The Impact of the German Minimum Wage on the Labour Market: Evidence from Macro-Data

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Abstract

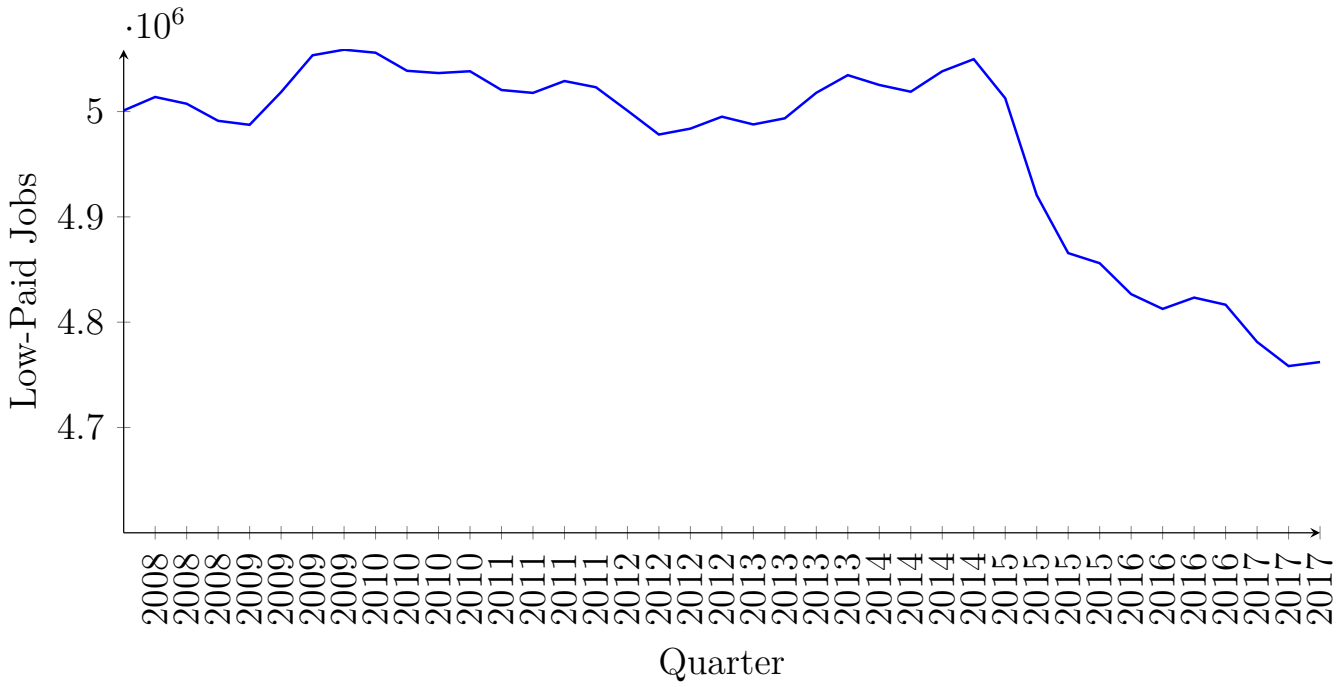
In this thesis I attempted to analyse the impact of the national minimum wage, imposed in 2015, on the German labour market. This analysis is completely based on macro-data, which differentiates the thesis from the previously written literature on this topic. Using measures such as employment, low-wage employment, unemployment and wages I find mostly distortionary effects. The method used in this thesis is primarily fixed effects panel data regression, but difference-in-differences analysis is conducted in the robustness section. Although the results seem relatively conclusive, it would be advised to further analyse the impact in a later time, when the reform has aged some more.

1. Introduction

Although in most countries the existence of a minimum wage might be regarded as trivial and straight-forward, it is not as unquestionable as it might seem to be. Granted, most European countries have adopted a national minimum wage, but countries such as Austria, Denmark, Norway, Finland, Iceland, Italy, Sweden and Switzerland do not have a state mandated wage floor in place. Historically it has been assumed in economic theory that minimum wages have distortionary effects and create market failures. However, with the introduction of different views on the labour market in itself, more

diverse assumptions on the effects of the policy have emerged. Germany had for long been a country that elected to let the market decide on the prevailing wage and thus opted not to impose a minimum wage, until 2015. From the first of January 2015 onwards, a national minimum wage has been introduced, which is revised every year to follow closely the developments of the median wage of the country. Immediately after the introduction of the minimum wage, it was estimated that in the first quarter of 2015 roughly two million workers were earning exactly the newly introduced minimum, whereas one million workers were still earning less. In comparison, in 2014, the number of workers earning less than the newly imposed minimum wage was around four million. Of course, the wage increase did not come without a cost.

Figure 1: Low-Paid Jobs in Germany



As can be inferred from the graph shown above, a sharp decrease in employment of low-wage workers can be seen exactly at the time of the reform. In this paper, a critical evaluation of the minimum wage will be attempted to be formulated. Factors such as employment, income and unemployment in multiple sectors will be analysed in order to estimate whether there was

an effect around the introduction of the minimum wage and if so, whether this can be considered as caused by the policy reform. The main research question which will be attempted to answer is as follows: **Did the introduction of the national minimum wage in Germany in 2015 result in significant distortions on the labour market?** The results of the analyses conducted in this thesis, based on panel data regression and difference-in-differences analyses, seem to confirm the classic thought, as severe distortions were found accompanied by only small median wage effects. Total employment figures took a significant hit, whereas unemployment rose. It seems that the participation rate dropped severely as well, indicating that many former workers became inactive.

This thesis is structured as follows: first, some background information and a literature review will be provided. Afterwards, the methodology and data will be discussed and described, after which the results will be presented and visualised, along with several robustness checks to control for the internal validity of the results. Finally, a discussion of the results and caveats of this research are reviewed, followed by a general conclusion.

2. Background information

Whether or not imposing a minimum wage in a given labour market is a good or a bad development has been a prominent point of discussion in the economic literature to date. In this section, the two main theories will be elaborated on, in order to clarify the arguments used by both sides of the discussion.

2.1. Classics

The classic view that is still taught initially in most standard economics books used by students believes in mere distortionary effects as a result of imposing a minimum wage. The supporters of this view postulate that in an efficient, perfectly competitive labour market, introducing a minimum wage above the prevailing equilibrium wage (of course, setting it at the current wage or below will not induce any effect) will result in considerable distortions. These distortions arise as a result of increasing marginal and average costs of labour. As a response to these shifts, firms decide to employ less of the now costlier labour. The net effect is that, although the wage has increased to the newly imposed minimum level, it comes at a cost in the form of (unnecessary) involuntary unemployment.

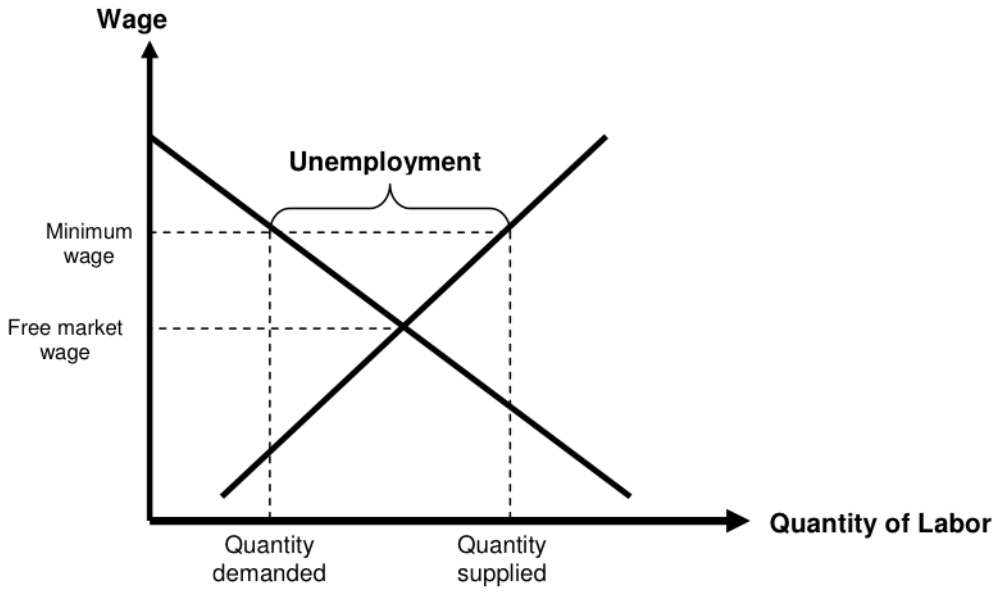


Figure 2: Perfect Competition Labour Market

The ones affected most by this distortion will be the lowest earning workers, as they will be the ones whose wage is altered the most out of the working force. Workers with a high productivity will (since in the classical theories, wage is equal to marginal productivity) be paid higher and thus – commonly – their initial payment will not be affected by the implementation of the reform. This leads to the distortions mostly taking place at the lower end of the earnings spectrum, which can induce negative distribution effects (Stigler, 1946).

2.2. Alternatives

Although the effects as described above sound straight-forward in the framework in which it operates, it crucially relies on the massive, yet questionable assumptions that labour markets are perfectly competitive and that firms pay wages equal to the labourers' marginal productivities. The term efficiency wages is nowadays widely accepted and used in economic literature, although it rejects the concept of workers being paid exactly their marginal product. Efficiency wages imply that there is a certain principle-agent problem between the employer and the employee, that can be resolved by paying the worker in excess of his productivity. These problems are largely based on

the phenomenon of asymmetric information, because the employer cannot fully observe the employee's productivity at all times. This, for example, yields the employee an opportunity to shirk, and thus create an extra cost for the firm. By increasing this worker's wage, the employer tries to impose a heftier cost on shirking: if the employee gets caught and is subsequently laid-off, he will forego a larger income. Other reasons include the attempt to make the outside option of a worker less attractive and the reduction of the potential incentive to switch jobs. The essence of the efficiency wage theory is that the causation, as we know it from the classical theory, is reversed: wages influence productivity, and not the other way around (Stiglitz, 1986).

The mere existence of efficiency wages already is contradicting the story of a perfectly competitive labour market, as it implies that the prevailing wages are not equal to the workers' marginal productivities. Furthermore, it proposes that a change in the minimum wage does not only increase the wages of the workers below the threshold of this wage, but also of the ones just above: otherwise, the skill gap would no longer be represented in the wages. An alternative viewpoint rejects the complete assumption of the existence of a perfectly competitive labour market. Instead, the labour market could be considered as a monopsony. The core of this theory is the assumption that the employer possesses some degree of power over his employees and can therefore offer him a salary that is in fact lower than his productivity. Due to this lower salary, the employment is also lower than in the perfect competition equilibrium. If then a minimum wage is introduced, which is higher than the current prevailing wage, yet lower than the perfect competition equilibrium salary, both the wage as well as the employment will increase. Due to the fact that this jump in employment can induce more output, it often goes hand in hand with a decrease in prices, as opposed to an increase in the perfect competition scenario (Stigler, 1946).

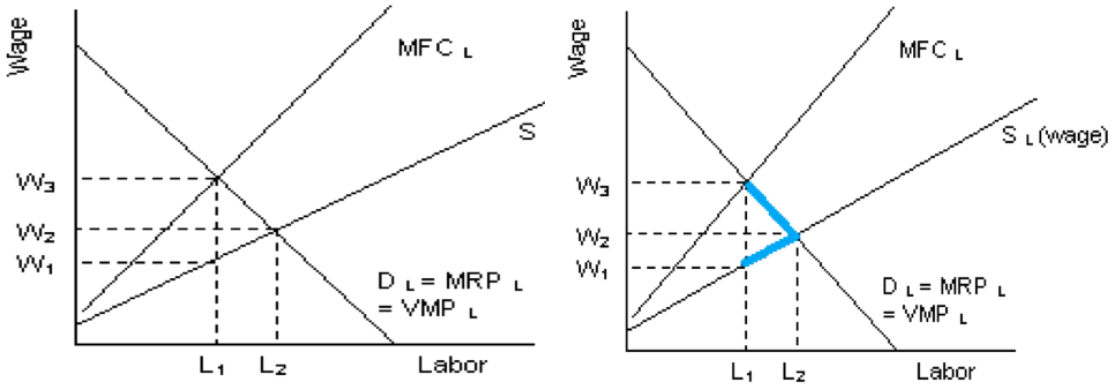


Figure 3: Monopsony Labour Market

In the graphs above, the effect is visualised. The perfectly competitive equilibrium would be point (Lz,Wz). However, because employers have monopsony power, they can offer a wage that is smaller than the equilibrium wage, being W1. At this wage, employment will only be at the level L1, since W1 is lower than the reservation wage for a substantial share of the workforce. If a minimum wage would be introduced at any given point on the blue line, both employment as well as the equilibrium wage would increase.

3. Literature Review

Many articles have preceded this paper in investigating the effects of minimum wages in specific labour markets. A great example for the case of Germany was written by Mario Bossler and Hans-Dieter Gerner (2016), who published a paper for the German Institute for Employment Research (IAB). Although they attempt to research the effects of the same policy reform, the methodology is vastly different. The writers use yearly survey data, conducted by the IAB itself, in the annual so-called IAB Establishment Panel, in which roughly 15,000 labourers are being interviewed in the month June of each year. The conclusion of their research includes that they found generally positive effects. Average wages went up by nearly 5% after the introduction of the minimum wage, where employment declined by just short of 2%. After careful analysis of the jobs that were lost, they found that about 60,000 jobs were lost as a direct result of the minimum wage. The loss of jobs contained both increased lay-offs as well as a decrease in

vacancies (Bossler & Gerner, 2016). Contrastingly, in this thesis I elected to use macroeconomic data gathered from multiple German federal sources, both to provide evidence based from a different viewpoint and source as well as to minimise the inevitable threat of endogeneity that goes hand in hand with survey analysis.

Although Germany did not have a minimum wage before 2015, there have been several opportunities to analyse similar effects. It was common practice for several labour sectors to have a standardised sector-specific minimum wage as a result of bargaining between unions and employers. An example of research based on this phenomenon is presented by Marion König and Joachim Möller (2009), who decided to have a closer look at the minimum wages that were imposed in 1999 in the German construction sector. They used a difference-in-differences approach to compare the effects on the workers who were earning below the minimum wage and just above the minimum wage before the reform. They found that in both East- as well as West-Germany the minimum wage increased the earnings of the treated workers, but that only in East-Germany employment significantly decreased. Contrastingly, there was no significant effect on employment in West-Germany (König & Möller, 2009).

Similarly, Bodo Aretz et al. (2013) analysed a sector-specific minimum wage for the German roofing industry. In contrast to their colleagues König and Möller, they use the plumbing sector (which was not affected by a minimum wage) as a control group, rather than the workers in the same sector that were already earning above the minimum wage. Based on a fulfilled similarity assumption, they utilise difference-in-differences techniques to come to the conclusion that there were significant negative employment effects that directly resulted from the introduction of a minimum wage. Similar to König and Möller, they found that the effect is greater in East-Germany (Aretz, Arntz, & Gregory, 2013).

Another paper on the effect of the introduction of the minimum wage using micro-data was written by Caliendo et al. (2017). This paper focuses primarily on distributional effects, as opposed to mere employment and participation consequences. To come to their results, they used the widely popular approach of difference-in-differences analysis and used data from the Socio-Economic Panel, a longitudinal panel survey, which is conducted annually among roughly 30,000 participants. In order to trim their sample to be as representative as possible, they remove among others outliers, non-respondents, non-eligible groups and workers that fall under the collectively

bargained wages. They find that there is a significantly higher wage growth at the bottom distribution, leading to a decrease in overall income inequality. Still, seven percent of the workers earn a wage that is lower than the minimum wage, which is substantial and remarkable. However, the average monthly wage seems to be unaffected, as no significant effects were found at the average level. This is due to the fact that simultaneously working hours were decreased, meaning that the wage increase was compensated by shorter working hours (Caliendo, Fedorets, Preuss, Schroeder, & Wittbrodt, 2017).

When considering non-German-specific, international environments, analyses have often been more credible as a result of policy reforms often allowing for comparison between similar states or countries with separate arrangements, as opposed to a nationally imposed minimum wage, which leaves no room for different treatments across states. One of, if not the most famous example was written by David Card and Alan Krueger (1993) in their paper regarding the increase of the minimum wage in New Jersey. They compared the effects to neighbouring state Pennsylvania, that served as a control group as the minimum wage there was left unchanged. In contrast to the literature dominating until then, which generally found negative employment effect (which also holds for the German evidence as described above), strong positive developments were observed. To ensure that they analysed workers who were part of the low-wage category, they restricted their analysis to fast-food restaurants. Again, the difference-in-differences technique was used to come to a finding of, till that date, counterintuitive results (Card & Krueger, 1994).

4. Methodology

In order to analyse the impact of the minimum wage on the labour market, several dependent variables that were deemed to be relevant were tested. Of course, a labour market cannot be summarised by just one variable, and the effects of a minimum wage are thought to be diverse. Hence, I chose to focus not only on one particular variable, but to conduct analysis on multiple factors. However, it must be noted that it is beyond the scope and resources of this thesis and most probably any academic article to analyse every single variable associated with the labour market. Therefore, and taking the data sources into account, I have chosen to particularly look into the effects on the general employment, employment of low-wage workers, the median hourly wages, unemployment figures and the total labour force. The most prevalent methodology in this thesis is before- and after analysis using Fixed

Effects regression. This was done by conducting regression analysis like one commonly would, but adding in a treatment dummy, that distinguishes the effects before and after the introduction of the minimum wage in 2015. The methodology of choice was panel data regression, as the data fits perfectly and it is arguably the most credible analysis in this field. To control for the differences between the states and over time, both time- as well as state-fixed effects have been used. The inclusion of these fixed effects prevents us from picking up effects that would be attributed to our explanatory variables, whereas they in reality are driven by characteristic changes between either all the states (such as population, size, etc.) or movements that are time-specific (in this case quarter-specific) such as macroeconomic shocks. In order to account for time fixed effects, linear, squared and cubic trend variables were added as well as dummies for the four quarters. Because not all of the data was available in the same time frame, some variables had to be interpolated from annual to quarterly. The only variables to have undergone this transformation are the GDP and the median hourly wage. The methodology used was cubic spline interpolation, a commonly used and fairly robust method of interpolating variables using polynomials.

Additionally, to examine the differences in development between the southern Bundesländer (i.e. states) in Germany with the neighbouring Austrian states, difference-in-differences analysis has been conducted. The same method has been applied to the analysis on the differences between the richer and poorer areas of Germany. This is by far the most adopted methodology within the field of labour economics, and especially so in the literature regarding effects of minimum wage (as can also be inferred from the literature review). The methodology relies on the assumption that both the control and the treated groups are similar in their characteristics. If this assumption is satisfied, then one can compare the trends of the variable of interest over time. If the development of the variable in the treatment group significantly differs from the trend in the control group, whilst the growth was similar before the treatment, one can infer a causal effect from this treatment, provided that there were no other asymmetric changes occurring at the time of treatment. In this case, the control group can be considered as the counterfactual to the treatment, which yields the causal effect of the treatment.

The visualising graphs used throughout this paper are smoothened out in order to create a clearer image. Some key variables are subject to substantial seasonality, which would make the graphs more difficult to interpret at the first sight. In order to not artificially change the values of the variables in the

actual analysis, the raw data is used for the regressions and the smoothened out values are merely used as a visualisation aid. The method used was a moving average smoother, based on four lagged terms of the variable in question. The smoothing mechanism creates uniformly weighted moving averages of the variable, generating much smoother residuals.

In the panel data regression, several control variables deemed to be relevant for the analysis were chosen to be included in order to increase the internal validity as much as possible. Of course, it would be impossible to assume that the results from an OLS regression or a Fixed Effects regression estimate is causal, but I nevertheless tried to eliminate omitted variables as much as was possible with the resources at hand. The control variables used include the share of part-time workers, the share of migrant workers, the participation rate, the median hourly wage, the GDP per capita growth, the population, the amount of people receiving unemployment benefits and the amount of vacancies. Because some variables are subject to trends over time, they were detrended or differenced in order to eliminate the possibility of spurious regressions as a result of non-stationarity. The variables that were subject to this problem were the GDP and the amount of vacancies, as they clearly followed an (upward) trend over the time span of the sample. Therefore, the first differences of the GDP per capita were used instead, and the vacancies were detrended using the fourth lag. Furthermore, because the data is observed between the first quarter of 2008 until the third quarter of 2017, it is unavoidable that there will be some effects caused by the Great Recession in the sample. To minimise the interference on the analysis, a recession dummy has entered the regression. By looking at the GDP growth rates over time, I observed that there was substantial negative growth in the whole year of 2008 and the first half of 2009. Moreover, negative growth was observed from 2012-Q4 until 2013-Q3. Naturally, the dummy takes a value of one for these quarters.

This all can be summarised in a regression equation, which takes the following form for the panel data regressions:

$$Y_{it} = \alpha_{it} + \beta_1 X_{it} + \beta_2 \Delta_{it} + \delta_t + \gamma_i + \epsilon_{it} \tag{1}$$

Where Y_{it} represents the dependent variable, α_{it} serves as the constant, X_{it} represents the variable of interest, being the minimum wage dummy and Δ_{it} representing the set of control variables used. Furthermore, δ_t is the state-fixed effects, whereas γ_i represents the time-fixed effects and ϵ_{it} the error term.

The difference-in-differences analyses can be summarised in a similar form, using the following equation:

$$Y_{it} = \alpha_{it} + \beta_1 D_{it} + \beta_2 \Delta_{it} + \delta_t + \gamma_i + \epsilon_{it} \tag{2}$$

The only difference is that D_{it} now represents the difference-in-differences dummy, that estimates the causal effect.

5. Data

Fortunately, data regarding the labour markets in both Germany and Austria is sufficiently available. The constructed dataset exists of many variables, disaggregated to the level of the Bundesländer and at a quarterly frequency. Most of the data on labour market variables were taken from the Bundesagentur für Arbeit, whereas general demographic data was retrieved from the German federal statistics institute, DEstatis. A brief summary of the data can be found in the appendix, in table A.10, where summary statistics are provided. The threshold of 'low-paid jobs' as formulated by the Bundesagentur lies at a monthly salary of €450. Any job paying less is considered a low-paid job. Since the introduced minimum wage at a full-time employment amounts up to roughly €1,500 per month – or €8.50 per hour – we should expect to see a massive effect on the low-paid jobs.

The Austrian data is slightly different in its nature, as it relies on a quarterly survey formally known as the "European Labour Force Survey", in which roughly 1500 households are interviewed on a weekly basis, to project quarterly data. The data of the survey is provided by STATcube, the official Austrian statistics database. All entries in the database are based on at least 8,000 observations and should thus be fairly reliable and representative. The survey is conducted throughout the whole of Europe and is internationally recognised. However, due to the nature of the dataset, it is by definition less accurate and reliable than the German data, on which I focus in this paper. Because there is no similar boundary of 'low-paid jobs' in the Austrian databse, I elected to use a proxy, being low-educated jobs. Although the proxy of course is by no means perfect, it is highly plausible to assume that the low-educated jobs in Austria would follow the same trend as the low-paid jobs in Germany. Notwithstanding the caveats of the Austrian data, I remain confident that the sample is sufficiently representative to function for my analysis.

6. Results

In this part of the thesis, the results will be presented. As mentioned many times, although the utmost effort was used to attempt to reach high levels of (internal) validity, economic analysis is always exposed to several threats and full causality is rarely observed. This thesis is no exemption, but the finer details of the validity will be discussed in the last section.

6.1. Low-Paid Jobs

The first and main model of this thesis is a panel data regression with the amount of low-paid jobs as the dependent variable and the main explaining variable of interest being the treatment dummy of the minimum wage. All of the previously mentioned control variables entered the model as well, yielding an R-squared value of 0.59, indicating that the model as shown below explains more than half of the changes in the amount of low-paid jobs through the period of interest. The model includes 560 observations, of which 176 post-treatment.

As can be inferred from model 1 in the table below, the treatment effect seems to be fairly substantial. It is highly significant at a p-value of 0.000 and the coefficient is economically salient. It seems that the average effect of the introduction of the minimum wage on low paid jobs in a Bundesland amounts up to the disappearance of approximately 11,000 low-paid jobs (which would amount up to a total effect of more than 175,000 jobs). All the control variables have expected signs: low paid jobs seem to be destroyed during economically difficult periods, which would explain the negative sign for recession. Furthermore, it seems that if the participation rate goes up, people move from low-paid jobs to better jobs, hence why the sign is negative. The wages, GDP per capita, share of part-time workers and recession variables are insignificant and therefore uninterpretable. Furthermore, the model seems to explain the situation well, taking into consideration the very respectable R-squared value.

Germany is a large country with a considerable population, which makes it seem plausible that severe heterogeneity between the states is to be expected. Especially considering Germany's history, which included a substantial and recent period of division between West- and East-Germany, it would be expected to observe some considerable differences. It is also commonly known that the wealth is unevenly distributed between the states. Keeping this in mind, I ran four separate regressions for the regions North-, South-,

Table 1: Fixed Effects Panel Data Regression: Low-Paid Jobs

	(1)	(2)	(3)	(4)	(5)
Low-Paid Jobs	Total	North	South	West	East
Minimum Wage	-11044.2***	-5701.8***	-20550.5***	-27647.2***	-6121.5***
	(1605.3)	(1380.3)	(2296.3)	(5315.2)	(742.3)
Median Wage	-2526.3	3983.5**	-9008.6***	-29396.9***	-1347.0
	(1834.4)	(1772.9)	(3400.8)	(8244.9)	(1231.0)
Share Migrant	11301.9***	-3549.1	18712.0***	36139.5***	3959.9***
	(1041.0)	(2074.6)	(3363.9)	(4988.5)	(837.3)
Benefits	0.449***	0.660***	0.424***	0.841***	0.353***
	(0.0439)	(0.0704)	(0.152)	(0.148)	(0.0232)
Share Part-Time	270.6	40.09	526.4	-6003.6**	-1175.0***
	(572.1)	(592.7)	(1295.2)	(2536.6)	(287.7)
GDP per capita	0.965	0.273	0.464	-4.250	-1.336
	(1.442)	(0.914)	(2.913)	(5.080)	(0.920)
Recession	-2636.7***	-160.6	-2157.5	-431.8	-559.1
	(959.1)	(824.8)	(1557.6)	(3192.9)	(483.3)
Participation	-2904.7***	-1120.9*	-381.8	903.4	53.99
	(486.2)	(666.0)	(1052.4)	(2935.2)	(351.3)
Population	-0.0512***	-0.0484***	-0.0248**	-0.0520***	-0.00374
	(0.00635)	(0.0106)	(0.0106)	(0.0135)	(0.00872)
Vacancies	-0.248***	0.0185	-0.0957	-0.0617	-0.433***
	(0.0646)	(0.110)	(0.0891)	(0.154)	(0.113)
Time F.E.	Yes	Yes	Yes	Yes	Yes
State F.E.	Yes	Yes	Yes	Yes	Yes
N	560	140	105	105	210
R^2	0.587	0.799	0.877	0.821	0.906

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

West- and East-Germany. The divisions of the Bundesländer can be found in the appendix (Table A.11) and the results are depicted in table 1 as well.

As expected, some heterogeneity can be spotted in the regression results. For example, it seems that migration has a substantially higher impact on the labour market in all the regions besides North-Germany (the reasoning behind this should be clear and trivial: the Northern part of Germany is more isolated and therefore considerably less prone to cross-national migration). Some other differences include impacts of part-time workers: it is significantly negative both in the South as well as in the East. The participation rate has a significant negative effect solely in the North, whereas it is insignificant in all other areas. Furthermore, and perhaps most notable, is the difference between the Eastern and Northern labour market and the Western and Southern one. Although the treatment effects are significant, meaning that the introduction of the minimum wage did have a notable impact on the amount of low-paid jobs, it is significantly lower than in the other two areas. The reason for this heterogeneity is simple: the two areas (North and East) are much smaller in population – and thus labour market – magnitude, yielding smaller absolute impacts.

The effect on the amount of low-wage jobs seems to be clear-cut and unambiguous: a substantial decrease of employment in this category. At the first sight, and following the classic school of thought as mentioned before, one might suspect that these jobs are destroyed as a result of the policy introduction. However, another possibility would be that the employers simply shift up in wage-categories; i.e. they start to earn too much to still be considered low-wage workers. As mentioned before, the minimum wage at a rate of roughly nine euros per hour at a full-time employment would yield a salary way above the limit for the low-wage category, so simply shifting between categories seems a plausible explanation. Before continuing to researching where these workers ended up, I would like to investigate the effect on the actual median wage. Was this minimum wage sufficiently high to have a significant impact?

6.2. Median Wage

For this model, the median wage control variable was dropped and used as a dependent variable, to check whether the imposed minimum wage had an effect at all on the prevailing median wage. Following the same pattern as before, it can be seen in Table 2 that in the aggregate model the effect was significant and marginally positive. This effect might seem surprisingly

small at the first sight, but is consistent with the literature cited above. One important note to keep in mind is that we are taking a look at the median hourly wage, which is far above the minimum wage and should therefore not necessarily be impacted all that heavily. The average impact of the introduction of the minimum wage on the median wage was roughly 12 cents in the positive, amounting to an increase just short of 0.6% at an average median wage over the panel of €21.89. We can see that the effect is only significantly positive in the North and in the East, whereas no significant effect was found in the West and in the South. One potential explanation for this finding is that the West and South are generally considered somewhat richer than the North and especially the East, and they should therefore be less affected by the treatment. Whether this reasoning holds will be analysed later on.

Overall, it seems that so far the biggest impact of the policy change took place in the East, where the wage effect is highest by quite a margin and a substantial employment effect was found (considering it is considerably smaller than the West and the South, population wise). The model seems to explain the differences in the wage extremely well, with an R-squared value of 0.99. Again, the significant control variables seem to have the expected signs. One observation that might be worth noting is that the recession seems to have had a fairly small to no effect on the wages, providing suggestive evidence for a somewhat high degree of wage rigidity. An average increase of roughly 0.6% for the growth of the median wage in the German labour market can hardly be considered substantial and economically salient. Something to keep in mind though is that this analysis is based on macro data of median wages. It is therefore difficult to have a look at the specific wage level around the minimum wage. However, I have made an effort to make a distinction between the richest and 'poorest' Bundesländer. Based on the average median wages over time and the average GDP per capita over time, there were some clear poorest and richest Länder: Bremen, Nordrhein-Westfalen, Hamburg, Hessen, Baden-Württemberg and Bayern were found to be the richest regions in the panel based on the two described criteria by quite a margin, whereas Mecklenberg-Vorpommern, Sachsen-Anhalt, Brandenburg, Sachsen and Thüringen were among the poorest. The division can be found in the appendix in Table A.12. I implemented these cleavages by creating two new groups: 'poor' and 'rich'. When running separate regressions for these groups, some interesting results arise, as can be seen in Table 3.

Table 2: Fixed Effects Panel Regression on the Median Wage

	(1)	(2)	(3)	(4)	(5)
Median Wage	Total	North	South	West	East
Minimum Wage	0.118***	0.209***	0.119	0.0849	0.326***
	(0.0340)	(0.0782)	(0.0774)	(0.0743)	(0.0505)
Share Part-Time	-0.0967***	-0.0603	-0.0669	-0.105*	-0.0964***
	(0.0239)	(0.0497)	(0.0586)	(0.0580)	(0.0323)
GDP per capita	-0.000142***	-0.0000898	-0.0000667	-0.000279***	-0.0000330
	(0.0000354)	(0.0000556)	(0.000106)	(0.0000859)	(0.0000700)
Share Migrant	0.00595	-0.144	-0.522	-0.182	0.219
	(0.110)	(0.267)	(0.348)	(0.224)	(0.223)
Recession	-0.0465*	-0.106*	-0.0530	-0.107*	-0.0577
	(0.0261)	(0.0560)	(0.0606)	(0.0610)	(0.0364)
Participation	-0.0111	0.0938***	-0.00678	0.0706	-0.0195
	(0.0113)	(0.0324)	(0.0434)	(0.0503)	(0.0177)
Vacancies	-0.00000785***	-0.0000240***	-0.00000760**	-0.00000418	-0.0000576***
	(0.00000171)	(0.00000725)	(0.00000354)	(0.00000278)	(0.00000829)
Time F.E.	Yes	Yes	Yes	Yes	Yes
State F.E.	Yes	Yes	Yes	Yes	Yes
N	560	140	105	105	210
R^2	0.985	0.983	0.989	0.986	0.990

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

As can be inferred from Table 3 above, it seems that the two different areas are impacted quite differently. First of all, the positive effect is only significant for the poorer regions, whereas it is not significant at all in the richest parts of Germany. Furthermore, the magnitude of the effect is nearly

Table 3: Differences between wealth classes for the Median Wage

	(1)	(2)
Median Wage	Poor	Rich
Minimum Wage	0.138***	0.0756
	(0.0499)	(0.0493)
Share Part-Time	-0.0901***	-0.0789**
	(0.0289)	(0.0359)
GDP per capita	-0.000240***	-0.000139***
	(0.0000889)	(0.0000393)
Share Migrant	0.0130	-0.430**
	(0.196)	(0.183)
Recession	-0.0697**	-0.0921**
	(0.0341)	(0.0379)
Participation	-0.106***	0.0394*
	(0.0240)	(0.0221)
Vacancies	-0.0000469***	-0.00000707***
	(0.00000960)	(0.00000168)
[1em] Time F.E.	Yes	Yes
State F.E.	Yes	Yes
N	175	210
R^2	0.993	0.990

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

double in the poorest states. This seems to indicate that there was only a (severe) positive effect at the lower wage level, and the effect decreased the higher the hourly wage, which is to be expected. We should be wary of the limitations of this approach, as it is based on macro-data instead of micro-data and is therefore somewhat inaccurate for this kind of approach. Furthermore, although the median wage might be lower in the poorer regions, this does not mean that everyone in this area per definition earns a low salary.

However, I am still confident that this regression visualises the effect quite well, as it seems to underline the previously found results in this field.

6.3. Unemployment

To find out whether the observed decrease in low-paid jobs was a result of job destruction or merely an 'upgrade' of the wage of these jobs, I tested multiple variables that would indicate one scenario or the other. Firstly, I will analyse the effect of the treatment on unemployment.

The general effect taken as measured over the whole panel seems to edge towards confirming the classic school of thought. It seems that unemployment rose with about 7,200 people on average (as can be seen in Table 4), which would amount to roughly 65% of the loss in low-paid jobs. Of course, it is impossible to link the two events with a complete certainty, but the statistics so far heavily point towards a story of job destruction as a result of the minimum wage.

Again, some heterogeneity is observed between the regions. It seems that unemployment increased in the North, South and the East, whereas there were no significant changes in the West. Without further investigation, this would suggest one of two scenarios for the North, South and East: either jobs were destroyed, or the minimum wage made the labour market more attractive, leading to previously inactive people now actively looking for jobs and thus switching status from inactive to unemployed. For the West, two other scenarios remain: the job market did not significantly change as a result of the policy change, or the labour market simultaneously became more attractive and expanded, leading to no change in the unemployment. To exclude the faulty explanations, it is necessary to also have a look at the total employment data. If people become more active because of favourable labour market conditions, we would expect an increase in the total employment. Another possibility would be a simultaneous increase in unemployment and no effects in the total employment figure. If people were to become inactive as a result of job destruction, it would be logical to see a decrease in the employment statistics. If people simply switch wage categories, and thus stay employed, we would expect the total employment statistics to remain stable over the time of the treatment and if jobs were destroyed, we would expect total employment to decrease. The differences in magnitude in these results cannot simply be pinned down to differences in region sizes like before. The East shows one of the highest coefficients, whereas it is by no means the biggest region. This suggests that the hit was felt relatively the most in

Table 4: Fixed Effects Panel Data Regression on Unemployment

	(1)	(2)	(3)	(4)	(5)
Unemployment	Total	North	South	West	East
Minimum Wage	7218.8***	5778.0*	18279.9**	9282.2	14189.5***
	(2684.1)	(3087.4)	(8257.5)	(7098.7)	(2469.7)
Share Migrant	-16392.9***	-1416.9	-41451.9***	-26967.4***	-14698.2***
	(1744.1)	(4538.3)	(8661.9)	(7057.2)	(2602.8)
Median Wage	-2561.4	12161.5***	-8881.2	343.3	12327.0***
	(2980.6)	(3816.4)	(9654.2)	(10492.5)	(3759.8)
Share Part-Time	-1343.0	903.0	-5231.0	-6711.7**	4256.6***
	(922.2)	(1245.7)	(3488.3)	(3095.5)	(847.0)
GDP per capita	5.694**	3.526*	9.304	-1.318	4.568
	(2.345)	(1.958)	(7.944)	(6.049)	(2.824)
Low-Paid Jobs	0.593***	0.920***	0.729**	0.578***	2.623***
	(0.0647)	(0.150)	(0.282)	(0.109)	(0.150)
Recession	-2625.2*	-744.6	-8305.7**	-6316.8*	1848.7
	(1571.2)	(1785.5)	(4040.7)	(3674.3)	(1489.6)
Participation	661243.1***	-71840.5	8350.5	-26465.8	135971.7
	(74470.0)	(145916.8)	(287443.9)	(349359.8)	(106647.3)
Population	0.0952***	0.127***	0.104***	0.0729***	0.0782***
	(0.0105)	(0.0217)	(0.0283)	(0.0172)	(0.0268)
Vacancies	-0.730***	-0.527**	-0.928***	-1.029***	0.505
	(0.107)	(0.237)	(0.244)	(0.173)	(0.353)
Time F.E.	Yes	Yes	Yes	Yes	Yes
State F.E.	Yes	Yes	Yes	Yes	Yes
N	560	140	105	105	210
R^2	0.742	0.749	0.846	0.758	0.951

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

the East, but it is still to be seen what the forces behind this change were. The models used all have respectable R-squared values, suggesting that the model captures the changes quite well. The average effect through the whole of Germany seems to be an unemployment increase of roughly 7,200 people, which would amount up to the biggest share of 120,000 in total. Although this would seem to be a substantial figure without context, it is hardly an extreme figure or a serious concern, considering the magnitude of the German labour market. Furthermore, we have yet to explore whether this is due to job destruction or whether there are other forces at hand.

6.4. Employment

The last variable to be analysed is the total employment. As shown above, it has become clear from the results so far that the general trend seems to be an increased unemployment figure. There remain two possible explanations for this phenomenon: either the labour force increased as a result of a more attractive labour market, resulting in more people becoming active. The other possible explanation is that as proposed by the classic school of thought: job destruction.

When taking a first glance at Table 5, it seems that this case is providing some suggestive evidence for the classic school theories. The effect on total employment is significant and considerably negative. Especially important here is that the coefficient is considerably higher than the low paid job regression one, indicating that we are not only picking up the effect that we already considered before. Of course, as mentioned before, the threshold for qualification of 'low-paid job' is extremely low at €450,- per month, which makes it plausible that the amount of job destruction is much higher than the effect we picked up in the first regression. Again, we can see the same pattern as in the low-paid job regression regarding heterogeneity: a bigger absolute effect in the bigger regions. All in all, the patterns seem to be equal, and this suggests that not only did unemployment overall increase, employment went down quite drastically as well. Since the negative effect we found on employment is much bigger than the positive effect on unemployment, it would be straight-forward to conclude that not only were a lot of jobs destroyed, but it primarily led to people exiting the labour market as a whole.

Table 5: Fixed Effects Panel Data Regression on Total Employment

	(1)	(2)	(3)	(4)	(5)
Total Employment	Total	North	South	West	East
Minimum Wage	-65559.8***	-58241.1***	-145690.8***	-69198.6**	-17250.7***
	(12002.6)	(14775.8)	(25697.4)	(31143.2)	(4539.8)
Share Migrant	117516.2***	14851.3	334361.3***	82258.7***	42163.0***
	(7799.0)	(21719.3)	(26955.8)	(30961.3)	(4784.3)
Median Wage	18288.7	-43233.6**	158082.6***	130942.6***	8152.1
	(13328.4)	(18264.4)	(30043.9)	(46032.4)	(6911.2)
Share Part-Time	-35725.9***	-9124.8	-7044.2	21750.8	-6233.1***
	(4123.8)	(5961.8)	(10855.7)	(13580.4)	(1556.9)
GDP per capita	-34.94***	-12.94	-11.88	20.07	-4.742
	(10.48)	(9.368)	(24.72)	(26.54)	(5.191)
Low-Paid Job	-6.661***	-8.544***	-7.671***	-6.919***	-3.746***
	(0.289)	(0.720)	(0.877)	(0.480)	(0.276)
Recession	14387.2**	-9349.5	-2842.8	-2879.1	844.1
	(7025.8)	(8545.0)	(12574.7)	(16119.9)	(2738.1)
Participation	1664456.7***	1254206.9*	1433069.6	-2163957.6	1481498.9***
	(333007.9)	(698326.0)	(894529.2)	(1532699.1)	(196036.3)
Population	0.0594	-0.366***	0.134	-0.412***	0.209***
	(0.0467)	(0.104)	(0.0880)	(0.0755)	(0.0493)
Vacancies	2.285***	0.746	1.411*	2.664***	0.397
	(0.476)	(1.135)	(0.759)	(0.758)	(0.650)
Time F.E.	Yes	Yes	Yes	Yes	Yes
State F.E.	Yes	Yes	Yes	Yes	Yes
N	560	140	105	105	210
R^2	0.851	0.875	0.980	0.930	0.955

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

7. Robustness

The analysis thus far seems to be quite suggestive of some serious and considerable distortions in the labour market. We ought to be careful with simply reproducing and taking for granted the results presented so far, as investigating a dynamic and important institution such as a labour market is very fragile and prone to negligible validity. In order to improve the credibility of the work, some robustness tests have been performed.

7.1. Labour Force

Firstly, although the results of the unemployment and employment statistics seem to be sufficient to draw conclusions, I ran regressions on the total labour force to find out whether the findings were consistent.

As can be inferred from Table 6 below, it seems that the evidence as proposed so far is consistent. Overall, the labour force decreased significantly and substantially, which holds for all of the regions apart from the West. The regression seems to confirm the consensus that the job destruction was to such an extent that a considerable share of people left the labour market and became inactive.

To further prove this statement, I looked at the participation rates, both in total and by wealth division. As can be seen in Table 7 below, the overall participation rate seems to have decreased significantly by 0.49%, meaning that there was, as shown above as well, a severe demotivation effect and people seem to have left the labour market. Interestingly and again confirming the classic consensus it was found that the hit took place largely among the poorer Bundesländer as defined before in the results section. This would mean that the drop in participation rate was, according to this methodology, solely caused by the poorer part, which would fit the classic consensus that job destruction occurs among the low-paid jobs. As expected, the effect in the richer areas is insignificant, since it would not make sense if the higher-paid jobs would also be destroyed by the introduction of the minimum wage. It furthermore confirms that there were no other global labour market distortions happening simultaneously, which underlines the results presented so far even more so.

Table 6: Fixed Effects Panel Data Regression: Labour Force

	(1)	(2)	(3)	(4)	(5)
Labour Force	Total	North	South	West	East
Minimum Wage	-32034.4***	-20867.1**	-34103.7**	-22446.7	-9625.7**
	(9488.3)	(9894.0)	(13928.3)	(29037.5)	(4755.8)
Share Migrant	63809.4***	8233.6	90490.9***	29664.8	63566.2***
	(6165.2)	(14543.4)	(14610.3)	(28867.8)	(3751.4)
Median Wage	3760.0	-64174.9***	74261.5***	104626.4**	-5013.0
	(10536.3)	(12230.0)	(16284.1)	(42919.9)	(7434.9)
Share Part-Time	-28147.9***	-11085.6***	-7979.7	-135.5	-1148.3
	(3259.9)	(3992.1)	(5883.9)	(12662.2)	(1694.9)
Low-Paid Job	-3.446***	-4.251***	-1.738***	-3.710***	-0.570*
	(0.229)	(0.482)	(0.475)	(0.448)	(0.305)
GDP per capita	-26.27***	-9.793	-0.542	9.539	-1.609
	(8.288)	(6.273)	(13.40)	(24.74)	(5.570)
Recession	-1760.3	-14694.6**	264.9	-14674.3	-2364.4
	(5554.0)	(5721.8)	(6815.6)	(15030.0)	(2948.7)
Population	0.237***	-0.0139	0.599***	-0.116	0.0339
	(0.0370)	(0.0694)	(0.0477)	(0.0704)	(0.0436)
Vacancies	0.538	-2.169***	0.763*	0.806	0.155
	(0.376)	(0.760)	(0.411)	(0.706)	(0.698)
Participation	38172.1***	28794.6***	111486.2***	26179.3*	
	(2632.5)	(4676.0)	(4848.4)	(14290.7)	
Time F.E.	Yes	Yes	Yes	Yes	Yes
State F.E.	Yes	Yes	Yes	Yes	Yes
N	560	140	105	105	210
R^2	0.810	0.879	0.989	0.851	0.867

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Fixed Effects Panel Data Regression on Participation Rates

	(1) Participation Rate	(2) Poor	(3) Rich
Minimum Wage	-0.491***	-0.475***	-0.0169
	(0.155)	(0.120)	(0.175)
Share Migrant	0.641***	0.788***	-0.187
	(0.0979)	(0.138)	(0.125)
Median Wage	0.0400	0.282	1.379***
	(0.174)	(0.229)	(0.226)
Low-Paid Jobs	-0.00000876**	-0.0000460***	0.00000376
	(0.00000376)	(0.00000718)	(0.00000322)
Share Part-Time	-0.173***	0.0987**	0.142*
	(0.0533)	(0.0418)	(0.0801)
GDP per capita	0.000266*	0.000357	0.000181
	(0.000136)	(0.000224)	(0.000125)
Recession	0.165*	-0.195***	0.0890
	(0.0914)	(0.0736)	(0.105)
Population	-6.51e-08	-0.0000120***	0.000000375
	(0.000000610)	(0.00000147)	(0.000000530)
Vacancies	-0.0000125**	-0.0000486**	-0.00000627
	(0.00000619)	(0.0000216)	(0.00000488)
N	560	175	210
R^2	0.623	0.768	0.888

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

7.2. Difference-in-Differences

In order to assess some sort of causality and following the widespread literature of the field, I conducted some difference-in-differences analyses to further improve the internal validity of this work. First and foremost, I tested the initial treatment effect on the low-paid jobs. Although assessing a causal effect to the sudden decrease at the exact time of the treatment seems trivial, the results further confirm the causal effect of the introduction of the minimum wage on the amount of low-paid jobs. The differences are taken between the Southern states of Germany (being Baden-Württemberg and Bayern) and the neighbouring Austrian states (being Tyrol, Vorarlberg, Salzburg and Upper Austria). I chose particularly to only include said states, because it seems plausible that these states are similar (which is not necessarily the case for e.g. the most Northern German states) and since mobility between the states seems unlikely, given that the jobs are low-paid. Taking this all into consideration, I am confident that a difference-in-differences analysis would be appropriate as the similarity in states yields a good opportunity for the methodology. Furthermore, as we concluded following the first models presented in this paper, the heterogeneity between the regions was only observed in magnitude and not in signs, which leaves me to conclude that generalising this result for the whole of Germany is fair enough.

As can be inferred from Table 8 below, all the models yield similar results, regardless of the controls. The R-squared value of 0.55 is encouraging and the overall effect is clear: the introduction of the minimum wage in the German states did indeed lead to a causal significant decrease in low-paid jobs.

Furthermore, I conducted difference-in-differences analyses for the cases in which I compared the poorer to the richer regions in Germany. Table 9 below showcases that all the mechanisms that have been assumed before can be confirmed. The poorer regions lose more employment, of which most leave the labour force and thus become inactive. Their wages grow faster than the rich, but, as showcased by the employment and labour force statistics as well, their participation rate drops significantly more than the rich.

7.3. Recession

A phenomenon that might have caught one's attention in this thesis is the remarkable behaviour of the 'recession' dummy in some of the analyses. It seems counterintuitive at some points, as e.g. employment hardly decreased if at all during the recession in my panel. There are two different reasons for this behaviour. The first is a mechanical and is due to the fact that a lot of the

Table 8: Difference-in-Differences: Low-Paid Jobs

	(1)	(2)	(3)
Low-Paid Jobs	OLS	FE	FE + Controls
DiD	-18724.7***	-19061.0***	-24359.3***
	(2804.0)	(1736.8)	(3044.7)
Population			0.00196
			(0.00863)
Share Part-Time			-65674.5
			(47723.1)
Share Migrant			-250184.5***
			(57979.7)
Total Employment			0.0234***
			(0.00593)
Time F.E.	No	Yes	Yes
State F.E.	No	Yes	Yes
N	234	234	234
R^2	0.341	0.375	0.550

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

variation that is similar between the states (like a macroeconomic shock such as the Great Recession) is picked up by the time fixed effects. Furthermore, as described by Burda and Hunt (2011), Germany showed a very peculiar labour market response to the crisis. As opposed to other countries, that saw massive cuts in employment and historically high unemployment spikes, the German labour market remained relatively unscathed. This was due to potentially lower expectations in the previous boom, leading to a lesser spike in vacancies than in the rest of the world (a weaker employment growth than the prevailing trend was observed in Germany), and due to institutional forces: in spite of being laid off, employers simply reduced working hours quite substantially, leaving the employment and unemployment figures relatively intact (Burda & Hunt , 2011).

Table 9: Difference-in-Differences: Poor versus Rich

	(1) Total Employment	(2) Median Wage	(3) Participation Rate	(4) Labour Force
DiD	-146342.8***	0.082***	-1.484***	-137185.8***
	(17142.9)	(0.0371)	(0.137)	(11813.0)
Share Part-Time	-2314.6	0.090***	0.0612	-9854.8***
	(5438.6)	(0.0240)	(0.0572)	(3748.1)
Share Migrant	75248.0***	-0.102	0.588***	71166.6***
	(14698.4)	(0.132)	(0.111)	(10385.2)
GDP per capita	-44.82**	-0.000129(***)	0.000485***	-14.98
	(17.66)	(0.0000357)	(0.000133)	(12.22)
Vacancies	3.906***	-0.0000775***	-0.00000386	0.423
	(0.759)	(0.00000154)	(0.00000526)	(0.536)
Median Wage	23863.5*		1.660***	1839.0
	(13203.3)		(0.209)	(9462.6)
Population	0.114	0.00000603***	-0.000000849	0.0755
	(0.0840)	(0.000000114)	(0.000000565)	(0.0600)
Total Employment		0.000000145*		
		(0.000000100)		
Low-Paid Job			-0.00000935***	-2.450***
			(0.00000326)	(0.317)
Time F.E.	Yes	Yes	Yes	Yes
State F.E.	Yes	Yes	Yes	Yes
N	385	385	385	385
R^2	0.688	0.990	0.737	0.703

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

8. Discussion and Conclusion

In this thesis, I strived to analyse the macro-economic effects of the introduction of the German minimum wage in 2015. Germany was one of the remaining Western countries without a minimum wage in place until 2015. Considering the fact that economists all over the world have been divided on the topic of minimum wages, this policy reform yielded an interesting opportunity for research. Although one always has to be careful with interpreting economic analysis, the results of the analyses conducted in this thesis seem to unambiguously point to the direction of distortions created by the introduction of the minimum-wage. It seemed that the wage-effects were positive for the poorer parts of Germany, albeit in a very slight form, whereas at the same time employment was significantly and substantially reduced everywhere. Unemployment increased significantly as well, but the biggest share of employment loss was due to people becoming inactive and thus leaving the labour market. Taking into account that the empirical tests were carefully constructed, using many control variables and an appropriate methodology, and the results were backed up by robustness tests, it seems plausible to assume that the results following from this analysis seem to correctly portray the trends as observed in the period shortly after the policy change.

Although I am confident that the empirics are fairly accurate, one always has room for improvement and no research is without caveats. This research is based on macro-economic data, which has both its advantages and disadvantages. The prevailing literature so-far has focused on micro-economic data as it is more precise and allows for better differentiation. However, all these analyses have been based on one or two datasets constructed on the basis of a – relative to the population size – small amount of survey responses. As is common knowledge in the field, survey analysis comes with its problems, as the validity of the responses is often highly questionable. This was the main reason as to why I opted to utilise the available macro-data.

However, although this data is fairly complete in the sense that it captures most if not all citizens of the country at hand, it leaves little room for specific analysis. For example, it is difficult to measure effects closely around the bite of the minimum wage, as there is no data available regarding specific income classes. This is the reason why a lot of proxies had to be used, such as 'low-paid jobs' and the division between 'rich' and 'poor' Bundesländer.

A more general remark regarding the analysis of the effects on the labour

market is that the reform took place fairly recently and thus might need more time to completely affect the market. As widely known, labour markets are fairly rigid and can take quite a while to adapt to massive changes. I therefore strongly encourage further research on this topic on a later date, when more data in a longer panel is available. One more caveat that is imminent with this reform is that the general effect might not be completely exogenous, as it is plausible that the negotiations about the reform took a long time, leading to firms building expectations and prematurely taking action. Such actions could include increasing wages, reducing working hours or laying people off on forehand. If anything, this would understate the results.

All in all, taking the results and the discussion points into consideration, it can be concluded that this thesis provides suggestive evidence that points towards severe distortions created by the introduction of the minimum wage. Whether these distortions are merely temporary as the labour market is still adapting, or whether they are permanent is still to be seen and will hopefully be researched in a later time.

This conclusion once again leaves the question whether imposing a minimum wage is socially desirable: it creates a group of winners, who see their wages rise (albeit not substantial), whereas a big group of losers leave the labour market. Once again, it has been proven that this topic is an extremely difficult one and finding full agreement will remain impossible, hence why we still observe severe heterogeneity between countries either opting for or staying back from a minimum wage legislation.

Appendix A. Summary Statistics

Table A.10: Summary Statistics

	(1) Total	(2) North	(3) South	(4) West	(5) East
LowPaidJob	309734.8	211868.1	619775.6	528618.7	110516.9
	(330844.9)	(182720.3)	(174070.6)	(521251.3)	(38865.82)
Share Part-Time	24.5	25.1	23.6	23.7	25.0
	(3.341)	(3.149)	(2.716)	(3.027)	(3.707)
Share Migrant	6.4	6.5	11.0	8.4	3.1
	(3.740)	(2.103)	(1.936)	(1.370)	(2.867)
GDP per capita	32953.9	39927.6	39398.5	32280.3	25419.3
	(9302.6)	(11977.3)	(3251.4)	(2750.8)	(4033.0)
Vacancies	29984.4	20756.6	60291.8	42907.92	14520.82
	(29534.16)	(17046.06)	(17046.06)	(44191.78)	(6472.346)
Median Wage	21.89	23.43	25.20	23.14	18.58
	(3.61)	(3.01)	(1.89)	(1.82)	(2.57)
Population	5092100	3284645	9806390	7592241	2689854
	(4679987)	(2769873)	(2761056)	(7321354)	(834218)
Total Employment	1850714	1178502	3811043	2627765	930164.6
	(1726631)	(891566)	(1122065)	(2583356)	(326673)
Unemployed	186272	121784	230736	301201.6	149569.1
	(165253.5)	(92532.85)	(42428)	(322158.1)	(54712.3)
Labour Force	2682195	2468987	5273125	3937352	1407982
	(2468987)	(1435319)	(1564011)	(3777062)	(426403)
Participation	52.41	51.96	53.52	51.84	52.45
	(1.627)	(2.002)	(1.546)	(1.426)	(1.139)
Benefits	120548	80167	124026	206933	102538.1
	(115001.8)	(58183.52)	(10056.71)	(229567.1)	(40642.07)
N	560	140	105	105	210

Means provided, Standard Deviations in parentheses

Table A.11: Division Regions

North	**South**	**West**	**East**
Bremen	Hessen	Nordrhein-Westfalen	Berlin
Hamburg	Baden-Württemberg	Saarland	Mecklenburg-Vorpommern
Schleswig-Holstein	Bayern	Rheinland-Pfalz	Sachsen-Anhalt
Niedersachsen			Brandenburg
			Sachsen
			Thüringen

Table A.12: Division Poor and Rich

Bundesland	**Category**	**Median Wage**	**GDP per capita**
Bremen	Rich	24.16	43608.39
Nordrhein-Westfalen	Rich	24.10	34111.30
Hamburg	Rich	27.13	57186.75
Hessen	Rich	25.95	39951.89
Baden-Württemberg	Rich	24.90	38955.26
Bayern	Rich	24.72	39288.46
Bundesland	**Category**	**Median Wage**	**GDP per capita**
Mecklenburg-Vorpommern	Poor	17.28	23014.67
Sachsen-Anhalt	Poor	17.56	23639.76
Sachsen	Poor	18.20	25223.75
Brandenburg	Poor	18.22	24127.86
Thüringen	Poor	17.61	23992.5

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