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ABSTRACT

Employment Adjustments Following Rises and Reductions in Minimum Wages: New Insights from a Survey Experiment*

The effects of large minimum wage increases, like those planned in the UK and in some US states, are still unknown. We conduct a survey experiment that randomly assigns increases or decreases in minimum wages to about 6,000 establishments in Germany and asks the personnel managers about their expectations concerning employment adjustments. We find that employment reacts asymmetrically to positive and negative changes in minimum wages. The larger the increase in the minimum wage is, the larger the expected reduction in employment. Employment adjustments are more pronounced in those industries and plants which are more strongly affected by the current minimum wage and in those plants that have neither collective agreements nor a works council. In contrast, employment is not found to increase if the minimum wage is reduced by about 10 percent. This mainly reflects that plants with works councils and collective agreements would not cut wages.

JEL Classification: J31, J23, D22

Keywords: minimum wage, wage cuts, establishment survey, Germany

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1. Introduction

Discussions and investigations of minimum wages and their employment consequences have a long history, but in recent years academic and political interest in this topic has revived and has led to far-reaching policy decisions. A case in point is Germany which introduced a statutory minimum wage in 2015 after refusing to do so for decades for fear of employment losses. The UK government announced the introduction of a national living wage of £ 9 by 2020, which implies an effective increase of the current national minimum wage by 38 percent. And in the US, the states of New York and California decided to increase their state-specific minimum wages to $ 15 within only a few years (while the federal minimum wage is still $ 7.25).

Although conventional theoretical approaches predict that minimum wages will have damaging consequences if they are too high, it is still an unresolved research question at which level minimum wages start to hurt (cf. Manning 2016). Older empirical studies, often based on time series data, mostly found large negative effects of minimum wages, but these large effects have been questioned in more recent analyses using more sophisticated approaches and better data (see, e.g., Card and Krueger 1995, Allegretto et al. 2017). Most studies have analyzed minimum wages in ex-post evaluations of rather modest wage levels and changes, but these studies are not very informative ex ante, in particular concerning the consequences of large potential minimum wage changes (as pointed out by Krueger 2015 and Neumark 2017). Moreover, extant studies typically have focused on increases in minimum wages whereas little is known about the consequences of reductions in minimum wages, e.g. in case a newly introduced minimum wage turns out to jeopardize more jobs than expected. It is also an open question whether employment reactions are (a)symmetric w.r.t. to increases and decreases in minimum wages.

To overcome these research deficits, we conduct a survey experiment that randomly assigns a minimum wage to 6,118 establishments in Germany. The assigned minimum wages range from 8 to 12 Euros per hour (whereas the current minimum wage is 8.84 Euros), thereby encompassing large increases as well as small decreases in minimum wages. Conditional on the randomly assigned change in the minimum wage, we ask the personnel managers of these plants about their expectations concerning employment adjustments. Survey experiments of this sort have not often been conducted in economic research (for a recent exception, see e.g. Krueger and Kuziemko 2013), but they have a long-standing tradition in other research fields (starting with Green and Rao 1971 in marketing research). This new approach allows us to shed light on the consequences of both small and substantial minimum wage increases, and in contrast to observational studies we can also assess reductions in minimum wages which have rarely occurred in practice. As we randomly assign the level of the minimum wage to the interviews, there should be no correlation between any observables or unobserved

characteristics and the minimum wages of interest (which will be supported by tests). Hence, any group-specific adjustments in the expected employment growth should be due to the respective levels of the minimum wage but not due to co-determining factors.

Our study contributes to the literature in three ways: First, our survey experiment enables us to analyze the expected employment effects of large increases in minimum wages. Our highest assigned minimum wage level of 12 Euros per hour is equivalent to 66 percent of the median worker's hourly wage in Germany in 2016 (cf. OECD 2017). This level is quite similar to that of a $15 minimum wage in the US, which would amount to 70 percent of the median worker's hourly wage. Second, we also study the effects of (small) decreases in minimum wages, providing empirical evidence that employment reacts asymmetrically to positive and negative changes in minimum wages. Third, we investigate potential heterogeneities in wage and employment reactions with a special focus on institutional factors. We show that employment adjustments to variations in minimum wages are more pronounced in those industries and plants which are more strongly affected by the current minimum wage and in those plants that have neither collective bargaining agreements nor a works council.

The paper proceeds as follows: After a brief review of the literature in section 2, section 3 explains our survey experiment among personnel managers in Germany. Our data and the randomization of various minimum wage levels to the interviews are discussed in section 4. Section 5 presents the results of our empirical investigations, and section 6 concludes.

2. Literature review and institutional background

Most of the international literature on minimum wages analyzes their effects on employment using ex-post evaluations. After Card and Krueger (1995) published their book on "myth and measurement" as well as their famous study on the New Jersey minimum wage increase (Card and Krueger 1994), difference-in-differences based evaluations of minimum wages became standard in empirical labor economics. However, the extent of negative employment effects is still heavily debated. A comprehensive survey of minimum wage evaluations mostly from the US is presented in Neumark and Wascher (2007) and a summary of more recent US literature is provided in Neumark, Salas, and Wascher (2014). In the following, we concentrate on the empirical evidence for Germany and provide some institutional background.

In Germany, minimum wages only existed at the sectoral level until the statutory minimum wage was introduced on 1 January 2015. Hence, the German minimum wage literature was concentrated on sectoral minimum wages. König and Möller (2009) were the first to analyze employment effects of the minimum wage in the construction sector. The authors apply a difference-in-differences comparison of treated and untreated workers of the same sector and

find sizable effects on wages but only slightly negative effects on employment in eastern Germany where the bite of the minimum wage was much more pronounced. A recent study by vom Berge and Frings (2017) exploits regional variation but analyzes the same minimum wage introduction in the construction sector. The results largely corroborate the findings by König and Möller (2009) as they detect significantly negative effects mostly in the east. In line with these results from the construction sector, Aretz, Arntz, and Gregory (2013) analyze the roofing sector and also detect sizable effects on employment especially in eastern Germany. Frings (2013) studies minimum wages for painters and electricians and does not detect any disemployment effects on regular full-time workers. Boockmann et al. (2013) also evaluate the minimum wage for electricians, where minimum wages were introduced in 1997, abolished in 2003, and re-introduced in 2007, providing extensive variation over time. They detect meaningful positive wage effects but do not find any disemployment effects.

In 2015, the new statutory minimum wage came into force in Germany. In the first two years after its introduction the new law required an hourly wage of 8.50 Euro, but the minimum wage level was raised to 8.84 Euro starting in 2017. Bossler and Gerner (2016) present a first evaluation study by estimating employment effects from establishment-level variation in the bite of the new minimum wage. The estimated disemployment effect is small in overall numbers, implying a labor demand elasticity with respect to wages in the range between -0.2 and -0.3. Disemployment effects are stronger when employers affected by the minimum wage face high competition or are under pressure to conduct compensating cuts of extra payments. Garloff (2016) as well as Caliendo et al. (2018) pursue an alternative approach by drawing conclusions from regional variation in the bite of the minimum wage. While the employment effects in Garloff (2016) are negligible and statistically insignificant, Caliendo et al. (2018) come up with an employment loss of 140,000 jobs in Germany.

Although Bossler and Gerner (2016) present a minimum wage induced labor demand elasticity, it is still difficult to infer employment effects of upcoming changes in the minimum wage from these estimates. First, this would imply an out of sample prediction and the effect of the minimum wage may in fact be non-linear (Gorry and Jackson 2017). Second, it is difficult to infer employment effects when the wage effect of a change in the minimum wage is uncertain. Not all employees' remuneration is affected by the minimum wage, and moreover, there may be non-compliance leading to even lower wage increases. Hence, it is nearly impossible to correctly predict employment effects from elasticities of previous ex-post evaluations.

Another potential shortcoming of these evaluations of minimum wages is policy endogeneity. Considering the sectoral minimum wages, these were set in joint consultations by the respective unions and employers' associations in the sector and the federal ministry of labor

and social affairs. Had the respective minimum wage implied severe employment losses, it is likely that one of the three decisive parties would have opposed such a minimum wage. One explicit source of endogeneity is presented in Bachmann, Bauer, and Frings (2014). The authors show that some sectoral minimum wages were favored by employers for protective reasons, as minimum wages can increase the costs of rivals that pursue a low-cost strategy. The new statutory minimum wage is also not set in isolation; a newly founded minimum wage commission *(Mindestlohnkommission)* proposes adjustments to the minimum wage in a biennial cycle and the government then decides based on this proposal.[1] As unions and employers' associations are equally represented in the commission, some form of coordination between these two parties is likely to take place, resembling a collective bargaining process. In a cross-country comparison, Neumark and Wascher (2004) provide some weak evidence that minimum wages do not result in employment losses in countries in which minimum wages are set by some process of collective bargaining. This evidence is consistent with an argument that collective bargaining takes explicitly account of − and hence avoids − potential disemployment effects.

Additional to the potential policy endogeneity of minimum wages, a recent essay by Neumark (2017) argues that previous ex-post analyses are not informative for the large upcoming minimum wage increases that have been decided in some regions of the US and in the UK. The US states New York and California decided to increase state-specific minimum wages to $ 15 within only few years, while the federal minimum wage is still $ 7.25, and in the UK the government announced the introduction of a national living wage of £ 9 by 2020, which is an effective increase of the national minimum wage by 38 percent. In fact, there is still little information on the effects of very large minimum wage increases. Recent exceptions are a study by Harasztosi and Lindner (2017) who investigate a 50 percent increase in the Hungarian minimum wage detecting a small labor demand elasticity of -0.2, and a study by Bell and Machin (2018) that analyzes stock market responses (but not employment adjustments) when the 38 percent wage increase associated with the new British Living Wage was announced.

Two other approaches have been presented in the literature to infer future employment effects of upcoming minimum wage increases. First, Knabe, Schöb and Thum (2014) simulate the employment effect of the new statutory minimum wage in Germany imposing different assumptions on the structure of the labor market. As expected, simulated employment losses are much larger under perfect competition than in monopsonistic labor markets. Second,

[1] The suggestion of such adjustments comes along with the publication of a biennial report by the minimum wage commission, which closely monitors relevant labor market outcomes and discusses influential ex-post evaluations (Mindestlohnkommission 2016). This procedure implies that minimum wage adjustments are endogenous w.r.t. previous and prospective labor market outcomes. It may lead to a cautious minimum wage policy as the members of the commission are well aware of the fact that the minimum wage could have damaging consequences if it is set arbitrarily high.

Bossler (2017) analyzes employer reported expectations towards their own employment growth in 2014 when the German minimum wage law had been passed but was not yet in force. The employment expectation matches very well with the results from an ex-post analysis of actual employment changes in the same data. We will take this latter approach as a starting point and analyze employers' employment expectations by imposing different minimum wages in a survey experiment.

Related with our analysis, effect heterogeneities are another interesting strand of literature. So far, the moderating impacts of institutions on employment effects of minimum wages are not very well understood. Dolado et al. (1996) suggest that unions make the minimum wage less relevant because they reduce the share of workers at or near the minimum wage. Hence, unions should be a muting moderator. Aghion, Algan and Cahuc (2011) note a negative correlation between labor market regulations and minimum wages across countries and suggest a substitutive relationship between different ways of regulating labor markets. Hence, minimum wages should be of lower relevance when worker co-determination is emphasized.

By contrast, Coe and Snower (1997) argue in a model of policy complementarities that unions may exacerbate the employment effect of minimum wages. In line with this latter argument Neumark and Wascher (2004) present empirical evidence that minimum wages exert a stronger adverse effect in countries in which union density is larger. Moreover, they find some weak evidence of stronger minimum wage effects in countries with restrictive labor standards represented by regulations such as restrictive working time regulations or restricted use of temporary agency workers. The rationale behind this latter finding is the absence (i.e., restriction) of alternative adjustment channels other than employment reductions. However, when employment protection is high the results in Neumark and Wascher (2004) show muted disemployment effects. The same is true when active labor market policies are prevalent; presumably because some of the individuals who would otherwise be considered as unemployed are instead participating in or even benefit from these programs.

We contribute to this literature by estimating effect heterogeneities from a survey experiment that allows us to distinguish between segments of the labor market with high bites and low bites. We also distinguish between effects in eastern and western Germany and by establishment size. Finally, we estimate effects for establishments that are covered by the traditional German model of industrial relations and for plants where no collective agreement and no works council is present.

3. Methodology

To evaluate the effects of changes in the minimum wage, we conducted a survey experiment among personnel managers in the second quarter of 2017. Specifically, we asked them about their expected employment changes within the next twelve months if the minimum wage were set to a particular, randomly-assigned level. As we randomly assign the minimum wage, we can expect its level to be unconfounded with any observable and unobservable establishment characteristic, most importantly with establishments' employment trends. Hence, any group-specific adjustments in the expected employment development would be due to the different levels of the minimum wage.

Although survey experiments or vignette studies have a long-standing tradition in other research fields (starting with Green and Rao 1971 in marketing research), they have only rarely made their way into economic research. Early studies applying such experiments on economic questions stem from transportation economics (Ben-Akiva et al. 1993), labor economics (van Beek et al. 1997), and agricultural economics (Adamowicz et al. 1998). More recently, the studies by Eriksson and Kristensen (2014) on workers' valuation of fringe benefits and Krueger and Kuziemko (2013) on individual demand for health insurance exemplified how survey experiments can advance our knowledge on economic questions.

In addition to the random assignment of the wage floor to establishments, survey experiments offer three major advantages for evaluating minimum wage effects on employment. First, we can include a range of wage levels in our analysis, whereas observational studies are typically limited to analyzing one or only few minimum wage levels. This evidence closely matches the problem of policy-makers who must decide not only whether or not to introduce a minimum wage but also set its level. Second, we can investigate the effects of large changes in minimum wages. While large minimum wage changes often feature prominently in public debates, they are rarely implemented, and evaluations based on observational data are hence not feasible. We can include such large increases in our analysis to learn about their effects without imposing a structural model based on stark assumptions. Third, we can also analyze the effects of minimum wage decreases. Such reductions might serve to stabilize employment in times of economic distress, though it is unclear whether firms are able to reduce wages or wages are rigid at the level of the old minimum wage.

To learn about establishments' responses to various minimum wage levels, we ask personnel managers what employment changes they would expect at their plant if the hourly minimum wage were set at either 8, 9, 10, 11, or 12 Euro.[2] As the current level of the German minimum

[2] The question is (own translation): "Currently the mandatory national minimum wage in Germany is 8.84 Euro per hour. Imagine that, as of now, the minimum wage would be increased/reduced to x Euro. How do you expect the number of your employees to develop over the next 12 months? Increase/no

wage is 8.84 Euro, the first value implies a decrease of the minimum wage while all other minimum wages imply increases by a varying magnitude. A minimum wage of 9 Euro implies a 1.8 percent increase, 10 Euro implies a 13.1 percent increase, 11 Euro implies a 24.4 percent increase and 12 Euro implies a 35.7 percent increase.

Although we are ultimately interested in changes in actual employment, we can only observe employment expectations in our survey experiment. It is therefore natural to ask how employment expectations relate to actual employment changes. Bossler (2017) uses data from the IAB-Establishment Panel, which is a similar establishment-level survey, and shows that treatment effects of the German minimum wage introduction on expected employment changes closely match the effects on actual employment adjustments in the year thereafter. In our context, employment expectations can hence be regarded as an informative measure of changes in actual employment.

Using the managers' responses, we compute the expected relative employment change by dividing the expected employment change by the current employment level. For establishments that expect employment to remain constant, the relative employment change is zero. For establishments that expect to lay off all employees, the relative employment change is –1 (or –100 percent). The expected relative employment change is in principle unbounded for growing establishments. However, to reduce the influence of outliers, we exclude the 0.1 percent of establishments with the largest expected employment growth.[3]

Throughout our analysis, we will run regressions of the following form

$$empl\_change_i = \beta_0 + min\_wage_i'\delta + x_i'\beta + \epsilon_i$$

where $empl\_change_i$ denotes the expected relative employment change in the next 12 months in establishment *i*, and min_wage_i denotes the level of the minimum wage that establishment *i* is randomly assigned to. We run regressions with and without conditioning on a set of control variables x_i. In our setting, including control variables mainly serves as a check whether the randomization was successful. If the randomization was successful, the assigned minimum wage is orthogonal to establishment firm characteristics (x_i) and to unobservables, i.e. the error term ϵ_i. Hence controlling for observables should not alter the estimated minimum wage effects.

The effects of minimum wage changes on employment could be non-linear. For instance, minimum wage decreases have different effects in absolute terms than minimum wage

change/decrease? If increase/decrease: By how many persons would employment increase/decrease over the next 12 months?"; x takes the values of either 8, 9, 10, 11, or 12 Euro (only one minimum wage level per plant was implemented in the survey).

[3] By this restriction, we drop 11 establishments from our sample, which all expect an employment growth of more than 150 percent. Our main insights are robust to changing this threshold.

increases if wages are downwardly rigid. Furthermore, minimum wage increases might exhibit no negative effect on employment at low wage levels, but do so if the minimum wage is set high enough.[4] To allow for such non-linearities, we include dummy variables for each minimum wage level.

To alleviate potential concerns about design effects in our survey experiment, we will compare employment expectations across hypothetical minimum wage levels, using an hourly minimum wage of 9 Euros as reference category in our regressions. One potential design effect might be the framing of the survey question, e.g., asking about employment expectations after mentioning minimum wages, which could unintentionally affect the reported employment expectations. Even using round numbers might influence survey respondents. By comparing all minimum wage levels with the 9 Euro category, we eliminate any such design effects that are constant across minimum wage levels. To avoid order effects in our responses, we present only one counterfactual minimum wage level to each respondent.

Since wage changes are a prerequisite for potential effects on employment, we also ask personnel managers whether they would change wages for incumbent workers or for newly-hired workers in course of a changing minimum wage. While binding minimum wage increases obviously affect wages at the establishment level, it is not clear that reducing a binding minimum wage would result in wage reductions at the firm level. In face of wage rigidities (Bewley 1999), establishments might be unable to pay lower wages even if the minimum wage is reduced. Hence, understanding how actual wages respond to minimum wage decreases is crucial for understanding the employment effects.

The survey experiment captures effects of minimum wage changes on employment in existing establishments at the intensive margin and in closing establishments, which report an expected employment of zero. In contrast, we cannot account for minimum wage effects on market entry by new establishments.[5] Thus, in interpreting our findings, we should keep in mind that we do not observe employment adjustments via market entry, while our approach is well-suited to identify the effects of minimum wage changes on incumbents.

[4] One example for non-linearities would be a monopsony model where increasing the (monopsonistic) wage first raises employment but then begins to reduce employment if the (minimum) wage is set above the market-clearing, full employment wage level.

[5] To give two examples, first consider a minimum wage reduction when wages in existing establishments are rigid. Market entrants could then produce at lower costs than incumbents by paying the new minimum wage, and a minimum wage reduction could thus even reduce incumbents' employment. Second, consider a minimum wage increase. High minimum wages are often considered a barrier to entry, e.g. in Williamson (1968), as they correspond to a strategy of "raising rivals' costs" in the industrial organization literature (see Salop and Scheffman, 1987). Hence increasing minimum wages could exert a negative employment effect by lowering entries.

4. Data and randomization

For our analysis, we use the German Job Vacancy Survey (for a detailed description, see Kubis, Moczall, and Rebien 2017). The survey started in 1989 and is conducted by the surveying institute *Economix* on behalf of the *Institute for Employment Research (IAB)*. The data is collected quarterly and a new sample is drawn in the fourth quarter of each year. Since our analysis sample is the second quarter of 2017, we can exploit information also from the previous two quarters. The sample is randomly drawn from the universe of establishments located in Germany with at least one regular employee liable to social security contributions. The sampling is stratified for eastern and western Germany, by 23 sectors and 6 establishment size categories. The survey collects information on labor demand, other kinds of worker flows and basic establishment characteristics. Since all the basic establishment characteristics including the sector and location are very stable over time, they are only included in the questionnaire in the fourth quarter of each year.

In the fourth quarter of 2016, the German Job Vacancy Survey collected information on 11,588 establishments. From this initial sample, 6,781 establishments were additionally interviewed in the second quarter of 2017 when we conducted our experiment. In the experiment, we randomly assigned a minimum wage to each of the 6,781 establishments.[6] After excluding observations with missing information, we end up with an analysis sample of 6,118 establishments.

Table 1 provides supporting evidence that the randomization was successful by looking at the averages of observable characteristics of those establishments that participated in our experiment. To this end, we report the averages of various establishment characteristics for all minimum wage levels and test whether these averages differ significantly. Reassuringly, establishments are very similar across all minimum wage levels. In particular, we do not find a significant relationship between the minimum wage level and the mean of any observable characteristics. In F-tests on mean differences for each of the establishment characteristics by minimum wage categories, we do not observe a single p-value below 0.2. This unconfoundedness of the assigned minimum wage levels with observable characteristics lends credibility to the assumption that the level is also unconfounded with unobservables.

[Table 1 about here]

[6] Note that we randomized the assigned minimum wage after stratifying by location in western / eastern Germany, affiliation with a low / high bite sector and establishments with less than 20 / 20 or more employees. The stratification ensures that within each of these cells we assigned an equal number of establishments to each minimum wage level but does not affect random assignment within each cell. Nor does the stratification infer with any of the mentioned advantages of randomization.

5. Empirical results

A first impression of the firms' employment reactions to various changes in the minimum wage can be obtained from Figure 1. When taking a minimum wage of 9 Euros per hour as a starting point (which implies a small increase of only 1.8 percent compared to the actual national minimum wage of 8.84 Euros), we see that 94 percent of establishments do not expect to change their number of employees in the next 12 months. About 2.5 percent of plants intend to increase employment, and about 3.5 percent expect a reduction in employment. As suggested by neoclassical labor demand theory, this share of employment-reducing establishments increases substantially the higher the hypothetical minimum wage is set. Raising the minimum wage to 12 Euros would induce almost 19 percent of plants to reduce the number of employees. Interestingly, lowering the minimum wage to 8 Euros per hour does not seem to make much of a difference. In this case, about 3.5 percent of plants state that they intend to increase employment whereas 3.6 percent expect a reduction in employment. These employment changes are quite similar to those at our starting point of 9 Euros.

[Figure 1 about here]

5.1. Baseline effects

In order to get a more precise picture, we now conduct several econometric analyses on the exact employment changes which employers expect given the various levels of the minimum wage. Table 2 reports the results of our investigations. In columns (1) and (2), the dependent variable is the expected relative change in the number of employees. In column (1) this employment change is simply regressed on the various levels of hypothetical minimum wages, taking the 9 Euro level as the reference category. In column (2) we add a number of control variables that may affect employment changes. These include dummy variables for sector affiliation (24 industries), for establishment size (6 categories), and for the location of the firm in eastern Germany where the labor market still markedly differs from that of western Germany even more than 25 years after German unification (Schnabel 2016). We also take account of the industrial relations regime in the plants, i.e., whether they are covered by a collective bargaining agreement or have a works council, since these regimes have been shown to play a role for plants' wage adjustments and employment growth (see Gartner et al. 2013, Jirjahn 2010). Another dummy variable indicates whether the establishment is less than three years old since young firms can be expected to show a distinct employment behavior, with both higher failure rates and – conditional on survival – higher employment growth rates than older firms in their first years on the market (see Lotti et al. 2003, Fackler et al. 2013). Finally, we control for the share of employees covered by social security (who probably can be less easily

laid off than marginal workers without social security) and we take into consideration whether the establishments currently report to have unfilled vacancies.

[Table 2 about here]

The results of our OLS regressions in Table 2 show a clear (but asymmetric) relationship between variations in the minimum wage and expected employment growth which is in accordance with the descriptive evidence from Figure 1. No matter whether we run the regressions without (column 1) or with controls (column 2) we find an increasing magnitude of employment reductions (relative to the reference category of 9 Euro that broadly reflects the status quo), the larger the increase in the minimum wage. The coefficient estimates in column (2) indicate that the number of employees is 1.9 percent lower, ceteris paribus, if the minimum wage is set at 10 rather than 9 Euros per hour, and it is 5.2 percent lower if the minimum wage is fixed at 12 Euros. This employment reduction by 1.9 percent over the next 12 months given a wage increase by 11.1 percent (from 9 to 10 Euros) can be crudely interpreted as a short-run elasticity of labor demand to minimum wage changes of -0.17, and the employment reduction following a wage increase to 12 Euros implies an elasticity of -0.16. Interestingly, these elasticities are relatively constant, indicating that there are no substantial non-linearities.[7]

However, in contrast to our expectations, employment does not increase if the minimum wage is reduced from 9 to 8 Euros per hour. While the respective coefficients in Table 2 are negative, they are not significantly different from zero. An investigation into the reasons behind this non-adjustment to minimum wage reductions will be provided in section 5.3.

Our estimations in columns (1) and (2) reflect plants' overall employment adjustment to variations in the minimum wage and thus comprise adjustments both at the extensive and the intensive margin. As a reaction to a rising minimum wage, some plants may have to close down and thus reduce employment to zero (extensive margin) while others simply adjust their number of employees (intensive margin).[8] Column (3) in Table 2 shows how the probability of expected firm closure is related to variations in the minimum wage, controlling for the other variables mentioned above. The probability of firm closure steadily increases with the extent of the minimum wage increase. At a minimum wage of 12 Euros rather than 9 Euros, establishments' exit probability is about 2 percentage points higher. When excluding those 66 plants from the estimation sample that expect a reduction of employment to zero, we find in column (4) that the employment adjustment at the intensive margin is of course less pronounced than the overall adjustment in column (2). Nevertheless, we still see that the larger

[7] Our estimated elasticities are in the usual ballpark of elasticities of employment with respect to minimum wages presented in Neumark and Wascher (2017) and Neumark, Salas and Wascher (2014).
[8] In line with this distinction, Aaronson, French and Sorkin (2018) and Luca and Luca (2017) find that minimum wages affect closures, though their analyses are limited to US restaurants.

the increase in the minimum wage, the higher the expected fall in employment. As before, a reduction in the minimum wage to 8 Euros neither significantly affects the level of employment nor the probability of plant closure.

5.2. Effect heterogeneities

Our next step in the analysis is to identify various heterogeneities that might be behind the average baseline effects of Table 2. Since it can be expected that the employment adjustments to variations in the minimum wage are more pronounced in those industries and firms which are more strongly affected by the current minimum wage, Table 3 analyzes how employment adjustments are related to the bite of the minimum wage. We first use an industry level categorization and classify those firms as high bite which belong to one of the seven industries found to be strongly affected by the introduction of the national minimum wage in an empirical analysis by Bellmann et al. (2015).[9] Firms from other industries are classified as low bite. We then make use of a finer categorization at establishment level and define firms to fall in the high bite category if they state in our survey that currently 20 percent or more of their employees earn less than 9 Euros per hour (note that the national minimum wage is 8.84 Euros). All other firms are categorized as experiencing a low bite.

[Table 3 about here]

Columns (1) and (2) in Table 3 show the results of our regressions when dividing the estimation sample into those establishments with a high or a low bite at the industry level. As expected, employment reductions in case of minimum wage increases are substantially larger in those plants that belong to a high bite industry. The differences are even larger when using our finer measure of the minimum wage bite at the establishment rather than the industry level, as can be seen from columns (3) and (4). Plants where a substantial part of the workforce receives less than 9 Euros per hour of work expect drastic decreases in employment if the minimum wage rises. For instance, if the minimum wage was 12 Euros rather than 9 Euros, the number of employees in such high bite plants would be reduced by almost 22 percent (column 3). Plants with a low bite are less affected, but they still show the familiar pattern of steadily increasing employment reductions in case of a larger minimum wage rise. However, the implied elasticities differ tremendously between these groups, amounting to 0.66 in case of an increase to 12 Euro for high bite establishments and to merely 0.11 for low bite establishments.

Interestingly (but not surprising), high bite establishments even intend to increase employment if the minimum wage is set at 8 rather than 9 Euros. In contrast, low bite establishments expect

[9] High bite industries are hospitality, retail, food and beverages, services, transportation and warehouses, agriculture, and temporary job agencies.

to reduce employment in case of such a reduction in the minimum wage. One explanation for this difference between the two groups of plants could be that low bite establishments, which possibly pursue a high wage strategy, suffer from the minimum wage reduction since this creates a cost advantage for competitors that follow a low wage strategy. Hence, the minimum wage reduction may enable low wage plants to increase their market share at the expense of high wage plants.[10]

Another factor that may play a role in employment adjustments is the industrial relations regime in a plant, in particular the coverage by a collective agreement and the presence of a works council. In Germany, employers or employers' associations and unions have the right to regulate wages and working conditions without state interference. They conclude collective bargaining agreements (at industry or company level) which are legally binding to all members of the unions and employers' associations involved, but in general they are extended to all employees working for the employers involved, no matter whether they are union members or not. Collective agreements determine wages as well as job classifications, working time, and working conditions. These collectively agreed norms are minimum terms in that companies bound by collective agreements may not undercut but only improve upon these terms and conditions (for instance by paying higher wages). At the plant level, the employees in all establishments that exceed a size threshold of five permanent employees are free to elect a works council representing the entire workforce (but they are also free not to establish a works council). In addition to extensive rights of information and consultation, German works councils have co-determination rights prescribed by law on "social matters" such as remuneration arrangements, layoffs, health and safety measures, and the regulation of working time. Unlike unions, works councils are not allowed to call a strike, and they are also excluded from reaching agreement with the employer on wages or working conditions that are normally settled by collective agreements between unions and employers' associations at industry level. However, in practice works councils can use their extensive powers and rights in other areas to also influence wage adjustments. In some cases, such competencies are explicitly transferred from the industry to the plant level (by means of so-called derogation clauses), so that management and works councils can find a way to adjust wages and employment if this is necessary to secure the survival of the plant. Descriptive analyses show that in 2016 about

[10] To investigate this line of reasoning further, we ran separate regressions for high and low bite establishments in high bite industries (not reported in a table). A minimum wage reduction to 8 Euros would lead low bite establishments to reduce employment by about 2 percent. In contrast, high bite establishments would increase employment by almost 10 percent. As these establishments probably compete against each other, this opposing effect pattern supports the argument that lowering the minimum wage could allow low wage plants to increase their market share at the expense of high wage plants.

56 percent of employees in Germany were covered by collective bargaining agreements and about 41 percent were represented by a works council (Ellguth and Kohaut 2017).

[Table 4 about here]

In Table 4 we distinguish between four different regimes that are particularly relevant for industrial relations and wage setting in Germany (see, e.g., Gartner et al. 2013 and Oberfichtner and Schnabel 2017). The four regimes are presented in an increasing order of regulation, ranging from those establishments that have neither collective agreements nor works councils (column 1) over those that have a collective bargaining agreement (column 2) or a works council (column 3) to those plants that have both a collective agreement and a works council and can thus be seen as prototypes of the traditional German model of industrial relations (column 4).[11] We would expect that plants which are not or less constrained by collective agreements and/or works councils can adjust wages and employment more easily so that their reactions to increases in minimum wages should be more pronounced. This is confirmed by our estimations reported in Table 4. Expected employment reductions following an increase in the minimum wage are highest in the subsample of those plants that have neither collective agreements nor a works council (column 1). Employment reductions are also found in those establishments that are covered by a collective agreement (column 2), but they are less pronounced here. In contrast, plants with a works council (column 3) or with both a works council and a collective agreement (column 4) do not significantly reduce employment if the minimum wage increases. The reason for these differences may be that plants covered by collective bargaining and plants with a works council pay relatively high wages so that they are less severely affected by our increases in the minimum wage. Furthermore, our results suggest that works councils, whose consent is needed in Germany for layoffs to be legal, seem to be able to fend off employment reductions.

When the minimum wage is reduced to 8 instead of 9 Euros, we observe a negative employment effect for plants that are bound by collective bargaining agreements. A plausible explanation for this observation is that these plants face a relative disadvantage from a minimum wage decrease because they cannot reduce the binding collectively-agreed wages when the minimum wage falls. We address this potential mechanism in section 5.3.

[Table 5 about here]

Heterogeneities by plant size and region are presented in Table 5 by distinguishing between three categories of plant size and between plants located in eastern and western Germany. The results in column (1) show that expected employment reductions following an increase in

[11] Note that these four categories are not mutually exclusive. For instance, establishments that participate in collective bargaining may or may not have a works council and may hence be included not only in column (2), but also in columns (3) and (4) of Table 4.

the minimum wage are highest in the subsample of small plants with no more than 10 employees. This may reflect the fact that the employment protection law in Germany does not apply to establishments with 10 or fewer employees. Employment reductions are less pronounced but still statistically highly significant in medium-sized establishments (column 2), and they are relatively small and only marginally significant in the subsample of large establishments with more than 100 employees (column 3). As before, a reduction in the minimum wage to 8 Euros does not significantly affect the expected level of employment in all three plant size categories. These results for plant size correspond quite well to those for industrial relations regimes (Table 4) which also differ by plant size, with small and medium-sized plants being much less likely to have collective agreements and/or works councils (see Ellguth and Kohaut 2017, Oberfichtner and Schnabel 2017).

Columns (4) and (5) in Table 5 show that there are substantial differences in reactions to minimum wage changes between eastern and western Germany, even after controlling for variables like establishment size and industrial relations that still differ on average between both parts of Germany 25 years after unification (Schnabel 2016). In both regions we find the familiar pattern that the larger the increase in the minimum wage, the higher the expected reduction in employment, but the magnitude of these effects is more than twice as large in eastern than in western Germany. This corresponds to our insights from Table 3 on the bite of the minimum wage since on average plants in eastern Germany are more likely to be affected by the current minimum wage. As expected, the estimated coefficient for a reduction in the minimum wage from 9 to 8 Euros per hour is positive (but statistically insignificant) in eastern Germany. Somewhat surprisingly, however, it is negative and statistically significant in western Germany. This again calls for a more detailed investigation into the reasons behind the unexpected adjustment to minimum wage reductions.

These heterogeneities underscore that there is not one typical minimum wage effect on employment across establishments, and they show how the effects vary across different types of establishments. As establishment characteristics like industrial relations or plant size correlate with each other and with wage levels, our approach is not suited to disentangle the influence of each single characteristic. That said, the results inform us how the economy and its structure would react to large increases in minimum wages. In particular, they imply that large minimum wage increases would raise the employment shares of large, high-wage establishments with institutionalized industrial relations (mostly found in western Germany) at the expense of other establishments, which would incur larger employment losses. In contrast, a modest minimum wage reduction would benefit low-wage employers, who are typically not subject to collective bargaining.

5.3. How do establishments react when the minimum wage is reduced?

Our econometric analyses have shown that – in contrast to initial expectations – a reduction in the minimum wage from about 9 to 8 Euros per hour typically does not result in employment increases. Potential explanations for this surprising result may be some kind of status quo bias (i.e. plants have organized their production structure around the current minimum wage and do not gain by reverting to the previous, less capital-intensive setting), the relatively small extent of the wage reduction of only 11 percent, or the binding character of (higher) collectively-agreed wages. Another possibility is that plants are not able or willing to lower employees' wages in response to a reduction in the minimum wage, e.g. due to resistance from the side of workers and works councils or due to efficiency wage considerations (Franz and Pfeiffer 2006).

[Table 6 about here]

In order to get a better understanding of the (non-)response to a minimum wage reduction, we asked the group of employers to which a minimum wage decrease (to 8 Euros) was assigned whether they would cut the wage of at least one of their current employees and/or the entry wage of at least one newly hired employee if the minimum wage was reduced to 8 Euros per hour. For a number of subsamples, Table 6 reports the sample means of the share of establishments which answer that they would cut wages. It can be seen that on average only 2.6 percent of establishments would reduce the wages of their current workforce whereas 11 percent of establishments would implement a cut in entry wages. The willingness (or pressure) to reduce current and entry wages is substantially higher in high bite sectors and establishments that are most strongly affected by the minimum wage. Recall from Table 3 that these establishments are the ones which intend to raise employment after a reduction in the minimum wage. Establishments without collective bargaining agreements and works councils are also more likely to cut wages whereas those plants that have a works council or a works council plus a collective agreement (i.e. the traditional German model of industrial relations) would not cut the wages of incumbent workers and would also be less likely to reduce entry wages. The likelihood of wage cuts is also lower in larger establishments and in western Germany. The latter result probably reflects a compositional effect since low bite sectors and establishments as well as large establishments and establishments with full IR institutions are more often present in western Germany.

Since most establishments are not able or not willing to cut wages in response to a minimum wage reduction, the missing increase in employment identified in our estimations is not surprising. It clearly does not invalidate the neoclassical theory of labor demand but points to the importance of institutional settings and other wage determining factors (like fairness) to be considered by plant management.

5.4. Robustness checks

As a first robustness check of our results, we include the share of part-time workers in a plant to control for selective employment adjustments. Second, we adjust for the sampling procedure by running a weighted least squares regression that weights observations to resemble the population of all establishments in Germany. Third, we use the ratio of the expected employment growth relative to the unconditional expected employment growth (reported in the same survey before the minimum wage experiment) as dependent variable to control for potential differences in employment prospects across assigned minimum wage levels. As can be seen from columns (1) through (3) of Table 7, our main results are robust across these specifications.[12]

Finally, we replace our dependent variable, the relative employment change, by the absolute change in the number of employees. The results in column (4) of Table 7 show that a minimum wage of 11 Euro decreases establishment-level employment by roughly one employee compared to a minimum wage of 9 Euro. A minimum wage of 12 Euro reduces employment expectations by 2.8 employees. Given an average firm size of 97 employees, the results are again in line with our baseline estimations, but the implied relative employment effects are estimated much less precisely.

[Table 7 about here]

6. Conclusion

To shed light on the consequences of substantial minimum wage changes, we conducted a survey experiment that randomly assigned a minimum wage increase or decrease to 6,118 establishments in Germany. Conditional on the randomly assigned change in the minimum wage, we asked the personnel managers of these plants about their expectations concerning employment adjustments. Our econometric analyses show a clear (but asymmetric) relationship between variations in minimum wages and expected employment growth. We find that the larger the increase in the minimum wage is, the larger the expected reduction in employment. Employment adjustments to variations in minimum wages are more pronounced in those industries and plants which are more strongly affected by the current minimum wage. We also show that expected employment reductions following an increase in minimum wages are highest in those plants that have neither collective agreements nor a works council. In

[12] The sample size slightly decreases for some of the reported specifications as we use additional information that is not available for all establishments included in our main analysis.

contrast, plants with a works council or with both a works council and a collective agreement do not significantly reduce employment if minimum wages increase. This suggests that works councils, whose consent is needed in Germany for layoffs to be legal, seem to be successful in fending off employment reductions.

Interestingly, and in contrast to our expectations, employment is not found to increase if the minimum wage is reduced by about 10 percent. Only for those plants that are most strongly affected by the current minimum wage, we find a substantial positive effect of a minimum wage decrease on employment. The main reason is that hardly any establishment would cut the wages of its current workforce, and only 11 percent of establishments would reduce entry wages. The willingness (or pressure) to decrease current and entry wages is substantially higher in those sectors and establishments that are most strongly affected by the minimum wage. In contrast, plants that have a works council or a works council as well as a collective agreement (i.e. the traditional German model of industrial relations) would not cut their workforce's wages and would be less likely to reduce entry wages.

Our study fills a gap in the literature concerning the impact of very large minimum wage increases like those planned in the UK and in some states of the US, indicating that such large increases might indeed lead to large employment losses. Our results also corroborate findings from Germany that the negative employment effects of sectoral minimum wages are more pronounced in eastern Germany (see, e.g., König and Möller 2009, Aretz et al. 2013) and that they are mostly driven by high-bite firms facing strong competition (Bossler and Gerner 2016). Going beyond the extant literature by investigating reductions in minimum wages, we find that such wage cuts cannot be expected to automatically increase employment. Our results point to the importance of institutional settings and other wage determining factors (like fairness) that need to be taken into account when assessing or predicting employment reactions to minimum wage changes.

Although our ex ante analysis does overcome some deficits of previous ex post evaluations that are not very informative concerning potentially large changes in minimum wages, it also has its limitations. First, our analysis is based on managers' expectations concerning employment adjustments rather than actual employment changes. However, previous studies have demonstrated that in the case of the German minimum wage introduction expected and actual employment reactions largely coincided (see Bossler 2017). Second, while our survey experiment captures the effects of minimum wage changes on employment in existing and closing establishments, we cannot account for minimum wage effects on market entry by new establishments. Third, in addition (or alternative) to the adjustments in the number of employees our analysis focused on, establishments could make use of other adjustment channels such as changes in working hours (see Caliendo et al. 2017), increases in product

prices, reductions in non-labor costs, and improvements in productivity (see Bodnár et al. 2018 for survey evidence on these channels). These potential adjustments within plants and the general equilibrium effects between plants and across the economy provide interesting challenges for future research.

Despite these caveats, our investigation shows that setting the “right” minimum wage is quite challenging since most establishments would react to excessive minimum wage increases by substantially reducing employment. Importantly, the minimum wage levels that lead to such employment losses are within the bandwidth of minimum wage increases currently under discussion. Our analysis furthermore reveals important heterogeneities among establishments that policymakers need to consider when setting the minimum wage.

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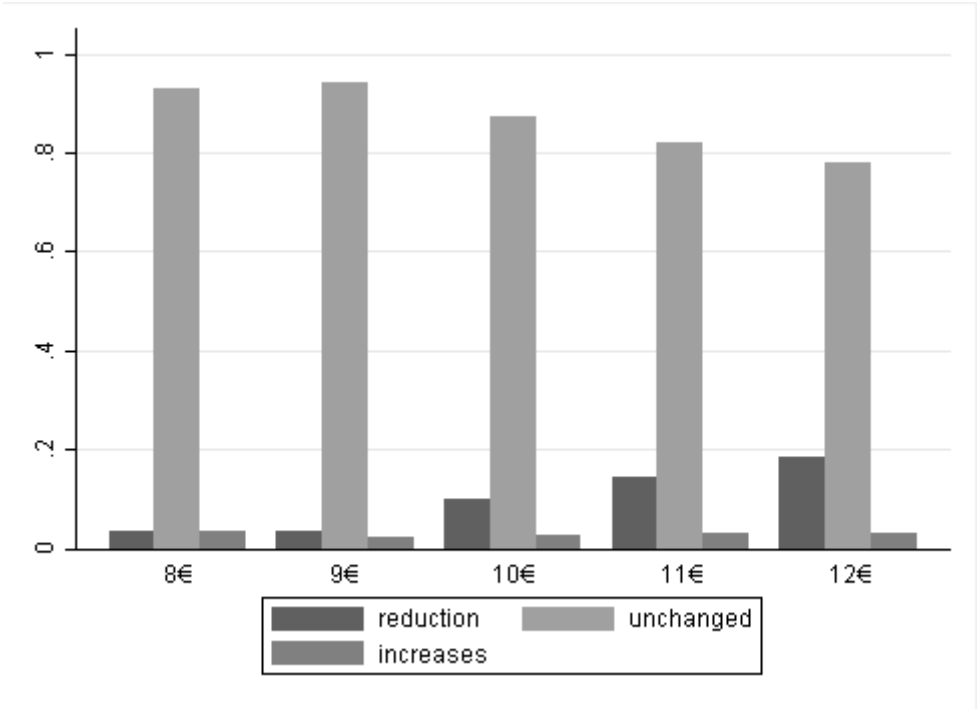
Figures and Tables

Figure 1: Ordinal employment expectations for different minimum wages



Data: IAB-Job-Vacancy-Survey, Q2-2017, analysis sample.

Table 1: Descriptive statistics by minimum wage

	Assigned hourly minimum wage (in Euro)					p-value (H_0: equal means)
	8	9	10	11	12	
Variables defining the experimental stratification:						
Eastern Germany	0.426 (0.014)	0.427 (0.014)	0.435 (0.014)	0.426 (0.014)	0.411 (0.014)	0.841
High bite sectors	0.308 (0.013)	0.307 (0.013)	0.315 (0.013)	0.311 (0.013)	0.315 (0.013)	0.989
Plant size (dummy >= 20 employees)	0.564 (0.014)	0.552 (0.014)	0.563 (0.014)	0.553 (0.014)	0.559 (0.014)	0.967
3 Establishment size categories used for separate analyses:						
≤ 10	0.253 (0.012)	0.260 (0.012)	0.258 (0.013)	0.243 (0.012)	0.260 (0.013)	0.861
11 - 100	0.592 (0.014)	0.595 (0.014)	0.583 (0.014)	0.620 (0.014)	0.580 (0.014)	0.274
> 100	0.155 (0.010)	0.145 (0.010)	0.159 (0.011)	0.136 (0.010)	0.160 (0.011)	0.411
Establishment bite (>=0.2)	0.104 (0.009)	0.087 (0.008)	0.112 (0.009)	0.110 (0.009)	0.102 (0.009)	0.276
Share of workers with wage < 9 €	0.065 (0.005)	0.053 (0.005)	0.066 (0.005)	0.068 (0.005)	0.061 (0.005)	0.254
Plants without coll. agreement and without works council	0.490 (0.014)	0.482 (0.014)	0.466 (0.014)	0.462 (0.014)	0.468 (0.014)	0.587
Plants with collective agreement	0.465 (0.014)	0.472 (0.014)	0.494 (0.014)	0.498 (0.014)	0.495 (0.014)	0.336
Plants with works council	0.272 (0.013)	0.271 (0.013)	0.264 (0.013)	0.265 (0.013)	0.261 (0.013)	0.960
Plants with both collective agreement and works council	0.228 (0.012)	0.225 (0.012)	0.224 (0.012)	0.225 (0.012)	0.224 (0.012)	0.999
Vacancies (dummy)	0.338 (0.013)	0.337 (0.013)	0.355 (0.014)	0.345 (0.014)	0.369 (0.014)	0.437
Share of regular employees	0.838 (0.005)	0.830 (0.005)	0.826 (0.006)	0.830 (0.005)	0.825 (0.006)	0.531
Young plant dummy (<=3 years)	0.050 (0.006)	0.044 (0.006)	0.048 (0.006)	0.045 (0.006)	0.046 (0.006)	0.961
Empl. growth (2011 to 2016, geometric mean)	0.019 (0.003)	0.025 (0.004)	0.021 (0.004)	0.016 (0.003)	0.020 (0.003)	0.521

Notes: Averages by minimum wage levels and standard errors in parentheses. The reported p-values in the last column are regression-based tests for mean differences that allow for heteroscedasticity. Data: IAB-Job-Vacancy-Survey, Q2 2017, analysis sample.

Table 2: Baseline effects on the employers' expected employment growth for different minimum wage levels

	Baseline effects on the expected employment growth		Extensive and intensive margin effects on the expected employment growth	
	Without controls	With controls	Probability of closure	Employment expectation excluding closures
	(1)	(2)	(3)	(4)
Assigned minimum wage:				
8 Euro	-0.005	-0.006	0.004	-0.002
	(0.004)	(0.004)	(0.003)	(0.003)
9 Euro	*reference*	*reference*	*reference*	*reference*
10 Euro	-0.018***	-0.019***	0.006**	-0.013***
	(0.004)	(0.004)	(0.003)	(0.003)
11 Euro	-0.033***	-0.033***	0.012***	-0.022***
	(0.005)	(0.005)	(0.004)	(0.003)
12 Euro	-0.050***	-0.052***	0.021***	-0.032***
	(0.006)	(0.006)	(0.005)	(0.004)
Controls:				
Sectors (24 cat.)	No	Yes	Yes	Yes
Eastern Germany	No	Yes	Yes	Yes
Plant size (6 cat.)	No	Yes	Yes	Yes
Other controls	No	Yes	Yes	Yes
Observations	6118	6118	6118	6052
R-squared	0.017	0.046	0.016	0.040

Notes: OLS regression coefficients. Robust standard errors are in parentheses. Asterisks indicate significance levels: * p<0.1, ** p<0.05, *** p<0.01. Other controls include dummies for a bargaining contract, works council, vacancies and young plants below 3 years of age and the share of social security employees.

Data: IAB-Job-Vacancy-Survey, Q2 2017, analysis sample.

Table 3: Heterogeneous effects on the expected employment growth by the bite of the minimum wage

	Separate regressions by industry bite		Separate regressions by establishment-level bite	
	High bite (1)	Low bite (2)	High bite (3)	Low bite (4)
Assigned minimum wage:				
8 Euro	-0.001	-0.008**	0.069***	-0.013***
	(0.009)	(0.004)	(0.022)	(0.004)
9 Euro	*reference*	*reference*	*reference*	*Reference*
10 Euro	-0.036***	-0.013***	-0.061**	-0.014***
	(0.010)	(0.004)	(0.027)	(0.004)
11 Euro	-0.070***	-0.017***	-0.117***	-0.022***
	(0.012)	(0.005)	(0.030)	(0.004)
12 Euro	-0.095***	-0.032***	-0.219***	-0.034***
	(0.014)	(0.006)	(0.034)	(0.005)
Controls:				
Sectors	Yes	Yes	Yes	Yes
Eastern Germany	Yes	Yes	Yes	Yes
Plant size (6 cat.)	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes
Observations	1903	4215	612	5347
R-squared	0.074	0.029	0.184	0.025

Notes: OLS regression coefficients. Robust standard errors are in parentheses. Asterisks indicate the following significance levels: * p<0.1, ** p<0.05, *** p<0.01. Other controls are as in Table 3.

Data: IAB-Job-Vacancy-Survey, Q2 2017, analysis sample.

Table 4: Heterogeneous effects on the expected employment growth by industrial relations regimes

	Separate regressions for establishments…			
	without collective agreement and without works council	with collective agreement	with works council	with both collective agreement and works council
	(1)	(2)	(3)	(4)
Assigned minimum wage:				
8 Euro	-0.002	-0.012**	-0.004	-0.004
	(0.006)	(0.006)	(0.004)	(0.004)
9 Euro	*reference*	*reference*	*reference*	*reference*
10 Euro	-0.025***	-0.014***	-0.010*	-0.011*
	(0.007)	(0.005)	(0.005)	(0.006)
11 Euro	-0.036***	-0.031***	-0.001	0.002
	(0.008)	(0.006)	(0.004)	(0.003)
12 Euro	-0.070***	-0.034***	-0.012**	-0.007
	(0.010)	(0.007)	(0.006)	(0.005)
Controls:				
Sectors (24 cat.)	Yes	Yes	Yes	Yes
Eastern Germany	Yes	Yes	Yes	Yes
Plant size (6 cat.)	Yes	Yes	Yes	Yes
Other controls w/o industrial relations	Yes	Yes	Yes	Yes
Observations	2899	2963	1632	1376
R-squared	0.069	0.045	0.035	0.037

Notes: OLS regression coefficients. Robust standard errors are in parentheses. Asterisks indicate the following significance levels: * p<0.1, ** p<0.05, *** p<0.01. Other controls include dummies for vacancies and young plants below 3 years of age and the share of social security employees.

Data: IAB-Job-Vacancy-Survey, Q2 2017, analysis sample.

Table 5: Heterogeneous effects on the expected employment growth by establishment size and for eastern and western Germany

	Separate regressions for three different establishment size categories			Separate regressions for eastern and western Germany	
	Small establ. (≤ 10 empl.)	Medium size establ. (11 - 100 employees)	Large establ (> 100 empl.)	Eastern Germany	Western Germany
	(1)	(2)	(3)	(4)	(5)
Assigned minimum wage:					
8 Euro	-0.008	-0.005	-0.003	0.004	-0.012**
	(0.011)	(0.005)	(0.004)	(0.006)	(0.006)
9 Euro	reference	reference	reference	reference	reference
10 Euro	-0.031***	-0.019***	-0.003	-0.029***	-0.012**
	(0.010)	(0.005)	(0.007)	(0.007)	(0.005)
11 Euro	-0.042***	-0.035***	-0.006*	-0.050***	-0.021***
	(0.012)	(0.006)	(0.003)	(0.009)	(0.006)
12 Euro	-0.075***	-0.049***	-0.017*	-0.079***	-0.031***
	(0.013)	(0.007)	(0.009)	(0.011)	(0.006)
Controls:					
Sectors (24 cat.)	Yes	Yes	Yes	Yes	Yes
Eastern Germany	Yes	Yes	Yes	No	No
Plant size (6 cat.)	No	No	No	Yes	Yes
Other controls	Yes	Yes	Yes	Yes	Yes
Observations	1560	3636	922	2601	3517
R-squared	0.059	0.047	0.065	0.078	0.029

Notes: OLS regression coefficients. Robust standard errors are in parentheses. Asterisks indicate the following significance levels: * p<0.1, ** p<0.05, *** p<0.01. Other controls are as in Table 3.

Data: IAB-Job-Vacancy-Survey, Q2 2017, analysis sample.

Table 6: Expected wage cuts when the minimum wage decreases by establishment characteristics

	Wage cuts for incumbent employees (1)	Wage cuts of entry wages (2)
All establishments	0.026	0.110
	(0.005)	(0.009)
High bite sectors	0.061	0.164
	(0.012)	(0.019)
Low bite sectors	0.011	0.086
	(0.004)	(0.010)
High bite establishments	0.146	0.309
	(0.032)	(0.042)
Low bite establishments	0.012	0.084
	(0.003)	(0.009)
No collective agreement, no works council	0.035	0.132
	(0.007)	(0.014)
Collective agreement	0.019	0.086
	(0.006)	(0.012)
Works council	0.003	0.063
	(0.003)	(0.013)
Both collective agreement and works council	0.004	0.054
	(0.004)	(0.014)
Plant size ≤ 10	0.038	0.097
	(0.011)	(0.017)
Plant size 11 - 100	0.025	0.116
	(0.006)	(0.012)
Plant size > 100	0.010	0.105
	(0.007)	(0.022)
Eastern Germany	0.042	0.147
	(0.009)	(0.016)
Western Germany	0.014	0.083
	(0.004)	(0.010)
Observations	1,230	1,212

Notes: Sample means on whether the employer would cut wages if the minimum wage falls to 8 Euro.
Data: IAB-Job-Vacancy-Survey, Q2 2017, analysis sample restricted to those establishments to which we assigned a minimum wage of 8 Euro.

Table 7: Robustness checks concerning the effect of different minimum wages on the expected employment growth

	Additional control for part-time	Weighted regression	Expected employment growth relative to unconditio-nal expectation	Employment expectation in heads
	(1)	(2)	(3)	(4)
Assigned minimum wage:				
8 Euro	-0.007	0.001	-0.012	-0.297
	(0.004)	(0.010)	(0.010)	(0.216)
9 Euro	*reference*	*reference*	*reference*	*reference*
10 Euro	-0.017***	-0.016	-0.033***	-0.518*
	(0.004)	(0.012)	(0.008)	(0.304)
11 Euro	-0.033***	-0.016*	-0.047***	-1.001***
	(0.005)	(0.009)	(0.009)	(0.216)
12 Euro	-0.051***	-0.039***	-0.063***	-2.812**
	(0.006)	(0.011)	(0.009)	(1.192)
Controls:				
Sectors (24 cat.)	Yes	Yes	Yes	Yes
Eastern Germany	Yes	Yes	Yes	Yes
Plant size (6 cat.)	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes
Observations	5196	6118	6018	6118
R-squared	0.049	0.046	0.052	0.022

Notes: OLS regression coefficients in columns (1), (3), and (4). Weighted least squares regression coefficients in column (2) using the sampling weights provided by the IAB-Job-Vacancy-Survey (cf. Kubis et al. 2017). Robust standard errors are in parentheses. Asterisks indicate the following significance levels: * p<0.1, ** p<0.05, *** p<0.01. Other controls are as in Table 3.
Data: IAB-Job-Vacancy-Survey, Q2 2017, analysis sample.