The Empirics of the Reservation Wage and Labour Market Transitions

Sofia Bounahai

Supervised by Prof. Carlos Carrillo-Tudela

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Department of Economics

University of Essex

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Summary

The first chapter of the thesis studies the determinants of the reservation wage of non-employed workers using longitudinal survey data. We do not find enough evidence in favour of a decline in the reservation wage as the non-employment spells lengthens. However, the reservation wage of older workers and those with some savings are more responsive to non-employment duration. The second part of this chapter is dedicated to studying the search process of non-employed workers. It documents that the probability of sending an application, getting an interview, and getting hired declines with non-employment duration. Furthermore, workers who search through private employment agencies are more likely to get a job.

The second chapter extends and builds on the previous chapter by examining job acceptance decisions in relation to the reservation wage. Our sample shows that 26% of hires from non-employment accept wages paying below their self-reported reservation wages. We attribute this finding to the fact that these jobs are temporary and are used as a steppingstone to the job these workers seek for the long-term. This argument is reinforced by the higher quit probability that this subset of workers is characterised by.

The last chapter uses the PSID data to study competition of hiring effects on the starting wages of workers and on their wage-tenure profiles. This chapter documents three main findings: (a) Competition of hiring exits at both the non-employment and employment margins, (b) Starting wages are positively correlated with competition of hiring, (c) Hires from employment with multiple offers are characterised by flatter profiles. However, no explicit evidence has been detected in favour of competition induced wage-tenure profiles differentials for workers hired from non-employment.

Table of Contents

Chapter 1 Empirics of the reservation wage of non-employed workers in Germany 1

1.1 Introduction 1

1.2 Data 4

1.2.1 Institutional Background 4

1.2.2 The PASS Survey 5

1.2.3 KM versus PASS survey 11

1.3 Determinants of the Reservation Wage 12

1.3.1 The reservation wage over the spell of non-employment 12

1.3.2 Reservation wage and household unemployment benefits 19

1.3.3 Subgroup Analysis 19

1.4 The Search Process of Non-employed Workers 21

1.4.1 Job search statistics for non-employed workers 22

1.4.2 Probability of sending an application, getting an interview and getting hired from non-employment 23

1.5 Robustness checks: BA versus Microm sample 27

1.5.1 The reservation wage in BA and Microm samples 27

1.5.2 Determinants of the reservation wage by sample 29

1.5.3 Job search statistics by sample 30

1.6 Robustness analysis: Duration dependence and reported hours 31

1.6.1 The reservation wage over the spell of non-employment and reported hours 31

1.6.2 Determinants of the reservation wage and reported hours 32

1.7 Conclusion 34

1.8 Appendix 36

1.8.1 Duration dependence in the first 12 months of non-employment 36

1.8.2 Sample analysis using deflated reservation wage 37

Chapter 2 Labour market transitions and the reservation wage: evidence from Germany 39

2.1 Introduction 39

2.2 Data 41

2.2.1 Institutional background 41

2.2.2 The PASS-ADIAB Data 42

2.2.3 Variables Description 45

2.3 Job Acceptance and the Reservation Wage 49

2.4 Post Non-employment to Employment Transitions and Acceptance Below the Reservation Wage 56

2.4.1 Employment to non-employment transitions 56

2.4.2 Job to job transitions 58

2.4.3 Labour Market Transitions: Multinomial logit Estimation 61

2.5 Job to Job transitions: Wage Cuts or Wage rises? 63

2.6 Robustness analysis: Duration dependence and reported hours 68

2.6.1 Acceptance below the reservation wage and reported hours 68

2.6.2 Employment to non-employment transitions and reported hours 69

2.6.3 Job-to-job transitions and reported hours 70

2.6.4 Job to job transitions: wage cuts or wage rises and reported hours 72

2.7 Robustness analysis: controlling for whether the accepted job is permanent or temporary 73

2.8 Comparative Study: Germany versus the US 75

2.8.1 SCE Data 76

2.8.2 PSID Data 78

2.8.3 Acceptance in relation to reservation wage 79

2.8.4 Accepted wage and the previous wage 80

2.8.5 Previous wage and reservation wage 81

2.9 Conclusion 82

2.10 Appendix 84

2.10.1 Employment transitions: a closer look at the timing of these transitions 84

2.10.2 Job to job transitions: wage cuts or wage rises? LPM versus Probit 86

Chapter 3 Competition of hiring and wage-tenure effects 87

3.1 Introduction 87

3.2 Data 92

3.2.1 Variables Description 93

3.3 Starting wages 95

3.4 Wage-tenure profiles: non-employment to employment transitions 98

3.5 Wage-tenure profiles: job to job transitions 102

3.5.1 Wage cuts 107

3.6 Competition of hiring and quit rates 108

3.7 Robustness checks 110

3.7.1 Competition of hiring and gender differences 110

3.8 Conclusion 112

3.9 Appendix 114

3.9.1 Job tenure statistics by cohorts 114

3.9.2 Experience variable 114

3.9.3 Industry variable 115

3.9.4 Occupation variable 116

3.9.5 Instrumental variable (IV) analysis 116

List of Figures

Figure 1-1: Reservation wage distribution of non-employed workers 8

Figure 1-2: Deflated reservation wage distribution of non-employed workers 8

Figure 1-3: Reservation Wage Distribution of non-employed workers by gender, age and education 9

Figure 1-4: The reservation wage and non-employment duration 13

Figure 1-5: Reservation wage distribution of non-employed workers by sample 28

Figure 2-1: Daily Reservation Wage Distribution of Non-employed Workers 46

Figure 2-2: Accepted Wage and Reservation Wage Distributions 49

Figure 2-3: Reservation wage distribution-SCE sample 76

Figure 2-4: Reservation wage distribution-PSID sample 79

Figure 3-1: Starting wages distribution by job offers for hires from non-employment and employment 96

Figure 3-2: Wage-tenure profiles for hires from non-employment 101

Figure 3-3: Wage-tenure profiles – hires from employment 106

Figure 3-4: Wage-tenure profiles for hires from non-employment and employment – women only 111

Figure 3-5: Wage-tenure profiles for hires from non-employment and employment – men only 111

List of Tables

Table 1-1: Descriptive Statistics 6

Table 1-2: Household savings and debt 7

Table 1-3: Non-employment duration distribution 10

Table 1-4: The Krueger and Mueller survey versus the PASS survey 12

Table 1-5: Average reservation wage by non-employment duration 14

Table 1-6: Determinants of the reservation wage 16

Table 1-7: Determinants of the reservation wage – Fixed Effects 18

Table 1-8: Determinants of the reservation wage – subgroup analysis – age and savings 21

Table 1-9: Job search descriptive statistics 22

Table 1-10: Probability of sending a job application, getting an interview and transiting from non-employment to employment 24

Table 1-11: Search channels marginal effects from table 1-8 26

Table 1-12: Average reservation wage and non-employment duration by sample 28

Table 1-13: Determinants of the reservation wage by sample 30

Table 1-14: job search statistics by sample 31

Table 1-15: Average reservation wage by non-employment duration and reported hours 32

Table 1-16: Determinants of the reservation wage and reported hours 33

Table 1-17: Determinants of the reservation wage and reported hours – subgroup analysis 34

Table 1-18: The reservation wage in the first 12 months of non-employment 36

Table 1-19: The deflated reservation wage in the BA and Microm subsamples 38

Table 2-1: Descriptive statistics 45

Table 2-2: Occupation groups distribution.....47

Table 2-3: Firm information descriptive statistics 48

Table 2-4: Likelihood of accepting a job paying below the reservation wage. 53

Table 2-5: Likelihood of staying at the same firm.....58

Table 2-6: Likelihood of job-to-job transitions.....60

Table 2-7: Labour market transitions - Multinomial Logit 62

Table 2-8: Labour market transitions - Multinomial Logit – Robustness checks 63

Table 2-9: Likelihood of job-to-job transitions with a wage cut.....66

Table 2-10: Likelihood of accepting a job paying below the reservation wage-30 hours and over. 68

Table 2-11: Likelihood of staying at the same firm-30 hours and over.....70

Table 2-12: Likelihood of job-to-job transitions-30 hours and over. 71

Table 2-13: Likelihood of job-to-job transitions with a wage cut – 30 hours and over 72

Table 2-14: Likelihood of accepting a job paying below the reservation wage: job permanent or temporary?.....73

Table 2-15: Probit marginal effects for table 2-14 74

Table 2-16: PASS-ADIAB versus PSID versus SCE.....75

Table 2-17: Job acceptance relative to the reservation wage 80

Table 2-18: Job acceptance relative to the previous wage 81

Table 2-19: Reservation wage to previous wage ratio 81

Table 2-20: Likelihood of staying at the same firm-transitions at 1,3 and 12 months84

Table 2-21: Likelihood of job-to-job transitions-transitions at 1,3 and 12 months 85

Table 2-22: Likelihood of job-to-job transitions with a wage cut-Probit estimation....86

Table 2-23: Likelihood of job-to-job transitions with a wage cut-Probit-marginal effect 86

Table 3-1: PSID descriptive statistics 92

Table 3-2: Job offer descriptive statistics 94

Table 3-3: Job tenure descriptive statistics 95

Table 3-4: Average starting wages by job offers for hires from non-employment and employment 96

Table 3-5: Starting wages and competition of hiring 97

Table 3-6: Wages, tenure and job offers – hires from non-employment 99

Table 3-7: Wages, tenure and job offers - level regressions 100

Table 3-8: Wages, tenure and multiple offers – hires from employment 104

Table 3-9: Wages, tenure and job offers-level regressions 105

Table 3-10: Wage cuts statistics by job offers 107

Table 3-11: Quit probability and job offers 109

Table 3-12: Quit probability – Probit marginal effects 110

Table 3-13: Job tenure statistics by cohorts 114

Table 3-14: Descriptive statistics by labour market experience 115

Table 3-15: Industry categories 116

Table 3-16: Occupation categories 116

Table 3-17: IV analysis for hires from non-employment 117

Table 3-18: IV analysis for hires from employment 118

Chapter 1 Empirics of the reservation wage of non-employed workers in Germany

1.1 Introduction

The reservation wage in search theory represents the minimum wage at which a worker is willing to leave unemployment and accept a job offer (Mortensen, 1977). Examining the behaviour of the reservation wage is key to understanding its influence on a worker's labour market experience. Changes in the reservation wage could have implications on the effects of unemployment on wages, notably starting wages. In addition, understanding how the reservation wage responds to factors such as unemployment duration, unemployment benefits and liquidity constraints could have important implications on different labour market policies.

The relationship between reservation wages and unemployment duration has been a long-standing question in the job search literature. However, no consensus has been reached on this topic and the evidence remains mixed. Starting with the McCall (1970) canonical job search model which postulates that the reservation wage is stationary, the literature grew considerable interest in this topic. Some papers, however, challenged this stationarity result and accumulated evidence in favour of a declining reservation wage over the course of an unemployment spell (Kasper, 1967). Since the seminal contribution of Mortensen (1977), several papers both theoretical and empirical, have relaxed the stationarity assumption of the standard job search model and have considered factors that could be contributing to the declining trend in reservation wages. This finding has been explained by several factors such as liquidity constraints, benefit receipt and age effects (Danforth, 1979) (Kenneth Burdett & Vishwanath, 1988).

Most of the empirical evidence on the behaviour of reservation wages throughout unemployment spells has either been making indirect inferences on the reservation wage or has relied on cross-sectional data by comparing information on differences between individuals rather than following the same individual to examine how their wages evolve over time and build an encompassing picture of their experience in the labour market. Few papers, to the best of our knowledge, have exploited panel data such as Addison et al. (2009)[1] and more recently, Kruger and Muller (2016)[2]. However, the common feature of these papers and most of the broader literature on this topic is that they are constrained by relatively small sample sizes and quite a limited amount of retrospective information. We attempt to fill in the void in the empirical literature by utilising a much richer dataset. We use panel data from the Panel Labour Market and Social Security survey, PASS which is provided by the Institute for Employment Research in Germany, IAB. The PASS survey allows us to follow workers for 8 years and provides information on their self-reported reservation wages. The PASS survey also provides information on household unemployment benefit receipt[3] which we utilise in the empirical estimation. Several papers have examined the response of reservation wages to unemployment benefits, but a few have performed so by using data on self-reported reservation wages. Earlier work on this topic includes Feldstein and Porteba (1984) who find a large elasticity of reservation wages with respect to unemployment benefits in the US. In more recent work, Krueger and Mueller (2016) compare their results to those of Feldstein and Porterba (1984) and find that there is little response of reservation wages to unemployment benefits. Furthermore, there has

[1] In this paper, the authors use a cross country panel dataset from 1994-99 and find that the reservation wage is stationary.
[2] Section 1.2.3 presents a table which compares our dataset to the Krueger and Mueller (2016) dataset.
[3] Section 1.2.1 provides more details on household unemployment benefits in this context.

been a relatively expanding literature examining the behaviour of reservation wages by exploiting reemployment wages. Schmieder et al. (2016) rely on reemployment wages to infer the behaviour of reservation wages by exploiting unemployment insurance discontinuities. The results of their paper suggest that the reservation wage is insensitive to unemployment insurance. However, it should be noted that there could potentially exist a selection bias problem. The reason being is that those who are offered a wage and accept it only constitute a subset in the pool of unemployed workers. In fact, those individuals who got reemployed could have potentially had a lower reservation wage relative to those who remained unemployed. Fortunately, the advantage of having direct information on reservation wages and longitudinal data like ours overcomes these issues**.**

The rest of this chapter is organised as follows: the next section describes the PASS survey and key variables in the analysis. Section 1.3 examines the determinants of the reservation wage. We do not find enough evidence in support of a declining reservation wage over the course of non-employment spells, however the reservation wages of older workers and individuals who hold some savings appear to be more responsive to non-employment duration. To gain further insights on the experience of non-employed workers throughout their jobless spells, section 1.4 is dedicated to a study of the search process and outcomes of non-employed workers in our sample. Our findings suggest that the probability of sending an application and getting called back for an interview declines with non-employment duration. Furthermore, workers who search through private employment agencies are more likely to get hired while those who search through postings appear to be the least successful in escaping non-employment. Section 1.6 summarises and provides concluding remarks.

1.2 Data

1.2.1 Institutional Background

To put our analysis into context, our data spans from 2007 to 2015 which represents the post *Hartz* reform period. At a time where Germany was characterised by relatively slow economic growth and high unemployment rates, the Hartz reform came along to reshape the German labour market in terms of how labour market issues such as unemployment benefits are dealt with (Krebs & Scheffel, 2013). The reform started in 2003 and unfolded in four stages: Hartz I, II, III and IV. The reform restructured the benefits system by bundling unemployment benefits and social welfare benefits together. The last stage of the reform known as Hartz IV took place in 2005 and was characterised by benefit cuts in order to create more incentives for unemployed workers to search for jobs (Krebs & Scheffel, 2013). Th PASS survey targets unemployment benefit type two recipients *Arbeitslosengeld II* (hereafter UB II) which are different from unemployment benefits type one. Household UB II have been established in Germany as part of the Hartz IV reform. It is also referred to as the basic job seeker allowance and is paid to individuals over 15 years old and under 65 years old who are fit to work and not eligible for unemployment benefits. UB II are paid out by local job centres on a monthly basis. These benefits need to be approved every 12 months where benefits seekers have to apply again to prove eligibility. The monthly payment depends on individual situations, number of children living in the household and whether the partner/spouse works… etc[4].

[4] More information on UB II can be found in the “Bundesagentur fur Arbeit” website.

BA sample versus Microm sample

The survey sample contains two subsamples: *BA* and *Microm* samples where the first is targeted towards UB II household recipients in Germany and the second is from a register of German residents. The target population of the Microm sample is all private households in Germany while the target population of the BA sample is all households in which at least one person receives UB II. About 10% of individuals in our data extract are from the Microm sample while the rest is from the BA sample. One might be concerned that the over-representation of UBII recipients can cause bias in the results or restrict the findings of the analysis to a subset of individuals. To address this issue, we conduct the same empirical analysis for individuals from the BA and Microm samples separately. We do not detect results differentials between the two subsamples and conclude that our sample is inclusive and representative of the population. A detailed analysis of the two samples is provided in section 1.5.

1.2.2 The PASS Survey

We use data from the PASS survey provided by the German institute of employment research. The survey covers 9 waves where both individuals and households are interviewed on a yearly basis from December 2006 to 2015. Survey respondents are asked many questions about their social situation, employment status, receipt of benefits and job search activities. Our dataset consists of 74,397 observations where we consider both men and women. We restrict our sample to survey respondents aged between 18 and 65 years old and stratify individuals into three age groups: 18-25, 26-45 and 46-65. We also control for education level by sorting individuals into three groups: (i) no school degree or high school degree (iii) vocational degree (iv) university degree. Table 1-1 provides further details and shows that we have an equal

representation of men and women, and we also observe a relatively low level of schooling as only 8.82 percent of individuals hold a university degree in our sample.

Summary Statistics	
Number of observations	74,397
Number of individuals	23,649
Number of households	15,376
Percent men	46.30
Average age	41
Percent with high school degree	32.52
Percent with vocational degree	58.66
Percent with university degree	8.82
Percent married	31.94
Percent with children under 18	33.30
Percent actively searching for a job	47.61
Average UBII (in Euros)	676.82
Average household income (in Euros)	1475.58

Table 1-1: Descriptive Statistics

Savings and Debt- The household data of this survey provides information on savings and debt which will be exploited in the empirical analysis. Households are asked about the estimated total amount of their savings, if they have any, excluding any properties they might own. They are then asked about any amount of debt they might hold such as loans and overdrafts excluding any housing mortgages. Table 1-2 presents information on the distribution of savings and debt of households in our sample. About half of households in our sample do not hold any savings or debt and even those who report holding some form of savings report relatively low amounts.

	Savings (percent)	Debt (percent)
NO savings/debt	49.29	48.81
Less than 1,000 EUR	28.99	13.32
1,000 – 2,500 EUR	7.74	8.69
2,500 – 5,000 EUR	5.82	7.80
5,000 – 10,000 EUR	4.14	7.67
10,000 – 20,000 EUR	2.16	5.69
20,000 – 50,000 EUR	1.34	4.69
50,000 + EUR	0.52	3.33

Table 1-2: Household savings and debt

The reservation wage- In this survey, respondents are asked about the monthly net wage they expect to get when they are looking for a job and the number of weekly hours they expect to work in order to earn that expected net wage. The questions are phrased as the following: *"What do you expect to earn as a monthly net wage?"* and *"How many hours a week would you have to work for this amount of money do you think?"*[5] The respondents are then asked about the minimum monthly net wages and corresponding minimum weekly hours they are willing to work for. In our empirical analysis, we refer to this minimum net wage as the reservation wage. The questions are phrased as the following: *"How much this net monthly wage have to be as a minimum, in order for you to be willing to take the job?" "And how many hours per week would you have to work to earn [value] euros?"*[6]

Figure 1-1 shows the kernel density of the monthly reservation wage for non-employed workers in our sample. This density exhibits many spikes due to the fact that the reservation wage is a self-reported measure, therefore, most survey respondents round up numbers, hence the spikes around 1000, 1500 and 2000 Euros. The mean

[5] Refer to pages 165 and 166 of the PASS Person Questionnaire Wave 9 downloadable from their website through the following link: http://fdz.iab.de/de/FDZ_Individual_Data/PASS.aspx

[6] Refer to pages 167 and 168 of the PASS Person Questionnaire Wave 9 downloadable from their website through the following link: http://fdz.iab.de/de/FDZ_Individual_Data/PASS.aspx

reservation wage of non-employed workers is 986.93 Euros with a standard deviation of 335.07.

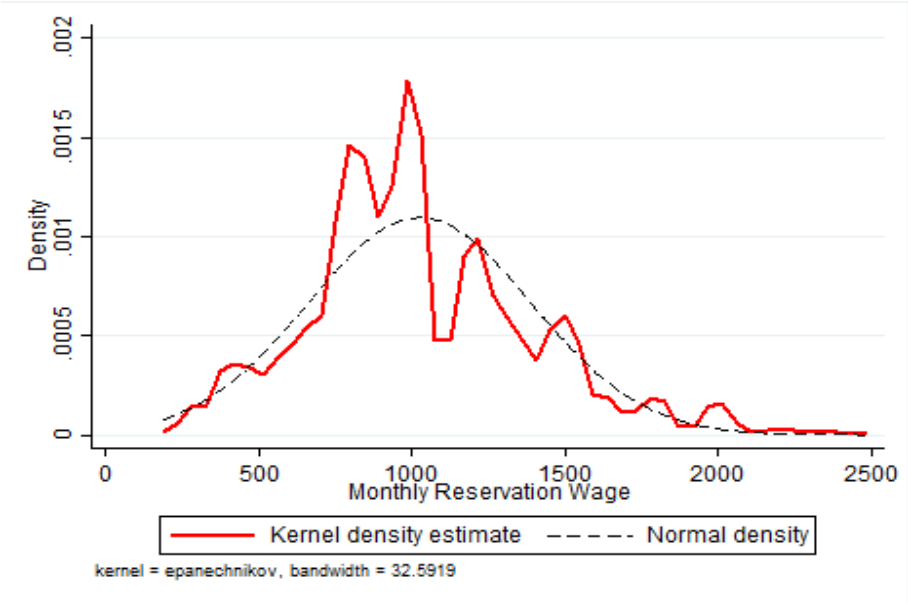

Figure 1-1: Reservation wage distribution of non-employed workers

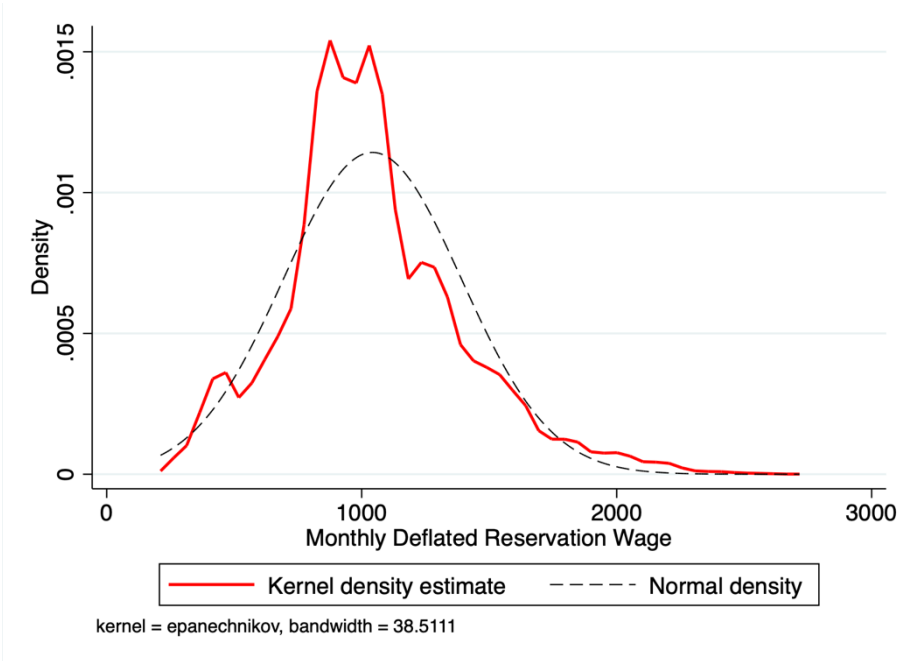

Figure 1-2: Deflated reservation wage distribution of non-employed workers

The reservation wage has been deflated following the method and CPI index data in Dauth and Eppelsheimer (2020) and the chosen base year is 2015. For regression

results, both findings using the reservation wage and the deflated reservation wage will be reported. Figure 1-2 shows the kernel density of the monthly deflated reservation wage for non-employed workers in our sample. The mean deflated reservation wage is 1042.24 Euros with a standard deviation equal to 349.12.

Figure 1-3 shows the reservation wage distribution for different categories. The reservation wage distribution of non-employed men stochastically dominates that of women workers. In line with what would be expected, the distribution of high skilled workers stochastically dominates that of low and medium skilled workers. In terms of age categories, middle aged and older workers' wage distributions appear to closely map each other and there are no significantly apparent differences in the reservation wage distributions for these two age categories.

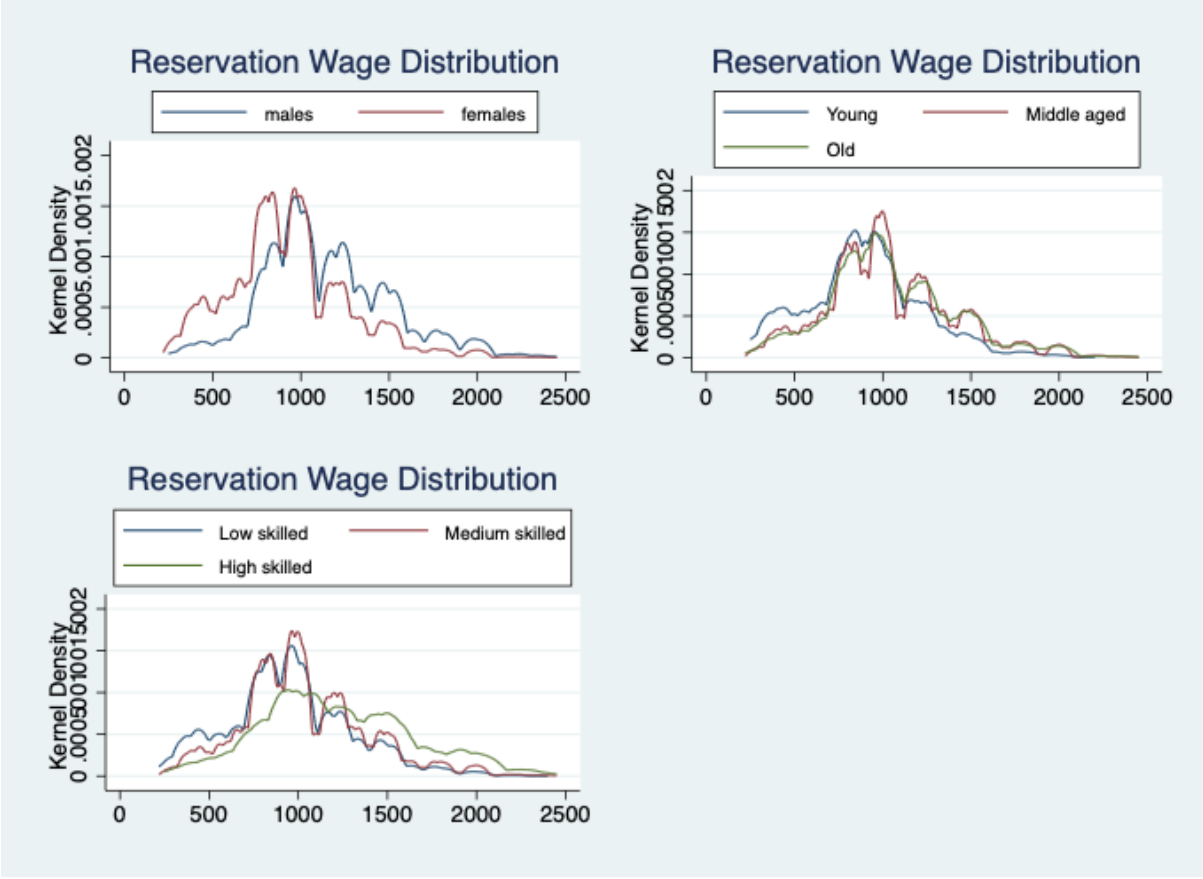

Figure 1-3: Reservation Wage Distribution of non-employed workers by gender, age and education

Non-employment duration - Non-employment duration is a key variable in analysing the determinants of the reservation wage. The PASS survey provides us with spell data that contains information on the exact date of the beginning and end of each labour market spell an individual has experienced. We utilise this information to create our measure of non-employment duration. Since the rest of the interview data is organised in waves, we convert the duration data from spell format to wave format. We organise the spell data by waves as the following: for each wave, duration is calculated as the time elapsed from the start date of the spell (as recorded in the spell dataset) until the interview date of the corresponding wave[7]. Therefore, our measure of non-employment duration refers to elapsed duration: the time an individual has spent non-employed up to the interview date of the subsequent wave. We construct six non-employment duration intervals (less than 12 months, 12-24, 24-36, 36-48, 48-60 and over 60 months).

Non-employment duration intervals	Percent
Less than 12 months	15.92
12-24 months	15.16
24-36 months	17.11
36-48 months	14.52
48-60 months	9.34
60 months and over	27.95
Total observations	22,204

Table 1-3: Non-employment duration distribution

We opted for an annual stratification due to the long non-employment spells individuals experience in our sample. In fact, the average duration of non-employment is 49.73 months (the median is 37 months) and 27.95% of workers in our sample have been non-employed for over 60 months. One might be concerned that the relatively high

[7] For spells which were still ongoing beyond the survey interview date of the corresponding wave.

share of long-term non-employed workers in this sample could be non-participants. To overcome this potential issue, the empirical analysis is restricted to non-employed workers who are actively searching for a job.

1.2.3 KM versus PASS survey

The closest antecedent to this chapter is Krueger and Mueller (2016) who created a survey in order to study the determinants of the reservation wage and its relationship with unemployment duration. The KM survey started in September 2009 in the state of New Jersey in the United States of America. The survey includes information about job seekers' reservation wages, offered wages and job offer acceptance and rejection. It was carried out on a weekly basis for a total duration of 24 weeks and was targeted towards unemployed benefits recipients. As discussed in the previous section, the PASS survey also targets benefit recipients and more specifically UBII recipients, but it also includes a random sample of households and individuals who are not in receipt of unemployment benefits which makes our sample more representative and the generalisation of the findings plausible. Furthermore, while the KM survey is based on a single state in the USA, the PASS data covers the entire of Germany and allows us to follow workers for 8 years providing us with a longer time span than the KM survey. Table 1-4 compares the different features of the PASS and KM surveys and provides more details.

SURVEY	KRUEGER AND MUELLER (2016)	PASS
Data source	CPS and US department of labour	IAB
Data type	panel	Unbalanced panel
Geographical context	New Jersey state, US	Germany
Start date	September 28, 2009	December 2006
Data span	24 weeks	9 years
Survey frequency	weekly	yearly
Response rate	10%	84.9 (wave 1) to 89.4% (wave 9)[8]
Attrition	60%	20%[9]
Sample size	6,025	18,954[10]
Gender restrictions	Both males (53%) and females (47%)	Both males (45%) and females (55%)
Age restrictions	20 - 65	18 - 65

Table 1-4: The Krueger and Mueller survey versus the PASS survey

1.3 Determinants of the Reservation Wage

1.3.1 The reservation wage over the spell of non-employment

A long-standing empirical question has been whether reservation wages decline with non-employment duration. The longitudinal nature of our data permits us to test this hypothesis. Before diving into regression analysis, we start first by examining the nature of the relationship between reservation wages and non-employment duration in our sample. The figure below displays the *raw* correlation between workers' reservation wages and time spent in the non-employed pool (measured in months). At first glance, reservation wages appear to be flat throughout non-employment duration. Taking a closer look at the fitted red line, one can notice a decline of reservation wages at longer non-employment durations, however this decline is minute.

[8] Data report wave 9 provides a detailed table of the corresponding response rate for each wave.
[9] This figure is accurate for wave 5.
[10] This refers to the number of surveyed individuals in wave 1 (the corresponding number of households is 12,794).

Figure 1-4: The reservation wage and non-employment duration

Table 1-5 reports the average reservation wage for each non-employment duration interval that was created. The statistics reported in Table 1-5 are in substantial agreement with the findings depicted in Figure 1-4. Although the means are lower in each duration interval, the magnitude of this decline in quantitatively negligible. The reservation wage is only 3.8% lower for non-employed workers with 60 or more months of non-employment relative to workers who have been non-employed for less than 12 months. The reservation wage is on average constant in our sample across all duration intervals and there appears to be little tendency for the reservation wage

to decline with non-employment duration[11]. This result is also shared by (Krueger & Mueller, 2016) and (Feldstein & Poterba, 1984) who carried out a similar exercise.

To test this result further, we carry out a multivariate mean test to investigate whether these reservation wage averages do differ between non-employment duration intervals. The null hypothesis for this test postulates that the means are equal across the duration intervals while the alternative hypothesis claims that the means do differ across the duration intervals. The test outcome fails to reject the null hypothesis implying that there isn't enough evidence in favour of non-stationarity of the reservation wage over the course of non-employment.

Non-employment Duration Intervals	**Less than 12 months**	**12 – 24 months**	**24 – 36 months**	**36 – 48 months**	**48 – 60 months**	**Over 60 months**
Average Reservation Wage in Euros	1007.49	989.39	980.25	995.20	969.72	969.24
Average deflated Reservation Wage	1055.95	1045.65	1046.79	1059	1029.72	1037.47
Observations	2352	2071	2359	1783	1212	7573

Table 1-5: Average reservation wage by non-employment duration

The preliminary correlations in Table 1-5 and Figure 1-4 constitute preliminary evidence that the reservation wage is stationary throughout non-employment duration. To assess the direction of this relationship formally, we regress the log reservation wage on non-employment duration and various other variables. It must be highlighted

[11] The same exercise was carried out for different cohorts: by gender, education groups and age intervals and the findings remained unaltered.

that this is a correlation exercise due to the potential presence of simultaneity in determining the relationship between reservation wages and non-employment duration. In other words, while non-employment duration affects the reservation wage, the latter itself might affect the duration of non-employment (Addison et al., 2013). Abstracting from any potential simultaneity issues, we adopt the following equation to investigate the determinants of the reservation wage, notably non-employment duration:

$$\boldsymbol{log\, R = a + X\beta + \delta T + \varepsilon} \qquad \textit{Equation 1}$$

where *R* refers to the (log) reservation wage of non-employed workers, *X* represents a set of explanatory variables[12], *T* refers to the elapsed non-employment duration and ε is the error term. The equation below describes an auxiliary wage equation which extends equation 1 by accounting for measures of liquidity. *B* refers to the (log) of UBII received by a household. *Savings* denotes a categorical variable for household savings and *Debt* is a categorical variable for the amount of debt in a household[13].

$$\boldsymbol{log\, R = a + X\beta + \delta T + \gamma\, log(B) + \theta\, Savings + \lambda\, Debt + \varepsilon} \qquad \textit{Equation 2}$$

The table below summarises the OLS results for equations 1 and 2 described above. We control for individual characteristics including gender, age, education level, whether the person is married or not, presence of children and household income. We also account for the importance of job search by considering whether non-employed workers are actively searching for a job.

[12] These control variables are gender, age, education, marital status, presence of children and household income.
[13] See section 1.2.2 for more details.

Log (reservation wage)	(1)	(2)	(3)	(4)	(5)
Women	-.2346208***	-.2477575***	-.2380259***	-.2359915***	-.2305096***
	(.0069558)	(.0090847)	(.0105278)	(.0106345)	(.010675)
Age groups					
26-45	.1233317***	.1363459***	.1261933***	.1261099***	.1225106***
	(.0138163)	(.0176843)	(.0218628)	(.0221311)	(.0220962)
46-65	.1804308***	.178978***	.1683747***	.1729539***	.1605125***
	(.0157175)	(.0207156)	(.0252087)	(.0256042)	(.0256862)
Marital status	.0038953	.0130616	.0096388	.0124146	.0123173
	(.0089441)	(.0117962)	(.013458)	(.0135953)	(.0141137)
Presence of kids	.0441843***	.0304944***	.0171565	.0128347	.0177512
	(.0092047)	(.0117099)	(.0133414)	(.0134171)	(.0141638)
Skills					
Medium skilled	.0503525***	.0528732***	.0616182***	.0673665***	.070868***
	(.0078188)	(.0104714)	(.0120822)	(.0122399)	(.0123376)
High skilled	.1821483***	.2228489***	.2348907***	.2409783***	.2426837***
	(.0146998)	(.0179451)	(.0207619)	(.0209445)	(.020796)
Log(HH[14] income)	.0374832***	.0385542***			
	(.0070779)	(.0087836)			
Non-employment duration					
12-24 months	-.0114818	-.0142078	-.0167932	-.0184158	-.013099
	(.0114628)	(.0137436)	(.0176075)	(.0178339)	(.0177681)
24-36 months	-.0127827	-.0121777	-.0152921	-.0146745	.0025088
	(.010964)	(.0131858)	(.0167927)	(.0170711)	(.0170956)
36-48 months	-.0139249	-.0174807	-.0041987	-.0053403	.0088781
	(.0114951)	(.0144608)	(.0179753)	(.0182436)	(.0181823)
48-60 months	-.0510279***	-.0653675***	-.0455672**	-.0424185*	-.0328568
	(.0140142)	(.0186796)	(.02163)	(.0220715)	(.0221614)
60+ months	-.0469568***	-.0595543***	-.0622661***	-.0638183***	-.0636188***
	(.0103363)	(.012904)	(.0162018)	(.0163801)	(.0163659)
Actively searching	.0448245***				
	(.00693)				
Log (UBII)			.1020323***	.1012957***	.0945512***
			(.0112346)	(.0113712)	(.0119753)
HH savings				-.0483407***	-.0488225***
				(.0103027)	(.0104106)
HH debt				.0213651**	.0250185**
				(.0099804)	(.0099838)
R squared	13.96%	15.55%	17.18%	17.58%	17.20%
Observations	10,512	6,437	4,769	4,665	4,665

Table 1-6: Determinants of the reservation wage

[14] HH refers to household.

The first specification includes a search dummy which is set to 1 if workers are actively searching and 0 otherwise. the remaining specifications exclude workers who are not actively searching for a job[15]. One might be concerned that the relatively high share of long-term non-employed workers in this sample could be non-participants. To overcome this potential issue, we only consider non-employed workers who are actively searching for a job. All subsequent specifications (except for the first column) exclude non-employed workers who are not actively searching for a job.

We depart from the theoretical prediction that the reservation wage is stationary to examine the nature of the relationship between the reservation wage and non-employment duration in our sample. In all four specifications in Table 1-6, non-employment duration and the reservation wage are negatively correlated. However, this correlation is only significant for workers who have been in the non-employed pool for over 48 months. Although the direction of the effect is negative, there isn't enough evidence in favour of a declining the reservation wage as the non-employment spell lengthens. This finding is also in line with Addison et al. (2009) and Krueger and Mueller (2016).

The last column of Table 1-7 reports the results using the deflated reservation wage as the independent variable. Although the non-employment duration effects in the two last specifications follow opposite directions for workers in the 24-36 and 36-48 months intervals, these effects do not display any statistical significance in the regression based on the deflated reservation wage. Furthermore, both results using the log deflated, and non-deflated reservation wage indicate that the reservation wage is only responsive to non-employment duration for workers who have been in the non-

[15] All subsequent specifications exclude non-employed workers who are not actively searching for a job.

employed pool over 60 months. Overall, specifications 4 and 5 (based on the deflated reservation wage) display a great deal of similarities in terms of the sign, magnitude, and statistical significance of the coefficients.

As discussed in section 1.3.1, the fluctuations in the mean reservation wage with non-employment duration seem negligible in terms of magnitude. However, the average reservation wage goes up for workers who have been non-employed between 36 and 48 months. This outcome also holds for the average deflated reservation wage. This result could constitute evidence in favour of the existence of composition effects. To account for these potential effects, we run a Fixed Effects estimation. For briefness, Table 1-7 zooms into the Fixed Effect results for non-employment duration. At first glance, the fixed effects findings appear to suggest a positive relationship between non-employment duration and the reservation wage. However, the lack of any statistical significance keeps our conclusions from the OLS estimation unchanged overall.

Log (reservation wage)	**Non-deflated reservation wage**	**Deflated reservation wage**
Non-employment duration		
12-24 months	.0163582	.0203001
	(.0283073)	(.0284515)
24-36 months	.0464052	.0475925
	(.029516)	(.0296195)
36-48 months	.0465427	.0306743
	(.0296638)	(.0296449)
48-60 months	.0327536	.0102981
	(.0348633)	(.0349141)
60+ months	.006296	-.0404848
	(.0350245)	(.0353982)
R squared	1.76%	1.95%
Observations	4,598	4,598

Table 1-7: Determinants of the reservation wage – Fixed Effects

1.3.2 Reservation wage and household unemployment benefits

An important question that needs to be addressed when examining the determinants of the reservation wage is the extent to which reservation wages respond to unemployment benefits. In their cross-sectional study of the reservation wage, Feldstein and Poterba (1984) find a positive correlation between the reservation wage ratio and the benefit replacement ratio. Their result was challenged by Shimer and Werning (2007) and more recently by Krueger and Mueller (2016) who find a negative relationship between the log reservation wage ratio and the log weekly benefit; however, this relationship is statistically insignificant. The last two specifications of Table 1-6 control for the amount of UBII received in a household. For each individual living in a household where at least one person is in receipt of UBII, the PASS provides information on the total amount of UBII received by each household every month (reported in logs in the regression). The results show that UBII and reservation wages are positively correlated, and this relationship appears to be statistically significant. The results in this chapter may not be directly comparable to the three papers mentioned above as the adopted measure for unemployment benefits is different, but one clear takeaway from the findings in Table 1-6 is that reservation wages are considerably responsive to household unemployment benefits. This provides motivating evidence for future research on this topic as a thorough evaluation of this question could have interesting policy implications.

1.3.3 Subgroup Analysis

To gain further insights on the determinants of reservation wages, we take a closer look at how the reservation wage responds to non-employment duration for different

subgroups. In this section, we control for non-employment duration as a continuous variable measured in months (instead of the duration intervals in the previous section). The OLS estimates in the first column of Table 1-8 show that the reservation wage declines as non-employment duration increases. However, this change is negligible and statistically insignificant. This outcome is consistent with the previously reported OLS results and is in line with the predictions of search theory on the stationarity of the reservation wage throughout jobless spells. Table 1-8 supplements the empirical analysis by providing additional estimates for various subsamples. For workers living in a household with a positive amount of savings, their reservation wages appear to be negatively correlated with non-employment duration as opposed to workers living in a household with no savings. Furthermore, the reservation wage is more responsive to non-employment duration for workers who live in a household with some savings (based on results for the non-deflated wage). This finding is in line with Krueger and Mueller (2016) who carry out a similar exercise and find that workers with over 10,000 dollars in savings lower their reservation wages as their unemployment spell lengthens. They explain this finding by the fact that these individuals become less selective about which jobs to accept as they draw on their savings during their jobless spell. The last three columns of Table 1-8 report the reservation wage's response to non-employment duration for workers aged between 18-24, 25-54 and 55-65 respectively. The specifications with non-deflated and deflated reservation wages respectively seem to be narrating slightly different stories. In the first specification, workers between the ages of 25 and 54 are more reactive to non-employment duration and show evidence of a decline as the non-employment spell lengthens. However, the results based on the delated reservation wage indicate that the youngest workers (aged between 18 and 24) are more likely to revise their reservation wages upwards

as the non-employment spell lengthens. Krueger and Mueller (2016) find a similar result for their sample of workers in New Jersey and relate this outcome to the fact that the cost of accepting below the reservation wage is higher for younger workers as they plan to spend more time in the labour market than older workers.

Dependent variable: log (reservation wage)	All workers actively searching	No HH savings	Positive HH savings	Age 18-24	Age 25-54	Age 55-65
Non-employment duration[16], in months	-0.0005 (0.0004)	-0.0002 (0.0005)	-0.0012* (0.0006)	+0.0030 (.0018918)	-0.0009** (.0004407)	-0.0007 (.001015)
Observations	3,378	2,109	1,293	337	2,605	436
R squared	18.98%	18.24%	20.95%	13.98%	18.54%	20.85%
Deflated reservation wage	-0.0003 (.0003906)	+0.0001 (.0005012)	-0.0009 (.0006199)	+0.0034* (.0018064)	-0.0006 (.0004351)	-0.0005 (.0009978)
observations	3,378	2,109	1,293	337	2,605	436
R squared	17.98%	17.41%	20.26%	12.36%	17.36%	16.79%

Table 1-8: Determinants of the reservation wage – subgroup analysis – age and savings

1.4 The Search Process of Non-employed Workers

Non-employed workers searching for a job have to make several choices as part of their search process which then influence their employment likelihood. These choices include deciding on which search channels to follow, the number of applications to send and the amount of hours to devote towards their job hunt (Addison & Portugal, 2002). The PASS survey provides a rich set of information that we exploit in this part to examine the search behaviour and search outcomes of non-employed workers in our sample.

[16] In this table, non-employment duration is a continuous variable measured in months and it excludes any workers with a non-employment duration exceeding 60 months.

1.4.1 Job search statistics for non-employed workers

Table 1-9 documents that about 45% of individuals in our sample report to be actively searching for a job and around 70% of those searching report to be seeking a full-time job. On average, non-employed workers in this sample search for about six hours a week. In terms of search frequency, around 38% of individuals in our sample search every day to several times a week.

Job Search Statistics	**Non-employed workers**
Percent actively searching for a job	44.67%
Search Channels:	
Postings	6.67%
Family and friends	10.14%
Employment agencies	53.89%
Private employment agencies	13.39%
Other channels	15.90%
Percent seeking a full-time job	70.97%
Applications:	
Replied to job postings	7.11%
Asked for job at company itself	12.01%
Unsolicited application	18.08%
Placed advertisement themselves	62.81%
Search Effort	
Percent intensively searching[17]	37.75%
Average hours spent searching per week	7.23
Mean applications sent, last 4 weeks	11.18
Search Outcomes	
Mean job interviews	2.21
Mean call back rate	0.10

Table 1-9: Job search descriptive statistics

We distinguish between five different job search channels: postings, family and friends, employment agency, private employment agency and *other* search methods. The most frequently used search channel by these non-employed workers appears to be employment agencies. The dominance of this search channel may be driven by the

[17] Intensive search is defined as searching every day to several times a week

fact that most of individuals in the sample are UBII recipients and must report to employment agencies to maintain their benefit allowance.

Due to data restrictions, an extensive discussion on all aspects of search outcomes cannot be provided as we do not possess data on job offers. However, the PASS survey provides information on the number of interviews non-employed workers receive which we exploit in the empirical analysis. We also construct a measure of call back rates which is defined as the ratio of the number of interviews a non-employed worker received to the number of applications sent. Table 1-9 reports that the mean job interview in our sample is 2.21 and the mean call back rate is 0.10.

1.4.2 Probability of sending an application, getting an interview and getting hired from non-employment

Table 1-9 has documented informative statistics about the search effort and outcome of non-employed workers. We utilise this information to examine the probability of sending a job application and the impact of search channels on search outcomes of non-employed workers in terms of receiving an interview and reemployment probabilities. We also pay close attention to how non-employment duration affects these probabilities. The first column of Table 1-10 reports the results for the probability of sending a job application for non-employed workers. This specification controls for several individual characteristics, non-employment duration and UBII receipt as well as a categorical variable for the search channels used by non-employed searchers. The reference category in the regressions is set to “employment agencies” as it is the most frequently used search channel in this data extract. It appears that the likelihood of sending an application decreases with non-employment duration. This negative effect could be attributed to the discouragement in finding a job these non-employed workers face as their jobless spell lengthens (Bjørnstad, 2006). The reported Probit

marginal effects in Table 1-11 show that workers who search through private employment agencies are the most likely to send job applications while workers who rely on postings are the least likely to send an application.

Probability	**Sending an application**	**Getting an interview**	**Making an NE transition**
Women	-.0059121	-.0807923**	.0262305
	(.0368527)	(.0339921)	(.0470954)
Age	-.011466***	-.000577	-.0093182***
	(.0018352)	.0016345	(.002326)
Skills			
Medium skilled	.1640861***	.0171481	.1195739**
	(.042233)	(.0399241)	(.0595841)
High skilled	.1671175**	.1197669	.1089728
	(.0730538)	(.0653884)*	(.093481)
Married	-.0221072	-.0723672*	-.2304113***
	(.0470666)	(.0437811)	(.0622116)
Presence of children	.0069494	.022775	-.1343275**
	(.0471306)	(.042847)	(.0596194)
Household income	-.0457922	-.0184485	1.075298
	(.0430235)	(.0378023)	(.0745112)***
Non-employment duration			
12-24 months	-.0375872	-.1328944**	-.1428754*
	(.0700862)	(.0563371)	(.0760286)
24-36 months	-.1169829*	-.2151823***	-.409944***
	(.0663276)	(.0555418)	(.0749552)
36-48 months	-.0608296	-.3477545***	-.511743***
	(.0712102)	(.0610188)	(.085025)
48-60 months	-.1388821*	-.2570601***	-.5717593***
	(.0791743)	(.0690977)	(.1019071)
60+ months	-.2344012***	-.4645366***	-.6067179***
	(.0630938)	(.0548005)	(.0765107)
Search channels			
Postings	-.4909***	-.1099185	-.198497*
	(.061039)	(.0733504)	(.1095158)
Friends and family	-.2467987***	.0324107	.0556262
	(.0539656)	(.0572359)	(.0754838)
Private agencies	.4524474***	.2822599***	.1825695***
	(.0661423)	(.0475938)	(.0683078)
Other channels	.321955***	.2132738***	.121882*
	(.0560399)	(.0445496)	(.0635083)
Log (UBIl)	-.0213339	.0219491	-.1494505***
	(.0354591)	(.0319729)	(.0401038)
Positive household savings	.0492715	-.0129653	.062345
	(.0373408)	(.033962)	(.046868)
Positive household debt	-.0173769	.1011743***	.0063307
	(.0361335)	(.0330845)	(.0465466)
Observations	8,174	7,028	5,368

Table 1-10: Probability of sending a job application, getting an interview and transiting from non-employment to employment

We then turn to the determinants of getting called back for an interview conditional on sending an application. The results are reported in the second column of Table 1-10 and demonstrate that workers' chances of getting an interview become lower the longer they stay in the non-employed pool. Our results are in line with (Kroft et al., 2013) who run a field experiment by sending fictitious CVs to real job postings in 100 US cities. They find that the likelihood of getting called back declines with the time a worker has spent unemployed, and this effect is found to be more significant in tighter labour markets. The same result is shared by two other papers by (Oberholzer-Gee, 2008) and (Eriksson & Rooth, 2014) who conduct audit studies to study call back rates of unemployed workers. Both studies report that the long term unemployed are at a disadvantage in terms of getting called back for an interview and this effect is more prevalent amongst low and medium skilled workers. The negative relationship between the likelihood of getting called back for an interview and non-employment duration could be attributed to several factors such as depreciation of human capital during periods of non-employment duration which reduces the chances of reemployment (Faberman et al., 2017). Another possibility is firms using non-employment duration as a signal for hiring. In this case, the non-employed, notably the long-term non-employed, may have less chances of getting an interview despite sending job applications (Jarosch & Pilossoph, 2018). The reported marginal effects in Table 1-11 show that workers who search for jobs through private employment agencies are more likely to receive a job interview relative to the other search channels considered in the analysis. Furthermore, individuals who search through postings appear to be the least successful in receiving an interview invitation.

One evident takeaway from the findings reported in tables 1-8 and 1-9 is that the probabilities of sending an application and getting called back for an interview decline

with the length of non-employment duration. This finding is consistent with previous research on this topic as discussed earlier. Furthermore, workers who search through private employment agencies are more likely to send job applications and are more likely to receive a job interview. Workers who search through postings appear to be the least successful in terms of getting an interview, but they are also the least likely to make a job application.

	Probability of sending an application	**Probability of receiving an interview**	**Probability of NE transition**
Postings	.7201058	.2134715	.1091073
Family and friends	.7948964	.2564027	.1544452
Employment agencies	.8569179	.2462473	.1435673
Private agencies	.9347566	.3413481	.1813051
Other channels	.9167684	.3168147	.1681107
Observations	8,174	7,028	5,368

Table 1-11: Search channels marginal effects from table 1-8

A question that arises subsequently is: How successful is the private agencies search channel in getting workers a job offer? Although we do not possess data on job offers, we can infer the effectiveness of search channels in getting hired through non-employment to employment transitions thanks to our longitudinal sample. The last column of Table 1-10 reports the results for the probability of making a non-employment to employment transition by accounting for the type of job search channels used. The reference group for the search channel categorical variable remains “employment agencies”. The findings indicate that workers who search through postings are less likely to be successful in getting hired from non-employment in comparison to workers who search through employment agencies. Non-employed workers who search through family and friends and those who rely on private employment agencies are more likely to secure a job relative to workers who search through employment agencies. The marginal effects reported in Table 1-11 reveal that

non-employed workers who search through private employment agencies are characterised by the highest probability of escaping non-employment and getting a job.

This section has provided informative correlations on the search activities and outcomes of non-employed workers in this PASS sample. However, the analysis is open to a range of extensions. One interesting avenue for future research would be to follow workers who successfully transited from non-employment to employment to assess how fast they move up the job ladder depending on the search channel they used to secure their current job.

1.5 Robustness checks: BA versus Microm sample

As mentioned in section 1.2.1, the PASS survey consists of two samples: BA and Microm samples. The first is directed towards UBII recipients while the latter is targeted towards a register of German residents. About 10% of workers in the data extract are from the Microm sample while the rest belongs to the BA sample. One might be concerned that the over-representation of UBII recipients can cause bias in the results or restrict the findings of the analysis to a subset of individuals. To address this issue, we conduct the same empirical analysis for individuals from the BA and Microm samples separately.

1.5.1 The reservation wage in BA and Microm samples

We start first by taking a closer look at the key variable in the empirical analysis, the reservation wage. The figure below reports the overlapping reservation wage distributions for each sample separately. Both reservation wage distributions are characterised by a similar shape and are analogous to the reservation wage distribution in the full sample displayed by Figure 1-1 in section 1.2.2.

Table 1-5 in section 1.3 reported the statistics for the average reservation wage by non-employment duration intervals. Table 1-12 repeats the same exercise by stratifying workers by sample. The reservation wage averages follow a similar pattern across all samples and no striking differences are detected between the main sample and the BA and Microm samples.

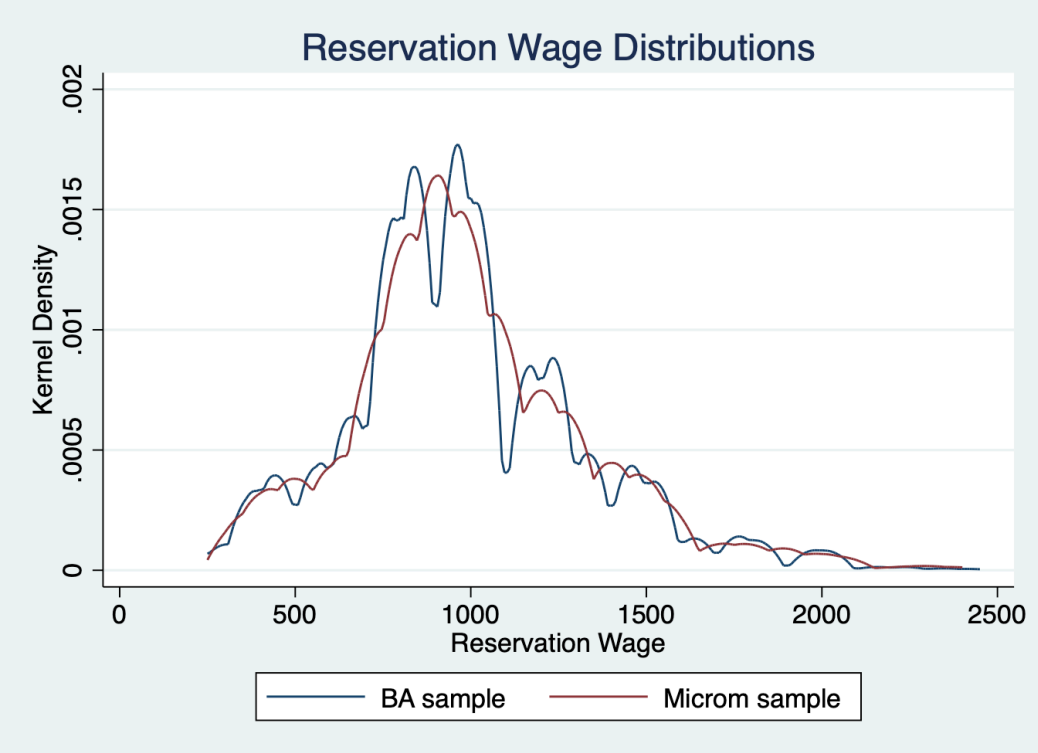

Figure 1-5: Reservation wage distribution of non-employed workers by sample

Nom-employment Duration Intervals	Less than 12 months	12 – 24 months	24 – 36 months	36 – 48 months	48 – 60 months	Over 60 months
Average Reservation Wage in Euros-full sample	1007.49	989.39	980.25	995.20	969.72	978.62
Average reservation wage-BA sample	1000.75	983	975.76	991.21	967.67	981.40
Average reservation wage-Microm sample	1047.68	1008.94	986.31	1012.01	984.47	931.02

Table 1-12: Average reservation wage and non-employment duration by sample

1.5.2 Determinants of the reservation wage by sample

Table 1-13 investigates the determinants of the reservation wage in each subsample[18]. The first two columns report the OLS results for the BA and Microm samples respectively while the last two columns control for measures of liquidity: log of UBII receipt in the household, household savings and debt. We do not detect any striking differences between the two samples and all the coefficients follow the same direction in all specifications. However, age effects, household savings and debt do not appear to matter for the reservation wages of workers in the Microm sample. Furthermore, comparing the results reported in the table below to the coefficients in Table 1-6, both subsamples' results follow the same direction of the findings in the main sample.

	(1) BA sample	(2) Microm sample	(3) BA sample	(4) Microm sample
Women	-.248456***	-.2125557***	-.2361598***	-.1942451***
	(.0094847)	(.0338657)	(.0110417)	(.0482732)
Age groups				
26-45	.1367621***	.1085601*	.1219077***	.1247551
	(.0185756)	(.0603719)	(.0231833)	(.0792861)
46-65	.1858498***	.06292	.1743605***	.0748621
	(.0216177)	(.0770493)	(.0266156)	(.1089917)
Marital status	.0162218	.0175438	.0210008	.0032662
	(.0123523)	(.0430507)	(.0140568)	(.0581648)
Presence of kids	.0191846	.1199484***	.0048449	.0817653
	(.0122631)	(.0436957)	(.0139592)	(.0542334)
Skills				
Medium skilled	.053585***	.0131434	.0676845***	.0057648
	(.0110155)	(.0347354)	(.0128168)	(.0464821)
High skilled	.2240841***	.2192002***	.230451****	.3367531***
	(.0186082)	(.066469)	(.0217414)	(.0763824)
Log (HH income)	.0434488***	-.0110052		
	(.009104)	(.0360312)		

[18] Table 1-19 in the Appendix repeats the same exercise using the log of deflated reservation wage as an independent variable.

	(1) BA sample	(2) Microm sample	(3) BA sample	(4) Microm sample
Non-employment duration				
12-24 months	-.0065668	-.0977725*	-.0129594	-.1509289*
	(.0143398)	(.0551882)	(.0186692)	(.08796)
24-36 months	-.0068062	-.0542973	-.0100509	-.0894635
	(.0139647)	(.0447097)	(.0180968)	(.0599101)
36-48 months	-.0151272	-.0398401	-.0043981	-.0525349
	(.015206)	(.0469716)	(.0192854)	(.0574525)
48-60 months	-.0588513***	-.1424912***	-.0351188	-.1517856**
	(.0196796)	(.0606394)	(.0232321)	(.0752744)
60+ months	-.0458752***	-.2426123***	-.0534342***	-.2349654***
	(.0134886)	(.0479189)	(.0172327)	(.061259)
Log (UBII)			.0989231***	.1088137***
			(.0118148)	(.0407516)
HH Savings			-.0469502***	-.0517866
			(.0106876)	(.0451879)
HH Debt			.0205408**	.0517251
			(.0103873)	(.0441026)
Observations	5,879	456	4,307	274

Table 1-13: Determinants of the reservation wage by sample

1.5.3 Job search statistics by sample

The table below reports job search statistics for both samples separately and includes the statistics for the full sample from Table 1-9 for reference. As the table below demonstrates, there are no striking differences between the statistics in the BA and Microm samples. For all samples, “employment agencies” is the dominant search channel, the majority of workers are seeking a full-time job and search outcomes statistics are similar across samples.

Overall, we do not detect any perceptible differences between the statistics reported by the main sample and the two subsamples. The empirical analysis by sample has also demonstrated that the results remain similar between the BA and Microm samples. Therefore, the findings from the main sample are representative and are not restricted to a subset of individuals.

Job Search Statistics	Full sample	BA sample	Microm sample
Percent actively searching for a job	44.67%	55.66%	52.43%
Search Channels:			
Postings	6.67%	6.73%	11.01%
Family and friends	10.14%	9.85%	20.23%
Employment agencies	53.89%	54.30%	44.90%
Private employment agencies	13.39%	13.46%	8.49%
Other channels	15.90%	14.67%	15.37%
Percent seeking a full-time job	70.97%	70.64%	74.57%
Search Effort			
Average hours spent searching per week	7.23	7.08	4.96
Mean applications sent, last 4 weeks	11.18	11.09	12.41
Search Outcomes			
Mean job interviews	2.21	2.22	1.97
Mean call back rate	0.10	0.10	0.09

Table 1-14: job search statistics by sample

1.6 Robustness analysis: Duration dependence and reported hours

1.6.1 The reservation wage over the spell of non-employment and reported hours

In the PASS survey, workers who report their reservation wages are asked about the number of hours they would be required to work per week to earn that wage. To rule out that the duration dependence in the main analysis is not driven by hours of work required to earn that reported reservation wage, we restrict our sample to workers who reported *reservation hours* of 30 or more. Table 1-15 replicates the same exercise as Table 1-5 by restricting the sample to workers that report 30 or more weekly hours when stating their reservation wages. The hours restricted reservation wage's average follows a similar pattern to the non-restricted reservation wage showing a declining trend as non-employment duration increases except for workers in the non-

employment duration interval 36-48 months where the mean reservation wage goes up from 1108.07 to 1113.9 Euros.

Non-employment Duration Intervals	Less than 12 months	12 – 24 months	24 – 36 months	36 – 48 months	48 – 60 months	Over 60 months
Average Reservation Wage in Euros	1007.49	989.39	980.25	995.20	969.72	969.24
Average deflated Reservation Wage	1055.95	1045.65	1046.79	1059	1029.72	1037.47
Observations	2352	2071	2359	1783	1212	7573
Average deflated reservation wage (30hours +)	1111.30	1109.80	1108.07	1113.19	1090.35	1084.45
Observations	2023	1736	1975	1506	1022	2975

Table 1-15: Average reservation wage by non-employment duration and reported hours

1.6.2 Determinants of the reservation wage and reported hours

The following table reports the results for the determinants of the reservation wage corresponding to 30 or more weekly hours. The results are reported in the last column of Table 1-16 while the first two columns show the results for the non-restricted reservation wage from Table 1-6 for comparison purposes. The OLS results for the non-restricted reservation wage and those for the hours-restricted reservation wage follow a similar pattern and no striking differences are detected. Zooming into the results for non-employment duration, only the reservation wage of the long-term non-employed appears to be responsive to non-employment duration. These findings are

in line with the discoveries of the main analysis suggesting that there isn't enough evidence to attest that duration dependence is driven by *reservation hours*.

Log (reservation wage)	**OLS: non-deflated reservation wage**	**OLS: deflated reservation wage**	**OLS hours analysis – deflated reservation wage**
Women	-.2359915***	-.2305096***	-.1510329***
	(.0106345)	(.010675)	(.0094042)
Age groups			
26-45	.1261099***	.1225106***	.1493911***
	(.0221311)	(.0220962)	(.0214688)
46-65	.1729539***	.1605125***	.2082668***
	(.0256042)	(.0256862)	(.0240891)
Marital status	.0124146	.0123173	.0339615***
	(.0135953)	(.0141137)	(.0124595)
Presence of kids	.0128347	.0177512	.0683448***
	(.0134171)	(.0141638)	(.0128869)
Skills			
Medium skilled	.0673665***	.070868***	.0339615***
	(.0122399)	(.0123376)	(.0124595)
High skilled	.2409783***	.2426837***	.0683448***
	(.0209445)	(.020796)	(.0128869)
Non-employment duration			
12-24 months	-.0184158	-.013099	-.0037896
	(.0178339)	(.0177681)	(.016125)
24-36 months	-.0146745	.0025088	.0052546
	(.0170711)	(.0170956)	(.0154104)
36-48 months	-.0053403	.0088781	.0043992
	(.0182436)	(.0181823)	(.0165325)
48-60 months	-.0424185*	-.0328568	-.012334
	(.0220715)	(.0221614)	(.0195951)
60+ months	-.0638183***	-.0636188***	-.0518979***
	(.0163801)	(.0163659)	(.01459)
Log (UBII)	.1012957***	.0945512***	.0688014***
	(.0113712)	(.0119753)	(.0108939)
HH savings	-.0483407***	-.0488225***	-.0433547***
	(.0103027)	(.0104106)	(.0092969)
HH debt	.0213651**	.0250185**	.0300475***
	(.0099804)	(.0099838)	(.0088897)
R squared	17.58%	17.20%	17.25%
Observations	4,665	4,665	3,839

Table 1-16: Determinants of the reservation wage and reported hours

Table 1-17 reports the subgroup analysis results for the hours-restricted reservation wage by focusing on household savings and different age groups. The results from

Table 1-8 are also reported below for comparison purposes. The hours-restricted analysis follows a similar pattern to the main analysis' findings in terms of sign, magnitude and statistical significance of the effects with the exception of a loos in significance for the youngest age group (18-24 years old). Overall, no age-driven differences are detected in terms of responsiveness to non-employment duration, and this also applies to household savings. Therefore, the conclusions from the main analysis remain unchanged overall.

Dependent variable: log (delated reservation wage)	All workers actively searching	No HH savings	Positive HH savings	Age 18-24	Age 25-54	Age 55-65
Non-restricted sample from table 1-8	-0.0003 (.0003906)	+0.0001 (.0005012)	-0.0009 (.0006199)	+0.0034* (.0018064)	-0.0006 (.0004351)	-0.0005 (.0009978)
Observations	3,378	2,109	1,293	337	2,605	436
R squared	17.98%	17.41%	20.26%	12.36%	17.36%	16.79%
Hours-restricted sample	-0.0001 (.0003489)	6.91e-06 (.0004527)	-0.0002 (.0005403)	+0.0022 (.0018255)	-0.0002 (.0003801)	-0.0006 (.0008679)
Observations	2,842	1,785	1,074	297	2,186	359
R squared	18.28%	16.69%	20.82%	10.32%	16.06%	19.49%

Table 1-17: Determinants of the reservation wage and reported hours – subgroup analysis

1.7 Conclusion

This chapter has documented informative correlations about the determinants of individuals' reservation wages and notably its relationship with non-employment duration. We do not find enough evidence in favour of a declining reservation wage. In fact, reservation wages show little responsiveness to non-employment duration since only workers with non-employment durations exceeding 48 months appear to be reducing their reservation wages as their jobless spell lengthens.

Our analysis has also revealed that reservation wages positively respond to household unemployment benefits and a thorough evaluation of this question could have

interesting policy implications. We sidestep from investigating this further due to lack of information on unemployment benefit eligibility and time until exhaustion of benefits. The last part of this chapter exploited the job search information in the PASS survey to further our understanding of workers' search behaviour and its implications on the probability of exiting non-employment. Our findings reveal that the probability of making a job application and getting called back for an interview decline with non-employment duration. We also assess the effectiveness of different search channels in getting workers hired from non-employment and find that workers who search through private employment agencies are the most likely to escape non-employment while workers who search through postings appear to be the least successful in getting hired from non-employment. These results provide motivating evidence to pursue this topic further and one interesting avenue for future research would be to evaluate the impact of different search channels on future job stability.

1.8 Appendix

1.8.1 Duration dependence in the first 12 months of non-employment

Log (deflated reservation wage)	OLS	Fixed Effects	OLS hours analysis
Non-employment duration in months	-.0052271 (.0033679)	.0049054 (.0085902)	-.0048677 (.0031343)
R squared	24.93%	31.33%	23.72%
Observations	812	812	690
Non-employment duration: 3 months intervals			
3-6 months	-.0225297 (.0322323)	.1226774 (.1028621)	-.0112361 (.0288063)
6-9 months	-.0448628 (.0365965)	.0824828 (.0936716)	-.0655181* (.0357685)
9-12 months	-.0483757 (.0325944)	.0603072 (.0802119)	-.0259231 (.030232)
R squared	24.96%	33.04%	23.93%
Observations	812	812	690
Non-employment duration: 6 months intervals			
6-12 months	-.0382084 (.0250238)	.0168159 (.0605309)	-.0384332 (.023496)
R squared	25.18%	30.85%	23.76%
Observations	812	812	690

Table 1-18: The reservation wage in the first 12 months of non-employment

Table 1-18 zooms into duration dependence within the first twelve months of the non-employment spell using both OLS and Fixed Effects specifications and for briefness non-employment duration results are solely reported but these regressions include the same controls as the main regression in Table 1-6. We use three definitions of non-employment duration: (i) continuous variable (ii) duration intervals of 3 months (ii) duration intervals of 6 months. At first glance, the OLS findings appear to be detecting negative duration dependence, however, none of these negative effects are statistically significant. The Fixed Effect findings seem to follow a different direction to the OLS findings. However, the positive sign produced by the Fixed Effect specification

lacks statistical significance. The last column reports the OLS results for workers who report *reservation hours* of 30 or over. The hours analysis reiterates the findings of the main analysis in terms of direction of the effects and significance. Overall, the outcomes in the table above narrate a similar story to the findings of the main analysis in Table 1-6.

1.8.2 Sample analysis using deflated reservation wage

Table 1-19 reiterates the analysis in Table 1-13 using the delated reservation wage as the dependent variable to check the validity of the main analysis results. The OLS results for both the Microm and BA samples are reported, and the results for the full sample are also reported for comparison purposes. For both samples, the deflated reservation wage doesn't appear to be responsive to non-employment duration except for workers who have been non-employed for over 60 months (as well as workers belonging to the non-employed pool for over 48 months in the Microm sample).

Log (deflated reservation wage)	**OLS Full sample**	**OLS MICROM**	**OLS BA**
Women	-.2305096***	-.1954858***	-.2303214***
	(.010675)	(.0478857)	(.0109578)
Age groups			
26-45	.1225106***	.1053977	.1214713***
	(.0220962)	(.0813752)	(.0229525)
46-65	.1605125***	.0560509	.1658236***
	(.0256862)	(.1104606)	(.0264136)
Marital status	.0123173	.0066236	.0215439
	(.0141137)	(.0578081)	(.0139713)
Presence of kids	.0177512	.094092*	.0085962
	(.0141638)	(.0536383)	(.0138248)
Skills			
Medium skilled	.070868***	.0102146	.0712817***
	(.0123376)	(.0468095)	(.0127709)
High skilled	.2426837***	.3459401***	.2315221***
	(.020796)	(.0762602)	(.0213473)
Non-employment duration			
12-24 months	-.013099	-.1334501	-.0069839
	(.0177681)	(.0872633)	(.0184519)
24-36 months	.0025088	-.0580455	.0046274
	(.0170956)	(.0594044)	(.017913)

Log (deflated reservation wage)	OLS Full sample	OLS MICROM	OLS BA
36-48 months	.0088781	-.0300796	.0071853
	(.0181823)	(.0567699)	(.0190878)
48-60 months	-.0328568	-.1353247*	-.0242508
	(.0221614)	(.0745371)	(.0230165)
60+ months	-.0636188***	-.2358602***	-.0552816***
	(.0163659)	(.0609032)	(.0170916)
Actively searching Log (UBII)	.0945512***	.1031694**	.0910519***
	(.0119753)	(.0405452)	(.0115839)
HH savings	-.0488225***	-.0517161	-.0489609***
	(.0104106)	(.0449955)	(.010595)
HH debt	.0250185**	.0503825	.0221188**
	(.0099838)	(.0439655)	(.0102887)
R squared	17.20%	25.39%	17.11%
Observations	4,665	274	4,307

Table 1-19: The deflated reservation wage in the BA and Microm subsamples

Chapter 2 Labour market transitions and the reservation wage: evidence from Germany

2.1 Introduction

After studying workers' reservation wages and their search process throughout a non-employment spell, we follow workers who succeed in finding a job and pay closer attention to their job acceptance decisions and its implications on subsequent labour market transitions. To perform this exercise, we extend the PASS survey used in the previous chapter by combining our survey data with German administrative data, the Sample of Integrated Labour Market Biographies, SIAB which is also provided by the IAB. This dataset will allow us to construct full employment histories of individuals from the PASS survey who agreed for their records to be matched to the SIAB data. In fact, it will provide us with information on labour market transitions that our respondents experience within each wave since the spell data recorded in the SIAB provides day to day information. Therefore, the PASS-ADIAB data will allow us to fill in most of the gaps in our survey data to obtain a more encompassing dataset.

Our data reveals that 26% of hires from non-employment in our sample accepted wages below their self-reported reservation wages. This is a puzzling result since the reservation wage is defined as the lowest wage a worker is willing to accept to move to employment. It is quite easy to imagine somewhat mundane explanations such as people being systematically overconfident about their ability and the job market is a brutal reality check that forces them to accept lower wages. If this is the case, self-reported reservation wages should fall as workers spend more time in the non-employed pool. However, the analysis from the first chapter hasn't revealed enough

evidence in favour of a declining reservation wage as the non-employment spell lengthens. One could think of an array of possibilities that might be driving this acceptance decision. The presence of nonwage values which are not reflected in the wage could constitute a potential driving force behind acceptance below the reservation wage (Hall & Mueller, 2018). There exists a wide literature which focuses on nonwage job characteristics. Different papers have considered different types of job amenities, some papers such as Dey and Flinn (2008) have considered health insurance as a job amenity while others have estimated workers' preferences over the number of hours worked. These papers include Gørgens (2002), Bloemen (2008) and (Blau, 1991) who finds no significant preference for hours worked. Other papers have considered more than a single nonwage value. For instance, Bonhomme and Jolivet (2009) consider five job amenities and find strong preferences for job security. To the best of our knowledge, empirical literature that addresses nonwage values by exploiting information on reservation wages is not extensive. This chapter closely relates to Holzer (1986) and Hall and Mueller (2018) who discuss job acceptance decisions in relation to the reservation wage. On the one hand, Holzer (1986) postulates that acceptance below the reservation wage could be driven by the fact that workers' reported reservation wages are targeted towards specific jobs. Hence, workers accepting jobs paying below their reservation wages perceive these jobs as temporary. On the other hand, Hall and Mueller (2018) attribute this finding to the existence of nonwage values. Our data enables us to investigate both possibilities since it provides firm information which we use as an indicator of a job's nonwage value and permits us to follow workers after their non-employment to employment transitions.

The upcoming section describes the data and key variables. In section 2.3, we start the empirical analysis by investigating the determinants of acceptance below the reservation wage, notably non-employment duration and firm size as a measure of nonwage value. We do not find enough evidence that firm size influences workers' acceptance decisions in relation to the reservation wage. To examine further the driving forces behind this acceptance decision, section 2.4 studies the quit probabilities of the subset of workers who accepted below their reservation wages. Our findings suggest that these workers are more likely to go back to non-employment, but they are also more likely to move to another firm. This constitutes suggestive evidence that these jobs are more likely to be temporary. In section 2.5, we take a closer look at job-to-job transitions and find that workers who accepted below their reservation wages at the previous job are less likely to take a wage cut when moving to the new firm. This reinforces the argument that jobs paying below the reservation wage are more likely to be temporary. Section 2.6 of this chapter is dedicated to a comparative study of acceptance below the reservation wage statistics in the German and US labour markets. The comparison reveals that acceptance below the reservation wage prevails in both labour markets. A summary and concluding remarks are provided in section 2.7.

2.2 Data

2.2.1 Institutional background

As discussed in the previous chapter, our dataset spans from 2007 to 2015 which represents the post *Hartz* reform period in Germany, and our data extract includes

both type two benefit recipients (UB II) and a random sample of German residents[19]. UB II recipients can also hold a job in marginal employment which is one of the most common forms of atypical employment in Germany (Lietzmann et al., 2016). Marginal employment was restructured in 2003 as part of the Hartz reforms in order to improve labour flexibility and attract low-wage workers into the labour market through different incentives such as exemption from taxes and social security contributions. Our data provides information on labour market histories of both workers in contributing employment (employment liable to social security) as well as workers in marginal employment. 28.28% of workers in our sample are in marginal employment while the rest of workers are in contributing employment. We restrict the analysis to workers in contributing employment since there are substantial differences in the labour market conditions that workers face in these two separate types of employment and they are characterised by different patterns and trends. Marginal jobs are characterised by lower job stability as they are generally temporary and the income from these jobs is capped at 400 Euros and 450 Euros as of 2015 (Lietzmann et al., 2016). Moreover, these jobs are usually concentrated in few specific sectors of the economy. Therefore, considering both contributing employment and marginal employment simultaneously could limit the scope of our research in terms of generalisation of the results to more formal types of employment.

2.2.2 The PASS-ADIAB Data

The PASS-ADIAB is a unique dataset that links administrative data, the SIAB, to survey data, the PASS. The SIAB is a 2 percent German random sample drawn from

[19] See chapter 1 section 2.1 for detailed information.

the Integrated Employment Biographies of the IAB and provides access to social security records from 1975. The PASS is a survey conducted by the IAB and we have access to data from 2007 until 2015. Therefore, our linked PASS-ADIAB data allows us to follow the PASS respondents[20] who agreed for their records to be matched to the administrative data from 2007 until 2015.

The SIAB administrative data-This data provides day to day information on every labour market spell covered by social security and the corresponding daily wage if applicable. We are also able to observe several individual characteristics such as gender, age and education. Furthermore, the SIAB data provides information on job characteristics: whether the job is full-time or part-time, occupation and tenure. Thanks to this rich dataset, we are also able to observe firm information: establishment id, total number of employees in a firm, number of full-time employees, number of part-time employees and the mean imputed wage of full-time employees in a firm.

Data construction-The administrative data and survey data are obtained as two separate files and several data adjustments had to be performed in order to link the two datasets and harmonise both files into one rich and consistent dataset. The SIAB data is organised by labour market spells while the PASS[21] survey is organised by waves (where each wave refers to a year). We convert both datasets into monthly panels (12 observations per wave for each person) to be able to match the information from the two sources appropriately. This method allows us to fill in the gaps in the

[20] The administrative data includes PASS respondents from chapter 1 who agreed for their records to be matched by administrative data.

[21] See chapter 1 section 1.2.2 for more detailed information on the PASS survey and variables key to the analysis.

survey data by completing the missing information from the administrative data and constructing complete labour market histories of the PASS respondents who agreed for their records to be matched with their information in the administrative data. After successfully matching the two datasets, we obtain a rich sample of 16,588 individuals that we are able to follow in principle for 8 years from 2007 until 2015. The longitudinal dimension of our sample and access to workers' labour market histories allows us to observe different labour market transitions: non-employment to employment (and vice-versa) and job to job transitions thanks to firm information that is made available by the administrative data.

Sample-Our PASS-ADIAB sample is a monthly panel of 16,588 individuals between the ages of 18 and 65 and includes both men and women. We stratify individuals into three age groups: 18-25, 26-45 and 46-65. We also control for education level by sorting individuals into three skill groups: (i) low-skilled (no school degree or high school degree) (ii) medium-skilled (vocational degree) (iii) high-skilled (university degree). Table 2-1 provides further details and shows that we have an equal representation of both men and women, we also observe that our sample is dominated by low-skilled workers[22] and there is a large representation of individuals who live in households where at least one person is in receipt of UBII benefits.

[22] The dominance of low skilled workers in this sample could be attributed to the overrepresentation of households where at least one person is in receipt of UB II.

Summary Statistics	
Number of Observations	1,304,464
Number of Individuals	16,588
Percent women	52.78
Average Age	38.8
Percent low-skilled	70.64
Percent married	13.09
Percent with children	44.97
Percent living in a household in receipt of unemployment benefits	63.26
Percent living in a household that holds a positive amount of savings	78.79
Percent living in a household that owes a positive amount of debt	80.39
Percent non-employed workers actively searching for a job	32.11
Percent employed workers actively searching for a job	21.71
Average non-employment duration (in months)	16.29
Average job tenure (in months)	10.98

Table 2-1: Descriptive statistics

2.2.3 Variables Description

Reservation wage- The PASS-ADIAB provides information on the reservation wages of PASS respondents (from the first chapter) who agreed for their records to be matched with the SIAB data. The reservation wage is originally reported as a monthly measure in the PASS survey. However, workers' wages which are provided by the SIAB, are reported as a daily measure. Therefore, the reservation wage was converted it into a daily measure to ensure comparability with employment wage measure. Although this conversion may introduce some noise because the daily reservation wage figures might entail some measurement error, this conversion is necessary to ensure that the two wage metrics are comparable. Figure 2-1 presents the distribution of the daily reservation wage for non-employed workers in our sample. This distribution displays several spikes due to the fact that the reservation wage is a self-reported measure, therefore, most survey respondents round up numbers when reporting their reservation wages hence the spikes around 20, 30, 35 and 40 Euros. The mean daily reservation wage of non-employed workers is 32.25 Euros with a standard deviation of 11.53.

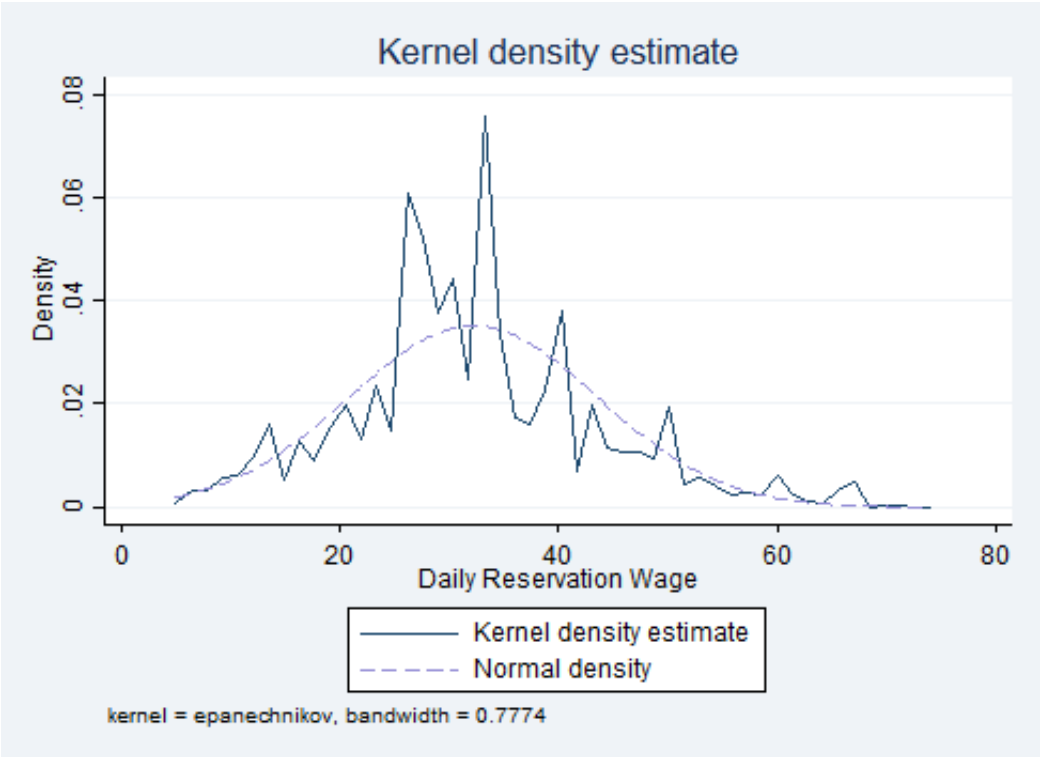

Figure 2-1: Daily Reservation Wage Distribution of Non-employed Workers

Labour market status-Workers in our sample are either employed or non-employed. Individuals' labour market status is given by the administrative data. It contains several categories which we have grouped into two: employed if the person is in employment liable to social security which we refer to as contributing employment. Non-employed if the person is recorded as an adult and able to work, if the person is registered as unemployed and/or if the person is in receipt of unemployment benefits.

Non-employment Duration-We construct our measure of non-employment duration by utilising information made available by the administrative data where we can observe the start date (month and year) of a spell and its end date. Thus, non-employment duration is a measure of the time elapsed between the start date of the non-employment spell and the interview date and it is measured in months. We construct labour market histories in such a way that there are no overlapping spells. We consider two scenarios: (i) If a worker starts more than one job in the same month, the job with

the longest tenure is retained in our sample. (ii) If a worker started and ended multiple jobs at the same time, the job with the highest wage is retained. The average non-employment duration is our sample is 16.29 months. For our empirical analysis, we stratify workers into three non-employment duration groups (i) up to 6 months (ii) 7 to 12 months (iii) over 12 months.

Job tenure- Since the PASS-ADIAB data provides information on the start and end dates of each employment spell workers experience, we utilise this information to compute workers' job tenures. Our measure of job tenure is the elapsed duration between the time the worker started the job until the end of the employment spell. The average job tenure for workers in contributing employment in our sample is about 11 months.

Occupation groups- Workers are stratified into 10 occupation groups as demonstrated by Table 2-2. Most workers are concentrated in labour-intensive occupations, retail, hospitality and cleaning jobs while workers in high skilled occupation appear to be underrepresented in this sample.

Occupation Groups	
Agriculture, manufacturing and labour-intensive occupations	20.23
Hospitality and food related occupations	12.41
Construction	4.53
Sales, retail and tourism	13.77
Transport	10.22
Office related occupations and administrative jobs	12.11
Teachers and social workers	6.58
Health related occupations	4.75
Cleaning	11.88
High skilled occupations	3.53

Table 2-2: Occupation groups distribution

Firm Information-The SIAB data provides the following information on firms (i) total number of employees in the firm (ii) total number of part-time workers and total number of full-time workers which we use to construct a measure of the ratio of part-time

workers to full-time workers in the firm (ii) mean imputed gross daily wage of full-time workers in a firm[23].

	Firm information statistics	observations
Average (median) number of employees	291.40 (44)	120,758
Average (median) number of full-time employees	170.66 (21)	108,147
Average (median) number of part-time employees	74.08 (6)	99,306
Mean (median) imputed gross daily wage	71.40 Euros (65.64)	108,147

Table 2-3: Firm information descriptive statistics

Retrospective job information-The longitudinal dimension of our data allows to control for previous job characteristics such as the wage at previous employment, whether workers changed their occupation since their last job and whether workers switched from a full-time to part-time job (and vice versa) since their last spell of employment. This information is not directly available in the linked data for workers who are non-employed from the first observation in our sample (January 2007). We retrieve the previous job information of these workers from the SIAB administrative data and go back as far as the year 2004 to detect their most recent employment spell prior to their non-employment spell (as recorded in 2007). We then append their previous job information to the linked data extract. Out of workers who transited from non-employment to employment, on average 32.52 percent have changed their occupation in our sample, 9.39 percent switched from full-time to part-time relative to their previous job and 12.73 percent switched from part-time to full-time.

[23] See SIAB data report available on the IAB website for a detailed description of this variable.

2.3 Job Acceptance and the Reservation Wage

An unemployed worker accepts a job if it pays above his/her reservation wage (McCall, 1970). We depart from this theoretical prediction to study non-employed workers' job acceptance decisions. To perform this exercise, we construct a ratio measure of the accepted wage to the reservation wage. For every worker hired from non-employment, the ratio is defined as the wage at which the worker got employed (the accepted wage) divided by the worker's reported reservation wage. We consider the last reservation wage value reported by individuals prior to their transition from non-employment to employment.

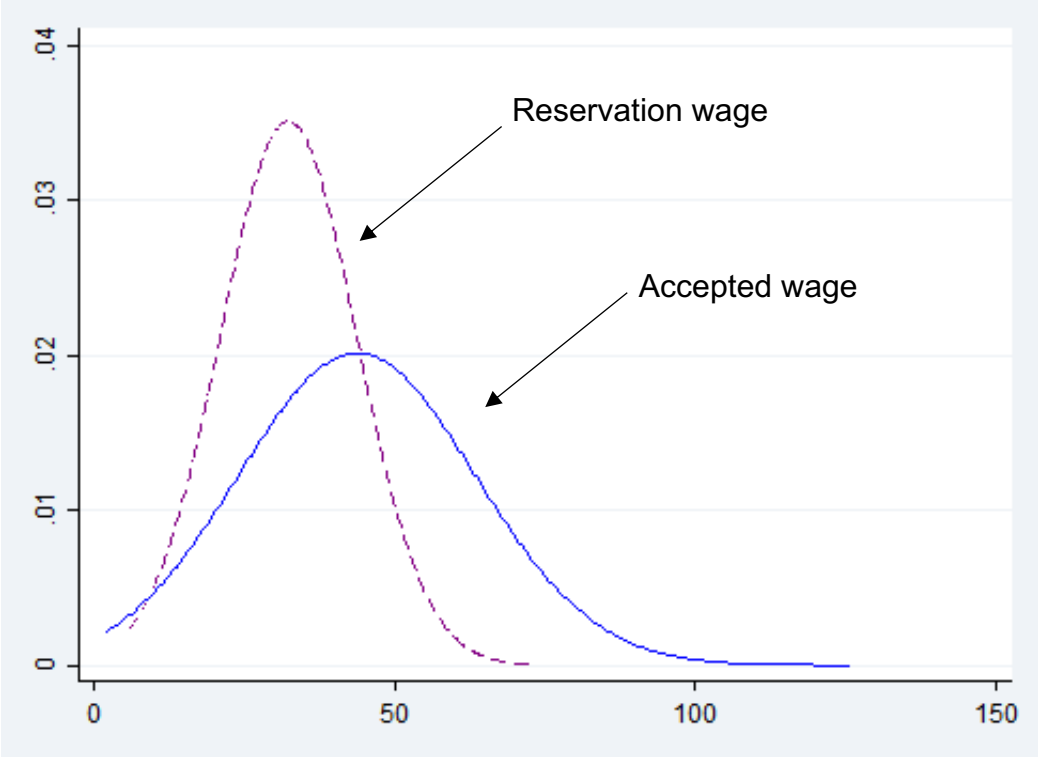

Figure 2-2: Accepted Wage and Reservation Wage Distributions

As previously highlighted, the information on accepted wages is obtained from the administrative data side of the sample while the reservation wage data is provided by the PASS survey. This implies that for some workers, there exists a time lapse between the time the last reservation wage was reported and the date when the job

was accepted. Therefore, in order to account for any noise in our ratio data, we construct a duration measure which we refer to as duration of report. This duration measure refers to the time elapsed between the date a worker transited from non-employment to employment and the date they reported their latest reservation wage during their most recent spell of non-employment prior to accepting the job. The duration of report variable is measured in months with a maximum duration of 13 months.

Conditional on transitioning from non-employment to contributing employment, our sample shows that 26% of workers accepted wages paying lower than their reported reservation wage. This result follows the same direction as the findings in Krueger and Mueller (2016) where 44% of workers in their KM survey accepted jobs paying below the reservation wage. This leads us to question the validity of the reservation wage and its predictive power in terms of job acceptance. One might attribute this result to potential noise in the reservation wage data due to measurement error. However, there could be other factors beyond the trivial explanation of measurement error that might be driving this result. As discussed in the introduction, acceptance below the reservation wage could be driven by the existence of nonwage values which are not reflected in the wage and influence workers' acceptance decisions (Hall and Muller, 2018). Furthermore, workers' willingness to work for less than their reported reservation wage could potentially be an indication that this subset of workers perceives these jobs as temporary (Holzer, 1986). To investigate these statements further, Table 2-4 reports results of the likelihood of accepting jobs paying below the reported reservation wage by accounting for several factors that could be driving this decision.

Non-employment duration is a variable that we pay close attention to as a potential driver of job acceptance below the reservation wage. One might think that as the non-employment spell lengthens, workers reduce their reservation wages, and this downward adjustment reflects on their acceptance decision. However, the analysis in the first chapter has revealed that reservation wages show little to no response to non-employment duration. The positive sign for the non-employment duration intervals in the table below indicates that workers who remain in the non-employed pool for over 6 months are more likely to accept lower. However, this effect lacks statistical significance. This finding is in line with the previous chapter's results as we do not find enough evidence that non-employment duration influences workers' acceptance decisions relative to the reservation wage. Krueger and Mueller (2016) find that although the long-term unemployed are more likely to accept lower, the difference between the accepted wage and reservation wage for this group of workers is not significantly lower relative to the other groups. They postulate that while the long-term unemployed are more likely to accept lower, they are also more likely to reject offers equal or above their stated reservation wage suggesting that there is some noise in the reservation wage data for the long-term unemployed. However, since we do not possess data on offer rejections, we are not able to verify if this result holds in our sample.

We control for firm information (firm size, ratio of part-time to full-time employees in a firm and average wage of full-time workers in a firm) to examine the extent to which these firm characteristics influence workers' acceptance decisions. Firm size is a variable that we pay close attention to as a measure of nonwage values. The sign of its coefficient indicates that workers who move to bigger firms are more likely to accept less than their reservation wage. This could be attributed to the fact that larger firms

can offer relatively better work advantages in terms of health insurance and holiday policy for instance. Furthermore, this appears to be a plausible result and in line with job search models such as Postel–Vinay and Robin (2002) where bigger firms can offer better career prospects and more scope for future wage growth. However, this effect does not display statistical significance which suggests that the empirical analysis lacks evidence that firm size matters for the acceptance decision relative to the reservation wage.

Table 2-4 also accounts for whether workers live in a household where at least one person is in receipt of UBII. Our findings suggest that workers who live in a household where at least one person is in receipt of UBII are more likely to accept lower. Although the coefficient lacks statistical significance, the sign of the effect could constitute preliminary evidence of a strategic behavior by the workers where they accept low wages to temporarily fulfill the requirement of having worked for a while in order to go back to the unemployed pool and receive government benefits. We do not possess information on the date of exhaustion of benefit receipt and cannot analyse this in further detail. However, if this is true, these jobs will be characterised by a higher quit probability. The longitudinal nature of our data permits us to follow workers after they get hired from non-employment and we can infer whether these jobs are temporary by examining quit probability and subsequent labour market transitions.

Variables	Specification (1)	Specification (2) controlling for acceptable disadvantage
Female	-0.111***	-0.077**
Age dummies		
Middle aged workers	+0.006	+0.065
Old workers	+0.004	+0.080
Married	+0.0010	+0.005
Presence of kids	+0.012	+0.017
Skill level		
Medium skilled	-0.007	+0.012
High skilled	+0.099***	+0.060
Previous wage	+0.008	+0.013
Duration of report		
Duration report: 3 to 6 months	-0.037**	-0.063*
Duration report: 7 to 13 months	-0.031	-0.015
Completed non-employment duration		
Completed non-employment duration: 6 to 12 months	+0.011	+0.029
Completed non-employment duration: over 12 months	+0.027	+0.064
Active Search	+0.001	
Change in type of job		
Full-time to part-time	+0.014	-0.056
Part-time to full-time	-0.023	+0.049
Change in occupation	+0.029	-0.036
Savings	-0.020	-0.073
Debt	+0.008	+0.029
HH benefits	+0.009	-0.019
Firm Information		
Firm size	+0.007	+0.012
Ratio of PT to FT employees	+0.016***	+0.015*
Log mean imputed wage	-0.532***	-0.568***
Acceptable disadvantage dummies		
long commute		+0.007
Unfavourable hours		-0.010
Job below skill level		-0.047
Burden at workplace		-0.068**
Change of residence		+0.032
Long distance relationship		-0.021
Observations	2,258	664
R squared	34.35%	41.55%

Table 2-4: Likelihood of accepting a job paying below the reservation wage.

Acceptable disadvantage- In the PASS survey, respondents are presented with a set of disadvantages that could possibly come with a job offer and are asked to report whether they would be willing to accept any of these job disadvantages: (i) commuting time of one hour or more (ii) unfavourable working hours (iii) job below skill level (iv) burdens at workplace such as noise, dirt or strenuous physical work (v) change of residence (vi) mounting a long distance or weekend relationship. For each of the listed disadvantages, survey respondents are asked to report whether they would "definitely yes", "probably yes", "definitely not", "probably not" accept the disadvantages listed above. For ease of results interpretation, we aggregate those who answer the question by "definitely yes" and "probably yes" into the "yes" category and those who answered the question by "definitely not" or "probably not" into the "no" category. We therefore obtain six dummy variables that we control for in the specification in column 2. The reason we control for this variable is to test whether there exists a correlation between accepting job disadvantages and acceptance below the reservation wage and the extent to which workers' willingness to accept certain job disadvantages affects their likelihood of accepting a job paying below their reported reservation wage. Our results show that workers who reported they would be willing to accept a job disadvantage are less likely to accept a wage below the reservation wage with the exception of those who would be willing to change their residence or accept a long commute in order to get a particular job. However, it appears that the *acceptable disadvantages* considered in our estimation do not constitute a strong indicator for job acceptance below the reservation as most of these coefficients lack statistical significance, except for workers who reported accepting a job despite "burden at the workplace". This subset of workers is less likely to accept a wage below their self-reported reservation wage.

Robustness Checks- Since the reservation wage was reported once in a year, one might be concerned that the time lag between the date the last reservation wage was reported and the date the job was accepted could constitute a source of bias in the results. Therefore, all specifications in the empirical analysis of this chapter control for the duration between the time the reservation wage was last reported before the worker accepted the job. We create three *duration of report* categories in order to account for any differences between different duration intervals and their effect on job acceptance below or above the reservation wage. The three duration intervals are the following: (i) up to 3 months (ii) between 4 and 6 months (iii) between 7 months and a maximum of 13 months. As reported in Table 2-4, the results suggest that the longer the duration of report the less likely workers will accept jobs paying below the reservation wage. One potential explanation could be that as duration increases, workers adjust their reservation wage upwards thus reducing the likelihood of accepting jobs paying below their reported reservation wages. This upward adjustment of the reservation wage could be attributed to different factors. For instance, as job seekers search for longer, they learn more about the distribution of offered wages and update their reservation wages accordingly. However, the analysis from chapter one has shown that reservation wages experience little to no variation throughout workers' non-employment spells. Therefore, one might still be concerned that despite controlling for the duration of report, the results might be biased**.** To eliminate any concerns, we estimate the same specifications as in Table 2-4 by excluding any workers with a duration of report that exceeds three months. We do not detect any striking differences between the results for the restricted sample with our earlier estimates. Therefore, our conclusions remain unchanged.

2.4 Post Non-employment to Employment Transitions and Acceptance Below the Reservation Wage

2.4.1 Employment to non-employment transitions

We now turn into the question of how workers evolve in the labour market after transitioning from non-employment to employment. To answer that, we exploit the longitudinal nature of our data to examine the likelihood that these workers remain at the same firm against going back to non-employment. We control for individual characteristics, job characteristics, firm information and most importantly our main predictor is a dummy variable for whether a worker accepted a job paying lower than the reservation wage. Controlling for the latter variable enable us to test whether job acceptance below the reservation wage has any implications on the worker's future job stability. Furthermore, if nonwage values are binding, workers who accepted below the reservation wage would be expected to be characterised by relatively longer tenure and be more likely to remain at the same firm at which they accepted to work at a wage below their self-reported reservation wage. However, our data does not appear to be fully in support of this claim. The table below reports the results of the likelihood of remaining at the same firm against going back to non-employment. According to the results below, workers who accepted lower than the reservation wage are more likely to fall back into non-employment and less likely to remain at the firm at which they accepted to work for a wage lower than their reservation wage. One must be cautious when interpreting this finding since the data does not distinguish whether these transitions to non-employment are voluntary quits or layoffs. These transitions could be voluntary quits that represent evidence of a strategic behavior by the workers where they accept lower wages to temporarily fulfill the requirement of having worked

for a while in order to go back to the unemployed pool and receive government benefits. In fact, our results show that workers who live in a household where at least one person is in receipt of benefits are more likely to join back the non-employed pool. However, we do not possess information on benefit eligibility and time until benefit exhaustion to carry out a thorough investigation of quit probability and unemployment benefits. This topic could have noteworthy policy implications if future research can shed more light on this.

Variables	**Specification (1)**	**Specification (2) controlling for firm information and change of occupation**	**Specification (3) Controlling for log current wage**
Dummy for accepting lower than the reservation wage	**-0.007****	**-0.002**	**.0058094**
Female	+0.008***	0.009***	.0132747***
Age dummies			
Middle aged workers	-0.005	+0.0002	.0003713
Old workers	-0.020**	-0.015	-.0122159
Married	-0.007**	+0.009***	.0086813***
Presence of kids	-0.00010	-0.002	-.0011986
Skill level			
Medium skilled	+0.010***	+0.007	.0060582
High skilled	+0.018***	+0.010*	.005189
Active search	-0.018***	+0.022***	-.0195603***
Tenure	+0.031***	-0.028***	.0272137***
Household Information			
Savings	+0.002	+0.005	.0049671
Debt	-0.003	-0.002	-.0027448
At least one person in receipt of UB II	-0.034***	-0.036***	-.0318366***
Duration of report			
Duration report: 3 to 6 months	+0.001	-0.001	-.0013978
Duration report: 7 to 13 months	-0.012***	-0.011	-.0101435***
Completed non-employment duration			
Completed non-employment duration: 6 to 12 months	+0.001	+0.0004	.0004726

Completed non-employment duration: over 12 months	-0.005	-0.004	-.0035896
Change in type of job			
Full-time to part-time	-0.004	-0.001	-.0051229
Part-time to full-time	+0.015***	+0.004	-.0118969**
Change in occupation		+0.0003*	-.0025222
Firm Information			
Firm size		-0.0007	-.0004436
Ratio of PT to FT employees		-0.0007	.002195**
Log mean imputed wage at firm		-0.007***	.0041805
Log current wage			.0217827***
Observations	36,265	25,654	25,654
R squared	3.54%	3.52%	3.61%

Table 2-5: Likelihood of staying at the same firm

One might be concerned that if a worker accepts a wage below the reservation wage, then that accepted wage itself must be relatively low. As a result, those workers are more likely to go back non-employment. To deal with this concern, we include the log current wage into the regression as reported by the last column of Table 2-5. The results including the current wage appear to narrate a different story to the previous results by suggesting that workers who accepted below the reservation wage are more likely to stay in the same firm and less likely to go back to non-employment. Therefore, the discrepancies between the specifications with and without the current wage could constitute a source of concern. However, it must be highlighted that the absence of statistical significance for the wage acceptance dummy in the last column is reassuring.

2.4.2 Job to job transitions

To further understand the implications of acceptance below the reservation wage on workers' labour market transitions, we investigate the likelihood of experiencing a job-to-job transition against remaining at the same firm. Table 2-6 shows that conditional

on transitioning from non-employment to employment, workers who accepted lower than the reservation wage are more likely to leave to another firm. One could think of various reasons that might be driving this result, which can either be voluntary or non-voluntary. One possibility could be that this subset of workers perceives these jobs as temporary and use them as a steppingstone to the job they seek in the long-term. A plausible scenario could be that certain survey respondents report reservation wages which are targeted at a particular type of job that they seek in the long-term and not the temporary job they accept with the intention of eventually moving to the other job (Holzer, 1986). These temporary jobs may be accepted for several motives. It could potentially be for financial reasons where workers need to sustain a living while they continue searching for their sought-after job. Another possibility is to accumulate human capital after falling off the job ladder in order to increase their chances of getting employed at their sought-after job. A comparison of the average job tenure of workers who accepted below the reservation wage and those who accepted above reveals that the former has an average job tenure of 9.78 months while the latter has an average job tenure of 11.58 months. This suggests that workers who accepted below the reservation wage hold on average jobs characterised by shorter tenures and lower stability which reinforces the argument that these jobs are temporary.

As discussed in the previous section, one might be concerned that if a worker accepts a wage below the reservation wage, then that accepted wage itself must be relatively low. As a result, those workers are more likely to quit to another job. Therefore, log current wage has been included in the regression as reported by the last column of table 2-6. The results of the specifications with and without the current wage follow a similar direction. In addition, the finding that workers who accepted below their

reservation wage are more likely to quit to another firm still holds and this effect displays stronger statistical significance when controlling for the current wage.

Variables	Specification (1)	Specification (2) controlling for firm information	Specification (3) Controlling for log current wage
Dummy for accepting lower than the reservation wage	+0.002	+0.004*	.0072865***
Female	-0.003***	0.003*	-.000459
Age dummies			
Middle aged workers	-0.006	-0.005	-.005356
Old workers	-0.011**	-0.013**	-.0119762**
Married	-0.0001	-0.0004	-.0004643
Presence of kids	-0.002	-0.001	-.0011875
Skill level			
Medium skilled	-0.007	-0.0003	-.000961
High skilled	+0.002	+0.004	.0013743
Active search	+0.010***	+0.010***	.0113195***
Tenure	-0.003***	-0.002***	-.0025906***
Household Information			
Savings	-0.002	-0.004**	-.0038914**
Debt	-0.0008	-0.001	-.0017941
At least one person in receipt of UB II	-0.009***	-0.008***	-.0061099***
Duration of report			
Duration report: 3 to 6 months	-0.001	-0.001	-.0013628
Duration report: 7 to 13 months	-0.0005	-0.001	-.0009915
Completed non-employment duration			
Completed non-employment duration: 6 to 12 months	-0.0007	+0.0005	.0005605
Completed non-employment duration: over 12 months	-0.003	-0.003	-.0032638
Change in type of job			
Full-time to part-time	-0.0009	-0.001	-.000331
Part-time to full-time	+0.006**	+0.004	.0036906
Change in occupation	+0.002	+0.0003*	.0032022*
Firm Information			
Firm size		-0.0007	-.0003161
Ratio of PT to FT employees		-0.0007	-.0002585
Log mean imputed wage at firm		-0.007***	-.0117156***
Log current wage			.0111881***
Observations	31,696	24,499	24,499
R squared	0.43%	0.56%	0.66%

Table 2-6: Likelihood of job-to-job transitions

2.4.3 Labour Market Transitions: Multinomial logit Estimation

As a further test to our results, we estimate a Multinomial Logit model to construct a holistic picture of labour market transitions we considered so far and their probabilities. The Multinomial regression model is analogous to a Logistic regression model except that the probability distribution of the response is multinomial rather than binomial. Therefore, we are able to estimate the three labour market transitions listed below simultaneously. The response variable (left-hand side of the regression) is a transition variable which comprises of three categories. Conditional on transitioning from non-employment to employment, we consider three transition possibilities: (1) going back to non-employment (2) staying at the same firm (3) moving to another job. The reference category is the probability of remaining at the same firm post non-employment to employment transition. Therefore, the Multinomial Logit results refer to the probabilities of going back to non-employment or moving to another job relative to staying employed at the same firm. We use the same predictors as we have previously controlled for when estimating the likelihood of going back to non-employment and the likelihood of a job-to-job transition: individual characteristics, household characteristics, current job information, previous job information and firm information. On the one hand, workers who accepted a wage below their reservation wage are expected to have shorter tenures and higher quit probabilities if the steppingstone argument (discussed in the previous section) holds. On the other hand, if nonwage values are binding, workers who accepted below the reservation wage are expected to be characterised by longer job tenures and lower quit probabilities[24].

[24] Although going back to non-employment could be an involuntary decision from the employee's side due to a displacement shock, being fired or end of contract. However, we cannot differentiate between the type of quits in this sample.

	Non-employment	Job to job trans	observations	R squared
Excluding firm info	+0.133** (0.0581)	+0.238 (0.1506)	35,561	6.92%
Including firm info	+0.060 (0.0701)	+0.185 (0.1772)	27,388	7.09%

Table 2-7: Labour market transitions - Multinomial Logit

The table above verifies these predictions in the data, For brevity, Table 2-7 only reports the multinomial logit results for the reservation wage dummy which equates 1 if a worker accepted below the reservation wage and 0 otherwise. Two specifications are considered, the first excludes firm information[25] while the latter includes it. The predictions of the Multinomial Logit estimation are in substantial agreement with earlier estimates presented in tables 2-5 and 2-6. In fact, Table 2-7 shows that the direction of the effects remains the same with and without the presence of firm information suggesting that workers who accepted below their self-reported reservation wages are characterised by higher quit probabilities. Furthermore, the dummy coefficient for quit to non-employment probability loses its statistical significance once we include firm information suggesting that there isn't enough evidence to indicate that firm characteristics influence workers' decisions to accept below the reservation wage. Overall, the data has displayed non-negligible evidence that acceptance below the reservation wage could be driven (or at least partially driven) by the steppingstone argument discussed above.

To ensure that the duration between the time the reservation wage was reported and the time the worker accepted the job does not introduce bias in the results, we run the same multinomial logit estimation while excluding workers with a duration of report

[25] Firm information includes the total number of employees in a firm, the ratio of part-time to full-time workers and the average imputed wage of full-time workers in the firm. More details on firm information in section 2.3.3.

that exceeds 3 months. The table below summarises the results for this subset of workers and confirms that the outcomes reported in Table 2-7 are robust to the restricted sample and our conclusions remain unchanged.

	Non-employment	Job to job trans	observations	R squared
Excluding firm info	+0.067 (0.0883)	+0.217 (0.2215)	15,736	6.35%
Including firm info	+0.044 (0.1047)	+0.195 (0.2591)	12,156	6.95%

Table 2-8: Labour market transitions - Multinomial Logit – Robustness checks

2.5 Job to Job transitions: Wage Cuts or Wage rises?

A question which naturally follows after examining the likelihood of job-to-job transitions is whether these transitions were accompanied by wage cuts or wage rises. There exists a non-negligible literature that relies on job-to-job transitions to infer revealed preferences about different job characteristics. Voluntary job-to-job transitions can be particularly informative about workers' preferences for the new job as it is the worker's choice to either remain at the same firm or switch to a new one (Becker, 2011). Postel-Vinay and Robin (2002) and Becker (2011) use a search model where they assume that all voluntary movements to lower paying jobs are attributed to the variation in wage growth potential. Connolly and Gottschalk (2008) share a similar view as they find that a third of low-skilled workers who moved to another job with a wage cut have done so with the expectation of future wage growth and the rest of these job movements were incentivised by nonwage values. Lopes de Melo (2007) finds that while wage dynamics have an explanatory power in terms of transitions to lower-paying jobs for high-wage workers, wage dynamics do not seem to explain much of the transitions for low-wage workers to lower paying jobs.

We create a ratio measure defined as the accepted wage at the new job divided by the last recorded employment wage at the previous job. Our ratio measure suggests that 35.92% of workers who experienced job to job transitions moved to a firm paying lower that their wages at the previous firm. This result is very similar to the findings in Becker (2011) who finds that 33% of voluntary job to job transitions occurred with a wage cut and suggests that this finding highlights the importance of nonwage values. Our result is also similar to Sorkin (2018) who finds that a third of employer-to-employer transitions were accompanied by a wage cut. Although the focus of his paper is more on understanding why some firms pay so much and others pay so little, Sorkin (2108) suggests that movements from high-paying jobs to low-paying jobs indicate that there exist factors that workers place a valuation on at the firm-level. However, this finding is not necessarily evidence in favour of compensating differential because wage cuts could simply be a reflection of idiosyncratic factors that do not hold a price in the labour market (Sorkin, 2018).

Table 2-9 reports the results of the likelihood of making a job-to-job transition with a wage cut against the alternative of making a job-to-job transition with a wage rise. We control for several characteristics such as previous job tenure, whether workers changed their occupation at the new job and whether workers changed their job type: full-time to part-time and vice versa. We also control for whether workers accepted below their reservation wage at their previous job as it will allow us to gain further insights on job acceptance in relation to the reservation wage.

The specification in column 2 controls for current firm information and indicates that the larger the firm, the higher the probability of accepting a wage cut. If firm size is considered as a measure of firm productivity, this finding suggests that workers moving to a higher productivity firm are more likely to take a wage penalty. Interpreting

these results through the lenses of Postel-Vinay & Robin (2002), workers moving to a higher productivity firm may be willing to accept a wage because of greater scope for future wage growth in higher productivity firms. To verify this result in the data, one needs to follow this subset of workers further in time to examine their wage growth in the firm and assess their quit probabilities. The expectation following Postel-Vinay & Robin's model prediction is that these workers will be characterised by steeper wage-tenure profiles due to the greater career prospects that higher productivity firms can offer. We sidestep from this exercise due to data restrictions in this this chapter. However, this question is revisited in the subsequent chapter using a different dataset and conducts a thorough investigation on this topic.

It must be highlighted that these findings rest on the assumption that job to job transitions are voluntary (Hall and Mueller 2018). Therefore, the conclusions drawn in this chapter cannot be generalised to cases where job to job transitions occurred due to layoffs or involuntary separations.

Variables	**Specification (1)**	**Specification (2) controlling for firm information**	**Specification (3) Controlling for log current wage**
Dummy for accepting lower than the reservation wage at previous job	-0.141**	-0.200***	-.2982415***
Female	-0.019	-0.037	-.1181313**
Age dummies			
Middle aged workers	-0.001	+0.051	.0416486
Old workers	+0.033	+0.099	.0576599
Married	-0.044	-0.061	-.0601933
Presence of kids	+0.034	+0.042	.0435965
Skill level			
Medium skilled	+0.009	+0.092	.0783736
High skilled	+0.022	+0.202*	.201057**
Active search	-0.024	-0.015	.0160804
Previous Tenure	-0.014	-0.0006	.0089854
Household Information			
Savings	-0.034	-0.069	-.0792503

Variables	Specification (1)	Specification (2) controlling for firm information	Specification (3) Controlling for log current wage
Debt	+.026	-0.002	.018734
At least one person in receipt of UB II	-0.011	-0.090	-.1069074
Duration of report	+0.004	+0.008	.0055365
Change in type of job			
Full-time to part-time	+0.235***	+0.270**	.2113796*
Part-time to full-time	-0.064	-0.025	-.0268378
Change in occupation	+0.084*	+0.093	.0485877
Firm Information			
Firm size		+0.011	-.0035984
Ratio of PT to FT employees		+0.022	-.0024643
Log mean imputed wage at firm		-0.337***	-.1157227
Log current wage			-.3865747***
Observations	460	306	306
R squared	5.23%	13.78%	23.63%

Table 2-9: Likelihood of job-to-job transitions with a wage cut

Going back to the discussion on job acceptance relative to the reservation wage, one of our interesting findings is that workers who accepted lower than their reservation wage at their previous job are less likely to accept lower when they move to another firm. This effect displays strong statistical significance in every specification that we have considered with and without accounting for firm information. This finding reinforces the steppingstone argument discussed earlier; if workers who accept lower than their reservation wage are using that particular job as a temporary position, the prediction that these workers will be less likely to accept lower at the new firm appears to be quite plausible. Indeed, while these workers have the financial security from their current jobs, they can be more selective about jobs while searching on-the-job until they find and obtain the job they seek. Furthermore, to the extent to which the steppingstone argument holds, if these workers are moving to their pursed job, they would be expected to remain at the new job for longer so any wage losses they could

potentially incur due to a wage cut would be more relevant than if they viewed the job as temporary. Therefore, these workers will have less incentive to switch to a job paying below the wage they receive at the *temporary* job.

One could argue that workers who have accepted below their reservation wage are more likely to experience a wage rise when moving to a new firm because the wage they had previously accepted was itself low, not because that wage was lower than the reservation wage. To rule this possibility out, we control for the current wage as reported in the last column of table 2-9. Zooming on the dummy for acceptance below the reservation wage, the latter maintains its statistical significance along with the sign of the effect which consolidates the previous findings reported in the second column of table 2-9.

Robustness Checks- Our data shows that 15% of workers who experienced job to job transitions in our sample have done so within a month of moving from non-employment to employment. We refer to this subset of workers as short-term switchers. We were concerned that the inclusion of these short-term switchers could potentially constitute a source of bias in our results given the short time frame at which these particular transitions occurred. Therefore, we estimated the same regressions as the ones reported in Table 2-9 with a subsample that excludes short-term switchers. Our results remained unaltered; thus, the previously drawn conclusions still hold.

For further checks, the Linear Probability Model (LPM) estimated in table 2-9 has been supplemented by a Probit estimation. The results are reported in Table 2-22 in the Appendix. Both the LPM and Probit specifications follow the same pattern in terms of results. The Probit's marginal effects in Table 2-23 in the appendix show that workers who accept below the reservation wage have a higher probability of experiencing a wage rise when moving to a different firm in comparison to workers who accept above

their reservation wage in their previous job. These findings confirm the story narrated by the LPM specification.

2.6 Robustness analysis: Duration dependence and reported hours

2.6.1 Acceptance below the reservation wage and reported hours

Variables	Specification (1)	Controlling for reported hours
Female	-0.111***	-.0921076***
Age dummies		
Middle aged workers	+0.006	-.0043102
Old workers	+0.004	.0145833
Married	+0.0010	.0028041
Presence of kids	+0.012	.0408262**
Skill level		
Medium skilled	-0.007	.0150048
High skilled	+0.099***	.1429656***
Duration of report		
Duration report: 3 to 6 months	-0.037**	-.0371705*
Duration report: 7 to 13 months	-0.031	-.0240384
Completed non-employment duration		
Completed non-employment duration: 6 to 12 months	+0.011	.0116922
Completed non-employment duration: over 12 months	+0.027	.026249
Active Search	+0.001	.0118394
Change in type of job		
Full-time to part-time	+0.014	.0018618
Part-time to full-time	-0.023	-.0313995
Change in occupation	+0.029	.0222733
Savings	-0.020	-.029275*
Debt	+0.008	-.0003164
HH benefits	+0.009	-.009563
Firm Information		
Firm size	+0.007	.009616
Ratio of PT to FT employees	+0.016***	.0204926***
Log mean imputed wage	-0.532***	-.5346132***
Observations	2,258	1,674
R squared	34.35%	35.60%

Table 2-10: Likelihood of accepting a job paying below the reservation wage-30 hours and over.

One might be concerned that the differences between the reservation wage and accepted wage are driven by differences in *reservation hours* (as discussed in the first chapter) and actual hours worked. To deal with this concern, we restrict our sample to workers who reported 30 or more *reservation hours* while non-employed and workers who reported working for 30 or more hours when transitioning from non-employment to employment.

The last column of Table 2-10 replicates the analysis in table 2-4 for the hours-restricted sample and the main regression results are included in the two first columns for comparison purposes. The findings of both specifications follow the same direction, and no clear evidence has been found in favour of discrepancies driven by differences in working hours.

2.6.2 Employment to non-employment transitions and reported hours

Variables	Specification (1)	Specification (2) controlling for firm information and change of occupation	Controlling for reported hours
Dummy for accepting lower than the reservation wage	**-0.007****	**-0.002**	**-.0053122**
Female	+0.008***	0.009***	.0058806
Age dummies			
Middle aged workers	-0.005	+0.0002	-.0025057
Old workers	-0.020**	-0.015	-.0190849
Married	-0.007**	+0.009***	.0093925**
Presence of kids	-0.00010	-0.002	-.0058768
Skill level			
Medium skilled	+0.010***	+0.007	.0045867
High skilled	+0.018***	+0.010*	.0073997
Active search	-0.018***	+0.022***	-.0198701***
Tenure	+0.031***	-0.028***	.0295988***
Household Information			
Savings	+0.002	+0.005	.0080847*
Debt	-0.003	-0.002	-.0017484
At least one person in receipt of UB ll	-0.034***	-0.036***	-.0312551***
Duration of report			
3 to 6 months	+0.001	-0.001	-.0015261

7 to 13 months	-0.012***	-0.011	-.0101497**
Completed non-employment duration			
6 to 12 months	+0.001	+0.0004	.0004189
over 12 months	-0.005	-0.004	-.0020246
Change in type of job			
Full-time to part-time	-0.004	-0.001	-.0122708
Part-time to full-time	+0.015***	+0.004	-.012239**
Change in occupation		+0.0003*	-.0033063
Firm Information			
Firm size		-0.0007	-.0013571
Ratio of PT to FT employees		-0.0007	.0008963
Log mean imputed wage at firm		-0.007***	.0157288***
Observations	36,265	25,654	18,432
R squared	3.54%	3.52%	3.56%

Table 2-11: Likelihood of staying at the same firm-30 hours and over.

Table 2-11 reports the results for the likelihood of going back to non-employment against staying at the same firm, conditional on making a non-employment to employment transition. The finding that those who accepted below the reservation wage are more likely to go back to non-employment still holds even after restricting the sample by the number of hours workers as demonstrated by the last column of the table above. Similar to the main regression results in the second column, this effect also lacks statistical significance.

2.6.3 Job-to-job transitions and reported hours

Table 2-12 is dedicated to the likelihood of moving to another firm, conditional on moving from non-employment to employment, for the hours-restricted sample. The last column reports the results while the first two columns show the results from the main analysis in Table 2-6. Despite losing statistical significance in the hours-restricted regression, the dummy for acceptance below the reservation wage maintains its negative sign suggesting that workers who accepted below the reservation wage are more likely to move to another firm. The remaining of the effects are in line with the findings of the main analysis in column 2 and this outcome alleviates concerns of

potential discrepancies in the findings that might be driven by differences in working hours.

Variables	Specification (1)	Specification (2) controlling for firm information	Controlling for reported hours
Dummy for accepting lower than the reservation wage	**+0.002**	**+0.004***	**+.0026983**
Female	-0.003***	0.003*	-.0031279*
Age dummies			
Middle aged workers	-0.006	-0.005	-.0055033
Old workers	-0.011**	-0.013**	-.0135701**
Married	-0.0001	-0.0004	-.0005285
Presence of kids	-0.002	-0.001	-.0020699
Skill level			
Medium skilled	-0.007	-0.0003	.0003929
High skilled	+0.002	+0.004	.0045203
Active search	+0.010***	+0.010***	.0101644***
Tenure	-0.003***	-0.002***	-.00151
Household Information			
Savings	-0.002	-0.004**	-.0044924**
Debt	-0.0008	-0.001	-.0006559
At least one person in receipt of UB II	-0.009***	-0.008***	-.0071052***
Duration of report			
3 to 6 months	-0.001	-0.001	-.0035685
7 to 13 months	-0.0005	-0.001	-.00165
Completed non-employment duration			
6 to 12 months	-0.0007	+0.0005	-.0002445
over 12 months	-0.003	-0.003	-.0039331
Change in type of job			
Full-time to part-time	-0.0009	-0.001	-9.73e-06
Part-time to full-time	+0.006**	+0.004	.0045066
Change in occupation	+0.002	+0.0003*	.0043479*
Firm Information			
Firm size		-0.0007	-.001344**
Ratio of PT to FT employees		-0.0007	-.0011283**
Log mean imputed wage at firm		-0.007***	-.0065148**
Observations	31,696	24,499	17,583
R squared	0.43%	0.56%	0.51%

Table 2-12: Likelihood of job-to-job transitions-30 hours and over.

2.6.4 Job to job transitions: wage cuts or wage rises and reported hours

Variables	Specification (1)	Specification (2) controlling for firm information	Controlling for reported hours
Dummy for accepting lower than the reservation wage at previous job	**-0.141****	**-0.200*****	**-.2307931****
Female	-0.019	-0.037	-.0358734
Age dummies			
Middle aged workers	-0.001	+0.051	.1366575
Old workers	+0.033	+0.099	.223098
Married	-0.044	-0.061	-.0845745
Presence of kids	+0.034	+0.042	.0584706
Skill level			
Medium skilled	+0.009	+0.092	-.0333868
High skilled	+0.022	+0.202*	.0529431
Active search	-0.024	-0.015	.0365557
Previous Tenure	-0.014	-0.0006	-.0014425
Household Information			
Savings	-0.034	-0.069	-.0393634
Debt	+.026	-0.002	.0023908
At least one person in receipt of UB II	-0.011	-0.090	-.0843237
Duration of report	+0.004	+0.008	.0124758
Change in type of job			
Full-time to part-time	+0.235***	+0.270**	.3509737**
Part-time to full-time	-0.064	-0.025	-.0466959
Change in occupation	+0.084*	+0.093	.1350815*
Firm Information			
Firm size		+0.011	.0126967
Ratio of PT to FT employees		+0.022	.0283073
Log mean imputed wage at firm		-0.337***	-.3458003***
Observations	460	306	233
R squared	5.23%	13.78%	16.27%

Table 2-13: Likelihood of job-to-job transitions with a wage cut – 30 hours and over

This section focuses on the wages of workers who experienced a job-to-job transition (after transiting from non-employment to employment) for the hours-restricted sample and compares the results with the findings based on the main sample. Similar to the main sample analysis, the conclusion that those who accepted below the reservation wage in their previous job are less likely take a wage cut when moving to a different

firm also holds for the hours-restricted sample. This effect displays strong statistical significance in both specifications.

2.7 Robustness analysis: controlling for whether the accepted job is permanent or temporary

Variables	LPM	Probit
Female	-.1189253***	-.5741666***
Age dummies		
Middle aged workers	.0262322	.0976367
Old workers	.0256141	.1524155
Married	.0027814	.0199508
Presence of kids	.0104314	.1023676
Skill level		
Medium skilled	-.0069664	.0527493
High skilled	.0703093**	.2689038
Duration of report		
3 to 6 months	-.0509351***	-.2278041**
7 to 13 months	-.0546623***	-.2474922**
Completed non-employment duration		
6 to 12 months	.0161394	.0269441
over 12 months	.0268402	.080523
Active Search	-.0025459	-.0048193
Change in type of job		
Full-time to part-time	.0188904	-.0261174
Part-time to full-time	-.0165865	-.104386
Change in occupation	.0039223	.0281481
Savings	-.0181276	-.0901944
Debt	.0231567	.0891067
HH benefits	.0111319	.0833773
Firm Information		
Firm size	.0117889**	.0352619
Ratio of PT to FT employees	.0149533***	.0573401**
Log mean imputed wage	-.5348354 ***	-2.551137***
Job temporary	**-.0253137**	**.0203502**
Observations	1,931	1,931
R squared	34.83%	34.85%

Table 2-14: Likelihood of accepting a job paying below the reservation wage: job permanent or temporary?

Probit	Marginal effects
Accepted above the reservation wage	.2340046***
Accepted below the reservation wage	.2300027***

Table 2-15: Probit marginal effects for table 2-14

The PASS includes a question where workers are asked if their job is temporary or permanent. Out of workers who transited from non-employment to employment, 11.99% who accepted below the reservation wage reported the job to be temporary.

Table 2-14 replicates the analysis in table 2-4 by including a dummy for whether the job is temporary or not. As demonstrated by the LPM results in the first column, workers who took a temporary job are less likely to accept below the reservation wage. This finding does not appear to support our interpretation of the results of the main analysis (that accepted jobs paying below the reservation wage are more likely to be perceived as temporary). However, it must be highlighted that this effect is statistically insignificant.

The Probit results reported in the last column of Table 2-14 appear to be more in favour of our reading of the main results. Nonetheless, this effect lacks statistical significance, and the marginal effects of the Probit estimation are almost identical in terms of magnitude. Therefore, based on the analysis above, job acceptance decision relative to the reservation wage does not seem to be influenced by whether a job is temporary or permanent. However, the lack of statistical significance in both the LPM and Probit specifications does not allow us to reach any clear-cut conclusions. It must also be highlighted that although jobs can be permanent (contract wise), workers can still perceive these as temporary especially if they have the intention of moving to a different firm. However, this is not a fact that can be observed in the data.

2.8 Comparative Study: Germany versus the US

This section is dedicated to a comparison between German and US workers in relation to their job acceptance decision and their reservation wages. To perform this comparison exercise, we use two US surveys: Panel Study of Income Dynamics, PSID and Survey of Consumer expectations, SCE. Both the PSID and SCE data provide a rich set of information on workers' wages, employment status and notably reservation wages which makes the comparison to the PASS-ADIAB feasible.

	PASS-ADIAB	PSID	SCE
Data source	IAB	University of Chicago	Federal reserve bank of New York
Data type	Unbalanced panel	Unbalanced panel	Short panel
Geographical context	Germany	US	US
Time span	2007-2015	1984-1987	2014-2018
Frequency	Monthly	yearly	triennially
Number of individuals	16,588	6,918	8,395
Observations	1,304,464	28,029	18,349

Table 2-16: PASS-ADIAB versus PSID versus SCE

This comparison is motivated by the institutional and labour market differences between the two countries. The PASS-ADIAB data provides information on German individuals after the *Hartz* reform where the labour market was liberalised especially amongst low skilled workers. Indeed, there has been a shift in what would have been described as the conservative social protection system in Germany from the last two millenniums onward. This shift could be described as a sort of convergence towards an American style social protection system which is more liberal and less regulated (Seeleib-Kaiser, 2013). Social protection in this context refers to policies affecting unemployment, job search process and intensity and unemployment benefit receipt. However, despite the liberalisation of the German labour market post Hartz reforms, striking differences between the countries still prevail especially in their provision of

social insurance and approaches to welfare. The table below compares the different features of the three datasets used in this section. The different time frames of the PSID and SCE data enable the comparison with the PASS-ADAIB data during different time periods. The subsequent sections are dedicated to a more detailed description of the PSID and SCE datasets.

2.8.1 SCE Data

Survey of Consumer expectations is a survey provided by the Federal Reserve Bank of New York. The survey started in the US in 2013 and is still running to present. Respondents are interviewed on a monthly basis and are asked a series of questions about their current economic well-being and their outlook for the future. The SCE data provides other data supplements that focus on different topics.

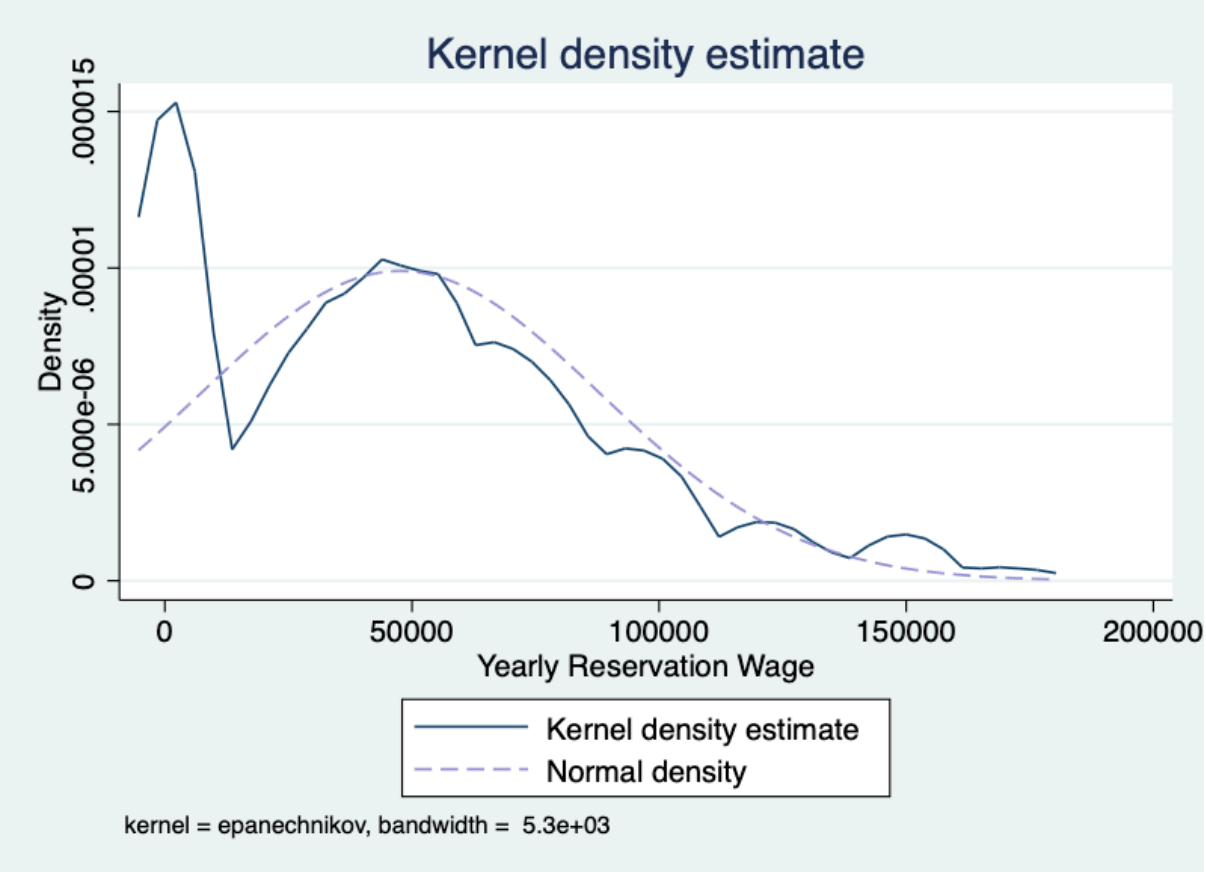

Figure 2-3: Reservation wage distribution-SCE sample

We were particularly interested in information on reservation wages. Therefore, we also use the SCE labour market survey supplement and attach it to the main questionnaire. The SCE labour supplement is organised differently to the main questionnaire, while the latter interviews respondents on a monthly basis, respondents in the labour supplement were interviewed three times a year on the months of March, July and November consecutively. Therefore, our dataset consists of the main questionnaire merged to the labour supplement and provides information on survey respondents triennially from 2014 to 2018. Our sample consists of 18,349 observations of 8,395 individuals.

Survey respondents were asked to answer the following question: "*Suppose someone offered you a job today in a line of work that you would consider. What is the lowest wage or salary you would accept (BEFORE taxes and other deductions) for this job?*". The answer to this question is what will constitute our reservation wage variable. Before utilising the reservation wage data, some necessary alterations had to be made due to the change in the measurement of this wage figure. Since March 2017, SCE survey respondents were asked to report their reservation wages in yearly values whereas pre-2017, respondents had the choice to report these wages in either hourly, weekly, biweekly, monthly or yearly formats. Providentially, the SCE data provides information on the format of pre-2017 reservation wages so the conversion to yearly values was made possible. We proceed as follows: multiply reservation wage by 52 if reported in weekly format, multiply by 26 if reported in biannually format and multiply by 12 if reported as a monthly figure. For those who reported the reservation wage in hours, we multiply by number of weekly hours and then by 52 to obtain the yearly figure. We decide on the number of hours based on whether these workers were in fulltime or part-time employment. For part-timers, we multiply the hourly measure by

20 and then by 52. For full-timers, we multiply the hourly measure by 40 and then by 52. Figure 2-3 shows the Kernel density of the reservation wage for the period from March 2014 to July 2018 inclusive. The reservation wage distribution is close to log normal, the mean of the reservation wage is 47,646 and the standard deviation is 40,283.

2.8.2 PSID Data

PSID, Panel Study of Income Dynamics, is a longitudinal household survey which started in 1968 in the US where information on respondents was collected annually up until 1997 where it became biennially. The PSID covers a series of topics including employment histories, wages and other job information. We are particularly interested in the period from 1984 to 1987 where survey respondents were asked about their reservation wages.

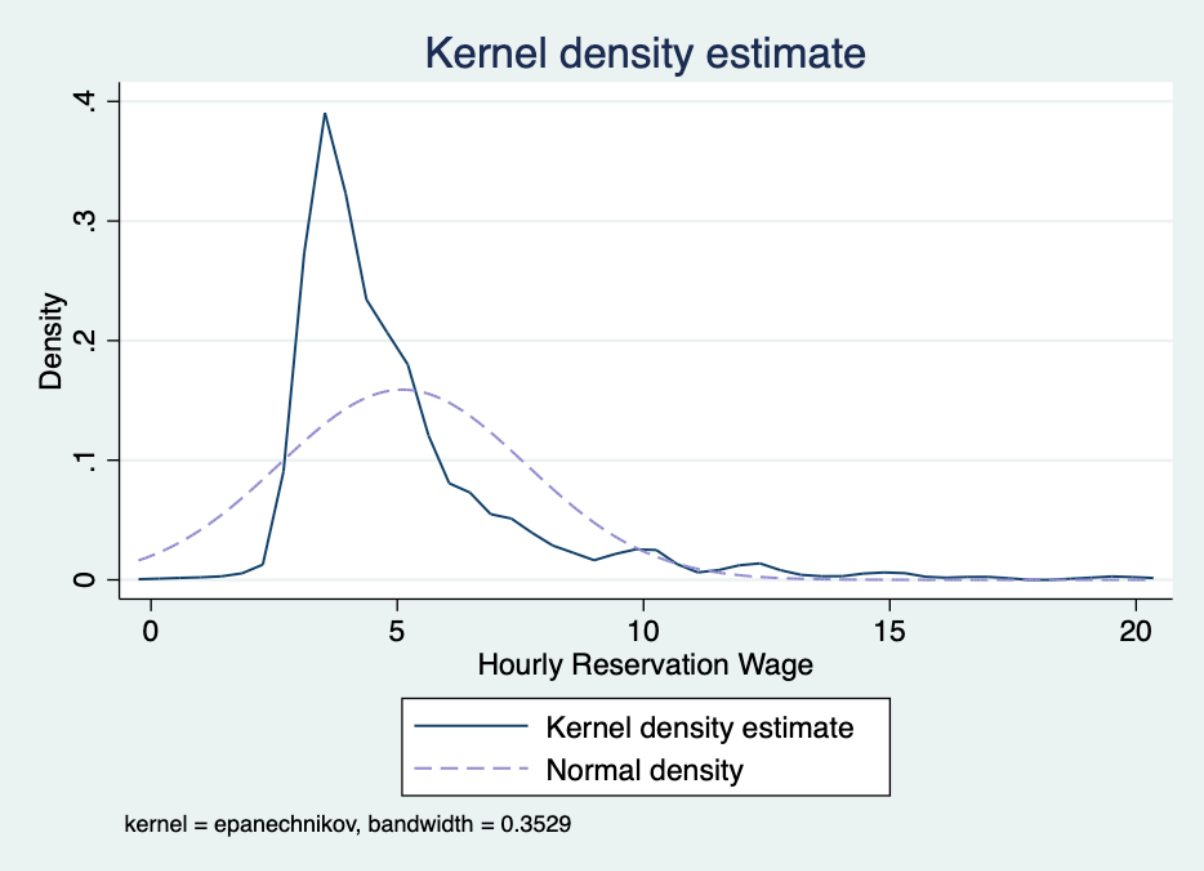

Figure 2-4: Reservation wage distribution-PSID sample

Survey respondents were asked the following question: “What is the lowest wage or salary you would accept on any job?” the reservation wage is reported as an hourly measure. Figure 2-4 shows the Kernel density of the reservation wage for the years from 1984 to 1987 inclusive. The reservation wage distribution is close to log normal, the mean of the hourly reservation wage is 8.40 and the standard deviation is 17.13.

2.8.3 Acceptance in relation to reservation wage

Following the same method previously used for the German data, we construct a ratio of the accepted wage to reservation wage for the PSID and SCE survey respondents. The results reported in the table below show that the decision to accept jobs paying below the reservation is a feature of both the German and US labour markets. These statistics are also in line with the findings of Krueger and Mueller (2016) who find that 50.5% (44% for full-time workers) of workers in their sample accepted job offers paying below their self-reported reservation wages in New Jersey in the US. This figure is 10% higher in the SCE data where 60.72% of workers in our SCE sample accepted wages below their self-reported reservation wages. It should be noted that the reservation wage measure in the SCE data may be prone to error due to the conversion to yearly wage values for reservation wage figures reported before 2017 as discussed in section 2.6.1.

Abstracting from any potential bias in this metric due to measurement error, one clear takeaway is that acceptance below the reservation wage prevails in both the German and US labour markets.

	SCE	PSID	PASS-ADIAB
Accepted wage=reservation wage	9.12%	9.56%	0.59%
Accepted wage>reservation wage	30.16%	56.34%	73.27%
Accepted wage<reservation wage	60.72%	34.10%	26.14%
Observations	746	481	7,122

Table 2-17: Job acceptance relative to the reservation wage

2.8.4 Accepted wage and the previous wage

The statistics reported in the previous section indicate that workers do not seem to base their reservation wages on previous wages. To assess if previous wages reveal any interesting facts about workers' job acceptance decisions, we construct a ratio measure that compares the accepted wage to the previous wage. Our results suggests that in Germany, 27.24% accept wages equal to their previous wage. This does not appear to be the case in the US, as none of the workers seem to base their acceptance decision on their previous wages. This could perhaps be attributed to measurement error due to some potential inaccuracies of the previous wage data in the PSID. Indeed, the accepted wage is reported as an hourly measure while the previous wage is reported as a yearly measure. Therefore, we had to convert the previous wage into an hourly measure to ensure compatibility. We divided the yearly previous wage by the average number of hours a person worked in a year. The presence of noise in the number of hours of data could have potentially led to bias in the hourly measure of the previous wage. Furthermore, the wage variable for workers in the US is provided by survey data (PSID and SCE) which is more prone to measurement error whereas the wage variable in the PASS-ADIAB German data is derived from the administrative sample (SIAB) which is more likely to provide accurate measures compared to survey data.

	SCE	PSID	PASS-ADIAB
Accepted wage=previous wage	4.96%	0.76%	27.21%
Accepted wage>previous wage	51.91%	47.76%	42.74%
Accepted wage<previous wage	43.13%	51.48%	30.05%
Observations	262	5,681	17,372

Table 2-18: Job acceptance relative to the previous wage

2.8.5 Previous wage and reservation wage

To gain some insights on how workers form their reservation wages, we compare the latter to the last wage they were previously earning by constructing a ratio of the two wage values. The three datasets appear to be in agreement on the fact that individuals do not base their reservation wages on previous wages. In the PASS-ADIAB data, around 70% of workers in our sample report a reservation wage figure below the previous wage. This result could be an indication that this subset of workers are willing to accept lower wages in order to temporarily fulfill the requirement of having worked for a while to eventually go back to the non-employed pool and receive government benefits. However, we do not possess enough information in our data extract to verify this. In the US data, about 60% of the SCE respondents and about half of respondents in the PSID report reservation wages above their previous wages which could either be suggesting overly optimistic wage expectations or measurement error in the reservation wage data (Krueger & Mueller, 2016). This finding is also in line with the results reported by Krueger and Mueller (2016) for their sample of workers in New Jersey.

	SCE	PSID	PASS-ADIAB
Reservation wage=previous wage	5.68%	1%	0.70%
Reservation wage>previous wage	61.81%	48.79%	29.23%
Reservation wage<previous wage	32.51%	50.20%	70.07%
Observations	5,480	992	5,107

Table 2-19: Reservation wage to previous wage ratio

2.9 Conclusion

This chapter uses data on self-reported reservation wages to infer information on workers' job acceptance decisions and examine subsequent labour market transitions. Our most striking finding is that around a quarter of workers in our sample who experienced transitions from non-employment to employment accepted a job paying lower than their self-reported reservation wage. This leads to question the amount of information the reservation wage conveys in terms of job acceptance. To answer this question, we exploited the longitudinal dimension of our data to examine labour market transition probabilities and found that workers who accepted below their reservation wage are more to go back to non-employment but also more likely to move to another firm. The higher quit probability of this subset of workers is consistent with the view that these jobs paying below the reservation wage are temporary (Holzer, 1986). In fact, workers use these jobs as a steppingstone to the jobs they seek for the long-term. Therefore, more detailed data on reservation wages is needed where survey respondents are asked to specify if the reservation wage they are reporting is targeted at a specific job. It would also be useful for surveys to ask workers for the lowest wage they are willing to accept if the position is temporary. Such information will enable researchers to differentiate between the type of jobs these reservation wages are targeted at and help further with understanding workers' job acceptance decisions in relation to the reservation wage.

We also investigate if acceptance below the reservation wage is driven by the presence of nonwage values. We control for firm size as an indicator of firm nonwage values and find that the latter does not appear to influence workers' acceptance decisions in relation to the reservation wage. One should note that there are other sources of nonwage values other than firm information that could potentially influence

workers' acceptance decisions, and which are not necessarily reflected in the accepted wage such holiday pay, promotion prospects and future wage growth.

One noteworthy finding is that workers who accepted a wage lower than their reservation wage at their previous job are less likely to switch to another job with a wage cut. This effect is statically significant and supports the argument that jobs paying below the reservation wage are characterised by a limited time span.

We conclude this chapter with a brief comparative study of the empirics of the reservation wage between the German and US labour markets. This comparison is motivated by institutional and labour market differences between the two countries. This chapter documents that acceptance of wages below the reservation wage is a feature that prevails in both the US and German labour markets. The statistics for the US are in line with the findings of Krueger and Mueller (2016) who find that around half of workers in their New Jersey sample accepted job offers paying below their self-reported reservation wages. One clear takeaway is that despite geographical and temporal differences, the reservation wage ratio metric shows analogous results for the two different labour markets during different time scales.

2.10 Appendix

2.10.1 Employment transitions: a closer look at the timing of these transitions

The results reported in Table 2-5 and Table 2-6 do not put a restriction on the timing of the transition but they do control for tenure. Table 2-20 reports the results of the likelihood of staying at the firm against going back to non-employment after 1, 3 and 12 months respectively. Table 2-21 repeats the same exercise for the likelihood of job-to-job transitions after 1, 3 and 12 months respectively. For briefness, only the coefficient of the dummy for acceptance below the reservation wage is reported.

Dummy for accepting lower than the reservation wage	**Specification without firm information**	**observations**	**Specification with firm information**	**observations**
Results from main regression in table 2-5	-0.007**	36,265	-0.002	25,654
Timing of the transition: 1 month	-.0320062**	3,616	-.0231268	2,430
Timing of the transition: 3 months	-.0193891	2,550	-.0040806	1,740
Timing of the transition: 12 months	+.0367677**	974	+.052682***	695

Table 2-20: Likelihood of staying at the same firm-transitions at 1,3 and 12 months

The findings for transitions at one month and 3 months are in line with the main regression findings reported in table 2-5. However, transitions from employment to non-employment occurring at 12 months tell a different story: workers who accepted below the reservation wage are more likely to stay at the firm than going back to non-employment at 12 months of job tenure. The statistical significance of the two

coefficients (with and without the inclusion of firm information) could constitute a source of concern for the results of the main regression in table 2-5.

As a further check, the same exercise was repeated at 11 and 13 months of tenure respectively (not reported here) and the results follow the same direction as the main specification. Therefore, employment transitions at 12 months could be an exception to the main analysis findings.

Dummy for accepting lower than the reservation wage	**Specification with firm information**	**Observations**	**Specification with no firm information**	**Observations**
Results from main regression in table 2-6	+0.002	31,696	+0.004**	24,499
Timing of the transition: 1 month	+0.008	2,897	+0.020**	2,107
Timing of the transition: 3 months	+0.007	2,180	+0.010	1,617
Timing of the transition: 12 months	+0.007	858	+0.005	668

Table 2-21: Likelihood of job-to-job transitions-transitions at 1,3 and 12 months

The results reported in Table 2-21 demonstrate that workers who accepted below the reservation wage at their previous firm are less likely to remain at that firm and more likely to experience a job-to-job transition. This applies to workers with a tenure of one, 3 and 12 months and is in line with the findings of the main analysis in table 2-6.

2.10.2 Job to job transitions: wage cuts or wage rises? LPM versus Probit

Variables	LPM Specification (1)	LPM Specification (2) controlling for firm information	Probit Specification (3) controlling for firm information
Dummy for accepting lower than the reservation wage at previous job	-0.141**	-0.200***	-.6247726***
Female	-0.019	-0.037	-.0999799
Age dummies			
Middle aged workers	-0.001	+0.051	.1429953
Old workers	+0.033	+0.099	.3110732
Married	-0.044	-0.061	-.1679349
Presence of kids	+0.034	+0.042	.0849396
Skill level			
Medium skilled	+0.009	+0.092	.2757805
High skilled	+0.022	+0.202*	.6108465*
Active search	-0.024	-0.015	-.0443897
Previous Tenure	-0.014	-0.0006	-.0015737
Household Information			
Savings	-0.034	-0.069	-.2215621
Debt	+.026	-0.002	-.0122426
At least one person in receipt of UB II	-0.011	-0.090	-.2772498
Duration of report	+0.004	+0.008	.0218791
Change in type of job			
Full-time to part-time	+0.235***	+0.270**	.7559646**
Part-time to full-time	-0.064	-0.025	-.1070446
Change in occupation	+0.084*	+0.093	.2865365*
Firm Information			
Firm size		+0.011	.0359001
Ratio of PT to FT employees		+0.022	.0753392
Log mean imputed wage at firm		-0.337***	-1.031958
Observations	460	306	306
R squared	5.23%	13.78%	11.42%

Table 2-22: Likelihood of job-to-job transitions with a wage cut-Probit estimation

Probit	Marginal effects
Accepted above the reservation wage	0.3997864 ***
Accepted below the reservation wage	0.207333 ***

Table 2-23: Likelihood of job-to-job transitions with a wage cut-Probit-marginal effect

Chapter 3 Competition of hiring and wage-tenure effects

3.1 Introduction

Before the pandemic, the idea for the third chapter was to be a final piece to complete a trilogy of research on labour market experiences of German workers. Building on results from the second chapter, the third chapter was intended to follow workers further in time and focus on wage-tenure profiles of these workers. The idea was to compute the wage premium and the returns to tenure for workers who accepted below the reservation wage and those who did not. This question naturally arose from the argument that those who accepted below the reservation wage had higher quit probabilities suggesting preliminary evidence that those jobs were temporary and to test this hypothesis further, we intended to follow workers further in time to comprehend if those who transited to the sought-after job enjoyed a wage premium relative to their comparable workers who didn't accept below the reservation wage and how these returns to tenure varied.

The PASS-ADIAB data access is only permitted through the IAB centre in Germany or through remote access at the UK Data Archive. Due to Covid-19, the secure lab at the UK Data Archive has been closed and as a result, I haven't been able to resume working on the PASS-ADIAB data. Given the time restrictions on my PhD end date, finding a data alternative had become necessary in these unprecedented circumstances. The alternative dataset we opted for to resume the research is the Panel Study of Income Dynamics (PSID)[26]. It is a survey of individuals in the US that

[26] We are unable to use SCE data to answer this particular question due to its short time span. The same survey respondent is followed for a maximum of three time periods (equivalent to a year) which

provides information on labour market experiences of workers and information on their reservation wages as well as job offers.

The idea of the third chapter has therefore been reshaped to fit into the new dataset's scope of information and to overcome the data restrictions caused by the Coronavirus pandemic as explained earlier. As we explored the PSID in more detail, the focus of the third chapter shifted around an interesting variable: job offers. Our main objective in this chapter is to examine the relative importance of labour market competition in shaping wage-tenure profiles of workers in the US.

There is a wide strand of research providing empirical evidence on tenure effects on wages. However, there is no consensus on how tenure impacts wages and the empirical evidence remains mixed. Motivated by this ongoing debate, this chapter aims to contribute to the existing literature by introducing competition of hiring into the empirical analysis. To the best of our knowledge, empirical literature addressing wage-tenure effects from this angle is scarce. Earlier research such as Altonji and Shakotko (1987) and Topel (1991) provided seminal contributions to the wage growth literature. As mentioned earlier, the empirical evidence on tenure effects on wages remains mixed. Some papers found little to no returns to tenure (Abraham & Farber, 1988), while other papers found positive and significant returns to tenure (see Topel (1991) and Dustmann and Meghir (2005)). Although the focus of this chapter is not on estimating returns to tenure, the findings of the empirical literature on this topic lay the foundation of our understanding of wage-tenure effects and competition of hiring. The closest paper to this chapter is Guo (2022) which utilises information on job offers from

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makes it impossible to follow workers after a labour market transition (if they experienced any). Therefore, we opt for the PSID data to carry out our empirical analysis as our data extract allows us to follow workers for 8 years (similar to the PASS-ADIAB length).

the PSID data to study the multiple job offers wage premium and the cyclicality of multiple offers. Although the focus of Guo's paper differs from the research question of this chapter, it is the first paper (to the best of our knowledge) that addresses multiple offer effects on wages from an empirical perspective.

This chapter takes on a full empirical approach, however it remains paramount to base our study on theoretical models that will lay the foundations for the empirical analysis. In an environment where markets are competitive, wages are not affected by firm specific capital (Burdett & Coles, 2010). Therefore, when labour market frictions are not present, tenure effects on wages should be non-existent. However, empirical evidence has demonstrated that there exists a positive correlation between wages and tenure, our data also confirms this finding. Therefore, taking labour market frictions into account is essential when addressing tenure effects. Hence, search theory provides a powerful framework to comprehend why and how wages evolve throughout individuals' working life. The analysis in this chapter is guided by search and matching theory and the empirical results are interpreted through the lenses of Bradley and Gottfries (2021) (hereafter BG) and Postel-Vinay and Robin (2002) (hereafter PV-R).

Job search models addressing competition effects on wages have focused on job-to-job transitions and competition at the employment margin. BG (2021) introduce competition of hiring at both the unemployment and employment margins. This mirrors the information in our data extract which shows that both non-employed and employed workers report receiving multiple job offers. Therefore, BG's model provides a suitable theoretical framework to guide the analysis and interpret the findings of this chapter.

BG (2021) extend the standard job ladder model by introducing an additional state variable they refer to as employment opportunities. Their model produces declining job finding rates and declining starting wages with the duration of unemployment. In

the standard job ladder model, longer unemployment duration generates a wage penalty due to decreasing human capital throughout the unemployment spell. BG's model generates this earning loss through a different mechanism: stochastic employment opportunities. The idea is that the longer a worker is unemployed, the lower his/her employment opportunities. This declining job finding rate leads to lower starting wages for workers hired from unemployment[27]. Although BG (2021) do not discuss persistence effects of competition of hiring on workers' wages, our data allows us to test for these effects as we can follow workers after they start their new position. Sections 3.4 and 3.5 discuss persistence effects in more detail.

In order to construct an encompassing theoretical foundation for the empirical analysis, we consider a PV-R environment with BG matching. In fact, our interpretation of the results is also directed by PV-R wage setting mechanism. In this economy, firms have complete information and can respond to outside offers received by their employees from competing firms. Both the incumbent and poaching firms enter Bertrand competition to retain/poach the worker. In a PV-R world, the employed worker chooses the firm with the highest productivity. This wage setting mechanism implies that workers' wages (or piece rates as referred to by PV-R) gradually increase throughout a job spell as workers receive job offers from other firms. Building on PV-R (2002), Bagger et al. (2014) develop an equilibrium search model to quantify the role of human capital accumulation and imperfect labour market competition in influencing wage profiles of workers throughout their working life. Their model

[27] BG's adopted wage setting mechanism: firm post wages prior to meeting workers as set out in Burdett and Mortensen (1998). Note: the authors point out that the core results of the paper are unaltered when considering a different wage-setting mechanism such as wage bargaining as outlined in PV-R (2002).

generates positive returns to tenure through labour market competition. The idea is that wages (or piece rates as referred to by the authors) gradually increase throughout a job spell as workers receive job offers from other firms. Subsequent sections of the chapter are dedicated to a more detailed discussion of the theoretical structure guiding the empirical analysis.

Using the PSID data, we stratify workers into two groups: the first consists of workers who received one job offer while the latter group includes workers who received multiple job offers. Our data extract reveals that competition of hiring exists both at the non-employment (NE) and employment margins. Therefore, we consider both NE and job to job transitions in the analysis. Our findings suggest that competition of hiring affects starting wages at both the non-employment and employment margins. Furthermore, the constructed wage-tenure profiles reveal the existence of differentials caused by competition of hiring for hires from employment. In fact, the data produces steeper profiles for workers who received one job offer. We are unable to conclude the same for hires from non-employment.

The next section of this chapter describes the dataset that will be utilised for the empirical analysis. Section 3.3 starts the empirical analysis by investigating the effect of competition of hiring on initial wages. Sections 3.4 and 3.5 are devoted to the impact of multiple offers on wage-tenure profiles for hires from non-employment and employment respectively. Section 3.6 complements the empirical analysis by focusing on the relationship between quit probabilities and competition of hiring. The last section of this chapter provides concluding remarks.

3.2 Data

The data used in this chapter is the PSID, Panel Study of Income Dynamics. It is a longitudinal household survey which started in 1968 in the US where information on respondents was collected annually[28]. The PSID covers a series of topics including employment histories, wages and asks various questions about labour market opportunities. The time frame of our sample starts in 1984 and ends in 1992. We were particularly interested in the period from 1984 to 1987 where survey respondents were asked about job offers they had received prior to starting work at the current position. The sample includes men and women between the age of 18 and 65 years old. Individuals are stratified into three skill groups based on their educational attainment. Table 3-1 reports the summary statistics for the sample used in the empirical analysis.

Variables	Descriptive statistics
Number of observations	28,029
Number of individuals	6,917
Percentage of women	29.75%
Average age	42
Percent married	57.27%
% low-skilled	31.79%
% medium-skilled	52.50%
% high-skilled	15.70%
Percent married	55.18%
Race: white	63.73%
Average tenure	7.78 years
Average experience	17.22 years

Table 3-1: PSID descriptive statistics

[28] up until 1997 where it became biennially.

3.2.1 Variables Description

3.2.1.1 Job Offers

From 1984 to 1987, survey respondents were asked retrospective questions about their situation before their current employment. We are particularly interested in the question about job offers. Survey respondents were asked the following question: "At the time you (HEAD)[29] started in your present (position/work situation), was it the only job opportunity you had, or did you choose it over something else?" Based on the answer to this question, we stratify respondents into two groups: single job offer holders (those who responded by choosing "only job opportunity") and multiple job offers holders (those who responded by choosing "chose over something else"). Although we do not know the exact number of job offers received, the ability to differentiate between workers who received on job offer and those who received more than a job offer, provides enough information to examine the impact of competition of hiring on various labour market outcomes, and more specifically on wage-tenure profiles. Our sample shows that almost 52% of survey respondents report having received multiple offers. In terms of differences between the employed and the non-employed, 45.67% of the non-employed received multiple offers while 68.28% of the employed received multiple offers[30]. These statistics indicate that competition of hiring

[29] HEAD in the PSID survey refers to the household's head.

[30] We compute the same statistics using the SCE data and it turns out that the figures in SCE are similar to those from the PSID data. In the SCE sample, 27.92% of the non-employed received multiple offers while this figure is 72.08% for the employed. Comparing the PSID results with the SCE data gives us a good sense of comparison as it is a survey based in the US providing comparable/ information to the PSID but with a different and more recent time frame. These results are in line with the findings in the empirical literature that compares the job search behaviour and outcomes of the employed and the non-employed. Faberman et. al (2017) find that the employed fare better than the non-employed in job search. Their results show that employed workers receive more job offers than non-employed workers and a sizeable fraction of job offers goes to employed workers even when they are not actively searching for work.

is pervasive at both the non-employment and employment margins. Therefore, we consider both hires from non-employment and employment in the empirical analysis.

	All workers	Hires from non-employment	Hires from employment
% Single offers	48.69	58.66	28.68
% Multiple offers	51.31	41.34	71.32
Observations	4,613	3,079	1,534

Table 3-2: Job offer descriptive statistics

3.2.1.2 Tenure variable

The longitudinal nature of our data provides us with information on individual's job tenures. The question in the survey is asked as the following: *"How many years altogether have you (HEAD) worked for your present employer?" The values for this variable in the range 001-997 represent the actual number of months Head has worked for the present employer."*

Job tenure is reported in number of months, the average tenure in our sample is 93.34 months (median is 60 months). Before starting our analysis, some rectifications of the tenure variable were necessary. First, some inconsistencies in the reported tenure values were detected. When looking at the minimum and maximum values of job tenure months, we found that a few reported tenure figures above 65 years which is not possible as the maximum age of workers in our sample is 65 years old. Therefore, any tenure measures above the maximum age were dropped and the maximum tenure was set to equal 564 months (47 years). This maximum tenure measure was obtained by calculating the longest possible job tenure of the oldest workers in our sample based on them entering the labour market at the age of 18 and remaining with the same employer since then. Table 3-3 reports job tenure statistics by individual characteristics. We do not detect striking differences in average tenures across different skill groups. Women workers are characterised by lower job tenure relative

to men. However, all job tenure statistics are close to the average tenure across the whole sample.

Demographics	Average tenure (years)	Observations
Full sample	7.77	43,395
Men	8.10	33,345
Women	6.70	10,050
Low skilled workers	8.29	7,382
Medium skilled workers	7.38	19,049
High skilled workers	8.18	6,261

Table 3-3: Job tenure descriptive statistics

3.3 Starting wages

In a PV-R world, wage-tenure effects occur because firms bump up their employees' wages each time they receive an attractive job offer from another firm. It must be highlighted that these tenure effects depend on the wages at which workers started their employment at the current firm (Bagger et al., 2014). For instance, a worker who starts at a lower wage is more likely to have more scope for future wage rises relative to another worker who starts at a higher wage and has already negotiated a wage close or equal to the firm's ceiling (Bagger et al., 2014). Therefore, we begin the empirical analysis by taking a closer look at the starting wages of newly hired workers. More specifically, this section addresses the question of how competition of hiring impacts starting wages.

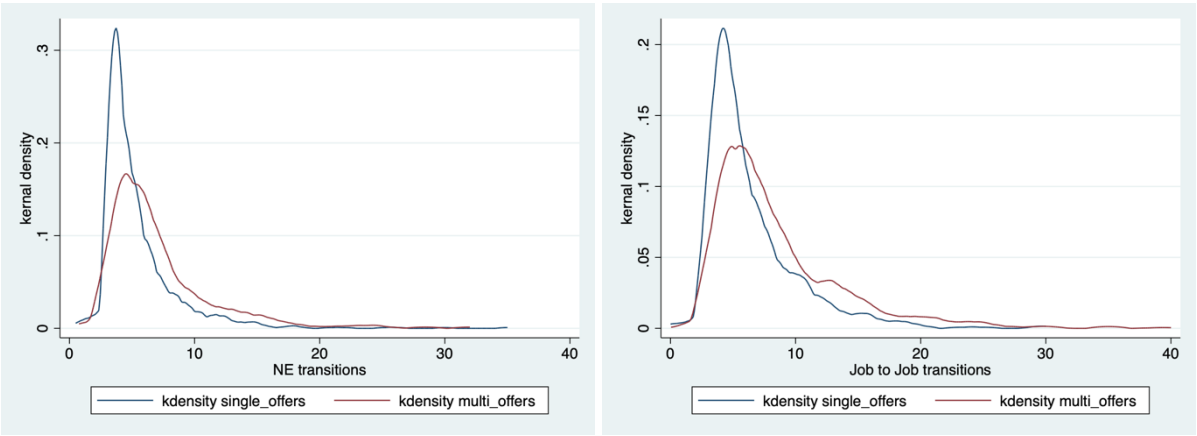
The prediction of BG (2021) is that employment opportunities (as referred to in their paper) are negatively correlated with initial wages. The mechanism driving this negative correlation is competition of hiring at the unemployment margin. The idea is that the number of employment opportunities plummets as the unemployment spell lengthens. Indeed, short-term unemployed workers are more likely to receive employment opportunities relative to the long-term unemployed. Therefore, workers

who receive one job offer while unemployed are more likely to start working at a lower wage than workers who received more than one job offer.

	All workers	Workers with one offer	Workers with multiple offers
Hires from non-employment	7.64	6.66	9.08
Observations	2,737	1,632	1,105
Hires from employment	8.31	6.55	9.02
Observations	1,336	387	949

Table 3-4: Average starting wages by job offers for hires from non-employment and employment

We put this prediction into test by comparing the initial wages of workers who reported receiving one job offer and those with multiple offers. Table 3-4 reports the starting wage averages by job offers received and Figure 3-1 depicts the overlapping starting wage distributions by job offers received for workers hired from non-employment (Figure 3-1a) and workers hired from employment (Figure 3-1b).



(a) *(b)*

Figure 3-1: Starting wages distribution by job offers for hires from non-employment and employment

Both figures demonstrate that the initial wage distributions of workers who received multiple job offers stochastically dominates the initial wage distribution of workers who received one job offer. This constitutes suggestive evidence that competition of hiring

at both the non-employment and employment margins influences workers' wages at the start of their new jobs.

As a further test for the relationship between initial wages and job offers, we run an OLS estimation where we control for various individual characteristics: gender, education, race and marital status. The metric of particular interest is the coefficient of the job offers dummy variable which is set to equate 0 for one job offer and equates 1 for multiple job offers. The coefficient in Table 3-5 suggests that workers who received multiple job offers start on average at higher wages than workers who received one job offer.

Log(starting wage)	**Hires from non-employment**	**Hires from employment**
Women	-.0534398*	-.0658375
	(.0314779)	(.0447384)
Medium skilled	.2067505***	.1698942***
	(.0253675)	(.0392547)
High skilled	.4037691***	.4069641***
	(.0383081)	(.0534981)
race	-.1185095***	-.1430318***
	(.0178469)	(.028019)
Married	.1775281***	.13397***
	(.0296483)	(.041858)
Multiple offers	.1038439***	.1443941***
	(.0184609)	(.0356997)
Experience	.0276608***	.0392102***
	(.0031794)	(.0048859)
Experience squared	-.0005735***	-.0007755***
	(.0000907)	(.0001354)
Tenure		.0003644
		(.0002702)
Tenure*multiple offers		.0000461
		(.0003328)
Observations	3,182	1,216
R squared	41.95%	41.36%

Table 3-5: Starting wages and competition of hiring

These findings confirm the narrative in Figure 3-1. However, these outcomes tell us one part of the story on how competition of hiring affects wages. It remains an open question if competition of hiring impacts how job tenure affects wages. BG's model

generates declining job finding rates and lower starting wages for workers with relatively less employment opportunities. Although their model does not address persistence effects, our data allows us to test for these effects as we can follow workers after they start their new position. The following section is dedicated to investigating how wages evolve with tenure for single and multiple offer holders.

3.4 Wage-tenure profiles: non-employment to employment transitions

Our formulation of the wage function is the general Mincer equation which is fundamentally the same taken by most of the empirical literature on this topic. However, our formulation differs from the rest of the literature as it goes one step further by introducing competition of hiring. This empirical estimation strategy allows us to trace any potential competition-induced wage-tenure profiles differentials. The equation below includes the job offer dummy *MO* which represents our measure of competition of hiring. It is a dummy variable which equates 0 for workers who received one job offer and 1 for multiple offers[31].

$$ln\, W_i = \propto + \beta_1 tenure_i + \beta_2 tenure_i^2 + \beta_3 experience_i + \beta_4 experience_i^2 + \beta_5 MO_i + \beta_5 MO_i * tenure_i + \sum_k \delta_k D_{ik} + \varepsilon_i \qquad \textit{Equation 3}$$

ln(W) refers to log annual wage and *D* refers to a set of additional controls that we included such as individuals' characteristics and job information such as occupation and industry.

[31] Although the PSID does not provides the exact number of job offers received, the stratification of single versus multiple offers gives us sufficient information to obtain a reliable measure for competition of hiring.

Dependent variable: log hourly wage	OLS	Fixed Effect
Tenure	.0028742*** (.0002305)	.0025029*** (.0003899)
Tenure squared	-3.89e-06*** (5.78e-07)	-1.82e-06* (1.08e-06)
Multiple offers	.0692162*** (.0204202)	.043328 (.0420178)
Tenure*multiple offers	-.0001705 (.0001368)	-.0001421 (.0002923)
Experience	.0218705*** (.0029434)	.0312497*** (.0058616)
Experience squared	-.0004829*** (.0000718)	-.0004298** (.0001932)
Observations	4,020	3,666
R squared	48.26%	16.24%

Table 3-6: Wages, tenure and job offers – hires from non-employment

Table 3-6 reports the results of the regression above for workers who moved from non-employment to employment. For brevity, the results in the table above are restricted to tenure, job offers and experience variables. The first column displays OLS results while the second column presents Fixed Effects (FE) results. Both OLS and FE specifications confirm that wages do increase with job tenure. The multiple offer dummy measures competition of hiring effects and suggests that workers with multiple job offers are characterised by higher wages relative to workers who received one job offer. This finding is also in line with the findings in Guo (2022) who relies on the PSID data as well. The question is, however, what do the results in the table above reveal about potential wage-tenure profile differentials caused by competition of hiring? To answer this question, we zoom into the interaction term between tenure and job offers. This term depicts competition of hiring's impact on wage-tenure effects. Although it is suggesting that increased competition at the non-employment margin implies smaller

wage-tenure effects, the coefficient lacks statistical significance leaving us with inconclusive evidence in favour of possible competition effects on wage-tenure profiles.

To investigate this further, we isolate the effect of job offers by following the same specification in Table 3-6 for workers with multiple offers and workers with single offers separately. This stratification can serve as a test to uncover any hidden effects in the main regression (Table 3-6). As Table 3-7 shows below, there are no striking differences between workers with multiple and single offers in terms of the effect of tenure on wages. For both groups, the results suggest that the longer the tenure, the higher the wages and this correlation is strongly significant. This leads us to conclude, at least from the results available so far, that the amount of job offers does not appear to influence the impact of tenure on wages at the non-employment margin.

Dependent variable: log hourly wage	**OLS multiple offers**	**OLS single offers**	**FE multiple offers**	**FE single offers**
Tenure	.0022608*** (.0002575)	.0030255*** (.0004211)	.0027385*** (.0003498)	.0028473*** (.0005405)
Tenure squared	-4.19e-06*** (7.65e-07)	-4.41e-06*** (1.10e-06)	-3.65e-06*** (9.79e-07)	-3.36e-06 (2.08e-06)
Experience	.0327925*** (.0041182)	.0293681*** (.005013)	.0411765*** (.00702)	.0378634*** (.0090031)
Experience squared	-.0006831*** (.0001048)	-.0006326*** (.0001172)	-.0005309** (.0002194)	-.0004636* (.0002379)
Observations	2,716	1,538	3,574	1,952
R squared	43.97%	54.85%	14.76%	20.07%

Table 3-7: Wages, tenure and job offers - level regressions

As discussed in the introduction, BG (2021) do not discuss persistence effects of competition of hiring in their model. Nevertheless, based on their prediction of negative correlation between initial wages and employment opportunities, lower competition entails lower starting wages. However, starting a job at a lower wage implies more

scope for future wage growth and therefore, steeper wage-tenure profiles. The subsequent section takes this prediction into the test by investigating how wages evolve with tenure with and without the presence of competition of hiring at the non-employment margin.

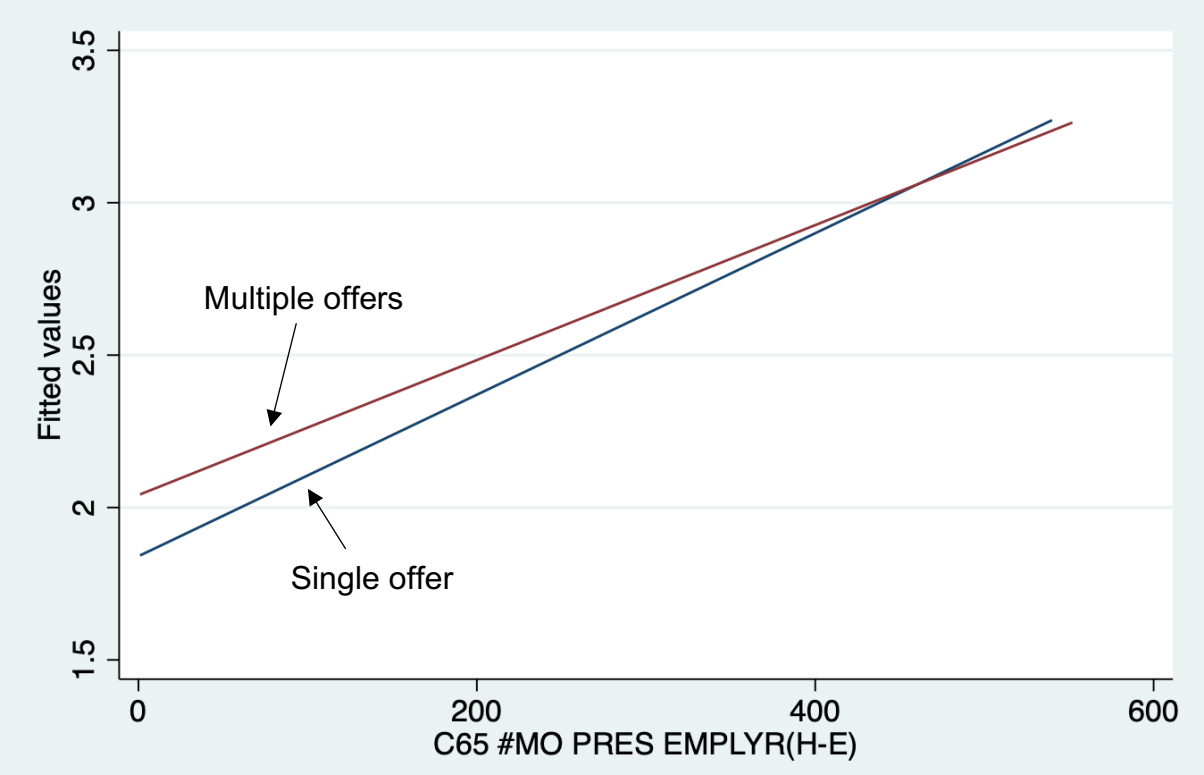


Figure 3-2: Wage-tenure profiles for hires from non-employment

We construct wage-tenure profiles as the following: we first run the wage regression with a second order polynomial in tenure, job offer dummy and the other control variable as described in equation 3. Next, we use the regression output to predict wages. We then obtain a plot of predicted wages against job tenure (in months) describing the wage-tenure profiles of workers. We produce wage-tenure profiles for multiple offer holders and single offer holders as depicted in Figure 3-2. We do not detect explicit wage-tenure profile differentials that could be attributed to competition of hiring at the non-employment margin. This result reinforces the findings from

equation 3 and we do not obtain enough evidence to conclude that competition of hiring matters at the non-employment margin.

3.5 Wage-tenure profiles: job to job transitions

The focus of this section is on competition effects on wage-tenure profiles at the employment margin. Before we zoom into these effects, we first clarify how job to job transitions are detected in our data extract. Survey respondents who are employed are asked whether they are still with the same employer or with a different employer. Workers who reported being with a different employer are classified into the pool of job-to-job transitions.

Similarly to workers hired from non-employment, employed workers who experience job to job transitions are classified into two groups: single and multiple job offers. In this context, competition of hiring at the employment margin refers to competition between the worker's firm and the poaching firm for employed workers who reported receiving one job offer. In the case of multiple job offers, competition occurs between the worker's current company and all other poaching firms.

Following PV-R wage setting mechanism, in an environment where workers engage in on-the-job search, a worker can receive one or more job offers from different firms. Let us consider two workers: A and B where worker A receives one job offer from firm Y with productivity p' while employed at firm X with productivity p. Firms X and Y enter in Bertrand competition and the firm with the highest productivity retains worker A. For instance, if p'>p, worker will move to firm Y.

Worker B receives multiple job offers while employed at firm X with productivity p. For instance, worker B receives two outside offers where the first job offer is from firm with productivity p' while the second job offer is from firm with productivity p". The worker's

firm choice depends on the productivity ranking of the competing firms (the incumbent and the two poaching firms in this case).

Scenario 1:

Case a: p>p'>p" **case b:** p>p">p' → worker B remains at the current firm and receives the wage offered by the second highest productivity firm which would be p' in case a and p" in case b.

Scenario 2:

Case a: p'>p>p" **case b:** p'>p">p → worker B leaves the current firm and moves to the highest productivity poaching firm p'. In case a, worker B receives the wage offered by the second highest productivity firm p while in case b, the worker receives the wage offered by firm with productivity p".

Scenario 3:

Case a: p">p'>p **case b:** p">p>p' → worker B leaves the current firm and moves to the firm with the highest productivity p" where he/she receives the wage offered by the second highest productivity firm.

BG's model generates a negative relationship between employment opportunities and starting wages. This finding is also supported by the data extract used in the empirical analysis as discussed in section 3.3. If competition of hiring at the employment margin matters for starting wages, what are the implications of this competition for wage-tenure profiles of workers who experience job to job transitions? The section below addresses this question.

Let us recall the example of workers A and B who search while employed where worker A receives one job offer while worker B receives two job offers. Let both workers receive offers from firms that are higher in productivity than their current firms. In a PV-R world, worker A moves to the poaching firm and worker B also leaves their

current firm to take a new job at the highest productivity firm. Worker A who received one job offer is more likely to start at a lower wage but with greater scope for subsequent wage growth relative to worker B who received multiple offers. Besides, worker B might have already negotiated a wage close to the poaching firm's ceiling leaving a small range for future wage rises with that firm. Therefore, following Bagger et al. (2014), worker A who started at a relatively lower wage faces higher returns to tenure. If this is the case, we would expect workers with single offers to be characterised by steeper wage-tenure profiles relative to workers with multiple job offers.

We put all the predictions discussed above into the test in our data extract. First, we estimate the same equation as the one specified in Equation 3 for workers hired from employment. Table 3-8 reports the OLS regression results in column one and Fixed Effects results in the second column.

Dependent variable: log hourly wage	**OLS**	**Fixed Effetcs**
Tenure	.0009654 (.0015192)	.0027137 (.0018357)
Tenure squared	5.05e-06 (4.81e-06)	-7.98e-06 (5.56e-06)
Multiple offers	.0997367*** (.0373297)	.0423198 (.04413)
Tenure*multiple offers	-.0013163 (.0009159)	-.0032938** (.0014319)
Experience	.0391932*** (.0061303)	.0168703** (.0076677)
Experience squared	-.0008113*** (.0001539)	7.50e-06 (.0002329)
Observations	925	933
R squared	47.39%	13.31%

Table 3-8: Wages, tenure and multiple offers – hires from employment

Wages are positively correlated with tenure in both specifications, although these correlations are not significant in both specifications. The OLS results indicate that workers who received multiple offers have higher wages suggesting that increased competition of hiring positively impacts wages. The variable of particular interest in our analysis is the interaction term between tenure and job offers which depicts the tenure impact on wages through competition of hiring effects. Zooming into this interaction term, both OLS and FE specifications indicate that wage-tenure effects are smaller for multiple offer holders relative to single offer holders. However, the effects based on OLS do not display statistical significance.

Dependent variable: log hourly wage	**OLS multiple offers**	**OLS single offers**	**FE multiple offers**	**FE single offers**
Tenure	-.0012283 (.0013809)	.0020583 (.0023155)	-.0014441 (.0010813)	.0050712* (.0027409)
Tenure squared	9.16e-06 (6.48e-06)	1.35e-07 (7.66e-06)	2.18e-06 (6.50e-06)	-.0000281 (.0000187)
Experience	.0459734*** (.0073191)	.0136427 (.0120303)	.0153595* (.0090225)	.0212809 (.0129633)
Experience squared	-.0009306*** (.0001886)	-.0002099 (.000283)	.0001858 (.00031)	-.0001642 (.0003244)
Observations	702	223	710	224
R squared	46.11%	56.50%	12.23%	44.20%

Table 3-9: Wages, tenure and job offers-level regressions

Table 3-9 above reports the results of OLS and FE level regressions for single and multiple offer holders separately. We include the same controls as specified in Equation 3 but for briefness, we only report coefficients for tenure, experience and their second order polynomials. The results obtained from the FE level regressions above indicate that competition of hiring matters less for multiple offers holders, as far as tenure effects are concerned. Although the relationship between wages and tenure for single offer holders is positive, this correlation displays low statistical significance.

So far, the data does not reveal discernible evidence in favour of competition effects on wage-tenure profiles. However, the statistics reported in tables 3-8 and 3-9 only tell part of the story. To construct a fuller picture, we turn into the graphical depiction of wage-tenure profiles.

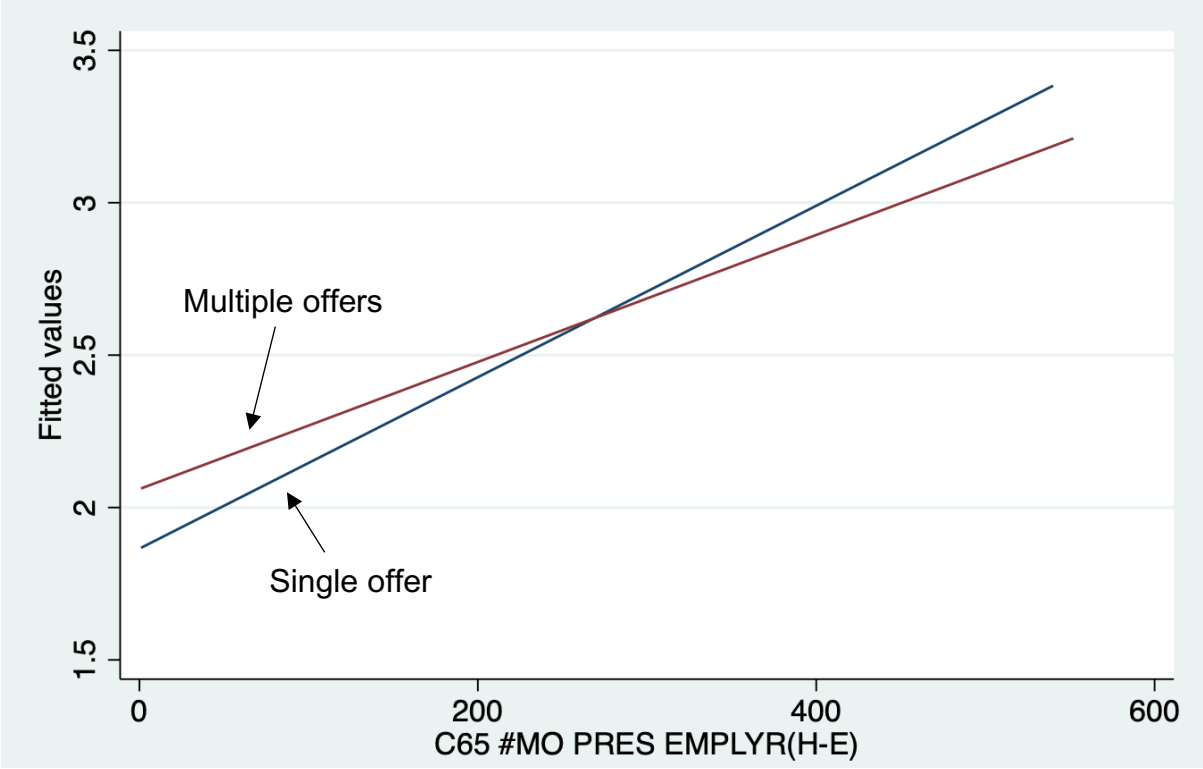


Figure 3-3: Wage-tenure profiles – hires from employment

We follow the same method used to produce wage-tenure profiles for non-employment to employment transitions as described in section 3.4. The findings so far have indicated that there is no strong evidence showing that the presence of multiple offers impacts the way tenure affects wages at the non-employment margin. However, the figure below indicates that the results follow a different direction at the employment margin. Figure 3-3 displays the overlapping wage-tenure profiles of workers hired from employment and shows that workers who received one job offer have steeper profiles than workers who received more than one job offer. This suggests that competition of hiring at the employment margin generates wage-tenure profiles differentials.

3.5.1 Wage cuts

In this section, we take a closer look at the starting wages of workers who experience job to job transitions. We construct a ratio measure defined as the previous wage at the preceding firm divided by the starting wage at the current firm following the job-to-job transition.

	All	Single offers	Multiple offers
Initial wage=previous wage	8.71%	9.77%	8.21%
Initial wage>previous wage	54.95%	48.17%	57.93%
Initial wage<previous wage	36.34%	42.06%	33.86%
Observations	1,849	573	1,267

Table 3-10: Wage cuts statistics by job offers

The statistics reported in Table 3-10 show that 36.34% of workers who experienced a job-to-job transition took a wage cut when moving to the new firm. Out of these transitions with a wage cut, 33.86% reported receiving multiple job offers from different firms. One question which arises when reading these statistics is why some workers accept a wage cut despite the presence of competition of hiring. Interpreting these results through the lenses of PV-R, this finding could be related to firm productivity. Their model generates wage cuts through the following mechanism: a worker who received multiple job offers while employed will choose to move to the firm with the highest productivity (Postel-Vinay & Robin, 2002). However, workers might be willing to accept a lower wage when moving to a higher productivity firm. The reason motivating such decision is that higher productivity firms are able to provide better career prospects and can offer higher wage rises when engaged in harsh competition as workers receive outside offers (Postel-Vinay & Robin, 2002).

It must be highlighted that these results rest on the assumption that job to job transitions occurred voluntarily. However, this prediction is difficult to verify in the data

due to the lack of information on firm productivity and the data does not differentiate between voluntary and involuntary job to job transitions. One could argue that these wage cuts represent involuntary job to job transitions where workers had to move to a different firm following a match dissolution shock with no spell of unemployment between the job transitions (Bagger et al., 2014). Since information on survey respondents was collected yearly, the PSID does not provide data on workers' employment status between the two waves. Therefore, we cannot verify if there was a spell of unemployment between the two jobs. Furthermore, this would have unlikely been the case for workers who reported receiving multiple job offers.

3.6 Competition of hiring and quit rates

So far, our results have indicated that increased competition of hiring has a positive impact on workers' wages. We have also found suggestive evidence that wage-tenure effects are greater with increased competition of hiring for hires from employment. In this section, we complement the empirical analysis by exploring quit probability. Quits in the context of this chapter refer to employment to non-employment transitions. Every quit resets a worker's job tenure to zero. Therefore, it is important to understand competition effects on quit probability as it will lead to implications on wage-tenure profiles of workers. For instance, the presence of multiple offers might raise the quality of the match which leads to a positive impact on tenure. If this is the case, we should observe lower quit rates for multiple offer holders. To test this prediction in the data, we estimate a Probit regression for the quit probability where we control for individual characteristics, job tenure, experience and competition of hiring.

The results suggest that workers who received multiple job offers are less likely to quit their jobs. Furthermore, workers with longer tenure are characterised by a lower quit

probability. To gain further insights on how tenure responds to quit probability in the presence of competition of hiring, we interact the tenure variable with the multiple offers dummy. The interaction term indicates that tenure effects on quit probability are higher for workers with multiple offers relative to workers who received one job offer. The second column of Table 3-11 reports the results for quit probability using a different estimation method: Linear Probability Model (LPM) as a robustness check for the Probit results. The LPM results are in line with the Probit results and follow the same direction.

	Probit	**LPM**
Tenure	-.0027924***	-.0001086**
	(.000966)	(.0000497)
Tenure squared	4.80e-06*	8.39e-08
	(2.59e-06)	(1.41e-07)
Multiple offers	-.2444911***	-.0127826***
	(.0674507)	(.0036775)
Experience	-.0759287***	-.0056062***
	(.0089429)	(.0007212)
Experience squared	.0020663***	.0001636***
	(.000201)	(.0000206)
Tenure*multiple offers	.0012923*	.0000856**
	(.0006921)	(.0000352)
Observations	12,311	12,427
(Pseudo) R squared	14.23%	4.04%

Table 3-11: Quit probability and job offers

Table 3-12 zooms into competition of hiring effects and reports the marginals effects of the Probit estimation for job offers. Holding all variables at their mean values, the quit probability is 26.5% among workers who received one job offer and 18.4% among those who received multiple offers. This result could be attributed to the better match quality under increased competition leading to longer job tenures and therefore, lower quit rates.

The analysis in this section has presented a set of informative correlations which could be extended further with the help of a formal model. We sidestep from this exercise as it is beyond the scope of this empirical chapter.

Probit	Marginal effects
One job offer	.0265426***
	(.0021677)
Multiple job offers	.018421***
	(.0015544)

Table 3-12: Quit probability – Probit marginal effects

3.7 Robustness checks

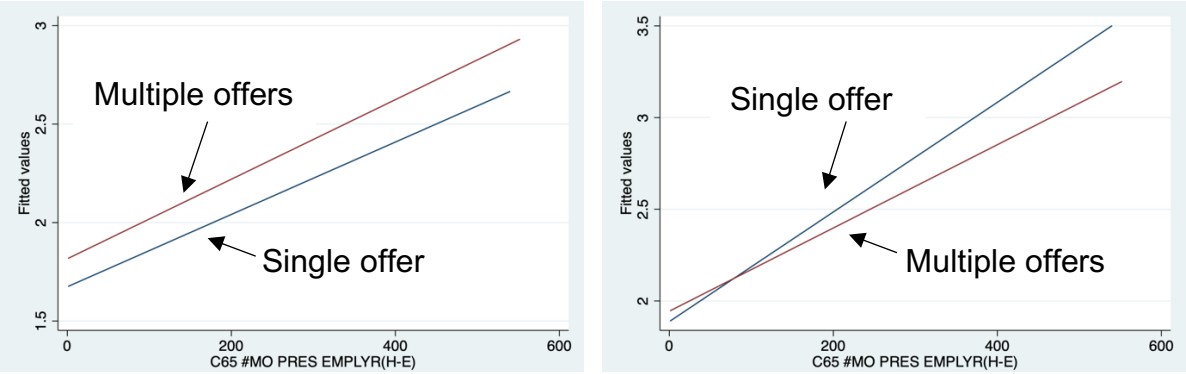
3.7.1 Competition of hiring and gender differences

The data extract used in this chapter shows out of workers who reported receiving multiple offers, 23.94% are women and 76.06% are men. This could be attributed to the US labour market characteristics in the eighties where the general tendency was that labour markets favoured men over women. In addition to the restrictions on the type of jobs women could apply for at the time due to number of hours required, flexibility of hours and how these could fit in with “motherhood” responsibilities (Gottfries & Teulings, 2017). These restrictions implied that women would make less job applications, leading to lower call back rates and a lower amount of job offers as a result.

There exists a non-negligible empirical literature that compares returns to tenure for men and women. Some papers conclude there are no gender differences while other papers such as Becker and Lindsay (1994) and Qu et al. (2019) find returns to tenure differences between men and women workers. While the focus of this chapter is not on computing returns to tenure, we investigate potential wage-tenure profile gender

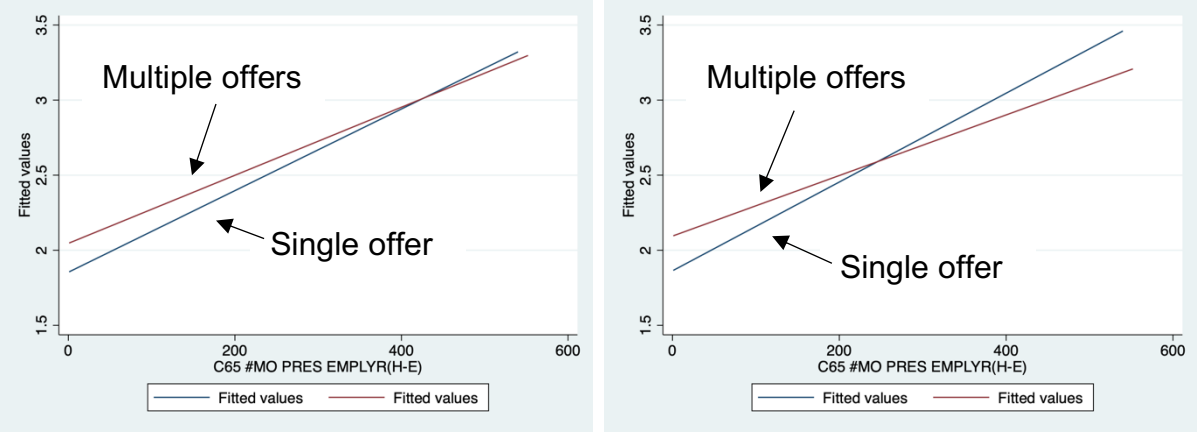
differences driven by competition of hiring by excluding women workers from the analysis.

Figure 3-4 displays wage-tenure profiles for hires from non-employment and employment for men workers only. The figures demonstrate that even after restricting the analysis to men only, no changes in the wage-tenure profiles were detected in both cases: hires from non-employment and employment. This suggests that the inclusion of women workers in the main empirical analysis does not conceal any effects that could be driven by gender differences.



(a) Hires from non-employment *(b) Hires from employment*

Figure 3-4: Wage-tenure profiles for hires from non-employment and employment – women only



(a) Hires from non-employment *(b) Hires from employment*

Figure 3-5: Wage-tenure profiles for hires from non-employment and employment – men only

3.8 Conclusion

This chapter contributes to the empirical literature by providing evidence suggesting that multiple offers are prevalent at the non-employment and employment margins, they impact starting wages and generate wage-tenure profile differentials at the employment margin.

Guided by search and matching theory, the empirical results of this chapter are interpreted through the lenses of BG and PV-R models. Starting from BG's model prediction that initial wages increase with employment opportunities, we put this theoretical prediction into test and find that indeed competition of hiring does impact starting wages both at the non-employment and employment margins. In fact, workers who received one job offer tend to start working at lower wages relative to workers who received multiple job offers. BG do not discuss persistence effects of competition of hiring in their model. However, the longitudinal nature of our data enables us to investigate any potential persistence effects as we can observe how wages evolve over workers' job tenures. Although we find strong evidence in favour of a positive correlation between wages and tenure, our data extract does not detect explicit wage-tenure profile differentials caused by competition of hiring at the non-employment margin. However, job to job transitions narrate a different story. Our findings indicate that multiple offer holders have flatter wage-tenure profiles suggesting that competition of hiring does matter at the employment margin.

The PSID is a rich dataset, but it lacks information on the exact number of job offers and the time these were received. There are datasets such as the SCE and the Krueger and Muller survey which provide information on the number of job offers; however, these are either cross-sections or short panels and do not enable us to follow workers throughout their working lives. Therefore, good quality longitudinal data

providing information on the exact number of job offers and date received is needed (Guo, 2022). This will allow researchers to study the incremental effect of job offers and construct a better measure for competition of hiring. In terms of the theoretical environment that has guided this chapter, BG's model paired with PV-R wage setting mechanism has provided solid theoretical foundations for the empirical analysis. Future theoretical research that extends the BG framework is needed to study persistence effects of competition of hiring and incorporate incremental effects of job offers.

3.9 Appendix

3.9.1 Job tenure statistics by cohorts

Demographics	Average tenure (years)	Observations
Full sample	7.78	43,404
Men	8.10	33,352
Women	6.66	10,052
Low skilled workers	around 8	27,927
Medium skilled workers	around 7	13,069
High skilled workers	around 8	1685
Professional, Technical, and Kindred Workers	8.66	6806
Managers and Administrators, except Farm	8.75	4910
Sales workers	5.66	1876
Clerical and Kindred Workers	7.27	4747
Craftsman and Kindred Workers	8.75	8242
Operatives, except Transport	7.77	5230
Transport Equipment Operatives	around 7	2759
Laborers, except Farmers	around 6	2344
Farmers and Farm Managers	7.80	26
Farm Laborers and Farm Foremen	7.61	531
Service Workers, except Private Household	around 6	5540
Private Household Workers	around 10	350

Table 3-13: Job tenure statistics by cohorts

3.9.2 Experience variable

Different papers have used different measures of experience in their empirical estimation: actual, potential and/or predicted experience. In this paper, we will be using actual experience as it is the most accurate measure of experience that our data has to offer. Although potential experience is an important control in equation 3 as it accounts for periods of unemployment, we do not control for it in our empirical estimation due to data restrictions in the “education” variable in PSID. We do not have data on the exact years of schooling that a person has completed as respondents are organised in education intervals. Since potential experience is calculated as age

minus years of schooling, we sidestep from using this measure as it will not be accurate due to the education intervals stratification.

In the PSID, survey respondents are asked the following question: “How many years altogether have you worked for money since you were 18?” This constitutes our measure for actual experience. When examining this variable, we found that some unrealistic experience values we reported. Therefore, we drop out any values above 47 years. We obtained this figure by subtracting 18 from the age of the eldest respondents in our sample which is 65.

Maximum actual experience = maximum age – age work start

The average actual experience in our sample is 17.22 years (median is 14). The minimum accumulated years of experience is one year or less and the maximum is 47 years as explained above.

	Average in years	Observations
Full sample	17.22	61,592
men	17.80	45,375
women	15.60	16,217
Low skilled	21.09	12,736
Medium skilled	15.61	25,236
High skilled	18.14	8,529

Table 3-14: Descriptive statistics by labour market experience

3.9.3 Industry variable

Industry categories	Percent
Agriculture, Forestry, and Fisheries	3.60
Mining	0.91
Construction	8.73
Manufacturing	23.10
Transportation, Communications, and Other Public Utilities	8.56
Wholesale and Retail Trade	16.57
Finance, Insurance, and Real Estate	4.51
Business and Repair Services	5.52
Personal Services	3.92
Entertainment and Recreation Services	0.87
Professional and Related Services	15.92

Public Administration	7.80
Number of observations	50,341

Table 3-15: Industry categories

3.9.4 Occupation variable

Occupation categories	**Percent**
Professional, Technical, and Kindred Workers	15.66
Managers and Administrators, except Farm	13.97
Sales Workers	4.83
Clerical and Kindred Workers	9.61
Craftsman and Kindred Workers	18.81
Operatives, except Transport	10.66
Transport Equipment Operatives	5.97
Laborers, except Farm	5.34
Farmers and Farm Managers	1.33
Farm Laborers and Farm Foremen	1.11
Service Workers, except Private Household	11.72
Private Household Workers	1
Number of observations	50,651

Table 3-16: Occupation categories

3.9.5 Instrumental variable (IV) analysis

There is an extensive literature that addresses potential endogeneity issues linked to tenure effects on wages, particularly in the seminal work by Altonji & Shakokto (1985), Topel (1991) and Altonji and Williams (2005) .We follow the Altonji & Shakokto (1985) method, which has also been adopted by several papers such as Deelen (2012) in more recent literature, where the instrumental variable for tenure is the deviation of tenure from its average. Table 3-17 and Table 3-18 report the IV estimation results for hires from non-employment and hires from employment respectively. For hires from non-employment, the IV results follow the same direction as the OLS results despite a loss in statistical significance of the tenure variable in the IV estimation for workers hired from non-employment.

Dependent variable: log hourly wage	OLS	IV
Tenure	.0028742***	.0007491
	(.0002305)	(.0006327)
Tenure squared	-3.89e-06***	1.62e-06
	(5.78e-07)	(1.88e-06)
Multiple offers	.0692162***	0665428***
	(.0204202)	(.0235812)
Tenure*multiple offers	-.0001705	-.0000894
	(.0001368)	(.0002168)
Experience	.0218705***	.0305451***
	(.0029434)	(.0039869)
Experience squared	-.0004829***	-.000678***
	(.0000718)	(.0001002)
Observations	4,020	4,020
R squared	48.26%	47.20%

Table 3-17: IV analysis for hires from non-employment

For workers hired from employment, the comparison between the OLS and IV results reveals a change in the direction of the relationship between wages and tenure which turns negative. The tenure and job offer interaction term also switch signs in the IV specification suggesting that tenure effects for workers with multiple offers are higher relative to workers with single offers. However, it must be highlighted that this effect is insignificant in both the OLS and IV estimations. The negative sign of the tenure IV coefficient is rather surprising and could be alarming in terms of the validity of our main analysis results. However, our concerns are alleviated by the absence of statistical significance of this IV coefficient.

Dependent variable: log hourly wage	OLS	IV
Tenure	.0009654 (.0015192)	-.0041038 (.0031041)
Tenure squared	5.05e-06 (4.81e-06)	.0000154 (9.48e-06)
Multiple offers	.0997367*** (.0373297)	.0810443** (.0349335)
Tenure*multiple offers	-.0013163 (.0009159)	.0004909 (.0008804)
Experience	.0391932*** (.0061303)	.042005*** (.0058304)
Experience squared	-.0008113*** (.0001539)	-.0008346*** (.0001408)
Observations	925	925
R squared	47.39%	46.51%

Table 3-18: IV analysis for hires from employment

Data references

Chapter 1

Data:

This chapter uses the factually anonymous data of the Panel Study 'Labour Market and Social Security' (PASS). Data access was provided via a Scientific Use File supplied by the Research Data Centre (FDZ) of the German Federal Employment Agency (BA) at the Institute for Employment Research (IAB).

Data documentation:

- Trappmann, Mark; Beste, Jonas; Bethmann, Arne; Müller, Gerrit (2013): The PASS panel survey after six waves. In: Journal of Labour Market Research.

- Berg, Marco; Cramer, Ralph; Dickmann, Christian; Gilberg, Reiner; Jesske, Birgit; Kleudgen, Martin; Beste, Jonas; Dummert, Sandra; Frodermann, Corinna; Schwarz, Stefan; Trappmann, Mark; Bähr, Sebastian; Coban, Mustafa; Friedrich, Martin; Gundert, Stefanie; Müller, Bettina; Teichler, Nils; Unger, Stefanie; Wenzig, Claudia (2020): Codebook and documentation of the Panel Study 'Labour Market and Social Security' (PASS). Datenreport Wave 12. FDZ-Datenreport, 09/2019 (en), Nürnberg.

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Chapter 2

Data:

This chapter uses the PASS survey data linked to administrative data of the IAB, Version PASS-ADIAB 1975 - 2015. Data access was provided via on-site use at the Research Data Centre (FDZ) of the German Federal Employment Agency (BA) at the Institute for Employment Research (IAB) and subsequently remote data access.

Data documentation:

Antoni, Manfred; Dummert, Sandra; Trenkle, Simon (2017): PASS-Befragungsdaten verknüpft mit administrativen Daten des IAB. Datensatz Version: PASS-ADIAB 7515. FDZ-Datenreport, 06/2017. Nürnberg.

Chapter 3

This chapter uses the Panel Study of Income Dynamics, public use dataset produced and distributed by the Survey Research Centre, Institute for Social Research, University of Michigan, Ann Arbor, MI (2020).

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