011)	(0.010)	(0.010)
Share co-ethnics						-0.000
						(0.001)
Log of ratio co-ethnic graduates						0.011
						(0.016)
Employment rate co-ethnics						-0.001
						(0.001)
Interaction share and graduates co-ethnics						0.001
						(0.001)
Parental class for minorities (ref. working class)						
self-employed						0.000

	(0.017)
intermediate	0.014
	(0.017)
high	0.023
	(0.014)

*+: p<0.1; *: p<0.05; **: p<0.01, standard errors are clustered by local authority of origin.*

Table A 4-7: Log wage for women six months after graduation

Obs = 126,877	Basic	Family	Area	University	All	Co-ethnic
Dummy: disability	-0.013**	-0.016**	-0.015**	-0.004	-0.008*	-0.008*
	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)
Year of graduation (ref. 2005)						
2006	0.082**	0.081**	0.080**	0.073**	0.071**	0.071**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
2007	0.149**	0.148**	0.148**	0.138**	0.136**	0.135**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
2008	0.208**	0.207**	0.204**	0.189**	0.187**	0.186**
	(0.004)	(0.004)	(0.005)	(0.004)	(0.005)	(0.005)
2009	0.204**	0.203**	0.197**	0.182**	0.179**	0.178**
	(0.004)	(0.004)	(0.007)	(0.004)	(0.007)	(0.006)
2010	0.233**	0.233**	0.227**	0.214**	0.212**	0.212**
	(0.004)	(0.004)	(0.006)	(0.004)	(0.006)	(0.006)
2011	0.274**	0.275**	0.266**	0.255**	0.253**	0.252**
	(0.004)	(0.004)	(0.007)	(0.003)	(0.007)	(0.007)
2012	0.355**	0.355**	0.348**	0.328**	0.325**	0.324**
	(0.004)	(0.004)	(0.007)	(0.003)	(0.007)	(0.007)
Ethnicity (ref. white British)						
black Caribbean	-0.061**	-0.052**	-0.057**	-0.040**	-0.032**	-0.120**
	(0.012)	(0.011)	(0.010)	(0.012)	(0.011)	(0.036)
black African	-0.019*	-0.011	-0.015+	-0.022**	-0.012	-0.096**
	(0.009)	(0.008)	(0.009)	(0.008)	(0.008)	(0.028)
Indian	0.019*	0.024**	0.020**	-0.003	-0.000	-0.101**
	(0.009)	(0.009)	(0.007)	(0.008)	(0.006)	(0.034)
Pakistani	-0.034**	-0.025*	-0.029*	-0.057**	-0.048**	-0.107**
	(0.012)	(0.012)	(0.011)	(0.011)	(0.011)	(0.025)
Bangladeshi	-0.069**	-0.054**	-0.063**	-0.079**	-0.063**	-0.118**
	(0.016)	(0.016)	(0.015)	(0.015)	(0.015)	(0.032)
Chinese	0.026*	0.034**	0.028**	0.002	0.011	-0.070*
	(0.011)	(0.011)	(0.010)	(0.010)	(0.009)	(0.029)
Dummy: work in London	0.198**	0.190**	0.192**	0.218**	0.208**	0.208**
	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)

Parental class (ref. working class)					
self-employed	0.013**			0.010**	0.012**
	(0.004)			(0.004)	(0.004)
intermediate	0.021**			0.017**	0.016**
	(0.003)			(0.003)	(0.003)
high	0.028**			0.023**	0.022**
	(0.003)			(0.002)	(0.002)
Dummy: private school	0.049**			0.038**	0.037**
	(0.003)			(0.003)	(0.003)
Ranking of multiple deprivation (ref. most deprived)					
least deprived (1st quintile)		0.051**		0.055**	0.053**
		(0.009)		(0.009)	(0.009)
2nd quintile		0.026**		0.026**	0.025**
		(0.009)		(0.009)	(0.009)
3rd quintile		0.027**		0.024**	0.022**
		(0.007)		(0.007)	(0.007)
4th quintile		0.016**		0.016**	0.014**
		(0.005)		(0.005)	(0.005)
Rate of jobseekers' claimants		0.003		0.002	0.002
		(0.002)		(0.002)	(0.002)
Herfindahl index of diversity		0.033*		0.043**	0.045**
		(0.014)		(0.014)	(0.014)
Share of graduates in local authority		0.000		-0.000	-0.000
		(0.000)		(0.000)	(0.000)
Employment rate in local authority		0.001		0.001	0.001
		(0.001)		(0.001)	(0.001)
Study subject (ref. health sciences)					
biological sciences			-0.233**	-0.235**	-0.235**
			(0.004)	(0.004)	(0.004)
physical sciences			-0.093**	-0.095**	-0.095**

	(0.004)	(0.004)	(0.005)
social sciences	-0.166**	-0.168**	-0.168**
	(0.004)	(0.004)	(0.004)
business	-0.120**	-0.124**	-0.124**
	(0.004)	(0.004)	(0.004)
humanities	-0.230**	-0.233**	-0.233**
	(0.004)	(0.004)	(0.004)
creative arts	-0.279**	-0.281**	-0.281**
	(0.004)	(0.004)	(0.004)
education	0.006	0.006	0.006
	(0.005)	(0.005)	(0.005)
studying combined degree	-0.224**	-0.226**	-0.226**
	(0.013)	(0.012)	(0.012)
Grades obtained (ref. at most lower second-class)			
upper second-class honours	0.045**	0.043**	0.043**
	(0.002)	(0.002)	(0.002)
first-class honours	0.102**	0.100**	0.100**
	(0.003)	(0.003)	(0.003)
University attended (ref. other old)			
former polytechnic	-0.015**	-0.011**	-0.011**
	(0.002)	(0.002)	(0.002)
Russell group	0.020**	0.014**	0.014**
	(0.003)	(0.003)	(0.003)
Share co-ethnics			-0.001*
			(0.001)
Log of ratio co-ethnic graduates			0.015
			(0.015)
Employment rate co-ethnics			0.001**
			(0.000)
Interaction share and graduates co-ethnics			0.000
			(0.001)

Parental class for minorities (ref. working class)	
self-employed	-0.025*
	(0.011)
intermediate	0.005
	(0.010)
high	0.013
	(0.008)

*+: p<0.1; *: p<0.05; **: p<0.01, standard errors are clustered by local authority of origin.*

Table A 4-8: Log wage for men six months after graduation

Obs = 86,862	Basic	Family	Area	University	All	Co-ethnic
Dummy: disability	-0.014**	-0.021**	-0.017**	0.000	-0.008*	-0.008*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Year of graduation (ref. 2005)						
2006	0.110**	0.110**	0.109**	0.089**	0.088**	0.087**
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
2007	0.178**	0.178**	0.177**	0.158**	0.157**	0.157**
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
2008	0.231**	0.230**	0.229**	0.203**	0.201**	0.201**
	(0.005)	(0.005)	(0.006)	(0.005)	(0.006)	(0.006)
2009	0.212**	0.211**	0.208**	0.185**	0.181**	0.181**
	(0.006)	(0.006)	(0.008)	(0.005)	(0.007)	(0.007)
2010	0.246**	0.246**	0.242**	0.224**	0.221**	0.221**
	(0.005)	(0.005)	(0.007)	(0.005)	(0.006)	(0.006)
2011	0.294**	0.295**	0.289**	0.275**	0.273**	0.273**
	(0.005)	(0.005)	(0.008)	(0.005)	(0.007)	(0.007)
2012	0.385**	0.385**	0.379**	0.355**	0.353**	0.352**
	(0.005)	(0.005)	(0.008)	(0.005)	(0.007)	(0.007)
Ethnicity (ref. white British)						
black Caribbean	-0.072**	-0.060**	-0.055**	-0.026*	-0.007	-0.008
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.035)
black African	-0.031*	-0.019	-0.013	-0.014	0.007	-0.014
	(0.014)	(0.014)	(0.014)	(0.013)	(0.014)	(0.032)
Indian	0.042**	0.052**	0.055**	0.020*	0.034**	0.023
	(0.010)	(0.009)	(0.008)	(0.009)	(0.007)	(0.036)
Pakistani	-0.015	0.001	0.004	-0.025*	-0.003	-0.003
	(0.011)	(0.010)	(0.010)	(0.011)	(0.010)	(0.028)
Bangladeshi	-0.014	0.012	0.005	-0.017	0.012	0.029
	(0.017)	(0.017)	(0.017)	(0.017)	(0.016)	(0.031)
Chinese	0.046**	0.053**	0.052**	-0.003	0.008	-0.003
	(0.014)	(0.013)	(0.013)	(0.012)	(0.012)	(0.029)

Dummy: work in London	0.229**	0.217**	0.225**	0.221**	0.211**	0.211**
	(0.006)	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)
Parental class (ref. working class)						
self-employed		0.011*			0.008	0.007
		(0.005)			(0.005)	(0.005)
intermediate		0.022**			0.015**	0.010**
		(0.004)			(0.004)	(0.004)
high		0.042**			0.026**	0.020**
		(0.004)			(0.003)	(0.004)
Dummy: private school		0.077**			0.059**	0.058**
		(0.004)			(0.004)	(0.004)
Ranking of multiple deprivation (ref. most deprived)						
least deprived (1st quintile)			0.053**		0.060**	0.058**
			(0.011)		(0.010)	(0.010)
2nd quintile			0.031**		0.036**	0.033**
			(0.009)		(0.009)	(0.009)
3rd quintile			0.020**		0.024**	0.022**
			(0.007)		(0.006)	(0.006)
4th quintile			0.011+		0.017**	0.016**
			(0.006)		(0.005)	(0.005)
Rate of jobseekers' claimants			0.001		0.002	0.002
			(0.002)		(0.002)	(0.002)
Herfindahl index of diversity			0.008		0.024*	0.030**
			(0.011)		(0.011)	(0.011)
Share of graduates in local authority			0.000		-0.001+	-0.000
			(0.000)		(0.000)	(0.000)
Employment rate in local authority			0.001+		0.001+	0.001*

	(0.001)		(0.001)	(0.001)
Study subject (ref. health sciences)				
biological sciences		-0.134**	-0.135**	-0.135**
		(0.007)	(0.007)	(0.007)
physical sciences		0.057**	0.057**	0.058**
		(0.006)	(0.006)	(0.006)
social sciences		-0.042**	-0.047**	-0.047**
		(0.007)	(0.007)	(0.007)
business		0.002	-0.002	-0.002
		(0.007)	(0.007)	(0.007)
humanities		-0.171**	-0.176**	-0.176**
		(0.007)	(0.007)	(0.007)
creative arts		-0.184**	-0.183**	-0.183**
		(0.007)	(0.007)	(0.007)
education		0.034**	0.038**	0.038**
		(0.010)	(0.010)	(0.010)
studying combined degree		-0.120**	-0.122**	-0.121**
		(0.020)	(0.020)	(0.020)
Grades obtained (ref. at most lower second-class)				
upper second-class honours		0.066**	0.065**	0.065**
		(0.002)	(0.002)	(0.002)
first-class honours		0.155**	0.156**	0.156**
		(0.003)	(0.003)	(0.003)
University attended (ref. other old)				
former polytechnic		-0.036**	-0.031**	-0.031**
		(0.003)	(0.003)	(0.003)
Russell group		0.051**	0.042**	0.041**
		(0.003)	(0.003)	(0.003)
Share co-ethnics				-0.001+
				(0.000)

Log of ratio co-ethnic graduates	0.036*
	(0.017)
Employment rate co-ethnics	-0.000
	(0.000)
Interaction share and graduates co-ethnics	-0.002
	(0.001)
Parental class for minorities (ref. working class)	
self-employed	-0.001
	(0.014)
intermediate	0.036**
	(0.011)
high	0.049**
	(0.009)

*+: p<0.1; *: p<0.05; **: p<0.01, standard errors are clustered by local authority of origin.*

Table A 4-9: Log wage for women 3.5 year after graduation

Obs = 12,980	Basic	Family	Area	University	All	Co-ethnic
Dummy: disability	-0.074**	-0.076**	-0.074**	-0.055**	-0.056**	-0.056**
	(0.015)	(0.015)	(0.015)	(0.014)	(0.015)	(0.014)
Year of graduation (ref. 2005)						
2007	0.032**	0.032**	0.030**	0.023*	0.023*	0.021*
	(0.011)	(0.011)	(0.011)	(0.010)	(0.010)	(0.010)
2009	0.133**	0.134**	0.129**	0.124**	0.120**	0.114**
	(0.011)	(0.011)	(0.020)	(0.010)	(0.019)	(0.020)
Ethnicity (ref. white British)						
black Caribbean	-0.153**	-0.135**	-0.138**	-0.098**	-0.075*	-0.142
	(0.032)	(0.032)	(0.036)	(0.031)	(0.035)	(0.149)
black African	-0.135**	-0.114**	-0.118**	-0.111**	-0.081+	-0.162
	(0.040)	(0.039)	(0.041)	(0.041)	(0.041)	(0.125)
Indian	-0.018	-0.005	-0.011	-0.023	-0.009	-0.120
	(0.025)	(0.025)	(0.026)	(0.025)	(0.026)	(0.152)
Pakistani	-0.117**	-0.101**	-0.104**	-0.109**	-0.088*	-0.133
	(0.037)	(0.038)	(0.037)	(0.034)	(0.035)	(0.112)
Bangladeshi	-0.134*	-0.107+	-0.126+	-0.111+	-0.086	-0.110
	(0.064)	(0.064)	(0.065)	(0.062)	(0.062)	(0.119)
Chinese	-0.018	-0.003	-0.017	-0.033	-0.019	-0.116
	(0.041)	(0.042)	(0.042)	(0.037)	(0.039)	(0.121)
Dummy: work in London	0.237**	0.223**	0.229**	0.233**	0.220**	0.220**
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Parental class (ref. working class)						
self-employed		0.040*			0.028	0.030
		(0.020)			(0.019)	(0.022)
intermediate		0.051**			0.041*	0.042*
		(0.016)			(0.016)	(0.018)
high		0.061**			0.045**	0.047**
		(0.014)			(0.013)	(0.015)
Dummy: private school		0.071**			0.041**	0.041**

	(0.014)		(0.014)	(0.013)
Ranking of multiple deprivation (ref. most deprived)				
least deprived (1st quintile)	0.069+		0.074*	0.069+
	(0.037)		(0.036)	(0.037)
2nd quintile	0.047		0.052+	0.048
	(0.031)		(0.030)	(0.031)
3rd quintile	0.040		0.042+	0.039
	(0.025)		(0.025)	(0.026)
4th quintile	0.011		0.016	0.016
	(0.021)		(0.021)	(0.021)
Rate of jobseekers' claimants	0.001		0.003	0.004
	(0.010)		(0.010)	(0.010)
Herfindahl index of diversity	0.039		0.048	0.035
	(0.030)		(0.031)	(0.031)
Share of graduates in local authority	-0.000		-0.001	-0.000
	(0.001)		(0.001)	(0.001)
Employment rate in local authority	0.001		0.001	0.001
	(0.002)		(0.002)	(0.002)
Study subject (ref. health sciences)				
biological sciences		-0.188**	-0.186**	-0.185**
		(0.020)	(0.020)	(0.020)
physical sciences		-0.070**	-0.067**	-0.066**
		(0.019)	(0.019)	(0.019)
social sciences		-0.139**	-0.136**	-0.135**
		(0.019)	(0.019)	(0.019)
business		-0.071**	-0.070**	-0.070**
		(0.020)	(0.020)	(0.020)
humanities		-0.230**	-0.229**	-0.229**
		(0.020)	(0.020)	(0.020)

creative arts				-0.269**	-0.269**	-0.268**
				(0.020)	(0.020)	(0.020)
eudcation				-0.062**	-0.055*	-0.054*
				(0.023)	(0.023)	(0.023)
studying combined degree				-0.171**	-0.169**	-0.167**
				(0.046)	(0.045)	(0.045)
Grades obtained (ref. at most lower second-class)						
upper second-class honours				0.094**	0.092**	0.092**
				(0.011)	(0.011)	(0.011)
first-class honours				0.151**	0.148**	0.149**
				(0.015)	(0.015)	(0.015)
University attended (ref. other old)						
former polytechnic				-0.028*	-0.021+	-0.020+
				(0.011)	(0.011)	(0.011)
Russell group				0.067**	0.063**	0.063**
				(0.011)	(0.011)	(0.011)
Activity status six months (ref. employed)						
Unpaid work	-0.191**	-0.197**	-0.191**	-0.175**	-0.176**	-0.177**
	(0.031)	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)
Unemployed	-0.201**	-0.200**	-0.200**	-0.177**	-0.175**	-0.175**
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
Further study	0.074**	0.069**	0.075**	0.052**	0.050**	0.050**
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Inactivity	-0.013	-0.020	-0.015	-0.035	-0.040	-0.040
	(0.026)	(0.026)	(0.027)	(0.027)	(0.027)	(0.027)
Share co-ethnics						0.005+
						(0.003)
Log of ratio co-ethnic graduates						0.082
						(0.057)
Employment rate co-						0.001

ethnics	
	(0.002)
Interaction share and graduates co-ethnics	0.001
	(0.006)
Parental class for minorities (ref. working class)	
self-employed	-0.004
	(0.046)
intermediate	-0.012
	(0.045)
high	-0.010
	(0.041)

*+: p<0.1; *: p<0.05; **: p<0.01, standard errors are clustered by local authority of origin.*

Table A 4-10: Log wage for men three and a half years after graduation

Obs = 9,296	Basic	Family	Area	University	All	Co-ethnic
Dummy: disability	-0.117**	-0.121**	-0.121**	-0.076**	-0.081**	-0.082**
	(0.020)	(0.020)	(0.020)	(0.019)	(0.019)	(0.019)
Year of graduation (ref. 2005)						
2007	0.061**	0.061**	0.058**	0.046**	0.045**	0.043**
	(0.013)	(0.013)	(0.014)	(0.013)	(0.014)	(0.014)
2009	0.166**	0.168**	0.173**	0.142**	0.146**	0.145**
	(0.014)	(0.014)	(0.023)	(0.013)	(0.023)	(0.023)
Ethnicity (ref. white British)						
black Caribbean	-0.194**	-0.176**	-0.155**	-0.124*	-0.082	-0.417*
	(0.057)	(0.058)	(0.058)	(0.054)	(0.054)	(0.176)
black African	-0.123*	-0.107+	-0.084	-0.075	-0.027	-0.324*
	(0.054)	(0.055)	(0.056)	(0.053)	(0.054)	(0.146)
Indian	0.020	0.036	0.052+	-0.002	0.036	-0.337+
	(0.031)	(0.029)	(0.029)	(0.029)	(0.026)	(0.177)
Pakistani	-0.075	-0.041	-0.035	-0.086+	-0.029	-0.275*
	(0.050)	(0.049)	(0.053)	(0.047)	(0.049)	(0.126)
Bangladeshi	-0.012	0.036	0.019	0.008	0.070	-0.173
	(0.099)	(0.100)	(0.099)	(0.089)	(0.092)	(0.166)
Chinese	0.060	0.074	0.074	0.021	0.045	-0.243+
	(0.046)	(0.046)	(0.046)	(0.043)	(0.044)	(0.142)
Dummy: work in London	0.279**	0.266**	0.274**	0.261**	0.253**	0.251**
	(0.012)	(0.013)	(0.012)	(0.012)	(0.012)	(0.012)
Parental class (ref. working class)						
self-employed		-0.015			-0.028	-0.036
		(0.030)			(0.028)	(0.030)
intermediate		0.064**			0.048*	0.045*
		(0.019)			(0.019)	(0.020)
high		0.065**			0.038*	0.032+
		(0.017)			(0.017)	(0.018)
Dummy: private school		0.079**			0.045**	0.044**

	(0.015)		(0.015)	(0.015)
Ranking of multiple deprivation (ref. most deprived)				
least deprived (1st quintile)	0.091*		0.089*	0.090**
	(0.036)		(0.035)	(0.034)
2nd quintile	0.050		0.049	0.049
	(0.032)		(0.030)	(0.030)
3rd quintile	0.047+		0.047+	0.044+
	(0.026)		(0.024)	(0.024)
4th quintile	0.025		0.031	0.028
	(0.022)		(0.021)	(0.021)
Rate of jobseekers' claimants	-0.005		-0.001	-0.002
	(0.010)		(0.010)	(0.010)
Herfindahl index of diversity	-0.036		-0.016	0.002
	(0.037)		(0.036)	(0.037)
Share of graduates in local authority	0.000		-0.001	-0.001
	(0.001)		(0.001)	(0.001)
Employment rate in local authority	-0.000		0.001	0.000
	(0.002)		(0.002)	(0.002)
Study subject (ref. health sciences)				
biological sciences		-0.214**	-0.219**	-0.216**
		(0.039)	(0.040)	(0.040)
physical sciences		-0.029	-0.032	-0.029
		(0.034)	(0.035)	(0.035)
social sciences		-0.096**	-0.102**	-0.100**
		(0.037)	(0.037)	(0.037)
business		-0.017	-0.022	-0.020
		(0.034)	(0.034)	(0.035)
humanities		-0.259**	-0.265**	-0.262**
		(0.038)	(0.038)	(0.038)

creative arts				-0.350**	-0.351**	-0.348**
				(0.037)	(0.038)	(0.038)
eudcation				-0.045	-0.039	-0.036
				(0.052)	(0.052)	(0.053)
studying combined degree				-0.183*	-0.200*	-0.195*
				(0.081)	(0.079)	(0.079)
Grades obtained (ref. at most lower second-class)						
upper second-class honours				0.112**	0.111**	0.111**
				(0.012)	(0.012)	(0.012)
first-class honours				0.219**	0.217**	0.218**
				(0.014)	(0.014)	(0.014)
University attended (ref. other old)						
former polytechnic				-0.026+	-0.018	-0.017
				(0.015)	(0.014)	(0.014)
Russell group				0.090**	0.086**	0.086**
				(0.012)	(0.012)	(0.012)
Activity status six months (ref. employed)						
Unpaid work	-0.257**	-0.258**	-0.255**	-0.239**	-0.236**	-0.235**
	(0.037)	(0.038)	(0.037)	(0.036)	(0.036)	(0.036)
Unemployed	-0.207**	-0.203**	-0.204**	-0.168**	-0.163**	-0.162**
	(0.017)	(0.017)	(0.017)	(0.016)	(0.016)	(0.016)
Further study	0.004	-0.001	0.005	-0.027*	-0.028*	-0.027*
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Inactivity	-0.030	-0.036	-0.035	-0.066**	-0.072**	-0.071**
	(0.024)	(0.024)	(0.024)	(0.022)	(0.022)	(0.022)
Share co-ethnics						-0.002
						(0.003)
Log of ratio co-ethnic graduates						0.010
						(0.062)
Employment rate co-						0.005+

ethnics	
	(0.002)
Interaction share and graduates co-ethnics	-0.014*
	(0.006)
Parental class for minorities (ref. working class)	
self-employed	0.032
	(0.058)
intermediate	-0.022
	(0.064)
high	0.021
	(0.041)

*+: p<0.1; *: p<0.05; **: p<0.01, standard errors are clustered by local authority of origin.*

Table A 4-11: Coefficients of probability to find a job through networks and wage returns of network

	Network		Wage	
Outcome	women	men	women	men
Dummy: work in London			0.209**	0.210**
			(0.005)	(0.005)
Dummy: disability	0.003	0.014**	-0.008*	-0.008*
	(0.003)	(0.003)	(0.003)	(0.004)
Year of graduation (ref. 2005)				
2006	-0.008+	-0.017**	0.070**	0.087**
	(0.004)	(0.006)	(0.004)	(0.005)
2007	-0.013**	-0.024**	0.135**	0.157**
	(0.004)	(0.005)	(0.004)	(0.005)
2008	-0.054**	-0.068**	0.183**	0.201**
	(0.005)	(0.006)	(0.005)	(0.006)
2009	-0.044**	-0.044**	0.176**	0.182**
	(0.005)	(0.007)	(0.007)	(0.007)
2010	-0.045**	-0.051**	0.210**	0.223**
	(0.005)	(0.007)	(0.006)	(0.007)
2011	-0.036**	-0.038**	0.252**	0.276**
	(0.005)	(0.007)	(0.007)	(0.007)
2012	-0.039**	-0.032**	0.321**	0.355**
	(0.005)	(0.007)	(0.007)	(0.007)
Ethnicity (ref. white British)				
black Caribbean	-0.055+	-0.051	-0.129**	-0.008
	(0.029)	(0.035)	(0.038)	(0.036)
black African	-0.040	-0.048	-0.107**	-0.018
	(0.025)	(0.031)	(0.030)	(0.033)
Indian	-0.034	-0.036	-0.112**	0.022
	(0.031)	(0.038)	(0.037)	(0.038)
Pakistani	-0.004	-0.020	-0.115**	-0.001

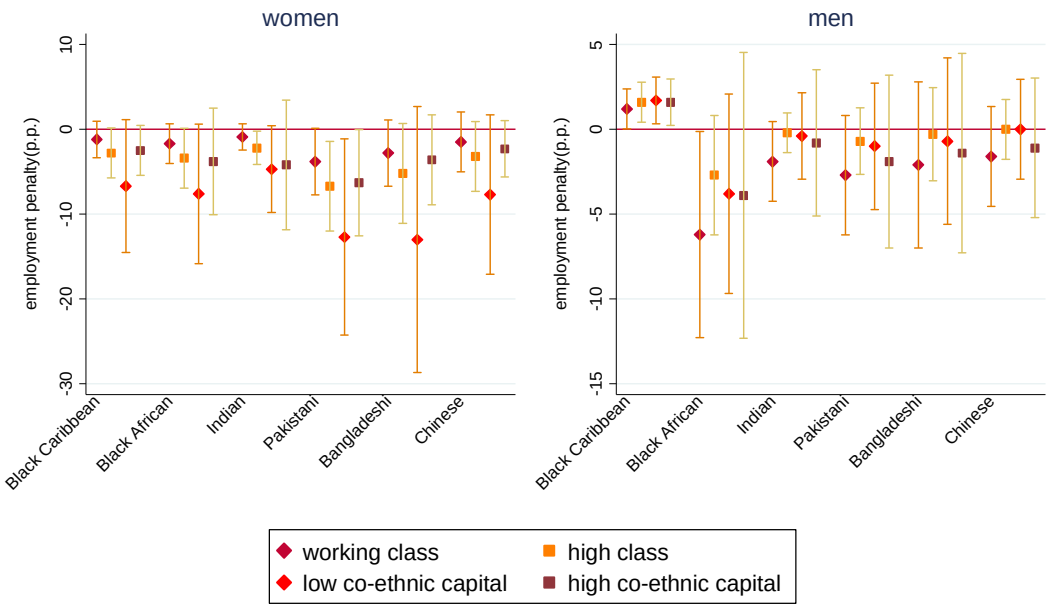
	(0.025)	(0.028)	(0.028)	(0.030)
Bangladeshi	-0.019	-0.009	-0.132**	0.033
	(0.029)	(0.033)	(0.033)	(0.032)
Chinese	-0.034	-0.029	-0.077*	-0.009
	(0.025)	(0.033)	(0.032)	(0.032)
Parental class (ref. working class)				
self-employed	0.023**	0.029**	0.013**	0.008
	(0.004)	(0.006)	(0.004)	(0.005)
intermediate	0.005	0.002	0.016**	0.011**
	(0.003)	(0.004)	(0.003)	(0.004)
high	0.017**	0.018**	0.022**	0.021**
	(0.003)	(0.004)	(0.002)	(0.004)
Dummy: private school	0.046**	0.054**	0.039**	0.061**
	(0.003)	(0.004)	(0.003)	(0.004)
Ranking of multiple deprivation (ref. most deprived)				
least deprived (1st quintile)	-0.029**	-0.005	0.052**	0.059**
	(0.006)	(0.008)	(0.009)	(0.010)
2nd quintile	-0.017**	0.003	0.024**	0.035**
	(0.006)	(0.007)	(0.009)	(0.009)
3rd quintile	-0.014**	-0.000	0.023**	0.025**
	(0.005)	(0.006)	(0.007)	(0.007)
4th quintile	-0.008*	-0.001	0.014**	0.018**
	(0.004)	(0.005)	(0.005)	(0.005)
Rate of jobseekers' claimants	-0.001	-0.000	0.001	0.002
	(0.002)	(0.002)	(0.002)	(0.002)
Herfindahl index of diversity	0.011	0.013+	0.050**	0.032**
	(0.007)	(0.008)	(0.014)	(0.011)
Share of graduates in local authority	0.002**	0.001**	-0.000	-0.000

	(0.000)	(0.000)	(0.000)	(0.000)
Employment rate in local authority	0.001+	-0.000	0.001	0.001+
	(0.000)	(0.000)	(0.001)	(0.001)
Study subject (ref. health sciences)				
biological sciences	0.099**	0.086**	-0.231**	-0.131**
	(0.003)	(0.007)	(0.004)	(0.007)
physical sciences	0.083**	0.042**	-0.091**	0.059**
	(0.004)	(0.007)	(0.005)	(0.006)
social sciences	0.087**	0.060**	-0.164**	-0.046**
	(0.003)	(0.007)	(0.004)	(0.007)
business	0.079**	0.051**	-0.119**	0.001
	(0.004)	(0.007)	(0.004)	(0.007)
humanities	0.102**	0.082**	-0.229**	-0.174**
	(0.003)	(0.007)	(0.004)	(0.007)
creative arts	0.135**	0.115**	-0.276**	-0.177**
	(0.003)	(0.007)	(0.005)	(0.007)
education	0.026**	0.036**	0.007	0.039**
	(0.004)	(0.009)	(0.005)	(0.010)
studying combined degree	0.106**	0.080**	-0.226**	-0.114**
	(0.013)	(0.021)	(0.013)	(0.019)
Grades obtained (ref. at most lower second-class)				
upper second-class honours	-0.020**	-0.032**	0.042**	0.065**
	(0.002)	(0.002)	(0.002)	(0.003)
first-class honours	-0.035**	-0.066**	0.099**	0.154**
	(0.003)	(0.004)	(0.003)	(0.003)
University attended (ref. other old)				
former polytechnic	-0.004+	0.011**	-0.010**	-0.031**
	(0.002)	(0.003)	(0.002)	(0.003)
Russell group	-0.002	-0.007*	0.015**	0.041**

	(0.002)	(0.003)	(0.003)	(0.003)
Share co-ethnics	0.001	-0.000	-0.001*	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Log of ratio co-ethnic graduates	0.028+	0.012	0.015	0.036*
	(0.015)	(0.017)	(0.015)	(0.017)
Employment rate co-ethnics	0.000	0.000	0.001*	-0.000
	(0.000)	(0.001)	(0.000)	(0.001)
Interaction share and graduates co-ethnics			-0.000	-0.002
			(0.001)	(0.001)
Parental class for minorities (ref. working class)				
self-employed	-0.008	0.000	-0.023*	-0.002
	(0.013)	(0.013)	(0.012)	(0.014)
intermediate	-0.011	-0.009	0.004	0.035**
	(0.010)	(0.012)	(0.010)	(0.011)
high	-0.019*	0.015	0.014+	0.050**
	(0.009)	(0.010)	(0.008)	(0.010)
job found through network			-0.040**	-0.044**
			(0.002)	(0.003)
Interaction minority and network			0.008	-0.011
			(0.009)	(0.009)
Observations	242,005	171,087	118,974	80,752

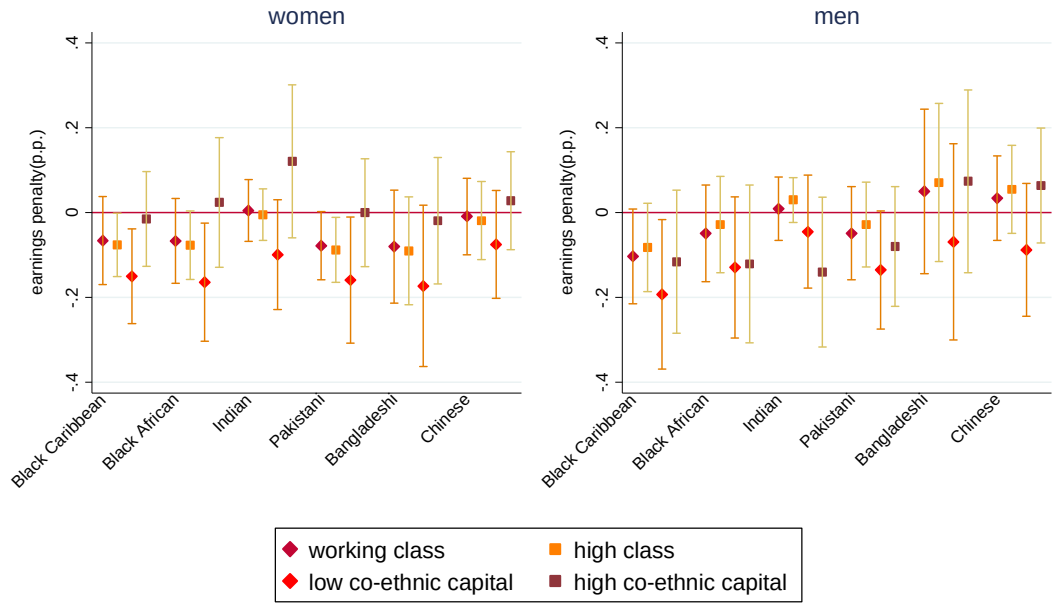
*+: p<0.1; *: p<0.05; **: p<0.01, standard errors are clustered by local authority of origin.*

Figure A 4-1: ethnic penalties in employment for average person three and a half years after graduation by resources



The figure shows 95% confidence intervals around the ethnic penalty for an average person from working class background or high class background; or for a person from intermediate background in an area with the ethnic-specific 10th percentile of share of co-ethnics, co-ethnic employment rate and share of graduates or 90th percentile of those factors.

Figure A 4-2: ethnic penalties in wage for average person three and a half years after graduation by resources



The figure shows 95% confidence intervals around the ethnic penalty for an average person from working class background or high class background; or for a person from intermediate background in an area with the ethnic-specific 10th percentile of share of co-ethnics, co-ethnic employment rate and share of graduates or 90th percentile of those factors.