



RE M I N D E R

ROLE OF EUROPEAN MOBILITY AND ITS IMPACTS
IN NARRATIVES, DEBATES AND EU REFORMS

Minimum Wages, Earnings and Mobility in the EU

WORKING PAPER

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Abstract

This document summarises the results of several studies exploring the link between the minimum wage and earnings of EU migrant workers in different EU countries. The results reveal important differences about the relationship of minimum wage change and the earnings of these migrants. For instance, there was a positive increase in the hourly wage of EU migrants in Germany associated with the introduction of the minimum wage in 2015. In Spain, changes in the minimum wage (i.e. Salario Mínimo Interprofesional) during the mid-2000s were negatively associated with the monthly earnings of EU migrants. Finally, in the UK, a higher National Minimum Wage during 2000-2018 was associated negatively with the hourly earnings of EU migrants. Overall, the mixed results suggest that while the minimum wage on its own could play some role in driving migration among EU countries, it is unlikely to be a major driver of EU mobility.

Disclaimer regarding data: Some of the data used for this study come from the secured access version of the UK Labour Force Survey, produced by the ONS and supplied by the UK Data Service. The use of the data in this work does not imply the endorsement of the ONS or the Secure Data Service at the UK Data Archive in relation to the interpretation or analysis of the data. The data used in this publication also includes data that were made available to us by the German Socio-Economic Panel Study (SOEP) at the German Institute for Economic Research (DIW), Berlin. The use of the data in this work does not imply the endorsement of the DIW in relation to the interpretation or analysis of the data.

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1. Introduction

Making the most of the movement of people to, and across, Europe is a crucial but complex challenge for policymakers. Migration has become an integral part of EU Member States' economies and societies, supported by a comprehensive policy infrastructure of work authorisation, family (re)unification, access to social benefits, and recognition of professional qualifications, among others. Migration has also brought political, economic and social challenges. For example, enlargements of the European Union in 2004, 2007 and 2013 brought several new Member States with substantially lower wages than the EU average, and as transitional restrictions on mobility were progressively removed, mobility increased more than some analysts expected. In the midst of these enlargement processes, the deepest economic crisis of modern times created substantial pressure on many Member States' labour markets, public finances and social systems, and the economic inequalities that resulted appear to have been a significant driver of human mobility.

This document summarises the results from three different quantitative analyses, which aimed to provide insights on the influence of policy and other key factors on migration to, and across, EU countries. The main working papers related to each of these results will be published separately in the REMINDER website. The key focus is on the association between changes in the minimum wage and the earnings of migrant workers. We follow recent literature and estimate the wage effects of the minimum wage conditional on continued employment (Lopresti and Mumford, 2016). This differs from the traditional approach of focusing on the employment effects of minimum wages (e.g. Cengiz et al., 2019). The main idea is that low-paid workers would have experienced wage changes even in the absence of a minimum wage increase. In fact, it is possible for low-paid workers to experience a smaller pay rise after an increase in the minimum wage, than without any increase.

There are important variations in the minimum wage across EU countries, including variations across eligible age groups in different countries. It is often argued that by increasing the minimum wage countries become more attractive to low-skill migrant workers, as many will receive a higher salary (Cadena, 2014; Giuletti, 2014). Others argue instead that an increase in the minimum wage reduces the number of low-paid jobs

available in the country and increases the number of low-skilled native workers available (Zavodny, 2014).

The minimum wage also has implications for the impact of migration on the labour market outcomes of resident workers. For instance, a higher minimum wage is associated with higher wage-rigidity and can make natives' wages and employment less sensitive to competition from migrant workers. In fact, some studies suggests that the existence of labour market institutions such as minimum wages is one of the reasons for which is difficult to detect any labour market impact of migration (Edo and Rapoport, 2018).

There are reasons to expect the link between minimum wage changes and pay uplifts to differ between migrants and natives. First, there may be labour market segmentation between migrants and natives (Nanos and Schutler, 2014). Labour market segmentation refers to a situation in which the labour market is divided into separate submarkets, distinguished by different characteristics and rules. If this segmentation is relatively strong, then it can imply differences in the degree to which the minimum wage is a focal point in setting wages in each market (Shelkova, 2015).

Second, from the point of view of workers, a higher minimum wage may not only affect incentives of workers and employees, but also change their perception of what is fair and create entitlement effects (Card and Krueger, 1995). Falk et al. (2006) suggests that these effects lead employers to increase workers' wages after an increase in the minimum wage by an amount exceeding that necessary for compliance with the new legal minimum. However, this is potentially less likely for employers hiring migrant workers, as they are less familiar with work conditions in the host country.

Third, migrant workers, particularly recently arrived ones, could be less attached to their jobs compared to native workers, and could be more willing to accept pay below the legal minimum while looking for a better job. Moreover, because of language and cultural differences, migrant workers might not be fully aware of their rights.

Finally, an increase in the minimum wage could increase the supply of low-skilled migrant workers, particularly in a context in which there is a flexible route for immigration into low-paid jobs. The additional supply of workers could affect wages along the wage

distribution, i.e. not only for those earning the minimum. If there is strong labour market segmentation between natives and migrants, this increase in supply could affect the wage of migrants more than that of natives.

A recent literature has explored differences in the impact of the minimum wage on the earnings of native and migrant workers (Cadena, 2014; Giulietti 2014; Orrenius and Zavodny, 2008). Most of these studies have focused on the case of the United States and there are several reasons for which the lessons learned might not apply to other countries, particularly to EU countries. For instance, a substantial portion of the low-skilled foreign-born workforce in the United States is not legally resident. Employers who are already breaking the law by hiring undocumented migrants may be less likely to comply with minimum wage regulations and undocumented migrants may be more willing to accept pay below the legal minimum. In addition, there is no large-scale legal route for low-skilled labour immigration to the United States suggesting that most of the increase in the national low-paid foreign-born labour force in response to minimum wage rises has to come via other channels (e.g. individuals using another legal route such as family re-unification or crossing the border illegally). On the other hand, the rules governing freedom of movement in the EU mean that nationals of other EU countries have immediate and unrestricted access to low-paid jobs in other EU countries.

The empirical analysis of this part of Work Package 3 of REMINDER has two components. First, we identified relevant policy changes regarding minimum wage and transitory restrictions in the context of accession for the 2000 – 2015 period in the five key EU-14 countries of the REMINDER project/WP 3: Germany, Italy, Spain, Sweden and the UK. This task was coordinated with other REMINDER packages that were already collecting much of this information. Second, we selected some of the countries and policy changes and used different econometric techniques to estimate the effect of some of these changes on the outcomes of migrants and then discuss the possible implication of these impacts on future migration flows. That is, the purpose of the work was not to provide an EU-wide analysis of the link between immigration and minimum wages, but to provide insights using particular case studies. Moreover, while much of the existing research on the impact of the minimum wage on the earnings of migrant workers has focused on the employment effects,

we focus on the wage effect, which is a relatively unexplored area. That is, we focus on the impacts of the minimum wage *conditional* on continued employment.

The next two sections of this document explore the evolution of minimum wage policies of the different countries explored, as well as the transitional arrangements in order to justify the case study selection for the empirical analysis.

2. Minimum Wages in Different Countries

Of the five countries explored, Sweden and Italy do not have a traditional national minimum wage. In Sweden, salaries are negotiated between unions and employer organisations. Because of those negotiations, some employees, particular those in the low-paid market, will have something similar to a minimum wage established as part of an employment national agreement. The agreements are binding for all employees of an employer, even for those who are not members of a union. Union membership is high in Sweden and national agreements are strongly enforced. However, for some sectors with high migrant concentration, such as domestic workers in private households, there are no collective agreements (Woolfson et al., 2014). This means that for these types of workers there is no minimum wage regulation.

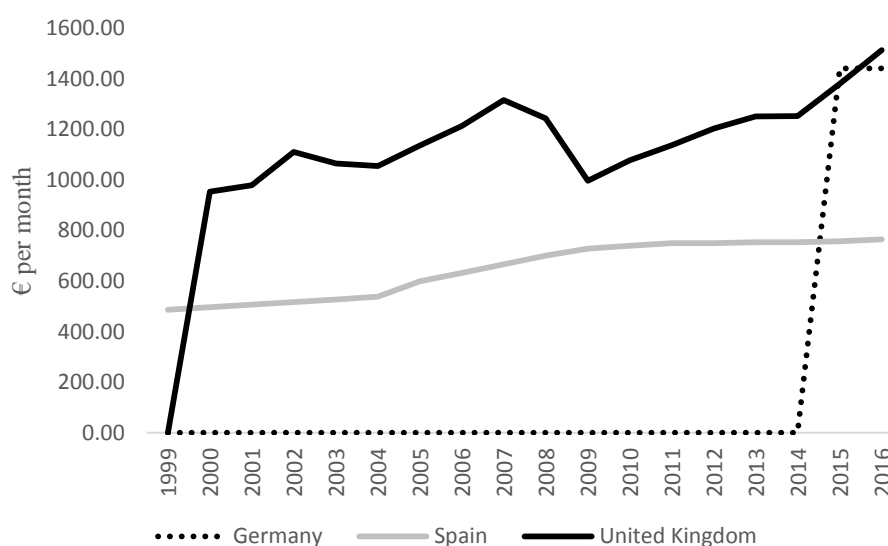
In Italy, collective bargaining also plays a role in setting something similar to a minimum wage that varies per sector (Devicienti et al., 2019). There are over 800 sectoral collective agreements in Italy, which cover most of private-sector employees in the country. However, recent research suggests substantial non-compliance with minimum wages. For instance, Garnerio (2018) suggests that 10% of workers in Italy received 20% less than the minimum wage established in their corresponding collective agreements.

In Germany, the national minimum wage is relatively recent. As shown in Figure 1, it was introduced in 2015 (Bossler, 2017). It is adjusted over time following recommendations of a minimum wage commission (Mindestlohnkommission) with representation from employer organisations and unions. Before 2015, Germany also relied on minimum wages

based on collective agreements. Some of these collective agreements could imply a wage floor above the national minimum wage in some sectors.

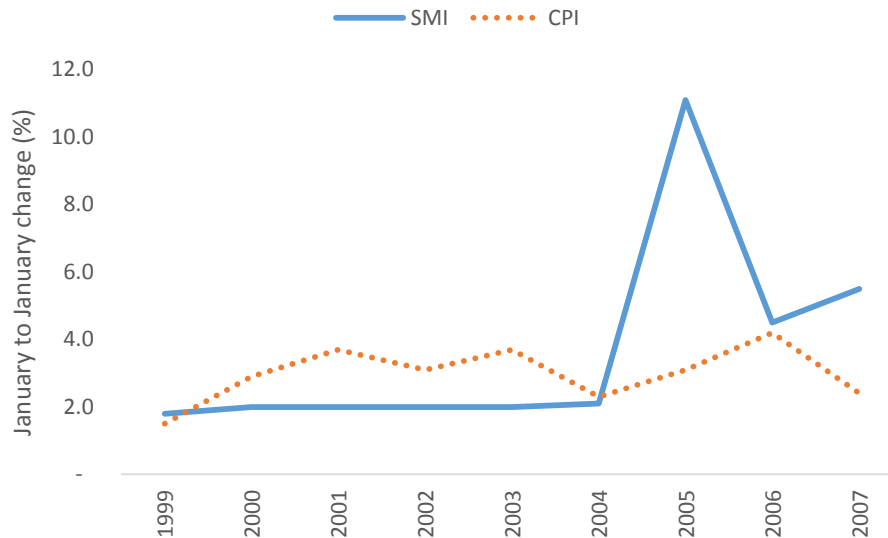
The Spanish minimum wage, known as *salario mínimo interprofesional* (SMI), is typically set on December on an annual basis and takes effect on January of the following year. The Spanish Government decides on the annual increase in the SMI following consultations with trade unions and employers associations, and taking into account inflation and productivity measures. The SMI is expressed as a monthly minimum income for a full time worker and it is adjusted for part-time workers. As shown in Figure 1, in years before 2005, the SMI increased at a stable rate of about 2%. However, this changed somewhat unexpectedly in that year. As shown in Figure 2, from January 2004 to January 2005, the SMI increased by 11%.

Figure 1 – National minimum wages in countries of interest.



Notes: data source is Eurostat Monthly minimum wages - bi-annual data.

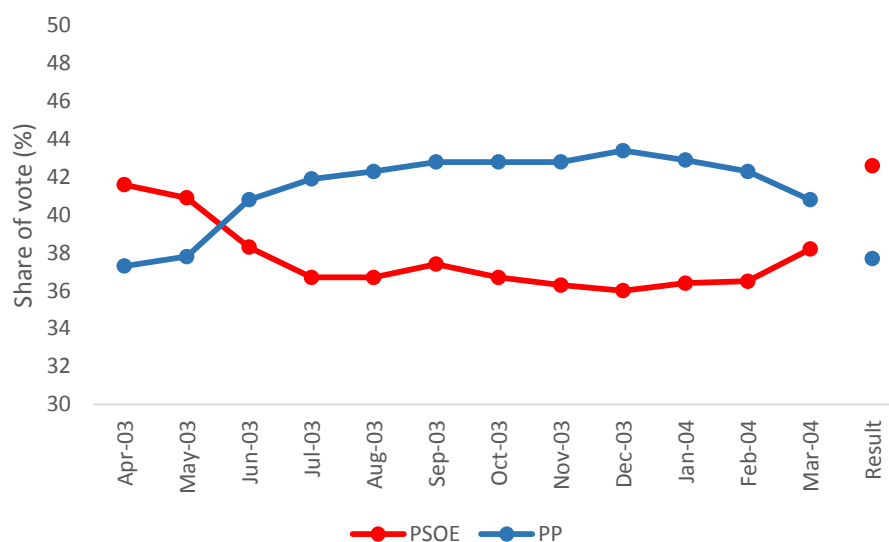
Figure 2 – Annual increase in the SMI in Spain



Notes: data source is the Spanish Ministry of Work, Migration and Social Security.

Given the drastic nature of the minimum wage change, we further explored the reasons behind the change. The 2004 Spanish general election was held on the 14 of March 2004. As shown in Figure 3, the governing conservative Popular Party (PP) led in the polls for most of the year before the election. On the 11th of March 2004, Spain experienced the largest terrorist attack in its history. The Government pointed to Basque nationalist group Euskadi Ta Askatasuna (ETA) as the primary suspect of the attacks. However, it became clear relatively quickly that ETA was not involved in the attacks. This led to a backlash against the Government and protests around the country, as many perceived that the tragedy was manipulated for electoral purposes. The mishandling on information following the attacks on the part of the Spanish Government led to an increase in the share of the Spanish Socialist Workers' Party (PSOE) vote and to an unexpected electoral victory (Chari, 2004).

Figure 3 – Share of votes for main parties in Spain (polls average and result)

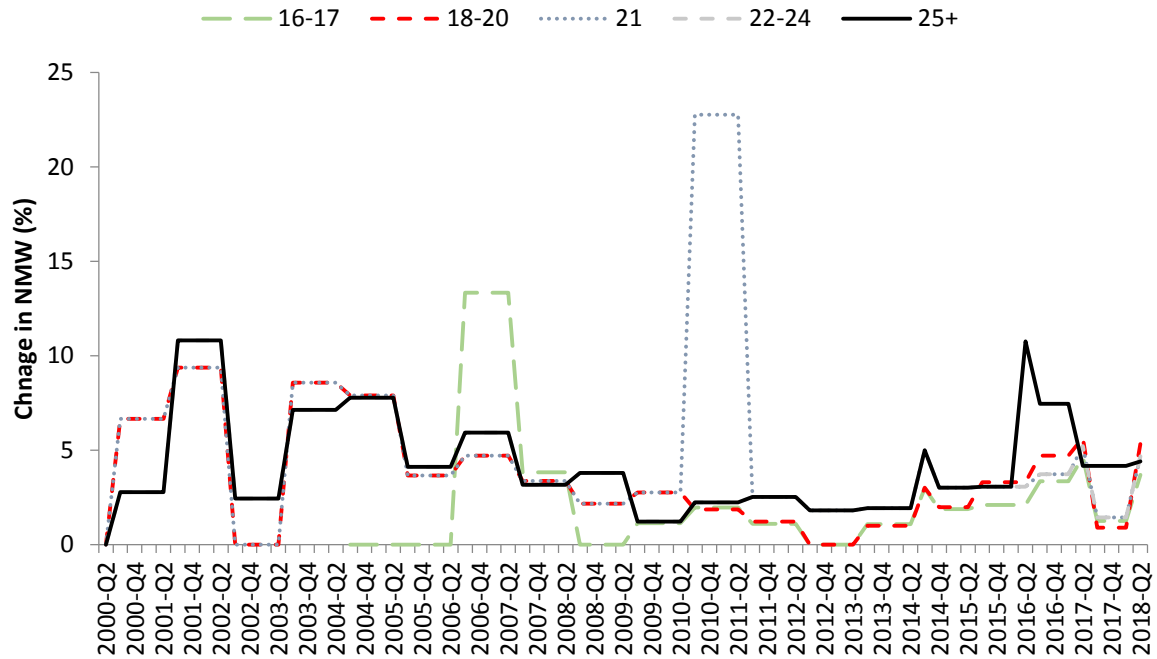


Notes: simple unweighted average of all polls available online. Data source is Arenas-Arroyo et al., 2019a.

One of the key electoral promises of the PSOE was a substantial increase in the SMI. This was the largest percentage increase in the SMI in decades and was largely unexpected in January 2004 given the polls at that time.

The UK National Minimum Wage (NMW) was introduced in 1999. Most NMW adjustments occur in October and follow from the recommendation of the Low Pay Commission, an independent body of experts with representation from unions, employers, and labour market experts. As shown in Figure 4, the NMW rate depends on the age of the workers, but the composition of the age groups has changed over time. For instance, those who were 21 years old had the same NMW rate as those 18 to 20 years old until October 2010. Also, those 25 years of age and older had the same NMW rate as those 22 to 24 years old until April 2016.

Figure 4 – Change in the minimum wage for the UK for different age groups



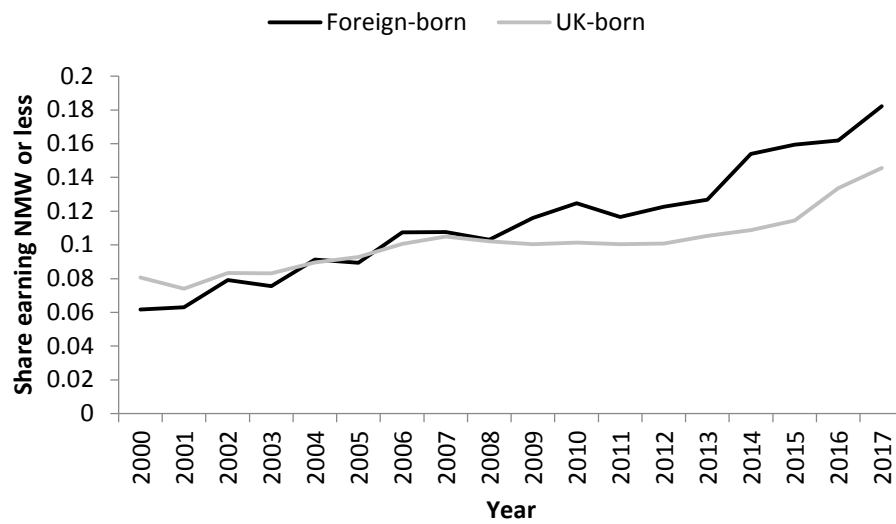
Notes: source is Arenas-Arroyo et al., 2019b.

Figure 5 presents the share of UK-born and foreign-born workers earning the NMW or less. In the mid-2000s, these two shares were close, but this changed over time. The divergent trend in recent years can largely be attributed to the arrival of immigrants from the EU, in particular those from new member states following its 2004 enlargement. As we explain in detail below, the UK was one of three countries to open up the labour market to nationals of the new EU member states immediately after accession and this led to a large wave of immigration from countries such as Poland, which has now overtaken India as the top origin country of migrants in the UK. The majority of migrants from the new EU member states working in the UK are employed in low-paid jobs (Vargas-Silva 2016). In fact, our estimates suggest that 23% of the workers from the new EU member states in the UK earned the NMW or less in 2017.

The sudden increase in the share of UK-born workers earning the NMW in 2016 is due to an unexpected and substantial increase in the NMW in April of that year (Bell and Machin, 2017). The announcement of this higher rate of the minimum wage (also known as

the “National Living Wage”) was accompanied by an announcement that the UK Government plans to increase the NMW substantially over the following years (Low Pay Commission 2016).

Figure 5 - Percentage of workers in the UK earning the NMW or below



Notes: source is Arenas-Arroyo et al., 2019b.

Finally, it is important to highlight that enforcement of the minimum wage in the UK tends to be low. Metcalf (2008) explains that in the UK “the typical employer gets caught for not complying with the NMW once every thousand years and there is no penalty for such non-compliance.” As explained above, the lack of compliance could be more relevant for migrant workers compared to natives.

3. Transitional Arrangements

Existing EU member countries could apply restrictions on the movement of workers coming from new member states for a transitional period of up to 7 years. Each existing member made a decision on whether to apply restrictions, and what kind of restrictions to impose.

Importantly, countries could not restrict the general freedom to travel, only the right to work in the country as an employed person.

Table 1 – Period for which workers from accession countries had free access to the labour market (shaded).

Group/Country	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
	Germany											
A8												
Malta/Cyprus												
Bulgaria/Roma												
Croatia												
	Italy											
A8												
Malta/Cyprus												
Bulgaria/Roma												
Croatia												
	Spain											
A8												
Malta/Cyprus												
Bulgaria/Roma												
Croatia												
	Sweden											
A8												
Malta/Cyprus												
Bulgaria/Roma												
Croatia												
	United Kingdom											
A8												
Malta/Cyprus												
Bulgaria/Roma												
Croatia												

Note: Spain maintained restrictions on nationals from Romania until 2014. A8 = Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovenia, and Slovakia.

As shown in Table 1, there has been large variation in the opening of labour markets to the nationals of new member states. In particular, Sweden and the UK granted immediate and unrestricted access to nationals of all A8 countries (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovenia, and Slovakia). In fact, Sweden has been generally open regarding migration of workers from new EU member states. Importantly for the analysis below, Spain imposed limitations on the access of A8 nationals to its labour market until 2006. Finally, Germany imposed strong restrictions nationals of new EU member states and did not open the labour market to A8 nationals until 2011.

4. Case Studies Selection, Data and Methods

Based on the previous analysis we decided to focus the empirical component on the cases of Germany, Spain and the UK. That is, on the three countries that have a national minimum wage. For each of the countries we completed a slightly different set of estimations as explained below.

4.1 Methods: Germany

In the case of Germany, we focus on the consequences of the introduction of the minimum wage in 2015. For this purpose, we use the German Socio-Economic Panel (SOEP), a representative longitudinal study of private households in the country. The SOEP started collecting data in 1984 and includes about 30,000 respondents (11,000 households) every year. We limit the sample to the years 2013 to 2015 and to individuals who are working as employees in each year and are 16 to 65 years of age. In the final sample we have 18,380 observations of which 1,702 are from migrants.

The empirical analysis is conducted using median regressions (i.e. Koenker and Bassett, 1978) in order to disregard more extreme wage changes. The estimation consists of a series of regressions along the following lines:

$$\Delta W_{it} = \beta_0 + \beta_1 L_j + \beta_2 D2015_t + \beta_3 L_j * D2015_t + \eta X_{it} + \varepsilon_{it}. \quad (1)$$

Where ΔW_{it} is the change in the log hourly wage of individual i in between year t and $t-1$, $D2015_t$ is a dummy equal to one for the year 2015. L_j is a dummy indicating that the individual is a low wage worker, defined as having a wage in 2014 which is no more than 30% higher of the minimum wage in 2015. In the result tables, we also show the results using a threshold of 20 and 40% instead. The X_{it} variables represent a series of individual characteristic such as age, marital status, gender, number of children, years of education, region and being a full time worker.

In the presentation of the results we focus on discussing the estimated impact of the presence of the minimum for the wage growth of low wage workers, which is given by $\beta_2 + \beta_3$.

4.2 Methods: Spain

In Spain, we focus on the unexpected increase in the minimum wage that resulted from the 2004 terrorist attack and related unexpected electoral outcome. The empirical analysis uses the Muestra Continua de Vidas Laborales (MCVL), an administrative data set with longitudinal information. The sample represents a 4% non-stratified random sample (over 1 million observations each year) of the population who in a given year have any relationship with Spain's Social Security system due to work, receiving unemployment benefits, or receiving a pension.

Each MCVL year includes records for the complete labour market history of individuals included in that year. It contains detailed information on individual characteristics (gender, date of birth, place of birth, level of education), as well as employment characteristics (monthly earnings, pension benefits, period of employment, sector, occupation, part-time or full time contract, fixed-term or unlimited contract, tenure with current employer, municipality of current job, experience accumulated in the labour market).

The purpose of the analysis is to estimate the impact of the minimum wage on the labour market outcomes of the native-born and different groups of migrant workers. In the analysis, we limit the sample to the months January-March 2004 and January-March 2005. The sample includes both male and females aged 18 to 60 who were observed in all relevant months (6 times).¹ Overall, we have 805,292 individuals (4,831,752 observations) of which 40,820 are foreign-born (244,920 observations).

The estimation consists of a series of median regressions along the following lines:

$$\Delta W_{it} = \beta_0 + \beta_1 L_j + \beta_2 D2005_t + \beta_3 L_j * D2005_t + \eta X_{it} + \varepsilon_{it}. \quad (2)$$

In this case, ΔW_{it} is the change in the log monthly earnings of individual i with respect to the same month in year t and $t-1$. For example, in January 2005 the dependent variable is

¹ We exclude spells which workers spent in self-employment since earnings are not available, as well as job spells in agriculture, fishing, mining, and other extractive industries that are more rural, and usually covered by a special social security regime characterised by self-reporting. In addition, we exclude job spells in public sectors such as international organizations, education, and health services since earnings are heavily regulated by both national and regional governments. We also exclude apprenticeships and certain rare contracts. Finally, we exclude the Basque Country and Navarre since tax record in those regions are collected differently than the rest of Spain. We also exclude those working for less than 20 days per month.

the difference between the log wage in January 2005 and log wage in January 2004; in January 2004 the dependent variable is the difference between the log wage in January 2004 and the log wage in January 2003. The same criteria applies to observations from February and March.

In addition, δ_i is the individual fixed effect, $D2005_t$ is a dummy, which is zero for 2004 and one for 2005, X_{it} are a series time variant demographic characteristics and ε_{it} is the error term. X_{it} includes controls for age, tenure, gender, education, GDP change, unemployment change, occupational skill level, fixed term contract, part-time contract, and municipality of current job. Finally, the regressions are conducted for different groups: all, Spanish-born, foreign-born, EU born, Latin American-born, African-born, and other migrants.

4.3 Methods: United Kingdom

For the UK, the analysis relies on the panel component of the secured access version of the UK Labour Force Survey. Given that it was not possible to identify an obvious sub-period for the analysis, as in Spain and Germany, the analysis uses all the data available from Q1 2000 to Q2 2018. An alternative source of information on earnings in the UK could be the Annual Survey of Hours and Earnings (ASHE), which is based on a 1% sample of HM Revenue and Customs records. Most of previous research on the NMW has been conducted using ASHE. However, this dataset does not contain information on country of birth and it is, therefore, not adequate for our purposes.

The LFS has several additional advantages over ASHE. First, the LFS is a survey of households and it is more likely to cover the informal economy than ASHE. Moreover, ASHE is unlikely to reveal much underpayment as it is employers themselves who complete the survey (Low Pay Commission 2019).² This is different for the LFS, which is a survey of workers. Finally, the LFS allows us to look at wages throughout the year, whereas ASHE just provides information for April. This is important as some uprates of the NMW have taken place in April and timing issues can affect the estimates of impact (Low Pay Commission 2019).

² Note that if there is under(over)reporting of earnings in the LFS this will not affect our results unless this under(over)reporting systematically differs across groups.

The LFS interviews individuals for five successive quarters, but the earnings information is only recorded in two waves (waves 1 and 5). Therefore, the sample is limited to individuals who are employed in those two waves (excludes the self-employed and those in government schemes). That is, the earliest cohort in the estimations includes those who enter the sample in the first quarter of 2000 (and exit in the first quarter of 2001), while the last cohort includes those who enter the sample on the second quarter of 2017 (and exit in the second quarter of 2018).

The main analysis is restricted to employees who are 16 to 47 years of age in 2000 and are working in the private sector when first observed. These individuals are 34 to 65 years of age in 2018. Migrants are defined as individuals born outside of the UK. In total, we have information on 131,268 individuals. This includes 120,593 observations for natives and 10,675 observations for migrants.

As explained above, the NMW changes at least once per year. This means that we can observe individuals in the sample under different rates and changes of the NMW, depending on the year and quarter of their inclusion in the LFS. The wage data refers to earnings in the main job of the individual. The hourly wage is derived by dividing the weekly wage by the usual number of paid hours worked per week.³

The empirical analysis is conducted using median regressions. In particular, following the suggestions of Lopestri and Mumford (2016) we estimate different regressions along the lines of:

$$\Delta W_{iqt} = \beta_0 + \beta_1 L_j + \sum_{k=1}^3 \gamma_k K_k + \sum_{k=1}^3 \delta_{jk} (L_j * K_k) + \eta X_{it} + \tau_q + \omega_t + \varepsilon_{iqt}. \quad (5)$$

Where ΔW_{iqt} is the change in wage between wave 1 and wave 5 of the survey estimated as $\Delta W = ((W_5 - W_1)/W_1)$ and L_j is a dummy indicating that the individual is a low wage worker, defined as having a wage which is no higher than 30% of the NMW in wave 5. In the result tables, we also show the results using a threshold of 20 and 40% instead. The dummies K_k indicate that the individual experienced a NMW increase of 3% to 4%, 5% to 6% or over 6% percent (i.e. baseline are those experiencing a NMW increase of 0 to 2%).

³ The analysis is conducted in nominal terms. We also tried dividing the wage and minimum wage by the CPI, but the implications of the results remain the same.

That is, in the estimation we allow the effect to depend nonlinearly on the size of the minimum wage increase. The X_i variables represent a series of individual characteristic such as age, gender, marital status, full time worker status, ethnicity, education, London location, and union membership. Finally, τ_q are quarter dummies and ω_t are year dummies.

In the presentation of the results we focus on discussing the estimated impact of a NMW change of size K for low wage workers, which is given by $\hat{\gamma}_k + \hat{\delta}_{jk}$. This is the effect of a given NMW change for low-wage workers relative to low-wage workers who experienced a small increase in the NMW (i.e. 0 to 2%).

We first estimate the regressions for the full sample and then separately for UK-born and foreign-born workers. In a second step, we separate EU and non-EU migrants in the analysis.

5. Results

5.1 Results: Germany

Table 2 present the results for Germany. Focusing on those who earned within 30% of the minimum wage, the results suggests that these individual experienced growth in their earnings in 2015 which was 11% higher than in 2014 (column 1, row 2). The results suggest that the impact was similar for those born in the EU, at 10%. We do not divide the EU group further in the estimation because of sample size. The effect seems to be much bigger for those born outside the EU. Low-paid workers from this group experienced wage growth in 2015 that was 16% higher than in 2014.

Note that changing the definition of low-paid workers has important implications for the results. Using the more restrictive 20% band, the coefficient on EU migrants is substantially smaller than the one for the German born population, while this band change has almost no effect on the non-EU born group. In other words, the results suggest that the introduction of the minimum wage had fewer hourly earnings implications for low-paid EU migrants compared to those of other groups. On the other hand, increasing the band to 40% leads to almost the same coefficient across all groups. In this case, the results suggests that

individuals experienced growth in their earnings in 2015 which was 8.6% higher than in 2014.

Table 2 – Introduction minimum wage and hourly wage change in Germany in 2014/2015.
Dependent variable $\text{Logwage}_t - \text{Logwage}_{t-1}$.

Wage group	All workers (1)	German (2)	All migrants (3)	EU migrants (4)	Non-EU migrants (5)
20%	0.144*** (0.002)	0.142*** (0.006)	0.152*** (0.019)	0.126*** (0.025)	0.168*** (0.032)
30%	0.111*** (0.005)	0.110*** (0.005)	0.109*** (0.017)	0.104*** (0.022)	0.162*** (0.029)
40%	0.086*** (0.004)	0.086*** (0.005)	0.087*** (0.014)	0.087*** (0.020)	0.087*** (0.026)
Observations	18,368	16,666	1,702	1,047	655

Note: Sample: all individuals age 16 to 65 when first observed who are working (excluding the self-employed). Significance *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust clustered at individual level standard errors in (.).

5.2 Results: Spain

The results for Spain are reported in Table 3. The results suggest that the overall low-paid population experienced higher wage growth in 2005 (after unexpected large increase in the minimum wage) compared to 2004 (pre-increase). In particular, the results suggest that individuals experienced an increase in their wage growth rate that was 3.8% higher in 2005 than in 2004. Hence, the overall effect is statistically significant but small.

The effects are different for migrants. In this case, the wage growth rate was smaller in 2005 than in 2004. Hence, a minimum wage is not an automatic ensurance of higher earnings for low-paid workers. As explained above, this could be the result of the minimum wage becoming a focal point for setting wages on the part of employers.

It is important to highlight again that there were other events parallel to the minimum wage change that could be affecting the results. For instance, the terrorist attack could have led to more discrimination against migrants, particularly those from outside the EU and that the results could reflect this dynamic. Finally, changing the wage band to 20% increases the negative coefficient for all migrants, but has little effect on the coefficient for EU migrants.

Table 3 – Growth in monthly earnings in Spain in 2004/2005. Dependent variable $\text{Logwage}_t - \text{Logwage}_{t-1}$

Wage group	All workers	Spanish	All migrants	EU migrants	Latin American migrants	African migrants	Other migrants
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
20%	0.056 *** (0.000)	0.057 *** (0.001)	-0.092 *** (0.003)	-0.055 *** (0.005)	-0.111 *** (0.006)	0.004 (0.007)	-0.344 *** (0.007)
30%	0.038 *** (0.000)	0.040 *** (0.000)	-0.062 *** (0.002)	-0.060 *** (0.004)	-0.035 *** (0.005)	0.027 *** (0.005)	-0.355 *** (0.006)
40%	0.032 *** (0.000)	0.035 *** (0.000)	-0.041 *** (0.002)	-0.042 *** (0.003)	-0.050 *** (0.004)	0.025 *** (0.005)	-0.138 *** (0.005)
Observations	4,831,752	4,586,832	244,920	73,320	93,072	36,936	41,592

Notes: Robust clustered at individual level standard errors in (.). Significance *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Sample: all individuals age 18 to 60 when first observed who are working.

5.3 Results: United Kingdom

Columns (1) to (3) of Table 4 reports the results for the full sample. As in the previous estimations, these are results from median regressions. Therefore, the estimates refer to the effects of the minimum wage increase at the median percentage wage change rather than on average. The results suggest that those who experienced a higher minimum wage increase experienced lower growth in hourly pay. In particular, individuals with an initial hourly wage no more than 30% larger than the new NMW who experienced a rise in the minimum wage of between 5 to 6%, had growth in their hourly wage which was 1% lower than similar individuals who experienced a rise in the minimum wage of between 0 to 2%. The result does not change much if we focus on those who had an initial hourly wage no more than 20 or 40% larger than the new NMW. This is consistent with the results of Lopresti and Mumford (2016) for the United States who found that relative small increases in the minimum wage had negative effects on wage growth for low-paid individuals. In their case, they find that minimum wages increases of 20% or more were required to have positive effects on low-wage individuals. These types of minimum of large minimum wage changes are rare in the UK. However, as we will see below, the dynamics are markedly different from UK-born and migrant workers.

Columns (4) to (9) of Table 4 report the results disaggregated by migrant status. The overall result holds for both samples, but the coefficients are substantially larger for the foreign-born group. The estimates suggest that migrants with an initial hourly wage no more than 30% larger than the new NMW who experienced a rise in the minimum wage of between 5 to 6%, had growth in their hourly wage which was 4% lower than similar individuals who experienced a rise in the minimum wage of between 0 to 2%. The effect is substantially smaller for the UK-born around 1%.

Table 3 – Minimum wage changes and hourly wage change in the UK in 2000-2018. Dependent variable $\text{Logwage}_t - \text{Logwage}_{t-1}$.

Wage group	All workers			British			All migrants			EU migrants			Non-EU migrants		
	(1) 2-3%	(2) 4-6%	(3) >6%	(4) 2-3%	(5) 4-6%	(6) >6%	(7) 2-3%	(8) 4-6%	(9) >6%	(10) 2-3%	(11) 4-6%	(12) >6%	(13) 2-3%	(14) 4-6%	(15) >6%
20%	-0.0002 (0.003)	-0.011*** (0.004)	-0.008 (0.003)	0.0002 (0.0027)	-0.0090** (0.0043)	-0.0072** (0.0033)	-0.0067 (0.0106)	-0.0400** (0.0192)	-0.0265* (0.0143)	-0.0038 (0.0177)	-0.0656* (0.0365)	-0.0165 (0.0260)	-0.0023 (0.0129)	-0.0246 (0.0222)	-0.0223 (0.0168)
30%	-0.001 (0.003)	-0.012*** (0.004)	-0.010 (0.003)	-0.0008 (0.0027)	-0.0113** (0.0043)	-0.0094*** (0.0034)	-0.0060 (0.0105)	-0.0403** (0.0189)	-0.0240* (0.0141)	-0.0038 (0.0168)	-0.0669** (0.0340)	-0.0172 (0.0244)	-0.0016 (0.0129)	-0.0269 (0.0222)	-0.0260 (0.0168)
40%	-0.002 (0.003)	-0.010** (0.004)	-0.010 (0.003)	-0.0018 (0.0028)	-0.0087** (0.0044)	-0.0099*** (0.0034)	-0.0096 (0.0104)	-0.0403** (0.0186)	-0.0234* (0.0139)	0.0023 (0.0178)	-0.0513 (0.0354)	-0.0055 (0.0256)	-0.0050 (0.0132)	-0.0303 (0.0225)	-0.0249 (0.0172)
Observations	131,268	131,268	131,268	120,593	120,593	120,593	10,675	10,675	10,675	3,406	3,406	3,406	7,269	7,269	7,269

Note: Sample: all individuals age 16 to 47 when first observed who are working (excluding the self-employed and those in government schemes). Significance *** p<0.01, ** p<0.05, * p<0.1. Robust clustered at individual level standard errors in (.).

Next, columns (10) to (15) present results separately for EU and non-EU migrants. EU migrants have unrestricted access to the UK labour market, including access to low-paid jobs, while non-EU migrants face strong restrictions in accessing low skill jobs from abroad. If EU immigration responds to increases in the NMW, then increases in the NMW could result in an increase in the supply of low paid workers in the UK. This increase in supply could affect the wage of EU and non-EU low-paid workers resident in the UK. However, to the degree that EU and non-EU low-paid workers are imperfect substitutes in the labour market, the effect should be stronger on resident EU migrant workers.

The results in Table 4 suggest that the effect of a larger NMW is much higher for EU migrants. In particular, EU migrant workers who experienced a rise in the minimum wage of between 5 to 6%, had wage growth that was 7% lower than similar individuals who experienced a rise in the minimum wage of between 0 to 2%. Interestingly, the coefficient is no longer significant and substantially smaller when looking at those who experienced a NMW of more than 6%. Hence, it seems that main negative effect is for those experiencing a mid-level rise in the NMW.

Again, it is important to put these results into context and remember that low-paid workers would have experienced wage increases with or without minimum wage changes. The results show that those wage increases were smaller during periods at which the change in the minimum wage was higher.

6. Limitations and Implications for EU mobility

The results from the different analyses above for Germany, Spain and the UK suggest that there is no consistent effect of higher minimum wages for the earnings of EU migrants. There was a positive increase in hourly wage because of the introduction of the minimum wage in Germany, while the analysis for Spain and the UK even suggests that there could be negative consequences of higher minimum wage for the earnings of low-paid EU migrants.

There are several implications of this analysis for the broader question of EU mobility. Initially, it might seem that the lack of a major positive effect of minimum wage increases on earnings suggest that this increases are unlikely to motivate additional



migration. However, the focus of our analysis was on the wage effects of the minimum wage, conditional on continued employment. It is possible that the wage effects estimated reflect an increase in the supply of low-skilled EU migrants in response to a minimum wage increase. The full papers for each country provide further insights into these dynamics.

Finally, it is important to highlight several caveats in the analysis. First, for the case of Germany the sample is somewhat small and this could be driving some of the results. In the case of Spain, it is important to remember that this country was still imposing restrictions on the migration of A8 nationals for the period of analysis (i.e. 2004 and 2005). The dynamics could have changed after the lifting of these restrictions. Finally, in the case of the UK, the analysis covers a long period and the nature of the EU workforce in the country has changed over that period.



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The REMINDER project is exploring the economic, social, institutional and policy factors that have shaped the impacts of free movement in the EU and public debates about it.

The project is coordinated from COMPAS and includes participation from 14 consortium partners in 9 countries accross Europe.



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