

**The National Minimum Wage's Effects on  
the Non-Wage Benefits of Labour  
Migrants: Evidence from the UK**

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## **Abstract**

Studies of the minimum wage, particularly of its impact on the labour market, have raised interesting but contentious questions among researchers and policymakers alike. There have been a number of studies which examine the impact of the National Minimum Wage on the UK labour market, but little has been done to examine the effects of the minimum wage on non-wage benefits. There is also a paucity of studies that examine the effects of the minimum wage on migrant workers. This study aims to fill this gap by examining the effects of the minimum wage on the non-wage benefits of migrant workers. Therefore three important and interrelated issues are examined in theoretical and empirical contexts: (i) the effects of the minimum wage on a wide range of non-wage benefits, (ii) the effects of the minimum wage on migration, and (iii) the effects of the minimum wage on the non-wage benefits of migrant workers. It is argued that to some extent the minimum wage has had adverse effects on both non-wage benefits and migrant workers.

Primary and secondary research has been conducted by applying mainly positivist quantitative methodology, complemented by a qualitative approach (i.e. a number of interviews) to examine the effects of the minimum wage on the non-wage benefits of migrant workers. The secondary data has been collected from three major labour surveys in the UK: the Annual Survey of Hours and Earnings (ASHE), the Workplace Employee Relations Survey (WERS), and the Labour Force Survey (LFS). The primary data has been collected through a face-to-face questionnaire survey of 200 London-based migrants who have low-paid, low-skilled jobs. The secondary data is analysed using Difference-in-Difference (DID) analysis, while the primary data is analysed through regression analysis, the Pearson's Chi-squared coefficient, descriptive statistics and qualitative analysis.

It is shown through regression that the minimum wage is likely to create adverse effects in the UK labour market, particularly for migrant workers. It was found that the minimum wage has significant negative influences on migrants' access to numerous valuable non-wage benefits, such as training, holiday pay, paid sick leave and pension schemes. Accommodation/housing, which is a non-wage benefit pertinent to the minimum wage, was also found to be an excuse for not paying statutory wages. Migrants who work in the minimum wage sectors are also less likely to receive health/life insurance. Nevertheless,

DID analysis overall shows no evidence that the minimum wage reduces the provision of non-wage benefits.

The thesis conclusion addresses the implications of these findings for National Minimum Wage policy, in particular to encourage policymakers to consider the minimum wage's adverse effects on the UK labour market. The thesis makes some recommendations for National Minimum Wage policy in relation to both non-wage benefits and migrant workers.

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## About the Author

Maria Elfani trained as an economist at the outset of her academic life. She has received a BSc in Economics with Summa Cum Laude honour from the University of Indonesia. She has worked in the banking industry in Indonesia as an intern and a graduate employee. Continuing her education, she was awarded an MBA at the University of Nicosia with support from the Government of Cyprus scholarship. From her MBA work, she has produced written papers in relation to finance and quantitative analysis. She has now progressed onto a PhD program supported by the London Metropolitan University Vice Chancellor Scholarship where she still uses quantitative methods as a foundation to do her research on labour and migration.

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Elfani, M. (2014) 'Mapping London Immigration: A Spatial Analysis', In LCSS PhD Conference 2014: Mixed Methods in Social Sciences, 22 February 2014, London School of Economics and Political Science (LSE), London.

Elfani, M. (2013) 'Indonesian Migrant Labours: A Perspective from Labour Policy', Essay Presented at the BNI Essay Competition at the International Conference on Indonesian Development, 14 September 2013, Den Haag – Netherlands.

Elfani, M. and Putra, N.K. (2013) 'Biomedical Engineering and Its Potential for Employment in Indonesia', *International Journal of Technology*, 4 (1): 34-44.

Tsangari, H. and Elfani, M. (2011) 'Asset pricing in the Cyprus Stock Exchange: are stocks fairly priced?', Proceedings of the 8th International Conference on Applied Financial Economics (AFE 2011), 30 June – 2 July 2011, Samos – Greece.

Elfani, M. (2011) 'The Impact of Renewable Energy on Employment in Indonesia', *International Journal of Technology*, 2 (1): 47-55.

Charitou, M., Elfani, M., and Lois, P. (2010) 'The Effect of Working Capital Management on Firm's Profitability: Empirical Evidence from an Emerging Market', *Journal of Business and Economics Research*, 8 (12): 63-68.

Elfani, M. (2010) 'Effects of Working Capital Management on Cypriot Firms Profitability', 3<sup>rd</sup> Annual EuroMed Conference of the EuroMed Academy of Business, Nicosia: EuroMed Press.

## **Chapter 1**

### **Introduction**

Many employers described the extra benefits they were able to offer their workers, such as travel, meals, free access to the trade that they worked in (such as construction work being carried out at cost), or the fact that they were giving people with no skills and experience the training to potentially get a job elsewhere. Indeed, many employers thought that were they to be inspected by a NMW [National Minimum Wage] enforcement officer then the financial impact of these additional perks would be taken into account.  
(Ipsos MORI and Community Links, 2012: 3–4)

This short excerpt from a research study might serve as an introductory note about the focus of this thesis. It shows that the National Minimum Wage may affect the provision of non-wage benefits. Since the National Minimum Wage came into force in 1999, numerous studies have been conducted to investigate its impact in the UK. However, few of these studies have discussed its impact on the wide range non-wage benefits.

Ever since the minimum wage was first introduced in the United States in 1938, its impact has been a contested issue. The opponents of the minimum wage argue that it has some negative effects, including on employment, working hours and non-wage benefits. This thesis explores the impact of the minimum wage in the UK. This is an under-researched topic that constitutes a gap in the British literature.

This thesis aims to relate minimum wage studies with migration studies, specifically in order to understand how the minimum wage affects migrant workers in the UK labour market. The focus of this thesis is thus on investigating the minimum wage policy, its effects on non-wage benefits, and how it differently affects migrants.<sup>1</sup> Very few studies have been done on the minimum wage's effects on migrant workers; indeed, this study

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<sup>1</sup> This thesis defines migrants as those who were born outside the UK and to non-British parents. These include migrants who have gained permanent residency in the UK. I prefer to use the term 'migrants' rather than 'immigrants', since the latter term obscures the significance of migration as such.

may be the first to investigate the effects of the minimum wage on the non-wage benefits of migrants.

While this thesis aims to investigate the relationship between the minimum wage and migrant workers, there has long been an interesting and heated debate on how to deal with migration. In the UK, immigration policy has created many controversies for governments of every political stripe. British immigration policy has never been static, particularly in relation to the labour market.<sup>2</sup> The recent New Labour initiative to reshape approaches to immigration is one clear examples of this.<sup>3</sup>

The proportion of non-UK-born workers has been increasing significantly for more than a decade. Non-UK-born workers accounted for 14% of the working-age population in late 2009, a significant increase from just 8% in 1995 (Wadsworth, 2010a). In London, non-UK-born workers accounted for 39% of the working-age population in 2009 (Wadsworth, 2010a). The proportion of non-UK-born workers has increased rapidly in relatively low-skilled sectors and occupations.<sup>4</sup> This thesis will therefore particularly focus on the

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<sup>2</sup> There has been a shift in immigration policy, particularly under the current coalition government. During the last decade, immigration policy has favoured migration in order to fill the labour shortage, in line with the open labour market and following the accession of several new countries to the EU in 2004. Under the current coalition government, however, immigration is seen as a zero-sum game: (im)migration is seen as a threat to the UK labour market.

<sup>3</sup> See Ed Miliband's New Labour approach to immigration policy (Miliband, 2012).

<sup>4</sup> The proportion of non-UK-born workers among the total workforce has seen the largest increase in the food, beverage and manufacturing industries, from 8.1% in 2002 to 21.4% in 2008 (Ruhs and Anderson, 2010). Ruhs and Anderson (2010) also show that migrants are concentrated at the lowest- and highest-paid ends of occupational distribution. Male migrants are particularly concentrated in the two lowest-paid occupations, namely elementary workers (cleaners, kitchen assistants and catering assistants) and processing operators (transport drivers and food, drink and tobacco process operators), as well as in the highest-paid (managerial and professional) occupations (Rienzo, 2012).



minimum wage's effects on low-paid, low-skilled jobs (i.e. secondary jobs, according to dual labour market theory).

This thesis presents three main arguments as the foundation of the study:

- a. On the basis of earlier studies and research, this work intends first to explore whether, despite the advantages of the minimum wage for increasing the standard of living of workers at the bottom end of pay distribution, it also has some negative effects. It is expected that any increase in the minimum wage will lead to a reduction of (the costs of) non-wage benefits, i.e. compensation other than wages that is provided to employees. Such compensation may include the provision of training, holiday pay, paid sick leave, pension schemes or bonuses. Cost reductions may also consist of reductions in working hours. It is also expected that the minimum wage may have adverse effects on working arrangements, which may create disadvantages for workers at the bottom end of pay distribution.
- b. Second, the study will explore whether the minimum wage affects migrant workers, and if so, whether the effect is differentiated. It is expected that certain factors, such as human capital, union membership and ethnicity, will determine why some migrants earn the minimum wage or below while others are able to earn above it. It is also expected that the minimum wage has negative effects on migrants, in particular on their non-wage benefits. Migrants who earn the minimum wage or below are expected to be the group who derive the least advantage from any rise in the minimum wage. They may not get the statutory wage according to minimum wage policy; even worse, they may receive fewer non-wage benefits.
- c. Third, this study will examine whether the introduction of the minimum wage triggers the proliferation of jobs in the second tier of the market. It is expected that minimum-wage workers, and particularly those who earn less than the minimum, will be the hardest hit.

### **1.1. Theoretical Perspective**

This thesis' theoretical perspective is mainly derived from migration and minimum wage studies. The debate on migrants' performance on the labour market has been prolonged – and is likely to continue, given that the mobility of workers is so difficult to control. This

thesis starts by reviewing the literature on how migrant workers perform in the labour market. The debate starts with the argument that an influx of migrants will create competition with non-migrants in the labour market, and therefore that migrants will place non-migrants' jobs at risk and lower non-migrants' wages. However, Chiswick (1978, 2000) argues that there are human capital factors that place migrants to be outperformed in the labour market. Chiswick's argument is driven by human capital theory, which suggests that any investment in human capital, such as education or training, will increase workers' performance and hence their earnings (Becker, 1964; Mincer, 1974). Building from migrants' performance in the labour market, this thesis will examine some of the factors that affect migrants' wage levels in order to understand the aspects of low-paid, low-skilled jobs that lead to some (migrants) earning the minimum wage (or below) while others earn above it.

Migrants in the UK labour market display some interesting phenomena. Studies suggest that migrants in the UK have become younger and more educated (Manacorda *et al.*, 2006; Dustmann *et al.*, 2007; Wadsworth, 2010a). However, although migrants have become more educated, this does not mean that they are getting better jobs. Dustmann *et al.* (2007) suggest that migrants in the UK have been 'downgraded' into low-skilled and low-paid jobs. Recent migrants – predominantly those who have been in the UK for two years or less – are more concentrated at the lower end of pay distribution (Dustmann *et al.*, 2007). It is argued that this downgrading might occur because migrants fail to apply their human capital immediately they enter the host country (Dustmann *et al.*, 2007). This thesis will investigate whether this downgrading occurs; if so, whether human capital can or cannot explain it; and whether there are any factors other than human capital which might explain why skilled migrants still earn the minimum.

Piore's (1979) concept of labour market segmentation, which links migration with the duality of the labour market, will be valuable for exploring empirical data. Migrants are indeed positioned to become segmented labour and to accept secondary jobs more often. Secondary jobs, as opposed to primary jobs, are low paid, temporary and less stable (and thus have high flexibility), and have fewer non-wage benefits, inferior working conditions and/or environments, and a lower degree of formality. Both primary and secondary jobs<sup>5</sup>

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<sup>5</sup> The term 'secondary' is taken to describe a labour market with flat returns to human capital but potentially subject to institutional regulation.

may sometimes be offered by the same employers.<sup>6</sup> Migrant workers are more likely to fill secondary jobs.

Building from Piore's concept, this study supports Anderson's (2010) claim that weak control over labour standards to some extent benefits employers by enabling them to create a segmented labour force to their own advantage. Thus the tendency of the presence of migrants to confirm the duality of the labour market can also be ascribed to the effects of the weak regulation of employment standards, while the weak enforcement of the minimum wage is seen as one of the reasons why migrants are employed in secondary jobs.

As in migration studies, studies of the minimum wage also discuss controversial issues, particularly the minimum wage's possible adverse effects. Classical labour economics suggests that an increase in wages may cause a reduction in employment and working hours, because it might create an increase in the labour supply but a drop in labour demand. Few employers are willing to pay higher wages, resulting in a cut in employment or working hours.

Classical economics also suggests that an increase in labour costs should be compensated by an increase in worker productivity. Thus if an increase in the minimum wage is not followed by any such increase in worker productivity, employers will take the necessary action to reduce labour costs elsewhere, such as by reducing staff, working hours or non-wage benefits. Since employers may not be able easily or immediately to reduce employment or working hours (for instance, because of the terms of employment contracts), the more feasible option to offset the minimum wage increase may be to reduce non-wage benefits. Non-wage benefits are simply forms of compensation other than wages, and they constitute a significant proportion of labour costs. They may include training, holiday pay, paid sick leave, pension schemes, bonuses, meals or accommodation. Non-wage benefits are less regulated than wages, and employers therefore have more

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<sup>6</sup> For example, in restaurants there are front-stage jobs, which are constituted as primary jobs, and backstage jobs, constituted as secondary jobs. Or some parts of a single company's operations, such as cleaning, may be subcontracted, and agency/subcontracting jobs are likely to be secondary jobs.

flexibility to change their provision. This thesis follows previous studies by Wessels (1980), Leighton and Mincer (1981), Hashimoto (1982), Royalty (2000) and Simon and Kaestner (2004) on the impact of the minimum wage on non-wage benefits. Particular attention will be addressed to the study by Wessels (1980) on the adverse effects of the minimum wage on working arrangements and worker utilisation, according to which the minimum wage to some extent drives the further creation of secondary jobs.

This thesis aims to investigate the effects of the minimum wage on the non-wage benefits of migrant workers. Thus labour economics, minimum wage and migration studies will all be drawn on in order to answer this study's research questions.

## **1.2. Research Questions and Hypotheses**

Three main research questions form the basis of the study:

*1. What are the minimum wage's effects on non-wage benefits, working hours and working arrangements in the UK labour market?*

The minimum wage's effects on non-wage benefits, working hours and working arrangements will be investigated. This study is interested in exploring which non-wage benefits in particular are significantly affected by the minimum wage, and in establishing the direction of the effect (i.e. negative or positive). The null hypothesis claims that the minimum wage has adverse effects on non-wage benefits, working hours and working arrangements. It is expected that the minimum wage reduces both working hours and non-wage benefits, and that it causes damage to working arrangements.

*2. What are the differentiated effects of the minimum wage on migrant workers in terms of their wages and non-wage benefits?*

2a. Why are some migrants in low-skilled, low-paid sectors earning above the minimum wage, while other migrants in the same sectors earn the minimum wage or below? What are the factors that affect the wage levels of migrant workers?

2b. What are the minimum wage's effects on the non-wage benefits of migrants?

The null hypothesis is that the minimum wage is a predictor of migrants' non-wage benefits. It is expected that migrants who earn the minimum wage or below are less likely to receive non-wage benefits than migrants who earn above the minimum

wage. The research will explore the variations in non-wage benefits in low-paid, low-skilled jobs. The research findings are expected to make original contributions to existing knowledge on the topic.

2c. Do migrants in the low-skilled and low-paid sectors display interesting phenomena? Does the phenomenon of downgrading suggested by Dustmann *et al.* (2007) exist? Does it confirm Piore's (1979) argument that the presence of migrants increasingly confirms the duality of the labour market?

### *3. What are the implications of the research findings for the National Minimum Wage?*

The empirical evidence collected while answering these research questions will provide evidence for policy recommendations. It is expected that the National Minimum Wage has some adverse effects on the UK labour market in term of non-wage benefits, working hours and working arrangements, and particularly on workers at the low end of pay distribution. The study is expected to produce evidence-based recommendations for possible improvements to the National Minimum Wage policy.

## **1.3. Methods of Investigation**

To address these research questions, this thesis use positivist and quantitative methodology in the design of both its primary and secondary research. The purpose of the secondary research is to investigate the first research question, i.e. to examine the minimum wage's effects on non-wage benefits, working hours and working arrangements, and to identify the non-wage benefits that are particularly affected by the minimum wage. The quantitative methodology used in the secondary research rests on the analysis of secondary data from three major surveys in the UK: the Annual Survey of Hours and Earnings (ASHE), the Workplace Employee Relations Survey (WERS) and the Labour Force Survey (LFS). These surveys have been chosen on the basis of their wide coverage of earnings, non-wage benefits, working hours and working arrangements. The quantitative analytical technique employed is Difference-in-Difference (DID) – a widely known econometric technique in minimum wage studies to analyse the effects of the minimum wage (see previous studies by Card and Krueger, 1994; Stewart, 2003, 2004; Arulampalam *et al.*, 2004; Dickerson, 2007). DID detects the effects of the minimum wage at different time periods; thus the

variables of earnings and outcomes (effects), i.e. non-wage benefits, working hours and working arrangements, are essential to the DID analysis.

Alongside the secondary research, this study has also conducted primary research to capture the realities of migrants in low-paid, low-skilled jobs that rarely appear in public information or surveys. The quantitative method used to collect the primary data was face-to-face interviews (based on questionnaires) with migrant workers in London who work in the low-paid, low-skilled sectors, including retail, catering, domestic, cleaning, care, construction and factory work. The primary research was designed to investigate the second research question on the minimum wage's effects in relation to migration.

First, in order to examine the factors that affect migrants' minimum wage, regression analysis is used to investigate any cause-and-effect relationships. Variables such as human capital, working hours, migration-related factors and demographics are set as explanatory variables that might affect whether migrants earn the minimum wage or below (the dependent variable). Second, the primary research also uses regression analysis to examine the minimum wage's effects on migrant workers' non-wage benefits. In the construction of the regression, the level of the wage (minimum wage or below, and above minimum wage) is the explanatory variable, while non-wage benefits are the dependent variables. The primary research also uses a number of qualitative interviews to examine the minimum wage's relationship to migration – in particular its relationship with non-wage benefits and working arrangements, as suggested by Wessels (1980) – and to address the segmentation of labour market, as suggested by Piore (1979). Third, the primary research uses Pearson's Chi-square coefficient and simple descriptive statistics to analyse whether the phenomenon of downgrading suggested by Dustmann *et al.* (2007) exists, and to determine migrants' characteristics in relation to the minimum wage.

The results of both the secondary and primary research are expected to lead to implications for the National Minimum Wage policy.

#### **1.4. Scope and Limitations**

This thesis focuses its investigation on the National Minimum Wage in the UK. It focuses in particular on the minimum wage's effects on non-wage benefits. It is understood that the minimum wage may have effects on many factors; this thesis therefore limits the scope of

its investigation to the minimum wage's effects on non-wage benefits, working hours and working arrangements, which include temporary and flexible work. Flexibility here refers only to numerical flexibility, i.e. adjustments in the labour market in terms of the number of workers and the hours of work, which are mainly caused by the minimisation of costs.

The thesis discusses the minimum wage's relationship with migration, but the discussion of migration is limited to the scope of the second research question, i.e. the factors affecting migrants' minimum wage, the minimum wage's effects on migrants' non-wage benefits, and the characteristics of migrants in low-paid, low-skilled jobs. The thesis does not discuss any other effects of the minimum wage beyond these aspects.

The methodology is limited by its quantitative and positivist approach. In particular, the quantitative analysis of secondary data through the DID method may cover the minimum wage's effects during only two time periods. However, the analysis combines three datasets for various years, covering both the short term (recent data) and the long term, in order to overcome this limitation. The limitation on the primary research is that it only produces cross-sectional data; thus the minimum wage's effects may be revealed only at a certain point in time. Other than in the regression analysis, the primary data can only produce the minimum wage's associations, rather than its impact (causality). The primary data also only provides limited insights from in-depth analysis, as it only uses a number of qualitative interviews. This study does not capture employers' responses. Most of the data collected provides only individual workers' responses.

The target group of the primary research is migrant workers in London who work in low-paid, low-skilled sectors, including retail, catering, domestic, cleaning, care, construction and factory work. The samples to some extent are purposive rather than representative. In order to accommodate this limitation, the samples are stratified by sector, gender, wage level (the minimum wage or below, and above minimum wage) and skills (less skilled and skilled workers).

## **1.5. Chapter Outline**

This research is a broadly cross-disciplinary study of the minimum wage and migration. Its focus is on the national minimum wage in the UK and its effects on non-wage benefits,

particularly on the non-wage benefits of migrant workers. The thesis is organised into six chapters.

Chapter 1 presents the introduction to the thesis, highlighting its aims, research questions, scope and limitations, and broadly outlining the other five chapters of the thesis.

Chapter 2 reviews the literature that provides the foundation of the thesis' hypotheses. The literature review starts by presenting the debate over migration's impact on the labour market. This literature review mainly covers the economics of labour migration, with a particular focus on human capital and labour market segmentation. The chapter goes on to address the debate in minimum wage studies. Labour economics, with its foundation in neoclassical and institutional economics, has been most influential on the minimum wage debate. The literature review covers both theoretical concepts and empirical evidence, including recent evidence from the British literature.

Chapter 3 presents the methodological approach to the research. The chapter presents both primary and secondary research, to which positivist and quantitative methods are applied. The chapter starts by explaining the primary and secondary research processes, including how the data was collected. The secondary data was collected from three major labour surveys in the UK, while the primary data was collected from a questionnaire survey of migrant workers in London. The chapter then explores the methods of analysis used for the primary and secondary research. The chapter states that each primary and secondary research had its own method of analysis, and explains how each method was able to answer the research questions. The secondary research, for instance, was analysed using the DID method, while the primary research was approached through regression analysis and Pearson's Chi-square coefficient. The purpose of the DID analysis was to detect the impact of the minimum wage at two different time periods, while the regression analysis aimed to detect the effect of the minimum wage only at a certain time period. Pearson's Chi-square coefficient, on the other hand, presents only an association between two variables. The primary research also involved a number of qualitative analysis.

Chapter 4 presents the analyses of the secondary research. It starts by discussing the results of the DID test, which analyses the minimum wage's effects on a wide range of non-wage benefits. The DID results show which non-wage benefits are significantly affected by the



minimum wage, and the direction (positive or negative) of the effects. The secondary research analysis also considers the minimum wage's effects on working hours and working arrangements. Chapter 4 is mainly devoted to research question one and part of research question two.

Chapter 5 presents the analyses of the primary research, which are designed to address research question two on the minimum wage's effects on migration. It starts with descriptive statistics from its primary data. Through descriptive statistics and Pearson's Chi-square coefficient, the primary research analysis explores the characteristics of migrants in minimum-wage jobs and examines whether the phenomenon of downgrading exists. Through regression analysis, this chapter also explores the minimum wage's effect on the likelihood of migrants receiving non-wage benefits. It discusses a wide range of the non-wage benefits that are provided to migrant workers in low-paid, low-skilled jobs. A number of qualitative interviews are also discussed in order to explore the minimum wage's link with migrant workers.

The last chapter, on Conclusions and Recommendations, recaps the findings and evidence from the previous two chapters and draws out their policy implications. This chapter in particular is devoted to the third research question, and suggests how the evidence collected might have implications for the National Minimum Wage policy. The recommendations will address potential improvements that might be considered by policymakers involved in the National Minimum Wage.

## **1.6. Contributions**

This thesis contributes to the field of knowledge by making an original contribution that addresses a gap in the minimum-wage literature. First, although there are plenty of studies that discuss the national minimum wage's effects on the UK labour market, there is a paucity of literature that discusses its effects on non-wage benefits. This thesis may indeed be the first to examine the minimum wage's relationship with certain non-wage benefits, which may have not been tested before.

Second, this thesis also fills a gap in the UK literature on the minimum wage's effects on migration. In particular, to the best of my knowledge, no previous study has been devoted

to the effects of the minimum wage on migrants' non-wage benefits. This study thus makes an original contribution in this respect.

Lastly, this study will draw on its findings to make some evidence-based recommendations to improve the National Minimum Wage policy in the UK.

## Chapter 2

### Literature Review

Any insightful analysis that addresses the relationship between immigration and the minimum wage needs to look at those parts of the wage distribution where the minimum wage is located. We demonstrate that there is a substantial skill downgrading of new immigrant groups. It is therefore unclear *ex ante* where in the skill distribution immigrants may put pressure on native wages and where they may lead to wage increases, due to complementarities.

(Dustmann *et al.*, 2007: 7)

Although this study does not attempt to answer whether any competition between migrants and non-migrants exists in minimum-wage jobs, its focus on the relationship between the minimum wage and migration means that it must examine not only the economics of labour, but also the economics of migration, in which migrants' performance is linked with such competition.

This chapter in particular reviews the literature on which this study is founded, namely the minimum-wage and migration literature. In relation to the minimum-wage literature, the context of this study is framed by the neoclassical labour economics that drives minimum-wage research; in the migration literature, on the other hand, the context is framed by the economics of migration.

The quote from Dustmann *et al.* (2007) above is the starting point for my discussion of the relationship between wages and migrant workers. The link between migrants' performance and competition in the labour market has always been a contested topic. In the UK this heated debate has been taking place alongside the economic downturn and the consequent focus on UK unemployment figures. In other words, the impact of migration on the labour market, and particularly the question of whether there is any competition between migrants and non-migrants in the labour market, have been gaining centre stage.

The literature review starts with a thorough review of the evidence and debates about migrants' performance in the labour market, and particularly of recent evidence in the UK. The demographic profile of migrants in the UK reveals some interesting phenomena.

Recent migrants to the UK are younger and more educated than non-migrants, and indeed than previous migrants. However, they are more likely to be downgraded, undertaking less skilled and lower-paid jobs, at least in the initial period of their stay in the host country. (This study adopts the term ‘downgraded’, which emerged from the study by Dustmann *et al.* (2007) quoted above.) Recent migrants to the UK are thus far from being perfect substitutes for either natives or previous migrants in terms of their skill-age profile. The literature suggests that the impact of migration, to some extent, is more significant on previous migrants than on natives (Manacorda *et al.*, 2006, 2012). In other words, previous migrants are the group that is hardest hit by the presence of recent migrants. To sum up, the evidence shows that the main impact of migration is on migrants themselves (i.e. previous migrants), rather than on natives.

The literature review will go on to investigate the downgrading of migrants in order to establish why this phenomenon exists. Can the concept of human capital explain why skilled migrants work in low-skilled, low-paid jobs? If, as human capital theory suggests, investment in education and language proficiency may lead to higher wages, is this a sign that recent migrants are unable to apply their human capital immediately upon arrival? Or is there some other factor which might explain the phenomenon of downgrading? Why are migrants concentrated in the lower level of occupational distribution? Why might migration be relevant to explain the duality in labour market, i.e. the concentration of migrants in secondary jobs according to Piore (1979)’s definition of labour market segmentation?

Focusing on rates of pay, this thesis will seek to establish whether the minimum wage applies to secondary jobs, and to assess the impact of the minimum wage on the labour market. The literature review will therefore go on to discuss the minimum wage debate. It will start with the theoretical concept of the minimum wage, focussing on the possible impacts of the minimum wage on employment and non-wage benefits. A further review is then conducted on the importance of non-wage benefits and the reasons for the minimum wage’s adverse effects on non-wage benefits. In low-paid, low-skilled jobs in particular, what might the minimum wage’s effect be on non-wage benefits?

The literature review then turns to the topic of the minimum wage and migration. There is indeed a gap in the UK literature here, as there have only been a few studies that explore

the issue of the minimum wage through the prism of migration; there is a particular absence of studies that discuss the minimum wage's impact on migration. Since the introduction of the National Minimum Wage policy in 1999, there has been plenty of research on the impact of the minimum wage. However, only a few such studies discuss the minimum wage's impact on non-wage benefits, and the gap is particularly profound in literature on the minimum wage's impact on the non-wage benefits of migrant workers. In the UK literature to date, only a few studies appear to link the effects of the minimum wage with migration: Dustmann *et al.* (2007) and French and Möhrke (2007) are among the very few to do so. None of these studies, however, focuses on the non-wage benefits of migrant workers, and in particular none analyses the causality between the minimum wage and migrants' non-wage benefits. This thesis therefore attempts to fill the gap in the literature by making an original contribution to minimum wage studies in the UK.

## **2.1. Migrants' Performance in the Labour Market**

This literature review starts with the literature on migration, particularly on migrants'<sup>1</sup> performance in the labour market. This topic concerns how migration affects the (host country's) labour market. The neoclassical theory of labour supply and demand (Marshall, 1890; Hicks, 1932) suggests that the influx of labour has an impact on wages.

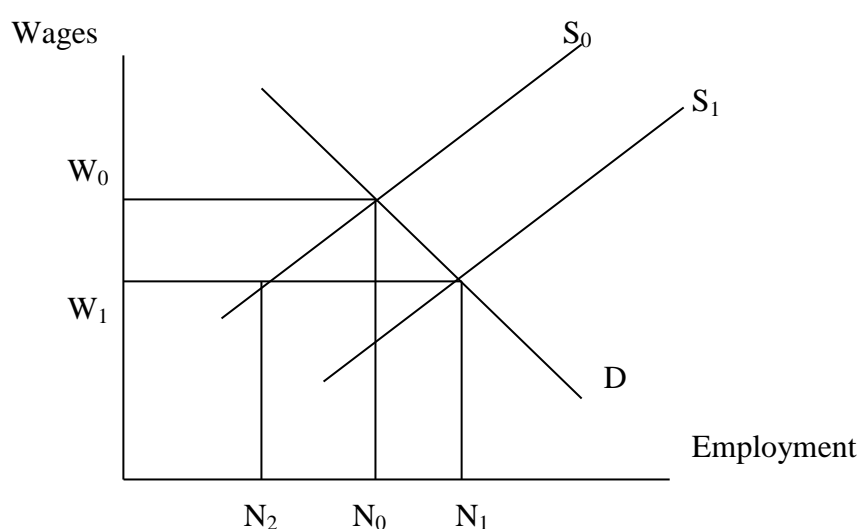
The neoclassical approach has become the foundation of analyses of the economics of migration, specifically of migrants' performance in the labour market. There is a lengthy, profound and ongoing debate over whether migrants' performance has negative impacts on the (host country's) labour market, particularly on the wages and jobs (employment) of non-migrants.

There are three main conditions of migration's impact on the host country's labour market, particularly on natives' jobs and wages, according to Borjas (2008). The first is the impact on the short-term labour market where migrants are assumed to be close substitutes for natives. The second is the impact on the short-term labour market where migrants are assumed to be the complements of natives. The third is the impact on the long-term labour

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<sup>1</sup> For the purposes of this study, migrant workers are defined as those who were born outside the UK to non-British parents and who are currently in employment in the UK. It also includes migrants who have obtained permanent residency in the UK.

market. Figure 2.1 describes the first condition, where the major influx of close-substitute migrants moves the supply curve from  $S_0$  to  $S_1$  and brings the wages down from  $W_0$  to  $W_1$ . Close-substitute migrants are those whose skills are seen as closely resembling those of natives; thus a major influx of such migrants leads to a reduction in wages. With lower wages, some natives become unwilling to take the jobs in question, and thus the employment of natives decreases from  $N_0$  to  $N_2$ . It is interesting to note that in this case a certain section of the labour force is unwilling to take jobs at lower wages. This ‘unwillingness’ factor must be taken into account in the study of low-paid, low-skilled jobs.<sup>2</sup>



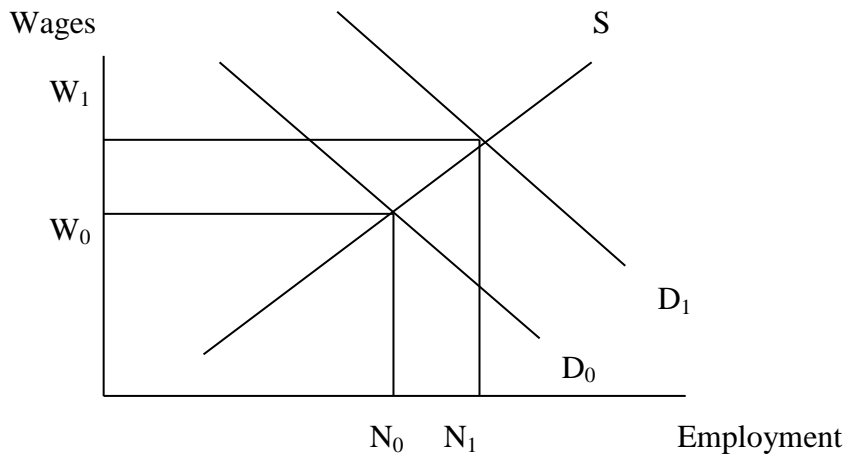
**Figure 2.1 Perfect-Substitute Migrants Affect the Wages and Employment of Natives**

Source: Borjas (2010: 168), Figure 4-10.

Figure 2.2, on the other hand, presents the theoretical view that migrants are complementary to natives. In such cases, migrants compete for different types of jobs which require different types of skill. This condition leads natives to specialise their skills and develop their human capital. Thus the labour demand for natives increases from  $D_0$  to  $D_1$ , and so do their wages. At the higher wage  $W_1$ , the employment of natives increases from  $N_0$  to  $N_1$ . However, the first and second conditions as represented by Figures 2.1 and 2.2 only apply for a short time period, given the assumption that if capital and labour are the only factors of production, in the short run capital is going to be constant.

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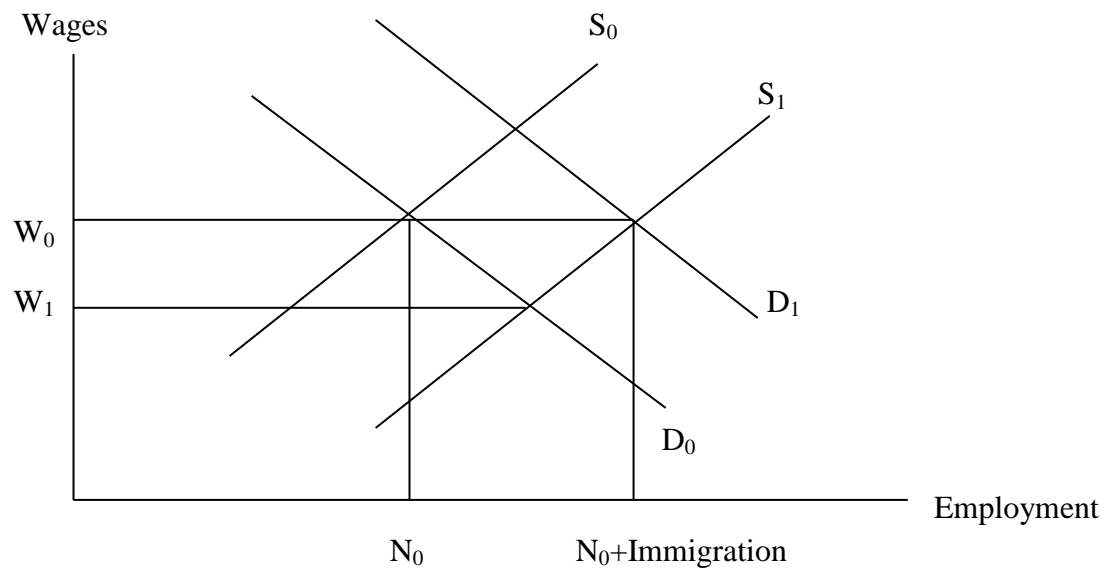
<sup>2</sup> This is expressed by Moriarty (2010) as ‘who wants to do what’ from the labour supply point of view.



**Figure 2.2 Complementary Migrants Affect the Wages and Employment of Natives**

Source: Borjas (2010: 169), Figure 4-11.

In the long run, however, capital becomes variable, and as capital increases over time, employers can hire more workers. The third condition, described in Figure 2.3, shows that in the long run, although the abundant entrance of migrants increases the supply curve from  $S_0$  to  $S_1$ , it also drives up the demand from  $D_0$  to  $D_1$ . Wages therefore return to the equilibrium level ( $W_0$ ), and the employment of natives also returns to the equilibrium level ( $N_0$ ) that pertained before the migrants' entry. Thus migration only has an adverse impact at a certain point in time, and this impact weakens as the economy self-adjusts.



**Figure 2.3 Perfect-Substitute Migrants Affect the Wages and Employment of Natives in the Long Run**

Source: Borjas (2010: 171), Figure 4-12.

Evidence from the US labour market shows a mixed picture in relation to this debate on migration and wages. Studies by Borjas (2003) and Borjas and Katz (2007) show evidence of a negative impact of migration on non-migrants' wages. Ottaviano and Peri (2006) and Peri (2007), on the other hand, suggest that migration increases non-migrants' wages.

In his paper re-examining the impact of migration on the labour market, Borjas (2003) observes natives' wage growth and compares it with the percentages of migrants between 1960 and 2000. Using a national-level approach, the results confirm a negative correlation between migration and native wages: an increase of 10% in the share of migrants lowers wages by 3% to 4% (Borjas, 2003). In order to estimate more closely how the wages of specific skill groups of natives are affected by migration, Borjas and Katz (2007) in a subsequent study used a structural approach – an extension of the national-level approach – to examine the impact of Mexican-born workers on specific groups of natives. Their study found that in the period 1980 to 2000, Mexican migrants lowered the wages of all natives by 3.4%, the wages of native high-school dropouts by 8.2%, the wages of native high-school graduates by 2.2%, and the wages of native college graduates by 3.9% (Borjas and Katz, 2007).



Using the Current Population Survey in the United States for 1994 to 2000, Orrenius and Zavodny (2006) examine the effect of migration at the occupational group level. They separate occupational group levels into the professional level, the service-related level and the manual-labour level (or the least skilled level). Their results indicate a significant negative relationship between migration and native wages at the least skilled level. In other words, the larger the immigration influx, the greater the reduction in native wages at the manual-labour level. They found that an increased share of new legal migrants lowers the wages of natives in blue-collar occupations by 0.8%. However, at the medium-skill and high-skill levels there is no evidence that migration has an adverse impact on natives' wages.

A study by Ottaviano and Peri (2006) challenges the earlier evidence. They found strong evidence that migrants in the US are not perfect substitutes for natives in term of educational experience. They found only a small negative impact on the group of high-school dropouts; for the other native groups, there are significant increases in wages. They also found that previous migrants are the group who are hardest hit. Previous migrants are the group with the largest reduction in wages, because it is they who compete for similar jobs with the new migrants. The study by Ottaviano and Peri (2006) rejects the hypothesis that migrants constitute a negative attack on non-migrants' jobs. A subsequent study by Peri (2007) using data from California migrants – most of whom have very low levels of education – even found that migration increased the average wage of US natives. These contradictory results, as Ottaviano and Peri (2006) suggest, might arise from the different methods and approaches used by the studies' authors. For example, Ottaviano and Peri (2006) argue that Borjas (2003) placed greater emphasis on the 'partial' effect of migrants, whose skills are similar to those of natives, while Ottaviano and Peri (2006) themselves used the general equilibrium approach, which focuses on migrants with different skills to natives.

Ottaviano and Peri's (2006) argument is strengthened by a subsequent study by Card (2009). In the interpretation of his findings, Card (2009) makes three important arguments about education (skills). First, workers with below high-school education are perfect substitutes for workers with a high-school education: his study found that workers with no formal education, those with primary education only and high-school dropouts fall into the same skill categories (and thus compete for the same jobs) as those who have completed a

high-school education. Second, Card (2009) notes that high-school equivalents are imperfect substitutes for college equivalents. His interpretation is that college and high school give completely different skills, and that college is superior to high school. Third, Card (2009) found that within each education group, migrants are imperfect substitutes for natives. This is very interesting, as it supports the hypothesis that within the same level of skill (education), migrants do not substitute for natives. This probably means that they do not compete for the same jobs. Nonetheless, the consequences are that an influx of migrants with the same skills as natives will have more of an impact on migrants themselves (previous migrants) than on natives<sup>3</sup> (Ottaviano and Peri, 2006; Card, 2009).

Although the US evidence presents some mixed results, the same does not apply to the UK. Migrants in the UK have their own interesting characteristics, which differ from those of migrants in the US. One of the differences is in terms of skill (education): migrants to the UK have become more educated, while this might not have happened in the US.<sup>4</sup> Although the definition of ‘skill’ is debatable, as it may cover educational level as well as language proficiency and working experience – not to mention that in specific sectors the definition of skill might be ambiguous<sup>5</sup> – this evidence might still shed some light on migrant phenomena in the low-skilled, low-paid sectors that are the focus of this study.

### **2.1.1. Migrants’ Performance in the UK Labour Market**

Empirical evidence from the UK highlights some interesting phenomena of migration in the country’s labour market. Migrants to the UK have distinctive characteristics and conditions that might not be the same as those of migrants to other countries such as the

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<sup>3</sup> In his earlier study of migrants and competition in the labour market, Borjas (1987) also confirmed that migrants’ main competitors are other migrants. His study found that a 10% increase in the supply of migrants led to 10% reduction in migrant wages.

<sup>4</sup> See Passel (2005) and Card (2009), who stress that a third or more of recent migrants have low education and limited English skills. Peri (2007) also notes that in California in 2004, two thirds of the workers who had no school qualifications were foreign-born.

<sup>5</sup> Sectors such as hospitality, care and domestic work are unlikely to share the same definitions of skill as other sectors.

US. Dustmann *et al.* (2005) note that at the national level, migrants in the UK have similar skills to natives. Following Dustmann *et al.*'s (2005) findings, later evidence by Manacorda *et al.* (2006) concludes that migrants are better educated and tend to be younger. This evidence is also echoed by Dustmann *et al.* (2007) and Wadsworth (2010a).

Dustmann *et al.* (2005) investigate the effects of migration in the UK by using data from the Labour Force Survey for the period 1983–2000. They use a spatial correlation approach with a percentage of migrants in different regions. Their results demonstrate that migrants have no significant effect on the overall employment of natives. They differentiate the impact of migration on three education groups: low education (no formal qualifications), intermediate education (O levels) and advanced education (A levels/degree). With disaggregate analysis, in the intermediate education group, an increase of 1% in migrants reduces native employment by 1.8%, reduces the native participation rate by 1.1%, and increases the native unemployment rate by 1%. For the advanced education group, a 1% increase in migrants increases the native employment and participation rate by 1.1%, but has no effect on unemployment rate. There is no significant effect of migrants on the native labour market for the low education group.

Manacorda *et al.* (2006) use the Labour Force Survey and General Household Survey for the period from the mid-1970s to the mid-2000s to investigate the effects of migration on native wages in the UK. They adopt a similar approach to Ottaviano and Peri (2006), using parallel age-education groups to the US study. Their empirical findings show that within each age-education group, migrants are imperfect substitutes for natives; indeed, recent migrants are imperfect substitutes for previous migrants. This echoes Ottaviano and Peri's (2006) findings. Manacorda *et al.*'s (2006) results show that migration reduces the wages of university-educated previous migrants, but has only a small effect on native wages. Their later study even concludes that the main impact of migration is on the wages of previous migrants already in the UK (Manacorda *et al.*, 2012).

Dustmann *et al.* (2007) in their report to the Low Pay Commission investigate in great detail the effects of migration on the UK labour market, predominantly in the low-paying sectors. They use data from the Labour Force Survey, the Annual Survey of Hours and Earnings, and the UK Census. Similarly to Manacorda *et al.* (2006), they conclude that migrants to the UK have become more educated than natives. However, although migrants

have become more educated, they do not easily get better jobs. Dustmann *et al.* (2007) describe how recent migrants who have resided in the UK for up to two years are more concentrated at the lower end of occupational distribution. Using Labour Force Survey data for the period 2001 to 2005, they argue that 16.92% of recent migrants earn wages below the 10<sup>th</sup> percentile, while for earlier migrants the figure is 8.77%, and for natives it is 10.19%. Work in private households accounts for largest proportion of recent migrants who earn below the 10<sup>th</sup> percentile: 87.76% of all recent migrants who work in private households earn below the 10<sup>th</sup> percentile.

Dustmann *et al.* (2007) draw the conclusion that recent migrants, who are more educated and younger, are being downgraded into less skilled and lower-paid jobs. Dustmann *et al.* (2007: 19) suggest that upon arrival, migrants lack information about the host country, as well as key skills such as language proficiency which are required for immediate use on the labour market. These conditions ‘push’ migrants towards the lowest occupational end of the labour market on entry. As migrants acquire the information and skills they need, they gradually move into better jobs (2007: 25). These findings support Card’s (2009) argument that within each educational group, migrants are imperfect substitutes for natives. Migrants to the UK who have the same level of education (skills) as natives apparently do not compete with natives for the same jobs. However, Dustmann *et al.* (2007: 25–26) stress the importance of specifying the time period and particular immigration flow when analysing migration’s effects on the host labour market, as the composition of migrants may change over time.

Dustmann *et al.*’s (2007) findings are particularly useful for the empirical analysis to be conducted in this study namely, which asks questions that arise from the phenomenon of downgrading: why would skilled migrants, at least initially, be concentrated in low-skilled, low-paid jobs? Does this only happen during the early years of residence in the host country? Is it solely because migrants are unable to put their human capital to immediate use, or are there factors other than human capital involved? Has the tightening of immigration controls to select ‘the best and the brightest’ contributed to the fact that migrants have become more educated? According to Wadsworth (2010a), India, Poland and Pakistan were the top three countries from which migrants came to the UK in 2009, accounting for 10.7%, 7.9% and 7.2% of total migrants respectively. India and Pakistan seem to be the countries that are most affected by the UK government’s tightening of

control on non-EU migration.<sup>6</sup> This stricter immigration control might be the reason why migrants to the UK have become more educated. Nonetheless, according to the Low Pay Commission (2011), among all adult jobs in April 2010, migrants held approximately 8% of jobs below £5.80 per hour (the 2009 adult National Minimum Wage) and 11% of jobs below £5.93 per hour (the 2010 adult National Minimum Wage).

Despite the wage discrepancies between migrants and non-migrants, or between recent migrants and earlier migrants, studies in the UK have also found evidence of differences in earnings between ethnicities. Chiswick (1980) used data from the 1972 General Household Survey to examine ethnic differences in male migrants' earnings in the UK. His main finding confirmed that although white migrants had similar earnings patterns to natives, ethnic minority migrants' earnings were around 25% lower when other factors were constant. Bell's (1997) analysis of General Household Survey data for 1973–1992 also found that ethnic minorities were disadvantaged in earnings performance. His findings suggest that black migrants with significant work experience, particularly those from the Caribbean, were the most disadvantaged group; however, the magnitude of the wage difference was reduced as the group's time in the UK increased. By using two UK surveys, the Fourth National Survey on Ethnic Minorities for 1993–1994 and the Family and Working Lives Survey for 1994–1995, Dustmann and Fabbri (2003) show that language proficiency (a component of human capital, which is covered in the next section) has a positive relationship with employment chances and earnings, although these variables differ widely among non-white migrants according to ethnicity. Statistics from the UK National Minimum Wage show that for all adult jobs in April 2010, Bangladeshis and Pakistanis are the top two among ethnic groups who earn the National Minimum Wage or below. It is estimated that of all jobs paying less than or equal to £5.93 per hour (the 2010

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<sup>6</sup> This began with the introduction of the Points-Based System (PBS) by the UK Border Agency (UKBA) in 2008, under which non-EU nationals have to have earned a number of 'points' in order to acquire a permit to work or study. However, UKBA's requirements have been criticised for a multitude of changes – they have changed substantially at least 14 times in the last three years (London Metropolitan University, 2012). Although there is no statistical data showing how many times the PBS requirement has been substantially changed, this thesis demonstrates that it is becoming increasingly difficult to work and study in the UK.

adult National Minimum Wage), approximately 15% are held by Bangladeshis and 12% by Pakistanis (Low Pay Commission, 2011).

Recent reports in the UK also show mixed results that contribute to the controversy over the impact of migration on natives' wages and employment. A report by the Migration Advisory Commission (MAC) describes a link between the increasing numbers of non-EU migrants and increasing unemployment figures in the UK. Specifically the report states that for every 100 non-EU migrants, there are 23 natives who lose their jobs (Migration Advisory Commission, 2012). The report emphasises that this is an 'association' rather than a 'causal relationship': it bases this conclusion on the assumption that non-EU migrants' association with unemployment applies only to temporary migrants who stayed in the UK for less than five years during the period 1995–2010 (when the economy was not operating at full capacity), and that it will not be a long-term phenomenon.

Contrary to the MAC report, a report by National Institute of Economic and Social Research found no evidence that migration has any impact on unemployment (Lucchino *et al.*, 2012). This study, which was conducted using the National Insurance number registrations of foreign nationals, found no association between migrant inflows and claimant unemployment, even during the recent economic downturn and recession (Lucchino *et al.*, 2012).

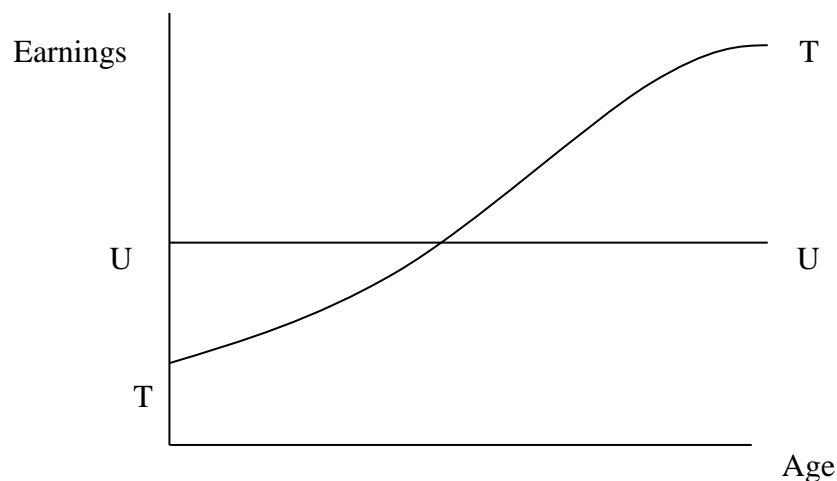
The following conclusions can be drawn about migrants' performance on the UK labour market. First, taking Card's (2009) argument into account, migrants are imperfect substitutes for natives at the same educational level. This is particularly true in the case of recent, (more) educated migrants, who are concentrated at the lower end of occupational distribution. Clearly these downgraded migrants do not compete for the same jobs as natives with similar levels of education. Second, this raises the question of the effect of these downgraded migrants on less skilled, low-paid jobs. It is still unclear whether migration has an impact on natives at the lower end of occupational distribution; however, the literature suggests that the impact is greater on migrants themselves (i.e. previous migrants) than on natives (Manacorda *et al.*, 2006, 2012). The literature also suggests that there is still little evidence in the UK that migration has an impact on less skilled natives; Lucchino *et al.* (2012) suggest that the impact is modest at most. Third, although this study does not address whether there is competition between migrants and natives for less skilled,

low-paid jobs, it would be interesting to know what is driving the phenomenon of downgrading. Does downgrading phenomenon provides evidences that human capital does not work in the way that it should, given that Dustmann *et al.* (2007) suggest that migrants are unable to turn their human capital to immediate use once they arrive in the host country? The next section reviews the influence of human capital on migration.

## **2.2. The Influence of Human Capital on Migrants' Performance**

Human capital is connected with workers' productivity, and hence with workers' wages: workers who invest in their own human capital are able to boost their performance and earn higher wages. This section discusses selected factors in human capital – training, education and language proficiency – and how they influence migrants' performance in the labour market.

The pioneering work of Becker (1964) emphasises the importance of on-the-job training, i.e. training in the workplace. According to Becker, there are two types of on-the-job training. The first is general training, which increases the marginal products of the firm providing the training as well as those of other firms. General training may benefit workers, in the sense that workers with general training may quit their job and get higher wages elsewhere. In return for this benefit, Becker explains that workers have to bear the cost of the training, unless there is legislation that requires the employers to provide general training or common ground in the sense that all firms in the industry benefit from the provision of such training. If employers have to provide training as a non-wage benefit, workers do not bear any cost (non-wage benefits are discussed later in this chapter). Becker also states that general training makes an important contribution by boosting workers' earnings in accordance with their age. Figure 2.4 describes the age-earnings profile of such workers, and shows that the earnings of workers who are equipped with training (line TT) eventually surpass those of untrained workers (line UU). When workers are younger, the earnings of trained workers are less than those of the untrained, as the workers have to bear the cost of training; but eventually, at older ages, their earnings surpass those of the untrained, as the trained workers are able to collect a return on their training.



**Figure 2.4 Age-Earnings Profile**

Source: Becker (1964: 23), Chart 1.

The second type of on-the-job training is specific training. Becker (1964) notes that this type of training only benefits the firm providing the training, and not other firms elsewhere. Workers who quit their job, therefore, do not get an increase in wages merely because of their specific training. The employers are obliged to pay for the training, and thus have less incentive to reduce employee numbers, even if demand is in decline: employers prefer not to fire workers who have received specific training, because their marginal productivity is initially higher than their wages. Workers therefore have less incentive to quit, as employers generally pay higher wages to specific-trained workers so as to secure long-term worker commitment and prevent any increase in turnover. Becker also states that monopoly firms tend to invest in more specific training than competitive firms.

From the analysis of low-paying sectors, this thesis argues that general training is more likely to be the type of on-the-job training offered by low-paying companies. This is simply because it is less likely for employers who offer low-paid, low-skilled jobs to be willing to bear higher costs (to pay for specific training) in order to retain workers in the long term. It is a criticism of employers offering secondary jobs in particular that employment has become more temporary, flexibilised and demand-driven, and hence less focused on training.

Evidence of the effect of training on workers' performance, as discussed by Bishop (1994), shows that on-the-job training by a previous employer has a positive impact on the



productivity of newly hired workers, and reduces the time required to train them. This finding is in line with Becker's theory that general on-the-job training benefits not only the current employer but also future employers. This will prove interesting for the analysis of the research findings presented in Chapter 5, which will consider why some workers in low-paid, low-skilled jobs receive no training at all. Further confirming Becker's theory, Bishop (1994) also finds that new hires with relevant vocational training obtained from vocational (or technical) schools (or colleges) require less training, are more productive, and are more likely to receive higher initial wages.

In their survey report on training statistics in the UK, Felstead *et al.* (1997) found that just under 10% of individuals in receipt of training thought that they had gained no benefit in terms of improvements to their skills, while 9% stated that their improved skills would only be useful if they continued to work for their current employer. This 9% figure exactly represents workers in receipt of specific training from their employers. Eighty per cent of individuals in the survey, however, believed that they had gained transferrable skills from training. Another interesting finding is that only 63% of employers paid their entire training bill, and roughly 10% of employees paid the entire bill for their own training. In relation to this study, it would be interesting to ask whether employers bear any of the costs of providing training in low-paid, low-skilled jobs. Another interesting finding from Felstead *et al.* (1997), which is also cited in Dickerson (2007), is that 'In comparison with other European countries, training provision in Britain is actually quite high, but much of it is of low level – for example, concerned with induction or health and safety – rather than directed towards productivity enhancing activities' (Dickerson, 2007: 6, footnote 2). This might be because, as Becker suggests, firms are obliged to provide such training by legislation or union pressure. This study will attempt to establish the types of training received by workers in low-paid, low-skilled jobs, in order to confirm Dickerson's argument.

The next human capital factor is education (schooling), which has the same theoretical age-earnings profile as training. As Becker emphasises, investment in human capital increases the marginal productivity of labour and drives wages up. However, Becker adds that investment in human capital is not without cost, and that cost may include not only money but also time (Equation 2.1). The model developed by Mincer (1974) outlines the present value of the individual at the start of schooling with a discounted rate of return (Equation

2.2). The model shows a trade-off between current earnings and future earnings as a result of the number of years the individual takes to complete their training or schooling (Weiss, 1986). The longer the individual spends in school (or training), the shorter the lifetime of earnings. More time in school means a reduction in current earnings, but an enhancement of future earnings (Weiss, 1986).

$$W = MP_L - k$$

where

$W$  = wages

$MP_L$  = marginal productivity of labour

$k$  = cost of investment in human capital

(Equation 2.1)

Source: Becker (1964).

$$V_s = Y_s \sum_{t=s+1}^n \left( \frac{1}{1+r} \right)^t$$

where

$V_s$  = present value of earnings at start of schooling

$Y_s$  = net annual earnings with  $s$  years of schooling

$r$  = discount rate

$t = 1, 2, 3 \dots n$  in years

(Equation 2.2)

Source: Mincer (1974).

Language proficiency is the next (and last) human capital factor discussed in this study. Language proficiency, as with the other human capital factors, increases the productivity of workers, because it decreases the cost of communicating with others (Chiswick, 1991; Chiswick and Miller, 1995). It also is complementary with the other human capital factors. Workers with professional skills and high levels of proficiency in the host country's language are more productive than those who lack language proficiency (Chiswick and Miller, 1995, 2001).

Most importantly, migrants tend to invest in the host country's language for one of three reasons: for economic benefit, because of their efficiency at language acquisition, and through exposure to the host country's language (Chiswick and Miller, 1995). Economic

benefits occur if the acquisition of the host country's language leads to an increase in earnings and a probability of getting a better job. Efficiency occurs when migrants have higher levels of education and migrate at younger ages; the hypothesis here is that the higher the level of education and the younger the age at migration, the greater the person's language proficiency. Efficiency also occurs when the linguistic distance between the person's native language and the host country's language is relatively narrow (Chiswick and Miller, 1998). Exposure to the host country's language is measured by the time of residence abroad, the cross-country/culture contact, and the characteristics of the person's home and location (Chiswick and Miller, 1998).

In relation to this study, language proficiency is most closely related to economic benefit in terms of whether the level of language proficiency has an impact on migrants' earnings. Is it because their language proficiency is minimal that a person's wage is also minimal? Does language proficiency matter in low-skilled and low-paid jobs?

The pioneering study by Chiswick (1978) introduced an important theory of how human capital influences the wage differentials between migrants and non-migrants. Using data from the 1970 US Population Census, Chiswick (1978) suggests that the number of years since migration is an important explanatory factor in the wage gap between migrants and natives. According to Chiswick, post-migration experiences – including migrants' ability to acquire the host country's language and customs, the nature of the labour market, and investment in post-school training – depress the wage gap. Chiswick (1978) also suggests that the earnings of migrants (and even of migrants' sons) are 'overtaking' those of natives (and their sons) because migrants 'have more innate ability, [and] are more highly motivated toward labour market success' (Chiswick, 1978: 919). Chiswick emphasises migrants' propensity for positive self-selection by stating that the more able the migrants are, the more productive they are in both the labour market and the migration process (Chiswick, 2000). He also stresses that migrants who are more able to invest in human capital such as education and the host country's language, and who have more 'ambition, intelligence, learning speed, entrepreneurial skills, aggressiveness and tenacity' (Chiswick, 2000: 62), are offered higher rates of return.

In relation to the present study, Chiswick's concept of human capital is important for explaining whether migrants' wage levels (minimum wage or below, and above minimum

wage) are determined by human capital factors. If that were the case, why would the phenomenon of downgrading exist? Supporting Chiswick's view, Carliner (1980: 89) also comments that migrants 'choose to work longer and harder'. Migrants who work longer hours are mainly highly motivated to support their relatives or friends abroad (Barwell, 2007). The notion that migrants are highly motivated, hardworking, and have innate desirable abilities is commonly cited to explain why employers hire migrants in the segmented labour market. However, this might adversely affect the labour market if employers are able to form a segmented labour force in ways that are favourable to themselves. This suggests that certain segments of labour are vulnerable to exploitation.

The downgrading phenomenon – whereby migrants are concentrated at the lower level of pay distribution – seems to contradict theories of the economics of migration. Chiswick (2000) points out that migrants with high abilities can spend the costs of migration more efficiently, and thus have greater incentives to migrate. The decision to migrate is taken if the net gain of migration is positive (Borjas, 2000). Equation 2.3 shows that the larger the wage differential and the smaller the cost of migration, the greater the individual's intention to migrate. Linking with Chiswick's theory, as the wage differential increases, positive self-selection also increases, meaning that only individuals with high abilities, high motivation, high productivity and high efficiency decide to migrate (Chang, 2000). If we link the economics of migration with the current research, it is unclear why migrants would choose to work at the lowest level of pay. The minimum level of wages lowers the wage-differential component in Equation 2.3. Nevertheless, the self-selection theory of migration might be insufficient to explain the downgrading phenomenon, as some migrants might have no idea that they will be entering low-paid, low-skilled jobs.<sup>7</sup>

$$\text{Net Gain} = \sum_{k=t}^T \left( \frac{W_{jk} - W_{ik}}{(1+r)^{k-t}} \right) - M$$

Where:

$W_{jk}$  = wage in the new region

$W_{ik}$  = wage in the current region

---

<sup>7</sup> McKay *et al.* (2011: 116) provide empirical evidence of undocumented migrants being unaware that their work is part of the underground economy.

$r$  = discount rate

$T$  = retirement age

$M$  = migration cost

(Equation 2.3)

Source: Borjas (2000).

As the literature reviewed suggested earlier, migrants to the UK tend to be concentrated at the lower level of pay distribution, and skilled migrants are likely to undertake low-skilled, low-paid jobs, at least during the initial period after migration. These findings help to further deepen the understanding of the relationship between migration and secondary jobs. As the focus of this study is on the minimum wage and migration, Piore's labour market segmentation theory – which bridges the migration and minimum-wage literature – is particularly useful for formulating some of the hypotheses to be tested through empirical data analysis in this thesis.

Geddes and Scott (2010: 197) also comment that an influx of migrants into secondary jobs might be 'constructed rather than inevitable', which supports Piore's (1979) thesis. Thus the duality of the labour market might prove to be a significant factor if human capital alone is not sufficient to explain either the phenomenon of downgrading or the concentration of migrants in minimum-wage jobs.

### **2.3. Dual Labour Market Segmentation**

The work of Dustmann *et al.* (2007), discussed above, showed that migrants, particularly skilled migrants, are concentrated at the lower end of occupational skill distribution, in a phenomenon known as downgrading. It would be interesting to know which industry has the greatest proportion of low-paid workers. Table 2.1 describes Dustmann *et al.*'s (2007) work with Labour Force Survey data. It is clear that four major sectors have the largest share of workers (including migrants and natives) with wages below the 10<sup>th</sup> percentile: private households with employed persons; hotels and restaurants; other community, social and personal work; and the wholesale, retail and motor trades. Of these four, private households with employed persons have a greater percentage of recent migrants with wages below the 10<sup>th</sup> percentile, followed by other community, social and personal work. On the other hand, hotels and restaurants and the wholesale, retail and motor trades have a higher proportion of natives with wages below the 10<sup>th</sup> percentile.

	<i>Natives</i>	<i>Migrants</i>	
		<i>Earlier</i>	<i>Recent</i>
<i>All industries</i>	10.19	8.77	16.92
<i>Industry</i>			
Manufacturing	5.29	7.58	17.67
Construction	7.28	5.06	5.17
Wholesale, retail and motor trade	21.02	16.63	16.28
Hotels and restaurants	36.70	26.07	33.86
Transport, storage and communication	5.07	4.60	8.67
Financial intermediation	1.83	1.86	1.62
Real estate, renting and business activities	6.46	5.21	6.77
Public administration and defence	1.90	1.85	4.15
Education	6.64	6.18	7.19
Health and social work	9.43	5.16	10.15
Other community, social and personal	16.79	13.20	26.68
Private households with employed persons	21.52	36.94	87.76
Other	8.12	2.86	6.84

**Table 2.1 Percentages of Natives and Migrants with Wages Below the 10<sup>th</sup> Percentile, 2001–2005**

Source: Dustmann *et al.* (2007: 77), Table 3.13.

This section of the literature review will look closely at dual labour market segmentation, a concept that originates mainly from the work of Michael J. Piore. The theory of the dual labour market divides the labour market into two segments, primary and secondary. The primary segment is full of jobs with high wages, good working conditions, secure employment and fairness in the workplace; the secondary segment, by sharp contrast, offers jobs with low pay, poor working conditions, insecure employment and unfair working practices (Doeringer and Piore, 1970). Osterman (1975) further develops the work of Doeringer and Piore by dividing the primary segment into an upper and lower tier: the upper tier has greater personal involvement and autonomy. Using data from the 1967 US Survey of Economic Opportunity, Osterman (1975) found that the upper tier of the primary segment accounted for 5% of all male workers, while the lower tier accounted for 90%, and the secondary segment for the remaining 5%. He added that the secondary segment on average comprised a less educated labour force and more non-whites than the other segments. He also noted that human capital such as education and experience (age) were significant factors in the primary segment, but had no influence in the secondary segment.

The secondary segment has recently consisted of jobs that tend to be ‘informal’<sup>8</sup> in nature or – as referred to by Undocumented Worker Transitions (2008) – are part of the ‘underground’ economy. The term ‘underground economy’ refers to ‘irregular production and/or labour that is perfectly integrated into the formal economy and represents ensembles of activities which contribute to the formation of the revenue and the wealth of the nation without, however, being reported in the official statistics’ (Undocumented Worker Transitions, 2008:11–12). Chaudhuri (1989) also suggests that informal jobs can be extended in terms of both output and employment, regardless of any connection between the two; informal jobs can even arise within formal jobs, for example in subcontracting or agency work (McKay *et al.*, 2011). This echoes Piore’s theory that the dual labour market often exists within the same firm: the firm may use primary workers as core workers, alongside secondary or ‘flexible’ workers who can be hired and fired depending on demand (Piore, 1980). Jobs in the secondary segment are also somewhat precarious, according to the International Labour Organisation’s definition of precarity: uncertainty about the duration of employment, multiple possible employers or ambiguous employment relationships, a lack of access to social protection and benefits associated with employment, low pay, and the presence of obstacles to joining a trade union (International Labour Organisation, 2011).

In relation to the analysis of migrant workers, migration tends to confirm Piore’s dual labour market theory (Piore, 1979). His analytical framework is becoming increasingly relevant, particularly in the UK (most notably in London), where migrant workers tend to occupy the secondary sector of the market. This is also true of other countries, including Italy, Spain, Greece and Portugal (McKay *et al.*, 2011: 113). Nevertheless, Warhurt *et al.* (2008) suggest that the low payment of workers does not depend on employers’ compliance or non-compliance with minimum-wage legislation, but rather arises from employment practices that are centred on the need for flexibility to hire or fire workers in reaction to fluctuations in demand (Entorf and Moebert, 2004). This effectively positions ‘flexible’ workers as ‘residual’ workers, while their non-permanent status also positions them as low-waged workers. As employers can flexibly hire or fire workers, they can also modify pay rates in response to demand fluctuations (McKay *et al.*, 2011). This thesis will argue that the employer’s ability to modify pay rates in response to demand is extremely

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<sup>8</sup> The term ‘informal’ is used to describe a labour market that exists outside the influence of institutional regulation (e.g., the minimum wage regulation).

problematic, and relates to the weak enforcement of employment standards; indeed, it places the constitution of the National Minimum Wage in doubt.

A further concern is that if, even with the National Minimum Wage, employers are still able to modify pay rates, then how strong is the position of other (workers') rights? These rights include the right to non-wage benefits – forms of compensation other than wages. Non-wage benefits are often less clearly stipulated in legislation than wage rights; even when they are provided, they are less easily enforceable, and they are often not written into employment contracts. Consequently, in secondary-segment jobs, the position of non-wage benefits is unclear, and the provision or otherwise of such benefits strongly depends on employers' decisions; moreover, some non-wage benefits are 'voluntary' and 'flexible', and thus are entirely at the discretion of employers. The next section reviews theories about the minimum wage and non-wage benefits, including debates and evidence from the UK.

## **2.4. The Minimum Wage**

This section covers the key literature in minimum-wage studies. These studies largely arise from neoclassical economics, with a substantial contribution from institutionalists.

Neoclassical theory emphasises the idea of marginal utility: for every marginal (extra) cost, there should be an extra benefit (Menger, 1871).<sup>9</sup> The marginal theory in turn generates the theory of production function, particularly the Cobb-Douglas (1928) production function.<sup>10</sup> The marginal theory also constitutes a theory of wage determination, whereby wages are

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<sup>9</sup> Although the marginal return (benefit) is diminishing (Jevons, 1871). The marginal theory, together with Cobb-Douglas' (1928) production function, is also reiterated in the human capital theory that an increase in earnings signals an increase in productivity.

<sup>10</sup> The neoclassical economist Paul Douglas, together with Charles Cobb, developed the Cobb-Douglas production function: capital and labour as the only input produce a total production output. In the short run, the capital input is assumed to be constant, and therefore in order to produce more output, the firm can only increase labour input. As the goal of the firm is to maximise profit, the neoclassical marginal theory is used to explain that the firm should hire additional labour only if the marginal revenue exceeds the marginal cost of hiring that labour.



determined by the intersection of supply and demand.<sup>11</sup> Neoclassical theorists also firmly believe that wages are determined by the action of ‘invisible hands’ in the supply of and demand for labour.

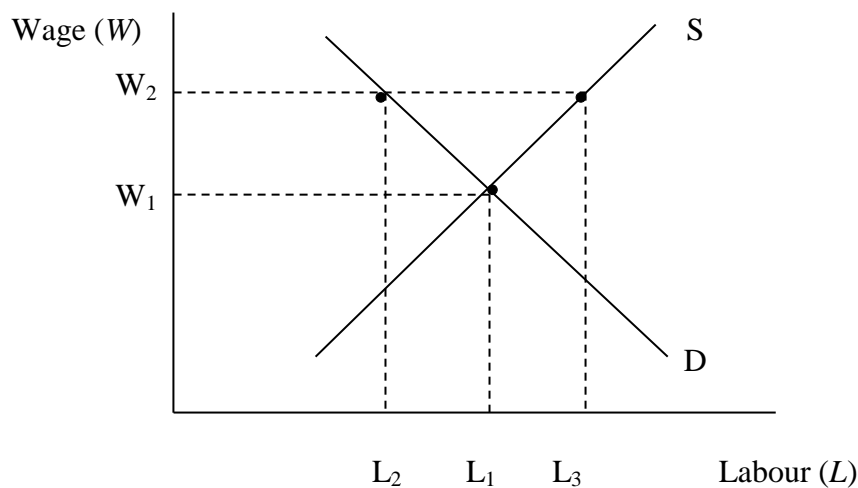
Institutional thought, in sharp contrast with neoclassical theory, considers the neoclassical view of the determination of wages to be unrealistic. Institutionalists believe that there are imperfections in the market: the costs of mobility, imperfect information, unions, government policies, market segmentation and discrimination obstruct the efficiency of supply and demand. Institutionalists therefore do not believe in ‘invisible hands’ (Kerr, 1954).

Neoclassical theory raises the question of what would happen if an enforced increase in the (minimum) wage were not followed by an increase in productivity. Would there be any reduction in employment, working hours or non-wage benefits?

Neoclassical theory suggests that, in a competitive market, an increase in the (minimum) wage results in a decline in employment (Brown *et al.*, 1982). Figure 2.5 shows that an imposed minimum wage drives wages up from  $W_1$  to  $W_2$ . Fewer employers are then able to pay the higher wage, resulting in a cut in employment. Employment thus declines from  $L_1$  to  $L_2$ , while the number of workers willing to work for the higher wage increases to  $L_3$ . This creates unemployment of  $L_3 - L_2$ . Workers at  $L_2$  who are still in their jobs, however, derive a benefit from the minimum wage, as their actual wages increase to  $W_2$ .

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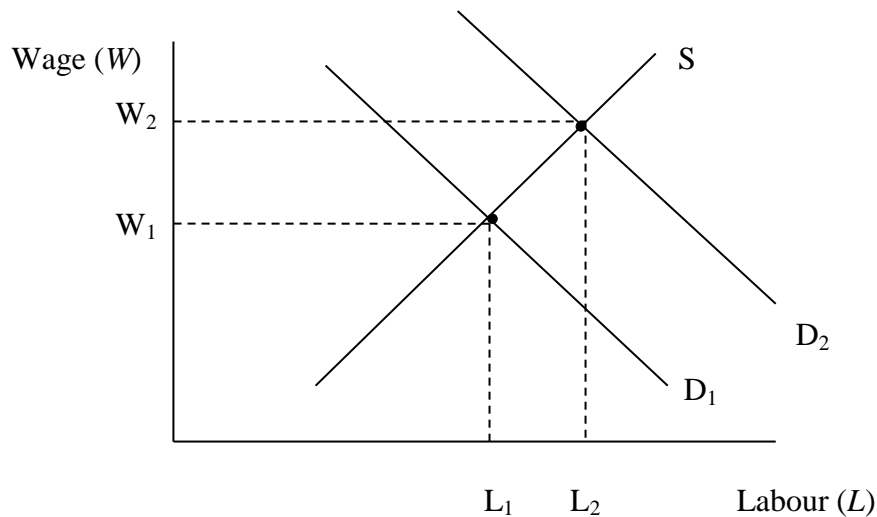
<sup>11</sup> The firm may employ additional workers whenever the marginal revenue product exceeds the marginal cost of labour.



**Figure 2.5 The Impact of the Minimum Wage in a Competitive Market**

Source: Brown *et al.* (1982: 488), Figure 1.

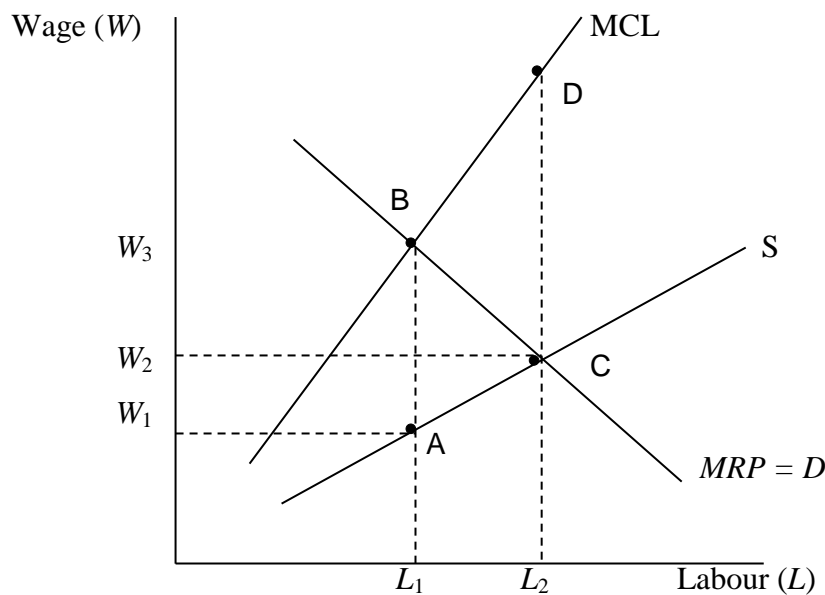
Nevertheless, the negative effect of the minimum wage on employment is debatable. The efficiency wage theory pioneered by Stiglitz (1976) suggests that workers in receipt of higher wages consequently have higher productivity. Figure 2.6 describes the condition where the minimum wage drives up employment. The increase in the minimum wage from  $W_1$  to  $W_2$  motivates workers to increase their work efforts, improve their physical strength (e.g. by eating healthier food as their standard of living improves), and consequently increase their productivity. The demand for productive labour then increases from  $D_1$  to  $D_2$ , which leads to an increase in employment from  $L_1$  to  $L_2$ . The increasing wage may also attract high-quality workers currently working for a wage below  $W_2$  to apply for these jobs, thus leading to an overall productivity increase (Kaufman and Hotchkiss, 2006). The view that the minimum wage has little or no effect on employment is also influenced by the neo-institutionalists or ‘social economics revisionists’ (Kerr, 1954; Card and Krueger, 1995). Their theory suggests that there is ‘indeterminacy in wages’ – that is, higher wages lead to increased productivity and reduced turnover – and that the minimum wage may ‘shock’ firms into adopting better management practices that will also result in an increase of output and employment (Card and Krueger, 1995).



**Figure 2.6 The Efficiency Wage Theory and the Impact of the Minimum Wage in a Competitive Market**

Source: Kaufman and Hotchkiss (2006: 291), Figure 6.8.

In a non-competitive market, however, neoclassical economics suggests that the minimum wage increases employment (Kaufman and Hotchkiss, 2006). Figure 2.7 describes the minimum wage's impact in a monopsonistic labour market. Kaufman and Hotchkiss (2006) argue that when the minimum wage is imposed, wages rise from  $W_1$  to  $W_2$  and employment increases from  $L_1$  to  $L_2$ . Workers in  $L_1$  to  $L_2$  benefit the most, as they receive higher wages and still retain their jobs. The firm, however, loses some of its monopoly, which previously constituted the difference between B and A. The marginal cost to the firm changes from MCL to  $W_2CD$  and continues up the MCL curve. If wages somehow increase above the  $W_3$  level, employment will return to  $L_1$  (Kaufman and Hotchkiss, 2006).



**Figure 2.7 The Impact of the Minimum Wage in a Monopsonistic Labour Market**

Source: Kaufman and Hotchkiss (2006: 288), Figure 6.7.

The minimum wage was first introduced in the United States in 1938 by the Fair Standards Act, the main objective of which was to maintain standards of living, especially for workers at the lowest level of pay distribution. Workers in the manufacturing industry had previously been exploited through an increase in sweatshop practices, particularly in the payment of unfair wages to women and young workers (Neumark and Wascher, 2008).

In relation to the US labour market, evidence from Card and Krueger (1994) shows that the minimum wage has no effect on employment. They surveyed 410 fast-food restaurants in New Jersey and eastern Pennsylvania using the difference-in-difference method, making a comparison between affected and unaffected groups before and after minimum-wage changes; the affected group was the New Jersey restaurants, and the unaffected group was the Pennsylvania restaurants. They followed nearly 100% of the restaurants, from just before the rise in the minimum wage (in February and March 1992 – the rise took place in April) to after the rise in the minimum wage (between seven and eight months later, in November and December 1992). The results showed that the 1992 minimum-wage rise in New Jersey had no effect on average employment. They also found no decline in the number of hours the restaurants were open on weekdays, the number of cash registers in operation in the restaurants, or the number of cash registers typically open at 11 am.

The next section discusses the implementation of the National Minimum Wage in the UK.

## 2.5. The Minimum Wage in the UK

In the UK, when the Labour Party came into government in 1997, one of its priorities was to establish the National Minimum Wage (NMW). The Low Pay Commission was established in July 1997 to recommend the initial rates for the NMW. A National Minimum Wage Bill was approved by Parliament in early 1999, and the NMW came into force on 1 April 1999 (Low Pay Commission, 1998). Since the first Low Pay Commission report in 1998, the Low Pay Commission has continued to advise the government on the NMW. There are four types of rate regulated by the NMW: the adult rate, the development rate, the 16–17-year-olds' rate and the apprentice rate. The apprentice rate was introduced on 1 October 2010. Table 2.2 describes historical NMW rates.

<b>From</b>	<b>Adult Rate</b> (For Workers Aged 22+)	<b>Development Rate</b> (For Workers Aged 18–21)	<b>16–17-Year-Olds' Rate</b>	<b>Apprentice Rate</b>
1 Apr 99	£3.60	£3.00	-	-
1 Oct 00	£3.70	£3.20	-	-
1 Oct 01	£4.10	£3.50	-	-
1 Oct 02	£4.20	£3.60	-	-
1 Oct 03	£4.50	£3.80	-	-
1 Oct 04	£4.85	£4.10	£3.00	-
1 Oct 05	£5.05	£4.25	£3.00	-
1 Oct 06	£5.35	£4.45	£3.30	-
1 Oct 07	£5.52	£4.60	£3.40	-
1 Oct 08	£5.73	£4.77	£3.53	-
1 Oct 09	£5.80	£4.83	£3.57	-
<b>From</b>	<b>Adult Rate</b> (for workers aged 21+)	<b>Development Rate</b> (for workers aged 18–20)	<b>16–17-Year-Olds' Rate</b>	<b>Apprentice Rate</b>
1 Oct 10	£5.93	£4.92	£3.64	£2.50
1 Oct 11	£6.08	£4.98	£3.68	£2.60
1 Oct 12	£6.19	£4.98	£3.68	£2.65

**Table 2.2 Historical (Hourly) NMW Rates**

Source: Low Pay Commission (2012)

The Low Pay Commission (2010) demonstrates that there has been an increase in the real and relative value of the minimum wage since its introduction. The adult rate increased by

61.1% between 1999 and 2009; this figure is higher than the increase in Average Earning Income (47.7%), the Retail Price Index (30.8%) and the Consumer Price Index (20.9%).

Evidence from the UK about the impact of the NMW on employment and hours of work is mixed. In their report to the Low Pay Commission, Dickens *et al.* (2009) suggest that there is not enough evidence to indicate that changes in the NMW have an adverse effect on employment, although there is some evidence of this in relation to hours of work. They use panel data from the Labour Force Survey and the Annual Survey of Hours and Earnings. Their methodology is difference-in-difference, differentiating between a group that is affected by the NMW and a group that is not. The affected group is people who are paid below the NMW at time  $t$ , and the unaffected group is those who are paid within some range above the NMW at time  $t$ . The outcome is then compared within the time  $t+1$ . Their results suggest that an increase in the NMW may reduce hours of work among some groups, but this evidence is inconsistent across different models. For adult women, in some models, an increase in the NMW has a significant negative impact on the total hours of work, but this effect is less strong for basic hours. For adult men, in some models, an increase in the NMW has a negative impact on basic hours, but this effect is less strong on the total hours of work. They define total hours of work as basic hours of work plus overtime.

Dickens *et al.* (2009) found that for adult women, when six months' changes in basic hours of work are analysed using the single difference and double difference method, the increase in the NMW in 2006 reduced basic hours by 1–1.5 hours per week when directly compared with the group who are paid 10–20 % above the NMW. For adult men, looking at six months' changes in basic hours of work, the increase in the NMW in 2001 reduced basic hours by 2.3–5.3 hours per week compared with the groups paid 0–10% and 10–20% above the NMW; in 2003, the NMW increase reduced basic hours by 3.2–5.8 per week.

There is stronger evidence of a reduction in total hours per week for adult women. When six months' changes are analysed using the dummy double difference model to compare with those who earn 0–10% above the NMW, there was a 10% reduction in total hours due to the increase in the NMW in 2003. When the single difference model is used, there is a reduction in total hours of two hours in 2003. If we look at changes over 12 months, the result is also statistically significantly negative on the pooled wage gap model using the 0–

10% comparison group. There is also some evidence of a negative impact of the increase in the NMW in the dummy model for 12 months' changes in 2001 and 2005. For adult men, there is less strong evidence about the total hours of work. The NMW increase in 2003 reduced total hours by 10% only in the wage gap model for six months' changes.

Thus there are interesting gender differences in terms of the effect of the minimum wage on working hours, according to Dickens *et al.* (2009). Women are apparently negatively affected in relation to total hours of work, while men are negatively affected in relation to basic hours of work. There are several theories to explain gender differences in the labour market. The neoclassical household model suggests that an increase in a person's wage may affect their spouse's participation in the labour market. Mincer (1962) and Kosters (1966), in their discussions of the household model, explain that family members allocate their time between market work, non-market work (housework or study) and leisure time. Becker thereafter introduced an extension of the household model of the allocation of time (Becker, 1965). According to Becker, there is a cost of time, as well as a cost of market goods, and households are both 'producers' – producing income (from working time) – and 'consumers' – consuming the income. Therefore, when wages increase, individuals substitute away not only their leisure time but also other time-consuming activities, such as cooking, cleaning and childcare. A theory of the allocation of time is relevant to explaining the rise of women's participation in the labour force, because women are substituting away their leisure time and housework time (cooking, cleaning and childcare) in order to take advantage of increasing wages.

However, referring back to Dickens *et al.*'s (2009) findings, there is still no clear explanation why, when the minimum wage rises, women are more affected in relation to total hours while men are more affected in relation to basic hours. Why would employers cut both basic hours and overtime for women, while for men they cut only basic hours? An earlier study by Stewart and Swaffield (2004) using New Earnings Surveys data found similar negative effects of the minimum wage on hours, but with no significant difference by gender. Stewart and Swaffield (2004) show a 1–2 hours' per week reduction in basic hours and total hours for both men and women. The effect on overtime, however, is minimal and insignificant.

When hours and gender differences are linked with migration, this thesis suggests that different issues may arise. Becker's allocation of time, for example, may affect migrant workers differently. Migrants might not value leisure time as much as native workers do, as their reference point might be costs (of goods) and wages in their home country rather than in the host country. Migrants might also have a fixed (limited) time that they want to use to the utmost so as to maximise their earnings. The allocation of time to some extent may also explain the rise in migrant domestic workers: the increasing participation of women in work may mean that women are substituting away their housework and childcare, thus leading to a rising demand for domestic workers and carers.

Allison *et al.* (2009)'s report to the Low Pay Commission on the various impacts of the NMW found that there was no conclusive evidence that the NMW reduces employment and hours of work. They used telephone interviews and a postal/email survey of 202 companies/organisations in six low-paying sectors: hotels, housing and social care, retail, nurseries, fast food and pubs, and the leisure sector. The telephone questionnaire asked employers about the impact of the NMW on the benefit packages provided to staff, pay scales, staffing levels, hours of work, training and development, and recruitment and retention. There was some evidence that the increase in the NMW between 2007 and 2008 had led to a reduction in the hours of work, although in general the evidence was not conclusive. One fast-food company reported that hours had been scaled back and also regulated more closely, partly because of the NMW but also because of rising costs elsewhere. One restaurant reported that, as part of ongoing NMW cost management, it had reduced basic hours of work. Five nurseries in the childcare sector had also reduced hours. However, the respondents generally said that the reduction of hours was not entirely due to the increase in the NMW, but was also because of rising costs elsewhere. There was some evidence of a reduction in staffing: two restaurants reported lay-offs during quiet periods, and four nurseries had reduced their staffing levels, but there was no indication that these were because of the rise in the NMW.

## **2.6. The Minimum Wage's Impact on Non-Wage Benefits**

While a relatively large amount of research has been conducted on the minimum wage's impact on employment and hours of work, this study focuses its investigation on the impact of the minimum wage on non-wage benefits. As with employment and hours of work, neoclassical economics suggests that an increase in the minimum wage will lead to a



reduction in non-wage benefits (Simon and Kaestner, 2003). There are good reasons why a firm would react to the minimum wage by adjusting the non-wages component, as Simon and Kaestner (2003) explain. Consider a firm that hires only low-skilled workers in a competitive labour market. Suppose that the firm receives a constant price for its output (i.e. it has no monopoly power), and that its production process yields diminishing marginal returns on labour. Before the rise in wages, the firm hires a worker until the Marginal Revenue Product (MRP) equals the marginal cost. The marginal cost here represents wages plus fringe benefits (non-wage benefits). If wages go up, there will be an imbalance between the marginal cost and the value of worker productivity. Thus the firm has two non-mutually exclusive options: to reduce employment until the MRP increases by a sufficient amount, or to reduce the non-wages component of compensation.

Non-wage benefits by definition are compensation other than wages. They are an important issue because their proportionality in relation to total compensation is continuously rising. In the US, non-wage benefits may account for 26.9% of total compensation (Ehrenberg and Smith, 2006).<sup>12</sup> Table 2.3 shows that non-wage benefits comprise a significant proportion of overall compensation. Employers may therefore implement changes to their non-wage benefits programmes in order to control costs (Williams, 1995). Moreover, given that roughly 15% of all non-wage benefits are voluntary and flexible (Pierce, 2001), it is much easier for employers to change the non-wage proportion of benefits (or value) rather than to cut employment or reduce hours of work in response to a minimum wage rise. Terms of employment and hours of work are likely to be written into formal employment contracts (which have legal value or rest on prior agreements with unions); it is less likely for non-wage benefits to appear in such formal agreements. It might also be more costly for employers to fire workers, as there are costs in terms of recruitment and training.<sup>13</sup>

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<sup>12</sup> Wessels (1980) shows that in 1971 all companies in the US spent on average 21% of their payroll on voluntary fringe benefits and paid leave. This percentage did not cover the other costs of providing a safe working environment and forms of management such as grievance procedures. However, Wessels also stresses that the percentage of these non-wage expenditures for low-wage workers was considerably smaller.

<sup>13</sup> Although with secondary jobs, employers are more likely to hire and fire workers as and when needed.

Type of Benefit	Percentage
<b>Legally required payments</b>	<b>6.1</b>
Social security	5.0
Workers' compensation	0.7
Unemployment insurance and other	0.4
<b>Retirement</b>	<b>6.3</b>
Employment costs based on benefit formulas	2.4
Employer costs proportional to earnings	2.5
Other (including insurance, annuities and administrative costs)	1.4
<b>Insurance (medical, life)</b>	<b>6.4</b>
<b>Paid rest</b> (coffee breaks, meal periods, set-up and wash-up time)	<b>1.2</b>
<b>Paid vacations, holidays, sick leave</b>	<b>6.5</b>
<b>Miscellaneous</b> (discounts on products bought, employee meals, childcare)	<b>0.4</b>
<b>Total</b>	<b>26.9</b>

**Table 2.3 Non-Wage Benefits as a Percentage of Total Compensation**

Source: Ehrenberg and Smith (2006: 148), Table 5.3.

Types of non-wage benefits vary by country. This thesis is specifically interested in the non-wage benefits available in the UK, particularly in secondary-segment jobs. In 2009 Employeebenefits.co.uk conducted a survey to ask 639 organisations<sup>14</sup> about the core non-wage benefits that they provided. The results, presented in Table 2.4, demonstrate the types of benefit and the proportions that were offered to all staff and some staff. Seventy-three per cent of respondents said that their organisation offered training and development to all staff, followed by life assurance/death-in-service insurance for 72%. Counselling or employee assistance programmes were the third most frequently offered to all staff. However, the results might have been different if the survey had included only organisations in low-paid, low-skilled sectors.

Workers in secondary jobs might not have the privilege of receiving the kinds of benefit revealed by this survey. Life insurance and counselling/employee assistance programmes, two of the three benefits that are offered most frequently according to this survey, might

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<sup>14</sup> The survey was conducted in January 2009 among readers of the Employee Benefits magazine and the users of [www.employeebenefits.co.uk](http://www.employeebenefits.co.uk). Respondents were drawn from all types of organisations, of which just over two thirds were privately owned (52%) and 24% were publicly quoted. A fifth was from the public sector.

not be offered in low-paying sectors. Moreover, there are variations in the non-wage benefits received by migrant workers, as this thesis will demonstrate.

Therefore this thesis will investigate the non-wage benefits received by migrants in low-paid, low-skilled jobs, and will explore the hypothesis that the minimum wage adversely affects the provision of non-wage benefits to such workers.

<b>Non-Wage Benefits</b>	<b>To All Staff</b>	<b>To Some Staff</b>
Training and development	73%	7%
Life assurance/death-in-service	72%	17%
Counselling/employee assistance programme	60%	6%
Childcare vouchers	55%	3%
Extra holidays for long service	52%	8%
Additional voluntary contributions to pensions	35%	14%
Give-as-you-earn/payroll giving	35%	1%
Income protection/permanent health insurance	31%	26%
Season ticket travel loan	31%	9%
Car parking	29%	34%
Group personal pension	28%	12%
Private medical insurance for employees	27%	41%
Legal advice/counselling	27%	2%
Stakeholder pension scheme	25%	11%
Bicycle loans (bikes for work)	25%	3%
Organisation's own products for staff	24%	1%
Tax-efficient car parking	20%	22%
Optical care/vouchers (above statutory minimum)	20%	6%
Personal accident insurance for employees	19%	9%
Discounts on food and beverages in on-site restaurants	18%	7%
Financial advice	17%	5%
Gym membership	17%	5%
Retail/leisure discounts	16%	0%
Defined benefit (final salary/career average) pension	15%	31%
Save-as-you-earn (share save) scheme	15%	1%
Financial education	15%	7%
Trust-based defined contribution (money purchase) pension	14%	16%
Private medical insurance for partners and dependants	13%	35%
Health screening	13%	31%
Buy/sell some holidays	13%	3%
Healthcare/hospital cash plan	11%	7%
Share incentive plan	9%	4%
Non-vocational training	9%	5%
Travel insurance	9%	7%
Subscriptions (publications)	9%	18%
Life assurance/death-in-service for partners and dependants	8%	9%
Critical illness insurance for employees	7%	11%

**Table 2.4 Types of Non-Wage Benefit and Proportions**

Source: Employee Benefits Research (2009).

I will now go on to review the existing literature on the minimum wage's impact on non-wage benefits, including the debate over whether the minimum wage adversely affects

such benefits. In relation to training, Leighton and Mincer (1981) and Hashimoto (1982) support the hypothesis that the minimum wage tends to reduce on-the-job training. Their findings are based on the argument that lower wage growth is associated with a reduction in training. This argument is derived from human capital theory, which predicts that investment in training will result in higher wage growth; thus lower wage growth indicates that training provision has been reduced.

Leighton and Mincer (1981) took data from National Longitudinal Survey and the Panel Study of Income and Dynamics. They found that the minimum wage's effect on wage growth is negatively significant only for white ethnicities; the coefficient for black ethnicities is also negative, but it insignificantly affects wage growth. They also use data from the Michigan Income Dynamics Panel for white male workers in 1973–1975, specifically using as dependent variables the answers to the question 'Do you feel you are learning things on the job that could lead you to better promotion?' and then regressing them with the wage growth. Their results show a strongly and consistently negative effect of the minimum wage on training for the lower-educational level group. However, no effect was found on the group with education beyond high school.

Hashimoto (1982) focuses on young workers. Many young workers who lack skills and experience accept the minimum wage as the best available rate that they can earn. Hashimoto therefore suggests that any negative impact on training is likely to be greater for these workers. Hashimoto uses data from the National Longitudinal Survey. The results confirm that the minimum wage has an adverse effect on training, particularly for young white males, and the effect on training is expected to be 'unambiguously negative' (Hashimoto, 1982: 16).

On the other hand, Lazear and Miller (1981), using the data from the National Longitudinal Survey and the National Longitudinal Study of the High School Class of 1972, found no change in wage growth with the increase in the minimum wage. They also found that the minimum wage may prevent a growth in wages, and a reduction in training is not the only reason for low wage growth. A later study by Grossberg and Sicilian (1999) using data from the Employment Opportunities Pilot Project supports Lazear and Miller's (1981) finding that there is no evidence that the minimum wage has an effect on training. They criticise the methods used by Leighton and Mincer (1981) and Hashimoto (1982), which

linked a reduction in wage growth with a reduction in training. Grossberg and Sicilian (1999) argue that these studies' methods might have been misleading, as they could not explain the causality between reduced wage growth and reduced training.

In relation to the minimum wage's impact on non-wage benefits other than training, Wessels (1980) found that an increase in the minimum wage created a reduction in fringe benefits in the retail and restaurant industries. Using data from the New York State Department of Labor, Wessels (1980) found that approximately 29% of retailers made some form of offset due to the increase in the minimum wage in New York State in 1957. One of the offsets was a reduction in non-wage expenditures; this included reductions in paid vacations, holiday pay, paid sick leave, year-end bonuses, store discount privileges, premium pay and profit sharing. On the basis of this evidence, Wessels argued that there are three main types of offset. The first is the reduction in money wages: this means the reduction in other forms of wages, such as bonuses and commission, which are not directly tied to hours of work. It also includes a delay in wage rises in anticipation of a minimum wage rise (Wessels, 1980: 5). The second offset is a reduction in non-wage expenditures, as explained above. The last offset is when the firm reduces the utility of the workers or imposes more effort on the workers.<sup>15</sup> This includes reductions in meal and coffee breaks, the rearrangement of start and end times so as to be more convenient and profitable for the firm (but not for the workers), and changes in work assignments, such as having clerks handle additional cash registers. Wessels argues that this offset also includes laying off workers more readily when demand for output falls, which results in reduced job stability (Wessels, 1980: 6). This last argument is very important in relation to this thesis, as it links the minimum wage with the creation of secondary-segment jobs (jobs that are less secure and demand-driven). This thesis stresses Wessels' point that demand-driven jobs (as a minimum wage offset) are increasingly relevant in the UK labour market, where particular sectors certainly are demand-driven. His argument creates a clear link between the minimum wage and the duality of the labour market.

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<sup>15</sup> Wessels explain this offset in other words as an increase in the productivity of workers that is directed in a negative way: to make the workers work harder and during unsocial hours (Wessels, 1980: 2, 13).

In their survey of restaurants in New Jersey and Pennsylvania, Card and Krueger (1994) found no overall evidence that an increase in the (New Jersey) minimum wage led to a decrease in the provision of meals by employers. They observed both free meals and reduced-price meals; although there was a greater decline in reduced-price meals in New Jersey, they found that New Jersey employers were shifting towards free (rather than reduced-price) meals – in other words, more generous fringe benefits were being provided.

Royalty (2000) found that a large increase in the minimum wage (or a small increase at a higher level of the minimum wage) led to a reduction in health insurance and pension eligibility for less-educated workers. Nevertheless, a small increase at the very low level of the minimum wage generally had no effect on health insurance and pension eligibility; in some cases it increased health insurance and pension eligibility at small points. His findings show that a \$0.50 increase in the minimum wage from its 1999 rate was predicted to reduce health insurance eligibility by 3.9 points and pension eligibility by 6.8 points for less-educated workers.

Simon and Kaestner (2004) used data from the Current Population Survey for 1979–2000, and found that the minimum wage had no effect on health insurance, family health insurance or pension benefits offered by employers. Their results remained unchanged whether the state-only variation or federal and state variations were used.

In the UK, there is little evidence available on the NMW's effect on non-wage benefits.<sup>16</sup> In his report to the Low Pay Commission, Dickerson (2007) uses Labour Force Survey data to estimate the effect on training of the rise in the NMW. His results confirm that for both men and women, and for both adult workers and young workers entitled to the development rate, the NMW has no significant impact on employer-provided training. This result is consistent across various methods.

In their report to the Low Pay Commission, Allison *et al.* (2009) found that among 202 organisations surveyed in low-paying sectors, two organisations in the social-care sector reported a reduction in their training budgets, and one organisation in the same sector reported limit training availability for some employees; however, this was not because of

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<sup>16</sup> This is probably not because of lack of interest, but because of lack of available data.

the increase in the NMW. There were also two companies in the fast-food sector that reported that they had had to freeze non-essential training; however, this was not only because of the rise in the NMW, but also because of rising costs elsewhere, such as for fuel, and the economic downturn. The study concluded that there was almost no evidence that the NMW has an impact on other non-wage benefits. Thirty per cent of respondents reported that there had been some changes to holiday entitlements; however, this was because of changes in statutory annual leave, not the NMW. The study also found evidence related to the presence of migrants in some sectors: 82% of respondents in the hotel sector and 100% of respondents in the fast-food and restaurant sector employed migrant workers. Approximately 11% of the 202 organisations surveyed employed agency workers (Allison *et al.*, 2009: 12).

The non-significant effect of the NMW appears to support the institutionalist (as opposed to classical) view that the labour market is shaped by institutional rules set down by the government, unions or employers, or by unwritten rules derived from collective bargaining or customary law (Kerr, 1954). These ‘non-economic’ factors may influence wage-setting and employment, and may explain why the minimum wage has little or no impact on employment or non-wage benefits (Card and Krueger, 1995).

As non-wage benefits vary among sectors and industries, it is interesting to analyse non-wage benefits in low-paying sectors, particularly in the secondary segment, which has significant numbers of informal (or ‘underground’) jobs. Some higher-wage workers see non-wage benefits as ‘normal goods’ and use some of their compensation to purchase them – for example, to buy health insurance (Card and Krueger, 1995). However, this thesis will suggest that low-paid workers do not have similar attitudes. Some workers also see non-wage benefits as non-taxable income, but this may not be the case with workers in the informal or ‘underground’ economy.

## **2.7. The Minimum Wage’s Impact on Migration**

There is limited literature from the UK that examines the NMW’s impact on migration. Dustmann *et al.* (2007) and French and Möhrke (2007) are among the very few studies to investigate the minimum wage’s effects on migration. The study by Dustmann *et al.* (2007) highlights the downgrading phenomenon in migration, and analyses the impact of



migration (migrant performance) on the UK labour market (see section 2.1 above for a discussion of this study).

The study by French and Möhrke (2007) explores the impact of migration on the operation of the NMW, and examines how migration and the NMW affect the supply of labour in low-paying sectors. It is based on a survey (using semi-structured interviews) of employers' representatives in north Staffordshire. The results show that 42 of the 78 firms surveyed employ migrant workers. One of the most interesting findings is the explanation given by these firms' representatives (i.e. personnel managers) of why they employ migrants: 11 firms (of the 42 that employ migrants) state that they do so specifically in order to address skills shortages. This is a very interesting response, because it suggests that the skills shortage issue still exists, although it should be borne in mind that the firms in the sample are not all from low-paying sectors. Five firms employ migrants because of international activities in relation to employment. Eight firms (approximately a fifth) claim that they employ migrant workers in order to develop flexible working practices. This again is a very interesting response, because to some extent it supports the argument that migrants are utilised to fulfil businesses' needs for flexibility and temporary working. The term 'flexibility' here (and in the thesis as a whole) refers to numerical flexibility, i.e. the adjustment of numbers of workers (or employment) and hours of work: workers can be hired and fired according to need, and their working hours can be adjusted through the implementation of shifts, part-time work, overtime or flexible hours. Thus flexibility in this sense is a working arrangement that is made for the convenience (or to the benefit) of employers, not of workers.

There are also interesting findings from French and Möhrke's (2007) interviews with agencies: two of the agencies in the survey reported that 97% and 95% of their workers were migrants. The agencies reported that their reason for employing so many migrants was that native workers were not prepared to work long hours in low-wage sectors and did not want to travel far to work (French and Möhrke, 2007: 47). French and Möhrke also conducted interviews with migrant workers; their findings were that the majority of migrants were paid at or slightly above the NMW. French and Möhrke argue that employers gain advantages from utilising migrants, with no need to cut pay rates; those advantages include migrants' reliability and their willingness to do low-status work for

long and flexible hours. French and Möhrke's findings have had an important influence on this thesis' investigation of how the minimum wage differently affects migrant workers.

French and Möhrke also argue that some agencies reduce workers' total wages by deducting accommodation costs (although the accommodation is poor quality, and in one case the worker had to pay their own repair costs) and transport costs (although no transport was actually provided, as the accommodation was near the workplace). Employers will always be looking for ways to offset the costs of a minimum-wage rise, and at some point it will therefore be the workers who will bear the costs of such a rise. It is my argument that these adverse effects of the minimum wage will be more significant for migrant workers. Migrant workers are differently affected by the minimum wage, in the sense that they might not be paid the statutory wage, they might face more unfair working conditions and greater reductions in non-wage benefits, and they are more neglected in relation to their overall employment rights.

There are some studies that link migrant workers with flexibilised/temporary jobs, although these studies do not specifically discuss the minimum wage. Anderson and Ruhs (2008, 2010) discuss the central debate over the link between migration and the 'needs' of the host country's labour market. They mention two key issues in this debate. First, labour demand and supply are dynamic and mutually condition one another. They argue that 'what employers want' can be partially influenced by 'what employers think they can get' from different groups of workers (2008: 36, 2010: 16). A possible consequence is that employers will develop a specific demand and preference for migrant workers over natives, and in extreme cases may develop requirements that natives are unable or unwilling to meet (2008: 36). Such requirements may include short-term (temporary) employment or working on an 'as/when needed' basis (flexibilised employment). The second key point is the 'system effects' that arise from regulations and institutional frameworks, such as welfare benefits or public-sector cuts, which are out of the control of employers and workers. These system effects, reiterated by macroeconomic conditions (as seen in the recent economic downturn), influence the decision to adopt a low-cost employment model, which may include temporary working and flexibilisation, and the utilisation of low-cost migrant workers.

Anderson and Ruhs (2010) also argue that the need to hire migrants might vary between sectors. Thus the degrees of temporary and flexible employment might also vary. Moriarty (2010) investigates the need for migrants in the social-care sector, a sector which is mainly publicly funded. Given the condition of public-funding cuts, employers have to adopt low-cost employment by offering low pay (only paying the actual hours worked) and temporary work (on an 'as/when needed' basis). The work itself (i.e. social care) is devalued, as the skills needed are 'only' those required for domestic labour; gender and ethnic stereotypes, limited career prospects, and the reality of working conditions (24/7 care with unsociable hours) also make this kind of work less appealing to non-migrants.

Lucas and Mansfield (2010) investigate the use of migrants in the hospitality sector. They state that the sector demands high 'flexibility' in employment, as the customer side is unpredictable. They also state that the proportion of full-time jobs is only 56%, with restaurants and pubs employing more part-time workers. Seventy-five per cent of all hospitality businesses are micro-enterprises employing no more than 10 people (Lucas, 2004), and these might include temporary agency workers such as caterers and cleaners. The turnover in the hospitality sector on average is 31%, with restaurant and pubs reaching 90%–100% (People 1<sup>st</sup>, 2009). The particular group that is seen as fitting employers' needs are students, because students can meet the requirements of 'temporary' and 'flexible' jobs while also bringing 'intellectual-courteous' soft skills (Lucas and Mansfield, 2010). Although this is a sector where migrants and non-migrants work side-by-side, there is no evidence that migrants have been taking students' jobs, as employers tend to place migrants in roles that the employers feel are most suited to them, such as kitchen assistant and housekeeping roles (People 1<sup>st</sup>, 2009).

McGovern (2007) argues that immigration is better understood by institutionalists (such as through labour market segmentation) rather than neoclassical economists. He stresses Piore's (1979) analysis of why the demand for migrants is 'chronic and unavoidable' (McGovern, 2007: 225–226). First, during periods of economic prosperity, when primary jobs become more available and natives therefore move into them, shortages occur in secondary jobs offering lower pay and lower status. In such cases, hiring migrants is a less costly solution than raising wages or replacing labour with capital. Second, labour is seen more flexible than capital, and employers reserve capital for fixed demands while labour is used for flexible ones. Labour-intensive sectors are thus filled with secondary jobs which

are low-paid and more disposable, in which workers can be hired and fired as and when needed. Third, occupational hierarchies motivate people to seek jobs with higher status and advancement. The bottom level of the hierarchy therefore suits those who are more concerned with economic survival than with status. Migrant workers, at least during the early years after migration, fit the bill in all three cases, to a greater or lesser extent.

## **2.8. The Minimum Wage's Impact on the Non-Wage Benefits of Migrants: the Gap**

Although plenty of studies have been done to analyse the impact of the NMW in the UK, only a few studies discuss its impact on non-wage benefits. Dickerson (2007), Allison *et al.* (2009) and a subsequent study by Melis *et al.* (2009) are among the few that do so.

Only a few studies in the UK have investigated the NMW's impact on migration. Dustman *et al.* (2007) and French and Möhrke (2007) do so, but again they do not focus on the NMW's effects on non-wage benefits.

Dustman *et al.* (2007) mostly discuss the effects of migration on the labour market, particularly on wages, but this differs from the aim of this thesis, which is to investigate how the minimum wage affects migration. Moreover, Dustman *et al.* (2007) do not discuss any relationship with non-wage benefits. French and Möhrke (2007), on the other hand, focus more on the utilisation of migrant workers. Their study does not aim to find any causal effects of the National Minimum Wage. Their findings discuss some non-wage benefits received by migrant workers, but make no link between the minimum wage and non-wage benefits.

Thus there is an absence of literature that discusses the minimum wage's effects on the non-wage benefits of migrant workers. In particular, the UK literature to date does not discuss whether the NMW might have causal effects on the non-wage benefits of migrants. This thesis therefore aims to address this gap, and in doing so to make an original contribution to the minimum-wage literature in the UK.

## **2.9. Conclusion**

This chapter has presented a thorough review of the literature on the relationship between the minimum wage and migration. The review started with the debate in migration studies over whether migration has any impact on the labour market. There is little evidence that

migrants are in competition with non-migrants; there is also little evidence that migrants are substitutes for non-migrants (Ottaviano and Peri, 2006; Peri, 2007; Card, 2009). Even when they have similar levels of education, migrants are imperfect substitutes for natives (Card, 2009). These findings importantly challenge the argument that migrants are in competition with non-migrants in the labour market. Indeed, a recent study by Lucchino *et al.* (2012) found no link between migration and unemployment in the UK.

There have been some interesting findings about migrants' performance in the UK labour market. Migrants to the UK have become more educated and tend to be younger than either previous migrants or non-migrants (Manacorda *et al.*, 2006; Dustmann *et al.*, 2007; Wadsworth, 2010a). However, migrants to the UK, particularly recent migrants, are more likely to be concentrated at the lower level of occupational distribution; in other words, they tend to become downgraded (Dustmann *et al.*, 2007).

There is little evidence as to whether downgraded migrants have an effect on less-skilled natives. Although this study does not seek to address whether such competition exists, Manacorda *et al.* (2006, 2012) suggest that the impact of migration is likely to be greater on migrants themselves (or previous migrants) than on natives. Lucchino *et al.* (2012) suggest that if any such competition does exist, the impact on less-skilled natives is modest at most.

This study will examine whether the downgrading phenomenon exists within its sample of migrants in low-paid, low-skilled jobs. Moreover, it seeks to identify the factors that affect whether migrants earn the minimum wage or below: whether human capital can explain the minimum wage, or whether there are factors other than human capital that explain the downgrading phenomenon.

There has been a debate in minimum-wage studies about the adverse effects of the minimum wage. Neoclassical economics suggests that a rise in wages that is not followed by a rise in productivity will create a reduction in labour demand. Thus the minimum wage will adversely affect employment, working hours and non-wage benefits, as employers will take the necessary action to reduce labour costs.

The main focus of this thesis is on the minimum wage's effects on non-wage benefits. The literature reveals that the effects of the minimum wage on non-wage benefits are adverse (Wessels, 1980; Leighton and Mincer, 1981; Hashimoto, 1982). Wessels (1980) suggests that the minimum wage offsets non-wage benefits such as holiday pay, paid sick leave, year-end bonuses, store discount privileges, premium pay and profit sharing. He also suggests that the minimum wage is linked to a reduction in job stability, as employers are able to flexibilise jobs when demand for output falls (Wessels, 1980: 6). His study not only stresses the importance of the minimum wage's effects on non-wage benefits, but also makes a link between the minimum wage and the duality of the labour market. It is evident that certain sectors in the UK are demand-driven (Ruhs and Anderson, 2010).

Piore (1979) suggests the relevance of migrants to the duality of the labour market. This thesis will attempt to link Piore's (1979) argument with Wessels' (1980) argument, and to examine whether there is a link between the minimum wage, the duality of the labour market and migration. The thesis will argue that the minimum wage does affect migrants differently. French and Möhrke (2007) suggest that employers' demands for flexibility are one of the reasons for hiring migrant workers. They claim that employers gain advantages from utilising migrant workers, without a need to cut pay rates. This thesis will suggest that this is exactly how migrants are differently affected by the practical implementation of labour standards: the minimum wage adversely affects migrants in the sense that employers treat migrant workers differently. French and Möhrke (2007) make it clear that employers' utilisation of migrant workers has adverse effects in terms of unnecessary costs, unfair working conditions and exemptions from workers' rights (including rights to non-wage benefits). These previous findings tend to support the argument of this thesis that the minimum wage adversely affects migrant workers.

There is still little UK literature that discusses the minimum wage's impact on non-wage benefits and migration. Dickerson (2007), Allison *et al.* (2009) and Melis *et al.* (2009) are among the few to analyse the NMW's impact on non-wage benefits; Dustman *et al.* (2007) and French and Möhrke (2007) are among the few that examine the NMW's impact on migration. This study might therefore be the first of its kind to examine the NMW's impact on a wide range of non-wage benefits, which seems not to have been tested before. It might also be the first to examine the minimum wage's impact on the non-wage benefits of migrant workers.

This literature review has helped to clarify the research questions asked by this thesis. First, the thesis aims to address the NMW's adverse effects on non-wage benefits. Second, it aims to examine the NMW's adverse effects on migrant workers. Third, on the basis of its findings, the thesis will present evidence-based recommendations for National Minimum Wage policy. Last, and to stress the importance of this chapter, this thesis aims to fill the gap in the minimum-wage literature by making an original contribution to knowledge about the NMW's effects on the non-wage benefits of labour migrants in the UK.

### **Chapter 3**

#### **Methodology**

We must extend to social phenomena a scientific distinction that is truly fundamental, and applicable by its nature to any phenomena, above all to those of living bodies: that between the static and the dynamic state of every subject of positive study.

(Comte 1974 [1830–42]: 147)

August Comte's philosophy of positivism affects the methodology chosen for this study. This thesis studies the social phenomena of migration in low-skilled, low-paid sectors, and uses positivist methods as an extension of the scientific distinction referred to by Comte – that is, it uses mathematical rationality to explain reality. This thesis is positivist in the sense that it explains reality through empirical data, mostly through the elaboration of statistics. To be precise, this study defines its methodology as positivist and quantitative.

This chapter is devoted to explaining how the research for the study was conducted; that is, how positivist and quantitative methodology was utilised to answer the research questions. The starting point is the understanding that the positivist-quantitative approach might lose some of the sense of the 'qualities' of reality. Therefore the research also draws on a (limited) number of qualitative interviews to inform its primary research analysis. Nevertheless, it stands by the argument that the positivist-quantitative approach should be able to explain the phenomena of migration. In the wake of studies in labour economics which are founded primarily on the use of statistics and econometrics, it is expected that a positivist-quantitative approach using similar econometric techniques will be adequate to answer the research questions.

The first research question posed by this thesis refers to the minimum wage's effects on working hours, working arrangements and especially non-wage benefits. In order to answer the first question, the thesis develops an analysis using secondary data from public surveys in the UK. The second research question concerns how the minimum wage might differently affect migrants; in order to provide a thorough answer to this question, the thesis collects and analyses primary data.



This chapter explains how both the secondary and primary research was conducted and analysed. The chapter is divided into two main parts. The first part introduces the secondary and primary research, including the research plan and rationale, the types of data sought, and how access to the data was gained. As quantitative methods tend to use large samples of empirical data, this thesis too uses large datasets, particularly for its secondary data.

The second part explains how the positivist-quantitative method is able to analyse the data. This part explores methods and techniques – in other words, how the thesis applies its positivist-quantitative methodology. It follows previous quantitative studies in labour economics, particularly on the minimum wage and migration. This part will explain the statistical and econometric techniques used, including the equations and variables, and how such techniques were able to answer the research questions.

The secondary research was conducted in accordance with existing minimum-wage literature,<sup>1</sup> which mainly utilises public surveys as the main data source. This thesis utilises three core labour surveys in the UK as the secondary dataset. The surveys are the Annual Survey of Hours and Earnings, the Workplace Employee Relations Survey, and the Labour Force Survey. Each of these surveys has its strengths and weaknesses: this chapter will explain the dataset that has been drawn from these three particular surveys, which do not substitute for but rather complement each other.

Secondary research alone would not be sufficient to answer all the research questions, or to address the national minimum wage's effect on migration. Moreover, data on migration is under-represented in public surveys and statistics. Therefore primary research was conducted in order to capture migration information that is less available from the secondary (public) database. The technique for collecting the primary data was also quantitative, and used a questionnaire survey. This follows previous studies on the minimum wage (see Card and Krueger, 1994; Allison *et al.*, 2009), which also conducted primary research using questionnaire surveys. It also follows earlier labour migration

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<sup>1</sup> See Leighton and Mincer (1981), Hashimoto (1982), Lazear and Miller (1981), Simon and Kaestner (2004), Dustmann *et al.* (2007), Dickerson (2007) and Dickens *et al.* (2009).

research which has utilised quantitative questionnaire surveys (see Markova and Black, 2007; McKay *et al.*, 2011).

Since the research seeks to investigate the impact of the minimum wage, and specifically its causal effects, the thesis uses econometric/statistical techniques to identify any causal relationships. The techniques used for analysing the secondary and primary data are not the same, however, as the types of data are different. The secondary data consists of panel data, which allows a comparison of variables across different time periods; the primary data is cross-sectional data, which captures information only at a particular point in time.

The secondary data is analysed using the difference-in-difference (DID) technique, an econometric technique that analyses two different groups (an affected and an unaffected group) at different times. DID is mainly used to detect the effects of policy changes (Meyer, 1995), and is a common technique for analysing the impact of the minimum wage (see previous studies by Card and Krueger, 1994; Stewart 2003, 2004; Arulampalam *et al.*, 2004; Dickerson, 2007). For the primary dataset, the thesis mainly uses logistic regression analysis (because of the binary character of the dependent variables), in order to explore the causal effects of the minimum wage. Apart from logistic regression analysis, it also uses Pearson's Chi-square coefficient to examine any association between variables. It also uses descriptive statistics in order to generate a profile of migrants in low-paid, low-skilled jobs. Moreover, so as not to completely lose the insights gained from migrants' own experiences, the primary research analysis uses a (limited) number of qualitative interview responses by utilising the open-ended questions in the questionnaire.

The quantitative-positivist methodology and analytical techniques are deemed to be adequate to answer the research questions, which will make an original contribution to minimum-wage literature by examining the minimum wage's impact on the non-wage benefits of migrant workers. They will also generate original evidence about how the minimum wage differently affects migrants' access to non-wage benefits, and will provide substantial evidence from the UK labour market.

### **3.1. Secondary Research**

The thesis mainly uses secondary research to address the first research question on the minimum wage's impact on working hours, working arrangements, and especially non-

wage benefits. Part of the secondary research also investigates whether the minimum wage has any impact on the non-wage benefits of migrants. Previous studies on the effects of the minimum wage have mainly used secondary research, drawing data from existing public surveys.<sup>2</sup>

The secondary research in this study follows previous studies by utilising existing data from public surveys, choosing surveys which are relevant to the research questions. These include public surveys that capture information on employment, and in particular on wages, non-wage benefits, and working hours. On the basis of a review of previous studies of the minimum wage in the UK, three public surveys were selected as particularly suitable for addressing the research questions: the Annual Survey of Hours and Earnings (ASHE), the Workplace Employee Relations Survey (WERS), and the Labour Force Survey (LFS).

There are extensive studies in the UK, including studies of the minimum wage, which have been done using the data from these three surveys. The Low Pay Commission (2011) uses ASHE as the main dataset to assess the minimum wage's impact on earnings distribution. Dustman *et al.* (2007)'s study of migrant workers in relation to the National Minimum Wage uses data from both ASHE and the LFS. Dickens *et al.* (2009)'s investigation of the minimum wage's effects on employment and hours of work uses both ASHE and the LFS. Forth and Millward (2001) use WERS data for 1998 to examine unions' impact on pay levels in lower-skilled jobs in the private sector. Draca *et al.* (2008) also use WERS to

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<sup>2</sup> Leighton and Mincer (1981), Hashimoto (1982) and Lazear and Miller (1981)'s investigations of the minimum wage's impact on training use National Longitudinal Survey data from the US Department of Labor. Leighton and Mincer (1981) also use the Panel Study of Income and Dynamics, a longitudinal household survey in the US. Simon and Kaestner (2004)'s investigation of the minimum wage's effects on health insurance and pensions use data from the Current Population Survey from the US Census Bureau and the US Bureau of Labor Statistics. Dustmann *et al.*'s (2007) study of the minimum wage and migration in the UK uses the Labour Force Survey, the Annual Survey of Hours and Earnings and the UK Census as its data sources. Dickerson's (2007) analysis of the minimum wage's effects on training in the UK utilises data from the Labour Force Survey. Dickens *et al.*'s (2009) investigation of the National Minimum Wage's impact on employment and hours of work uses data from the Labour Force Survey and the Annual Survey of Hours and Earnings.

determine the impact of the minimum wage on company profitability. Experian Business Strategies (2009) utilises the LFS to determine the impact of the minimum wage on staff turnover, retention and recruitment. Stewart (2003) uses the LFS as one of the datasets to examine the minimum wage's effects on employment.

The information in each of the three surveys has its limitations. However, the three surveys complement (and do not substitute for) each other. Therefore it is crucial to accommodate information from all three. The strengths and weaknesses of each survey are as follows.

ASHE comprises data on individual earnings in the UK, with a sample size of approximately 300,000. The ASHE survey was introduced in 1997, and since then it has been conducted annually. In 2004 ASHE replaced the New Earnings Survey, which had been in use since the 1970s. The Economic and Social Data Service (2011) considers ASHE one of the largest surveys of individual earnings in the UK. ASHE claims that it has particularly accurate responses about wages and hours, since the responses are usually provided by employers rather than employees. However, this thesis contends that information from workers is no less vital than that from employers, particularly for the analysis of the non-wage benefits of workers in low-paying jobs.

One of ASHE's strengths is that it provides very detailed information on hours and earnings (basic paid hours, overtime hours, basic weekly earnings and overtime pay) and some information on non-wage benefits (incentive pay, shift and premium payment, and employee and employer contributions to pensions). Section 3.3 below discusses each of the ASHE variables used in the analysis. However, ASHE provides limited data on non-wage benefits. It also does not provide any information on migration, ethnicity or educational background.

Two ASHE datasets, one covering a shorter and one a longer period comparison, are included. The first dataset is the shorter one, consisting of ASHE data for the years 2009 and 2010 (the latest datasets that were available at the time of data collection for this thesis). The second dataset is the longer one, consisting of ASHE data for the years 1997 and 2010 (the first and the latest available ASHE datasets). Each dataset compares two different years, as required in DID techniques, so as to establish whether the minimum wage has dissimilar impacts over shorter and longer periods. ASHE 1997 has limited

variables compared to ASHE 2010: the earliest ASHE survey does not capture as many non-wage benefit variables as the most recent ASHE survey. This problem affects this thesis in the sense that the longer-period dataset is not able to present as many analyses as the shorter one, which uses the more recent year.

WERS is a national survey of employment relations in Britain that collects data from both employees and employers (managers). WERS provides cross-sectional survey data from employees and employers in the years 1998 and 2004. Its sample size is approximately 40,000. In the cross-sectional survey of employees, WERS provides information about payment per week; hours of work (including basic hours and overtime) per week; whether particular working arrangements (such as flexitime, job sharing, working from home or the provision of workplace nurseries) are available; and whether parental leave (as a non-wage benefit) is available. It also provides information about ethnicity and educational background. WERS, however, does not provide any information on migration. The relevant WERS variables are explained in Section 3.3 below.

This thesis uses cross-sectional data from employees for 1998 and 2004 as its WERS datasets. In WERS there were no major changes to the questionnaire between 1998 and 2004, and so there are no significant problems which might affect the comparison of the data.

The Labour Force Survey (LFS) is a quarterly continuous household survey conducted in Britain. It is one of the largest surveys of the labour force in Britain, with a sample size of approximately 20,000. It has very detailed and complete information on hours of work, pay, migration status, ethnicity, age, gender and educational background. Some other useful variables are working arrangements, such as whether respondents work flexitime or in term time, or job share; whether respondents receive any additions to basic pay, such as bonuses, profit-related pay, a London allowance, a standby allowance or a shift allowance; whether respondents receive training opportunities; the extent of holiday pay entitlement; and whether respondents are union members. However, it has limited information on non-wage benefits.

The LFS datasets were selected to show the effects of the minimum wage over short and long time periods. Most importantly, it was hoped that the two datasets would be able to

reveal the minimum wage's impact on the non-wage benefits of migrants. LFS Quarter 1 (Q1) is used simply because more information on non-wage benefits is available in this quarter. There were no major changes to the questionnaires over the time, at least not in the LFS datasets used in this study. Therefore there is no major problem in comparing the data.

Thus in total there are four datasets used as secondary data:

1. ASHE 2009 and 2010  
Total eligible sample: 346,544
2. ASHE 1997 and 2010  
Total eligible sample: 315,911
3. WERS Cross-Section of Employees  
Total eligible sample: 48,675
4. LFS Q1 2000 and Q1 2011  
Total eligible sample: 26,057

Table 3.1 provides a summary of the strengths and limitations of the three surveys used to build the datasets. ASHE provides very detailed information about hours and earnings, but has limited information on non-wage benefits, and does not provide information on ethnicity or migration. WERS provides very detailed information on non-wage benefits and some information on ethnicity, but no information on migration. The LFS complements the other two by providing information on migration (by country of birth), but has limited information on non-wage benefits.

<b>Information</b>	<b>ASHE</b>	<b>WERS</b>	<b>LFS</b>
Sample size	+300k	+40k	+20k
Ethnicity	No	Yes	Yes
Migrant/native (country of birth)	No	No	Yes
Employers' views	No	Yes	No
Non-wage benefits	Few: incentive pay, shift/premium pay, pensions.	Many: training, pensions, profit/ownership share, health insurance, paid leave (sickness, holiday, childcare, paternity), working arrangements (flexitime, job share, work from home, workplace nurseries).	Medium: training, additions to basic pay (bonuses, profit share, London allowance, standby allowance, shift allowance), holiday pay, working arrangements (flexitime, term-time working, job share).

**Table 3.1 Secondary Data**

The secondary data also has limitations in relation to the research questions regarding migration. First, only the LFS contains information on migration; even here, the variables that discuss migration are very limited.<sup>3</sup> Second, the LFS data might under-represent particular types of migrants, such as migrants who work in low-paid, low-skilled jobs. The data also has no information about migrants' legal status. Third, the secondary data overall does not provide information on particular non-wage benefits in secondary-segment jobs<sup>4</sup>; thus migrants' experiences in low-paid, low-skilled jobs, and especially their non-wage

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<sup>3</sup> Although the LFS does provide information on country of birth, there are other migration variables which are not covered by the LFS, such as level of spoken English, legal status (visas), employer's ethnicity, and migrants' previous experiences (in their home country or abroad).

<sup>4</sup> The types of non-wage benefits available in secondary jobs might differ from those in primary jobs; moreover, some of the non-wage benefits in secondary jobs might not be captured in official statistics.

benefits, are not completely addressed. I therefore also conducted primary research to gather information which could not be found in public surveys.

There were restrictions on access to the three public surveys. First and foremost, in order to conduct secondary research, ethical approval had to be obtained from London Metropolitan University's Research Ethics Review Panel for the Faculty of Applied Social Sciences (now the Faculty of Social Sciences and Humanities). The next step was to make an application to the Office for National Statistics (ONS) for approval to access the Virtual Microdata Laboratory (VML) where the public survey data is located. This approval required several stages. An extensive review of the research project and its relevance to the data requested had to be provided, as did information regarding my research experience, especially in relation to confidentiality and data protection. I made a formal application to become an Approved Researcher in November 2010, and attended a one-day technical training session on confidentiality and data protection in December 2010. In late December 2010 I received my Approved Researcher status.

I began data collection in May 2011. I had to regularly visit the VML at the ONS offices in order to conduct the analysis. It took five months in total to complete the collection of secondary data. I spent approximately 20 hours per week at the VML during the data collection period. The first two months were devoted to reviewing the survey questionnaires, choosing the relevant variables, learning to use Stata (the econometric software for large sets of data), and conducting a trial-and-error regression test. The last three months were used to compile the sort data, code the data, analyse the data using DID, and make corrections and revisions.

### **3.2. Primary Research**

As the secondary research alone could not completely address migrants' experiences and the non-wage benefits they receive in low-skilled, low-paid jobs, I also conducted primary research to gather such information. The primary research was particularly designed to investigate the second research question on how the minimum wage differently affect migrants: a) what factors affect migrants' earning the minimum wage or below, b) how the minimum wage affects migrants' access to non-wage benefits, and c) whether the phenomenon of downgrading exists and how it relates to the duality of the labour market. The primary research was designed to capture substantial migration variables which are



rarely found in official statistics, such as human capital and legal status. Section 3.4 below explores in detail the variables used in the primary research and the regression techniques used to analyse the data.

In accordance with positivism and the quantitative method, I used a quantitative technique to collect the primary data. A questionnaire survey was developed, and responses were collected by conducting face-to-face interviews based on the questionnaires. The face-to-face interview was seen as the most appropriate way to collect responses, particularly with regard to the target sample.

Although this study's main methodology is quantitative, I did not want to completely lose 'insight' into the realities of migrants' experiences of wages and non-wage benefits. Thus the questionnaire design also allowed a few open-ended questions which gave room for respondents to express their concerns. The questionnaire design was an adapted version of the questionnaires designed by the Undocumented Workers Transitions project<sup>5</sup> and the East European Immigration and Community Cohesion project.<sup>6</sup> The template for the questionnaire is available in Appendix 1. There were 41 questions in total; the majority of the questions were multiple choice, with a few open-ended questions.

I submitted the ethics application to conduct the primary research to the Research Ethics Review Panel at the Faculty of Social Sciences and Humanities, London Metropolitan University, in May 2011. A thorough review was conducted in order to gain ethical approval on how to approach migrants while avoiding unethical conduct, how to ensure voluntary participation, and how to maintain the confidentiality of respondents. To this end an Information Sheet was created for distribution and communication to the respondents

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<sup>5</sup> An EU-funded project by McKay *et al.* (2011), Working Lives Research Institute, London Metropolitan University. Published report:  
<http://www.undocumentedmigrants.eu/londonmet/fms/MRSite/Research/UWT/UWT%20FINAL%20REPORT%20Revised%2021%20November%202009mw.pdf>.

<sup>6</sup> A Joseph Rowntree Foundation-funded project by Markova and Black (2007), Sussex Centre for Migration Research, University of Sussex. Published report:  
<http://www.jrf.org.uk/sites/files/jrf/2053-immigration-community-cohesion.pdf>.

before the interview began. The purpose of the Information Sheet was to ensure the voluntary participation, anonymity and confidentiality of the respondents. The information sheet is available in Appendix 2. Ethical approval to conduct the primary research was granted in July 2011.

As soon as the ethical approval was granted, the pilot testing of the questionnaire was conducted in July 2011. Ten questionnaires were distributed in the pilot test. Results from the pilot showed no major problems with the questionnaire design; the respondents did not find any difficulties in answering the questions. Overall, the questions were well understood by the respondents (It is to be noted that the questionnaire had already been extensively tested in major studies that had used it previously). The questionnaire collection was then conducted over five months, from August to December 2011.

The survey's target sample was London-based migrants who work in low-paid, low-skilled sectors. The sample comprised 200 completed questionnaires. It was decided to use London as the (migrant) base for the sample simply because London has the largest proportion of migrant workers, compared to other cities in the UK. Statistics show that in 2009, migrant workers constituted approximately 39% of London's working-age population; this is significantly above the proportion of migrant workers in the UK as a whole, which stands at 14% (Wadsworth, 2010a). Moreover, statistics show that although the stock of migrants has risen across all regions over time, it has risen the most in London (Wadsworth, 2010b: R37). Migration has become more concentrated in certain areas over time,<sup>7</sup> and 32% of migrants live in London (Wadsworth, 2010b); these factors also strengthened the decision to base the primary research in London.

However, limiting the survey to London may have had some implications for the generation of evidence about the UK as a whole, as the characteristics of jobs, pay and migrants may differ across the country. Moreover, the characteristics of migrants in London may differ from those of migrants across the UK, which may constitute another limitation. Nevertheless, as the focus is on the National Minimum Wage, the variation

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<sup>7</sup> Wadsworth (2010b: R38) also suggests that recent migrants tend to live in areas where the proportions of earlier migrants are higher.

between the results of the study in London and conditions in other regions may be modest, as the National Minimum Wage applies nationally.

Choosing London as the base for the questionnaire collection created further opportunities to access respondents, although access to migrants is sometimes problematic. This study defines London-based migrant workers as those who work in London and who were born outside the UK or to non-British parents. This includes migrants who have already gained permanent residency or British citizenship. There are difficulties with this definition of 'migrant': for example, in the case of a person who moved to the UK at an early age and underwent all their education and socialisation here, the classification of that person as a 'migrant' might be problematic. However, the approach taken in this study specifically targeted migrants who had not been brought up in the UK. The definition of 'migrant workers' is also problematic: for example, complications arise with migrants who are only working temporarily in the UK, migrants who intend to work in the short term only, those whose legal status does not permit them to take any work or allows them only limited hours of work, and those whose work is not reported in official statistics (or who work in the 'underground' economy).

The sample was designed to be purposive, so as to present a distribution of migrants in terms of age, gender, country of birth and sector of employment. It is a limitation of this thesis that the samples do not fully represent the distribution of migrants in London (Table 3.2 presents statistics on migrant distribution in London); however, the target sample of 200 migrants did include a variety of migrants, according to its purposive design.

The judgmental nature of the sample was motivated by the difficulty in accessing migrant groups in low-paid occupations and the simultaneous need to ensure a balanced representation of such groups in terms of their gender, skills, the proportion of those working at the minimum wage (or below) vs. those working above the minimum wage, sectors of low-paid, low skilled employment and legal status. The main limitation of this type of a purposive survey strategy is that the sample produced is not representative of the target population. This is mainly caused by the inevitable subjectivity of the researcher and availability of the population group from which the sample is drawn (Black, 1999).

An important limitation of this study in terms of the variety of legal statuses is that student legal status may be over-represented in the sample. To some extent this is due to the fact that students were over-used as entry points when accessing the sample initially. My part-time job teaching at a private College greatly facilitated my access to students, gaining their trust and support with my research. They were working in lower-paid sectors, doing minimum wage jobs.

The element of convenience sampling at the beginning is acknowledged as a drawback of the overall sampling strategy. As a remedy, a control variable for the student legal status is included in the data analysis (see section 3.4 on method of analysis).

Given the above considerations, the sample can only be considered as indicative of the London migrant population in low-skilled, low- paid jobs.

Features	Selected Comparisons	
	1986	2006
<b>Foreign-born population<sup>1</sup></b>	1.17 million	2.23 million
<b>Migrant proportion in total population<sup>2</sup></b>	17.6%	30.5%
<b>Dominant countries of origin<sup>3</sup></b>	Six countries: Ireland, India, Kenya, Jamaica, Cyprus, Bangladesh	Previous six countries + Nigeria, Poland, Sri Lanka, Ghana, South Africa, Pakistan, Somalia, USA, Turkey
<b>Origins by region in 1998–2005<sup>4</sup></b>		
Western Europe	18%	
Central/Eastern Europe	14%	
Australia/New Zealand	9%	
North America	6%	
Caribbean	2%	
Central/South America	5%	
Middle East	4%	
South Asia	12%	
East Asia	10%	
Africa	19%	
<b>Sectors of Employment in 2005/6<sup>5</sup></b>	<b>Share of Employment</b>	
	<b>Recent Migrants</b>	<b>Previous Migrants</b>
Manufacturing	5%	25%
Construction	9%	21%
Transport and distribution	5%	31%

Hotels and catering	17%	42%
Financial services	7%	25%
Business services	6%	26%
Administration, education	3%	23%
Health	6%	33%
Other services	7%	22%
<b>Total</b>	<b>5%</b>	<b>24%</b>
<b>Age in 2002/3<sup>6</sup></b>		
<16	6.4%	
16-64	79.7%	
65+	13.9%	
<b>Gender in 2002/3<sup>7</sup></b>		
Female	52.4%	
Male	47.6%	
<b>Ethnicity in 2002/3<sup>8</sup></b>		
White British	11.3%	
Other white	28.5%	
Mixed group	1.5%	
Indian	12.7%	
Pakistani	3.2%	
Bangladeshi	5.0%	
Other Asian	6.3%	
Black Caribbean	6.2%	
Black African	13.5%	
Chinese	2.3%	
Other	9.0%	

Sources: 1–5: Gordon *et al.* (2007: 13, 24, 48), Tables 2.1, 3.3 and 5.1; 6–8: DMAG (2005: 137–163), Appendix G.

### **Table 3.2 Migrant Distribution in London**

A number of procedures were established in order to overcome to a degree the limitations of the purposive sampling:

- a) Gender (for the sample to be gender-balanced). This is to ensure a fair inclusion of both male and female respondents in the sample. It has important implications for the empirical analysis, i.e., to avoid the sample to be skewed towards any of the genders.

b) Skills (for the sample to have a significant proportion of less-skilled workers). This is also to ensure a fair inclusion of less-skilled workers in the sample. Dustmann *et al.* (2007) show that migrants tend to be ‘downgraded’: skilled workers are indeed undertaking less-skilled jobs. In reality it proved very difficult to find less-skilled or less-educated migrants, and the majority of migrants in the sample were highly educated, even though they worked in low-skilled, low-paid jobs);

c) Minimum-wage (or below) and above-minimum wage workers: at least 30% of the sample would be minimum-wage workers earning the October 2011 National Minimum Wage rate or below.

As the primary research sought to compare workers on the minimum wage or below and workers earning above the minimum wage, it was decided at the beginning that 50% of the samples must be minimum wage workers, but in reality (ultimately during the pilot testing), it proved very difficult to access low – wage workers, therefore it was subsequently decided (at the supervisory meeting after the pilot testing) to change the target to 30%, i.e., at least 30% of the sample must hold jobs at the minimum-wage rate or below – a more feasible target. The figure of 30% would allow adequate analysis of the two different groups, minimum-wage (or below) and above-minimum wage workers. A minimum-wage worker is defined as a worker who earned exactly the 2011 National Minimum Wage rate or less ( $\leq$  2011 National Minimum Wage); an above-minimum wage worker is defined as a worker who earned above the 2011 National Minimum Wage rate ( $>$  2011 National Minimum Wage).

d) Low-paid, low-skilled sectors

In order to reach the target sample of workers in low-paid, low-skilled jobs, the primary research focused on particular low-paying sectors. These included the retail/shop/supermarket, sales, domestic-work, cleaning, care (elderly care/childcare), construction, hotel, restaurant/bar and factory sectors. They are described by the Low Pay Commission as low-paying industries with a visible proportion of minimum-wage jobs (see Low Pay Commission 2010: Figure 3.2). Moreover, some of these sectors also have significant proportions of migrant workers (see Table 3.3). The sample size of 200 respondents was thus also designed to include a variety of sectors and wage levels (point c).

- e) Legal status: to have variety of migrant legal status in the sample. This has implication on determining which statuses require permission to work and which do not; and whether the permission to work determines the level of wage.

Rank	2002	2008
1	Mining of metal ores (39%)	Clothing, fur manufacture (28%)
2	Clothing, fur manufacture (19%)	Mining of metal ores (25%)
3	Hotels, restaurants (16%)	Hotels, restaurants (23%)
4	Computer, related activities (15%)	Recycling (22%)
5	Research, development (14%)	Private households with employees (21%)
6	Private households with employees (13%)	Food, beverage manufacture (21%)
7	Air transport (11%)	Computer, related activities (19%)
8	Oil, gas extraction etc. (10%)	Air transport (18%)
9	Other business activities (10%)	Other transport, travel (17%)
10	Health, social work (10%)	Research, development (15%)

Note: Sectors are based on the Standard Industrial Classification 92 ‘two-digit’ level.

Source: Migration Advisory Committee Secretariat (2010: 8), Table 3.

**Table 3.3 Top 10 Sectors with Shares of Non-UK Born Workers, 2002 and 2008**

Accessing migrant communities is often challenging and sometimes problematic.

Snowballing with multiple entry points was considered the most viable and ethically acceptable technique to access migrant communities. First, a diversity of contacts was used to secure access to the migrant communities. This combination of multiple entry points with the snowballing approach enabled access to a wide range of participants. Second, a tree or snowballing diagram was maintained to describe the way each interviewee was recruited. Appendix 3 presents the tree diagram in detail.

In order to implement multiple entry points, I established extended networks, including gatekeepers, unions, migrant-based organisations and migrant communities. It was noted that some sectors are certainly more segmented than others. It was also found that some sectors were easier to access than others.

The restaurant/bar and retail/shop/supermarket sectors were the sectors that offered the easiest access to migrant workers in this study. Access to these sectors came mainly from London Metropolitan University students, private college students, London Metropolitan

University colleagues, and my other colleagues. Students offered entry into the strongest networks in these sectors, as they provided access to their (migrant) co-workers. It is a limitation of this study that students were used particularly heavily as entry points to gain access respondents in these sectors. An implication of this is that there is a high proportion of migrant student in these sectors in the sample.

In the hotel sector, the entry points were similar to those for the sectors listed above, but access was also gained through church communities. The care sector was found to be more segmented than the sectors mentioned above. Access to care workers was mainly gained through church communities and migrant communities.

Domestic work (i.e. work in private houses) is another example of a highly segmented sector. In order to access migrant domestic workers, contact was established with a gatekeeper from an Indonesian domestic-worker community. I became involved in their meetings and activities, and through this interaction I was able to speak with some workers. Other contacts with domestic workers were gained through church communities. Domestic workers were also accessed through some ethnic events: for example, at one event organised by the Indonesian Embassy.

In order to access cleaning workers, multiple entry points were also established. The first entry point was with the union Unite. I became involved in some Unite meetings with cleaner representatives at Canary Wharf. From the meetings with cleaner representatives, I was able to gain access to both night shift and day shift cleaners in the Canary Wharf buildings. The second entry point was through London Metropolitan University's cleaners: I managed to meet the duty/day supervisor, and was able to speak with some cleaners. The third entry point was through cleaners at the Indonesian Embassy. Other access points to cleaners came through colleagues living in halls of residence: I managed to speak with cleaners at several halls of residence. There were also council cleaners I met in the street or park.

The sectors in which it was most difficult to access migrant workers during this study were the construction and factory sectors. In these cases, extended networks and entry points had to be used. In the construction sector, the extended networks included the Latin American Workers' Association, which connected me with some construction workers.



Through a colleague I was introduced to the owner of a small construction business, who contributed substantial ‘insight’ findings to the study. Other entry points included students who work side-by-side with construction workers. Another entry point was the site of a construction project near where I live.

The factory sector presented similar difficulties in terms of access to migrant workers. A substantial entry point was through students who worked side-by-side with factory workers, or who had colleagues who worked in factories. From there I implemented snowballing to reach a number of factory workers.

Despite the range of the sector distribution, there were also difficulties in reaching a balance between less-skilled and skilled workers. It was extremely difficult to find low-skilled migrants. The majority of migrants who work in low-skilled, low-paid jobs are actually skilled migrants, at least according to their educational level. Although the definition of ‘skill’ is not homogenous, it was extremely difficult to find respondents with below-secondary levels of education, or respondents who lacked proficiency in English or prior work experience. The sample successfully included workers with low levels of education in the domestic-work and cleaning sectors, but the numbers were very few. In some cases, even though they had low levels of education or English proficiency, the workers did have previous work experience.

The questionnaire was written in English, and the majority of the interviews were conducted in English; a small number of interviews were conducted in Indonesian. Almost all of the respondents could speak very basic English. I was able to get interpreters for only two interviews, both in Arabic, for which I had help from the gatekeeper and from another respondent who could speak Arabic.

In an attempt to include a diversity of migrants’ legal statuses, the research aimed to include a proportion of undocumented workers. Accessing undocumented workers is often problematic. The majority of the undocumented workers in the sample worked in the ‘underground’ economy, although a small number of them did work in a declared business. A different approach had to be implemented to access undocumented workers. The majority of the undocumented respondents were not willing to speak directly to me without being accompanied (or introduced) by either the gatekeeper or a trusted co-worker. The

entry points were therefore through gatekeepers and by using the snowballing approach with other respondents (whom I carefully and cautiously asked whether any of their co-workers were undocumented).

Overall, the primary research, which quantitatively analyses responses from 200 migrant workers is considered adequate to answer the second research question on how the minimum wage differently affects migrant workers.

The next section presents the quantitative techniques used to analyse the data. The respondent profile, including the exact figures for the variables in the sample, is discussed in Chapter 5.

### **3.3. Secondary Research: Method of Analysis**

As discussed above, the secondary research is devoted to the first research question, on the effects of the minimum wage on working hours, working arrangements, and particularly non-wage benefits. The secondary data consists of eight datasets from three major labour surveys in the UK: the Annual Survey of Hours and Earnings (ASHE), the Workplace Employee Relations Survey (WERS) and the Labour Force Survey (LFS). The methodology used to analyse the data is positivist and quantitative.

This section will discuss the method used to analyse the secondary data. Just one specific method was used: difference-in-difference (DID). This is one of the econometric techniques used to measure the changes or impacts due to a particular treatment during different periods of time. This model is widely used to detect the effects of policy changes (Meyer, 1995). The effect of changes in the minimum wage, in the US and UK for instance, has been extensively analysed using DID.

Card and Krueger (1994) use DID to examine the impact of the New Jersey minimum-wage increase in 1992 on employment in the fast-food industry. In their book *Myth and Measurement: The New Economics of the Minimum Wage*, Card and Krueger (1995) discuss in depth the DID method used in their studies. Their discussion covers the implementation of DID in minimum-wage studies, how to define the treatment group and the control group as required by DID, how to measure the effects, and how to interpret the outcome of DID.

Stewart (2003, 2004) also applies DID to investigate the effects on employment of the introduction of the UK's National Minimum Wage in April 1999 and its subsequent increases in 2000 and 2001. Following the work of Stewart, many other studies have been conducted using similar DID methods. Dickens and Draca (2005) examine the impact of the 2003 National Minimum Wage increase on employment; Arulampalam *et al.* (2004) and Dickerson (2007) use DID to examine the impact of the UK National Minimum Wage on training provision.

This research similarly follows the DID method of Card and Krueger (1994, 1995), with small modifications to accommodate the research questions. The modifications were made to the definitions of the treatment and control groups, and to the definitions of the outcome variables (i.e. what the minimum wage affects). Nevertheless, DID was generally applied for the computation of standard errors.

In order to establish the DID estimation, two groups have to be defined: the treatment group and the control group. The treatment group (or affected group) is the group that is affected by the treatment or policy change. The control group (or non-affected group) is the group that is not affected by the treatment or policy change. In this thesis the treatment group is defined as the group of workers with earnings at or below the relevant National Minimum Wage, and the control group as the group of workers who earn above the relevant National Minimum Wage.

To put it simply, DID involves exactly what its name would suggest: difference-in-difference. DID can be explained as follows. Suppose Group 1 is the minimum-wage group (the treatment group), and the others (Group 0) are classified as the above-minimum wage group (the control group). To analyse how the minimum wage affects the specific outcome ( $Y$ ), the DID model is:

$$Y_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

Where  $T_t$  is the time dummy (1 for period A, 0 for period B),  $G_i$  is the group dummy (1 for the treatment group, 0 for the control group),  $T_t * G_i$  is the interaction between the time dummy and the group dummy, and  $Y_{t,i}$  is the average outcome in group  $i$  and in time  $t$ .

$\hat{a}_0$  is the constant term,  $\hat{a}_1$  is the treatment group specific effect (to account for the average permanent differences between treatment and control groups),  $\hat{a}_2$  is the time trend of control and treatment groups.

The regression approach is used as it is important to calculate the standard errors so it can be confidently concluded whether the difference-in-difference estimates are statistically different from zero. Nevertheless, the limitations of this approach must be acknowledged. The regression analysis does not include control variables using stratification of age, gender, region, occupation and industry. It is the limitation of the thesis that the regression treats all observations as if they have similar characteristics while in reality there should have been such stratification given that the ASHE and LFS do contain information on gender, age, region, occupation and industry.

The DID estimator, which demonstrates whether there is any effect on outcome (which is what this study is looking for), is shown by coefficient  $\hat{a}_3$ . That is, coefficient  $\hat{a}_3$  will show whether the impact of the minimum wage on non-wage benefits exists, and if so how large that effect is. The DID estimator (coefficient  $\hat{a}_3$ ) estimates the difference between the change in outcome for the treatment group and the change in outcome for the control group. The DID estimator can be calculated as the difference of group means:

$$(\mu_{11} - \mu_{01}) - (\mu_{10} - \mu_{00})$$

Where the first term is the change in outcome for the treatment group and the second term is the change in outcome for the control group (Manning, 2008). This can be used to further test the consistency of the DID OLS (*ordinary least squares*) model.

There are three assumptions of the DID estimator (Albouy, 2008: 2):

1. The model in the equation (the outcome) is correctly identified.
2. The error term is on average zero; Albouy (2008) added that it is not a hard assumption given the constant term  $\hat{a}$  put in.
3. The error term is uncorrelated with the other variables in the equation. Albouy (2008) noted that this is the most critical assumption, which is

known as the parallel trends assumption. Manning (2008: 3) also added that the validity of DID estimator is based on the assumption that the underlying ‘trends’ in the outcome variable are the same for both the treatment and the control group. Manning (2008) also clarifies that this assumption is not testable using only two observations, but it is plausible when there are more than two observations.

The limitation of the DID estimation in this thesis is that it may fail the assumption of the parallel trend, although it should be noted that the failure of the parallel trend assumption is the most common problem in estimating DID. It is often difficult and sometimes impossible to check this assumption as it is usually made of unobservable quantities (Albouy, 2008). One way to avoid this problem according to Albouy (2008: 4) is to get more data on other time periods before and after treatment. The ASHE and LFS datasets shown in this study provide two different time periods (long term and short term) to see if any different trend exists. However, it is the limitation of this study that no other control group exists which could provide additional underlying trend to satisfy the parallel trends assumption.

This study also acknowledges as a limitation the fact that the estimation method does not account for the possible spill-over effects. Spill-over effects might occur if an increase of the minimum wage in one sector affects also other sectors, which are not minimum wage. There is more evidence from the US market which suggests the existence of spill-over effects (see Katz and Krueger, 1992; Manning, 2003; Neumark et al., 2004), however, Stewart (2009: 5) points out that no such evidence has been found in the UK literature.

The DID estimation method may not be vigorous as it does not control for gender, age, region, occupation, or industry. Given the complex nature of the datasets, time constraints, access limitations and the difficulties in identifying persuasive and valid instruments, the DID model in this thesis consists only of the basic equation approach with no further stratification or control variables. It is thus the limitation of the thesis that the model presented is not constructed as the most robust approach which may trigger econometric problems in estimating the impact of the minimum wage.

The research used Stata statistical software to run the DID estimation, alongside SPSS and Microsoft Excel to sort the data. As stated in Section 3.1, this study uses four datasets as the secondary data. The subsections below explain the outcome variables that the study expected to find, i.e. the (minimum wage's) impact on working hours, non-wage benefits, and working arrangements. The next section also explains how the DID was translated into equations in order to meet these study expectations.

### 3.3.1. Annual Survey of Hours and Earnings (ASHE)

The ASHE datasets are:

Dataset 1: ASHE 2009 and 2010

Dataset 2: ASHE 1997 and 2010

Table 3.4 describes the outcome variables – that is, the impacts of the minimum wage that this study hoped to find – for ASHE.

<b>Outcome Variable</b>	<b>Description</b>	<b>Data set</b>
<i>Hourlywage</i> (£)	Wage per hour	1, 2
<i>Bpay</i> (£)	Basic weekly earnings	1, 2
<i>Bhr</i> (hrs)	Basic weekly paid hours worked	1, 2
<i>Ipayin</i> (£)	Incentive pay	1
<i>Spay</i> (£)	Additional premium payments for shift work and night or weekend work not treated as overtime	1
<i>Anipay</i> (£)	Portion of gross annual earnings that comes from incentive payments	1
<i>Ownpay</i> (£)	The amount of the employee's contributions to pension	1
<i>Compay</i> (£)	The amount of the employer's contributions to pension	1
<i>Ownperc</i> (%)	The percentage of the employee's contributions to pension	1
<i>Comperc</i> (%)	The percentage of the employer's contributions to pension	1
<i>Ovhrs</i> (hrs)	Average weekly paid overtime hours worked	1
<i>Ovpay</i> (£)	Average weekly overtime pay	1
<i>Othpay</i> (£)	Pay received for other reasons	1

**Table 3.4 ASHE Outcome Variables**

What is expected from the ASHE data is to find how the increase in the minimum wage in relevant years affects each outcome in Table 3.4.

The DID translates this expectation into an equation:

$$Outcome_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

where  $T_t$  is the time dummy (1 for period A, 0 for period B),  $G_i$  is the group dummy (1 for the treatment group, 0 for the control group),  $T_t * G_i$  is the interaction between the time dummy and the group dummy, and  $Outcome_{t,i}$  is the expected outcome of the minimum wage at time  $t$  for group  $i$ .

$\hat{\alpha}_0$  is the constant term,  $\hat{\alpha}_1$  is the treatment group specific effect (to account for the average permanent differences between treatment and control groups),  $\hat{\alpha}_2$  is the time trend of control and treatment groups, and  $\hat{\alpha}_3$  is the DID estimator.

For the *Bhr* outcome in Dataset 1, the DID estimation ( $\hat{\alpha}_3$ ) should be read as:

What is the minimum wage's effect on *basic hourly wages* for the period 2009 to 2010?

Overall, the DID estimation should be read as follows, unless otherwise specified:

What is the minimum wage's effect on [*outcome*] for the period [*year a*] to [*year b*]?

Appendix 4 shows in more detail how the secondary data were sorted and formulated.

### 3.3.2. Workplace Employee Relations Survey (WERS)

The WERS dataset is:

Dataset 3: WERS Cross-Section of Employees, 1998 and 2004

Table 3.5 describes the outcome variables that were expected to be found from WERS.

<b>Outcome Variable</b>	<b>Description</b>
<i>Hourlywage</i> (£)	Wage per hour
<i>Hoursperweek</i> (hrs)	Total hours of work per week including overtime
<i>Overtimehrs</i> (hrs)	Overtime hours per week
<i>Basichrs</i> (hrs)	Basic hours per week excluding overtime
<i>Flexitime</i>	If flexible working hours are available
<i>Jobshare</i>	If job sharing (sharing a full-time job with someone else) is available
<i>Parental</i>	If parental leave is available
<i>Workhome</i>	If working at or from home in normal working hours is available
<i>Nursery</i>	If a workplace nursery or help with the cost of childcare is available

**Table 3.5 WERS Outcome Variables**

### **3.3.3. Labour Force Survey (LFS)**

The LFS dataset is:

Dataset 4: LFS Q1 2000 and Q1 2011

Table 3.6 describes the outcome variables that are estimated from the LFS.



<b>Outcome Variable</b>	<b>Description</b>
<i>Cameyr</i> (year)	Number of years since first arrived in the UK
<i>Conmpy</i> (year)	Number of years in current job
<i>Bushr</i> (hour)	Total usual hours of work excluding overtime
<i>Ed13wk</i>	If respondent has been in job-related training or education in the last three months
<i>Netwk</i> (£)	Net weekly pay in main job
<i>Hourlypaid</i> (£)	Hourly wage
<i>Ernfilt</i>	If last pay contained any additions to basic pay
<i>Bonuses</i>	If receive bonuses
<i>Profitrelated</i>	If receive profit-related pay
<i>Londonallw</i>	If receive London or other regional allowance pay
<i>Standby</i>	If receive stand-by or on-call allowance pay
<i>Shiftallw</i>	If receive shift allowance pay
<i>Jobtrn</i>	If respondent receives on-the-job training
<i>Tfee</i>	If employer pays the training fee
<i>Trnlen</i>	If respondent receives (only) less than a week of training

**Table 3.6 LFS Outcome Variables**

To conclude this section, the DID method of analysis is used to investigate the secondary data in relation to the first research question, on the impact of the minimum wage on working hours, working arrangements, and particularly non-wage benefits. The thesis also compares the results of the secondary research with those of the primary research, in order to establish whether the secondary research suggests similar findings to the primary research.

### **3.4. Primary Research: Method of Analysis**

As discussed above, the secondary data alone is not sufficient to completely address all of the research questions: the realities for migrant workers in low-paid, low-skilled jobs and information on their non-wage benefits are rarely captured in public surveys or statistics. Primary research was therefore conducted, using survey questionnaires as a quantitative method. The aim of the primary research was to investigate the second research question, on how the minimum wage differently affects migrants. Hence the questionnaire was designed to address minimum-wage issues in relation to migration.

The second research question falls into three parts:

*a) What factors might explain why some migrants earn the minimum wage or below, while others earn above the minimum?*

In order to address this issue, variables of human capital were set which might explain migrants' likelihood of earning the minimum wage or below. The variables include language proficiency, educational level and length of stay in the UK. The main technique used to understand the factors affecting migrants' earning the minimum wage or below is logistic regression.

Theoretically, logistic regression analysis was developed to address the limitations of the ordinary least squares (OLS) regression in which the OLS was subsequently found to be inappropriate to handle dichotomous outcomes due to their strict statistical assumptions, i.e. linearity, normality and continuity (Peng *et al.*, 2002: 3). Logistic regression is generally suited for testing a relationship of a categorical dependent variable and one or more categorical or continuous independent variables. The logistic model predicts the logit of  $Y$  (the dependent or outcome variable) from  $X$  (the independent variable). The logit is the natural logarithm ( $\ln$ ) of the ratio of the probability of  $Y$  happening (i.e. a respondent earns the minimum wage or below) to the probability of  $Y$  not happening (i.e. a respondent earns above the minimum wage) (Peng *et al.*, 2002: 4). The mathematical formula of the simple logistic regression model is:

$\ln(p/1-p) = \alpha + \beta X$ , where  $p$  is the probability of the outcome (such as a respondent earns the minimum wage or below),  $\alpha$  is the intercept, and  $\beta$  is the regression coefficient.

Regression analysis is used mainly because regression reveals the causal relationship between the variables. The primary data in this study is cross-sectional; hence, no time series method is used. The regression equation in this particular investigation was formed on the basis of Chiswick's studies of human capital and migrant performance. Chiswick (1978) suggests that post-migration experiences, including migrants' ability to acquire the host country's language and customs and their investment in post-school training, offer a higher rate of return for migrants. Chiswick and Miller (1998) point out the importance of the acquisition of the host country's language, which relates to the economic benefit of an increase in earnings. Early studies by Becker (1964) and Mincer (1974), which lay the

foundations of the study of human capital in relation to earnings, also inform the regression equation.

It has been suggested that some demographic factors may affect migrants' likelihood of earning the minimum wage or below. These include age and gender. Factors other than human capital and demographics might also explain why some migrants earn the minimum wage or below. Therefore variables such as hours of work, union membership, legal status and employer's ethnicity are also included in the regression equation. As students represent one-third of the sample, a control variable for student legal status is added.

In this logistic regression, there are multiple independent variables with one dependent variable. Table 3.7 describes the variables included in the multiple logistic regression. The multiple logistic regression estimates which factors affect migrants' likelihood of earning the minimum wage or below. It first uses a stepwise method to regress ten independent variables, as the number of independent variables included is limited by the valid samples. It then uses only significant variables identified in the stepwise, add the next three variables and run another logistic regression.

The regression equation is as follows:

$$\begin{aligned} \ln(p/1-p) = & a + b1 \text{ Age} + b2 \text{ Gender} + b3 \text{ Length of stay} + b4 \text{ English language} \\ & + b5 \text{ Educational level} + b6 \text{ Hours of work} + b7 \text{ Same ethnicity employer} \\ & + b8 \text{ Local ethnicity employer} + b9 \text{ Union membership} + b10 \text{ Work permit needed} \\ & + b11 \text{ Work Experiences} + b12 \text{ Training} + b13 \text{ Student} \end{aligned}$$

Dependent variable = Minimum Wage

The following variables: Work Experiences, Training, and Student will be added at a later stage.

It is acknowledged that the above model may be subject to endogeneity problems: endogeneity of explanatory variables is due to their joint determination with the outcome (Meyer, 1995: 152). In this case in particular, the outcome measured by the model is not a random outcome but fixed by the construction of the sampling. For instance, hours of work

might be a function of the minimum wage. Similarly, union membership might also depend on whether the worker is receiving the minimum wage or above the minimum wage. Thus test of endogeneity is performed on endogenous variables: hours of work and union membership. Test of endogeneity or simultaneity is simply a test to see if an endogeneous independent variable is correlated with the error term (Gujarati and Porter, 2009). See section 5.1.1 for test of endogeneity (Hausman Specification test).

<b>Variable</b>	<b>Description</b>	<b>Sample Mean Values (a)</b>	<b>Expected sign</b>
Minimum wage	A dummy variable = 1 if respondent earns the National Minimum Wage or below, = 0 if respondent earns above the National Minimum Wage		
Age*	A continuous variable (years)	32.320 (10.025)	-
Gender	A dummy variable = 1 if male, 0 = if female	1.425	+
Length of stay	A continuous variable (years)	5.826 (6.922)	—
English language	A dummy variable = 1 if the spoken English has improved (from none to minimal, minimal to proficient, or proficient to fluent), = 0 otherwise	1.203	-
Educational level	A dummy variable = 1 if education is above secondary level, = 0 if education is secondary level or below	0.700	-
Hours of work	A continuous variable (hours of work per week)	33.086 (16.829)	+
Same ethnicity employer	A dummy variable = 1 if employer is of the same (migrant) ethnic origin as the worker, = 0 otherwise	0.144	?
Local ethnicity employer	A dummy variable = 1 if employer is of local (British/native) ethnic origin, = 0 otherwise	0.585	?
Union membership	A dummy variable = 1 if the worker is a member of a trade union, = 0 otherwise	1.830	-

Work permit needed	A dummy variable = 1 if the worker needs a permit to work, = 0 otherwise	0.635	-
Work Experience	A dummy variable = 1 if the worker has work experience at home country or abroad, = 0 otherwise	0.680	-
Training	A dummy variable = 1 if the worker receives training from employer, = 0 otherwise	0.710	-
Student	A dummy variable = 1 if the worker has a student legal status, = 0 otherwise	0.300	?

\*Respondents' age is considered when deciding which minimum wage rate is received.

Notes: (a) The numbers in parentheses are standard deviations and these are reported for the continuous variables only.

### **Table 3.7 Primary Data Variable Descriptions**

#### *b) Does the minimum wage affect the non-wage benefits of migrant workers?*

This part of the second research question (question 2b) is particularly important, as it will constitute the study's original contribution to the literature by examining whether the receipt of minimum wage affects migrants' likelihood of receiving non-wage benefits.

Logistic regression is used, with the main focus on minimum wage as independent variable and particular non-wage benefit as the dependent variable. Logistic regression is chosen because the dependent variable is a dichotomous variable with only two categories.

Regression analysis is used to determine the causal relationship between variables.

The regression is formed on the basis of the hypothesis that the minimum wage affects migrants' likelihood of receiving non-wage benefits. Previous studies by Wessels (1980), Leighton and Mincer (1981), Hashimoto (1982), Royalty (2000) and Simon and Kaestner (2004) on the minimum wage's effect on non-wage benefits drive the formation of the regression. The technique of logistic regression may differ from the techniques used in these previous studies. One reason for this is that the types of data analysed are dissimilar. The primary data used in this study is cross-sectional, and so only techniques that fit this type of data can be used. For example, cross-sectional data cannot be used to analyse the minimum wage's effect across different periods of time; it can only be used to analyse the minimum wage's effect at a particular point in time.

As this study is interested in testing the minimum wage's effect on each non-wage benefit, a logistic regression equation has been specified for each of the non-wage benefits where the dependent variables are dummies (i.e. equal to 1 if a certain non-wage benefit is received, and to 0 otherwise). The model also includes control variables such as age, gender, and minimum wage sector (equal to 1 if respondent is in minimum wage sector/industry, and to 0 otherwise). Minimum wage sectors include restaurant/bar, retail/shop/supermarket, domestic work, cleaning, care, construction, hotel, factory work, and sales. Non-minimum wage sectors include teaching, administration, and other sectors not mentioned above. A control variable for student legal status is also included as students represent a third of the sample. The limitation of the logistic regressions is acknowledged that they might contain endogeneity as the non-wage benefits and minimum wage might be jointly determined. Hausman Specification test for endogeneity is performed (see Section 5.2 for the test results).

The dependent variables for Training, Meals, Accommodation/Housing, Holiday Pay, Paid Sick Leave, Health/Life Insurance, Pension Scheme, Bonuses from Work (as an approximation for Incentive Pay) are selected in view of the most significant non-wage benefits received by the respondents in the sample as well as the ones recorded in the secondary data sets utilised in Chapter 4.

Dependent variable = Training (1 = if on-the-job training is received, 0 = otherwise)

$$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$$

Dependent variable = Meals (1 = if meals at work are received, 0 = otherwise)

$$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$$

Dependent variable = Accommodation/Housing (1 = if accommodation/ housing from work is received, 0 = otherwise)

$$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$$

Dependent variable = Holiday Pay (1 = if holiday pay from work is received, 0 = otherwise)

$$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$$

Dependent variable = Paid Sick Leave (1 = if paid sick leave from work is received, 0 = otherwise)

$$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$$

Dependent variable = Health/Life Insurance from Work (1 = if health/life insurance from work is received, 0 = otherwise)

$$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$$

Dependent variable = Pension Scheme (1 = if pension scheme from work is offered, 0 = otherwise)

$$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$$

Dependent variable = Bonuses from Work (1 = if bonuses from work are received, 0 = otherwise)

$$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$$

The above regression should be read as:

Whether [*the minimum wage, age, gender, work in minimum wage sector and student status*] affect the likelihood of receiving [*particular non-wage benefits*].

This research is also interested in variations in the non-wage benefits received across sectors, including whether there is an association between non-wage benefits and the

specific sectors where migrants tend to work. Pearson's chi-square coefficient is used to examine the association (correlation) between non-wage benefits and sectors.

Although the methodology is mainly quantitative, the questionnaire includes a number of open-ended questions which offer room for qualitative analysis, such as:

Is there any benefit that you have received but which you no longer receive, or receive in a reduced or less frequent way? If yes, please explain.

If yes [to the question above], do you know the reason why your employer does not provide it any more, or has reduced its value or frequency?

Respondents are also free to present their concerns or arguments, in which cases I noted those arguments as part of the qualitative analysis.

Again, the importance of the results generated in response to question 2b must be stressed, as these are expected to generate the study's original research contribution on how the minimum wage affects the non-wage benefits of migrant workers.

*c) Do migrants in the low-skilled, low-paid sectors experience downgrading, and how is this linked to the duality of the labour market?*

The primary data is expected to produce evidence about whether the downgrading phenomenon suggested by Dustmann *et al.* (2007) exists. The data analysis also seeks evidence on any link between the minimum wage and labour market segmentation.

Furthermore, it seeks evidence on the adverse effects of the minimum wage, in light of the suggestion that the minimum wage further drives the creation of secondary jobs, following Wessels (1980) on temporary and flexibilised work.

This research is also interested in finding particular evidence on undocumented workers, following the work of McKay *et al.* (2011). It seeks evidence on the link between the minimum wage and migration status, as well as on the link between the minimum wage and the non-wage benefits of undocumented migrants.



To summarise, this study implements relevant statistical (quantitative) techniques to analyse the primary data. To address research question 2a, logistic regression is used to examine which factors affect migrants' likelihood of earning the minimum wage or below. To address research question 2b, logistic regression, Pearson's chi-square coefficient and the qualitative analysis of a number of interviews responses are used. Logistic regression is used to examine whether migrants' minimum wage affects their likelihood of receiving non-wage benefits. Pearson's chi-square coefficient is used to understand the association between non-wage benefits and particular low-paid sectors. Qualitative analysis is used to investigate migrants' experiences in low-paid, low-skilled jobs, and particularly the non-wage benefits they receive. To address research question 2c, descriptive statistics and a number of qualitative interviews are used in an attempt to link the minimum wage, labour market segmentation and the phenomenon of downgrading. I used SPSS statistics software to run the logistic regression and Pearson's chi-square coefficient, and to produce the descriptive statistics. I used Microsoft Excel for data tabulation, data labelling and data sorting.

### **3.5. Conclusion**

This thesis uses positivist-quantitative methods to answer its research questions. The methodology mainly draws on statistics and econometric elaborations to explain social phenomena. Each research question has its own method of research and analysis.

The first research question, on the minimum wage's impact on non-wage benefits, working hours and working arrangements, is addressed using secondary research from three major public surveys in the UK: ASHE, WERS and the LFS. This thesis thus follows previous minimum-wage studies that utilise public surveys as part of their quantitative methodology, in particular Leighton and Mincer (1981), Hashimoto (1982), Lazear and Miller (1981), Simon and Kaestner (2004), Dustmann *et al.* (2007), Dickerson (2007) and Dickens *et al.* (2009). The method used to analyse the secondary data is DID, an econometric technique to analyse the effects of policy changes on affected and unaffected groups at two different times. DID is widely used in studies on the impact of the minimum wage, such as in the work of Card and Krueger (1994), Stewart (2003, 2004), Arulampalam *et al.* (2004) and Dickerson (2007).

The answer to the first research question is expected to make a contribution to the minimum-wage literature by testing the minimum wage's impact on a wide range of non-wage benefits, and by testing whether the minimum wage has any impact on the non-wage benefits of migrant workers. It is also expected to present evidence on the minimum wage's adverse effects on non-wage benefits, working hours and working arrangements, following the work of Wessels (1980). Wessels points out that the minimum wage creates changes in the work environment, including the ability to lay off workers more readily when demand for output falls, which results in job instability (Wessels, 1980: 6). Evidence about the temporary and flexibilised nature of work is also anticipated, which will help to establish whether the minimum wage can be linked to the creation of secondary jobs.

The second research question investigates how the minimum wage differently affects migrant workers. The primary research is designed to answer this research question. This research involved a face-to-face survey using questionnaires as a quantitative method. The target sample is 200 London-based migrant workers who work in low-paid, low-skilled sectors, such as the retail/shop/supermarket, sales, domestic-work, cleaning, care (elderly care/childcare), construction, hotel, restaurant/bar and factory sectors. This primary research follows previous minimum-wage studies by Card and Krueger (1994) and Allison *et al.* (2009), which utilise surveys as their method of primary research. It also follows previous migration studies by Markova and Black (2007) and McKay *et al.* (2011) on the design of surveys (questionnaires) for primary research purposes.

There are three subquestions on the minimum wage's effects on migration. The first seeks to investigate the factors that affect migrants' likelihood of earning the minimum wage or below. To address this question, logistic regression is used to explain why some migrants earn the minimum wage or below while others earn above the minimum wage. The design of the regression follows previous work by Chiswick (1978) and Chiswick and Miller (1998) on the link between human capital and migrant performance. This part of the study will reveal whether human capital can explain why migrants earn the minimum wage or below. To some extent it will also reveal why the phenomenon of downgrading exists.

The second subquestion seeks to investigate the minimum wage's effect on migrants' likelihood of receiving non-wage benefits. This part of the study is particularly important, as the evidence will constitute the original contribution of the thesis. Logistic regression is

used to test each of the non-wage benefits as a dependent variable, with the minimum wage as the independent variable. The primary research also provides data from a number of qualitative interview responses (to the open-ended questions in the questionnaire), which will help to establish whether there is any relationship between the minimum wage and the non-wage benefits of migrant workers.

The third subquestion concerns the extent to which the minimum wage affects migrant workers in secondary-segment jobs. It is expected that the primary data will reveal whether the phenomenon of downgrading exists, following the work of Dustmann *et al.* (2007). It is also expected to reveal any link between the minimum wage and the duality of the labour market. This part of the study uses descriptive statistics, Pearson's chi-square coefficient and the qualitative analysis of a number of qualitative interview questions to examine the downgrading phenomenon and the duality of the labour market.

The third research question will be addressed in the final chapter of the thesis, which will present the implication of the findings for National Minimum Wage policy. It will offer evidence-based recommendations to improve the policy.

To conclude this chapter, positivist-quantitative methodology is deemed to be adequate to enable the thesis to answer the research questions and make an original contribution by filling the gap in the minimum-wage literature. Only a few studies have been done in the UK to investigate the minimum wage's impact on non-wage benefits. Very few studies have been done to examine the minimum wage's impact on migration. Thanks to its positivist-quantitative methodology, this study might be the first of its kind to examine the minimum wage's impact on the non-wage benefits of migrants in the UK.

The next two chapters discuss the results of the secondary and primary research, starting with the secondary research analysis in Chapter 4, followed by the primary research analysis in Chapter 5.

## Chapter 4

### Secondary Research Analysis

Employers may react to a minimum wage by reducing expenditures on fringe benefits, on training workers, and on providing pleasant working conditions. They may make workers work harder and make them come to work during hours of greater convenience for employers than for the workers themselves. They may also lay off workers more readily when business conditions worsen.

(Wessels, 1980: 2)

Wessels' (1980) sharp argument above more or less sets out this thesis' expectations of its secondary research findings. The secondary research presented in this chapter seeks to investigate the first research question, on whether the minimum wage has an impact on working hours, working arrangements and particularly non-wage benefits. As discussed in the previous chapter, this thesis' methodology is positivist and quantitative, and it uses three public surveys in the UK as secondary data: the Annual Survey of Hours and Earnings (ASHE), the Workplace Employee Relations Survey (WERS) and the Labour Force Survey (LFS). This study follows previous studies on the minimum wage that also use ASHE, WERS and the LFS as datasets.<sup>1</sup> In total, the secondary data uses eight datasets from the three main surveys.

The method of analysing the secondary data is Difference-in-Difference (DID), an econometric technique to detect the effect of policy changes (Meyer, 1995). This follows earlier studies on the minimum wage which use DID as the method of analysis.<sup>2</sup> The DID technique used in this research is similar to that presented in Card and Krueger (1995).

The secondary research addresses several hypotheses to be tested in the analysis. The first is that the minimum wage has negative effects on non-wage benefits, following the work

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<sup>1</sup> See Low Pay Commission (2011), Dustman *et al.* (2007), Dickens *et al.* (2009), Draca *et al.* (2008) and Forth and Millward (2001).

<sup>2</sup> See Card and Krueger (1994, 1995), Stewart (2003, 2004), Dickens and Draca (2005), Arulampalam *et al.* (2004) and Dickerson (2007).

of Wessels (1980), Leighton and Mincer (1981) and Hashimoto (1982). However, the findings show modest evidence that the minimum wage has adverse impacts on non-wage benefits. This confirms several studies in the UK which also show that the minimum wage has no effect on non-wage benefits: Dickerson (2007) finds no impact on training; Allison *et al.* (2009) find almost no effect on non-wage benefits. This study tests the minimum wage's effect on a wide range of non-wage benefits, but only a few of the results appear to be significant.

Second is the hypothesis that the minimum wage has negative effects on working hours, following the work of Wessels (1980), Stewart and Swaffield (2004) and Dickens *et al.* (2009). The evidence in this thesis shows that the minimum wage negatively affects working hours particularly on the overtime hours while the evidence for basic hours is mixed across different datasets.

Third is the hypothesis that the minimum wage has a negative impact on working arrangements. Wessels (1980) argues that the minimum wage reduces workers' utility and pushes them to work harder and with extra effort. Wessels (1980) also argues that the minimum wage is linked to a decline in job stability, because employers may lay off workers according to demand. The findings of this thesis show little evidence that the minimum wage adversely affects working arrangements. There is, however, some evidence of the minimum wage's impact on migrant workers that may link the minimum wage to temporary and flexibilised jobs.

Through the secondary research, this thesis aims to make an original contribution that addresses a gap in the literature. There is a paucity of UK literature that addresses the minimum wage's effects on various non-wage benefits. The thesis therefore aims to make an original contribution by testing the minimum wage's impact on the non-wage benefits of migrant workers: the findings show little evidence that the minimum wage adversely affects the non-wage benefits of migrants. The thesis also seeks to make an original contribution by testing a wide range of non-wage benefits that appear not to have been tested before: these findings show modest evidence that the minimum wage has a negative impact on non-wage benefits. Minimum wage has adverse effect only on additional pay, while on other non-wage benefits; it actually shows positive effects.

This chapter starts by presenting the results of the DID estimations. The analysis of the results is presented in Section 4.2. The analysis will discuss the evidence in relation to the research questions, whether the evidence supports or disproves the hypotheses, and how the analysis can be taken further.

#### 4.1. Secondary Research Findings: DID Results

In order to analyse the secondary data, this thesis implements the DID technique. The function of DID is to explain the impact of policy changes, including changes in the minimum wage (the increase in the minimum wage over time). DID works by comparing two different groups (the treatment group and the control group) at two different times. In order to detect the effect of the minimum wage, DID requires the formation of a treatment group and a control group. The treatment group is defined as the group of workers who earn the National Minimum Wage or below; the control group is therefore the group of workers who earn above the National Minimum Wage. The DID estimation is then formed to detect any outcome (effect) of the minimum wage. The general DID estimation is as follows:

$$Outcome_{t,i} = \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i} \text{ (Equation 4)}$$

where  $T_t$  is a time dummy (1 for period A, 0 for period B),  $G_i$  is a group dummy (1 for the treatment group, 0 for the control group),  $T_t * G_i$  is the interaction between the time dummy and the group dummy, and  $Outcome_{t,i}$  is the expected outcome of the minimum wage at time  $t$  for group  $i$ .

The DID estimation ( $\hat{a}_3$ ) should be read as:

What is the impact of the minimum wage on [*outcome*] from [*year A*] to [*year B*]?

A central assumption of the DID model relates to parallel trends in the treatment and the control group. An important concern here is that the treatment group has potentially been affected by the influx of migrant workers in the last decade – an event that challenges the validity of the assumption for the current application.

It should be noted here that endogeneity issues naturally emerge between the minimum wage and variables such as hourly wages, overtime pay and working hours.

The ASHE and LFS analysis presents a comparison over a shorter and longer time period. The shorter period is taken as difference within one year, simply to generate an immediate effect (year  $t+1$ ) of the rise in the minimum wage. It is not unusual in minimum-wage studies to generate the minimum wage's effect over a very short time period. Card and Krueger (1994), for instance, investigate the effect of the 1992 New Jersey minimum wage (introduced in April 1992) by detecting the effects two or three months before the change (February – March 1992) and comparing them to seven or eight months after the change (November – December 1992). Allison *et al.* (2009) examine the effect of the UK National Minimum Wage rise from 2007 to 2008 (a one-year period only). The longer time period, on the other hand, covers the minimum wage's effect across a span of 10 years or more.

This section will present the findings, i.e. the results of the DID estimation, from each dataset. The subsections will make an extensive statistical presentation of the DID results. The analysis of the findings is presented in Section 4.2 below. The DID estimation was run using Stata statistical software; all of the Stata results are presented in Appendix 5.

Note: this work contains statistical data from the Office for National Statistics (ONS) which is Crown Copyright. The use of the ONS statistical data in this work does not imply the endorsement of the ONS in relation to the interpretation or analysis of the statistical data. This work uses research datasets which may not exactly reproduce National Statistics aggregates.

#### **4.1.1. ASHE, 2009 and 2010**

The DID results from the first dataset are presented in Table 4.1. To read the table (this applies to all DID results tables):

- The Outcome column shows the effect of the minimum wage. The outcome is shown by variable name. The description of variables is presented in Chapter 3 (Tables 3.4, 3.5 and 3.6).
- The DID column shows the DID estimation ( $\hat{\alpha}_j$ ), that is whether the impact (of the minimum wage) exists on specific outcome.
- Any significant impact on outcome is asterisked.

- This thesis uses 90% ( $p < 0.1$ ), 95% ( $p < 0.05$ ) and 99% ( $p < 0.01$ ) confidence levels. The significance of the results is tested by the p-value [p]; if  $p < 0.1$ , the result is statistically significant at a 90% confidence level.

Outcome (Average)	Minimum Wage		Above Minimum Wage		DID
	2009	2010	2009	2010	
<i>Hourlywage</i> (£) <sup>1</sup>	5.314745	5.409361	13.11083	13.27875	-0.073304
<i>Bpay</i> (£)	136.3789	137.4675	431.9682	435.9364	-2.8796
<i>Bhr</i> (hrs)	26.09893	25.83484	32.1614	32.11783	-0.22052
<i>Ipayin</i> (£)	9.112907	11.44016	5.844045	5.953103	2.218195**
<i>Spay</i> (£)	0.889796	0.875611	5.329218	5.450441	-0.1354076
<i>Anipay</i> (£)	517.1528	490.8065	1441.917	1409.484	6.0867
<i>Ownpay</i> (£)	0.569235	0.836853	14.56326	14.89255	-0.0616721
<i>Compay</i> (£)	1.906814	2.320928	37.98982	38.69847	-0.294536
<i>Ownperc</i>	4.738024	5.308296	5.058301	5.14855	0.480023**
<i>Comperc</i>	16.53584	16.16782	13.5155	13.52097	-0.37349
<i>Ovhrs</i> (hrs)	0.882431	0.861212	1.054124	1.147075	-0.1141697**
<i>Ovpay</i> (£)	6.021841	6.047095	13.70205	14.69127	-0.963966
<i>Othpay</i> (£)	2.567516	2.101894	11.05926	11.17308	-0.579442

Source: Office for National Statistics (ONS).

<sup>1</sup>The wages have not been adjusted for inflation.

\*\*Significant at  $p < 0.05$ .

**Table 4.1 DID Results for ASHE, 2009 and 2010**

Table 4.1. shows three significant outcomes from the first dataset. The results should be read as follows:

### ***Incentive Pay***

The increase in the incentive pay between 1997 and 2010 is £2.22 more in the treatment group. There is a substantial positive impact of the minimum wage as the percentage increase of the incentive pay in the minimum wage group is 25.54% compared to the incentive pay increase of 1.87% for the control group. Minimum wage, therefore, increases the incentive pay by 23.67 percentage points.

### ***Employees' contributions to pensions***

The increase of employee's share of pension contributions is 48 percentage points more in the treatment than the control group. There is a negative impact of the minimum wage as



the percentage increase in the treatment group is 12.04% compared to just 1.78% for the control group. Minimum wage, therefore, increases the percentage of employee contributions to pensions by 10.25 percentage points.

### ***Overtime hours***

There is a decrease in the average weekly paid overtime hours in the minimum wage group but an increase in the control group. The absolute increase in the average weekly overtime hours between 1997 and 2010 is 0.11 hours less in the treatment than the control group.

The percentage decrease in the treatment group is 2.40% compared to 8.82% of increase in the control group. Thus, the minimum wage has a fairly negative effect of 11.22 percentage points on the weekly overtime hours of the minimum wage group.

### **4.1.2. ASHE, 1997 and 2010**

The DID results for the second dataset are presented in Table 4.2.

<b>Outcome (Mean)</b>	<b>Minimum Wage</b>		<b>Above Minimum Wage</b>		<b>DID</b>
	<b>1997</b>	<b>2010</b>	<b>1997</b>	<b>2010</b>	
<i>Hourly wage</i> (£)	2.937196	5.409361	8.495907	13.27875	-2.310678***
<i>Bpay</i> (£)	81.07085	137.4675	290.4293	435.9364	-89.11045***
<i>Bhr</i> (hrs)	27.70141	25.83484	33.798	32.11783	-0.1864
<i>Ovhrs</i> (hrs)	1.568491	0.861212	2.076526	1.147075	0.2221721***
<i>Ovpay</i> (£)	7.272167	6.047095	17.71825	14.69127	1.801908***

Source: ONS.

\*\*\*Significant at  $p < 0.01$ .

**Table 4.2 DID Results for ASHE, 1997 and 2010**

Four outcomes are significant from the second dataset. The interpretation of the results is as follows:

### ***Hourly wages***

The increase in the hourly wage between 1997 and 2010 is £2.31 less in the treatment than the control group.

Nevertheless, there is a fairly positive impact of the minimum wage as the percentage increase of the nominal wage in the minimum wage group is 84.17% compared to an hourly wage increase of 56.30% for the control group. The minimum wage thus increases the hourly wage by 27.87 percentage points.

### ***Basic weekly earnings***

The minimum wage has slowed down the increase in the basic weekly earnings of the minimum wage group by £89.11 in the period 1997 and 2010.

Nonetheless, the percentage increase in the basic weekly earnings in the treatment group is 69.56% compared to 50.10% in the control group. Thus, the minimum wage has a fairly positive impact on the basic weekly earnings by 19.46 percentage points.

### ***Overtime hours***

The decrease in the average weekly paid overtime hours is 0.22 hours more in the treatment than the control group.

The percentage decrease in the weekly overtime hours in the treatment group is 45.09% compared to 44.76% decrease for the control group. Therefore, the minimum wage has a slightly negative effect on the average weekly paid overtime hours of the minimum wage group by 0.33 percentage points.

### ***Overtime pay***

The minimum wage has a slightly more favourable effect on the reduction of overtime pay in the minimum wage group compared to the control group, 16.85% and 17.08% respectively (i.e., 0.23 percentage points).

## **4.1.3. WERS Cross-Section of Employees, 1998 and 2004**

The DID results for the third dataset are presented in Table 4.3.

Outcome (Mean)	Minimum Wage		Above Minimum Wage		DID
	1998	2004	1998	2004	
<i>Hourlywage</i> (£)	2.914069	4.015426	8.027295	11.70391	-2.575258***
<i>Hoursperweek</i> (hrs)	36.00321	33.29618	37.31001	36.38826	-1.78528***
<i>Overtimehrs</i> (hrs)	4.050026	3.508763	4.151488	3.605723	0.004502
<i>Basichrs</i> (hrs)	32.10771	28.89435	33.28457	32.38928	-2.31807***
<i>Flexitime</i>	0.06441	0.4612701	0.1102185	0.4839439	0.0231347
<i>Jobshare</i>	0.110954	0.318107	0.1849324	0.3151064	0.0769793***
<i>Parental</i>	0.212976	0.1334604	0.2895734	0.2005179	0.0095399
<i>Workhome</i>	0.015985	0.059312	0.1223309	0.1775356	-0.0118777
<i>Nursery</i>	0.025858	0.0769231	0.0408741	0.1013329	-0.0093937

Source: ONS.

\*\*\*Significant at  $p < 0.01$ .

**Table 4.3 DID Results for WERS Cross-Section of Employees, 1998 and 2004**

Four outcomes are significant from the third dataset. These are:

#### ***Hourly wages***

The absolute increase in the hourly wage between 1998 (before the minimum wage was introduced) and 2010 (after the minimum wage was introduced) is £2.58 less in the treatment than the control group. There is a fairly negative impact of the minimum wage as the percentage increase in the nominal wage in the minimum wage group over this time period is 37.79% compared to an hourly wage increase of 45.80% for the control group. Minimum wage thus has a fairly negative effect on the hourly wage by 8.01 percentage points.

#### ***Weekly working hours***

The absolute decrease in the total hours of work per week is 1.79 hours more in the treatment than the control group. The percentage decrease in the total weekly hours of work in the treatment group is 7.52% compared to 2.47% decrease in the control group. Therefore, the minimum wage has a fairly negative effect on the total hours of work per week by 5.05 percentage points.

#### ***Basic hours per week***

The absolute decrease in the basic hours per week is 2.32 hours more in the treatment than the control group between 1998 and 2004. The percentage decrease in the basic hours per week in the treatment group is 10.01% compared to 2.69% in the control group. Therefore, the minimum wage has a substantial negative effect on the basic hours per week by 7.32 percentage points.

### ***Job sharing***

The increase in the proportion of job sharing available is 7.7 percentage points more in the treatment than the control group. The percentage increase in the treatment group is 186.70% compared to 70.39% increase in the control group. Thus, the minimum wage has a fairly positive impact, on the proportion of job sharing available to the minimum wage group (116.31 percentage points).

#### **4.1.4. LFS, Q1 2000 and Q1 2011**

The DID results are presented in Table 4.4.

<b>Outcome (Mean)</b>	<b>Minimum Wage</b>		<b>Above Minimum Wage</b>		<b>DID</b>
	<b>2000</b>	<b>2011</b>	<b>2000</b>	<b>2011</b>	
<i>Cameyr</i> (year)	36.00211	37.33356	37.85964	39.61468	-0.42359
<i>Conmpt</i> (year)	4.888575	6.349239	8.246335	9.260941	0.446058
<i>Bushr</i> (hour)	27.39235	30.33356	34.02773	33.54377	3.42517***
<i>Edl3wk</i>	0.194052	0.206993	0.303915	0.313073	0.0037822
<i>Jobtrn</i>	0.470238	0.685393	0.461242	0.608635	0.0677621
<i>Tfee</i>	0.358974	0.553192	0.66381	0.653086	0.204942***
<i>Trnlen</i>	0.169697	0.282486	0.377148	0.53464	-0.0447029
<i>Netwk</i> (£)	83.01949	148.5182	246.5605	370.4037	-58.34449***
<i>Hourlypaid</i> (£)	3.058477	5.121865	8.103821	11.98716	-1.819951***
<i>Ernfilt</i>	0.126161	0.079912	0.308715	0.208838	0.0536287***
<i>Bonuses</i>	0.169697	0.175439	0.200387	0.190373	0.0157552
<i>Profitrelated</i>	0.036364	0.017544	0.065265	0.022174	0.0242709
<i>Londonallw</i>	0.048485	0.026316	0.082427	0.066522	-0.0062645
<i>Standby</i>	0.012121	0.026316	0.032632	0.052461	-0.0056339
<i>Shiftallw</i>	0.042424	0.026316	0.1095	0.106544	-0.0131529

Source: ONS.

\*\*Significant at  $p < 0.05$ .

\*\*\*Significant at  $p < 0.01$ .

**Table 4.4 DID Results for LFS, Q1 2000 and Q1 2011**

Several outcomes are significant:

### ***Basic hours of work***

The increase in the usual basic hours of work is 3.4 hours more in the treatment group than the control group, for the period between 2000 and 2011. The corresponding percentage increase is 10.74% in the minimum wage group while the control group experiences a minor decrease of 1.42%, generating a positive impact of the minimum wage on the usual basic hours of work (12.16 percentage points).

### ***Provision of training***

Between 2000 and 2011, the provision of training by employers had increased in the treatment group by 54.10% while it had decreased in the control group by 1.62%, generating a fairly positive impact of the minimum wage (55.72 percentage points).

### ***Weekly earnings***

The absolute increase in the net weekly earnings is £58.34 less in treatment than in the control group. Nevertheless, the corresponding percentage increase is 78.90% in the treatment group compared to 50.23% in the control group. The minimum wage, therefore, positively affects the net weekly earnings of the minimum wage group ( 28.67 percentage points).

### ***Hourly payment***

The minimum wage group experiences a reduction of £1.82 hourly earnings compared with above-the-minimum-wage group. However, those in the minimum wage group experience 67.46% increase in their hourly wages compared with above-the-minimum-wage workers; their increase is 47.92%. Therefore, the minimum wage appears to have a positive impact on the hourly payment of the treatment group (19.54 percentage points).

### ***Additional Pay (including bonuses)***

Less minimum wage workers (5.36 percentage points) receive additional pay compared with those earning above the minimum wage.

The percentage decrease in the proportion of workers who receive additional pay is 36.66% in the treatment group compared with 32.35% in the control group. Thus, the minimum wage has a slightly more negative impact on the additional pay of the minimum wage workers (4.31 percentage points).

#### **4.1. Secondary Data Analysis**

This section focuses on the discussion and analysis of the DID results presented in Section 4.1. A summary of the results from the secondary data is given in Table 4.5. The subsections discuss the minimum wage's impact on particular outcomes.

<b>Outcome</b>	<b>DID</b>	<b>Effect (in percentage points)</b>	<b>Dataset</b>
<b>Hours</b>			
Paid weekly overtime hours	-0.11 hours	↓ 11.22	ASHE, 2009–2010
Paid weekly overtime hours	0.22 hours	↓ 0.33	ASHE, 1997–2010
Weekly total hours of work	-1.79 hours	↓ 5.05	WERS, 1998–2004
Weekly basic hours of work	-2.32 hours	↓ 7.32	WERS, 1998–2004
Usual hours of work	3.4 hours	↑ 12.16	LFS, Q1 2000–2011
<b>Earnings</b>			
Hourly wage	£2.31	↑ 27.87	ASHE, 1997–2010
Basic weekly earnings	£89.11	↑ 19.46	ASHE, 1997–2010
Hourly wage	£2.58	↓ 8.01	WERS, 1998–2004
Hourly wage	£1.82	↑ 19.54	LFS, Q1 2000–2011
Net weekly earnings	£58.34	↑ 28.67	LFS, Q1 2000–2011
<b>Non-wage benefits</b>			
Incentive pay	£2.22	↑ 23.67	ASHE, 2009–2010
Employee's % contribution to pension	48 percentage points	↑ 10.25	ASHE, 2009–2010

Weekly overtime pay	£1.8	↑ 0.24	ASHE, 1997–2010
Training paid for by employers	20.49 percentage points	↑ 55.72	LFS, Q1 2000–2011
Additional pay (on top of basic pay)	5.36 percentage points	↓ 4.31	LFS, Q1 2000–2011
<b>Working arrangements</b>			
Job-sharing availability	7.7 percentage points	↑ 116.31	WERS, 1998–2004

Source: ONS.

\*Not minimum-wage effect but ethnicity effect.

**Table 4.5 Summary of Secondary Data Findings**

#### **4.2.1. The National Minimum Wage's Impact on Working Hours**

A negative impact of the National Minimum Wage on working hours was expected, following the evidence from Dickens *et al.* (2009), which suggests that an increase in the minimum wage that is not compensated by an increase in productivity will lead to a reduction in working hours. The findings of this thesis, however, show mixed results in relation to working hours. In LFS testing for 2000 to 2011, the increase in the minimum wage leads to an increase in hours of work by approximately three hours per week (an increase of 12 percentage points).

However, using the ASHE and WERS datasets, the minimum wage shows some other negative effects. In the WERS survey with employees for 1998 to 2004, the minimum wage reduces the weekly total hours of work and basic hours of work by 1.79 and 2.32 hours respectively, generating negative effects in the range of 5 to 7 percentage points. Overtime hours are also reduced by 0.11 hour per week or 11.22 percentage points in ASHE 2009 to 2010. The long-span ASHE has a smaller reduction of 0.33 percentage points in the overtime hours. These mixed results are interesting as they indicate that over longer period of time, the minimum wage tends to have a more positive effect, while in shorter periods the effects tends to be more negative. This may be because, over shorter periods, employers have little choice about taking urgent measures to reduce costs. This is also connected with unanticipated business fluctuations, during which employers demand more flexibility (in working hours) from workers. Wessels' (1980) argument may also able to explain the short-term impact on working hours: employers may ask workers to come to

work at times that are more convenient and more profitable for employers, as a result of minimum-wage pressure on business stability. In longer term, the minimum wage affects working hours more positively. There are many possible explanations for this positive relationship in the long run, such as changes in macroeconomic circumstances. Further investigation is needed to test such possibilities.

#### **4.2.2. The National Minimum Wage's Impact on Earnings**

This thesis investigates the impact of the minimum wage on earnings. It follows Wessels' (1980) argument that the minimum wage leads to reductions in money wages. Wessels' definition of money wages includes non-wage pay (such as commission or bonuses); however, this subsection discusses the impact on earnings only in terms of wages (basic earnings). The results show that minimum wage has a fairly positive impact on earnings. This result is found across AHSE and LFS surveys with a significant percentage increase. ASHE 1997–2010 yields an increase of 19.46 and 27.87 percentage points for weekly and hourly earnings respectively, while LFS 2000–2011 yields an increase of 28.67 and 19.54 percentage points for weekly and hourly earnings

The only negative effect of the minimum wage on earnings is derived from the WERS survey (8.01 percentage points). This effect, nevertheless, is smaller compared with ASHE and LFS datasets.

#### **4.2.3. The National Minimum Wage's Impact on Non-Wage Benefits**

An adverse effect of the National Minimum Wage on non-wage benefits was anticipated. Evidence of any such adverse effect, however, is modest. Overall the evidence shows significant effects only on training, pensions, incentive pay, bonuses and overtime pay. There is no evidence on other non-wage benefits.

##### ***Training***

It was expected that the minimum wage would be found to reduce training provision, as suggested by Leighton and Mincer (1981) and Hashimoto (1982). The results show that the National Minimum Wage only significantly affects one variable: the proportion of training paid for by employers. LFS data for 2000 to 2011 shows the proportion of training paid for by employers is 20.49 percentage points more in the treatment group (compared to the control group), which suggests the minimum wage is likely to have a more positive effect



on training (55.72 percentage points). This may be due to an increase in the use of general on-the-job training to which employers contribute (some of) the cost (Becker, 1964). A reduction in training as a negative effect of the minimum wage, however, is not evident in this secondary data.

### ***Pensions***

It was expected that the minimum wage would be found to reduce pension provision, as suggested by Royalty (2000). The findings show that the National Minimum Wage increases employees' share of contributions to pensions. The ASHE data for 2009–2010 shows that the employees' share of contributions to pensions is 48 percentage points more in the minimum wage group compared to the above- minimum- wage group. This indicates a slightly negative result, as it suggests that it is the employees themselves (rather than the employers) who have to pay for their pensions.

### ***Incentive Pay, Additional Pay and Overtime Pay***

Following the work of Wessels (1980), it was expected that the minimum wage would be found to reduce non-wage earnings. Section 4.2.2 shows the overall positive effects on basic earnings and similar findings are found on other-than-basic earnings. The ASHE data shows that the incentive weekly pay is £2.22 (23.67 percentage points) more in the minimum wage group compared to the control group. Similarly, there is an increase of £1.80 (0.24 percentage points) in the minimum wage group compared to above-the- minimum-wage.

The proportion of workers who receive additional pay, however, is reduced. According to the LFS data, the minimum wage is likely to have a more negative effect on the receipt of bonuses by minimum wage workers (4.31 percentage points). Additional pay includes bonuses, profit-related pay, the London allowance, regional allowances, shift allowances, unsociable-hours pay, and stand-by or on-call allowances, among others.

The evidence suggests that the National Minimum Wage has an overall positive effect on basic earnings, incentive pay and overtime pay. The only reduction is in the proportion of workers who receive additional pay. In summary, there is little evidence to suggest that has minimum wage has adverse effects on the basic or other-than-basic earnings. Regarding the additional pay, nevertheless, the negative effect might reflect a connection between the

minimum wage and demands on workers for temporary and flexible work, as suggested by Wessels (1980). At least four components (out of 10) of additional pay are indicative of a demand for temporary/flexible work: payment for working unsociable hours, shift pay, overtime pay, and stand-by or on-call allowances. However, this indication is not confirmed when each of these components of additional pay is tested. Further investigation is therefore needed to confirm the argument.

#### **4.2.4. The National Minimum Wage's Impact on Working Arrangements**

This study sought evidence that the minimum wage is linked to a demand for flexible and temporary workers, as suggested by Wessels (1980).

##### ***Job-sharing availability***

Minimum wage workers appear to be more likely to have access to job sharing compared with those who are earning above the minimum wage (this is evident from the WERS data set). This might reflect flexibility in working arrangements in a positive way, as job-sharing is understood to be to the advantage of employees, and not of employers as Wessels (1980) suggests.

#### **4.2. Conclusion**

The aim of the secondary research was to investigate the first research question on whether the minimum wage has an impact on working hours, working arrangements, and especially non-wage benefits.

The analysis of the secondary data has revealed that the minimum wage has an impact on only some non-wage benefits. The evidence suggests that the minimum wage increases the proportion of training that is paid for by employers; increases the proportion of employees' pension contributions; increases weekly overtime pay; and increases incentive pay. The minimum wage adverse effect on non-wage benefits is only evident on (the reduction of) additional pay.

Overall, there is insufficient evidence to confirm the hypothesis that the minimum wage reduces non-wage benefits. The analysis has found that the minimum wage has some impact only on training, pensions provision, overtime pay, incentive pay and additional pay. No evidence has been found in relation to other non-wage benefits.

Nonetheless, the findings in relation to working hours confirm that the minimum wage has some adverse impact on the overtime hours; although for usual hours of work conflicting evidence appears across different datasets.

The evidence on working arrangements shows that the minimum wage has a significant effect on the availability of job-sharing. The minimum wage increases the availability of job-sharing; however, there is insufficient evidence to show that job-sharing is connected to the temporary and flexible nature of secondary-segment jobs.

To sum up, the secondary research analysis has provided an extensive investigation of the first research question, which sought to examine the minimum wage's effects on non-wage benefits, working hours and working arrangements. The hypotheses to some extent have been confirmed in relation to the impact on working hours. It has been found that the minimum wage had an adverse effect on working hours, ultimately the overtime hours. However, the analysis found only modest evidence to confirm that the minimum wage adversely affects non-wage benefits. A wide range of non-wage benefits were tested, but only very few appear to be significant. Among these, only additional pay that was adversely affected by the minimum wage.

Findings from the secondary research thus present modest evidence in relation to the minimum wage's effects on non-wage benefits. The next chapter presents the primary research, which may yield interesting findings in relation to the minimum wage's connection with the non-wage benefits of migrant workers.

## **Chapter 5**

### **Primary Research Analysis**

They never give you minimum wage, they never give holiday pay. There are five staffs in the kitchen and four waiters. Chef who controls the kitchen is too much rude; boss is also rude blaming staff without any reason. Boss says bad words, if boss do something wrong, boss will throw it to us [the staff]. When we want to break our fasting [i.e. for Ramadan, at around 8.50pm], the restaurant is in a busy environment, we never get chance to break our fast, boss does not allow us, even after we ask for it.

This excerpt from an interview with a Bangladeshi restaurant worker illustrates the types of insight provided by the qualitative questions in the primary research. The primary research aims to answer the second research question on how the minimum wage differently affects migrant workers; it is therefore primarily designed to capture the reality of migrants in low-paid, low-skilled jobs. The hypothesis is that the minimum wage does affect migrants differently, and in particular that it affects migrants' likelihood of receiving non-wage benefits.

Four related substantive issues will be examined in this chapter. First, there are certain factors that might explain why migrants earn the minimum wage or below. In other words, certain factors are able to explain why some migrants in low-paid, low-skilled jobs earn the minimum wage or below, while other migrants earn above the minimum wage. Human capital is expected to affect migrants' performance in the labour market (Becker, 1964; Mincer, 1974; Chiswick, 1978; Chiswick and Miller, 1998). However, the evidence shows that there are factors other than human capital that affect migrants' likelihood of earning the minimum wage or below.

Second, migrants to the UK have recently displayed some interesting phenomena. Recent migrants tend to be younger and more educated than non-migrants. Nonetheless, these younger and more educated migrants still earn the minimum wage or below, suffering downgrading (Dustmann *et al.*, 2007). The primary research echoes the initial evidence by showing that migrants who work in low-paid, low-skilled jobs are skilled migrants in terms of their educational level, language proficiency and work experience. The majority of the

sample have an education above secondary level and a medium-to-fluent level of spoken English. Half of the sample have work experience in their home country. A third of the sample have experience of working in another foreign country. The phenomenon of downgrading is evident, as 43.5% of the sample earn the minimum wage or below.

Third, it is hypothesised that the minimum wage adversely affects the non-wage benefits of migrants. The primary research tests to see whether the minimum wage is a significant predictor of migrants' receipt of non-wage benefits. In other words, the hypothesis is that migrants who earn the minimum wage or below are less likely to receive non-wage benefits. The evidence shows that migrants who earn the minimum wage or below are less likely to receive some valuable non-wage benefits, such as training, holiday pay, paid sick leave, health/life insurance and pension schemes. However, they are more likely to receive meals and accommodation. .

Fourth, it is hypothesised that the minimum wage to some extent drives the duality of the labour market, leading jobs to become temporary and flexibilised. There is a modest indication in the secondary research that the minimum wage may increase the demand for temporary/flexible working. However, the primary research shows no evidence that the minimum wage is connected to temporary or flexible work.

This chapter is divided into two main parts. The first part primarily focuses on the factors that affect the likelihood of migrants receiving the minimum wage or below. As previously discussed, the methodology in this thesis is positivist-quantitative; hence quantitative techniques were used to conduct and analyse the primary research. Logistic regression is used to test variables that may explain why some migrants earn the minimum or below while others earn above the minimum. These include human capital, demographic, employment-related and migration-related variables. A substantial discussion is offered in order to analyse the minimum wage's connections with these variables. The primary research also implements Pearson's chi-square coefficient and descriptive statistics to extend the analysis. The first part aims to investigate which factors affect migrants' minimum wage and whether human capital can explain the prevalence of migrants in low-paid jobs. Thus the first part also aims to investigate whether the phenomenon of downgrading exists, and to establish the characteristics (profile) of migrants in low-paid, low-skilled jobs.

The second part mainly discusses how the minimum wage differently affects migrant workers, particularly in relation to migrants' non-wage benefits. Logistic regression is used to test whether migrants who earn the minimum wage or below are less likely to receive non-wage benefits. This part extends the analysis of non-wage benefits by discussing non-wage benefits in relation to each low-paying sector. It also includes a number of qualitative interviews to further explore the non-wage benefits received by migrants in low-paid, low-skilled jobs. The importance of this part must be stressed, as this evidence is original to the thesis. Overall the primary research analysis is expected to produce evidence about how the minimum wage differently affects migrant workers, in the sense that migrants in low-paid, low-skilled jobs might not get the statutory minimum wage or, even worse, might receive fewer non-wage benefits.

### **5.1. What Factors Affect Migrant Workers' Likelihood of Earning the Minimum Wage or Below?**

This section discusses factors which might significantly affect migrants' likelihood of earning the minimum wage or below. In other words, it investigates why some migrants earn the minimum wage or below while other migrants earn above the minimum. The section starts by presenting the respondent profile from the questionnaires.

#### **5.1.1. The Respondent Profile**

As previously discussed, the primary research implemented a questionnaire survey of 200<sup>1</sup> London-based migrants who work in low-paid, low-skilled sectors. As noted in Chapter 3, the primary data collection sought to produce a purposive sample in terms of gender, skill, wage level (minimum wage or below, and above minimum wage), sector and legal status. Table 5.1 illustrates the respondent profile yielded by the primary research.

In terms of gender, the sample secures a good balance of males to females: 115 (57.5%) males and 85 (42.5%) females. The sample also achieves a good balance in terms of the minimum wage. In order for a comparison between minimum-wage (or below) and above-minimum wage workers to be possible, at least 30% of the sample had to earn the minimum wage or below. Minimum-wage workers were defined as workers earning at or below the 2011 National Minimum Wage (£4.98 per hour for 18–20-year-olds, and £6.08

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<sup>1</sup> Two of them did not disclose their earnings.

per hour for workers aged 21+); above-minimum wage workers were defined as workers earning above the 2011 National Minimum Wage. In total there are 87 (43.5%) minimum-wage workers and 111 (55.5%) above-minimum wage workers in the sample. Two respondents refused to disclose their earnings.

In terms of skill, it was very challenging to find less-skilled workers, even among those working in low-skilled, low-paid jobs. The term ‘skill’ can be interpreted (and measured) in various ways. It was therefore decided to use educational level and work experience as measures of skill. In terms of educational level, it proved extremely difficult to have less-educated workers in the sample. There are only 22 (11%) respondents with a below-secondary level of education; of these, only six (3%) had no formal education. In total there are just 60 (30%) respondents with an educational level up to secondary level only. In other words, 70% of the respondents have an above-secondary level of education.

When work experience is used as the measure of skill, the representation of less-experienced workers in the sample is better. There were two questions in the questionnaire on the respondents’ work experience. First, the questionnaire asked whether respondents had work experience in their home country, and second it asked whether they had experience of working abroad (i.e. in a country other than either the UK or their home country). The total number of respondents who had experience of working abroad was 68 (34%); the number of respondents with no experience abroad was 132 (66%). There were 107 (53.5%) respondents with work experience in their home country, and 93 (46.5%) respondents with no work experience in their home country. However, it might be inappropriate to conclude that workers with no experience at home or abroad were less skilled, as they might have developed their experience in the host country (UK), or they might have developed their educational level or other human capital factors before taking any employment.

The sample includes respondents from a variety of low-paid, low-skilled sectors, such as the retail, sales, domestic-work, cleaning, care, construction, hotel/restaurant and factory sectors. Some sectors are more represented in the sample than others; this is because they are less niche or segmented, and thus relatively easier to access.

It was difficult to include a wide variety of migrants with different legal statuses. Nevertheless, there are proportions of work permit holders, students, EU workers, permanent residents, British citizens and undocumented workers in the samples.

Overall, it is a limitation of the primary research data that it under-represents some types of migrants, such as irregular migrants, and migrants with certain types of legal status, such as refugees. It also over-represents migrants with student status. The sample does not fully represent the ethnic distribution of migrants in London (Chapter 3, Table 3.2), since it is a purposive sample that includes migrant workers from a range of sectors in London.

<b>Migrant Demographic Characteristics</b>	<b>Minimum-Wage Workers</b>	<b>Above-Minimum Wage workers</b>
<b>Age</b>		
19–29	50 (57.5%)	54 (48.6%)
30–39	25 (28.7%)	20 (18%)
40–49	8 (9.2%)	24 (21.6%)
Over 50	4 (4.6%)	13 (11.7%)
Total	87 (100%)	111 (100%)
<b>Gender</b>		
Male	51 (58.6%)	63 (56.8%)
Female	36 (41.4%)	48 (43.2%)
Total	87 (100%)	111 (100%)
<b>Educational level*</b>		
No formal education	1 (1.1%)	5 (4.5%)
Primary	10 (11.5%)	6 (5.4%)
Secondary	20 (23%)	18 (16.2%)
College	13 (14.9%)	19 (17.1%)
University	31 (35.6%)	30 (27%)
Postgraduate	12 (13.8%)	33 (29.7%)
Total	87 (100%)	111 (100%)
<b>Employer's Ethnicity</b>		
Same ethnic origin (as worker)	19 (22.9%)	9 (8.2%)
Other (migrant) ethnic origin	30 (36.1%)	17 (15.5%)
Local/British (incl. British companies)	33 (39.8%)	79 (71.8%)
Don't know	1 (1.2%)	5 (4.5%)
Total	83 (100%)	110 (100%)
Valid N=193 (96.5%)		



<b>Sector of current main job</b>		
Retail/shop/supermarket	11 (12.6%)	22 (19.8%)
Cleaning	5 (5.7%)	19 (17.1%)
Care: elderly care/childcare	3 (3.4%)	6 (5.4%)
Construction	3 (3.4%)	6 (5.4%)
Hotel	3 (3.4%)	6 (5.4%)
Restaurant/bar	30 (34.5%)	8 (7.2%)
Administration	3 (3.4%)	7 (6.3%)
Factory work	7 (8.0%)	3 (2.7%)
Teaching	0 (0%)	5 (4.5%)
Other	3 (3.4%)	19 (17.1%)
Total	87 (100%)	111 (100%)
<b>Ethnicity</b>		
White	4 (4.6%)	20 (18.0%)
Mixed	0 (0%)	2 (1.8%)
Asian	76 (87.4%)	65 (58.6%)
Black	5 (5.7%)	20 (18.0%)
Other	2 (2.3%)	4 (3.6%)
Total	87 (100%)	111 (100%)
<b>Work permit needed</b>		
Work permit needed	72 (82.8%)	55 (49.5%)
No work permit needed	15 (17.2%)	56 (50.5%)
Total	87 (100%)	111 (100%)

\*The educational qualifications represent censored outcomes as one third of the sample are students who have not completed their education. It is very likely therefore that the jobs they are currently doing will not necessarily be the jobs they will be doing post-qualifications.

### **Table 5.1 Profile of Respondents**

The main analysis in this section seeks to investigate the factors that determine migrants' likelihood of earning the minimum wage or below, using logistic regression. The regression equation was formed in light of the human capital theory of Becker (1964) and Mincer (1974), which links human capital with wage levels. The equation also incorporates Chiswick's (1978) theory of migrants' performance in the labour market, including the length of stay in the host country and the acquisition of the host country's language. Demographic variables and migration-related variables are also included in the equation. Student legal status is also included as a control variable. As there are multiple explanatory variables (thirteen variables) with limited valid samples (Valid N=158), the logistic regression equation is thus performed in two stages to satisfy the requirement of one explanatory variable per 15 observations. The first stage regresses ten explanatory

variables and the second one regresses the significant variables from the first stage plus three additional variables for work experience, training, and student legal status (see Table 3.7 for description of the explanatory variables).

Dependent variable = Minimum Wage

$$\ln(p/1-p) = a + b1 \text{ Age} + b2 \text{ Gender} + b3 \text{ Length of stay} + b4 \text{ English language} + b5 \text{ Educational level} + b6 \text{ Hours of work} + b7 \text{ Same ethnicity employer} + b8 \text{ Local ethnicity employer} + b9 \text{ Union membership} + b10 \text{ Work permit needed}$$

(Equation 5.1a)

Dependent variable = Minimum Wage

$$\ln(p/1-p) = a + \text{any significant explanatory variables from Equation 5.1a} + \text{Work Experience} + \text{Training} + \text{Student}$$

(Equation 5.1b)

Hausman Specification test is performed to examine whether an endogeneity problem exists between minimum wage and hours of work, and between minimum wage and union membership. Gujarati (2011) suggests to perform the Hausman Specification test and to find an instrumental variable as a 'proxy' for the suspected stochastic (endogeneous) variable. Three criteria are needed to find the valid instrument: first, the instrumental variable must be correlated with the stochastic variable; second, the instrumental variable must not be correlated with the error term; third, the instrumental variable must not be a regressor in the original model.

It is decided to use More Than One Job variable (if a respondent has more than one job) as the instrument for Hours of Work. Both variables are significantly correlated ( $p < 0.1$ ). The variable Holiday Pay is used as an instrument for Union Membership; their correlation is significant at  $p < 0.05$ . Heteroscedasticity corrected standard error is also used to get robust standard error.

$$\text{Hours of Work} = a + b1 \text{ Age} + b2 \text{ Gender} + b3 \text{ Length of stay} + b4 \text{ English language} + b5 \text{ Educational level} + b6 \text{ Same ethnicity employer} + b7 \text{ Local ethnicity employer} + b8 \text{ Work permit needed} + b9 \text{ More Than One Job} + b10 \text{ Holiday Pay}$$

From the above regression, the estimated residual ( $\hat{v}_i$ ) is calculated.

Dependent variable = Minimum Wage

$$\ln(p/1-p) = a + b_1 \text{ Age} + b_2 \text{ Gender} + b_3 \text{ Length of stay} + b_4 \text{ English language} + b_5 \text{ Educational level} + b_6 \text{ Hours of work} + b_7 \text{ Same ethnicity employer} + b_8 \text{ Local ethnicity employer} + b_9 \text{ Union membership} + b_{10} \text{ Work permit needed} + \hat{v}_i$$

The coefficient  $\hat{v}_i$  is not statistically significant ( $z=0.29$ ,  $p\text{-value}=0.769$ ). Thus, there is no simultaneity problem between hours of work and minimum wage.

To test for the possibility of simultaneity between the variables Union Membership and Minimum Wage, the reduced-form regression is used:

$$\text{Union Membership} = a + b_1 \text{ Age} + b_2 \text{ Gender} + b_3 \text{ Length of stay} + b_4 \text{ English language} + b_5 \text{ Educational level} + b_6 \text{ Same ethnicity employer} + b_7 \text{ Local ethnicity employer} + b_8 \text{ Work permit needed} + b_9 \text{ More Than One Job} + b_{10} \text{ Holiday Pay}$$

From the above regression, the estimated residual  $\hat{v}_i$  is calculated.

The following equation is obtained:

Dependent variable = Minimum Wage

$$\ln(p/1-p) = a + b_1 \text{ Age} + b_2 \text{ Gender} + b_3 \text{ Length of stay} + b_4 \text{ English language} + b_5 \text{ Educational level} + b_6 \text{ Hours of work} + b_7 \text{ Same ethnicity employer} + b_8 \text{ Local ethnicity employer} + b_9 \text{ Union membership} + b_{10} \text{ Work permit needed} + \hat{v}_i$$

The coefficient  $\hat{v}_i$  is not statistically significant ( $z=-0.30$ ,  $p\text{-value}=0.764$ ). Thus, there is no simultaneity problem between Union Membership and Minimum Wage.

The results from Hausman Specification test show no simultaneity problem in the logistic regression (Equation 5.1a).

Table 5.2a presents the results of the logistic regression (Equation 5.1a). *Regression Coefficients* column presents the coefficients of the independent variables. The asterisk indicates the significant variables. *Exp(B)* column presents the odds ratios. *Sig.* shows the

significance level of the coefficients using  $p < 0.1$ ,  $p < 0.05$  and  $p < 0.01$  levels of significance. The SPSS output for Equation 5.1a is presented in Appendix 6.

<b>Variables in the equation</b>	<b>Regression coefficients (B)</b>	<b>Exp(B)</b>	<b>Sig.</b>
Age	-	-	0.804
Gender	-	-	0.374
Length of stay	-	-	0.497
English language	-	-	0.187
Educational level	-	-	0.318
Hours of work	0.037***	1.038	0.003
Same ethnicity employer	-	-	0.607
Local ethnicity employer	-1.187***	0.305	0.002
Union membership	-	-	0.610
Work permit needed	1.536***	4.646	0.000

Valid N=158 (79%)

Dependent variable: Minimum Wage

\*\*\*Significant at  $p < 0.01$

**Table 5.2a. The Effects on the Minimum Wage (Logistic Regression Equation 5.1a Results)**

The equation for the logistic model is:

$$\ln(p/1-p) = -1.850 + 0.037(\text{Hours of work}) - 1.187 (\text{Local ethnicity employer}) + 1.536 (\text{Work permit needed})$$

Of the 10 independent variables tested in the regression, only three significantly affect migrants' likelihood of earning the minimum wage or below (see Table 5.2a): Hours of work, Local ethnicity employer, and Work permit needed. These three variables will then be included in the next stage of the logistic regression analysis (Equation 5.1b).

Dependent variable = Minimum Wage

$$\ln(p/1-p) = a + b1 \text{ Hours of Work} + b2 \text{ Local Ethnicity Employer} + b3 \text{ Work Permit Needed} + b4 \text{ Work Experience} + b5 \text{ Training} + b6 \text{ Student}$$

(Equation 5.1b)

Hausman Specification test is performed to check if the variable Training has any simultaneity with the Minimum Wage variable. The instrumental variable for Training is Minimum Wage Sector (if a respondent is in the minimum wage sector or not) as the two variable are significantly correlated (p-value of Pearson correlation 0.058).

The reduced form regression based on the Hausman test is the following:

Dependent variable = Training

$$\ln(p/1-p) = a + b1 \text{ Hours of Work} + b2 \text{ Local Ethnicity Employer} + b3 \text{ Work Permit Needed} + b4 \text{ Work Experience} + b5 \text{ Student} + b6 \text{ Minimum Wage Sector}$$

The estimated residual ( $\hat{v}_i$ ) is calculated is included in the initial Equation 5.1b.

Dependent variable = Minimum Wage

$$\ln(p/1-p) = a + b1 \text{ Hours of Work} + b2 \text{ Local Ethnicity Employer} + b3 \text{ Work Permit Needed} + b4 \text{ Work Experience} + b5 \text{ Training} + b6 \text{ Student} + \hat{v}_i$$

The coefficient  $\hat{v}_i$  is statistically significant at 10% level of significance ( $z=1.95$ ,  $p\text{-value}=0.051$ ). Therefore, there is an endogeneity problem between the variables for Training and Minimum wage.

In order to deal with the endogeneity problem in the model, Gujarati (2011) suggests the use of two-stage least squares (2SLS). The result from the 2SLS shows that no independent variable is significant (see Appendix 6 for '2SLS' results). Hausman test is run to compare the efficiency of the IV coefficients and the least square coefficients. The results (Appendix 6) do not reject the null hypothesis that IV and least square estimates are statistically the same ( $p=99\%$ ,  $\text{chi-square statistic}= 0.36$ ). This confirms that the IV estimation is less efficient (and thus the logistic regression is used instead).

The results of the logistic regression are shown in Table 5.2b, below (see Appendix 6 for the SPSS output).

<b>Variables in the equation</b>	<b>Regression coefficients (B)</b>	<b>Exp(B)</b>	<b>Sig.</b>
Hours of work	0.032***	1.033	0.003
Local ethnicity employer	-1.032***	0.356	0.002
Work permit needed	1.606***	4.982	0.000
Work Experience	-	-	0.431
Training	-	-	0.698
Student	-	-	0.226

Valid N=193 (96.5%)

Dependent variable: Minimum wage

\*\*\*Significant at  $p < 0.01$

**Table 5.2b. The Effects on the Minimum Wage (Logistic Regression Equation 5.1b Results)**

The adequacy of the logit model (Equation 5.1b) is tested using the Hosmer and Lemeshow (HL) goodness-of-fit test. It is found that HL= 18.897 with significance 0.015 which shows that the null hypothesis is rejected and the logistic model of Equation 5.1b is not an adequate representation of the data.

Equation 5.1a is estimated instead:

$$\ln(p/1-p) = -1.850 + 0.037(\text{Hours of work}) - 1.187 (\text{Local ethnicity employer}) + 1.536 (\text{Work permit needed})$$

Equation 5.1a is tested for the Hosmer and Lemeshow (HL) goodness-of-fit test with HL= 14.417 and significance 0.072, which shows that the null hypothesis is not rejected and therefore the logistic model (Equation 5.1a) adequately represents the data. Overall, 73.4 % of the cases were correctly predicted. The variables for Age, Gender, Length of stay,

English language, Educational level, Same ethnicity employer, and Union membership are not included in the final equation (see Appendix 6 on table ‘variables not in the equation’).

Based on the significant value, at a 1% level of significance (see Table 5.2a): the hours of work, a local ethnicity employer, and the need for a work permit affect migrants’ likelihood of earning the minimum wage or below.  $\text{Exp}(B)$  is interpreted in terms of the change in odds. If the hours of work per week increase by one hour, migrant respondents are 1.038 times more likely to earn the minimum wage or below. Individuals requiring a work permit are 4.646 times more likely to earn the minimum wage or below, and, those whose employer is of British/native background, are 0.305 times less likely to earn the minimum wage or below.

The next subsections discuss the interpretation of the other variables in the regression, including other relevant issues related to the minimum wage.

#### **5.1.2. Age and the Minimum Wage**

It was anticipated that age would significantly affect the level of wage, as the age-earnings profile (Becker, 1964) suggests that an increased investment in human capital will increase the worker’s age as well as their earnings. The regression results, however, do not show that age significantly affects the likelihood of earning the minimum wage (Table 5.2a, Significance = 0.804). Nevertheless, it is interesting to consider the age profile of the respondents. Table 5.1 shows a large proportion of workers under 30 years old who earn the minimum wage or below (57.5% in the minimum-wage group, and 25% in the total sample).

#### **5.1.3. Gender and the Minimum Wage**

The regression results also show no evidence that gender affects migrants’ likelihood of earning the minimum wage or below.

#### **5.1.4. Educational Level and the Minimum Wage**

It was anticipated that there would be a relationship between educational level and the minimum wage, as suggested by human capital theory. The regression results, however, show no evidence that educational level affects migrants’ likelihood of earning the

minimum wage or below. Nevertheless, it is interesting to look at the educational profile of the respondents.

From Table 5.1, it is evident that the phenomenon of ‘downgrading’ may exist in the sample. Table 5.1 shows that in total there are 140 respondents (70% of the total sample) who have an above-secondary level of education. Of these, 56 respondents (28% of the total sample) earn the minimum wage or below. If we narrow the analysis to include only minimum-wage workers, the proportion of respondents who have an above-secondary level of education is 64.4% among minimum-wage workers. However, it is difficult to know whether the downgrading phenomenon is solely applied to migrants, or whether it also applies to natives and thus generates a universal phenomenon in the UK labour market. Given the purposive nature of the sample, and the lack of a group of non-migrants for comparison, the downgrading outcome of this study does not provide conclusive evidence

It is interesting to note that five of the six respondents with no formal education earn above the minimum wage. Three of them work in the cleaning sector, with a strong union presence: the union supports cleaners in their area to enable them to earn the London Living Wage. The fourth respondent works in construction, and has more than 10 years’ experience in this sector. The fifth is a domestic worker: she has no legal immigration status (i.e. is undocumented), and she gained her current job through her connection with a colleague in the same occupation.

These findings give a sense that human capital alone is not enough to explain why some migrants earn the minimum wage while other migrants earn above it.

The next subsection discusses the results produced with other human capital variables.

#### **5.1.5. Human Capital and the Minimum Wage**

Apart from educational level, this subsection explores all the human capital variables used in the questionnaires. Some of the human capital variables are not included in the regression analysis, because the regression limits the number of independent variables that can be included. The analysis was therefore extended using Pearson’s chi-square coefficient to test whether there was an association between human capital and wage level. Table 5.3 presents the results of using Pearson’s chi-square coefficient.



<b>Human Capital Profile</b>	<b>Minimum-Wage Workers</b>	<b>Above-Minimum Wage Workers</b>
<b>Current level of spoken English</b>		
None	0 (0%)	1 (0.9%)
Minimum	1 (1.1%)	5 (4.5%)
Medium/proficient	53 (60.9%)	44 (39.6%)
Fluent	33 (37.9%)	61 (55%)
Total (Valid N=198 or 99%)	87 (100%)	111 (100%)
Chi-square = 10.081, p<5%		
<b>If respondent has improved level of spoken English</b>		
Yes	59 (81.9%)	69 (77.5%)
No	13 (18.1%)	20 (22.5%)
Total (Valid N=161 or 80.5%)	72 (100%)	89 (100%)
<b>Length of stay in the UK</b>		
Less than two years	30 (34.5%)	24 (21.6%)
Two to five years	35 (40.2%)	33 (29.7%)
More than five years	22 (25.3%)	54 (48.6%)
Total (Valid N=198 or 99%)	87 (100%)	111 (100%)
<b>Length of stay in current job</b>		
Less than a year	26 (29.9%)	21 (18.9%)
One to two years	37 (42.5%)	42 (37.8%)
Two to five years	18 (20.7%)	27 (24.3%)
Five to 10 years	5 (5.7%)	16 (14.4%)
More than 10 years	1 (1.1%)	5 (4.5%)
Total (Valid N=198 or 99%)	87 (100%)	111 (100%)
Chi-square = 8.290, p<10%		
<b>If respondent receives training from employer</b>		
Yes	53 (60.9%)	87 (78.4%)
No	34 (39.1%)	24 (21.6%)
Total (Valid N=198 or 99%)	87 (100%)	111 (100%)
Chi-square = 7.178, p<1%		
<b>Country of highest education level obtained</b>		
Home country	60 (69.8%)	56 (52.8%)
Host country	23 (26.7%)	49 (46.2%)
Other country where respondent has worked before	2 (2.3%)	1 (0.9%)
Somewhere else	1 (1.2%)	0 (0%)
Total (Valid N=192 or 96%)	86 (100%)	106 (100%)
Chi-square = 8.873, p<5%		
<b>If respondent has work experience in home country</b>		

Yes	40 (46%)	66 (59.5%)
No	47 (54%)	45 (40.5%)
Total (Valid N=198 or 99%) Chi-square = 3.564, $p < 10\%$	87 (100%)	111 (100%)
<b>If respondent has work experience abroad</b>		
Yes	25 (28.7%)	42 (37.8%)
No	62 (71.3%)	69 (62.2%)
Total (Valid N=198 or 99%)	87 (100%)	111 (100%)

**Table 5.3 Human Capital Factors and Wage Level**

#### **5.1.6. English-Language Proficiency and the Minimum Wage**

Chiswick (1991) and Chiswick and Miller (1995) suggest that a proficiency in the host country's language will increase the worker's productivity, which in turn will lead to higher earnings. It was therefore expected that English-language proficiency would have some association with migrants' wages. Pearson's chi-square coefficient shows that the current level of spoken English has a positive association with migrants' wage levels (Table 5.3, chi-square = 10.081,  $p < 5\%$ ). However, the regression results do not confirm that there is a relationship between language improvement and the likelihood of earning the minimum wage or below. The regression tests whether there is a relationship between migrants' improvements in their English-language skills (from their arrival in the UK to date) and their earnings. The results show no evidence of any such relationship..

Table 5.3 shows that the majority of respondents have a medium-to-fluent level of spoken English. Although no evidence was found of a relationship between English-language skills and migrants' wages, it can cautiously be suggested that the profile of migrants' language proficiency is indicative of downgrading: there is a significant proportion of migrants with medium-to-fluent proficiency in English (86 respondents, 43% of the total sample) who earn the minimum wage or below.

#### **5.1.7. Length of Stay in the UK and the Minimum Wage**

It was expected that the length of stay in the UK would affect migrants' likelihood of earning the minimum wage or below, as suggested by human capital theory. Chiswick (1978) argues that the number of years since migration leads to the development of post-migration experience, including the acquisition of the local language and customs, a familiarity with the nature of the labour market, and post-school training.

The regression results, however, show no evidence that length of stay in the UK affects migrants' likelihood of earning the minimum wage or below. It is therefore not clear from this study whether recent migrants are more likely to be at the lower level of pay distribution.

#### **5.1.8. Length of Stay in the Current Job and the Minimum Wage**

The results from Pearson's chi-square coefficient show a significant association between the length of stay in the current job and wage level (Table 5.3, chi-square = 8.290,  $p < 10\%$ ). Table 5.3 shows that there are 54 respondents (27% of the total sample) who have been in their current jobs for less than two years, 30 of whom still earn the minimum. Among migrants who earn the minimum wage, 34.5% have been in their current job for less than two years. This study further argues that these shorter stays in workers' current jobs reflect the demand for temporary workers in low-paid, low-skilled jobs. Nevertheless, it is interesting to note that a small proportion of respondents (six respondents) have been in their current jobs for more than five years but still earn the minimum wage or below; this indicates that there might be factors other than human capital which determine migrants' likelihood of earning the minimum wage.

#### **5.1.9. Training and the Minimum Wage**

It was expected that training would have some relationship with wages, as suggested in the early human capital theory of Becker (1964). The results show that training does have a significant association with wages (Table 5.3, chi-square = 7.178,  $p < 1\%$ ), confirming this early human capital study. It is noted that training is the non-wage benefit that is most generally received by migrants in the sample: 71% (142 respondents) receive training from their employers. The most common type of training received is induction, followed by on-the-job training and health and safety (see Table 5.4). It is noted that 31% of the respondents receive regular training, which mostly concerns health and safety or policy/regulations (for example, the Under 25 Challenge policy in relation to the sale of alcohol and cigarettes). This evidence generally confirms Dickerson's (2007: 6, fn 2) argument that the amount of training provision in the UK – particularly in this study of low-paid, low-skilled jobs – is quite high, but that much of it is low-level training concerning induction and health and safety rather than the enhancement of productivity. It is also noted that the majority of training is paid for by employers. However, this might be not because of the importance of on-the-job training, as Becker (1964) suggests, but due to

legislation or collective bargaining, since training in low-paid, low-skilled jobs is directed more towards legislation (health and safety) than towards employee productivity.

<b>Training</b>	<b>Frequency (of Total Sample)</b>
<b>Type of training</b>	
<b>Induction</b> (Valid N=198 or 99%)	114 (57%)
<b>On-the-job training</b> (Valid N=200 or 100%)	104 (52%)
<b>Health and safety</b> (Valid N=200 or 100%)	92 (46%)
<b>Off-the-job training</b> (Valid N=199 or 99.5%)	11 (6%)
<b>Who pays for the training</b> (Valid N=200 or 100%)	
Employer	113 (57%)
Employee	3 (2%)
Free (no payment needed)	26 (13%)
<b>Regular training received</b> (Valid N=200 or 100%)	62 (31%)
Health and safety	20 (10%)
Policy/regulations	8 (4%)
Product/service update	11 (5.5%)
Skills-related	15 (7.5%)
Other	8 (4%)
<b>Frequency of regular training</b> (Valid N=200 or 100%)	
Once a month	10 (5%)
Once in three months	21 (11%)
Once in six months	14 (7%)
Once in a year	8 (4%)

**Table 5.4 Training Distribution**

#### **5.1.10. Work Experience and the Minimum Wage**

This study uses two measures of work experience in the questionnaire: first, whether the worker has experience of working abroad, and second, whether the worker has experience of working in their home country before coming to the UK. The results show that 53% of the respondents have work experience in their home country. The Pearson's chi-square coefficient shows that work experience in the home country is significantly associated with migrants' wage levels (Table 5.3, chi-square = 3.564,  $p < 10\%$ ).

Table 5.5 shows the last jobs in their home countries of migrants who earn the minimum wage or below. If work experience in the home country is used as the definition of skill, it is evident from the results that migrants who earn the minimum wage or below are being downgraded: the majority of them were in the upper levels of occupational distribution in their home country, but in the UK they are taking lower levels of work.

The results also show that 33.5% of total respondents have experience of working abroad (i.e. in a country other than either the UK or their home country). Although working abroad has no significant association with the level of wage, it is evident that 25 respondents (12.5% of total respondents) who have experience of working abroad still earn the minimum wage or below – another sign that migrants are downgraded.

<b>Last Job in Home Country</b>	<b>Number of Workers</b>
Administrator	1
Airline staff	1
Bank customer service agent	1
Businessman	1
Call centre agent	1
Cardiovascular-thoracic technologist	1
Cashier	1
Civil engineer	1
Computer engineer	1
Consultant	1
Dental assistant	1
Doctor	1
Domestic worker	1
Electrician	1
Estate agent	1
Factory worker	3
Housekeeper	1
Insurance marketing manager	1
IT product manager	1
IT professional	1
Journalist	1
Lecturer	1
Product designer	1
Production supervisor	1
Public relations consultant	1
Retail worker (shoe company)	1
Salesperson	3
Schoolteacher	2
Shopkeeper	2
Steel industry worker	1
Supermarket worker	1
Translator	1
Waiter	1
Worker in family business	1
Total (Valid N=200 or 100%)	40

**Table 5.5 The Last Job in the Home Country of Migrants Earning the Minimum Wage or Below**

#### **5.1.11. Low-Paying Sectors and the Minimum Wage**

Descriptive statistics from Table 5.1 can be used to analyse the minimum wage and low-paying sectors. Table 5.1 shows that the sectors with the largest proportions of minimum-wage workers are restaurant/bar work (30 out of 38 workers earning the minimum), followed by factory work (seven out of 10 workers earning the minimum) and domestic work (14 out of 21 workers earning the minimum). The three lowest-paid workers in the sample are restaurant workers earning wages less than £2.00 per hour. Two of these work 10 hours a day, six days a week, to get paid as little as £100 per week (equivalent to £1.67 per hour). The third works for 12 hours a day, six days a week, to get paid as little as £130 per week (equivalent to £1.81 per hour).

Domestic work falls into the category of minimum-wage jobs mainly because these jobs demand long working hours, while payment is made weekly or monthly. On average, the hours of work for domestic workers in the sample are 10 hours per day, and the majority of them are paid weekly or monthly. Meanwhile, in the factory and restaurant/bar sectors, wages are mostly set hourly, but disturbingly, some employers set the hourly wage below the National Minimum Wage. It is to be noted that there are 13 respondents who are paid hourly and whose hourly pay is clearly below even the October 2010 National Minimum Wage. They are eligible for the adult minimum-wage rate, and yet their hourly pay is below that rate, ranging from £4.50 to £5.90 per hour. This is evidence of non-compliance with National Minimum Wage legislation. Table 5.6 shows the distribution of workers in the sample by hourly wage.

<b>Hourly Wage or Equivalent</b>	<b>Proportion of Total Sample</b>	<b>Description</b>
<£5.93	30.8%	Below the 2010 Adult National Minimum Wage
≤£5.93	35.9%	Up to the 2010 Adult National Minimum Wage
<£6.08	44.9%	Below the 2011 Adult National Minimum Wage
≤£6.08	43.5%	Up to the 2011 Adult National Minimum Wage
≤£6.69	56.6%	Up to the 2011 Adult National Minimum Wage + 10%
≤£7.30	67.7%	Up to the 2011 Adult National Minimum Wage + 20%
<£8.30	77.3%	Below the 2011 London Living Wage

**Table 5.6 Hourly Wage Distribution**

### **5.1.12. Ethnicity and the Minimum Wage**

This study has limitations in terms of the variety of respondents' ethnicities. The respondent profile (Table 5.1) to some extent leans towards Asian ethnicities. Therefore no tests were conducted to look for a link between ethnicity and the minimum wage, as the results might have been flawed. Nevertheless, it is worth considering the distribution of Asian ethnicities and their wage levels. Table 5.7 shows that Chinese, South-East Asian, Bangladeshi and Indian ethnic groups have the highest proportions of minimum-wage workers. These results are partly similar to figures produced by the Low Pay Commission (2011: 34), which show that among all ethnic groups, the Bangladeshi group has the highest proportion of workers earning the minimum wage or below (approximately 15% of Bangladeshi workers earned the 2011 Adult National Minimum Wage of £5.93 per hour, or below).

### **5.1.13. Employer's Ethnicity and the Minimum Wage**

The logistic regression (Table 5.2) shows that having an employer of local ethnicity significantly reduces migrants' likelihood of earning the minimum wage or below: if the employer is from a local ethnic (British/native) background, the respondent is 0.305 times less likely to earn the minimum wage or below.



However, the regression results do not show any such relationship in the case of employers of the same ethnicity as the migrant workers (Table 5.2). There is insufficient evidence to say that workers whose employers share the same ethnicity tend to earn the minimum wage or below.

Table 5.7 shows the distribution of employers' ethnicity.

<b>Ethnicity</b>	<b>Minimum-Wage Workers</b>	<b>Above-Minimum Wage Workers</b>
<b>Asian Ethnicity</b>		
Asian British	0 (0%)	2 (3.1%)
Asian Indian	15 (19.7%)	15 (23.1%)
Asian Pakistani	3 (3.9%)	7 (10.8%)
Asian Bangladeshi	15 (19.7%)	15 (23.1%)
Asian South-East Asian	34 (44.7%)	16 (24.6%)
Asian Chinese	4 (5.3%)	1 (1.5%)
Asian Other	5 (6.6%)	9 (13.8%)
Total	76 (100%)	65 (100%)
Valid N=198 (99%)		
<b>Employer's Ethnicity</b>		
Same ethnic origin (as worker)	19 (22.9%)	9 (8.2%)
Other (migrant) ethnic origin	30 (36.1%)	17 (15.5%)
Local/British (incl. British companies)	33 (39.8%)	79 (71.8%)
Don't know	1 (1.2%)	5 (4.5%)
Total	83 (100%)	110 (100%)
Valid N=193 (96.5%)		

**Table 5.7 Ethnicity and Wage Levels**

#### **5.1.14. Hours of Work and the Minimum Wage**

The logistic regression (Table 5.2a) shows that their hours of work significantly affect migrants' likelihood of earning the minimum wage or below. If hours of work per week increase by one hour, migrants are 1.038 times more likely to earn the minimum wage or below. Table 5.8 shows the evidence in detail. Workers who work 61–70 hours or more per week tend to earn the minimum wage or below. The majority of workers who work longer hours are in the domestic work sector. There are three domestic workers and one care worker who work 61–70 hours per week. There are three domestic workers and one restaurant worker who work 71–80 hours per week. The two workers who work the longest hours in the sample are also domestic workers, working 84 and 93.5 hours per week. The

former of the two works from 7am to 9pm, six days a week, for £250 per week (equivalent to £2.98 per hour); the latter works from 7am to midnight, five and a half days per week, for £240 per week (equivalent to £2.57 per hour). It is disturbing to see the reality of those who work very long hours and who, for that very reason, receive significantly below the minimum wage.

<b>Hours of Work per Week</b>	<b>Minimum-Wage Workers</b>	<b>Above-Minimum Wage Workers</b>
Up to 20 hours	27 (31%)	39 (35.1%)
21–40	29 (33.3%)	55 (49.5%)
41–50	7 (8%)	12 (10.8%)
51–60	14 (16.1%)	4 (3.6%)
61–70	4 (4.6%)	1 (0.9%)
71–80	4 (4.6%)	0 (0%)
81–90	1 (1.1%)	0 (0%)
More than 90	1 (1.1%)	0 (0%)
Total	87 (100%)	111 (100%)
Valid N=198 (99%)		
Chi-square=22.320, p<1%		

**Table 5.8 Hours of Work and Wage Levels**

#### **5.1.15. The Minimum Wage and the London Living Wage**

It is interesting to relate the minimum wage with the London Living Wage, particularly because the primary research is targeted at workers in London. A significant proportion of migrant workers in the sample earn below the minimum wage, and the majority of migrants in the sample also earn below the London Living Wage. Table 5.6 shows that 77.3% of total respondents earn below £8.30 per hour, which was the 2011 London Living Wage.

The demand for a London Living Wage was introduced in April 2001 by London Citizens, an alliance of community organisations including faith groups, schools and union branches. Their main demand is that every worker should earn enough to provide their family with the essentials of living (Citizens UK, 2012). Numerous studies have been implemented since the campaign began, notably at Queen Mary, University of London (Queen Mary University of London, 2012). One of the studies focuses on London's cleaning sector, with samples of cleaners from various workplaces, including subcontracted and agency workers.

The findings are mainly in line with the living-wage campaign, that is, they support the need for workers to earn a living wage.

Although this study is not specifically designed to investigate whether its respondents earn a living wage, it is still interesting to observe the respondent profile in light of the argument for the living wage.

In relation to living-wage research, Wills (2009) argues that many of the workers in London who earn well below the living wage are migrants who do not have access to the government benefit system. ‘They include international students, new arrivals from central and eastern Europe and irregular migrants who are not eligible to claim the in-work benefits that are available to their colleagues. Many of them have dependants and are the only working adult in the family’ (Wills, 2009: 38–39). Wills continues that even if they were paid the living wage – which is approximately 40% higher than the National Minimum Wage – these workers would never earn enough to provide their family with the essentials of living. ‘As a result, many work long hours, take up second or third jobs and share their accommodation with others’ (Wills, 2009: 39).

This study’s findings in relation to hours of work suggest that some of the workers in the sample who work very long hours still do not earn enough to provide their families with the essentials of living, as their wages are still below the London Living Wage (and some are even below the National Minimum Wage). Furthermore, this study’s findings highlight that workers who work such long hours are marginalised through unfair employment practices, with unclear working hours and wages that are not set at an hourly rate. The findings also support Wills’ argument about multiple jobs: some workers in the sample have to take two or three jobs in order to support their families to a decent standard. This raises the issue migrants who have dependants and who might be the only working adults in the family. The next subsections provide a discussion of these issues.

#### **5.1.16. The Number of Jobs Held and the Minimum Wage**

It is suggested in the living-wage campaign that some workers have to work more than one job because they cannot otherwise earn enough to provide their families with the essentials of living. Although the results of this study show no significant association between the

number of jobs held and wage levels, it is interesting to consider the profile of migrant workers in the sample who have more than one job.

Table 5.9 shows that there are 12 respondents earning the minimum wage or below who hold more than one job. Five of the 12 are workers whose main job is in the cleaning sector. This evidence supports Wills' (2009) argument that some cleaners have to take more than one job simply to be able to provide their family with the essentials. Three of these five cleaners have additional jobs as cleaners in other workplaces; one of the five has another job as a domestic worker; the last has a job at a school canteen, serving food and tidying the canteen. Four of the 12 are restaurant workers. Two of the 12 are undocumented workers. Two of the 12 state that they even have three jobs: one works in two different workplaces as cleaner and also has a third job as carer; the other works in three different restaurants. This evidence supports the living-wage argument that some workers who earn the minimum wage or below have to work two or three jobs simply because they would not otherwise earn enough to provide themselves and their families with the essentials of life.

Does the Respondent Have More Than One Job?	If the Main Job is at the Minimum-Wage or Above-Minimum Wage Level	
	Minimum Wage	Above Minimum Wage
Yes	12 (13.8%)	19 (17.1%)
No	75 (86.2%)	92 (82.9%)
Total	87 (100%)	111 (100%)
Valid N=198 (99%)		

**Table 5.9 Respondents with Multiple Jobs and Their Wage Levels**

#### **5.1.17. Migrants with Dependent Children and the Minimum Wage**

The living-wage campaign points out that a worker might be the only working adult in the family, and that it is therefore necessary for that worker to be able to earn enough to provide their family with a decent standard of living. Although the results of this study show no evidence of any association between dependants and wage levels, Table 5.10 shows that there is a proportion of workers with dependent children who earn the minimum wage or below (26 workers, 13% of the total sample). The majority of these are domestic workers (11 workers), followed by cleaners (four) and factory workers (three).

The survey also asks whether the respondent's children are in the home country, the host country or elsewhere. Table 5.10 shows that seven of the respondents with children in the host country (the UK) earn the minimum wage or below. Six of the seven, according to their legal status, are eligible to access the benefit system; the seventh is on a student visa, and so has no access to public funds. One of the seven with dependent children in the UK is a cleaner; she explained that she has to work more than one job in order to support her son, who is about to enter university. This exactly reflects the living-wage campaign's argument that some workers simply do not earn enough to provide their family with the essentials of living.

In the sample there is also a proportion of migrants who have children in their home country and who earn the minimum wage or below (19 workers or 9.5% of the total sample, see Table 5.10). One might wonder whether these workers can support their families if they do not even achieve a minimum standard of living for themselves.

<b>Dependent Children</b>	<b>Minimum-Wage Workers</b>	<b>Above-Minimum Wage Workers</b>
<b>Does the respondent have dependent children?</b>		
Yes	26 (29.9%)	42 (37.8%)
No	61 (70.1%)	69 (62.2%)
Total (Valid N=198 or 99%)	87 (100%)	111 (100%)
<b>Where do the dependent children live?</b>		
Home country	19 (73.1%)	17 (40.5%)
Host country	7 (26.9 %)	21 (50 %)
Home and host country	0 (0%)	2 (4.8%)
Elsewhere	0 (0%)	2 (4.8%)
Total (Valid N=68 or 100%)	26 (100%)	42 (100%)

**Table 5.10 Respondents with Dependent Children and Wage Levels**

### **5.1.18. Union Membership and the Minimum Wage**

The regression results show no evidence that union membership affects migrants' likelihood of earning the minimum wage or below. However, only a small proportion of migrants in the sample are members of a trade union: 34 respondents, or 17% of the total sample. Interestingly, there are 12 workers who have union membership but still earn the

minimum wage or below (Table 5.11). Nine of the 12 individuals are domestic workers. As noted above, there is a possibility of the marginalisation of domestic workers who work long hours; this may be because they have no formalised employment contracts in term of hours of work or wages. Nonetheless, it is surprising that their engagement with a union still has not freed them from the trap of unformalised working hours. If this state of affairs remains constant, migrant domestic workers will remain at the bottom end of the pay distribution.

<b>Respondent Profile</b>	<b>Minimum-Wage Workers</b>	<b>Above-Minimum Wage Workers</b>
<b>Union Membership</b>		
Yes	12 (13.8%)	22 (19.8%)
No	75 (86.2%)	89 (80.2%)
Total (Valid N=198 or 99%)	87 (100%)	111 (100%)

**Table 5.11 Union Membership in Relation to Wages**

#### **5.1.19. Legal Status and the Minimum Wage**

Legal status is one of the important variables to be examined for its relationship with wage levels, but for the most part it has not been well investigated in previous public surveys. This thesis therefore seeks to emphasise the importance of migrant legal status in relation to the minimum wage. The logistic regression confirms that there is a significant relationship between migrants' legal (work-permit) status and the likelihood of earning the minimum wage or below. Interpretation of Table 5.2a reveals that workers who need a work permit in order to work are 4.646 times more likely to earn the minimum wage or below.

In relation to the legality of entering the UK labour market, there is great pressure on employers to check the legal status of workers. Since February 2008 tough penalties have been in force for anyone caught employing workers with no right to work. According to the UK Border Agency's official website, 'the most severe penalties, including unlimited fines and prison sentences, are for employers that knowingly break the rules. But even those who unknowingly employ illegal migrants through less than diligent recruitment and employment practices, can face penalties of up to £10,000 for each illegal worker' (UKBorder Agency, 2010).

The survey questionnaire asks whether workers have been asked by their employer to prove their legal status. It is no surprise that 187 (93.5%) of the 200 respondents have been asked by their employers to prove their legal status. Of these 187 respondents, 176 (94%) have been asked to prove it in their current jobs. There are 13 respondents who have never been asked to prove their legal status; nine of them are currently undocumented.

The questionnaire also asks whether respondents have experienced any change in their legal status. Table 5.12 presents the proportion between changes in legal status and the level of wage. Table 5.13 describes the types of legal status in detail, and the changes in legal status: from first arrival in the UK to current legal status. Taken together, Tables 5.12 and 5.13 suggests that a change in legal status, notably in the ability to access the labour market, might be associated with higher wages. The regression suggests that workers who need a work permit are four times more likely to earn the minimum wage or below.

<b>Has the Respondent Changed Legal Status?</b>	<b>Minimum-Wage Workers</b>	<b>Above-Minimum Wage Workers</b>
Yes	40 (46%)	50 (45%)
No	47 (54%)	61 (55%)
Total (Valid N=198 or 99%)	87 (100%)	111 (100%)

**Table 5.12 Legal Status Change and Wage Levels**

<b>Changes in Legal Status (Status on First Arrival to → Current Status)</b>	<b>Minimum-Wage Workers</b>	<b>Above-Minimum Wage Workers</b>
Visitor/tourist → no visa (British passport)	1	2
Visitor/tourist → no visa (ILR)	4	4
Visitor/tourist → asylum seeker	1	1
Visitor/tourist → undocumented	7	2
Visitor/tourist → student	1	0
Work visa → no visa (ILR)	6	11
Work visa → undocumented	2	1
Work visa → no visa (British passport)	0	2
Engaged/married → no visa (ILR)	1	0
Student → work visa	12	12
Student → no visa (British passport)	0	2
Student → no visa (ILR)	0	1

Student → undocumented	3	1
Dependant → no visa (British passport)	0	1
Claimed asylum on arrival → no visa (British passport)	0	5
Claimed asylum on arrival → no visa (ILR)	0	4
Other → no visa (ILR)	1	1
Other → undocumented	1	0
Total (Valid N=90 or 100%)	40	50

**Table 5.13 Changes in Legal Status**

#### **5.1.20. Undocumented Workers and the Minimum Wage**

For the purposes of the discussion of legal status, this study sought to include a proportion of undocumented workers in the sample. It is hypothesised that undocumented workers derive the least benefit from rises in the minimum wage. It is also hypothesised that because of their undocumented status, they will not receive the minimum wage, will receive fewer non-wage benefits, and will probably work in secondary jobs or in the underground economy, where their working conditions too will be inferior. It is their status that leads them to undertake the most precarious jobs with the lowest pay and the smallest number non-wage benefits. Table 5.14 describes the profile and job descriptions of the undocumented workers in the sample. In total there are 17 undocumented respondents (8.5% of the total sample).

Table 5.14 shows that the working conditions of undocumented workers confirm the inferior characteristics of secondary-segment jobs: the work is temporary, flexibilised, precarious, unsecured and informal, and provides lower pay and fewer non-wage benefits. McKay *et al.*'s (2011) study of undocumented migrants argues that sanctions against employers who employ workers without permits paradoxically leads employers to further increase their exploitation of undocumented migrants. This study appears to confirm that low levels of pay, poor provision of non-wage benefits and inferior working conditions are used to offset the fines that employers have to pay for employing undocumented workers. As Bacon (2008) argues, it is workers rather than employers who have to bear the cost of such sanctions; and as McKay *et al.* (2011) argue, the burden of the risk of being raided by the authorities is also borne by the workers. Thus undocumented workers are the group of migrants who derive the least advantage from the minimum wage, as they face low pay,



fewer non-wage benefits, insecurity, flexibilisation and temporary work as a result of their undocumented status.

Most of the undocumented migrants in the sample are at their most productive age.

Thirteen out of the total of 17 undocumented workers earn less than the national minimum wage. Some even have to work more than one job and to work in different places, which confirm that their jobs are temporary and flexibilised. Some are in the most vulnerable positions. Two undocumented domestic workers rely on help from their colleagues to get jobs. One respondent is seeking help to resolve her undocumented status.

I had an opportunity to speak with one employer who employs undocumented workers. He runs a small construction company, where he employs documented as well as undocumented workers. His justification for employing undocumented workers is that he is helping his community. He says that if someone from his community comes and asks him for a job, he cannot turn them away. This situation also applies to some undocumented respondents who work in restaurants. At first they had a legal status that allowed them to work; however, at some point their visas expired and they could not renew them. Their employers were aware of their situation, and continued to employ them on the grounds of solidarity.

However, it might be argued that it is to the employers' economic benefit to continue to utilise undocumented workers. It is to be noted that a small proportion of the undocumented workers in this study work in the legitimate economy, meaning that the businesses where they work are proper legal businesses. This exactly confirms Piore's (1979) argument that the duality of the labour market can be seen even in a legitimate business: employers create a duality of jobs by employing documented as well as undocumented migrants.

<b>Gender, Age</b>	<b>Profile and Job Description</b>
Male, 24	Has two jobs: distributing leaflets, and as a kitchen porter in a restaurant.
Female, 44	Has a regular part-time job taking care of an empty house while the owner is overseas. Has irregular jobs as a domestic worker in various places; these jobs are usually provided by her colleague (another domestic worker).
Male, 25	Sells ethnic food door-to-door to companies, shops and colleges (the majority of staff in these places share a similar ethnic

	background with the respondent). Cooks for approximately three hours to prepare the food, and then sells the food during lunchtimes from noon to 3pm. Makes approximately 55 boxes per day with a price of £2–3 per box. In the evening, he works in a restaurant (the owner of which is of the same ethnicity as the respondent) as a second chef, for eight hours per day, six days per week, for which he receives £150 per week; he has been working in this restaurant for three years.
Female, 40	Works as a domestic worker in various houses; the jobs are provided by her colleague. Cannot speak English at all – the interview was conducted with another respondent acting as interpreter. Has previous work experience in Jeddah. Receives only bonuses and gifts as non-wage benefits. Never receives training, but receives above-minimum wage pay. Works only part-time and has no formal education.
Male, 22	Works in a restaurant in central London.
Female, 29	Works in a formally established restaurant in central London as a waitress.
Male, 30	Works in construction.
Male, 32	Works in a street market.
Female, 40	Works as a domestic worker. Was brought to the UK by her previous employer, who was a diplomat; the respondent then changed to another employer, and is now undocumented. Her situation is difficult. One NGO kept pushing her to apply for asylum-seeker status. This NGO – which claims to care for domestic workers’ rights – kept threatening that if she refused to sign the asylum application, the police would catch her. She signed the asylum application without clearly knowing what an asylum-seeker is. She is very reluctant to become an asylum seeker. Now her case is being processed in court. She is being asked a lot of questions by the Home Office, such as ‘Do you know what asylum is?’ and ‘Do you know that you can’t work with an asylum visa?’ Her vulnerable position makes it difficult for her to seek help; some people even try to take advantage of her. She is still seeking help, and asked throughout the interview whether I could help her. She previously had a solicitor, and her solicitor argued a lot with the NGO’s solicitor.
Male, 30	Works in a shop in East London.
Female, 28	Works in a shop that sells clothes. This is a cash-in-hand job. Her employer is from the same ethnic background. Her current job is her first job, and her employer never asked about her legal status.
Male, 49	Works as kitchen chef in a formally established restaurant in London. Never receives any training. Has extensive previous experience as a kitchen chef.
Male, 24	Works in a catering agency that serves clients in various places. Only gets lunch during the day; no other non-wage benefits, no training.
Male, 27	Works in a shop that sells clothes. This is a cash-in-hand job. His employer is from the same ethnic background. He has a second job in a catering agency.

Male, 26	Works as a domestic worker.
Male, 37	Works in a street market.
Female, 36	Works in a formally established restaurant in central London as a waitress.

**Table 5.14 Profile and Job Descriptions of Undocumented Migrants**

#### **5.1.21. Students in Minimum-Wage Jobs**

Students in the sample represent a significant proportion of migrants who earn the minimum wage or below. There are 33 students (16.5% of the total sample) who earn the minimum wage or below. Students also fall into the category of those who undertake precarious jobs. Ongoing research led by the Working Lives Research Institute is investigating precarious work among students in Europe (Working Lives Research Institute, 2012). According to this study, migrant students intend to stay in the host country for a limited time only. They therefore tend to undertake jobs of whatever kind is available at the time.

It is thus a limitation of this thesis that it is unclear whether the jobs students are currently doing reflect the jobs they would hold if fully qualified and integrated in the labour market post-qualifications. Nevertheless, the results show that 12 respondents who earn the minimum wage or less are also holders of Post-Study Work visa, which gives graduates of UK institutions the right to seek employment in the UK for up to two years. These are students who had completed their education in the UK and they are still doing the jobs in the low-paid, low-skilled sectors. Thus, even though there are students in the sample who have not yet completed their education, there are others who have completed their education (and thus fully qualified to undertake skilled jobs) and who are still undertaking the low-paid, low-skilled jobs. This to some extent reflects Dustmann *et al.*'s (2007) argument that educated migrants are still concentrated at the lower end of the pay distribution. However, given the limitations of the purposive sampling and the lack of comparable information on non-migrants, it is difficult to confirm with certainty whether migrants experience downgrading at work.

The results from the logistic regression (Equation 5.1b) using student as control variable shows that student status does not significantly affect the minimum wage (see Table 5.2b and Appendix 6 –for SPSS result). It is thus fair to say that, even though students constitute

a third of the sample, student legal status does not statistically bias the analysis of the factors affecting the minimum wage.

## **5.2. The National Minimum Wage's Effects on the Non-Wage Benefits of Migrants**

This second part of the analysis of the primary research is particularly important, as the evidence from this part will constitute the original contribution of this thesis to the minimum-wage literature. There is a paucity of literature that discusses the UK National Minimum Wage's effect on the non-wage benefits of migrant workers. This study intends to fill this gap by providing original evidence from the UK labour market on the basis of primary data.

It is hypothesised that the minimum wage is a significant predictor of migrants' access to non-wage benefits. In relation to the second research question, it is hypothesised that the minimum wage affects migrants differently, such that migrants on the minimum wage or below are less likely to receive non-wage benefits. Evidence from this part of the chapter will also be used to return to the first research question on the adverse effects of the minimum wage on non-wage benefits, as evidence from secondary data was not enough to prove or disprove the hypothesis.

Logistic regression is used to estimate the minimum wage's effect on migrants' likelihood of receiving non-wage benefits. Each non-wage benefit is tested in the regression estimation. The hypothesis is that respondents who earn the minimum wage or below are less likely to receive non-wage benefits. The regression should be read as showing whether the minimum wage is a significant predictor of migrants' likelihood of receiving non-wage benefits.

The logistic regression presented here is using the 'reverse causality': the minimum wage is now reversed, from being the dependent variable, to being an independent variable. The main purpose of this is to understand the effect of minimum wage on the non-wage benefits, that is, whether the (minimum) level of wage affects the provision of non-wage benefits. In this sense, the minimum wage acts as the explanatory variable. These logistic regressions therefore contain the possibility of endogeneity problems, for instance the provision of such non-wage benefits may increase the probability of being in a minimum wage job. Thus, test of endogeneity is required before undertaking the analysis.

Control variables such as age, gender, student legal status, employment in a minimum sector and the receipt of the minimum wage or not are included in the regression analysis.

There are eight logistic regressions. A Hausman Specification test is performed to examine whether simultaneity (endogeneity) exists between Minimum wage and each of the non-wage benefits and, between Minimum Wage Sector and each of the non-wage benefits. It is decided to use the Work Permit variable as the instrument for Minimum Wage (Pearson correlation=0.344,  $p<0.01$ ); and, Same Ethnicity Employer as the instrument for Minimum Wage Sector (Pearson correlation=0.153;  $p<0.05$ ). The result of the endogeneity test (Hausman Specification) is presented in Appendix 7 while the result of the logistic regressions is in Appendix 8.

***Dependent Variable = Training***

$$\ln(p/1-p) = a + b \text{ Minimum wage} + \text{Age} + \text{Gender} + \text{Minimum Wage sector} + \text{Student}$$

(Equation 5.2a)

Hausman Specification test shows the existence of endogeneity problem between Minimum Wage Sector and Training (see Appendix 7). Two-stage least squares (2SLS) method is applied to solve the endogeneity issue, however the results show that no regressor coefficient is significant. This might be due to inefficient instruments chosen, as explained in Gujarati (2011). Durbin, Wu and Hausman test is performed as suggested by Gujarati (2011) showing that the IV (2SLS) method might be less efficient (see Appendix 7). Thus, logistic regression is preferred instead of IV (2SLS).

The forward stepwise method of logistic regression selects Minimum Wage and Student as the significant variables (see Appendix 8). The Omnibus tests of model coefficients (Appendix 8) show a chi-squared coefficient = 14.822,  $df = 2$  and a significance value,  $p=0.001$ , meaning that the Minimum Wage and Student variables increase the predictive ability of the model. The overall percentage of the correctly predicted cases is 70.7%. The total valid samples is 198 observations (99%). Hosmer and Lemeshow test shows HL= 0.871 with significance 0.647, so the null hypothesis that the model adequately predicts

group membership would not be rejected and the logistic model (Equation 5.2a) is an adequate representation of the data.

***Dependent Variable = Meals***

$$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$$

(Equation 5.2b)

Hausman Specification test shows the existence of endogeneity issue between Minimum Wage Sector and Meals (see Appendix 7). 2SLS method is applied to solve it. However, the results show no significant explanatory variables. Durbin, Wu and Hausman test is then performed and it shows that the null hypothesis would not be rejected, that is, the IV and OLS estimates are statistically the same (see Appendix 7). The logistic regression is thus preferred as it is deemed to be more efficient than the IV (2SLS) method.

The forward stepwise method of logistic regression chooses Minimum Wage and Age as the significant variables (see Appendix 8). The Omnibus tests of model coefficients (Appendix 8) show a chi-squared coefficient = 39.032, df = 2 and a significance value,  $p=0.000$ , meaning that the Minimum Wage and Age variables increase the predictive ability of the model. The overall percentage of the correctly predicted cases is 71.2%. The total valid samples is 198 (99%). Hosmer and Lemeshow test shows HL= 6.190 with significance 0.626, so the null hypothesis would not be rejected and the logistic model (Equation 5.2b) is an adequate representation of the data.

***Dependent Variable = Accommodation/Housing***

$$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$$

(Equation 5.2c)

Hausman Specification test shows no endogeneity issue between Minimum Wage Sector and Accommodation/housing (see Appendix 7 for details).

The forward stepwise method of logistic regression selects Minimum Wage and Gender as the significant variables (see Appendix 8). The Omnibus tests of model coefficients

(Appendix 8) show a chi-squared coefficient = 9.051, df = 2 and a significance value,  $p=0.011$ , indicating that the Minimum Wage and Gender increase the predictive ability of the model. The overall percentage of the correctly predicted cases is 90.4%. The total valid samples is 198 (99%). Hosmer and Lemeshow test shows HL= 4.447 with significance 0.108. The null hypothesis would not be rejected and the logistic model (Equation 5.2c) is an adequate representation of the data.

***Dependent Variable = Holiday Pay***

$$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$$

(Equation 5.2d)

To check for endogeneity problems, Hausman Specification test is conducted. The result in Appendix 7 shows that there is endogeneity between Minimum Wage and Holiday Pay. As a remedy, 2SLS method is conducted. These results (Appendix 7) show no significant explanatory variables. Durbin, Wu and Hausman test is then performed to test whether IV method or the OLS is more efficient. Hausman test shows that the null hypothesis would not be rejected and the IV and OLS estimates are statistically the same. It is thus decided to use logistic regression (the original regression) instead as it is deemed to be more efficient.

The forward stepwise method of logistic regression chooses Minimum Wage and Gender as the significant variables (see Appendix 8). The Omnibus tests of model coefficients (Appendix 8) show a chi-squared coefficient = 15.283, df = 2 and a significance value,  $p=0.000$ , meaning that the Minimum Wage and Gender increase the predictive ability of the model. The overall percentage of the correctly predicted cases is 65.7%. The total valid samples is 198 (99%). Hosmer and Lemeshow test shows HL= 0.482 with significance 0.786, indicating that the logistic model of Equation 5.2d is an adequate representation of the data.

***Dependent Variable = Paid Sick Leave***

$$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$$

(Equation 5.2e)

In order to check for endogeneity between Minimum Wage and Paid Sick Leave, Hausman Specification test is performed (Appendix 7). The results show that there is endogeneity between Minimum Wage and Paid Sick Leave. As a remedy, 2SLS method is applied. The results (Appendix 7) however show no significant explanatory variables. Durbin, Wu and Hausman test is then used to test whether IV method or the OLS is more efficient (Appendix 7). The null hypothesis (least square and IV estimates are statistically the same) would not be rejected (chi-square= 0.27, p= 99.96%). Therefore, the original regression (the logistic regression) is chosen as it is more efficient than the IV method.

The forward stepwise method of logistic regression chooses Minimum Wage as the significant variable (see Appendix 8). The Omnibus tests of model coefficients (Appendix 8) show a chi-squared coefficient = 5.981, df = 1 and a significance value, p=0.014, meaning that the Minimum Wage variable increases the predictive ability of the model. The overall percentage of the correctly predicted cases is 69.2% (N=198, 99%).

***Dependent Variable = Health/Life Insurance***

$$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$$

(Equation 5.2f)

The endogeneity test shows no endogeneity issues (see Appendix 7). The forward stepwise method of logistic regression chooses Minimum Wage Sector as the significant variable (see Appendix 8). The Omnibus tests of model coefficients (Appendix 8) show a chi-squared coefficient = 5.577, df = 1 and a significance value, p=0.018, indicating that the Minimum Wage Sector variable increases the predictive power of the model. The overall percentage of the correctly predicted cases is 89.9% (N=198, 99%).

***Dependent Variable = Pension Scheme***

$$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$$

(Equation 5.2g)

Endogeneity test shows no endogeneity issues in Equation 5.2g (see Appendix 7). The forward stepwise method of logistic regression chooses Minimum Wage as the significant



variable (see Appendix 8). The Omnibus tests of model coefficients (Appendix 8) show a chi-squared coefficient = 9.005 and a significance value,  $p=0.003$ . The Minimum Wage variable increases the predictive ability of the model. The overall percentage of the correctly predicted cases is 91.4% (N=198).

***Dependent Variable = Bonus***

$$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$$

(Equation 5.2h)

There is endogeneity between Minimum Wage and Bonus (see Appendix 7 for the endogeneity test). 2SLS method is conducted to solve it. The logistic regression (the original regression) is used instead as it is deemed to be more efficient (see Appendix 7 for IV/2SLS and Hausman test). The stepwise method does not give satisfactory results, therefore the enter method is used instead (see Appendix 8). The Omnibus tests of model coefficients show a chi-squared coefficient = 4.727,  $df = 5$  and a non-significance value,  $p=0.450$ , meaning that no variable increases the predictive ability of the model.

Table 5.15a and Table 5.15b present the results of the logistic regressions. Only the significant variables are reported as the forward stepwise method is used. The SPSS results are presented in Appendix 8.

Equation	Dependent Variable	Minimum Wage Coefficient	Minimum Wage Exp(B)	Minimum Wage Sector Coefficient	Minimum W. Sector Exp (B)
5.2a	Training	<b>-1.008***</b>	<b>0.365</b>		
5.2b	Meals	<b>1.663***</b>	<b>5.277</b>		
5.2c	Accommodation	<b>1.165**</b>	<b>3.206</b>		
5.2d	Holiday pay	<b>-0.905***</b>	<b>0.404</b>		
5.2e	Paid sick leave	<b>-0.779**</b>	<b>0.459</b>		
5.2f	Health/life insurance			<b>-1.231**</b>	<b>0.292</b>
5.2g	Pension scheme	<b>-1.893**</b>	<b>0.151</b>		
5.2h	Bonuses				

Each equation has a valid N=198 (99%)

\*Significant at  $p<0.1$ .

\*\*Significant at  $p<0.05$ .

\*\*\*Significant at  $p<0.01$ .

**Table 5.15a The Minimum Wage's Effects on Non-Wage Benefits (Regression Results)**

Equa- tion	Dependent Variable	Age (Coefficient)	Gender (Coefficient)	Student (Coefficient)
5.2a	Training			<b>1.036***</b>
5.2b	Meals	<b>-0.046**</b>		
5.2c	Accommodation		<b>0.984*</b>	
5.2d	Holiday pay		<b>0.750**</b>	
5.2e	Paid sick leave			
5.2f	Health/life insurance			
5.2g	Pension scheme			
5.2h	Bonuses			

Each equation has valid N=198 (99%)

\*Significant at  $p<0.1$ .

\*\*Significant at  $p<0.05$ .

\*\*\*Significant at  $p<0.01$ .

**Table 5.15b Control Variables' Effects on Non-Wage Benefits (Regression Results)**

### **5.2.1. The Minimum Wage's Effect on Access to Training**

The logistic regression shows that the minimum wage is a significant predictor of migrants' likelihood to have access to training. When migrants earn the minimum wage or below, they are 0.365 times less likely to receive training. When migrants are student, they are also 2.818 times more likely to receive training.

### **5.2.2. The Minimum Wage's Effect on Access to Meals**

In relation to meals as a non-wage benefit, the minimum wage increases migrants' likelihood of receiving meals. Migrants on the minimum wage or below are 5.277 times more likely to receive meals. The increasing of age by one year also makes migrants 0.955 times less likely to receive meals.

### **5.2.3. The Minimum Wage's Effect on Access to Accommodation**

The minimum wage is a significant predictor of migrants' access to accommodation or housing. Migrants who earn the minimum wage or below are 3.206 times more likely to have access to accommodation/housing. From the primary data, it is noted that the majority of accommodation is received by live-in domestic workers. A few restaurant workers also receive accommodation, but according to face-to-face interviews with restaurant workers, the majority of the accommodation is substandard. This finding is consistent with French and Möhrke's (2007) argument that in cases where the employer provides accommodation, it is in inferior condition, and workers' wages are kept as low as possible. The evidence suggests that accommodation is used as an offset in order to pay workers below the minimum wage. Male migrants are 2.675 times more likely to receive accommodation.

### **5.2.4. The Minimum Wage's Effect on Access to Holiday Pay**

The evidence on holiday pay confirms the hypothesis that the minimum wage has an adverse effect on non-wage benefits. Migrants who earn the minimum wage or below are 0.404 times less likely to receive holiday pay. Furthermore, male migrants are 2.118 times more likely to receive holiday pay.

### **5.2.5. The Minimum Wage's Effect on Access to Paid Sick Leave**

The logistic regression confirms that the minimum wage significantly affects migrants' likelihood of receiving paid sick leave. Migrants who earn the minimum wage or below are 0.459 times less likely to receive paid sick leave.

### **5.2.6. The Minimum Wage's Effect on Access to Health/Life Insurance**

The logistic regression shows that migrants who are in the minimum wage sector are 0.292 times less likely to receive health/life insurance.

### **5.2.7. The Minimum Wage's Effect on Access to Pension Schemes**

The logistic regression shows that migrants on the minimum wage or below are 0.151 times less likely to receive a pension scheme.

### **5.2.8. The Minimum Wage's Effect on Access to Bonuses**

Bonuses do not depend on the minimum wage.

### **5.3. Minimum Wage, Minimum Wage Sector, and Control Variables on Non-Wage Benefits**

#### **5.3.1. Does the Minimum Wage Adversely Affect Migrants' Access to Non-Wage Benefits?**

Overall the findings (particularly from Table 5.15a) suggest that the minimum wage adversely affects migrants' access to non-wage benefits. Migrants who earn the minimum wage or below are less likely to receive training, holiday pay, paid sick leave, and a pension scheme. This evidence suggests that migrants are affected differently by the minimum wage, in particular in relation to the non-wage benefits they receive.

There is also evidence that the minimum wage increases migrants' likelihood of receiving particular non-wage benefits. Migrants on the minimum wage or below are more likely to receive meal and accommodation. A careful examination suggests that the non-wage benefits that is more likely to be received by migrants on the minimum wage or below – meals – are probably less costly than those they are less likely to receive – training, holiday pay, paid sick leave, and pension schemes.

Accommodation/housing, which is more likely to be received by migrants on the minimum wage or below, may be less costly for particular employers to provide. The evidence shows that the majority of accommodation is received by live-in domestic workers, and by some restaurant workers on very low wages. Indeed, some restaurant workers even pointed out that the accommodation provided is far from healthy or acceptable standards, with no central heating. Moreover, the provision of accommodation seems to be used by employers as an excuse to pay very low wages. One restaurant worker who receives accommodation is paid as little as £1.81 per hour; one live-in domestic worker is paid as little as £2.57 per hour. In total, three of the four restaurant workers who receive accommodation are paid below the National Minimum Wage, while nine of the 11 domestic workers who are live-in workers are paid below the National Minimum Wage. It is certainly evident that employers violate the National Minimum Wage policy when they provide accommodation.

The accommodation offset laid down by the 2011 National Minimum Wage policy is £4.73 per day, but workers' wages are being pushed far below the offset level. Table 5.16 shows that workers earning below the minimum wage (even the highest paid of them) still do not

earn the statutory wage when the National Minimum Wage's offset for accommodation is taken into account. Indeed, the figures reveal the extent to which employers violate the policy by providing accommodation while underpaying their workers: the discrepancy ranges from £25.30 to £279.40 per week.

	<b>Hous per Day</b>	<b>Days per Week</b>	<b>Weekly Wage (a)</b>	<b>Weekly Accommodation Offset Allowed by the National Minimum Wage</b>	<b>Weekly Wage According to the National Minimum Wage, Minus Accommodation (b)</b>	<b>Difference  (b) – (a)</b>
Lowest paid below the minimum wage	12	6	£130	£28.40	£409.40	£279.40
Highest paid below the minimum wage	12	5.5	£350	£26.00	£375.30	£25.30

**Table 5.16 The Minimum Wage and Accommodation Offsets**

This confirms previous findings by Anderson *et al.* (2007) that employers utilise accommodation to pay workers below the statutory minimum wage. In their report to the Trades Union Congress (TUC), Anderson *et al.* (2007: 11) demonstrate that ‘it is unlikely that the proportion of those earning below the minimum wage can be explained by the accommodation offset.’ Evidence from this thesis also reveals the substandard condition of the accommodation provided, confirming Anderson *et al.*’s (2007) findings. It is therefore problematic that workers to whom employers provide accommodation are excluded from the minimum wage.<sup>2</sup>

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<sup>2</sup> The TUC guide to the National Minimum Wage clearly states that ‘people working and living within their employer’s family home, who are provided with free accommodation and meals and who share in the tasks and leisure activities of the household’ are not entitled to the National Minimum Wage (TUC, 2008). A UNISON factsheet similarly states that ‘workers who live in their employer’s home’ are excluded from the minimum wage (UNISON, 2012)

On the other hand, this study argues that the non-wage benefits that are less likely to be received by migrants on the minimum wage or below – training, holiday pay, paid sick leave, and pension schemes – would make greater contributions towards the improvement of workers’ living standards; moreover, they would also provide better value for money. To sum up, the minimum wage tends to reduce migrants’ likelihood of receiving the non-wage benefits which are more costly and make a greater contribution to improving workers’ lives.

### **5.3.2. Does the Minimum Wage Sector Adversely Affect Migrants’ Access to Non-Wage Benefits?**

Table 5.15a shows that migrants who work in the minimum wage sectors are less likely to get access to health/life insurance. ,

### **5.3.3. Do Age, Gender and Student Legal Status Significantly Affect Migrants’ Access to Non-Wage Benefits?**

Gender is the only significant determinant for access to accommodation and holiday pay. Male migrants are more likely to have access to accommodation and holiday pay. Age has a significant negative effect on meals. Moreover, students in the sample are more likely to receive training.

## **5.4. The Proportion of Non-Wage Benefits Received**

It is evident that migrants in low-paid, low-skilled sectors generally receive fewer non-wage benefits. Table 5.17 presents the statistics on the non-wage benefits received by the respondents. The most commonly received benefit is training, which is received by 71% of the total sample. The second most commonly received is holiday pay, which is received by only 59.5%. Other non-wage benefits represent smaller proportions: paid break time (38%), bonuses (36.5%), paid sick leave (31%), health/life insurance (10.5%), and pension schemes (8.5%). The provision of health/life insurance and pensions, for example, in low-paid, low-skilled jobs is extremely low.

Non-Wage Benefits Received	Whether the Respondent Earns the Minimum Wage or Above		Total (% of Total Sample)
	Minimum Wage	Above-Minimum Wage	
Training***	53	87	142 (71%)
Meals***	52	23	75 (37.5%)
Accommodation/housing**	13	6	19 (9.5%)
Holiday pay***	41	76	119 (59.5%)
Paid sick leave**	19	42	62 (31%)
Health/life insurance*	5	15	21 (10.5%)
Pension scheme**	2	15	17 (8.5%)
Bonuses	36	36	73 (36.5%)

N=198 (99%).

The minimum wage's impact on non-wage benefits based on logistic regression results:

\*Significant at  $p < 10\%$ .

\*\*Significant at  $p < 5\%$ .

\*\*\*Significant at  $p < 1\%$ .

**Table 5.17 Non-Wage Benefits and Wage Levels**

### 5.5. Non-Wage Benefits by Sector

This thesis is also interested in the non-wage benefits received in low-paid, low-skilled sectors. Pearson's chi-square coefficient was used to analyse whether there is an association between particular sectors and particular non-wage benefits. Tables 5.18a and 5.18b show the variations in non-wage benefits between the sectors. The results show that the majority of non-wage benefits are significantly associated with particular sectors. This means that the non-wage benefits received are associated with the sectors in which migrants work: for example, meals are mainly received by restaurant workers, while accommodation is mainly received by domestic workers. In other words, particular sectors provide particular non-wage benefits. This result supports the logistic regression findings discussed earlier (see Section 5.3b and Table 5.15a) about the effect of the minimum wage sector on non-wage benefits.

This section will discuss in detail three sectors – the domestic-work, cleaning and restaurant sectors – and will argue that migrants in these sectors are more deprived in terms of the non-wage benefits they receive. In addition to some descriptive quantitative data, this section will also present a limited amount of qualitative analysis, drawing on the experiences of migrants in these particular sectors.

Non-Wage Benefits	Sector				
	Retail/Shops (n=34)	Sales (n=8)	Domestic Work (n=21)	Cleaning (n=25)	Care (n=9)
Training***	27	7	5	19	5
Meals***	9	1	16	0	1
Accommodation/housing ***	0	0	11	1	1
Holiday pay**	21	3	10	20	8
Paid sick leave ***	14	0	4	11	5
Health/life insurance	2	0	1	2	1
Pension scheme***	4	0	0	4	1
Bonuses***	13	4	18	4	3

N=200 (100%)

Non-wage benefits' association with sectors based on Pearson's chi-square coefficient:

\*Significant at p<10%.

\*\*Significant at p<5%.

\*\*\*Significant at p<1%.

**Table 5.18a Non-Wage Benefits by Sector**

Non-Wage Benefits	Sector					
	Construction (n=9)	Hotel (n=9)	Restaurant/ Bar (n=38)	Admin- istration (n=10)	Factory (n=10)	Teaching (n=5)
Training***	6	8	25	9	9	4
Meals***	1	5	35	1	1	0
Accommodation***	1	0	4	0	0	0
Holiday pay**	2	6	18	8	6	4
Paid sick leave ***	1	6	5	3	4	4
Health/life insurance	1	1	2	1	3	2
Pension scheme***	0	1	0	1	1	3
Bonuses***	4	2	10	4	4	1

N=200 (100%)

Non-wage benefits' association with sectors based on Pearson's chi-square:

\*\*Significant at p<5%.

\*\*\*Significant at p<1%.

**Table 5.18b Non-Wage Benefits by Sector**



### **5.5.1. Domestic Work**

The evidence shows that meals, bonuses and gifts are the most commonly received non-wage benefits of domestic workers. Domestic work in the sample is the sector with the longest average hours of work: workers in this sector do on average 10 hours of work per day. The record for hours worked is also held by domestic workers: the longest hours of work reach 93.5 hours per week. Some domestic workers report that their work is not non-stop; they have break times along the way. Paid break time is therefore commonly received by domestic workers. Half of domestic workers in the sample are live-in workers. They therefore receive accommodation from their employers. Approximately half of domestic workers receive holiday pay. Only five of the 21 domestic workers receive training. Among those who do not receive training, most report that they are used to the job and already know how to do it. None of the domestic workers receives a pension. A very low number receive health/life insurance or paid sick leave.

### **5.5.2. Cleaning**

None of the cleaners receives meals during the day, although one cleaner said that coffee, tea and milk are available for free. None of the cleaners receives paid transport. The average age of cleaners in the sample is 44 years old; however, only four of the 25 cleaners receive a pension entitlement from their employers. Twenty-two of the 25 cleaners have children; of these 22, 10 have children in the UK. However, only one cleaner is in receipt of childcare benefit, and this cleaner reports that the childcare benefit has been reduced in monetary value. Only four of the 25 cleaners receive any bonuses. The same number receive gifts. Two cleaners do not receive any non-wage benefits other than training. Another two cleaners do not receive any non-wage benefits at all, not even training. Thus there are two cleaners in the sample who receive nothing other than wages. In total, six of the 25 cleaners do not receive training. One respondent commented on this: 'No training because it is just cleaning; no needs training.' One cleaner commented on working conditions: 'The chemical used for toilet is too strong for my eyes.' This demonstrates that there is a health and safety concern in cleaning work, and it is therefore a cause for concern that there are cleaners who never receive any training. It is also disturbing to note that only two of the 25 cleaners receive health/life insurance from their employers.

### 5.5.3. Restaurant Work

The evidence shows an extremely high proportion of low-wage workers in the restaurant sector: 30 of the 38 restaurant workers earn the minimum wage or below. Three of them are the lowest-paid workers in the sample. A qualitative analysis was conducted of these lowest-paid workers' experiences of non-wage benefits. One of the lowest-paid workers receives only £130 a week for working 12 hours a day, six days a week. This is as little as £1.81 per hour. This respondent receives a meal once a day; however, he reports that there is a separation between meals for staff and meals for customers/family staff (the owner's family members also work in the restaurant). For example, there is ordinary rice for staff outside the family, but the rice given to customers is also given to family staff. Staff in this restaurant can have accommodation on the second floor of the restaurant building. However, the respondent states that the accommodation is in inferior condition and does not reach appropriate health and safety standards: for example, it has no heating, so it is extremely cold in the winter. It also has inferior sanitation facilities. This respondent also reports some serious problems during his one and a half years of working life:

Sometimes boss does not pay money in time, a week late, one of the reasons is because the money had been used for boss' father visit to [name of a country matching the employer's ethnicity], this is not good because you should not mix personal matter and business matter.

This respondent's deprivation in terms of non-wage benefits is clearly illustrated in this example:

They never give you minimum wage, they never give holiday pay. There are five staffs in the kitchen and four waiters. Chef who controls the kitchen is too much rude; boss is also rude blaming staffs without any reason. Boss says bad words, if boss do something wrong, boss will throw it to us [the staff]. When we want to break our fasting [i.e. for Ramadan, at around 8.50pm], the restaurant is in a busy environment, we never get chance to break our fast, boss does not allow us, even after we ask for it.

This respondents' experience suggests that some employers may see the provision of non-wage benefits, no matter how substandard, as an excuse for non-compliance with the

minimum wage. When I asked the respondents why they had chosen jobs that offer very low wages and unacceptable working conditions, they answered that it was simply because the jobs offered free accommodation. This evidence might further support the findings that the minimum wage is offset (and violated) by the provision of less costly non-wage benefits. This qualitative evidence confirms the statistical evidence that the minimum wage to some extent increases the provision of less costly non-wage benefits such as meals and accommodation.

For some respondents, their current jobs were not their first experience of this kind of work. It emerged from the qualitative interviews that at least two respondents had previously worked in similar jobs. One respondent said his previous restaurant job had paid £70 a week for 12 hours a day, six days a week: this is less than £1 an hour. He explained that most of the staff who worked there did not have work permits. The other respondent also spoke of a previous job in a takeaway restaurant which paid only £10 a day for 12–13 hours' work per day. Again, their reason for choosing these jobs was because the jobs offered free accommodation. This is in line with this thesis' argument that employers violate the minimum wage by offering low-cost non-wage benefits.

In the sample, there are four restaurant workers who receive accommodation. Three of these workers earn well below the minimum wage, earning £1.81, £3.75 and £4.63 per hour. I asked how the respondents were connected with the types of restaurant jobs that pay extremely low wages – in other words, how they got their jobs. Some respondents said that there was a job centre agent in their community who had a connection with the restaurants. As one of the respondents put it: 'If we need jobs, we go to the job centre and ask for restaurant jobs and the job centre will call the restaurants to ask if there is any vacancy.' When I further asked whether respondents had been asked to prove their legal status, some respondents stated: 'Most likely they [the restaurants that offer extremely low wages] do not ask if workers have any paper. They will ask only if there is any sense that the immigration official is approaching the restaurant. ...Because the job is cash-paying job so staffs do not pay NI, as well as the company does not pay tax.'

The responses confirm that migrants are being utilised for the economic benefit of employers. Employers clearly flout workers' rights in the terms of the minimum wage,

non-wage benefits and fair working conditions. The next section will provide another qualitative analysis of the non-wage benefits of migrants.

### **5.6. How Have Non-Wage Benefits Been Reduced?**

The survey asks whether there have been any reductions in the non-wage benefits received. However, there is no evidence that the minimum wage has any association with the reduction of non-wage benefits, as the Pearson's chi-square coefficient is not significant. There are 30 migrant workers (15% of the total sample) who have had some reduction on their non-wage benefits (see Table 5.19). Eleven of them earn the minimum wage or below.

The questionnaire asks the respondents what has been reduced, and asks why they think the reduction happened. Table 5.20 lists the reductions and the reasons suggested by the workers. The non-wage benefits that have been reduced, according to the responses, are performance-related incentives, pension provision, gifts, childcare benefit, holiday pay, cash in lieu of holiday, break times, meals, paid transport, and the provision of equipment that was previously free of charge.

There are several findings of note. First, there is no response that clearly mentions the minimum wage as the reason for a reduction in non-wage benefits. However, the majority of workers mentioned cost-saving as the main reason for the reduction. Because workers' wages are a part of labour costs, such a reduction might be indirectly linked with (an increase in) the minimum wage. However, this needs further investigation, perhaps from the employers' point of view.

Second, the reductions are not all about non-wage benefits. A few responses indicate reductions in staff numbers or working hours. Four responses suggest that there is a requirement for flexible or temporary work in their jobs, although there is no evidence that this is because of a rise in the minimum wage:

Reduced hours if not many customers.

(Retail/shop worker, female, 28)

In quiet period, seasonal staffs are reduced.

(Hotel worker, female, 30)

Now I have less shift, if it is getting more busy then they will call me.

(Factory worker, male, 24)

Now is a busy time, they will reduce people when the factory is not busy any more.

(Factory worker, male, 28)

Third, of the 30 respondents who had experienced a reduction, six (a fifth of them) commented that they had been required to put in extra effort at work. This is illustrated by the following six comments:

Previously they have cleaning employees [from a separate contractor], now they do not hire them anymore, therefore we have to do cleaning on our own.

(Retail worker, male, 33)

Previously there are four staffs in a shift, now there are only three staffs in a shift.

(Hotel worker, male, 25)

No overtime any more, rushing to work faster.

(Factory worker, male, 54)

Overtime is no more paid.

(Restaurant worker, male, 29)

If work extra hours then will be paid as normal hours, not as overtime.

(Factory worker, male, 27)

It is difficult to get more break time, especially in busy hours, for example sometimes we work more than five hours but still get 10 minutes' break; we never get chance to round it into six hours and get 30 minutes' break. If work six hours or more then we never get chance to get 40 minutes' break.

(Coffee-chain worker, female, 23)

<b>Has the Respondent Had a Reduction in Non-Wage Benefits?</b>	<b>Minimum-Wage Workers</b>	<b>Above-Minimum Wage Workers</b>
Yes	11 (12.6%)	19 (17.1%)
No	76 (87.4%)	92 (82.9%)
Total	87 (100%)	111 (100%)
Valid N=198 (99%)		

**Table 5.19 Reductions in Non-Wage Benefits and Wage Levels**

<b>What Has Been Reduced</b>	<b>Reason (Worker's View)</b>
'Cut hours and overtime, usually work eight hours a day, now only six hours.'	'Economic condition.'
'Cut staffs, cut hours, cut incentives based on performance: previously if staffs perform well, they will receive incentives such as voucher to stay for free in hotel/hotel network, now there is no more performance-based incentives.'	'Financial crisis.'
'Pension and seasonal staffs.'	'In quiet period, seasonal staffs are reduced, financial/economic condition.'
'Reduce hours.'	'Because as a low-cost hotel, they also implement a low-cost budget, and is also because of financial crisis.'
'They will reduce people next year (2012).'	'Now is a busy time, they will reduce people when the factory is not busy any more.'
'Working hours and staffs per shift, previously there are four staffs in a shift, now there are only three staffs in a shift.'	'Recession, cost-cutting.'
'Reduced hours if not many customers, depend on money the employers have.'	'Depend on money they have.'
'No overtime any more, rushing to work faster.'	'Cost-saving.'
'Before, they give me scarf, perfume, something like that, but do not give me any more.'	'I think they fed up.'
'Child benefit is reduced, previously they give more.'	'Save money.'
'Cut the working hours.'	'I think they do it because of my age, because I am old.'
'Discount on product used to be 50% but applicable to managerial level only, now is 30% but applicable to all staffs.'	'Flexibility to include all staffs, no cost reason.'
'Holiday pay.'	'I do not know the reason.'
'It is difficult to get more break time, especially in busy hours, for example sometimes we work more than five hours but still	'Save cost by saving break time, especially in

get 10 minutes' break; we never get chance to round it into six hours and get 30 minutes' break. If work six hours or more then we never get chance to get 40 minutes' break.'	busy time.'
'Less shift.'	'Now I have less shift, if it is getting more busy then they will call me.'
'Meals before three times a day, now twice a day.'	'Not many customers and because of too many staffs.'
'No overtime anymore.'	'Cost-saving.'
'No overtime anymore.'	'Cost-saving.'
'No overtime anymore.'	'Much cuts, no more funding as before.'
'Overtime no more paid.'	'Cutting the budget.'
'Overtime, if work extra hours then will be paid as normal hours, not as overtime.'	'Recession, cost-cutting.'
'Previously if we do not want to take holiday, we can convert it to cash, now we cannot do it anymore.'	'Cost-saving.'
'Previously they have cleaning employees [from a separate contractor], now they do not hire them anymore, therefore we have to do cleaning on our own.'	'Cost-saving.'
'Previously they pay money in hand and we receive less reduction of NI tax, now they pay money through bank and we receive more reduction of NI tax.'	'They want to show their budget to government that they are paying less money to employees, so they should receive less tax.'
'Reducing hours of work and number of employees.'	'Economic downturn, tough competition.'
'Sometimes my working hours are reduced, especially when there are not many customers.'	'Not many customers.'
'They keep reducing working hours.'	'To save money.'
'They reduce people.'	'Cost-saving.'
'They reduce people.'	'Cost-saving.'
'Transport payment was £1.50 per hour before, now it is only £1 per hour. They cut it one year earlier.'	'Cost management.'
'T-shirt has been charged £25 since June 2011, previously was free.'	'Cost-saving.'

**Table 5.20 Responses as to What Has Been Reduced and Why**

## 5.7. Conclusion

This chapter has discussed the analysis of primary data collected from 200 London-based migrants who work in low-paid, low-skilled jobs. The evidence suggests that there is a significant proportion of skilled migrants who work in low-paid, low-skilled jobs. The majority of migrants in the sample have an above-secondary level of education. The

majority of the sample also has a medium-to-fluent level of spoken English. Half of the migrants in the sample have work experience in their home countries. A third of the migrants in the sample have work experience in other countries abroad. The fact that 43.5% of the sample earn the minimum wage or below may suggest that the phenomenon of downgrading exists. Skilled migrants are earning the minimum wage or below, and skilled migrants certainly undertake jobs in low-paid, low-skilled sectors. This follows Dustmann *et al.*'s (2007) findings on the downgrading of migrants.

From the logistic regressions, it is evident that there are factors which explain migrants' likelihood of earning the minimum wage or below. These factors may also be able to explain why the phenomenon of downgrading exists. The logistic regressions show just three significant factors which affect migrants' likelihood of earning the minimum wage or below. The first factor is the hours of work per week. If the hours of work per week increase by one hour, migrants become 1.038 times more likely to earn the minimum wage or below. The second is the ethnicity of the employer. If the employer is of local (British/native) ethnicity, migrants are 0.305 times less likely to earn the minimum wage or below. The third is work permit status. If migrants need a permit to work, they are 4.646 times more likely to earn the minimum wage or below. Human capital factors are clearly ruled out by the logistic regression. It is thus evident that there are factors other than human capital which explain migrants' likelihood of earning the minimum wage or below.

The evidence also shows that migrants are differently affected by the minimum wage. The logistic regressions suggest that the minimum wage adversely affects migrants' likelihood of receiving some non-wage benefits. The results show that migrants on the minimum wage or below are less likely to receive training, holiday pay, paid sick leave, or a pension scheme. Migrants on the minimum wage sector are also less likely to receive health/life insurance. On the other hand, migrants on the minimum wage or below are more likely to receive meals and accommodation. This suggests that the minimum wage and the minimum wage sector adversely affects migrants' likelihood of receiving non-wage benefits, in the sense that migrants on the minimum wage or below (or on the minimum wage sector) have less access to more-costly and valuable non-wage benefits, but have more access to less-costly non-wage benefits. Evidence also pointed out that accommodation/housing has been used as an offset for the minimum wage, and even worse, that accommodation/housing might be being used as an excuse for not paying



statutory wages. Evidence also says that migrants in minimum wage sector are indeed more exposed to changes (reduction) in their non-wage benefits. It is thus fair to say that the low paying sectors play a role to determine the reduction in some of non-wage benefits.

A number of qualitative responses show that migrants have experienced some reductions in non-wage benefits; however, there is no evidence that the reductions are because of rises in the minimum wage. There is a little evidence from the qualitative analysis that migration is linked to temporary and flexible work. There is no evidence from the qualitative analysis that the minimum wage is linked to temporary or flexible work. There is a little evidence that migrants have to put in extra effort at work, but there is not enough evidence to say that this is because of any rise in the minimum wage.

## **Chapter 6**

### **Conclusions and Recommendations**

We need to enforce the laws we currently have on the protection of wages. It is one of the proudest achievements of the last Labour government that we introduced the national minimum wage... But unfortunately, too many people are not receiving its protection. We need to toughen up the enforcement of the minimum wage so that employers understand not paying it is a real risk.

(Miliband, 2012)

Indeed, many workers still do not receive the minimum wage. The survey conducted for this study shows that approximately 40% of the sample earn below the 2011 National Minimum Wage, while approximately 30% still earn below the 2010 National Minimum Wage. It is certainly time to toughen up the enforcement of the minimum wage.

To conclude this thesis, let us first recall the three main arguments that reflect the purpose of the research as a whole. First is the argument that the minimum wage has adverse effects on the UK labour market. The increase in the minimum wage is simply an increase in labour costs. Thus necessary action will be taken to offset the minimum wage.

According to this argument, the minimum wage is likely to affect the provision of non-wage benefits and working hours.

Second is the argument that the minimum wage differently affects migrant workers.

Linking the minimum wage with migration, it is argued that the minimum wage adversely affects migrant workers in term of their non-wage benefits. Some migrants might derive the least benefit from any rise in the minimum wage: they might not receive the statutory wage or any non-wage benefits. Migrants on the minimum wage or below are less likely to receive some non-wage benefits.

Third is the argument that the minimum wage is likely to drive the creation of secondary jobs.. It may reduce the length of stay of migrants in their current jobs: this might be an indication of the temporary and flexibilised effect of the minimum wage, although reasons other than the minimum wage may also explain the creation of secondary jobs.

## 6.1 Revisiting the Research Questions

Three main research questions were constructed to address the topic of the thesis.

1. What are the minimum wage's effects on non-wage benefits, working hours and working arrangements in the UK labour market?

The first research question was designed to investigate the effects of the minimum wage on non-wage benefits, working hours and working arrangements. It was constructed on the basis of the neoclassical argument that extra costs will not be accepted unless they are accompanied by extra benefits (Menger, 1871; Cobb and Douglas, 1928). Thus an increase in minimum-wage costs must be compensated by an increase in worker productivity; otherwise employers will take any necessary action to reduce costs elsewhere. Simon and Kaestner (2003) make it clear that when the minimum wage rises, employers have two options: to reduce employment, or to reduce the non-wage portion of compensation. This thesis follows previous studies by Wessels (1980), Leighton and Mincer (1981), Hashimoto (1982) and Royalty (2000) on the adverse effects of the minimum wage on non-wage benefits; by Wessels (1980) on the minimum wage's effects on working arrangements; and by Card and Krueger (1994, 1995) on the minimum wage's effect on working hours and employment. Chapter 4, which analyses secondary research from three major labour surveys in the UK, is devoted to the first research question. Chapter 4 examines the minimum wage's effects on non-wage benefits, working hours and working arrangements in the UK labour market.

2. What are the differentiated effects of the minimum wage on migrant workers in terms of their wages and non-wage benefits?
  - 2a. What are the factors affecting migrants earning the minimum wage or below?
  - 2b. What are the minimum wage's effects on the non-wage benefits of migrants?
  - 2c. Do migrants in low-skilled, low-paid sectors display any interesting phenomena?

The second research questions focus the investigation on the minimum wage in relation to migration. Limited studies have been conducted in the UK to address the minimum wage's effects on migrant workers. Dustmann *et al.* (2007) and French and Möhrke (2007) are among the very few to address the minimum wage's effects on migration. Building from Dustmann *et al.*'s (2007) findings, Chapter 5 uses primary research to investigate whether

the phenomenon of downgrading exists, i.e. whether skilled migrants are undertaking low-skilled, low-paid jobs. Chapter 5 also examines the factors affecting migrants earning the minimum wage or below, in other words, which factors are able to explain why downgrading occurs. Human capital, demographic features, migration and employment-related variables are tested to establish whether they can explain migrants' likelihood of earning the minimum wage or below. Chapter 5 also discusses the minimum wage's effect on migrants' likelihood of receiving non-wage benefits. It tests whether migrants on the minimum wage or below are less likely to receive particular non-wage benefits. In conjunction with Chapter 5, Chapter 4 also discusses how the minimum wage differently affects migrant workers, using secondary data.

### 3. What are the implications of the research findings for the National Minimum Wage policy?

The empirical evidence from the secondary and primary research will produce evidence-based recommendations for possible improvements to the National Minimum Wage policy. The recommendations section of this chapter (Section 6.4. below) will set out some evidence-based recommendations to answer the third research question.

## **6.2 Re-examining the Methodology**

Secondary and primary research was conducted to answer the research questions. The main methodology for analysing both secondary and primary data was quantitative and positivist. The secondary data drew from three major public surveys in the UK that had information on wages, non-wage benefits and working environments. The three public surveys were the Annual Survey of Hours and Earnings (ASHE), the Workplace Employee Relations Survey (WERS) and the Labour Force Survey (LFS). The secondary research was designed to answer the research questions on the minimum wage's impact on non-wage benefits, working hours and working arrangements, and particularly on how the minimum wage affects non-wage benefits. The difference-in-difference method was applied following previous studies (see Card and Krueger, 1994, 1995; Stewart, 2003, 2004; Arulampalam *et al.*, 2004; Dickerson, 2007). The secondary research was designed to investigate the first research question and also part of the second.

The primary research was conducted by means of a face-to-face questionnaire survey with 200 London-based migrants who work in low-paid, low-skilled jobs. It was mainly designed to answer the second research question on how the minimum wage differently affects migrant workers, and in particular on how the minimum wage affects migrants' likelihood of receiving non-wage benefits. The questionnaire targeted important variables on wages, working hours, non-wage benefits, human capital, and migration-related variables. The main technique of analysis was logistic regression, first to examine the factors affecting migrants earning the minimum wage or below, and second, to examine the minimum wage's effect on migrants' likelihood of receiving non-wage benefits. Pearson's chi-squared correlation and a number of qualitative interviews were also used to support the analysis.

### **6.3 Restating the Contributions**

Overall, the contributions of this thesis are mainly to the UK minimum-wage literature. First, it has uncovered some evidence that the minimum wage adversely affects the UK labour market; however, there is no evidence that the minimum wage reduces the provision of non-wage benefits. Some adverse effects have been found on working hours (particularly overtime hours) and additional pay. There is also a possible link to temporary and flexible work, although the evidence for this is inconclusive. The minimum wage is also a significant predictor of migrants' likelihood of receiving non-wage benefits: migrants who earn the minimum wage or below are less likely to receive certain valuable non-wage benefits. The secondary and primary research findings are complementary in their answers to the research questions.

#### **6.3.1. Secondary Research**

The secondary research contributes significant findings on the adverse effects of the minimum wage. The secondary data suggests that the minimum wage adversely affects overtime hours and additional pay (pay on top of basic pay). The minimum wage reduces overtime hours by 0.33 to 11.22 percentage points. The minimum wage reduces additional pay by 4.31 percentage points. It also increases the availability of job-sharing by 7.7%, although it is unclear whether job-sharing contributes (adversely) to the flexible and temporary working arrangements.

The secondary research tests the minimum wage's effects on a wide range of non-wage benefits, although the findings show insufficient evidence to say that the minimum wage adversely affects non-wage benefits. The secondary data shows that the minimum wage increases training paid for by employers; it also increases employees' contributions to pensions; and it increases incentive pay, and overtime pay. No evidence was found in relation to other non-wage benefits.

### **6.3.2. Primary Research**

The primary research answers the research questions on how the minimum wage differently affects migrant workers. First, the primary research investigates whether downgrading occurs in the primary research sample. The majority of migrants in the sample have an above-secondary level of education and a medium-to-fluent level of spoken English. Half of the sample have work experience in their home country, and the analysis has shown that they undertake downgraded occupations in the UK. A third of the sample also have experience of working abroad. The fact that 43.5% of the sample earn the 2011 National Minimum Wage or below (and approximately 30% of the sample earn below the 2010 National Minimum Wage) suggests the existence of signs of the phenomenon of downgrading, which chimes with the work of Dustmann *et al.* (2007). This needs to be justified further as the primary research does not control for non-migrants in order to test whether the downgrading also exists generally in the UK labour market.

Second, the primary research identifies factors which may affect migrants' likelihood of earning the minimum wage or below (including human capital, demographic, employment and migration-related variables). The evidence shows that an increase in the hours of work and the need for a work permit increase migrants' likelihood of earning the minimum wage or below. It also shows that if the employer is of local ethnic (British/native) origin, migrants are less likely to earn the minimum wage or below.

Third, the primary research examines how the minimum wage differently affects migrant workers in terms of their non-wage benefits. The logistic regressions test whether the minimum wage is a significant predictor of migrants' likelihood of receiving non-wage benefits. The evidence shows that migrants who earn the minimum wage or below are less likely to receive training, holiday pay, paid sick leave, and a pension scheme. Migrants who earn the minimum wage or below, however, are more likely to receive meals and

accommodation. It is evident that the minimum wage to some extent reduces migrants' likelihood of receiving particular valuable non-wage benefits, but increases their likelihood of receiving less costly non-wage benefits. It is also evident that accommodation/housing has been used as an offset to avoid paying the statutory minimum wage: 12 of the 19 migrants who receive accommodation are being paid below the minimum wage, in some cases well below.

Fourth, it is clear from the qualitative analysis that 30 respondents have experienced a reduction in non-wage benefits, working hours or shifts. However, there is no evidence that these reductions are because of any rise in the minimum wage. Four of these 30 respondents comment that their jobs are linked with a demand for temporary or flexible working. Six of the 30 comment that they have to work harder. However, there is no direct evidence that the minimum wage is the cause of these conditions. The majority of the respondents mention cost-saving as the reason for the lowering of benefits or working conditions.

#### **6.4. Recommending Policy Improvements**

This thesis presents substantial findings which have implications for the National Minimum Wage policy. It is evident that the National Minimum Wage policy adversely affects the UK labour market, particularly migrant workers. The evidence-based recommendations aim simply to eliminate the adverse effects of the National Minimum Wage, and in particular to implement a policy which will be fair to all workers. Drawing on the evidence generated by the secondary and primary research, this thesis makes evidence-based recommendations as follows.

First, the National Minimum Wage policy should not provide any accommodation offset. There should be no non-wage benefits that can offset the National Minimum Wage. The minimum wage and non-wage benefits should be treated as workers' rights; neither one should be used to offset (or conflict with) the other. The National Minimum Wage and non-wage benefits should be regulated separately. Thus employers should provide both statutory wages and non-wage benefits. The evidence clearly shows that accommodation benefits are being used by employers to avoid paying the National Minimum Wage. It is evident that some domestic workers and restaurant workers who live in employer-provided accommodation are being paid far below the National Minimum Wage. In fact none of

these workers, who are paid below the minimum, gets the statutory accommodation offset suggested by the policy. Therefore this thesis recommends that the National Minimum Wage policy should remove the accommodation offset.

Second, the National Minimum Wage should protect workers who work long hours. The evidence shows that some workers who are paid weekly or monthly perform excessive hours of work, but the minimum wage fails to cover these long hours. It is also evident that hours of work is a significant factor determining workers' likelihood of earning the minimum wage or below. The evidence shows that workers who work excessive hours are paid below the National Minimum Wage. This thesis therefore recommends that the National Minimum Wage policy should ensure that workers who are paid weekly or monthly receive the equivalent of statutory hourly pay, particularly workers in low-paid, low-skilled jobs and workers who live in employer-provided accommodation. In either case, it will be necessary to work closely with local authorities or unions to ensure the clear statement of working hours in employment contracts.

Third, the National Minimum Wage should be enforced in all forms of employment, regardless of the employer's ethnicity. Evidence shows that workers whose employers are of local/native ethnicity have less of a tendency to earn the minimum wage or below. Although there is no evidence that employers of non-local ethnicity are more likely to pay lower wages, the employer's ethnicity should not create any differences in relation to the minimum wage. The minimum wage should be applied by all employers, regardless of ethnicity.

Fourth, in conjunction with the first recommendation, the National Minimum Wage should not make any difference to migrants' likelihood of accessing non-wage benefits. A worker's likelihood of receiving non-wage benefits should not be determined by their wages. Workers on the minimum wage or below are less likely to receive valuable non-wage benefits such as training, holiday pay, paid sick leave, and pension schemes. It is again a matter of the enforcement of labour standards: both the National Minimum Wage and the rights of workers to receive statutory non-wage benefits (such as training and holiday pay) must be enforced.



Fifth, the National Minimum Wage should be enforced at the maximum level, so that there are no differential effects on workers who work long hours, workers who receive accommodation benefits, workers whose employers are of a particular ethnicity, or workers' access to non-wage benefits, or workers' legal status. This recommendation supports Miliband's (2012) plan to double the fines for employers who do not pay the minimum wage, and to have HM Revenue and Customs closely monitor the enforcement. The enforcement of the National Minimum Wage should not be misdirected by any immigration policy agenda. This study supports Anderson's argument (2010) that public concern about low pay, job security and job quality should not be misled with rhetoric about protecting British jobs. The National Minimum Wage should be enforced in relation to every employer and every worker, regardless of their ethnicity, nationality or legal status.

### **6.5. Recapping the Originality of the Thesis**

This thesis represents an original contribution to the UK minimum-wage literature. It fills a gap in the UK literature by discussing the impact of the minimum wage on non-wage benefits. Since the National Minimum Wage policy came into force in April 1999, there have been plenty of studies to investigate the impact of the National Minimum Wage; however, few of these studies discuss its impact on non-wage benefits. Dickerson (2007), Allison *et al.* (2009) and Melis *et al.* (2009) are among the few that discuss the minimum wage's impact on non-wage benefits.

This thesis should be considered pioneering in testing the impact of the National Minimum Wage on a wide range of non-wage benefits. Sections 3.3.1, 3.3.2 and 3.3.3 of Chapter 3 discuss the wide range of non-wage benefits involved in the secondary research, while Section 3.4 discusses the range of non-wage benefits that are particularly commonly received in low-paid, low-skilled jobs; these are explored in the primary research. The results of the secondary research (Table 4.5) on non-wage benefits might be the first of their kind in describing the minimum wage's impact on non-wage benefits in the UK labour market. The evidence shows that the minimum wage increases incentive pay, employees' contributions to pensions, training paid for by employers, and weekly overtime pay. The minimum wage is only evident to reduce additional pay. Therefore, overall, there is not enough evidence to suggest that minimum wage reduces non-wage benefits.

There is also a paucity of UK literature that discusses the National Minimum Wage's impact on migration. This study investigates the minimum wage's impact on non-wage benefits and no other study has been done to date that links this issue with migrant workers. Dustmann *et al.* (2007) and French and Möhrke (2007) are among the very few that link the National Minimum Wage with migration. Dustmann *et al.* (2007), however, does not discuss the minimum wage's impact on non-wage benefits, while French and Möhrke (2007), although they do discuss some non-wage benefits, do not stress the impact of the minimum wage on non-wage benefits. Thus this study might be the first to investigate the minimum wage's impact on the non-wage benefits of migrant workers. The evidence presented in Section 5.2 of Chapter 5, particularly in Table 5.15a, constitutes some of the most original evidence uncovered in this thesis. The evidence shows that migrants who earn the minimum wage or below are less likely to receive training, holiday pay, paid sick leave, or a pension scheme, but are more likely to receive meals and accommodation.

This study might also be the first to suggest factors other than human capital that might explain the likelihood of migrants earning the minimum wage or below. The findings presented in Section 5.1 of Chapter 5, particularly in Table 5.2a, also constitute some of the particularly original findings in this thesis. They show that hours of work per week, an employer of local ethnic background, and the need for a work permit, all affect migrants' likelihood of earning the minimum wage or below.

## **6.6. Reconsidering the Limitations**

This thesis acknowledges the econometric problems that appear in some applications of quantitative methods. The Difference-in-Difference (DID) has limitation on the possible existence of parallel trends in the treatment and control group alongside the potential spillover effects from the treatment to the control group. The DID outcomes that are modelled are actually more complex in terms of the determination process than a bivariate analysis allows. In many cases, it is acknowledged that selection and endogeneity issues have emerged.

Second, it is the limitation of the thesis that the secondary research analysis is not stratified by any demographic characteristics, even though the nationally representative surveys (the ASHE, the WERS, and the LFS) contain information on age, gender, region, occupation,

and industry. The DID model, therefore, is not stratified and has no control variables. Hence, it is acknowledged that the DID results are far from robust and tend to be difficult to interpret.

Third, it is a drawback of this thesis that the primary data survey is not representative of migrants in London, and does not represent the distribution of migrants in the UK. Thus there might be a grounded generalisation in the primary research in relation to the minimum wage's impact on the UK labour market as a whole. It should be noted that the purposive (judgemental) nature of the survey does not allow for any generalisations to be made about all migrants in the UK labour market. It is also a limitation that the sample does not offer a representative picture of low-skilled, low-paid migrants. For instance, the sample does not represent migrants from all low-paid, low-skilled sectors, irregular migrants, or migrants with certain legal statuses.

Fourth, the primary research analysis through the logistic regressions may still contain endogeneity issues even though particular effort has been made to detect and resolve them.

Fifth, students are overrepresented in the migrant sample. Although this thesis argues that students are in reality involved in low-paid low-skilled jobs, the result might somehow be biased and should not be used to generalise about the characteristics of all migrants in low-paid, low-skilled jobs. As a remedy, a control variable for student legal status was introduced in the logistic regressions.

Sixth, it is a limitation of the thesis that it does not constitute a comparative study between migrants and non-migrants: in particular, the primary research does not control for non-migrants. It does not explain whether migrants and non-migrants are differently affected by the minimum wage. However, at certain points the thesis does argue that the minimum wage does not affect all workers in the same way, and so some of the differential effects on migrant workers are made evident.

Seventh, this thesis rests mainly on responses from workers (or employees) in both its primary and secondary data; this constitutes a limitation, in that it does not capture employers' points of view. Consequently, the thesis might have made some grounded assumptions as if workers' responses were interchangeable with employers'. This may be a

particular limitation on the primary research, since the survey asks whether there has been any reduction in non-wage benefits and, if so, the reasons behind that reduction.

Eighth, the thesis has limitations in terms of the grounded assumptions it makes about indications of flexibility and temporary working. It is assumed that some variables, particularly in the secondary data, such as shift allowances, additional pay, and stand-by or on-call allowances, are linked to flexible and temporary working: this certainly needs further investigation.

Finally, there are limitations to the methodology, as the qualitative approach has not been fully accommodated – although this thesis argues that its main, quantitative-positivist methodology is deemed to be adequate to answer the research questions. Nonetheless, it must be acknowledged that the primary research could have done more to explore the qualitative aspects of the minimum wage's effects on migrant workers.

### **6.7. The Future Research Agenda**

This thesis has contributed to the development of the UK minimum-wage literature. It has also left room for further investigation in related areas. I therefore propose an agenda for future research in order to shape the debate on the minimum wage and migration, and in particular to draw out the implications of this thesis' findings for the National Minimum Wage policy.

#### **6.7.1. Minimum-Wage Research**

- The primary research from this study could be extended to sample employers' responses, particularly in order to determine the minimum wage's effects on non-wage benefits and migration. The employers might range from small entrepreneurs to large-scale businesses, and include formal, informal, agency and subcontracting employers. The methodology could also be extended to accommodate the qualitative approach to investigate the minimum wage's impact on non-wage benefits and migration. Ipsos MORI and Community Links (2012) is an example of research on the minimum wage that uses a qualitative approach with employers.
- Further research should be carried out to determine the extent of accommodation offsets of the minimum wage. Research with live-in workers – particularly

restaurant and domestic workers, among whom this study made specific findings – should be conducted to examine whether workers are being paid the statutory offset suggested by the minimum wage policy. The evidence found should then be evaluated to establish whether it supports this study’s recommendation to remove the accommodation offset.

- Further research should also address the minimum wage’s effects on workers who work long hours. In particular, it should investigate workers in minimum-wage jobs who are paid on a weekly or monthly basis. It should examine whether workers who work long hours and are paid weekly or monthly are exempted from the minimum wage, and if so, what the implications of this are for the minimum-wage policy.
- Further research should be conducted to investigate the adverse effects of the minimum wage on temporary and flexibilised work. There is not enough evidence from this thesis to conclude that the minimum wage is linked with temporary and flexible working. However, there are some indications that the minimum wage might be linked with flexible and temporary work, as suggested by Wessels (1980). Thus further investigation is needed, which will involve the selection of relevant variables that represent temporary/flexible work and/or the conduct of primary research that incorporates employers’ point of view.
- Further research should be carried out to determine whether the minimum wage adversely affects the utilisation of workers, as suggested by Wessels (1980): that is, to investigate whether workers have to work harder, faster or with extra effort because of increases in the minimum wage. This will include the determination of variables that define and describe worker utilisation, and the design of a detailed technique of analysis (quantitative and/or qualitative) to examine the relationship between the minimum wage and worker utilisation.

### **6.7.2. Migration Studies**

- Future studies could contribute to debates in migration studies by extending this study’s primary research to include non-migrant workers. The impact of immigration on low-paid, low-skilled jobs in the UK has been under-researched,

especially in relation to less-skilled natives. Dustmann *et al.* (2005, 2007), Manacorda *et al.* (2006, 2012), Wadsworth (2010a, 2010b), Lucchino *et al.* (2012) and the Migration Advisory Committee (2012) are among the few studies that investigate immigration's impact on the UK labour market. These studies, however, do not focus specifically on low-skilled, low-paid jobs, or on natives who undertake such jobs. Thus there is still a gap the analysis of immigration's impact on less-skilled natives or natives who undertake low-paid, low-skilled jobs.

- Future studies could also extend this thesis' primary research to examine the profile and characteristics of non-migrants who undertake low-paid, low-skilled jobs. Future studies might examine whether a downgrading phenomenon occurs for non-migrants, so as to establish a robust finding whether it applies to the UK labour market in general. Under recent conditions in particular, with extensive unemployment figures, it is worth analysing whether natives too are being deskilled.
- The scope of the study could therefore also be extended to examine unemployment figures in the UK – for instance, in relation to graduate unemployment and youth unemployment. Such research could investigate the relationship between immigration, UK unemployment and the minimum wage.

## **6.8. Concluding Remarks**

The purpose of this study was to answer the question: how does the minimum wage affect the non-wage benefits of migrants? The answer is that the minimum wage does not adversely affect non-wage benefits *per se*, but it does adversely affect migrants' likelihood of receiving them.

There is not enough evidence to conclude that the minimum wage adversely affects non-wage benefits. Nonetheless, it is clear that migrants who earn the minimum wage or below are less likely to receive valuable non-wage benefits. Migrants on the minimum wage or below are less likely to receive training, holiday pay, paid sick leave, and a pension scheme.

There is one non-wage benefit that has been used as an offset for the minimum wage: accommodation. The evidence shows that the offset is far below what the National

Minimum Wage suggests. At the time of writing, the National Minimum Wage policy still allows the use of accommodation to offset statutory wages. This thesis argues that no non-wage benefits should be used to exempt employers from paying the National Minimum Wage.

Migrants who work longer hours and who need a work permit are more likely to earn the minimum wage or below. Migrants whose employers are of local ethnicity, on the other hand, are less likely to earn the minimum wage or below.

This investigation of the effects of the National Minimum Wage on the UK labour market has no other purpose than to make evidence-based recommendations for possible improvements to the policy.

Finally, the practical usefulness of the research findings to policymakers, policy advisors, unions, local authorities and members of the public, including workers in low-paid, low-skilled jobs, must be emphasised. The findings may be taken as suggestions for all those who hope to improve the working lives of those at the lowest level of income distribution.

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## **Appendix 1**

### **Questionnaire**

This research is part of a doctoral dissertation that aims to contribute to the development of an evidence base for public policy on the impact of non-wage benefits on minimum wages in relation to migrant workers. The information collected will be used solely for the purposes of this research, and remains strictly confidential. No names or any other forms of identification of the respondent appear in the questionnaire.

1. Date of interview
2. Place of interview
3. What is your gender?
  - ☐ Male
  - ☐ Female
4. What is your ethnic group?
  - ☐ White: British
  - ☐ White: Irish
  - ☐ White: other western European (Iceland, Norway, Sweden, Finland, Denmark, Belgium, the Netherlands, Luxembourg, Germany, France, Monaco, Switzerland, Liechtenstein, Australia)
  - ☐ White: southern European (Turkey, Greece, Italy, Portugal, Spain)
  - ☐ White: new EU member states (Cyprus, Estonia, Czech Republic, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia)
  - ☐ White: non-EU eastern European (Bulgaria, Romania, Albania, Serbia-Montenegro, Bosnia-Herzegovina, Croatia, Ukraine, Russia, Moldova)
  - ☐ Mixed: white and black Caribbean
  - ☐ Mixed: white and black African
  - ☐ Mixed: white and Asian
  - ☐ Mixed: other mixed background (please specify)

- ☐ Asian: British
- ☐ Asian: Indian
- ☐ Asian: Pakistani
- ☐ Asian: Bangladeshi
- ☐ Asian: south-east Asian
- ☐ Asian: Chinese
- ☐ Asian: other Asian (please specify)

- ☐ Black: British
- ☐ Black: Caribbean
- ☐ Black: African
- ☐ Black: other black (please specify)

- ☐ Middle Eastern
- ☐ Other (please specify)

5. What is your country of birth?

6. What is your nationality?

7. What is your native language?

8. What is your age?

9. Do you have any dependent children of your own?

- ☐ Yes
- ☐ No

10. If yes to Q9, where do your children live?

- ☐ Home country
- ☐ Host country
- ☐ Both home and host countries
- ☐ Elsewhere



11. When did you first arrive in the UK (month/year)?

12. What was your last job in your home country?

13. Had you ever worked abroad before you came to the UK?

- ☐ Yes
- ☐ No

14. When you first arrived in the UK, what was the level of your spoken English?

- ☐ None
- ☐ Minimal
- ☐ Proficient
- ☐ Fluent

15. What is the level of your spoken English now?

- ☐ None
- ☐ Minimal
- ☐ Proficient
- ☐ Fluent

16. Do you have more than one job right now?

- ☐ Yes (please specify how many)
- ☐ No

17. What is the industry of your current main job?

- ☐ Agricultural
- ☐ Retail/shop/supermarket
- ☐ Sales
- ☐ Domestic work/cleaning
- ☐ Caregiving: elderly care/childcare
- ☐ Construction
- ☐ Hotel
- ☐ Restaurant/bar
- ☐ Administration
- ☐ Factory work
- ☐ Teaching
- ☐ Other (please specify)

18. If yes to Q16, what is the industry of your **other job**?

- ☐ Agricultural
- ☐ Retail/shop/supermarket
- ☐ Sales
- ☐ Domestic work/cleaning
- ☐ Caregiving: elderly care/childcare
- ☐ Construction
- ☐ Hotel
- ☐ Restaurant/bar
- ☐ Administration
- ☐ Factory work
- ☐ Teaching
- ☐ Other (please specify)

The following questions refer to your **current main job**:

19. How long have you been in your current main job (since month/year)?

20. What is the nationality of your current main employer?

- ☐ My ethnic community
- ☐ Other migrant community
- ☐ Local person
- ☐ Other (please specify)
- ☐ Don't know

21. How do you get paid in your current main job?

- ☐ Per hour
- ☐ Per day
- ☐ Per week
- ☐ Per month
- ☐ Other (please specify)

22. Please answer according to Q21:

- a. If per hour, how much is your hourly pay?
- b. If per day, how much is your daily pay?
- c. If per week, how much is your weekly pay?
- d. If per month, how much is your monthly pay?

23. How many hours, on average, do you work in a day?

24. How many days, on average, do you work in a week?

25. Do you get any of the following from your current main employer?

- ☐ Meals
- ☐ Housing/accommodation
- ☐ Holiday pay
- ☐ Paid sick leave
- ☐ Health/life insurance
- ☐ Pension scheme
- ☐ Transport paid
- ☐ Bonuses
- ☐ Gifts
- ☐ Discounts on products
- ☐ Paid rest (meal periods, break time, set-up time, wash-up time)
- ☐ Counselling/employee assistance programme
- ☐ Childcare vouchers
- ☐ Bicycle loans
- ☐ Other (please specify)

26. Can you tell me how often you receive the benefits (e.g. meals received once in a day, etc.)?

- ☐ Meals
- ☐ Housing/accommodation
- ☐ Holiday pay
- ☐ Paid sick leave
- ☐ Health/life insurance
- ☐ Pension scheme
- ☐ Transport paid
- ☐ Bonuses
- ☐ Gifts
- ☐ Discounts on products
- ☐ Paid rest (meal periods, break time, set-up time, wash-up time)
- ☐ Counselling/employee assistance programme
- ☐ Childcare vouchers
- ☐ Bicycle loans
- ☐ Other (please specify)

27. Is there any benefit that you **did receive** but no longer receive, or that you receive in a reduced or less frequent way?

- ☐ Yes (please explain)
- ☐ No

28. If yes to Q27, do you know the reason why your employer does not provide it any more, or has reduced the value or the frequency?

- ☐ Yes (please explain)
- ☐ No

29. Have you received any training from your current main employer?

- ☐ Yes
- ☐ No

30. If yes to Q29, what did you receive as training?

- ☐ Induction/introduction or welcome training
- ☐ On-the-job training
- ☐ Health and safety training
- ☐ Off-the-job training
- ☐ Other (please specify)
- ☐ No, I have never received training

31. Did the employer pay you for attending those training sessions?

- ☐ Yes
- ☐ No, the employer did not pay me, I attended the training for free
- ☐ No, I paid myself

32. Do you receive any regular training?

- ☐ Yes (please specify the training)
- ☐ No

33. If yes to Q32, how often do you receive the training?

- ☐ Once a month
- ☐ Once every three months
- ☐ Once every six months
- ☐ Other (please specify)

34. Are you a member of a trade union?

- ☐ Yes
- ☐ No

35. What is your highest level of education?

- ☐ No formal education
- ☐ Primary
- ☐ Secondary (high-school diploma or at least five GCSE passes)
- ☐ College (advanced diploma)
- ☐ University
- ☐ Postgraduate

36. Where did you complete the highest level of your education?

- ☐ Home country
- ☐ Host country
- ☐ Other country in which you previously worked
- ☐ Somewhere else (please explain)

37. What type of visa did you first enter the UK on (tick one only)?

- ☐ Visitor/tourist
- ☐ Work permit holder
- ☐ Self-employed
- ☐ Au pair
- ☐ Engagement/marriage
- ☐ Student
- ☐ Dependant
- ☐ No visa required
- ☐ Arrived and claimed asylum
- ☐ Clandestine
- ☐ Other (please specify)

38. Since starting work in the UK, have you ever been asked to prove your legal status?

- ☐ Yes
- ☐ No

39. If yes to Q38, was it at your last job?

- ☐ Yes
- ☐ No

40. Have you changed your immigration status since arrival?

- ☐ Yes
- ☐ No

41. If yes to Q40, what is your current immigration status (tick one only)?

- ☐ Visitor/tourist
- ☐ Work permit holder
- ☐ Self-employed
- ☐ Au pair
- ☐ Engagement/marriage
- ☐ Student
- ☐ Dependant
- ☐ No permit required
- ☐ Asylum seeker
- ☐ Refugee
- ☐ Undocumented
- ☐ Other (please specify)

*Thank you!*



## **Appendix 2**

### **Information Sheet**

#### **YOUR PARTICIPATION IN THE RESEARCH**

Dear Participant

You are invited to be in a research study on the minimum wage in the UK. Please read this sheet and ask any questions you may have before taking part in the questionnaire.

This study is being conducted by Maria Elfani, Research Student at London Metropolitan University. The study is on ‘The Impact of the National Minimum Wage on the Non-Wage Benefits of Labour Migrants: Evidence from the UK’. If you have any further questions, you can contact me by email: [REDACTED]

#### **Confidentiality**

Your contribution to the questionnaire will be strictly confidential. You will not be identified in any way, and your questionnaire will be filed by number alone. Only the researcher will have access to the information you provide. The responses will be securely stored, and they will only be used for the purposes of this study.

Your participation in this study is voluntary. If you decide to participate, you are free to not answer any question. You may also withdraw at any point without giving any reason.

Your participation is greatly appreciated. It is hoped that the research will contribute to improving the position of migrant workers in the UK.

**THANK YOU FOR YOUR HELP.**

Maria Elfani  
London Metropolitan University

**Appendix 3**  
**Sample Recruitment Tree**

N=200

Interview 1

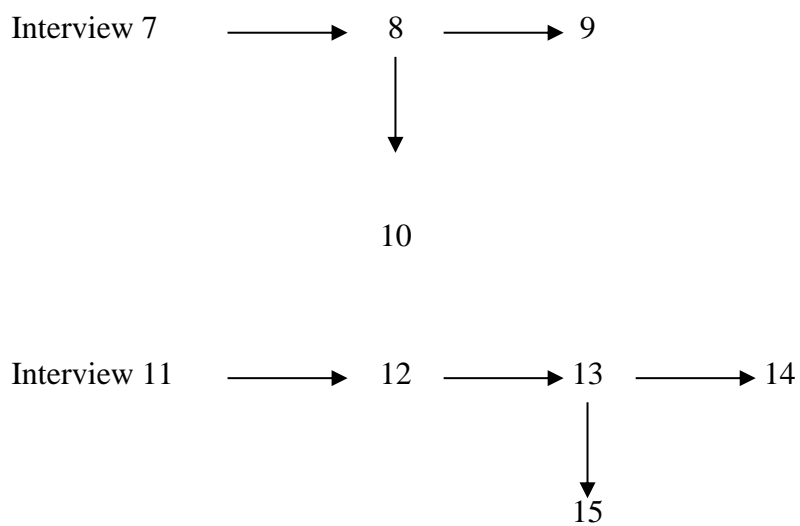
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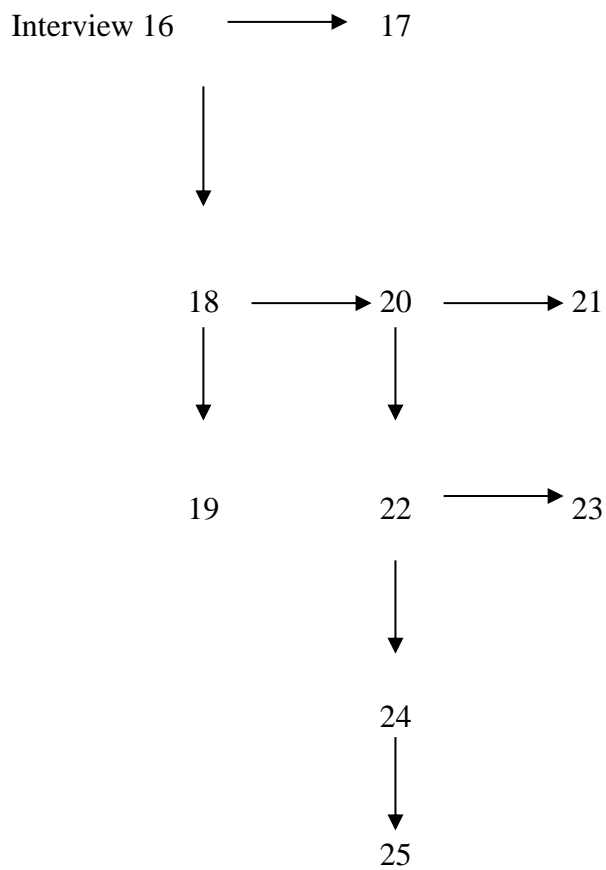
Interview 3

Interview 4

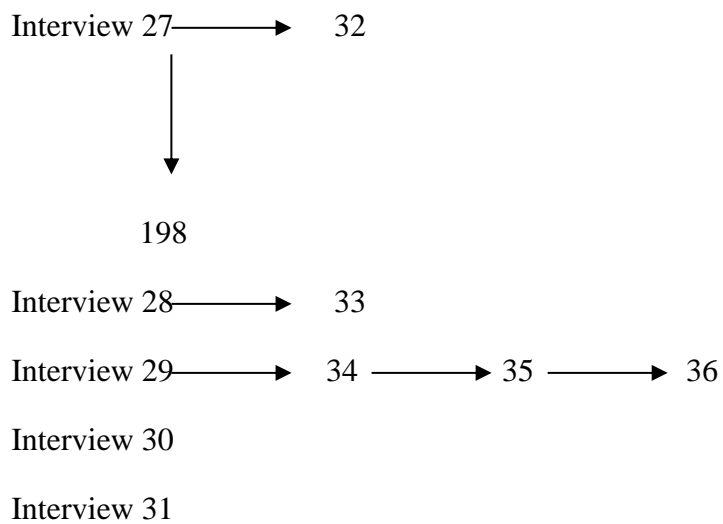
Interview 5

Interview 6



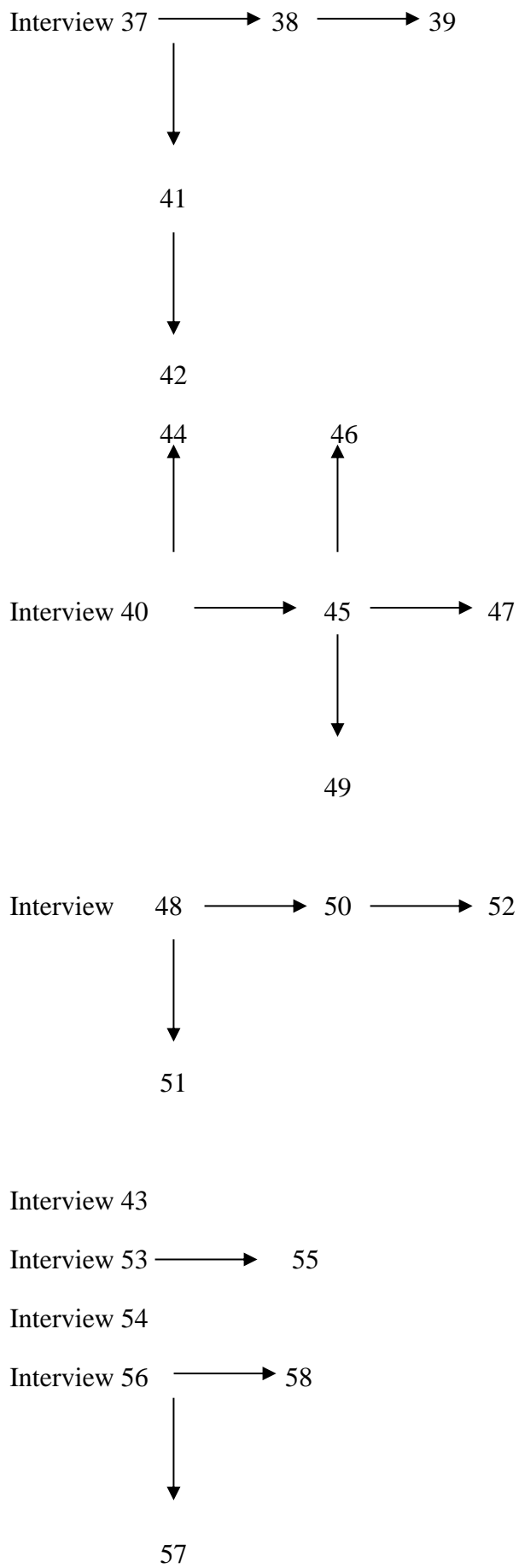


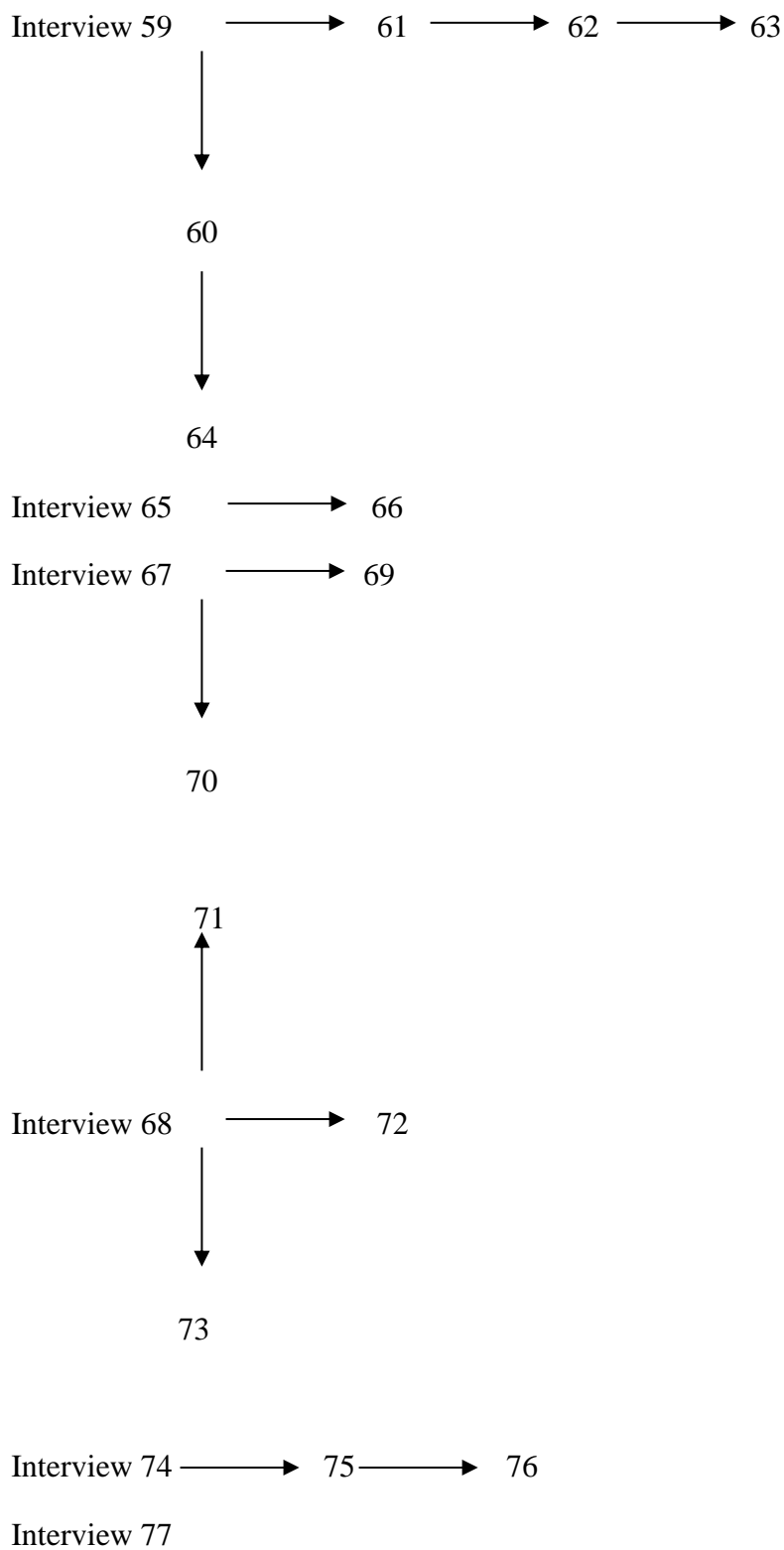
Interview 26



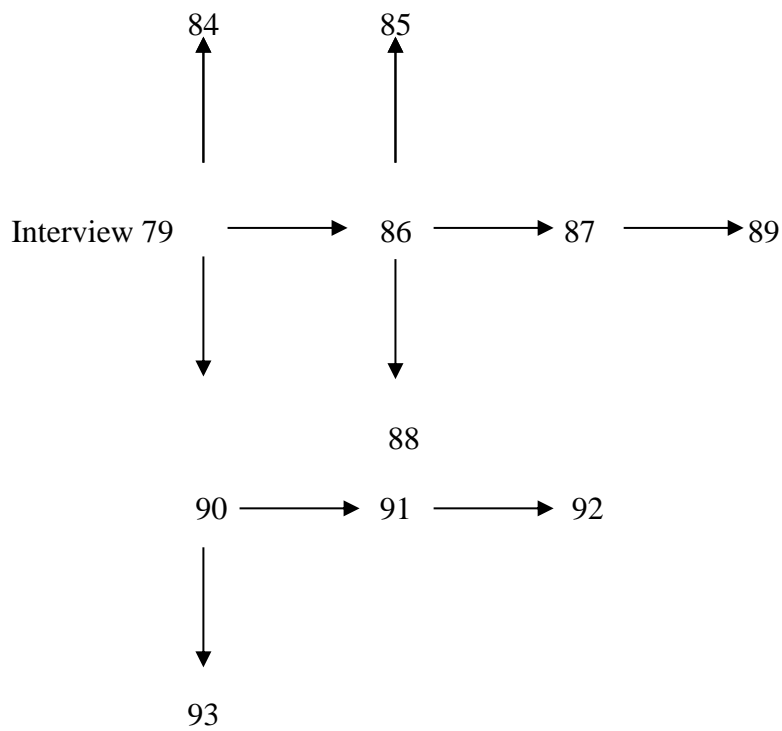
Interview 30

Interview 31





Interview 78



Interview 80

Interview 81

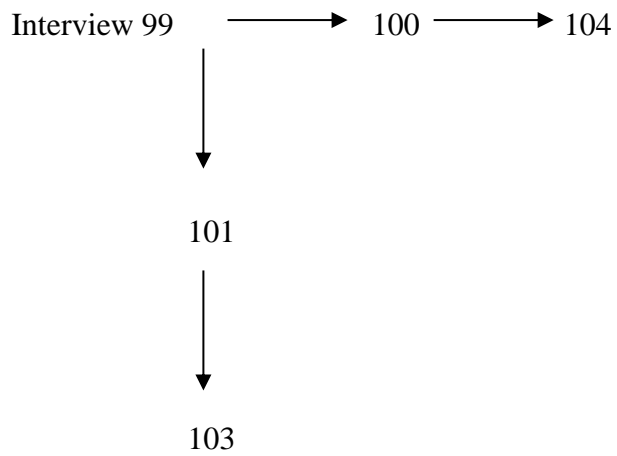
Interview 82

Interview 83

Interview 94 → 95

Interview 96 → 98

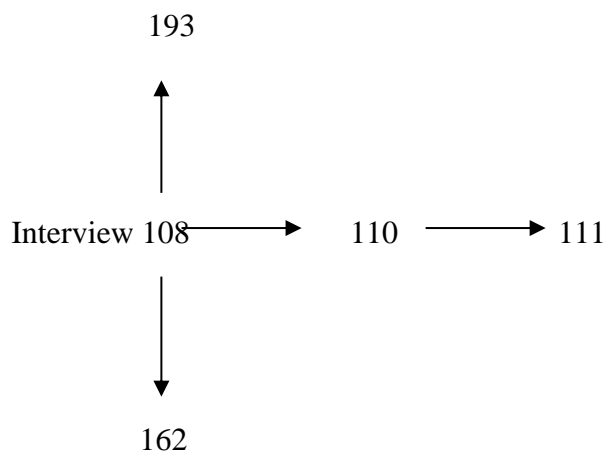
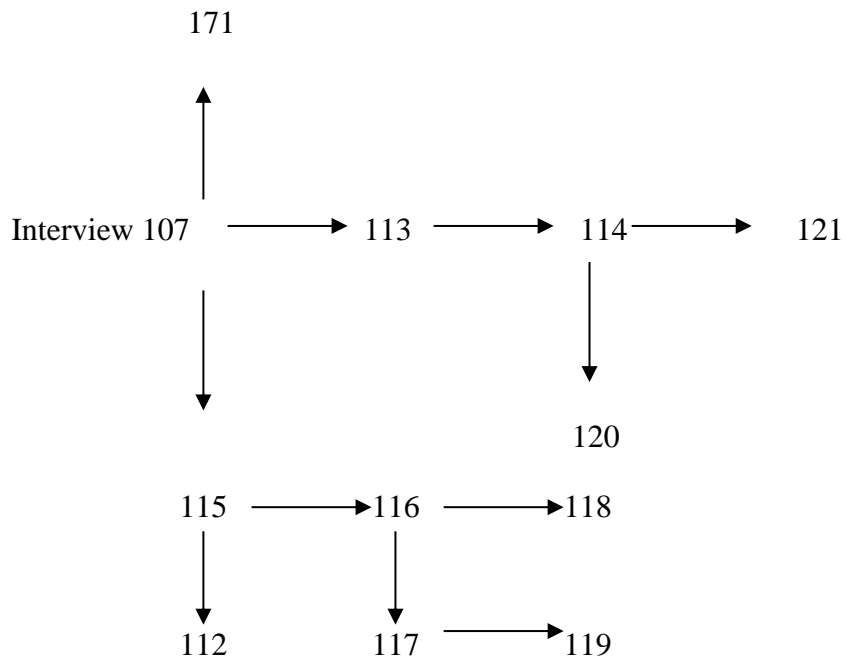
Interview 97



Interview 102

Interview 105

Interview 106



Interview 109

Interview 122

Interview 123

Interview 124

Interview 125

Interview 126

Interview 127

Interview 128

Interview 129

Interview 130 → 131

Interview 132

Interview 133

Interview 134

Interview 135 → 137 → 138



139



140



141

Interview 136 → 142 → 143



144



145

Interview 146

Interview 147

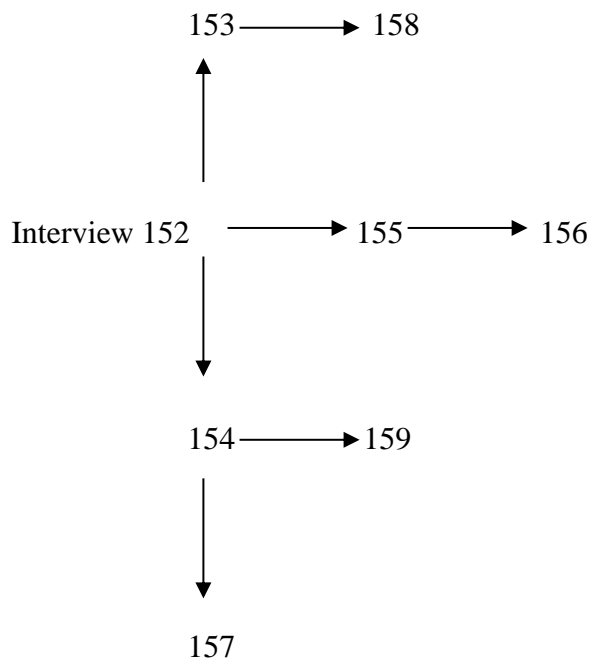


Interview 148

Interview 149

Interview 150

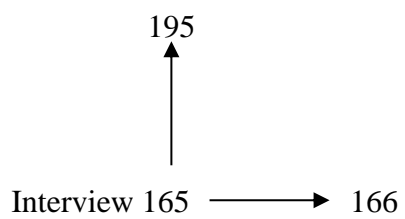
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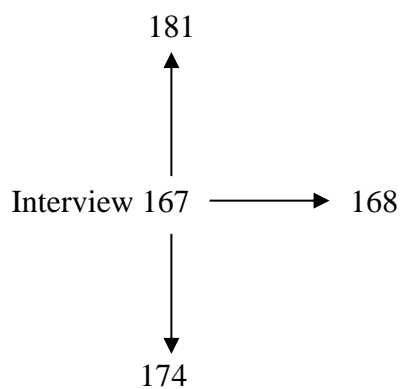


Interview 160

Interview 161

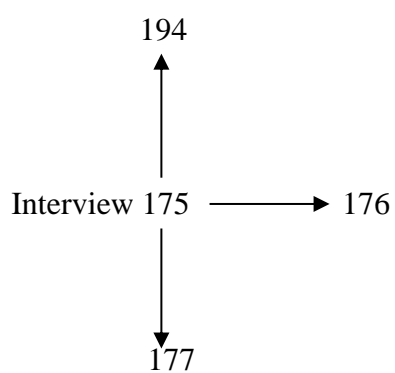
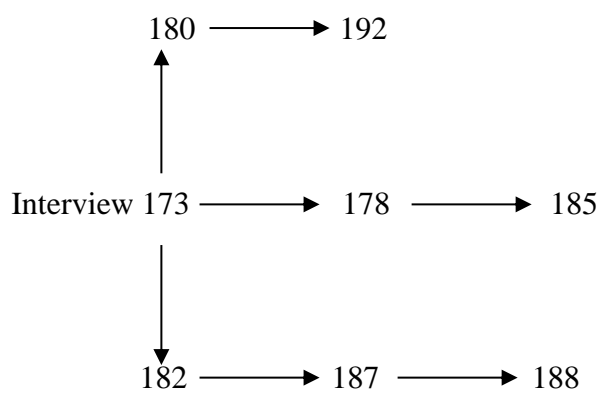
Interview 163 → 164





Interview 169

Interview 170 → 172



Interview 179

Interview 183

Interview 184 → 186

Interview 189 —→ 190

Interview 191

Interview 196 —→ 197

↓  
199

Interview 200

## Appendix 4

### Secondary Data Sorting and Formulation

This appendix explains how the study sorted the secondary data, formed the treatment and control groups, and formed the DID estimations for each dataset.

#### 1. ASHE 2009 and 2010

Total observation is 348,618 respondents. Respondents in 2009 are marked as the treatment group if their hourly wage is less than or equal to:

£3.57 for 16–17-year-olds (2009 National Minimum Wage (NMW) rate)

£4.83 for 18–21-year-olds (2009 NMW rate)

£5.80 for 22+-year-olds (2009 NMW rate)

Otherwise they are in the control group.

Respondents in 2010 are marked as the treatment group if their hourly wage is less than or equal to:

£3.64 for 16–17-year-olds (2010 NMW rate)

£4.92 for 18–21-year-olds (2010 NMW rate)

£5.93 for 21+-year-olds 2010 (NMW rate)

Otherwise they are in the control group.

The following variables explain the possible outcomes that this study would like to find from the ASHE dataset:

*Hourlywage* = Wage per hour

*Bpay* = Basic weekly earnings

*Bhr* = Basic weekly paid hours worked

*Ipayin* = Incentive pay

*Sppay* = Additional premium payments for shift work and night or weekend work not treated as overtime

*Anipay* = Portion of gross annual earnings that comes from incentive payments

*Ownpay* = Amount of employee's contribution to pension

*Compay* = Amount of employer's contribution to pension

*Ownperc* = Percentage of employee's contribution to pension

*Comperc* = Percentage of employer's contributions to pension

*Ovhrs* = Average weekly paid overtime hours worked

*Ovpay* = Average weekly overtime pay

*Othpay* = Pay received for other reasons

Hourly wage is *bpay* divided by *bhr*. Exclude respondents who answer *bpay*=0 and *bhr*=0.

Total eligible sample is 346,544 respondents.

DID estimations for the first dataset:

$$Hourlywage_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

$$Bpay_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

$$Bhr_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

$$Ipayin_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

$$Sppay_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

$$Anipay_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

$$Ownpay_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

$$Compay_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

$$Ownperc_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

$$Comper_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

$$Ovhrs_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

$$Ovpay_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

$$Othpay_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

where  $T_t$  is a time dummy (1 for period A, 0 for period B),  $G_i$  is a group dummy (1 for the treatment group, 0 for the control group),  $T_t * G_i$  is the interaction of the time dummy and the group dummy, and  $Outcome_{t,i}$  is the expected outcome of the minimum wage at time  $t$  for group  $i$ . Coefficient  $\hat{\alpha}_3$ , the DID estimator, show whether the impact of the minimum wage exists, and if so how large that effect is.

## 2. ASHE 1997 and 2010

The second dataset is used to examine the impact across a wider interval, between 1997 (when the first ASHE was introduced) and 2010 (the latest ASHE). However, the variables for 1997 are not as complete as those for 2010. Therefore the outcomes (effects) that could

be examined are fewer. The DID estimations explain which outcomes the study is looking for.

Total observation is 329,081 respondents. Respondents in 1997 are marked as the treatment group if their hourly wage is less than or equal to:

£3.00 for 16–21-year-olds (1999 NMW rate)

£3.60 for 22+-year-olds (1999 NMW rate)

Otherwise they are in the control group.

Respondents in 2010 are marked as the treatment group if their hourly wage is less than or equal to:

£3.64 for 16–17-year-olds (2010 NMW rate)

£4.92 for 18–21-year-olds (2010 NMW rate)

£5.93 for 21+-year-olds 2010 (NMW rate)

Otherwise they are in the control group.

Hourly wage is *bpay* (basic weekly earnings) divided by *bhr* (basic paid hours). Exclude respondents who answer *bpay*=0 and *bhr*=0. Total eligible sample is 315,911.

DID estimations for the second dataset:

$$Hourlywage_{t,i} = \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i}$$

$$Bpay_{t,i} = \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i}$$

$$Bhr_{t,i} = \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i}$$

$$Ovhrs_{t,i} = \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i}$$

$$Ovpay_{t,i} = \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i}$$

### 3. WERS Cross-Section of Employees 1998 and 2004

Total observation is 50,691 respondents. Respondents in 1998 are marked as the treatment group if their hourly wage is less than or equal to:

£3.00 for 16–21-year-olds (1999 NMW rate)

£3.60 for 22+-year-olds (1999 NMW rate)

Otherwise they are in the control group.

Hourly wage is question *d11* ‘How much do you get paid (per week) for your job here, before tax and other deductions are taken out?’ divided by question *a3* ‘How many hours do you usually work each week, including any overtime or extra hours?’

Since the answer to question *d11* is within a range, the average is used.

£50 or less per week or £2,600 or less per year = £50
£51 – £80 per week or £2,601 – £4,160 per year, average = £65.50
£81 – £140 per week or £4,161 – £7,280 per year, average = £110.50
£141 – £180 per week or £7,281 – £9,360 per year, average = £160.50
£181 – £220 per week or £9,361 – £11,440 per year, average = £200.50
£221 – £260 per week or £11,441 – £13,520 per year, average = £240.50
£261 – £310 per week or £13,521 – £16,120 per year, average = £285.50
£311 – £360 per week or £16,121 – £18,720 per year, average = £335.50
£361 – £430 per week or £18,721 – £22,360 per year, average = £395.50
£431 – £540 per week or £22,361 – £28,080 per year, average = £485.50
£541 – £680 per week or £28,081 – £35,360 per year, average = £610.50
£681 or more per week or £35,361 or more per year, average = £775.50

The variable *age* is also defined within a range; therefore the average age is used.

Age	Average Age
Less than 20	20
20–24	22
25–29	27
30–39	35
40–49	45
50–59	55
60 or more	60

For ages less than 20 years, use the 16–21-year-olds’ NMW rate; otherwise use the adult rate. Exclude respondents who did not answer questions *d11* and *a3*.

Respondents in 2004 are marked as the treatment group if their hourly wage is less than or equal to:

£3.00 for 16–17-year-olds (2004 NMW rate)

£4.10 for 18–21-year-olds (2004 NMW rate)

£4.85 for 22+-year-olds (2004 NMW rate)

Otherwise they are in the control group.

Hourly wage is question *e15* ‘*How much do you get paid (per week) for your job here, before tax and other deductions are taken out?*’ divided by question *a3* ‘*How many hours do you usually work each week, including any overtime or extra hours?*’

If question *e15* is unanswered, check question *e16* ‘*How much do you get paid per hour, before tax and other deductions are taken out?*’

Since the answer to question *e15* is within a range, the average is used.

£50 or less per week or £2,600 or less per year = £50
£51 – £80 per week or £2,601 – £4,160 per year, average = £65.50
£81 – £110 per week or £4,161 – £5,720 per year, average = £95.50
£111 – £140 per week or £5,721 – £7,280 per year, average = £125.50
£141 – £180 per week or £7,281 – £9,360 per year, average = £160.50
£181 – £220 per week or £9,361 – £11,440 per year, average = £200.50
£221 – £260 per week or £11,441 – £13,520 per year, average = £240.50
£261 – £310 per week or £13,521 – £16,120 per year, average = £285.50
£311 – £360 per week or £16,121 – £18,720 per year, average = £335.50
£361 – £430 per week or £18,721 – £22,360 per year, average = £395.50
£431 – £540 per week or £22,361 – £28,080 per year, average = £485.50
£541 – £680 per week or £28,081 – £35,360 per year, average = £610.50
£681 – £870 per week or £35,361 – £45,240 per year, average = £775.50
£871 or more per week or £45,241 or more per year = £871

The variable *age* is also defined within a range; therefore the average age is used.



Age	Average Age
16–17	17
18–19	19
20–21	21
22–29	26
30–39	35
40–49	45
50–59	55
60–64	62
65 or more	65

Exclude respondents who did not answer questions *e15*, *a3* or *e16*. Total eligible sample is 48,675.

The outcomes that the third dataset would like to find – that is, what the effects of the minimum wage are on – are the following variables:

*Hourlywage* = Wage per hour

*Hoursperweek* = Total hours of work per week including overtime

*Overtimehrs* = Overtime hours per week

*Basichrs* = Basic hours per week excluding overtime

*Flexitime* = If flexible working hours are available

*Jobshare* = If job sharing (sharing a full-time job with someone else) is available

*Parental* = If parental leave is available

*Workhome* = If working at or from home during normal working hours is available

*Nursery* = If a workplace nursery or help with the cost of childcare is available

*Belowdegree* = Proportion of employees with an education below degree level

DID estimations for the third dataset:

$$Hourlywage_{t,i} = \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i}$$

$$Hoursperweek_{t,i} = \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i}$$

$$Overtimehrs_{t,i} = \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i}$$

$$Basichrs_{t,i} = \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i}$$

$$Flexitime_{t,i} = \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i}$$

$$Jobshare_{t,i} = \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i}$$

$$Parental_{t,i} = \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i}$$

$$Workhome_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

$$Nursery_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

$$Belowdegree_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

#### 4. LFS Q1 2000 and Q1 2011

The seventh dataset is the LFS with a wider timespan comparison. The purpose is to examine whether the minimum wage's impact is greater if the time span is wider. Total observation is 249,901. Exclude respondents whose age is under 16 years. Include only respondents who are currently in paid work: only include them if the variable *wrking* (whether they did paid work in the reference week) = 1 (yes). Exclude respondents who answer *wrking* = 2 (no) or who did not answer the *wrking* question.

Respondents in 2000 are marked as the treatment group if their hourly wage is less than or equal to:

£3.20 for 16–21-year-olds (2000 NMW rate)

£3.70 for 22+-year-olds (2000 NMW rate)

Otherwise they are in the control group.

Respondents in 2011 are marked as the treatment group if their hourly wage is less than or equal to:

£3.68 for 16–17-year-olds (2011 NMW rate)

£4.98 for 18–21-year-olds (2011 NMW rate)

£6.08 for 21+-year-olds (2011 NMW rate)

Otherwise they are in the control group.

To count the hourly wage, use *hrrate* (basic hourly rate). If there is no information on *hrrate*, then divide the variable *netwk* (net weekly pay in main job) by *bacthr* (basic actual hours in main job per week). If there is no answer to *netwk* or *bacthr*, use *hourpay* (average gross hourly pay). If there is no answer to *hrrate*, *netwk*, *bacthr* or *hourpay*, then exclude the respondent. Total eligible sample is 26,057.

DID estimations for the seventh dataset:

$$Cameyr_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

$$\begin{aligned}
Eth01_{t,i} &= \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i} \\
Conmpy_{t,i} &= \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i} \\
Bushr_{t,i} &= \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i} \\
Edl3wk_{t,i} &= \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i} \\
Jobtrn_{t,i} &= \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i} \\
Tfee_{t,i} &= \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i} \\
Trnlen_{t,i} &= \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i} \\
Netwk_{t,i} &= \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i} \\
Hourlypaid_{t,i} &= \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i} \\
Ernfilt_{t,i} &= \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i} \\
Bonuses_{t,i} &= \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i} \\
Profitrelated_{t,i} &= \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i} \\
Londonallw_{t,i} &= \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i} \\
Standby_{t,i} &= \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i} \\
Shiftallw_{t,i} &= \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i}
\end{aligned}$$

## Appendix 5

### Stata Results of DID Estimations

This work contains statistical data from the ONS which is Crown Copyright. The use of ONS statistical data in this work does not imply the endorsement of the ONS in relation to the interpretation or analysis of the statistical data. This work uses research datasets which may not exactly reproduce National Statistics aggregates.

Note: from the Stata results, variable x represents variable  $G_i$  in the DID model, variable t represents variable  $T_t$ , and variable xt represents variable  $T_t * G_i$  in the DID model. Thus coefficient of variable xt in Stata result represents coefficient  $\hat{a}_3$  in DID model. This applies to all the Stata results.

#### ASHE 2009 and 2010

$$Hourlywage_{t,i} = \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs = 346544		
Model	1120452.78	3	373484.26	F( 3,346540) = 3395.52		
Residual	38117040.4346540	109.993191		Prob > F = 0.0000		
				R-squared = 0.0286		
				Adj R-squared = 0.0285		
Total	39237493.1346543	113.225467		Root MSE = 10.488		

hourlywage	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	-7.796085	.1144531	-68.12	0.000	-8.02041	-7.57176
t	.1679187	.0366683	4.58	0.000	.09605	.2397874
xt	-.0733033	.155815	-0.47	0.638	-.3786963	.2320896
_cons	13.11083	.0259289	505.64	0.000	13.06001	13.16165

$$Bpay_{t,i} = \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs = 346544		
Model	1.6103e+09	3	536768237	F( 3,346540) = 4016.95		
Residual	4.6307e+10346540	133625.94		Prob > F = 0.0000		
				R-squared = 0.0336		
				Adj R-squared = 0.0336		
Total	4.7917e+10346543	138271.55		Root MSE = 365.55		

bpay	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	-295.5894	3.989239	-74.10	0.000	-303.4082	-287.7706
t	3.968199	1.278065	3.10	0.002	1.46323	6.473169
xt	-2.879584	5.430901	-0.53	0.596	-13.52399	7.764823
_cons	431.9682	.9037475	477.97	0.000	430.1969	433.7396

$$Bhr_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs =	346544
Model	698084.19	3	232694.73	F( 3,346540) =	1794.42
Residual	44938166.1346540	129.676707		Prob > F =	0.0000
				R-squared =	0.0153
				Adj R-squared =	0.0153
Total	45636250.2346543	131.690007		Root MSE =	11.388

bhr	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
x	-6.062466	.1242727	-48.78	0.000	-6.306037 -5.818896
t	-.0435645	.0398142	-1.09	0.274	-.1215992 .0344703
xt	-.2205271	.1691833	-1.30	0.192	-.5521214 .1110672
_cons	32.1614	.0281535	1142.36	0.000	32.10622 32.21658

$$Ipayin_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs =	346544
Model	392341.281	3	130780.427	F( 3,346540) =	25.25
Residual	1.7949e+09346540	5179.49165		Prob > F =	0.0000
				R-squared =	0.0002
				Adj R-squared =	0.0002
Total	1.7953e+09346543	5180.57897		Root MSE =	71.969

ipayin	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
x	3.268862	.7853952	4.16	0.000	1.72951 4.808214
t	.1090582	.2516234	0.43	0.665	-.3841162 .6022327
xt	2.218194	1.069227	2.07	0.038	.1225396 4.313848
_cons	5.844045	.1779284	32.84	0.000	5.49531 6.192779

$$Sppay_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs =	346544
Model	371890.822	3	123963.607	F( 3,346540) =	216.77
Residual	198178512346540	571.877739		Prob > F =	0.0000
				R-squared =	0.0019
				Adj R-squared =	0.0019
Total	198550403346543	572.945934		Root MSE =	23.914

sppay	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
x	-4.439422	.2609734	-17.01	0.000	-4.950923 -3.927922
t	.1212226	.0836102	1.45	0.147	-.0426508 .2850961
xt	-.1354072	.355286	-0.38	0.703	-.8317574 .5609429
_cons	5.329218	.0591226	90.14	0.000	5.21334 5.445097

$$Anipay_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs =	346544
Model	1.5625e+10	3	5.2084e+09	F( 3,346540) =	14.04
Residual	1.2857e+14346540	371019201		Prob > F =	0.0000
				R-squared =	0.0001
				Adj R-squared =	0.0001
Total	1.2859e+14346543	371061078		Root MSE =	19262

anipay	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
x	-924.7645	210.2049	-4.40	0.000	-1336.76 -512.769
t	-32.43305	67.34504	-0.48	0.630	-164.4274 99.56126
xt	6.086763	286.1704	0.02	0.983	-554.7988 566.9724
_cons	1441.917	47.62115	30.28	0.000	1348.581 1535.253

$$Ownpay_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs =	346493
Model	3591429.51	3	1197143.17	F( 3,346489) =	424.38
Residual	977408340346489	2820.89284		Prob > F =	0.0000
				R-squared =	0.0037
				Adj R-squared =	0.0037
Total	980999769346492	2831.23353		Root MSE =	53.112

ownpay	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
x	-13.99403	.5796147	-24.14	0.000	-15.13006 -12.858
t	.329289	.1857091	1.77	0.076	-.0346955 .6932735
xt	-.0616711	.7891136	-0.08	0.938	-1.608311 1.484969
_cons	14.56326	.1313176	110.90	0.000	14.30589 14.82064

$$Compay_{t,i} = \hat{a}_0 + \hat{a}_1*T_t + \hat{a}_2*G_i + \hat{a}_3*(T_t*G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs = 346474		
Model	23963769.8	3	7987923.26	F( 3,346470) = 923.59		
Residual	2.9965e+09346470	8648.7803		Prob > F = 0.0000		
				R-squared = 0.0079		
				Adj R-squared = 0.0079		
Total	3.0205e+09346473	8717.87031		Root MSE = 92.999		

compay	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	-36.083	1.014902	-35.55	0.000	-38.07218	-34.09383
t	.7086486	.3251851	2.18	0.029	.0712952	1.346002
xt	-.2945349	1.381705	-0.21	0.831	-3.002637	2.413567
_cons	37.98982	.2299416	165.22	0.000	37.53914	38.4405

$$Ownperc_{t,i} = \hat{a}_0 + \hat{a}_1*T_t + \hat{a}_2*G_i + \hat{a}_3*(T_t*G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs = 166140		
Model	468.107031	3	156.035677	F( 3,166136) = 10.81		
Residual	2399064.43166136	14.4403647		Prob > F = 0.0000		
				R-squared = 0.0002		
				Adj R-squared = 0.0002		
Total	2399532.53166139	14.4429215		Root MSE = 3.8		

ownperc	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	-.3202773	.1430231	-2.24	0.025	-.6005995	-.0399551
t	.0902485	.018738	4.82	0.000	.0535224	.1269747
xt	.4800234	.1910982	2.51	0.012	.1054752	.8545717
_cons	5.058301	.0131984	383.25	0.000	5.032433	5.08417

$$Comper_{t,i} = \hat{a}_0 + \hat{a}_1*T_t + \hat{a}_2*G_i + \hat{a}_3*(T_t*G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs = 166093		
Model	12704.8206	3	4234.9402	F( 3,166089) = 56.80		
Residual	12384276.5166089	74.5640982		Prob > F = 0.0000		
				R-squared = 0.0010		
				Adj R-squared = 0.0010		
Total	12396981.3166092	74.6392441		Root MSE = 8.6351		

comperc	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	3.020339	.325226	9.29	0.000	2.382903	3.657775
t	-.0054718	.0425848	0.13	0.898	-.0779936	.0889371
xt	-.3734914	.4348297	-0.86	0.390	-1.225748	.4787654
_cons	13.5155	.0299966	450.57	0.000	13.45671	13.57429

$$\%Female_{t,i} = \hat{a}_0 + \hat{a}_1*T_t + \hat{a}_2*G_i + \hat{a}_3*(T_t*G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs = 346544		
Model	217.833061	3	72.6110205	F( 3,346540) = 291.46		
Residual	86332.0469346540	.249125778		Prob > F = 0.0000		
				R-squared = 0.0025		
				Adj R-squared = 0.0025		
Total	86549.88346543	.24975221		Root MSE = .49913		

female	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	.1139283	.005447	20.92	0.000	.1032524	.1246041
t	.0014783	.0017451	0.85	0.397	-.001942	.0048986
xt	-.0089097	.0074154	-1.20	0.230	-.0234437	.0056243
_cons	1.508939	.001234	1222.81	0.000	1.506521	1.511358

$$Ovhrs_{t,i} = \hat{a}_0 + \hat{a}_1*T_t + \hat{a}_2*G_i + \hat{a}_3*(T_t*G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs = 346544		
Model	1671.21851	3	557.072836	F( 3,346540) = 40.46		
Residual	4771665.15346540		13.7694498	Prob > F = 0.0000		
				R-squared = 0.0004		
				Adj R-squared = 0.0003		
Total	4773336.37346543	13.7741532		Root MSE = 3.7107		

ovhrs	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	-.1716934	.0404951	-4.24	0.000	-.2510627	-.0923241
t	.0929506	.0129738	7.16	0.000	.0675225	.1183788
xt	-.1141693	.0551296	-2.07	0.038	-.2222217	-.0061169
_cons	1.054124	.009174	114.90	0.000	1.036143	1.072105

$$Ovpay_{t,i} = \hat{a}_0 + \hat{a}_1*T_t + \hat{a}_2*G_i + \hat{a}_3*(T_t*G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs = 346544		
Model	1295111.98	3	431703.994	F( 3,346540) = 156.10		
Residual	958358481346540		2765.50609	Prob > F = 0.0000		
				R-squared = 0.0013		
				Adj R-squared = 0.0013		
Total	959653593346543	2769.21939		Root MSE = 52.588		

ovpay	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	-7.680206	.5738944	-13.38	0.000	-8.805023	-6.55539
t	.9892181	.1838632	5.38	0.000	.6288516	1.349585
xt	-.9639642	.7812927	-1.23	0.217	-2.495275	.5673468
_cons	13.70205	.1300137	105.39	0.000	13.44722	13.95687

$$Othpay_{t,i} = \hat{a}_0 + \hat{a}_1*T_t + \hat{a}_2*G_i + \hat{a}_3*(T_t*G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs = 346544		
Model	1415140.05	3	471713.352	F( 3,346540) = 195.84		
Residual	834680942346540		2408.61356	Prob > F = 0.0000		
				R-squared = 0.0017		
				Adj R-squared = 0.0017		
Total	836096082346543	2412.6763		Root MSE = 49.078		

othpay	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	-8.491744	.5355848	-15.86	0.000	-9.541474	-7.442013
t	.1138229	.1715896	0.66	0.507	-.2224877	.4501336
xt	-.5794451	.7291385	-0.79	0.427	-2.008535	.8496452
_cons	11.05926	.1213348	91.15	0.000	10.82145	11.29707

## ASHE 1997 and 2010

$$Hourlywage_{t,i} = \hat{a}_0 + \hat{a}_1*T_t + \hat{a}_2*G_i + \hat{a}_3*(T_t*G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs = 315911		
Model	2716415.42	3	905471.808	F( 3,315907) =11427.64		
Residual	25030956.6315907		79.2352072	Prob > F = 0.0000		
				R-squared = 0.0979		
				Adj R-squared = 0.0979		
Total	27747372315910	87.8331551		Root MSE = 8.9014		

hourlywage	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	-5.558711	.0860041	-64.63	0.000	-5.727277	-5.390146
t	4.782841	.0330615	144.66	0.000	4.718042	4.847641
xt	-2.310677	.1242961	-18.59	0.000	-2.554294	-2.06706
_cons	8.495907	.0246739	344.33	0.000	8.447547	8.544268

$$Bpay_{t,i} = \hat{a}_0 + \hat{a}_1*T_t + \hat{a}_2*G_i + \hat{a}_3*(T_t*G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs = 315911		
Model	2.9845e+09	3	994829942	F( 3,315907)	=10362.52	
Residual	3.0328e+10315907	96002.7355		Prob > F	= 0.0000	
				R-squared	= 0.0896	
				Adj R-squared	= 0.0896	
Total	3.3312e+10315910	105449.103		Root MSE	= 309.84	

bpay	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	-209.3585	2.993655	-69.93	0.000	-215.2259	-203.491
t	145.5071	1.150816	126.44	0.000	143.2516	147.7627
xt	-89.11049	4.326536	-20.60	0.000	-97.59037	-80.6306
_cons	290.4293	.8588547	338.16	0.000	288.746	292.1126

$$Bhr_{t,i} = \hat{a}_0 + \hat{a}_1*T_t + \hat{a}_2*G_i + \hat{a}_3*(T_t*G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs = 315911		
Model	975852.584	3	325284.195	F( 3,315907)	= 2675.48	
Residual	38407915315907	121.579816		Prob > F	= 0.0000	
				R-squared	= 0.0248	
				Adj R-squared	= 0.0248	
Total	39383767.6315910	124.667683		Root MSE	= 11.026	

bhr	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	-6.096593	.1065346	-57.23	0.000	-6.305397	-5.887788
t	-1.680172	.0409539	-41.03	0.000	-1.760441	-1.599904
xt	-.186401	.1539676	-1.21	0.226	-.488173	.115371
_cons	33.798	.0305639	1105.81	0.000	33.7381	33.85791

$$Ovhrs_{t,i} = \hat{a}_0 + \hat{a}_1*T_t + \hat{a}_2*G_i + \hat{a}_3*(T_t*G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs = 315911		
Model	67554.3943	3	22518.1314	F( 3,315907)	= 1033.47	
Residual	6883227.95315907	21.7887795		Prob > F	= 0.0000	
				R-squared	= 0.0097	
				Adj R-squared	= 0.0097	
Total	6950782.35315910	22.0024132		Root MSE	= 4.6678	

ovhrs	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	-.5080343	.0451	-11.26	0.000	-.596429	-.4196396
t	-.9294509	.0173373	-53.61	0.000	-.9634314	-.8954703
xt	.2221716	.0651801	3.41	0.001	.0944205	.3499227
_cons	2.076526	.0129388	160.49	0.000	2.051166	2.101885

$$Ovpay_{t,i} = \hat{a}_0 + \hat{a}_1*T_t + \hat{a}_2*G_i + \hat{a}_3*(T_t*G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs = 315911		
Model	2468428.6	3	822809.533	F( 3,315907)	= 342.39	
Residual	759157112315907	2403.10317		Prob > F	= 0.0000	
				R-squared	= 0.0032	
				Adj R-squared	= 0.0032	
Total	761625541315910	2410.89406		Root MSE	= 49.021	

ovpay	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	-10.44609	.4736376	-22.06	0.000	-11.3744	-9.517771
t	-3.026989	.182075	-16.62	0.000	-3.383851	-2.670128
xt	1.801917	.6845177	2.63	0.008	.4602819	3.143552
_cons	17.71825	.1358827	130.39	0.000	17.45193	17.98458

## WERS Cross-Section of Employees 1998 and 2004



$$\text{Hourlywage}_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs =	48675
Model	300329.37	3	100109.79	F( 3, 48671) =	694.74
Residual	7013301.05	48671	144.096095	Prob > F =	0.0000
				R-squared =	0.0411
				Adj R-squared =	0.0410
Total	7313630.42	48674	150.257436	Root MSE =	12.004

hourlywage	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
x	-5.113226	.2682114	-19.06	0.000	-5.638924 -4.587529
t	3.676618	.1144553	32.12	0.000	3.452284 3.900951
xt	-2.575261	.3863396	-6.67	0.000	-3.332491 -1.81803
_cons	8.027295	.0768037	104.52	0.000	7.876759 8.177832

$$\text{Hoursperweek}_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs =	48326
Model	35141.2962	3	11713.7654	F( 3, 48322) =	77.37
Residual	7316306.22	48322	151.407355	Prob > F =	0.0000
				R-squared =	0.0048
Total	7351447.52	48325	152.125143	Adj R-squared =	0.0047
				Root MSE =	12.305

hoursperweek	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
x	-1.306805	.2749316	-4.75	0.000	-1.845674 -.7679356
t	-.9217551	.1177897	-7.83	0.000	-1.152624 -.6908858
xt	-1.785268	.3990882	-4.47	0.000	-2.567486 -1.00305
_cons	37.31001	.0787281	473.91	0.000	37.15571 37.46432

$$\text{Overtimehrs}_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs =	46382
Model	3492.40855	3	1164.13618	F( 3, 46378) =	31.33
Residual	1723469.2	46378	37.1613524	Prob > F =	0.0000
				R-squared =	0.0020
Total	1726961.61	46381	37.234247	Adj R-squared =	0.0020
				Root MSE =	6.096

overtimehrs	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
x	-.1014625	.1436321	-0.71	0.480	-.3829836 .1800585
t	-.5457655	.0593256	-9.20	0.000	-.6620445 -.4294865
xt	.0045034	.2014479	0.02	0.982	-.3903376 .3993443
_cons	4.151488	.0407507	101.88	0.000	4.071616 4.23136

$$\text{Basichrs}_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs =	46382
Model	39916.5312	3	13305.5104	F( 3, 46378) =	107.57
Residual	5736748.9	46378	123.695478	Prob > F =	0.0000
				R-squared =	0.0069
Total	5776665.43	46381	124.5481	Adj R-squared =	0.0068
				Root MSE =	11.122

basichrs	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
x	-1.176857	.262049	-4.49	0.000	-1.690477 -.6632371
t	-.89529	.1082363	-8.27	0.000	-1.107435 -.6831451
xt	-2.318066	.367531	-6.31	0.000	-3.038432 -1.597699
_cons	33.28457	.0743475	447.69	0.000	33.13884 33.43029

$$\text{Flexitime}_{t,i} = \hat{\alpha}_0 + \hat{\alpha}_1 * T_t + \hat{\alpha}_2 * G_i + \hat{\alpha}_3 * (T_t * G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs =	43498
Model	1475.85253	3	491.950843	F( 3, 43494) =	3139.88
Residual	6814.56535	43494	.156678286	Prob > F =	0.0000
				R-squared =	0.1780
Total	8290.41788	43497	.190597464	Adj R-squared =	0.1780
				Root MSE =	.39583

flexitime	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
x	-.0458086	.0089545	-5.12	0.000	-.0633595 -.0282576
t	.3737254	.0040457	92.38	0.000	.3657958 .381655
xt	.0231347	.0141197	1.64	0.101	-.0045401 .0508095
_cons	.1102185	.0025537	43.16	0.000	.1052132 .1152239

$$Jobshare_{t,i} = \hat{a}_0 + \hat{a}_1*T_t + \hat{a}_2*G_i + \hat{a}_3*(T_t*G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs =	40015
Model	179.408223	3	59.8027411	F( 3, 40011) =	350.62
Residual	6824.34447	40011	.170561707	Prob > F =	0.0000
				R-squared =	0.0256
				Adj R-squared =	0.0255
Total	7003.75269	40014	.175032556	Root MSE =	.41299

jobshare	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	-.073978	.0093428	-7.92	0.000	-.0922901	-.0556658
t	.1301741	.0045383	28.68	0.000	.1212789	.1390693
xt	.0769792	.0154889	4.97	0.000	.0466206	.1073378
_cons	.1849324	.0026645	69.41	0.000	.17971	.1901548

$$Parental_{t,i} = \hat{a}_0 + \hat{a}_1*T_t + \hat{a}_2*G_i + \hat{a}_3*(T_t*G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs =	38013
Model	80.0466681	3	26.6822227	F( 3, 38009) =	141.77
Residual	7153.55263	38009	.18820681	Prob > F =	0.0000
				R-squared =	0.0111
				Adj R-squared =	0.0110
Total	7233.59929	38012	.190297782	Root MSE =	.43383

parental	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	-.0765973	.0098142	-7.80	0.000	-.0958334	-.0573613
t	-.0890554	.005024	-17.73	0.000	-.0989027	-.0792082
xt	.0095398	.0171214	0.56	0.577	-.0240185	.0430982
_cons	.2895734	.0027989	103.46	0.000	.2840875	.2950593

$$Workhome_{t,i} = \hat{a}_0 + \hat{a}_1*T_t + \hat{a}_2*G_i + \hat{a}_3*(T_t*G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs =	44629
Model	74.0033649	3	24.6677883	F( 3, 44625) =	213.38
Residual	5158.76121	44625	.115602492	Prob > F =	0.0000
				R-squared =	0.0141
				Adj R-squared =	0.0141
Total	5232.76457	44628	.117252948	Root MSE =	.34

workhome	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	-.1063459	.0076917	-13.83	0.000	-.1214218	-.0912701
t	-.0552047	.00342	16.14	0.000	-.0485014	-.061908
xt	-.0118777	.0116023	-1.02	0.306	-.0346183	.010863
_cons	.1223309	.0021936	55.77	0.000	.1180315	.1266303

$$Nursery_{t,i} = \hat{a}_0 + \hat{a}_1*T_t + \hat{a}_2*G_i + \hat{a}_3*(T_t*G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs =	39763
Model	32.8755029	3	10.958501	F( 3, 39759) =	197.00
Residual	2211.71117	39759	.055627938	Prob > F =	0.0000
				R-squared =	0.0146
				Adj R-squared =	0.0146
Total	2244.58668	39762	.056450548	Root MSE =	.23586

nursery	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	-.0150161	.0053356	-2.81	0.005	-.025474	-.0045582
t	.0604588	.0026042	23.22	0.000	.0553544	.0655632
xt	-.0093938	.0090008	-1.04	0.297	-.0270356	.0082481
_cons	.0408741	.0015217	26.86	0.000	.0378916	.0438566

$$\text{Belowdegree}_{t,i} = \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs = 42268		
Model	922.970489	3	307.65683	F( 3, 42264) = 2462.19		
Residual	5281.00311	42264	.124952752	Prob > F = 0.0000		
				R-squared = 0.1488		
				Adj R-squared = 0.1487		
				Root MSE = .35349		
Total	6203.9736	42267	.146780552			

belowdegree	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	.2346958	.0101579	23.10	0.000	.214786	.2546055
t	.2957575	.0035801	82.61	0.000	.2887404	.3027745
xt	-.1983497	.0131428	-15.09	0.000	-.2241099	-.1725896
_cons	.6608151	.0025437	259.78	0.000	.6558293	.6658008

## LFS Q1 2000 and Q1 2011

$$\text{Cameyr}_{t,i} = \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs = 26056		
Model	27293.8351	3	9097.94504	F( 3, 26052) = 46.67		
Residual	5078089.05	26052	194.921275	Prob > F = 0.0000		
				R-squared = 0.0053		
				Adj R-squared = 0.0052		
				Root MSE = 13.961		
Total	5105382.88	26055	195.946378			

cameyr	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	-1.857527	.3888764	-4.78	0.000	-2.619747	-1.095308
t	1.755043	.1876721	9.35	0.000	1.387196	2.122891
xt	-.4235939	.5542564	-0.76	0.445	-1.509967	.6627792
_cons	37.85964	.1177268	321.59	0.000	37.62889	38.09039

$$\text{Conmpy}_{t,i} = \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs = 26031		
Model	30459.6325	3	10153.2108	F( 3, 26027) = 145.96		
Residual	1810491.69	26027	69.5620581	Prob > F = 0.0000		
				R-squared = 0.0165		
				Adj R-squared = 0.0164		
				Root MSE = 8.3404		
Total	1840951.32	26030	70.7242151			

conmpy	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	-3.357759	.2323951	-14.45	0.000	-3.813266	-2.902252
t	1.014607	.1121649	9.05	0.000	.7947572	1.234456
xt	.4460572	.3312763	1.35	0.178	-.2032625	1.095377
_cons	8.246335	.0703636	117.20	0.000	8.108418	8.384251

$$\text{Bushr}_{t,i} = \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs = 25975		
Model	69911.2315	3	23303.7438	F( 3, 25971) = 174.03		
Residual	3477688.82	25971	133.90662	Prob > F = 0.0000		
				R-squared = 0.0197		
				Adj R-squared = 0.0196		
				Root MSE = 11.572		
Total	3547600.05	25974	136.582739			

bushr	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	-6.635375	.3230774	-20.54	0.000	-7.268625	-6.002125
t	-.4839612	.1557852	-3.11	0.002	-.7893088	-.1786136
xt	3.425175	.4606073	7.44	0.000	2.522359	4.327991
_cons	34.02773	.097695	348.31	0.000	33.83624	34.21921

$$Edl3wk_{t,i} = \hat{a}_0 + \hat{a}_1*T_t + \hat{a}_2*G_i + \hat{a}_3*(T_t*G_i) + e_{t,i}$$

Source	SS	df	MS		Number of obs =	25772
Model	28.8193579	3	9.60645264		F( 3, 25768) =	46.34
Residual	5341.85218	25768	.207305658		Prob > F =	0.0000
					R-squared =	0.0054
					Adj R-squared =	0.0053
Total	5370.67154	25771	.208399812		Root MSE =	.45531

ed13wk	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	-.1098625	.0129997	-8.45	0.000	-.1353427	-.0843823
t	.0091587	.0061459	1.49	0.136	-.0028876	.021205
xt	.0037822	.0183541	0.21	0.837	-.0321928	.0397572
_cons	.3039145	.0038552	78.83	0.000	.2963581	.311471

$$Jobtrn_{t,i} = \hat{a}_0 + \hat{a}_1*T_t + \hat{a}_2*G_i + \hat{a}_3*(T_t*G_i) + e_{t,i}$$

Source	SS	df	MS		Number of obs =	4117
Model	24.5980124	3	8.19933748		F( 3, 4113) =	33.64
Residual	1002.52854	4113	.243746301		Prob > F =	0.0000
					R-squared =	0.0239
					Adj R-squared =	0.0232
Total	1027.12655	4116	.249544837		Root MSE =	.49371

jobtrn	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	.0089961	.0394368	0.23	0.820	-.0683213	.0863135
t	.1473931	.0165568	8.90	0.000	.1149328	.1798534
xt	.067762	.055627	1.22	0.223	-.0412969	.176821
_cons	.461242	.0102171	45.14	0.000	.441211	.4812729

$$Tfee_{t,i} = \hat{a}_0 + \hat{a}_1*T_t + \hat{a}_2*G_i + \hat{a}_3*(T_t*G_i) + e_{t,i}$$

Source	SS	df	MS		Number of obs =	2032
Model	7.58739837	3	2.52913279		F( 3, 2028) =	11.17
Residual	459.024806	2028	.226343593		Prob > F =	0.0000
					R-squared =	0.0163
					Adj R-squared =	0.0148
Total	466.612205	2031	.229745054		Root MSE =	.47576

tfee	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	-.3048352	.0558337	-5.46	0.000	-.4143326	-.1953377
t	-.0107231	.0222486	-0.48	0.630	-.0543557	.0329095
xt	.2049402	.0761889	2.69	0.007	.0555235	.354357
_cons	.6638095	.0146821	45.21	0.000	.6350159	.6926032

$$Trnlen_{t,i} = \hat{a}_0 + \hat{a}_1*T_t + \hat{a}_2*G_i + \hat{a}_3*(T_t*G_i) + e_{t,i}$$

Source	SS	df	MS		Number of obs =	4099
Model	36.7391993	3	12.2463998		F( 3, 4095) =	52.16
Residual	961.523792	4095	.234804345		Prob > F =	0.0000
					R-squared =	0.0368
					Adj R-squared =	0.0361
Total	998.262991	4098	.243597606		Root MSE =	.48457

trnlen	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	-.2074508	.0390374	-5.31	0.000	-.2839853	-.1309163
t	.1574918	.0162842	9.67	0.000	.125566	.1894177
xt	-.0447029	.0549073	-0.81	0.416	-.152351	.0629452
_cons	.3771478	.010043	37.55	0.000	.3574581	.3968374

$$Netwk_{t,i} = \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs = 26057		
Model	169893840	3	56631280.1	F( 3, 26053) = 1395.37		
Residual	1.0574e+09	26053	40585.2494	Prob > F = 0.0000		
				R-squared = 0.1384		
				Adj R-squared = 0.1383		
Total	1.2273e+09	26056	47100.9112	Root MSE = 201.46		

netwk	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	-163.541	5.611333	-29.14	0.000	-174.5395	-152.5425
t	123.8432	2.707945	45.73	0.000	118.5355	129.1509
xt	-58.34449	7.997672	-7.30	0.000	-74.02037	-42.66861
_cons	246.5605	1.698751	145.14	0.000	243.2309	249.8901

$$Hourlypaid_{t,i} = \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs = 26057		
Model	164584.661	3	54861.5537	F( 3, 26053) = 900.47		
Residual	1587290.79	26053	60.9254517	Prob > F = 0.0000		
				R-squared = 0.0939		
				Adj R-squared = 0.0938		
Total	1751875.46	26056	67.2350113	Root MSE = 7.8055		

hourlypaid	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	-5.045344	.2174109	-23.21	0.000	-5.471481	-4.619207
t	3.883344	.1049192	37.01	0.000	3.677697	4.088992
xt	-1.819956	.3098695	-5.87	0.000	-2.427317	-1.212594
_cons	8.103821	.065818	123.12	0.000	7.974814	8.232828

$$Ernfilt_{t,i} = \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs = 24724		
Model	119.965639	3	39.9885462	F( 3, 24720) = 218.20		
Residual	4530.25035	24720	.183262554	Prob > F = 0.0000		
				R-squared = 0.0258		
				Adj R-squared = 0.0257		
Total	4650.21598	24723	.188092707	Root MSE = .42809		

ernfilt	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	-.1825543	.0124745	-14.63	0.000	-.207005	-.1581035
t	-.0998776	.0058902	-16.96	0.000	-.1114227	-.0883326
xt	.0536287	.0176322	3.04	0.002	.0190685	.0881888
_cons	.3087153	.0037106	83.20	0.000	.3014422	.3159883

$$Bonuses_{t,i} = \hat{a}_0 + \hat{a}_1 * T_t + \hat{a}_2 * G_i + \hat{a}_3 * (T_t * G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs = 6265		
Model	.300324032	3	.100108011	F( 3, 6261) = 0.63		
Residual	987.607737	6261	.157739616	Prob > F = 0.5926		
				R-squared = 0.0003		
				Adj R-squared = -0.0002		
Total	987.908061	6264	.157712015	Root MSE = .39716		

bonuses	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x	-.0306898	.0315298	-0.97	0.330	-.092499	.0311194
t	-.0100136	.0111103	-0.90	0.367	-.0317937	.0117665
xt	.0157552	.0496298	0.32	0.751	-.0815362	.1130467
_cons	.2003868	.0061749	32.45	0.000	.1882819	.2124916

$$Profitrelated_{t,i} = \hat{a}_0 + \hat{a}_1*T_t + \hat{a}_2*G_i + \hat{a}_3*(T_t*G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs =	6265
Model	2.54109711	3	.847032369	F( 3, 6261) =	17.66
Residual	300.216126	6261	.047950188	Prob > F =	0.0000
				R-squared =	0.0084
				Adj R-squared =	0.0079
Total	302.757223	6264	.04833289	Root MSE =	.21898

profitrela~d	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
x	-.028901	.0173838	-1.66	0.096	-.0629793 .0051772
t	-.0430905	.0061257	-7.03	0.000	-.0550989 -.0310822
xt	.0242708	.0273632	0.89	0.375	-.0293706 .0779121
_cons	.0652647	.0034045	19.17	0.000	.0585907 .0719387

$$Londonallw_{t,i} = \hat{a}_0 + \hat{a}_1*T_t + \hat{a}_2*G_i + \hat{a}_3*(T_t*G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs =	6265
Model	.743085269	3	.24769509	F( 3, 6261) =	3.54
Residual	438.243347	6261	.069995743	Prob > F =	0.0140
				R-squared =	0.0017
				Adj R-squared =	0.0012
Total	438.986433	6264	.070080848	Root MSE =	.26457

londonallw	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
x	-.033942	.0210032	-1.62	0.106	-.0751156 .0072315
t	-.0159044	.007401	-2.15	0.032	-.030413 -.0013959
xt	-.0062646	.0330604	-0.19	0.850	-.0710743 .0585451
_cons	.0824269	.0041133	20.04	0.000	.0743634 .0904904

$$Standby_{t,i} = \hat{a}_0 + \hat{a}_1*T_t + \hat{a}_2*G_i + \hat{a}_3*(T_t*G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs =	6265
Model	.631729847	3	.210576616	F( 3, 6261) =	5.80
Residual	227.402747	6261	.036320515	Prob > F =	0.0006
				R-squared =	0.0028
				Adj R-squared =	0.0023
Total	228.034477	6264	.036403971	Root MSE =	.19058

standby	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
x	-.0205111	.0151296	-1.36	0.175	-.0501703 .009148
t	.0198284	.0053313	3.72	0.000	.0093773 .0302796
xt	-.0056339	.0238149	-0.24	0.813	-.0523192 .0410514
_cons	.0326323	.002963	11.01	0.000	.0268238 .0384409

$$Shiftallw_{t,i} = \hat{a}_0 + \hat{a}_1*T_t + \hat{a}_2*G_i + \hat{a}_3*(T_t*G_i) + e_{t,i}$$

Source	SS	df	MS	Number of obs =	6265
Model	1.43930607	3	.47976869	F( 3, 6261) =	5.10
Residual	589.031564	6261	.09407947	Prob > F =	0.0016
				R-squared =	0.0024
				Adj R-squared =	0.0020
Total	590.47087	6264	.094264187	Root MSE =	.30672

shiftallw	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
x	-.0670754	.0243499	-2.75	0.006	-.1148096 -.0193412
t	-.0029556	.0085803	-0.34	0.731	-.019776 .0138649
xt	-.0131529	.0383283	-0.34	0.731	-.0882895 .0619837
_cons	.1094996	.0047688	22.96	0.000	.1001512 .118848

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## Appendix 6

### Output of Equation 5.1a and Equation 5.1b

#### Equation 5.1a

Dependent variable = Minimum Wage

$\ln(p/1-p) = a + b1 \text{ Age} + b2 \text{ Gender} + b3 \text{ Length of stay} + b4 \text{ English language} + b5 \text{ Educational level} + b6 \text{ Hours of work} + b7 \text{ Same ethnicity employer} + b8 \text{ Local ethnicity employer} + b9 \text{ Union membership} + b10 \text{ Work permit needed}$

#### Case Processing Summary

Unweighted Cases <sup>a</sup>		N	Percent
Selected Cases	Included in Analysis	158	79.0
	Missing Cases	42	21.0
	Total	200	100.0
Unselected Cases		0	.0
Total		200	100.0

a. If weight is in effect, see classification table for the total number of cases.

#### Dependent Variable Encoding

Original Value	Internal Value
Above Minimum Wage	0
Minimum Wage	1

#### Block 0: Beginning Block

Classification Table<sup>a,b</sup>

Observed			Predicted		
			If respondent is in minimum wage or above minimum wage		Percentage Correct
			Above Minimum Wage	Minimum Wage	
Step 0	If respondent is in minimum wage or above minimum wage	Above Minimum Wage	88	0	100.0
		Minimum Wage	70	0	.0
	Overall Percentage				55.7

a. Constant is included in the model.

b. The cut value is .500

#### Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 0 Constant	-.229	.160	2.042	1	.153	.795

#### Variables not in the Equation

		Score	df	Sig.
Step 0	Variables in the Equation	2.592	1	.107
	Overall Statistics	2.592	1	.107

### Block 2: Method = Forward Stepwise (Conditional)

#### Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	21.724	1	.000
	Block	21.724	1	.000
	Model	21.724	1	.000
Step 2	Step	10.592	1	.001
	Block	32.317	2	.000
	Model	32.317	2	.000
Step 3	Step	10.285	1	.001
	Block	42.602	3	.000
	Model	42.602	3	.000

#### Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	195.255 <sup>a</sup>	.128	.172
2	184.663 <sup>b</sup>	.185	.248
3	174.378 <sup>b</sup>	.236	.317

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

b. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

#### Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	.000	0	.
2	.196	2	.907
3	14.417	8	.072



**Contingency Table for Hosmer and Lemeshow Test**

		If respondent is in minimum wage or above minimum wage = Above Minimum Wage		If respondent is in minimum wage or above minimum wage = Minimum Wage		Total
		Observed	Expected	Observed	Expected	
Step 1	1	66	66.000	27	27.000	93
	2	22	22.000	43	43.000	65
Step 2	1	37	37.546	8	7.454	45
	2	29	28.454	19	19.546	48
	3	8	7.454	5	5.546	13
	4	14	14.546	38	37.454	52
Step 3	1	11	13.294	4	1.706	15
	2	20	17.356	1	3.644	21
	3	11	12.312	5	3.688	16
	4	12	11.152	4	4.848	16
	5	13	9.737	3	6.263	16
	6	5	8.009	11	7.991	16
	7	7	6.958	10	10.042	17
	8	4	4.997	11	10.003	15
	9	5	3.172	11	12.828	16
	10	0	1.013	10	8.987	10

**Classification Table<sup>a</sup>**

			Predicted		
			If respondent is in minimum wage or above minimum wage		Percentage Correct
			Above Minimum Wage	Minimum Wage	
Step 1	Observed				
	If respondent is in minimum wage or above minimum wage	Above Minimum Wage	66	22	75.0
		Minimum Wage	27	43	61.4
Overall Percentage					69.0
Step 2	Observed				
	If respondent is in minimum wage or above minimum wage	Above Minimum Wage	74	14	84.1
		Minimum Wage	32	38	54.3
Overall Percentage					70.9
Step 3	Observed				
	If respondent is in minimum wage or above minimum wage	Above Minimum Wage	70	18	79.5
		Minimum Wage	24	46	65.7
Overall Percentage					73.4

a. The cut value is .500

### Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 <sup>a</sup>	LocalEthnicEmployer	-1.564	.348	20.232	1	.000	.209
	Constant	.670	.262	6.536	1	.011	1.955
Step 2 <sup>b</sup>	LocalEthnicEmployer	-1.321	.363	13.278	1	.000	.267
	WorkPermitNeeded	1.241	.393	9.996	1	.002	3.460
	Constant	-.296	.405	.533	1	.465	.744
Step 3 <sup>c</sup>	HoursofWork	.037	.012	9.093	1	.003	1.038
	LocalEthnicEmployer	-1.187	.378	9.850	1	.002	.305
	WorkPermitNeeded	1.536	.424	13.144	1	.000	4.646
	Constant	-1.850	.663	7.780	1	.005	.157

a. Variable(s) entered on step 1: LocalEthnicEmployer.

b. Variable(s) entered on step 2: WorkPermitNeeded.

c. Variable(s) entered on step 3: HoursofWork.

### Model if Term Removed<sup>a</sup>

Variable	Model Log Likelihood	Change in -2 Log Likelihood	df	Sig. of the Change
Step 1 LocalEthnicEmployer	-108.492	21.728	1	.000
Step 2 LocalEthnicEmployer WorkPermitNeeded	-99.230	13.798	1	.000
	-97.699	10.734	1	.001
Step 3 HoursofWork LocalEthnicEmployer WorkPermitNeeded	-92.408	10.439	1	.001
	-92.240	10.102	1	.001
	-94.591	14.805	1	.000

a. Based on conditional parameter estimates

**Variables not in the Equation**

			Score	df	Sig.
Step 1	Variables	Age	1.292	1	.256
		Gender	.011	1	.918
		LengthOfStay	4.192	1	.041
		EnglishLanguage	.188	1	.665
		EducationLevel	.253	1	.615
		HoursofWork	6.129	1	.013
		SameEthnicEmployer	.185	1	.667
		UnionMembership	.695	1	.404
		WorkPermitNeeded	10.553	1	.001
		WorkExperience	.322	1	.570
		Training	.512	1	.474
		Overall Statistics	24.625	11	.010
Step 2	Variables	Age	.348	1	.555
		Gender	.685	1	.408
		LengthOfStay	.087	1	.768
		EnglishLanguage	1.091	1	.296
		EducationLevel	3.084	1	.079
		HoursofWork	9.597	1	.002
		SameEthnicEmployer	.032	1	.858
		UnionMembership	.028	1	.867
		WorkExperience	.003	1	.954
		Training	.330	1	.565
		Overall Statistics	15.070	10	.130
Step 3	Variables	Age	.062	1	.804
		Gender	.789	1	.374
		LengthOfStay	.462	1	.497
		EnglishLanguage	1.744	1	.187
		EducationLevel	.998	1	.318
		SameEthnicEmployer	.265	1	.607
		UnionMembership	.261	1	.610
		WorkExperience	.031	1	.861
		Training	.044	1	.834
		Overall Statistics	6.148	9	.725

## Two Stage Least Square (2SLS) result for Equation 5.1b

Instrumental variables (2SLS) regression

Number of obs = 193  
Wald chi2(6) = 2.84  
Prob > chi2 = 0.8286  
R-squared = .  
Root MSE = 2.074

MinimumWage	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
Training	-4.997434	8.218435	-0.61	0.543	-21.10527	11.1104
HoursofWork	-.0117208	.0323417	-0.36	0.717	-.0751094	.0516678
LocalEthnicEmployer	1.121311	2.23444	0.50	0.616	-3.258111	5.500734
WorkPermitNeeded	-.6466888	1.552073	-0.42	0.677	-3.688695	2.395318
WorkExperience	-.2561144	.4709778	-0.54	0.587	-1.179214	.6669852
Student	1.071653	1.659272	0.65	0.518	-2.180461	4.323767
_cons	3.954214	6.261831	0.63	0.528	-8.318749	16.22718

Instrumented: Training

Instruments: HoursofWork LocalEthnicEmployer WorkPermitNeeded WorkExperience  
Student MinimumWageSector

## Hausman Test for Instrumental Variable (IV) Validity

. hausman minimumwageiv minimumwageols, constant

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) minimumwag~v	(B) minimumwag~s		
Training	-4.997434	-.0551375	-4.942297	8.218067
HoursofWork	-.0117208	.0068241	-.0185449	.0322732
LocalEthni~r	1.121311	-.2088642	1.330176	2.233318
WorkPermit~d	-.6466888	.2598329	-.9065218	1.549994
WorkExperi~e	-.2561144	-.052523	-.2035914	.4657343
Student	1.071653	.1039829	.9676698	1.656942
_cons	3.954214	.2043038	3.74991	6.260357

b = consistent under Ho and Ha; obtained from ivregress

B = inconsistent under Ha, efficient under Ho; obtained from regress

Test: Ho: difference in coefficients not systematic

chi2(7) = (b-B)'[(V\_b-V\_B)^(-1)](b-B)  
= 0.36  
Prob>chi2 = 0.9998

## Equation 5.1b

Dependent variable = Minimum Wage

$\ln(p/1-p) = a + b_1 \text{ Hours of Work} + b_2 \text{ Local Ethnicity Employer} + b_3 \text{ Work Permit Needed} + b_4 \text{ Work Experience} + b_5 \text{ Training} + b_6 \text{ Student}$

### Case Processing Summary

Unweighted Cases <sup>a</sup>		N	Percent
Selected Cases	Included in Analysis	193	96.5
	Missing Cases	7	3.5
	Total	200	100.0
Unselected Cases		0	.0
Total		200	100.0

a. If weight is in effect, see classification table for the total number of cases.

### Dependent Variable Encoding

Original Value	Internal Value
Above Minimum Wage	0
Minimum Wage	1

## Block 0: Beginning Block

Classification Table<sup>a,b</sup>

	Observed		Predicted		
			If respondent is in minimum wage or above minimum wage		Percentage Correct
			Above Minimum Wage	Minimum Wage	
Step 0	If respondent is in minimum wage or above minimum wage	Above Minimum Wage	110	0	100.0
		Minimum Wage	83	0	.0
	Overall Percentage				57.0

a. Constant is included in the model.

b. The cut value is .500

### Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-.282	.145	3.752	1	.053	.755

#### Variables not in the Equation

		Score	df	Sig.
Step 0	HoursofWork	7.674	1	.006
	LocalEthnicEmployer	19.963	1	.000
	WorkPermitNeeded	21.935	1	.000
	WorkExperience	1.467	1	.226
	Training	7.316	1	.007
	Student	4.274	1	.039
	Overall Statistics	43.761	6	.000

#### Block 1: Method = Forward Stepwise (Conditional)

##### Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	23.028	1	.000
	Block	23.028	1	.000
	Model	23.028	1	.000
Step 2	Step	13.163	1	.000
	Block	36.191	2	.000
	Model	36.191	2	.000
Step 3	Step	9.575	1	.002
	Block	45.766	3	.000
	Model	45.766	3	.000

##### Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	240.737 <sup>a</sup>	.112	.151
2	227.574 <sup>a</sup>	.171	.229
3	217.999 <sup>a</sup>	.211	.283

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

##### Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	.000	0	.
2	.494	2	.781
3	18.897	8	.015

**Contingency Table for Hosmer and Lemeshow Test**

		If respondent is in minimum wage or above minimum wage = Above Minimum Wage		If respondent is in minimum wage or above minimum wage = Minimum Wage		Total
		Observed	Expected	Observed	Expected	
Step 1	1	56	56.000	15	15.000	71
	2	54	54.000	68	68.000	122
Step 2	1	43	43.976	9	8.024	52
	2	13	12.024	6	6.976	19
	3	36	35.024	24	24.976	60
	4	18	18.976	44	43.024	62
Step 3	1	13	16.055	5	1.945	18
	2	24	20.803	1	4.197	25
	3	12	13.705	6	4.295	18
	4	13	13.730	7	6.270	20
	5	17	11.983	2	7.017	19
	6	9	10.099	10	8.901	19
	7	7	8.584	12	10.416	19
	8	6	7.406	13	11.594	19
	9	8	5.338	12	14.662	20
	10	1	2.298	15	13.702	16

**Classification Table<sup>a</sup>**

	Observed		Predicted		
			If respondent is in minimum wage or above minimum wage		Percentage Correct
			Above Minimum Wage	Minimum Wage	
Step 1	If respondent is in minimum wage or above minimum wage	Above Minimum Wage	56	54	50.9
		Minimum Wage	15	68	81.9
	Overall Percentage				64.2
Step 2	If respondent is in minimum wage or above minimum wage	Above Minimum Wage	92	18	83.6
		Minimum Wage	39	44	53.0
	Overall Percentage				70.5
Step 3	If respondent is in minimum wage or above minimum wage	Above Minimum Wage	87	23	79.1
		Minimum Wage	26	57	68.7
	Overall Percentage				74.6

a. The cut value is .500

**Variables in the Equation**

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 <sup>a</sup>	WorkPermitNeeded	1.548	.343	20.346	1	.000	4.701
	Constant	-1.317	.291	20.530	1	.000	.268
	LocalEthnicEmployer	-1.157	.323	12.836	1	.000	.315
Step 2 <sup>b</sup>	WorkPermitNeeded	1.363	.355	14.746	1	.000	3.908
	Constant	-.544	.357	2.324	1	.127	.580
	HoursofWork	.032	.011	8.641	1	.003	1.033
Step 3 <sup>c</sup>	LocalEthnicEmployer	-1.032	.333	9.578	1	.002	.356
	WorkPermitNeeded	1.606	.378	18.082	1	.000	4.982
	Constant	-1.820	.569	10.245	1	.001	.162

a. Variable(s) entered on step 1: WorkPermitNeeded.

b. Variable(s) entered on step 2: LocalEthnicEmployer.

c. Variable(s) entered on step 3: HoursofWork.



**Model if Term Removed<sup>a</sup>**

Variable		Model Log Likelihood	Change in -2 Log Likelihood	df	Sig. of the Change
Step 1	WorkPermitNeeded	-132.018	23.298	1	.000
	LocalEthnicEmployer	-120.406	13.237	1	.000
Step 2	WorkPermitNeeded	-121.919	16.264	1	.000
	HoursofWork	-113.842	9.685	1	.002
Step 3	LocalEthnicEmployer	-113.875	9.750	1	.002
	WorkPermitNeeded	-119.366	20.732	1	.000

a. Based on conditional parameter estimates

**Variables not in the Equation**

			Score	df	Sig.
Step 1	Variables	HoursofWork	12.326	1	.000
		LocalEthnicEmployer	13.272	1	.000
		WorkExperience	.127	1	.722
		Training	4.704	1	.030
		Student	.079	1	.778
	Overall Statistics		23.540	5	.000
Step 2	Variables	HoursofWork	9.038	1	.003
		WorkExperience	.335	1	.562
		Training	1.027	1	.311
		Student	.000	1	.984
	Overall Statistics		11.208	4	.024
Step 3	Variables	WorkExperience	.621	1	.431
		Training	.150	1	.698
		Student	1.465	1	.226
	Overall Statistics		2.276	3	.517

## Appendix 7

### Endogeneity Test (Hausman Specification) and IV/2SLS Method

*Dependent Variable = Training*

$$\ln(p/1-p) = a + b \text{ Minimum wage} + \text{Age} + \text{Gender} + \text{Minimum Wage sector} + \text{Student}$$

*Dependent variable = Minimum Wage*

$$\ln(p/1-p) = a + b1 \text{ Age} + b2 \text{ Gender} + b3 \text{ Student} + b4 \text{ Work Permit} + b5 \text{ Same Ethnicity Employer}$$

*Dependent Variable = Training*

$$\ln(p/1-p) = 2.896965 - 1.599201 \text{ Minimum wage} - 0.0131614 \text{ Age} - 0.4836988 \text{ Gender} - 0.4226353 \text{ Minimum Wage Sector} + 0.830678 \text{ Student} + 0.3598172 \hat{v}_i$$

```
. logit Training MinimumWage Age Gender MinimumWageSector Student vhat1, vce(robust)

Iteration 0:   log pseudolikelihood = -117.12422
Iteration 1:   log pseudolikelihood = -107.58832
Iteration 2:   log pseudolikelihood = -107.33502
Iteration 3:   log pseudolikelihood = -107.33481
Iteration 4:   log pseudolikelihood = -107.33481

Logistic regression               Number of obs   =           193
                                Wald chi2(6)        =           16.51
                                Prob > chi2         =           0.0112
Log pseudolikelihood = -107.33481 Pseudo R2         =           0.0836
```

Training	Coef.	Robust Std. Err.	z	P> z	[95% Conf. Interval]	
MinimumWage	-1.599201	.626919	-2.55	0.011	-2.82794	-.3704627
Age	-.0131614	.0180227	-0.73	0.465	-.0484853	.0221626
Gender	-.4836988	.3338921	-1.45	0.147	-1.138115	.1707177
MinimumWageSector	-.4226353	.5183398	-0.82	0.415	-1.438563	.593292
Student	.830678	.469864	1.77	0.077	-.0902385	1.751594
vhat1	.3598172	.2620166	1.37	0.170	-.1537259	.8733603
_cons	2.896965	.9479612	3.06	0.002	1.038996	4.754935

*Dependent variable = Minimum Wage Sector*

$$\ln(p/1-p) = a + b1 \text{ Age} + b2 \text{ Gender} + b3 \text{ Student} + b4 \text{ Work Permit} + b5 \text{ Same Ethnicity Employer}$$

*Dependent Variable = Training*

$$\ln(p/1-p) = 3.424853 - 0.9832586 \text{ Minimum wage} - 0.0148072 \text{ Age} - 0.4520194 \text{ Gender} - 1.315739 \text{ Minimum Wage Sector} + 0.6479729 \text{ Student} + 0.4624633 \hat{v}_i$$

```
. logit Training MinimumWage Age Gender MinimumWageSector Student vhat2, vce(robust)
```

```
Iteration 0: log pseudolikelihood = -117.12422
Iteration 1: log pseudolikelihood = -107.10781
Iteration 2: log pseudolikelihood = -106.82618
Iteration 3: log pseudolikelihood = -106.82579
Iteration 4: log pseudolikelihood = -106.82579
```

```
Logistic regression                                Number of obs   =       193
                                                    Wald chi2(6)    =       16.71
                                                    Prob > chi2     =       0.0104
Log pseudolikelihood = -106.82579                Pseudo R2      =       0.0879
```

Training	Robust		z	P> z	[95% Conf. Interval]	
	Coef.	Std. Err.				
MinimumWage	-.9832586	.3627319	-2.71	0.007	-1.6942	-.2723171
Age	-.0148072	.0182524	-0.81	0.417	-.0505812	.0209667
Gender	-.4520194	.3349131	-1.35	0.177	-1.108437	.2043981
MinimumWageSector	-1.315739	.6593833	-2.00	0.046	-2.608106	-.0233711
Student	.6479729	.4598358	1.41	0.159	-.2532888	1.549235
vhat2	.4624633	.2473034	1.87	0.061	-.0222425	.9471692
_cons	3.424853	1.046295	3.27	0.001	1.374153	5.475552

```
.
```

```
. ivregress 2sls Training Age Gender Student (MinimumWage MinimumWageSector = WorkPermitNeeded SameEthnicEmpl
> oyer)
```

```
Instrumental variables (2SLS) regression                                Number of obs   =       193
                                                    Wald chi2(5)    =        2.82
                                                    Prob > chi2     =       0.7278
                                                    R-squared       =          .
                                                    Root MSE       =       1.6333
```

Training	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
MinimumWage	1.43293	7.856918	0.18	0.855	-13.96635	16.83221
MinimumWageSector	-4.231499	13.32903	-0.32	0.751	-30.35591	21.89292
Age	-.0037153	.0165401	-0.22	0.822	-.0361334	.0287027
Gender	.0441789	.4404108	0.10	0.920	-.8190104	.9073683
Student	-.1840793	1.331722	-0.14	0.890	-2.794207	2.426048
_cons	3.663945	7.161698	0.51	0.609	-10.37273	17.70062

```
Instrumented: MinimumWage MinimumWageSector
Instruments: Age Gender Student WorkPermitNeeded SameEthnicEmployer
```

```
. hausman traininggivmethod trainingols, constant
```

	Coefficients			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	trainingiv~d	trainingols	Difference	S.E.
MinimumWage	1.43293	-.183326	1.616256	7.856635
MinimumWag~r	-4.231499	-.0815466	-4.149952	13.32876
Age	-.0037153	-.0016318	-.0020835	.0161379
Gender	.0441789	-.1117612	.1559402	.435394
Student	-.1840793	.1350135	-.3190928	1.329354
_cons	3.663945	1.024832	2.639113	7.159667

b = consistent under Ho and Ha; obtained from ivregress  
B = inconsistent under Ha, efficient under Ho; obtained from regress

Test: Ho: difference in coefficients not systematic

```
chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
        =      1.45
Prob>chi2 =      0.9627
```

*Dependent Variable = Meals*

$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$

**(Equation 5.2b)**

*Dependent Variable = Minimum Wage*

$\ln(p/1-p) = a + b1 \text{ Age} + b2 \text{ Gender} + b3 \text{ Student} + b4 \text{ Work Permit} + b5 \text{ Same Ethnicity Employer}$

```
. logit MinimumWage Age Gender Student WorkPermitNeeded SameEthnicEmployer
```

```
Iteration 0:   log likelihood =  -131.8826
Iteration 1:   log likelihood = -116.97779
Iteration 2:   log likelihood = -116.91808
Iteration 3:   log likelihood = -116.91807
```

```
Logistic regression
```

```
Number of obs   =      193
LR chi2(5)      =      29.93
Prob > chi2     =      0.0000
Pseudo R2      =      0.1135
```

```
Log likelihood = -116.91807
```

MinimumWage	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
Age	.0103048	.0210076	0.49	0.624	-.0308693	.0514789
Gender	.4097283	.3412618	1.20	0.230	-.2591326	1.078589
Student	.0162161	.3954769	0.04	0.967	-.7589044	.7913365
WorkPermitNeeded	1.67635	.4431659	3.78	0.000	.8077607	2.544939
SameEthnicEmployer	1.094478	.4700451	2.33	0.020	.1732061	2.015749
_cons	-2.478159	1.015781	-2.44	0.015	-4.469053	-.4872636

```
. predict vhat1, residuals
```

*Dependent Variable = Meals*

$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student} + \hat{v}_i$

```
Iteration 0: log pseudolikelihood = -127.99666
Iteration 1: log pseudolikelihood = -106.77962
Iteration 2: log pseudolikelihood = -106.2053
Iteration 3: log pseudolikelihood = -106.20217
Iteration 4: log pseudolikelihood = -106.20217
```

Logistic regression	Number of obs	=	193
	Wald chi2(6)	=	36.92
	Prob > chi2	=	0.0000
Log pseudolikelihood = -106.20217	Pseudo R2	=	0.1703

		Robust				
Meals	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
MinimumWage	1.825366	.569187	3.21	0.001	.7097801	2.940952
Age	-.053837	.0195255	-2.76	0.006	-.0921062	-.0155677
Gender	.3566652	.3624698	0.98	0.325	-.3537626	1.067093
MinimumWageSector	.7867485	.5834787	1.35	0.178	-.3568487	1.930346
Student	-.0578933	.4128692	-0.14	0.888	-.8671022	.7513155
vhat1	-.1666761	.2430975	-0.69	0.493	-.6431384	.3097862
_cons	-.8313137	.9513565	-0.87	0.382	-2.695938	1.033311

$$\ln(p/1-p) = a + b1 \text{ Age} + b2 \text{ Gender} + b3 \text{ Student} + b4 \text{ Work Permit} + b5 \text{ Same Ethnicity Employer}$$

```
Iteration 0: log likelihood = -91.769921
Iteration 1: log likelihood = -84.506962
Iteration 2: log likelihood = -83.732194
Iteration 3: log likelihood = -83.714774
Iteration 4: log likelihood = -83.714725
Iteration 5: log likelihood = -83.714725
```

Logistic regression	Number of obs	=	195
	LR chi2(5)	=	16.11
	Prob > chi2	=	0.0065
Log likelihood = -83.714725	Pseudo R2	=	0.0878

MinimumWageSector	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
Age	.0111171	.0236287	0.47	0.636	-.0351404	.0574825
Gender	.6243551	.4214954	1.48	0.139	-.2017607	1.450471
Student	-.9440398	.5971052	-1.58	0.114	-2.114345	.2262649
WorkPermit	1.566769	.5958737	2.63	0.009	.3988784	2.73466
SameEthnicEmployer	1.98615	1.053473	1.89	0.059	-.0786187	4.050918
_cons	-.4614607	1.152008	-0.40	0.689	-2.719355	1.796434

$$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student} + \hat{u}_i$$

```
. . logit Meals MinimumWage Age Gender MinimumWageSector Student vhat2, vce(robust)
```

```
Iteration 0: log pseudolikelihood = -127.99666
Iteration 1: log pseudolikelihood = -105.42058
Iteration 2: log pseudolikelihood = -104.77446
Iteration 3: log pseudolikelihood = -104.77152
Iteration 4: log pseudolikelihood = -104.77152
```

```
Logistic regression                                Number of obs   =      193
                                                    Wald chi2(6)    =      38.93
                                                    Prob > chi2     =      0.0000
Log pseudolikelihood = -104.77152                Pseudo R2      =      0.1815
```

Meals	Robust		z	P> z	[95% Conf. Interval]	
	Coef.	Std. Err.				
MinimumWage	1.598322	.3512378	4.55	0.000	.9099084	2.286735
Age	-.049374	.0189889	-2.60	0.009	-.0865917	-.0121563
Gender	.2834931	.3652167	0.78	0.438	-.4323186	.9993048
MinimumWageSector	1.668513	.6931128	2.41	0.016	.3100372	3.026989
Student	.0765742	.4142563	0.18	0.853	-.7353532	.8885015
vhat2	-.4739238	.271636	-1.74	0.081	-1.00632	.0584729
_cons	-1.548661	1.043843	-1.48	0.138	-3.594556	.4972346

```
. ivregress 2sls Meals Age Gender Student (MinimumWage MinimumWageSector = WorkPermitNeeded SameEthnicEmployer)
> er)
```

```
Instrumental variables (2SLS) regression                                Number of obs   =      193
                                                    Wald chi2(5)    =      18.26
                                                    Prob > chi2     =      0.0026
                                                    R-squared       =      .
                                                    Root MSE       =      .53597
```

Meals	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
MinimumWage	.1041729	2.57835	0.04	0.968	-4.949301	5.157647
MinimumWageSector	.9738318	4.374095	0.22	0.824	-7.599236	9.5469
Age	-.0080642	.0054279	-1.49	0.137	-.0187026	.0025742
Gender	.0225677	.1445266	0.16	0.876	-.2606992	.3058346
Student	.0546634	.4370221	0.13	0.900	-.8018841	.9112109
_cons	-.2513125	2.350205	-0.11	0.915	-4.857629	4.355004

```
Instrumented: MinimumWage MinimumWageSector
Instruments: Age Gender Student WorkPermitNeeded SameEthnicEmployer
```

```
. hausman mealsiv mealsols, constant
```

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) mealsiv	(B) mealsols		
MinimumWage	.1041729	.3351968	-.2310239	2.577491
MinimumWageSector	.9738318	.1376026	.8362291	4.373292
Age	-.0080642	-.0093589	.0012947	.0040434
Gender	.0225677	.0628619	-.0402942	.1284702
Student	.0546634	-.0267158	.0813792	.4297696
_cons	-.2513125	.3400751	-.5913877	2.344022

b = consistent under Ho and Ha; obtained from ivregress  
B = inconsistent under Ha, efficient under Ho; obtained from regress

Test: Ho: difference in coefficients not systematic

```
chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
          =      1.74
Prob>chi2 =      0.9417
```

*Dependent Variable = Accommodation/Housing*

$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$

**(Equation 5.2c)**

*Dependent Variable = Minimum Wage*

$\ln(p/1-p) = a + b1 \text{ Age} + b2 \text{ Gender} + b3 \text{ Student} + b4 \text{ Work Permit} + b5 \text{ Same Ethnicity Employer}$

*Dependent Variable = Accommodation/Housing*

$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student} + \hat{v}i$

```
. logit AccommodationorHousing MinimumWage Age Gender MinimumWageSector Student vhat1, vce(robust)
```

```
Iteration 0:  log pseudolikelihood = -59.834969
Iteration 1:  log pseudolikelihood = -54.897044
Iteration 2:  log pseudolikelihood = -54.229085
Iteration 3:  log pseudolikelihood = -54.219774
Iteration 4:  log pseudolikelihood = -54.219749
Iteration 5:  log pseudolikelihood = -54.219749
```

```
Logistic regression                Number of obs   =        193
                                Wald chi2(6)        =         13.32
                                Prob > chi2         =         0.0383
Log pseudolikelihood = -54.219749  Pseudo R2       =         0.0938
```

AccommodationorHousing	Coef.	Robust Std. Err.	z	P> z	[95% Conf. Interval]	
MinimumWage	.7605446	.9979069	0.76	0.446	-1.195317	2.716406
Age	-.0351574	.0301078	-1.17	0.243	-.0941675	.0238527
Gender	.8200697	.485189	1.69	0.091	-.1308832	1.771023
MinimumWageSector	1.036334	1.023305	1.01	0.311	-.9693061	3.041975
Student	-1.016721	.6626728	-1.53	0.125	-2.315536	.2820939
vhat1	.1345472	.3862705	0.35	0.728	-.622529	.8916235
_cons	-3.507677	2.25141	-1.56	0.119	-7.920359	.905005

*Dependent variable = Minimum Wage Sector*

$\ln(p/1-p) = a + b1 \text{ Age} + b2 \text{ Gender} + b3 \text{ Student} + b4 \text{ Work Permit} + b5 \text{ Same Ethnicity Employer}$

*Dependent Variable = Accommodation/Housing*

$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student} + \hat{v}i$

```
. logit AccommodationorHousing MinimumWage Age Gender MinimumWageSector Student vhat2, vce (robust)
```

```
Iteration 0: log pseudolikelihood = -59.834969
Iteration 1: log pseudolikelihood = -54.858932
Iteration 2: log pseudolikelihood = -54.178674
Iteration 3: log pseudolikelihood = -54.168308
Iteration 4: log pseudolikelihood = -54.168279
Iteration 5: log pseudolikelihood = -54.168279
```

```
Logistic regression                                Number of obs   =          193
                                                    Wald chi2(6)    =          11.43
                                                    Prob > chi2     =          0.0759
Log pseudolikelihood = -54.168279                Pseudo R2      =          0.0947
```

AccommodationorHousing	Robust		z	P> z	[95% Conf. Interval]	
	Coef.	Std. Err.				
MinimumWage	.9976812	.5643144	1.77	0.077	-.1083546	2.103717
Age	-.0363384	.0288309	-1.26	0.208	-.092846	.0201692
Gender	.8423006	.4864155	1.73	0.083	-.1110563	1.795657
MinimumWageSector	.6817445	1.384483	0.49	0.622	-2.031793	3.395282
Student	-1.102448	.700489	-1.57	0.116	-2.475381	.270485
vhat2	.2085877	.4967759	0.42	0.675	-.7650752	1.182251
_cons	-3.2971	2.290269	-1.44	0.150	-7.785945	1.191745

*Dependent Variable = Holiday Pay*

$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$

**(Equation 5.2d)**

*Dependent Variable = Minimum Wage*

$\ln(p/1-p) = a + b1 \text{ Age} + b2 \text{ Gender} + b3 \text{ Student} + b4 \text{ Work Permit} + b5 \text{ Same Ethnicity Employer}$

*Dependent Variable = Holiday Pay*

$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student} + \hat{v}_i$



```
. . logit Holidaypay MinimumWage Age Gender MinimumWageSector Student vhat1, vce (robust)
```

```
Iteration 0: log pseudolikelihood = -129.80973
Iteration 1: log pseudolikelihood = -117.39273
Iteration 2: log pseudolikelihood = -117.29279
Iteration 3: log pseudolikelihood = -117.29275
Iteration 4: log pseudolikelihood = -117.29275
```

```
Logistic regression      Number of obs   =      193
                        Wald chi2(6)      =      21.00
                        Prob > chi2       =      0.0018
Log pseudolikelihood = -117.29275      Pseudo R2      =      0.0964
```

Holidaypay	Robust		z	P> z	[95% Conf. Interval]	
	Coef.	Std. Err.				
MinimumWage	-2.088262	.5783689	-3.61	0.000	-3.221844	-.9546802
Age	-.0047963	.0175597	-0.27	0.785	-.0392127	.0296201
Gender	.7027962	.3318341	2.12	0.034	.0524133	1.353179
MinimumWageSector	-.3818422	.4542027	-0.84	0.401	-1.272063	.5083788
Student	-.1120429	.383625	-0.29	0.770	-.8639342	.6398483
vhat1	.7665629	.2774104	2.76	0.006	.2228485	1.310277
_cons	.8748574	.8666266	1.01	0.313	-.8236995	2.573414

*Dependent variable = Minimum Wage Sector*

$\ln(p/1-p) = a + b1 \text{ Age} + b2 \text{ Gender} + b3 \text{ Student} + b4 \text{ Work Permit} + b5 \text{ Same Ethnicity Employer}$

*Dependent Variable = Holiday Pay*

$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student} + \hat{v}$

```
. . logit Holidaypay MinimumWage Age Gender MinimumWageSector Student vhat2, vce (robust)
```

```
Iteration 0: log pseudolikelihood = -129.80973
Iteration 1: log pseudolikelihood = -122.30629
Iteration 2: log pseudolikelihood = -122.26683
Iteration 3: log pseudolikelihood = -122.26682
```

```
Logistic regression      Number of obs   =      193
                        Wald chi2(6)      =      14.25
                        Prob > chi2       =      0.0270
Log pseudolikelihood = -122.26682      Pseudo R2      =      0.0581
```

Holidaypay	Robust		z	P> z	[95% Conf. Interval]	
	Coef.	Std. Err.				
MinimumWage	-.7610966	.324491	-2.35	0.019	-1.397087	-.1251059
Age	.0065765	.0180233	0.36	0.715	-.0287485	.0419015
Gender	.572622	.3294179	1.74	0.082	-.0730252	1.218269
MinimumWageSector	-.1691139	.5379249	-0.31	0.753	-1.223427	.8851995
Student	-.2162348	.3872114	-0.56	0.577	-.9751552	.5426857
vhat2	-.1303105	.219568	-0.59	0.553	-.5606559	.300035
_cons	-.0594102	.8696911	-0.07	0.946	-1.763973	1.645153

```
. ivregress 2sls Holidaypay Age Gender Student (MinimumWage MinimumWageSector = WorkPermitNeeded SameEthnicEm
> ployer)
```

```
Instrumental variables (2SLS) regression                                Number of obs =      193
                                                                    Wald chi2(5)  =       2.24
                                                                    Prob > chi2   =    0.8149
                                                                    R-squared     =        .
                                                                    Root MSE     =    1.9728
```

Holidaypay	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
MinimumWage	1.870178	9.490181	0.20	0.844	-16.73023	20.47059
MinimumWageSector	-5.116855	16.09981	-0.32	0.751	-36.6719	26.43819
Age	-.0010368	.0199784	-0.05	0.959	-.0401938	.0381202
Gender	.3049782	.5319616	0.57	0.566	-.7376474	1.347604
Student	-.4486942	1.608555	-0.28	0.780	-3.601404	2.704016
_cons	3.715613	8.650442	0.43	0.668	-13.23894	20.67017

```
Instrumented: MinimumWage MinimumWageSector
Instruments: Age Gender Student WorkPermitNeeded SameEthnicEmployer
```

```
. hausman holidaypayiv holidaypayols, constant
```

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) holidaypayiv	(B) holidaypayols		
MinimumWage	1.870178	-.1841506	2.054329	9.489905
MinimumWageSector	-5.116855	-.0581557	-5.058699	16.09955
Age	-.0010368	.0012947	-.0023314	.0195865
Gender	.3049782	.1490136	.1559645	.527067
Student	-.4486942	-.0731263	-.3755679	1.606243
_cons	3.715613	.4872771	3.228336	8.648458

b = consistent under Ho and Ha; obtained from ivregress  
B = inconsistent under Ha, efficient under Ho; obtained from regress

Test: Ho: difference in coefficients not systematic

```
chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
        =      1.26
Prob>chi2 =      0.9738
```

.

*Dependent Variable = Paid Sick Leave*

$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$

**(Equation 5.2e)**

*Dependent Variable = Minimum Wage*

$\ln(p/1-p) = a + b1 \text{ Age} + b2 \text{ Gender} + b3 \text{ Student} + b4 \text{ Work Permit} + b5 \text{ Same Ethnicity Employer}$

*Dependent Variable = Paid Sick Leave*

$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student} + \hat{v}_i$

```
. logit PaidSickLeave MinimumWage Age Gender MinimumWageSector Student vhat1, vce(robust)
```

```
Iteration 0:   log pseudolikelihood =  -119.6221
Iteration 1:   log pseudolikelihood = -113.15567
Iteration 2:   log pseudolikelihood = -113.06047
Iteration 3:   log pseudolikelihood = -113.06037
Iteration 4:   log pseudolikelihood = -113.06037
```

```
Logistic regression               Number of obs   =       193
                                Wald chi2(6)      =       10.95
                                Prob > chi2       =       0.0901
Log pseudolikelihood = -113.06037 Pseudo R2      =       0.0549
```

PaidSickLeave	Robust		z	P> z	[95% Conf. Interval]	
	Coef.	Std. Err.				
MinimumWage	-1.749654	.6047139	-2.89	0.004	-2.934871	-.5644361
Age	-.0030915	.0170014	-0.18	0.856	-.0364136	.0302305
Gender	.096765	.3449908	0.28	0.779	-.5794046	.7729346
MinimumWageSector	.0820181	.4515841	0.18	0.856	-.8030705	.9671067
Student	-.195951	.4300302	-0.46	0.649	-1.038795	.6468926
vhat1	.5636524	.2470213	2.28	0.023	.0794995	1.047805
_cons	-.1448061	.8713492	-0.17	0.868	-1.852619	1.563007

*Dependent variable = Minimum Wage Sector*

$\ln(p/1-p) = a + b1 \text{ Age} + b2 \text{ Gender} + b3 \text{ Student} + b4 \text{ Work Permit} + b5 \text{ Same Ethnicity Employer}$

*Dependent Variable = Paid Sick Leave*

$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student} + \hat{v}_t$

```
. logit PaidSickLeave MinimumWage Age Gender MinimumWageSector Student vhat2, vce(robust)
```

```
Iteration 0:   log pseudolikelihood =  -119.6221
Iteration 1:   log pseudolikelihood = -115.76115
Iteration 2:   log pseudolikelihood = -115.72826
Iteration 3:   log pseudolikelihood = -115.72825
```

```
Logistic regression               Number of obs   =       193
                                Wald chi2(6)      =       7.95
                                Prob > chi2       =       0.2418
Log pseudolikelihood = -115.72825 Pseudo R2      =       0.0326
```

PaidSickLeave	Robust		z	P> z	[95% Conf. Interval]	
	Coef.	Std. Err.				
MinimumWage	-.7769697	.3691766	-2.10	0.035	-1.500543	-.0533969
Age	.0003835	.0173248	0.02	0.982	-.0335725	.0343395
Gender	.0655377	.3442723	0.19	0.849	-.6092236	.7402991
MinimumWageSector	-.267023	.634789	-0.42	0.674	-1.511187	.9771407
Student	-.332578	.4286088	-0.78	0.438	-1.172636	.5074798
vhat2	.1931546	.2233121	0.86	0.387	-.244529	.6308383
_cons	-.2895399	.934143	-0.31	0.757	-2.120427	1.541347

```
. ivregress 2sls PaidSickLeave Age Gender Student (MinimumWage MinimumWageSector = WorkPermitNeeded SameEthni
> cEmployer)
```

```
Instrumental variables (2SLS) regression                                Number of obs =      193
                                                                    Wald chi2(5) =       0.43
                                                                    Prob > chi2 =    0.9945
                                                                    R-squared       =      .
                                                                    Root MSE       =    2.7566
```

PaidSickLeave	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
MinimumWage	3.37122	13.26067	0.25	0.799	-22.61922	29.36166
MinimumWageSector	-6.833881	22.49634	-0.30	0.761	-50.92589	37.25813
Age	.0020841	.027916	0.07	0.940	-.0526301	.0567984
Gender	.2118872	.7433123	0.29	0.776	-1.244978	1.668753
Student	-.6722645	2.247641	-0.30	0.765	-5.07756	3.733032
_cons	4.283766	12.0873	0.35	0.723	-19.40691	27.97444

```
Instrumented: MinimumWage MinimumWageSector
Instruments: Age Gender Student WorkPermitNeeded SameEthnicEmployer
```

```
. hausman paidsickleaveiv paidsickleaveols, constant
```

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b)	(B)		
	paidsickle~v	paidsickle~s		
MinimumWage	3.37122	-.1534965	3.524716	13.26049
MinimumWag~r	-6.833881	.0271404	-6.861021	22.49617
Age	.0020841	.0007618	.0013224	.0276577
Gender	.2118872	.0195211	.1923661	.7400778
Student	-.6722645	-.0683381	-.6039264	2.24611
_cons	4.283766	.3217904	3.961975	12.08599

b = consistent under Ho and Ha; obtained from ivregress  
B = inconsistent under Ha, efficient under Ho; obtained from regress

Test: Ho: difference in coefficients not systematic

```
chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
        =      0.27
Prob>chi2 =      0.9996
```

*Dependent Variable = Health/Life Insurance*

$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$

**(Equation 5.2f)**

The reduced-form regression:

*Dependent Variable = Minimum Wage*

$\ln(p/1-p) = a + b1 \text{ Age} + b2 \text{ Gender} + b3 \text{ Student} + b4 \text{ Work Permit} + b5 \text{ Same Ethnicity Employer}$

*Dependent Variable = Health/Life Insurance*

$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student} + \hat{u}$

```
. logit HealthLifeInsurance MinimumWage Age Gender MinimumWageSector Student vhat1, vce(robust)
```

```
Iteration 0:  log pseudolikelihood = -64.265115
Iteration 1:  log pseudolikelihood = -60.04326
Iteration 2:  log pseudolikelihood = -59.171685
Iteration 3:  log pseudolikelihood = -59.169948
Iteration 4:  log pseudolikelihood = -59.169948
```

```
Logistic regression              Number of obs   =          193
                                Wald chi2(6)      =          10.12
                                Prob > chi2       =          0.1197
Log pseudolikelihood = -59.169948 Pseudo R2      =          0.0793
```

HealthLifeInsurance	Coef.	Robust Std. Err.	z	P> z	[95% Conf. Interval]	
MinimumWage	-.1634231	1.085282	-0.15	0.880	-2.290537	1.963691
Age	.0048236	.0277333	0.17	0.862	-.0495326	.0591798
Gender	-.7320636	.5545605	-1.32	0.187	-1.818982	.354855
MinimumWageSector	-1.096699	.6181453	-1.77	0.076	-2.308242	.1148435
Student	-.7102163	.7344098	-0.97	0.334	-2.149633	.7292004
vhat1	-.2062598	.4197317	-0.49	0.623	-1.028919	.6163993
_cons	-.3029012	1.453953	-0.21	0.835	-3.152597	2.546794

. The reduced-form regression:

*Dependent variable = Minimum Wage Sector*

$\ln(p/1-p) = a + b1 \text{ Age} + b2 \text{ Gender} + b3 \text{ Student} + b4 \text{ Work Permit} + b5 \text{ Same Ethnicity Employer}$

*Dependent Variable = Health/Life Insurance*

$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student} + \hat{v}\hat{u}$

```
. logit HealthLifeInsurance MinimumWage Age Gender MinimumWageSector Student vhat2, vce(robust)
```

```
Iteration 0:  log pseudolikelihood = -64.265115
Iteration 1:  log pseudolikelihood = -60.174158
Iteration 2:  log pseudolikelihood = -59.318997
Iteration 3:  log pseudolikelihood = -59.317299
Iteration 4:  log pseudolikelihood = -59.317299
```

```
Logistic regression              Number of obs   =          193
                                Wald chi2(6)      =          10.62
                                Prob > chi2       =          0.1010
Log pseudolikelihood = -59.317299 Pseudo R2      =          0.0770
```

HealthLifeInsurance	Coef.	Robust Std. Err.	z	P> z	[95% Conf. Interval]	
MinimumWage	-.5182346	.6197542	-0.84	0.403	-1.732931	.6964612
Age	.0035577	.0269696	0.13	0.895	-.0493018	.0564172
Gender	-.6882444	.575374	-1.20	0.232	-1.815957	.4394678
MinimumWageSector	-1.141886	.8195917	-1.39	0.164	-2.748257	.4644841
Student	-.6394698	.7035556	-0.91	0.363	-2.018414	.7394739
vhat2	.0387505	.3572629	0.11	0.914	-.661472	.738973
_cons	-.1422189	1.354589	-0.10	0.916	-2.797164	2.512726

*Dependent Variable = Pension Scheme*

$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$

**(Equation 5.2g)**

The reduced-form regression:

*Dependent Variable = Minimum Wage*

$\ln(p/1-p) = a + b1 \text{ Age} + b2 \text{ Gender} + b3 \text{ Student} + b4 \text{ Work Permit} + b5 \text{ Same Ethnicity Employer}$

*Dependent Variable = Pension Scheme*

$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student} + \hat{v}$

```
. . logit PensionScheme MinimumWage Age Gender MinimumWageSector Student vhat1, vce(robust)
```

```
Iteration 0:   log pseudolikelihood = -57.529396
Iteration 1:   log pseudolikelihood = -51.525093
Iteration 2:   log pseudolikelihood = -50.220181
Iteration 3:   log pseudolikelihood = -50.195086
Iteration 4:   log pseudolikelihood = -50.194999
Iteration 5:   log pseudolikelihood = -50.194999
```

```
Logistic regression               Number of obs   =          193
                                Wald chi2(6)        =          14.82
                                Prob > chi2         =          0.0217
Log pseudolikelihood = -50.194999 Pseudo R2       =          0.1275
```

PensionScheme	Robust		z	P> z	[95% Conf. Interval]	
	Coef.	Std. Err.				
MinimumWage	-2.367783	1.042123	-2.27	0.023	-4.410306	-.3252597
Age	.0122958	.0258974	0.47	0.635	-.0384622	.0630537
Gender	-.4592412	.5273213	-0.87	0.384	-1.492772	.5742895
MinimumWageSector	-.581006	.5496885	-1.06	0.291	-1.658376	.4963636
Student	-.9208661	.8409441	-1.10	0.273	-2.569086	.727354
vhat1	.4582301	.3444803	1.33	0.183	-.216939	1.133399
_cons	-.7909677	1.377446	-0.57	0.566	-3.490711	1.908776

.

*Dependent variable = Minimum Wage Sector*

$\ln(p/1-p) = a + b1 \text{ Age} + b2 \text{ Gender} + b3 \text{ Student} + b4 \text{ Work Permit} + b5 \text{ Same Ethnicity Employer}$

*Dependent Variable = Pension Scheme*

$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student} + \hat{v}$

```
. logit PensionScheme MinimumWage Age Gender MinimumWageSector Student vhat2, vce (robust)
```

```
Iteration 0: log pseudolikelihood = -57.529396
Iteration 1: log pseudolikelihood = -52.123147
Iteration 2: log pseudolikelihood = -50.963692
Iteration 3: log pseudolikelihood = -50.945398
Iteration 4: log pseudolikelihood = -50.945351
Iteration 5: log pseudolikelihood = -50.945351
```

```
Logistic regression               Number of obs   =       193
                                Wald chi2(6)       =       12.97
                                Prob > chi2        =       0.0436
Log pseudolikelihood = -50.945351 Pseudo R2       =       0.1144
```

PensionScheme	Robust		z	P> z	[95% Conf. Interval]	
	Coef.	Std. Err.				
MinimumWage	-1.56494	.8444573	-1.85	0.064	-3.220046	.0901657
Age	.0129854	.0260599	0.50	0.618	-.0380911	.0640619
Gender	-.5339536	.5331381	-1.00	0.317	-1.578885	.5109779
MinimumWageSector	-.52914	.7640547	-0.69	0.489	-2.02666	.9683798
Student	-1.047262	.8249828	-1.27	0.204	-2.664198	.5696751
vhat2	-.0316252	.3615072	-0.09	0.930	-.7401662	.6769158
_cons	-1.012594	1.432187	-0.71	0.480	-3.819629	1.794441

.

*Dependent Variable = Bonus*

$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$

**(Equation 5.2i)**

To test for endogeneity between minimum wage and bonus, the reduced-form regression:

*Dependent Variable = Minimum Wage*

$\ln(p/1-p) = a + b1 \text{ Age} + b2 \text{ Gender} + b3 \text{ Student} + b4 \text{ Work Permit} + b5 \text{ Same Ethnicity Employer}$

*Dependent Variable = Bonus*

$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student} + \hat{v}_i$

```
. logit Bonuses MinimumWage Age Gender MinimumWageSector Student vhat1, vce(robust)

Iteration 0:   log pseudolikelihood = -126.40586
Iteration 1:   log pseudolikelihood = -122.04829
Iteration 2:   log pseudolikelihood = -122.0306
Iteration 3:   log pseudolikelihood = -122.0306

Logistic regression                                Number of obs   =       193
                                                    Wald chi2(6)   =        8.93
                                                    Prob > chi2    =       0.1776
Log pseudolikelihood = -122.0306                Pseudo R2      =       0.0346
```

Bonuses	Coef.	Robust Std. Err.	z	P> z	[95% Conf. Interval]	
MinimumWage	-.5043869	.5394775	-0.93	0.350	-1.561743	.5529696
Age	-.0199798	.0171569	-1.16	0.244	-.0536067	.0136471
Gender	.0909301	.3246013	0.28	0.779	-.5452767	.7271369
MinimumWageSector	.1372503	.4151014	0.33	0.741	-.6763335	.9508342
Student	-.3837107	.3879711	-0.99	0.323	-1.14412	.3766986
vhat1	.5129437	.2250799	2.28	0.023	.0717952	.9540922
_cons	.1532569	.7921357	0.19	0.847	-1.399301	1.705814

To test whether there is endogeneity between minimum wage sector and bonus, the reduced-form regression:

*Dependent Variable = Minimum Wage Sector*

$\ln(p/1-p) = a + b1 \text{ Age} + b2 \text{ Gender} + b3 \text{ Student} + b4 \text{ Work Permit} + b5 \text{ Same Ethnicity Employer}$

*Dependent Variable = Bonus*

$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student} + \hat{v}_i$

```
. logit Bonuses MinimumWage Age Gender MinimumWageSector Student vhat2

Iteration 0:   log likelihood = -126.40586
Iteration 1:   log likelihood = -124.72823
Iteration 2:   log likelihood = -124.72471
Iteration 3:   log likelihood = -124.72471

Logistic regression                                Number of obs   =       193
                                                    LR chi2(6)     =        3.36
                                                    Prob > chi2    =       0.7622
Log likelihood = -124.72471                Pseudo R2      =       0.0133
```

Bonuses	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
MinimumWage	.3539762	.3211085	1.10	0.270	-.275385	.9833374
Age	-.0146372	.0178097	-0.82	0.411	-.0495435	.0202691
Gender	.0572592	.3201538	0.18	0.858	-.5702307	.6847491
MinimumWageSector	-.0287277	.5683722	-0.05	0.960	-1.142717	1.085261
Student	-.4995829	.3908032	-1.28	0.201	-1.265543	.2663773
vhat2	.0812311	.2257272	0.36	0.719	-.3611861	.5236482
_cons	-.1637288	.8961726	-0.18	0.855	-1.920195	1.592737



```
. ivregress 2sls Bonuses Age Gender Student (MinimumWage MinimumWageSector = WorkPermitNeeded SameEthnicEmplo
> yer)
```

```
Instrumental variables (2SLS) regression                                Number of obs =      193
                                                                    Wald chi2(5)  =       0.21
                                                                    Prob > chi2   =    0.9990
                                                                    R-squared     =        .
                                                                    Root MSE     =    1.9394
```

Bonuses	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
MinimumWage	2.600811	9.329819	0.28	0.780	-15.6853	20.88692
MinimumWageSector	-4.664403	15.82776	-0.29	0.768	-35.68624	26.35744
Age	-.0014609	.0196408	-0.07	0.941	-.0399563	.0370344
Gender	.1461562	.5229727	0.28	0.780	-.8788515	1.171164
Student	-.5409455	1.581374	-0.34	0.732	-3.640382	2.558491
_cons	3.060752	8.50427	0.36	0.719	-13.60731	19.72881

```
Instrumented: MinimumWage MinimumWageSector
Instruments: Age Gender Student WorkPermitNeeded SameEthnicEmployer
```

```
. hausman bonusiv bonusols, constant
```

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) bonusiv	(B) bonusols		
MinimumWage	2.600811	.0887348	2.512076	9.329533
MinimumWag~r	-4.664403	.0394769	-4.70388	15.82749
Age	-.0014609	-.0033175	.0018565	.0192342
Gender	.1461562	.013942	.1322142	.517896
Student	-.5409455	-.1349003	-.4060452	1.578976
_cons	3.060752	.4205821	2.64017	8.502212

```
b = consistent under Ho and Ha; obtained from ivregress
B = inconsistent under Ha, efficient under Ho; obtained from regress
```

```
Test: Ho: difference in coefficients not systematic
```

```
chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
        =      0.18
Prob>chi2 =      0.9999
```

```
.
```

## Appendix 8

### Output of Equation 5.2a to Equation 5.2p

*Dependent Variable = Training*

*$\ln(p/1-p) = a + b \text{ Minimum wage} + \text{Age} + \text{Gender} + \text{Minimum Wage sector} + \text{Student}$*

**Case Processing Summary**

Unweighted Cases <sup>a</sup>		N	Percent
Selected Cases	Included in Analysis	198	99.0
	Missing Cases	2	1.0
	Total	200	100.0
Unselected Cases		0	.0
Total		200	100.0

a. If weight is in effect, see classification table for the total number of cases.

**Dependent Variable Encoding**

Original Value	Internal Value
No	0
Yes	1

## Block 0: Beginning Block

**Classification Table<sup>a,b</sup>**

	Observed		Predicted		
			If respondent receives training		Percentage Correct
			No	Yes	
Step 0	If respondent receives training	No	0	58	.0
		Yes	0	140	100.0
	Overall Percentage				70.7

a. Constant is included in the model.

b. The cut value is .500

**Variables in the Equation**

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 0 Constant	.881	.156	31.845	1	.000	2.414

**Variables not in the Equation**

	Score	df	Sig.
Step 0 Variables MinimumWage	7.178	1	.007
Age	1.837	1	.175
Gender	5.458	1	.019
MinimumWageSector	3.757	1	.053
Student	4.992	1	.025
Overall Statistics	18.404	5	.002

### Block 1: Method = Forward Stepwise (Conditional)

**Omnibus Tests of Model Coefficients**

	Chi-square	df	Sig.
Step 1 Step	7.157	1	.007
Block	7.157	1	.007
Model	7.157	1	.007
Step 2 Step	7.666	1	.006
Block	14.822	2	.001
Model	14.822	2	.001

**Model Summary**

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	232.326 <sup>a</sup>	.036	.051
2	224.660 <sup>a</sup>	.072	.103

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

**Hosmer and Lemeshow Test**

Step	Chi-square	df	Sig.
1	.000	0	.
2	.871	2	.647

**Contingency Table for Hosmer and Lemeshow Test**

Contingency Table for Hooper and Lomshew Test						
		If respondent receives training =		If respondent receives training =		Total
		No		Yes		
		Observed	Expected	Observed	Expected	
Step 1	1	34	34.000	53	53.000	87
	2	24	24.000	87	87.000	111
Step 2	1	27	25.876	27	28.124	54
	2	20	21.124	64	62.876	84
	3	7	8.124	26	24.876	33
	4	4	2.876	23	24.124	27

**Classification Table<sup>a</sup>**

		Observed		Predicted		
				If respondent receives training		Percentage Correct
				No	Yes	
Step 1	If respondent receives training	No		0	58	.0
		Yes		0	140	100.0
	Overall Percentage					70.7
Step 2	If respondent receives training	No		0	58	.0
		Yes		0	140	100.0
	Overall Percentage					70.7

a. The cut value is .500

**Variables in the Equation**

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 <sup>a</sup>	MinimumWage	-.844	.318	7.021	1	.008	.430
	Constant	1.288	.231	31.199	1	.000	3.625
	MinimumWage	-1.008	.332	9.223	1	.002	.365
Step 2 <sup>b</sup>	Student	1.036	.395	6.890	1	.009	2.818
	Constant	1.091	.240	20.711	1	.000	2.977

a. Variable(s) entered on step 1: MinimumWage.

b. Variable(s) entered on step 2: Student.

Model if Term Removed <sup>a</sup>					
Variable		Model Log Likelihood	Change in -2 Log Likelihood	df	Sig. of the Change
Step 1	MinimumWage	-119.767	7.209	1	.007
Step 2	MinimumWage	-117.145	9.630	1	.002
	Student	-116.203	7.746	1	.005

a. Based on conditional parameter estimates

Variables not in the Equation				
		Score	df	Sig.
Step 1	Age	3.585	1	.058
	Gender	5.917	1	.015
	MinimumWageSector	1.815	1	.178
	Student	7.174	1	.007
	Overall Statistics	11.680	4	.020
Step 2	Age	.516	1	.473
	Gender	3.296	1	.069
	MinimumWageSector	1.245	1	.265
	Overall Statistics	4.528	3	.210

*Dependent Variable = Meals*

$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$

Case Processing Summary			
Unweighted Cases <sup>a</sup>		N	Percent
Selected Cases	Included in Analysis	198	99.0
	Missing Cases	2	1.0
	Total	200	100.0
Unselected Cases		0	.0
Total		200	100.0

a. If weight is in effect, see classification table for the total number of cases.

### Dependent Variable Encoding

Original Value	Internal Value
No	0
Yes	1

**Classification Table<sup>a,b</sup>**

	Observed	Predicted		
		If respondent receives meals		Percentage Correct
		No	Yes	
Step 0	No	123	0	100.0
	If respondent receives meals Yes	75	0	.0
	Overall Percentage			62.1

a. Constant is included in the model.

b. The cut value is .500

### Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 0 Constant	-.495	.147	11.402	1	.001	.610

### Variables not in the Equation

	Score	df	Sig.
Step 0 Variables	MinimumWage	31.606	1
	Age	10.076	1
	Gender	.123	1
	MinimumWageSector	9.075	1
	Student	1.855	1
	Overall Statistics	40.291	5

**Block 1: Method = Forward Stepwise (Conditional)**

#### Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	32.197	1	.000
	Block	32.197	1	.000
	Model	32.197	1	.000
Step 2	Step	6.835	1	.009
	Block	39.032	2	.000
	Model	39.032	2	.000

#### Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	230.536 <sup>a</sup>	.150	.204
2	223.701 <sup>a</sup>	.179	.244

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

#### Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	.000	0	.
2	6.190	8	.626

#### Contingency Table for Hosmer and Lemeshow Test

		If respondent receives meals = No		If respondent receives meals = Yes		Total
		Observed	Expected	Observed	Expected	
Step 1	1	88	88.000	23	23.000	111
	2	35	35.000	52	52.000	87
	1	21	18.865	0	2.135	21
	2	16	17.816	5	3.184	21
	3	15	15.740	5	4.260	20
Step 2	4	14	12.726	3	4.274	17
	5	16	16.666	7	6.334	23
	6	12	12.764	8	7.236	20
	7	7	9.114	13	10.886	20
	8	7	6.864	11	11.136	18
	9	8	6.523	11	12.477	19
	10	7	5.924	12	13.076	19

**Classification Table<sup>a</sup>**

	Observed	Predicted		
		If respondent receives meals		Percentage Correct
		No	Yes	
Step 1	No	88	35	71.5
	If respondent receives meals Yes	23	52	69.3
	Overall Percentage			70.7
Step 2	No	94	29	76.4
	If respondent receives meals Yes	28	47	62.7
	Overall Percentage			71.2

a. The cut value is .500

**Variables in the Equation**

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 <sup>a</sup>	MinimumWage	1.738	.320	29.419	1	.000	5.684
	Constant	-1.342	.234	32.831	1	.000	.261
	MinimumWage	1.663	.326	26.049	1	.000	5.277
Step 2 <sup>b</sup>	Age	-.046	.019	6.221	1	.013	.955
	Constant	.144	.617	.054	1	.815	1.155

a. Variable(s) entered on step 1: MinimumWage.

b. Variable(s) entered on step 2: Age.

**Model if Term Removed<sup>a</sup>**

Variable	Model Log Likelihood	Change in -2 Log Likelihood	df	Sig. of the Change
Step 1 MinimumWage	-131.522	32.507	1	.000
Step 2 MinimumWage	-126.091	28.480	1	.000
Step 2 Age	-115.308	6.915	1	.009

a. Based on conditional parameter estimates



#### Variables not in the Equation

		Score	df	Sig.
Step 1	Age	6.466	1	.011
	Gender	.247	1	.619
	MinimumWageSector	3.207	1	.073
	Student	.341	1	.559
	Overall Statistics	11.109	4	.025
Step 2	Gender	1.597	1	.206
	MinimumWageSector	3.467	1	.063
	Student	.578	1	.447
	Overall Statistics	5.115	3	.164

*Dependent Variable = Accommodation/Housing*

*$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$*

#### Case Processing Summary

Unweighted Cases <sup>a</sup>		N	Percent
Selected Cases	Included in Analysis	198	99.0
	Missing Cases	2	1.0
	Total	200	100.0
Unselected Cases		0	.0
Total		200	100.0

a. If weight is in effect, see classification table for the total number of cases.

#### Dependent Variable Encoding

Original Value	Internal Value
No	0
Yes	1

## Block 0: Beginning Block

**Variables in the Equation**

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-2.243	.241	86.413	1	.000	.106

**Variables not in the Equation**

		Score	df	Sig.
Step 0	MinimumWage	5.114	1	.024
	Age	.014	1	.906
	Gender	3.699	1	.054
	MinimumWageSector	2.492	1	.114
	Student	2.096	1	.148
	Overall Statistics	12.114	5	.033

## Block 1: Method = Forward Stepwise (Conditional)

**Omnibus Tests of Model Coefficients**

		Chi-square	df	Sig.
Step 1	Step	5.120	1	.024
	Block	5.120	1	.024
	Model	5.120	1	.024
Step 2	Step	3.930	1	.047
	Block	9.051	2	.011
	Model	9.051	2	.011

**Model Summary**

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	120.061 <sup>a</sup>	.026	.054
2	116.130 <sup>a</sup>	.045	.095

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

**Hosmer and Lemeshow Test**

Step	Chi-square	df	Sig.
1	.000	0	.
2	4.447	2	.108

**Contingency Table for Hosmer and Lemeshow Test**

		If respondent receives housing/accommodation = No		If respondent receives housing/accommodation = Yes		Total
		Observed	Expected	Observed	Expected	
Step 1	1	105	105.000	6	6.000	111
	2	74	74.000	13	13.000	87
Step 2	1	59	60.954	4	2.046	63
	2	46	44.046	2	3.954	48
	3	48	46.046	3	4.954	51
	4	26	27.954	10	8.046	36

**Classification Table<sup>a</sup>**

			Predicted		
			If respondent receives housing/accommodation		Percentage Correct
			No	Yes	
Step 1	If respondent receives	No	179	0	100.0
	housing/accommodation	Yes	19	0	.0
	Overall Percentage				90.4
Step 2	If respondent receives	No	179	0	100.0
	housing/accommodation	Yes	19	0	.0
	Overall Percentage				90.4

a. The cut value is .500

**Variables in the Equation**

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 <sup>a</sup>	MinimumWage	1.123	.516	4.731	1	.030	3.074
	Constant	-2.862	.420	46.496	1	.000	.057
	MinimumWage	1.165	.522	4.978	1	.026	3.206
Step 2 <sup>b</sup>	Gender	.984	.507	3.764	1	.052	2.675
	Constant	-4.378	.936	21.879	1	.000	.013

a. Variable(s) entered on step 1: MinimumWage.

b. Variable(s) entered on step 2: Gender.

**Model if Term Removed<sup>a</sup>**

Variable		Model Log Likelihood	Change in -2 Log Likelihood	df	Sig. of the Change
Step 1	MinimumWage	-62.725	5.388	1	.020
Step 2	MinimumWage	-60.904	5.677	1	.017
	Gender	-60.101	4.072	1	.044

a. Based on conditional parameter estimates

**Variables not in the Equation**

		Score	df	Sig.
Step 1	Age	.076	1	.782
	Gender	3.978	1	.046
	MinimumWageSector	1.334	1	.248
	Student	3.151	1	.076
	Overall Statistics	7.376	4	.117
Step 2	Age	.090	1	.764
	MinimumWageSector	1.208	1	.272
	Student	1.885	1	.170
	Overall Statistics	3.744	3	.290

*Dependent Variable = Holiday Pay*

$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$

**Case Processing Summary**

Unweighted Cases <sup>a</sup>		N	Percent
Selected Cases	Included in Analysis	198	99.0
	Missing Cases	2	1.0
	Total	200	100.0
Unselected Cases		0	.0
Total		200	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding	
Original Value	Internal Value
No	0
Yes	1

## Block 0: Beginning Block

Classification Table <sup>a,b</sup>					
	Observed		Predicted		
			If respondent receives holiday paid		Percentage Correct
			No	Yes	
Step 0	If respondent receives	No	0	81	.0
	holiday paid	Yes	0	117	100.0
	Overall Percentage				59.1

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation						
	B	S.E.	Wald	df	Sig.	Exp(B)
Step 0 Constant	.368	.145	6.472	1	.011	1.444

Variables not in the Equation					
		Score	df	Sig.	
Step 0	Variables	MinimumWage	9.190	1	.002
		Age	3.238	1	.072
		Gender	5.983	1	.014
		MinimumWageSector	1.353	1	.245
		Student	4.121	1	.042
	Overall Statistics		16.461	5	.006

## Block 1: Method = Forward Stepwise (Conditional)

**Omnibus Tests of Model Coefficients**

		Chi-square	df	Sig.
Step 1	Step	9.214	1	.002
	Block	9.214	1	.002
	Model	9.214	1	.002
Step 2	Step	6.068	1	.014
	Block	15.283	2	.000
	Model	15.283	2	.000

**Model Summary**

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	258.690 <sup>a</sup>	.045	.061
2	252.622 <sup>b</sup>	.074	.100

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

b. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

**Hosmer and Lemeshow Test**

Step	Chi-square	df	Sig.
1	.000	0	.
2	.482	2	.786

**Contingency Table for Hosmer and Lemeshow Test**

		If respondent receives holiday paid = No		If respondent receives holiday paid = Yes		Total
		Observed	Expected	Observed	Expected	
Step 1	1	46	46.000	41	41.000	87
	2	35	35.000	76	76.000	111
Step 2	1	32	30.876	19	20.124	51
	2	14	15.124	22	20.876	36
	3	23	24.124	40	38.876	63
	4	12	10.876	36	37.124	48

**Classification Table<sup>a</sup>**

	Observed		Predicted		
			If respondent receives holiday paid		Percentage Correct
			No	Yes	
Step 1	If respondent receives	No	46	35	56.8
	holiday paid	Yes	41	76	65.0
	Overall Percentage				61.6
Step 2	If respondent receives	No	32	49	39.5
	holiday paid	Yes	19	98	83.8
	Overall Percentage				65.7

a. The cut value is .500

**Variables in the Equation**

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 <sup>a</sup>	Minimum Wage	-.890	.296	9.025	1	.003	.410
	Constant	.775	.204	14.408	1	.000	2.171
	Minimum Wage	-.905	.302	9.010	1	.003	.404
Step 2 <sup>b</sup>	Gender	.750	.309	5.899	1	.015	2.118
	Constant	-.273	.469	.340	1	.560	.761

a. Variable(s) entered on step 1: MinimumWage.

b. Variable(s) entered on step 2: Gender.

**Model if Term Removed<sup>a</sup>**

Variable	Model Log Likelihood	Change in -2 Log Likelihood	df	Sig. of the Change
Step 1 MinimumWage	-133.958	9.225	1	.002
Step 2 MinimumWage	-130.933	9.245	1	.002
Step 2 Gender	-129.354	6.086	1	.014

a. Based on conditional parameter estimates

Variables not in the Equation					
		Score	df	Sig.	
Step 1	Variables	Age	1.852	1	.174
		Gender	5.991	1	.014
		MinimumWageSector	.144	1	.704
		Student	2.668	1	.102
	Overall Statistics		7.603	4	.107
Step 2	Variables	Age	.618	1	.432
		MinimumWageSector	.314	1	.575
		Student	1.094	1	.295
	Overall Statistics		1.606	3	.658

*Dependent Variable = Paid Sick Leave*

*$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$*

Case Processing Summary		
Unweighted Cases <sup>a</sup>		
	N	Percent
Included in Analysis	198	99.0
Selected Cases Missing Cases	2	1.0
Total	200	100.0
Unselected Cases	0	.0
Total	200	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding	
Original Value	Internal Value
No	0
Yes	1



## Block 0: Beginning Block

**Classification Table<sup>a,b</sup>**

	Observed		Predicted		
			If respondent receives sick leave paid		Percentage Correct
			No	Yes	
Step 0	If respondent receives sick leave paid	No	137	0	100.0
		Yes	61	0	.0
	Overall Percentage				69.2

a. Constant is included in the model.

b. The cut value is .500

**Variables in the Equation**

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 0 Constant	-.809	.154	27.631	1	.000	.445

**Variables not in the Equation**

		Score	df	Sig.	
Step 0	Variables	MinimumWage	5.856	1	.016
		Age	1.300	1	.254
		Gender	.436	1	.509
		MinimumWageSector	.056	1	.812
		Student	2.256	1	.133
		Overall Statistics	7.440	5	.190

## Block 1: Method = Forward Stepwise (Conditional)

**Omnibus Tests of Model Coefficients**

	Chi-square	df	Sig.
Step 1	5.981	1	.014
Block	5.981	1	.014
Model	5.981	1	.014

**Model Summary**

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	238.571 <sup>a</sup>	.030	.042

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

**Hosmer and Lemeshow Test**

Step	Chi-square	df	Sig.
1	.000	0	.

**Contingency Table for Hosmer and Lemeshow Test**

		If respondent receives sick leave paid = No		If respondent receives sick leave paid = Yes		Total
		Observed	Expected	Observed	Expected	
Step 1	1	68	68.000	19	19.000	87
	2	69	69.000	42	42.000	111

**Classification Table<sup>a</sup>**

		Predicted			
		If respondent receives sick leave paid		Percentage Correct	
		No	Yes		
Step 1	If respondent receives sick leave paid	No	137	0	100.0
		Yes	61	0	.0
	Overall Percentage				69.2

a. The cut value is .500

**Variables in the Equation**

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 <sup>a</sup> MinimumWage	-.779	.325	5.739	1	.017	.459
Constant	-.496	.196	6.434	1	.011	.609

a. Variable(s) entered on step 1: MinimumWage.

Model if Term Removed <sup>a</sup>				
Variable	Model Log Likelihood	Change in -2 Log Likelihood	df	Sig. of the Change
Step 1 MinimumWage	-122.296	6.020	1	.014

a. Based on conditional parameter estimates

Variables not in the Equation				
		Score	df	Sig.
Step 1	Age	.562	1	.453
	Gender	.390	1	.532
	MinimumWageSector	.174	1	.676
	Student	1.411	1	.235
	Overall Statistics	1.642	4	.801

*Dependent Variable = Health/Life Insurance*

*$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$*

Case Processing Summary		
Unweighted Cases <sup>a</sup>		
	N	Percent
Included in Analysis	198	99.0
Selected Cases Missing Cases	2	1.0
Total	200	100.0
Unselected Cases	0	.0
Total	200	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding	
Original Value	Internal Value
No	0
Yes	1

## Block 0: Beginning Block

**Classification Table<sup>a,b</sup>**

	Observed		Predicted		
			If respondent receives health or life insurance		Percentage Correct
			No	Yes	
Step 0	If respondent receives health or life insurance	No	178	0	100.0
		Yes	20	0	.0
	Overall Percentage				89.9

a. Constant is included in the model.

b. The cut value is .500

**Variables in the Equation**

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 0 Constant	-2.186	.236	85.922	1	.000	.112

**Variables not in the Equation**

	Score	df	Sig.
Step 0 Variables	MinimumWage	3.240	1
	Age	.671	1
	Gender	1.406	1
	MinimumWageSector	6.651	1
	Student	1.118	1
	Overall Statistics	10.899	5

## Block 1: Method = Forward Stepwise (Conditional)

**Omnibus Tests of Model Coefficients**

	Chi-square	df	Sig.
Step 1 Step	5.577	1	.018
Block	5.577	1	.018
Model	5.577	1	.018

**Model Summary**

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	124.032 <sup>a</sup>	.028	.058

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

**Hosmer and Lemeshow Test**

Step	Chi-square	df	Sig.
1	.000	0	.

**Contingency Table for Hosmer and Lemeshow Test**

		If respondent receives health or life insurance = No		If respondent receives health or life insurance = Yes		Total
		Observed	Expected	Observed	Expected	
Step 1	1	149	149.000	12	12.000	161
	2	29	29.000	8	8.000	37

**Classification Table<sup>a</sup>**

		Predicted			
		If respondent receives health or life insurance		Percentage Correct	
		No	Yes		
Step 1	If respondent receives health or life insurance	No	0	100.0	
		Yes	0	.0	
	Overall Percentage			89.9	

a. The cut value is .500

**Variables in the Equation**

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 <sup>a</sup> MinimumWageSector	-1.231	.500	6.075	1	.014	.292
Constant	-1.288	.399	10.400	1	.001	.276

a. Variable(s) entered on step 1: MinimumWageSector.

Model if Term Removed <sup>a</sup>				
Variable	Model Log Likelihood	Change in -2 Log Likelihood	df	Sig. of the Change
Step 1 MinimumWageSector	-64.919	5.807	1	.016

a. Based on conditional parameter estimates

Variables not in the Equation				
		Score	df	Sig.
Step 1	Variables MinimumWage	1.502	1	.220
	Age	.548	1	.459
	Gender	1.061	1	.303
	Student	1.438	1	.231
	Overall Statistics	4.148	4	.386

*Dependent Variable = Pension Scheme*

*$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$*

Case Processing Summary			
Unweighted Cases <sup>a</sup>		N	Percent
Selected Cases	Included in Analysis	198	99.0
	Missing Cases	2	1.0
	Total	200	100.0
Unselected Cases		0	.0
Total		200	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding	
Original Value	Internal Value
No	0
Yes	1

## Block 0: Beginning Block

**Classification Table<sup>a,b</sup>**

	Observed		Predicted		
			If respondent receives pension scheme		Percentage Correct
			No	Yes	
Step 0	If respondent receives pension scheme	No	181	0	100.0
		Yes	17	0	.0
	Overall Percentage				91.4

a. Constant is included in the model.

b. The cut value is .500

**Variables in the Equation**

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 0 Constant	-2.365	.254	86.942	1	.000	.094

**Variables not in the Equation**

		Score	df	Sig.
Step 0	Variables			
	MinimumWage	7.815	1	.005
	Age	2.589	1	.108
	Gender	.387	1	.534
	MinimumWageSector	3.375	1	.066
	Student	3.026	1	.082
	Overall Statistics	12.683	5	.027

## Block 1: Method = Forward Stepwise (Conditional)

**Omnibus Tests of Model Coefficients**

	Chi-square	df	Sig.
Step 1	9.005	1	.003
Block	9.005	1	.003
Model	9.005	1	.003

**Model Summary**

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	106.964 <sup>a</sup>	.044	.100

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

**Hosmer and Lemeshow Test**

Step	Chi-square	df	Sig.
1	.000	0	.

**Contingency Table for Hosmer and Lemeshow Test**

		If respondent receives pension scheme = No		If respondent receives pension scheme = Yes		Total
		Observed	Expected	Observed	Expected	
Step 1	1	85	85.000	2	2.000	87
	2	96	96.000	15	15.000	111

**Classification Table<sup>a</sup>**

Classification Table					
	Observed		Predicted		
			If respondent receives pension scheme		Percentage Correct
			No	Yes	
Step 1	If respondent receives pension scheme	No	181	0	100.0
		Yes	17	0	.0
	Overall Percentage				91.4

a. The cut value is .500

**Variables in the Equation**

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 <sup>a</sup> MinimumWage	-1.893	.767	6.087	1	.014	.151
Constant	-1.856	.278	44.703	1	.000	.156

a. Variable(s) entered on step 1: MinimumWage.

**Model if Term Removed<sup>a</sup>**



Variable	Model Log Likelihood	Change in -2 Log Likelihood	df	Sig. of the Change
Step 1 MinimumWage	-58.554	10.144	1	.001

a. Based on conditional parameter estimates

Variables not in the Equation				
		Score	df	Sig.
Step 1	Variables			
	Age	1.234	1	.267
	Gender	.472	1	.492
	Minimum Wage Sector	1.023	1	.312
	Student	2.035	1	.154
Overall Statistics		4.503	4	.342

*Dependent Variable = Bonus*

$\ln(p/1-p) = a + b1 \text{ Minimum wage} + b2 \text{ Age} + b3 \text{ Gender} + b4 \text{ Minimum Wage sector} + b5 \text{ Student}$

```
LOGISTIC REGRESSION VARIABLES Bonuses
/METHOD=FSSTEP(COND) MinimumWage Age Gender MinimumWageSector Student
/PRINT=GOODFIT
/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5) .
```

Case Processing Summary		
Unweighted Cases <sup>a</sup>		
	N	Percent
Included in Analysis	198	99.0
Selected Cases Missing Cases	2	1.0
Total	200	100.0
Unselected Cases	0	.0
Total	200	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding	
Original Value	Internal Value
No	0
Yes	1

## Block 0: Beginning Block

**Classification Table<sup>a,b</sup>**

	Observed		Predicted		
			If respondent receives bonuses		Percentage Correct
			No	Yes	
Step 0	If respondent receives	No	126	0	100.0
	bonuses	Yes	72	0	.0
	Overall Percentage				63.6

a. Constant is included in the model.

b. The cut value is .500

**Variables in the Equation**

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 0 Constant	-.560	.148	14.349	1	.000	.571

**Variables not in the Equation**

	Score	df	Sig.
Step 0 Variables	MinimumWage	1	.194
	Age	1	.785
	Gender	1	.664
	MinimumWageSector	1	.352
	Student	1	.220
	Overall Statistics	5	.457

```
LOGISTIC REGRESSION VARIABLES Bonuses
/METHOD=ENTER MinimumWage Age Gender MinimumWageSector Student
/PRINT=GOODFIT
/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

### Case Processing Summary

Unweighted Cases <sup>a</sup>		N	Percent
Selected Cases	Included in Analysis	198	99.0
	Missing Cases	2	1.0
	Total	200	100.0
Unselected Cases		0	.0
Total		200	100.0

a. If weight is in effect, see classification table for the total number of cases.

### Dependent Variable Encoding

Original Value	Internal Value
No	0
Yes	1

## Block 0: Beginning Block

Classification Table<sup>a,b</sup>

	Observed		Predicted		
			If respondent receives bonuses		Percentage Correct
			No	Yes	
Step 0	If respondent receives bonuses	No	126	0	100.0
		Yes	72	0	.0
	Overall Percentage				63.6

a. Constant is included in the model.

b. The cut value is .500

### Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-.560	.148	14.349	1	.000	.571

**Variables not in the Equation**

			Score	df	Sig.
Step 0	Variables	MinimumWage	1.687	1	.194
		Age	.075	1	.785
		Gender	.189	1	.664
		MinimumWageSector	.865	1	.352
		Student	1.507	1	.220
	Overall Statistics		4.671	5	.457

**Block 1: Method = Enter****Omnibus Tests of Model Coefficients**

		Chi-square	df	Sig.
Step 1	Step	4.727	5	.450
	Block	4.727	5	.450
	Model	4.727	5	.450

**Model Summary**

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	254.843 <sup>a</sup>	.024	.032

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

**Hosmer and Lemeshow Test**

Step	Chi-square	df	Sig.
1	14.333	8	.073

**Contingency Table for Hosmer and Lemeshow Test**

	If respondent receives bonuses =		If respondent receives bonuses =		Total	
	No		Yes			
	Observed	Expected	Observed	Expected		
Step 1	1	15	15.174	5	4.826	20
	2	13	14.377	7	5.623	20
	3	17	13.588	3	6.412	20
	4	16	14.548	6	7.452	22
	5	9	13.053	11	6.947	20
	6	14	13.387	7	7.613	21
	7	14	12.839	7	8.161	21
	8	9	11.334	11	8.666	20
	9	8	10.592	12	9.408	20
	10	11	7.109	3	6.891	14

**Classification Table<sup>a</sup>**

	Observed		Predicted		
			If respondent receives bonuses		Percentage Correct
			No	Yes	
Step 1	If respondent receives	No	124	2	98.4
	bonuses	Yes	71	1	1.4
	Overall Percentage				63.1

a. The cut value is .500

**Variables in the Equation**

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 <sup>a</sup>	Minimum Wage	.385	.317	1.475	1	.225	1.470
	Age	-.015	.018	.688	1	.407	.986
	Gender	.064	.316	.041	1	.839	1.066
	Minimum Wage Sector	.187	.414	.203	1	.652	1.205
	Student	-.597	.384	2.409	1	.121	.551
	Constant	-.337	.814	.171	1	.679	.714

a. Variable(s) entered on step 1: Minimum Wage, Age, Gender, Minimum Wage Sector, Student.

Yes		30	0	.0
Overall Percentage				84.8

a. The cut value is .500

Variables in the Equation						
	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 <sup>a</sup>						
Minimum Wage	-.636	.437	2.117	1	.146	.529
Age	.032	.024	1.765	1	.184	1.033
Gender	-1.023	.487	4.418	1	.036	.359
Minimum Wage Sector	1.773	.795	4.968	1	.026	5.887
Student	.598	.524	1.302	1	.254	1.818
Constant	-2.874	1.284	5.011	1	.025	.056

a. Variable(s) entered on step 1: Minimum Wage, Age, Gender, Minimum Wage Sector, Student.