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Monopsonistic Competition, Low-Wage Labour Markets, and Minimum Wages – An Empirical Analysis

RWI #599

Imprint

Ruhr Economic Papers

Published by

Ruhr-Universität Bochum (RUB), Department of Economics
Universitätsstr. 150, 44801 Bochum, Germany

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Ruhr Economic Papers #599

Responsible Editor: Jochen Kluve

ISSN 1864-4872 (online) – ISBN 978-3-86788-695-6

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Bibliografische Informationen der Deutschen Nationalbibliothek

Die Deutsche Bibliothek verzeichnet diese Publikation in der deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über: *http://dnb.d-nb.de* abrufbar.

http://dx.doi.org/10.4419/86788695
ISSN 1864-4872 (online)
ISBN 978-3-86788-695-6

Ronald Bachmann and Hanna Frings[1]

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Abstract

This paper investigates the degree of monopsony power of employers in different industries against the background of a statutory minimum wage introduction in Germany in January 2015. A semi-structural estimation approach is employed based on a dynamic model of monopsonistic competition. The empirical analysis relies on a linked employer-employee data set which allows to control for heterogeneity both on the worker and on the firm side. The results show important differences in monopsonistic competition among low-wage industries: Retailing as well as the hotel and restaurant industry can be described as monopsonistic labour markets, while this is not true for agriculture and mining as well as private and public services. From a policy point of view, the introduction of a uniform minimum wage may therefore lead to different employment reactions in industries with a similar wage structure.

JEL Classification: J42, J31, J38

Keywords: Monopsony; labour supply; minimum wage; Germany

December 2015

1 Ronald Bachmann, RWI and IZA; Hanna Frings, RWI. *– We thank Thomas K. Bauer, Matthias Giesecke, Michael Kind and Christoph M. Schmidt as well as participants of the Verein für Socialpolitik 2014 conference, of the SOLE/EALE World Meeting 2015, of the European Economic Association 2015, of the IAB Workshop on "The German Minimum Wage - First Evidence and Experiences from Other Countries", and of a seminar at RWI for helpful comments and suggestions.* *– All correspondence to: Ronald Bachmann, RWI, Hohenzollernstr. 1-3, 45128 Essen, Germany, e-mail: bachmann@rwi-essen.de*

1 Introduction

The institutional framework governing minimum wages in Germany changed drastically on 1st January 2015 when a countrywide minimum wage was introduced at €8.50 per hour. Previously, minimum wages only existed for a selected number of industries and were based on collective bargaining agreements declared generally binding. The statutory minimum wage affects 15 percent of all West German employees and 27 percent of all East German employees (Brenke and Müller, 2013), and is relatively high compared to other industrialized countries (Kluve, 2013). Consequently, there is a widespread fear that many jobs are at risk of getting destroyed, especially if economic conditions deteriorate at some point in the future.

However, the expected employment effects of minimum wages depend not only on the minimum wage's bite, but also on the prevailing labour market structure. In a neo-classical labour market, the wage elasticity of labour supply to the firm is infinite, the wage equals the marginal product of labour, and an increase in the wage therefore unambiguously leads to an increase in unemployment (Neumark and Wascher, 2008). In a monopsonistic labour market, by contrast, the mobility of workers is limited, and the wage elasticity of labour supply to the firm is relatively low. As a consequence, firms can use their market power to set the wage below a worker's productivity (Manning, 2003*a*). Minimum wages may therefore lead to a reduction in firms' profits without a corresponding increase in unemployment.

In this paper, we therefore analyse if and to what extent industries are characterized by differing degrees of monopsonistic competition. For this purpose we follow the semi-structural estimation approach based on the dynamic model of monopsonistic competition proposed by Manning (2003*a*) and by using a unique linked employer-employee data set which allows to control for worker heterogeneity, firm heterogeneity and demand side effects. Our analysis yields estimates of the wage elasticity of labour supply to the firm, which provides a measure of monopsony power, separately for different industries and for East and West Germany. These results provide an important indication for the risk of potential job losses because of the minimum wage.

The empirical studies on employment effects of (sectoral) minimum wages in Germany (König and Möller, 2009; Frings, 2013; Vom Berge, Frings and Paloyo, 2013) is similarly inconclusive as in the US (Card and Krueger, 1994; Dube, Lester and Reich, 2010; Neumark and Wascher, 2008) or the UK (Machin and Wilson, 2004; Metcalf, 2008; Dolton, Bondibene and Wadsworth, 2012), but shows a tendency towards reporting neutral employment effects[1]. In the political

[1]This is especially true for a large-scale evaluation of the existing industry-specific mini-

and academic discussion leading to the introduction of the statutory minimum wage in 2015, the monopsonistic structure of the labour market was repeatedly brought forward as a theoretical explanation for the non-negative employment effects of the existing minimum wages at the industry level.[2] However, no empirical evidence exists on the relevance of this argument for the German labour market.

General evidence for monopsony power on the German labour market is provided by Hirsch, Schank and Schnabel (2010*a*) who estimate the wage elasticity of labour supply to the individual firm to lie in the range of 1.9 – 3.7 in West Germany. While this result is interesting by itself, the more relevant question in the context of the minimum wage is to which extent low-wage industries, in which the minimum wage bites hard, are characterized by monopsonistic competition. Thus, we contribute to the literature not only by estimating the extent of monopsony power by sector – which is of interest because wage-setting takes place at the sectoral level to a large extent – but especially by analysing the interplay of monopsony power and wages at the sectoral level. This simultaneous analysis is crucial in order to develop expectations on the employment effects of minimum wages, even ex ante to the policy implementation. Therefore, our results are of high relevance to policy makers.

We find that, first, the labour supply elasticity to the individual firm is considerably lower than suggested by the neoclassical model of the labour market which is in line with existing estimates. Second, we find important differences in the degree of monopsonistic competition between industries, which are related to worker composition and the presence of works councils. While monopsony power may mitigate adverse employment effects in some low-wage industries, such as the hotel and restaurant or retailing industries, this is not the case for agriculture and mining or private and public services where the minimum wage also severely cuts into the wage distribution. The employment effects of the minimum wage introduction will therefore be unevenly distributed across the individual low-wage industries.

The remainder of the paper is structured as follows: The next section reviews the dynamic monopsony model and develops hypotheses on the determinants leading to sectoral differences in monopsonistic competition. Section 3 presents details of the semi-structural estimation approach and Section 4 describes the data set. Section 5 discusses the empirical results and their implications for the

mum wages in Germany by the Ministry of Labour and Social Affairs. The reports containing detailed results can be downloaded at: `http://www.bmas.de/DE/Themen/Arbeitsrecht/Meldungen/evaluation-mindestloehne.html`.

[2]Clearly, monopsony is just one among many possible reasons for non-negative employment effects. Factors such as substitution of high-skilled for low-skilled labour, pass-through of increased labour costs to product prices, reduced non-wage benefits, or non-compliance may be equally important.

expected employment effects of the statutory minimum wage. The final section concludes.

2 Theoretical considerations and empirical evidence

The source of monopsony power in dynamic models of monopsonistic competition results from search frictions as well as heterogeneous preferences over non-wage employer characteristics (Bhaskar, Manning and To, 2002; Boal and Ransom, 1997).[3] First, search frictions constitute any factor that lengthens the time firms and workers need to find each other. For example, job seekers have only limited information available about job openings and the characteristics of such jobs, including the offered wage. At the same time employers suffer from information asymmetries in terms of job seekers available to firms. Second, preferences that are relevant for monopsony power mainly refer to non-wage employer characteristics such as flexible working time arrangements, commuting time, training and career opportunities, or the general working atmosphere. Finally, even though firm concentration in local labour markets is not a central source of monopsony power, it further advances monopsony power of employers due to limited mobility of workers across labour market regions.

As a result of these different sources of monopsony power, the labour supply to the firm is not perfectly elastic, and the degree of monopsonistic competition is defined by the wage elasticity of labour supply or, put differently, the slope of the labour supply curve. The flatter this curve, i.e. the higher the wage elasticity of labour supply, the more competitive the labour market. Figure 1 shows the situation of the individual firm in a monopsonistic labour market facing an upward sloping labour supply curve. In contrast to the competitive model of the labour market, firms are wage setters and can choose any wage-employment combination on the upward sloping labour supply curve. Intuitively, this means that some - but not all - workers will leave the firm if the wage is reduced by a small amount.

The existing empirical studies on monopsonistic competition all find relatively low wage elasticities of labour supply to the individual firm. The lowest elasticities are reported in studies analysing specific labour market segments in which employer concentration is an important source of monopsony. For example, Falch (2010) exploits an exogenous variation in wages for school teachers in Norway and finds an elasticity of 1.4. Staiger, Spetz and Phibbs (2010) follow a similar identification strategy but focus on nurses employed in Veteran Hospitals

[3] Manning (2003*b*) and Hirsch, König and Möller (2013) propose models of geographic oligopsony, in which a combination of regional employer concentration and limited mobility of workers are the sources of monopsony power. However, in the majority of modern monopsony models employer concentration is irrelevant.

in the US. Their results indicate an extremely low elasticity of 0.1. While the identification strategy in these studies is credible, the external validity is low and the degree of inference that can be drawn for the more general functioning of the labour market is limited.

A second strand of the literature employs a semi-structural estimation approach based on Manning's model of dynamic monopsony. The estimated elasticities are higher but still far from infinite: Ransom and Oaxaca (2010) find labour supply elasticities in the range of 1.4 – 3.0 for the grocery retail industry in the US, and Ransom and Sims (2010) report an elasticity of 3.7 for school teachers in the US. The external validity of the study by Ransom and Oaxaca (2010) is higher compared to the other results discussed up to this point. The reason is that search frictions or heterogeneous preferences are more likely reasons for monopsony power than pure employer concentration in the retail grocery industry compared to school teachers or nurses. Hirsch, Schank and Schnabel (2010*a*) present one of the few analyses for an entire labour market. Using linked employer-employee data for Germany, the authors provide separate estimations for men and women, showing that the labour supply elasticity to the firm lies in the range of 1.9 – 3.7. Booth and Katic (2011) also find evidence for monopsonistic competition for the entire Australian labour market using individual level data. The estimated labour supply elasticity is 0.71.

In addition to a finite labour supply elasticity to the firm, the monopsony model as in Manning (2003*a*) provides further insights, in particular with respect to employment, wages, and the expected effects of minimum wages. In this context, the central assumption is that workers with identical observable characteristics receive the same wage *within* one firm. Consequently, if a firm wants to increase its employment level, the higher wage has to be paid not only to the additional worker, but also to all existing employees of the same type. In other words, the marginal cost of labour includes the wage paid to the new employee as well as the wage increases of the workers already employed. Therefore, the marginal cost (MC) of labour exceeds the average cost (AC) of labour. A profit-maximizing firm will choose its employment level such that marginal costs are equal to the marginal revenue product (MRP) of labour. Thus, the firm depicted in Figure 1 will choose employment level E1. The wage that needs to be paid to obtain this employment level equals W1.

This has several important implications. First, wage W1 and employment E1 are lower in the monopsonistic equilibrium compared to the equilibrium under perfect competition (W2 and E2). Second, workers earn less than their marginal product because the marginal cost exceeds the average cost of labour. Third, the firm operates with a constant amount of vacancies, i.e. at the going wage

rate W1 the firm would like to employ workers up to E3. This implies that the equilibrium is supply-side constrained.

Finally, the model implies that a moderate minimum wage which is slightly above the going wage rate could increase wages and employment simultaneously while decreasing firms' profits. For example, increasing the wage rate exogenously slightly above W1 implies moving upwards the labour supply curve. Yet, this relationship only holds until labour supply equals labour demand. At higher wage rates, labour demand is the decisive factor in determining the employment level. Thus, a minimum wage exceeding the level W2 would lead, exactly as under perfect competition, to employment losses. Therefore, the effects of a minimum wage depend on its level as well as the degree of monopsonistic competition in the labour market.

Despite the high relevance of monopsony for the empirical minimum wage literature, Dube, Lester and Reich (2013) is the only existing study that explicitly links minimum wages to monopsonistic competition in the labour market by exploiting discontinuities at state borders in federal minimum wage rates in the US to estimate wage elasticities of accession and separation rates. The minimum wage elasticities of the separation rate are small, with an increase of 1 percent in the minimum wage leading to a decrease in separations of -0.24 percent for teenage workers in the entire economy and of -0.32 percent for restaurant workers. The remaining parameters of the Burdett and Mortensen (1998) equilibrium search model are then estimated drawing on these wage elasticities. The results point towards a significant degree of search frictions in the low-wage labour market in the US, which Dube, Lester and Reich (2013) interpret as an explanation for non-negative employment effects of the minimum wage.

A factor that has been completely neglected in this context by both the theoretical and the empirical literature is the sectoral dimension. This is, however, likely to be of great importance especially for the recent introduction of a statutory minimum wage in Germany. The reason for this is that wage-setting often takes place at the sectoral and regional level, resulting in inter-industry wage differentials. This leads to large differences in the bite of the minimum wage across industries. All else equal, industries with lower average wages can be expected to show a stronger reaction to the uniform minimum wage in terms of employment. However, the employment effects of the minimum wage will also depend on the degree of monopsony power in the different industries. For example, if all low-wage industries were characterized by a relatively high degree of monopsonistic competition, the overall employment effect of the minimum wage would be negligible. If the opposite was the case, i.e. if monopsony power was relatively low in low-wage industries, one would expect large employment effects. Finally, if

the picture was more diverse, i.e. if there were large differences in monopsonistic competition among low-wage industries, this could explain different employment reactions in these industries, despite similar wage levels prior to the introduction of the statutory minimum wage.

There are at least three reasons to expect varying degrees of monopsonistic competition across industries: Worker composition, job-specific human capital, and collective bargaining coverage. First, the degree of monopsonistic competition is expected to be higher in industries with a high share of women and/or migrants. All three groups are less regionally mobile than the associated comparison group. In addition, preferences for non-wage employer characteristics may be more important for women compared to men (e.g. flexible working time arrangements). Migrants are assumed to face stronger information asymmetries. The empirical literature is in line with these expectations: Hirsch, Schank and Schnabel (2010*a*) and Sulis (2011) show that the wage elasticity of labour supply to the individual firm is lower for women than for men in Germany and Italy, respectively; Hirsch and Jahn (2015) estimate labour supply elasticities of 1.64 – 2.6, with lower labour supply elasticity of migrants.

Second, the job-specificity of human capital is likely to vary between economic sectors because the production process exhibits dissimilar levels of complexity and because learning on the job differs between sectors. In sectors with a high degree of job-specific human capital, workers may be less inclined to switch employers because the probability that a new employer equally values the accumulated human capital is lower.

Third, union coverage itself does not directly influence the degree of monopsonistic competition but acts the same way as a minimum wage does: Wages are simply pushed above the free market equilibrium. Works councils - a representation of workers' interests at the firm level - appear to be more decisive for the degree of monopsonistic competition through the reduction of information asymmetries on the workers' side. Members of works councils are well informed about the industry's wage structure and the existence of vacancies through regular contact with works councils' members of other firms. At the same time, they frequently communicate with their colleagues within the firm they are representing.

In summary, industries with (i) a high share of women and/or migrants, (ii) a high degree of job-specific human capital, and (iii) a low share of firms with works councils are hypothesized to be characterized by a high degree of monopsonistic competitions.

3 Estimation Strategy

Estimating the labour supply elasticity to the individual firm at first sight appears to be straightforward and involves regressing the firm's employment level on the wage paid. However, such a regression would be endogenous as the firm decides simultaneously on wages and employment. Thus, to analyse the degree of monopsonistic competition in Germany across sectors, one would ideally exploit an exogenous wage variation to identify the labour supply elasticity of the individual firm. Seemingly, minimum wages or collective bargaining agreements appear to offer such a variation at the industry level in Germany. Unfortunately, all firms are equally affected by this wage increase which implies that the wage distribution over firms and workers is just shifted to the right or compressed from below. Since no convincing exogenous wage change exists that only affects some firms in a specific industry, we follow the semi-structural approach proposed by Manning (2003*a*).

This approach is based on the dynamic model of monopsonistic competition (Manning, 2003*a*) which in turn heavily draws from the Burdett and Mortensen (1998) equilibrium search model. The underlying idea is that a stable equilibrium distribution of wages exists, both over workers and over firms. Each worker receives job offers at an exogenously determined job offer rate. If the offered wage is higher than the wage paid in the current job, the worker accepts and moves up the job ladder. This implies that firms have a constant flow of hirings and separations. The separation rate $s(w_t)$ depends negatively on the wage, simply because there are fewer firms that will make a better wage offer in comparison to the current wage paid. The opposite is true for the number of recruits $R(w_t)$. The number of workers in a firm N_t can be expressed as the sum of workers who were already employed in the firm in the previous period N_{t-1} and the number of recruits in period t minus the number of separations $s(w_t)N_{t-1}$.

$$N_t = [1 - s(w_t)]N_{t-1} + R(w_t) \tag{1}$$

Note that both, the separation rate $s(w_t)$ and the number of recruits $R(w_t)$ depends on the wage rate offered by the firm. In the steady state, firm size should be constant which means that the number of separations should be equal to the number of recruits:

$$N(w) = R(w)/s(w) \tag{2}$$

This implies that the long-term elasticity of labour supply to the individual firm ϵ_{Nw} can be expressed as:

$$\epsilon_{Nw} = \epsilon_{Rw} - \epsilon_{sw} \tag{3}$$

Thus, in order to estimate the labour supply elasticity, it is sufficient to estimate the recruitment elasticity as well as the separation rate elasticity. Under the assumption that recruitment from and separations to non-employment are wage inelastic, only the separation rate elasticity of job-to-job transitions has to be estimated.[4] The reason is that in this case, the recruit of one firm must be a separation to another firm, which implies that $\epsilon_{sw} = -\epsilon_{Rw}$. The long-term elasticity of labour supply can therefore be expressed as:

$$\epsilon_{Nw} = -2\epsilon_{sw} \tag{4}$$

Estimating the wage elasticity of labour supply to the individual firm thus amounts to estimating the wage elasticity of job-to-job transitions. The focus on job-to-job transitions has the additional advantage that the majority of job-to-job transitions is voluntary from the point of view of the worker, i.e. they are mostly supply-side driven. By contrast, many transitions to non-employment are due to dismissals and thus involuntary, i.e. they are more likely to be due to demand-side factors. This is crucial because the aim is to identify the labour supply, not the labour demand curve, of the individual firm. The specification additionally controls for firm characteristics to ensure that demand-side shocks do not bias the results. This is especially important for the comparison of different industries as the macroeconomic situation may vary.

We model the instantaneous separation rate of employment spell i in firm j at duration time t as:

$$s_i(x_i(t), z_j(t)) = h_0 \exp(x_i(t)'\beta + z_j(t)'\gamma) \tag{5}$$

where s is a dummy variable which takes the value 1 if a separation takes place and 0 otherwise. Thus, the instantaneous separation rate depends on a constant baseline hazard h_0 as well as worker characteristics $x_i(t)$ and firm attributes $z_j(t)$ that shift the baseline hazard. Worker characteristics include sex, age, educational attainment, and the current wage. On the firm side, profitability, the existence of re-organisation or outsourcing measures, as well as the share of women and temporary workers among total employment are included as control variables.

Time-variant control variables are included at a yearly frequency. Thus, profitability is measured each year for the last financial year, outsourcing activities

[4] Clearly, the assumption that separations to non-employment are wage inelastic may not be true for all workers. However, the empirical literature shows that estimated labour supply elasticities change little when this assumption is relaxed (Hirsch, Schank and Schnabel, 2010*a*).

refer to the 12 months preceding the interview and re-organisation activities may have taken place during the last two years prior to the interview. The remaining indicators on the firm side as well as the worker characteristics are measured at the time of the interview. Furthermore, the regression equation includes year dummies to control for aggregate year-specific effects, such as business cycle conditions. All estimations are carried out separately for East and West Germany as well as for specific industries. The wage rate is specified in logs which enables the direct interpretation of the coefficient as the wage elasticity of job-to-job transitions. The absolute value of the separation elasticity multiplied by two equals the wage elasticity of labour supply to the individual firm. The exponential model with a constant baseline hazard has the advantage that tenure is explicitly not included as a control variable. In the model of monopsonistic competition, higher wages induce lower separation rates, thereby increasing tenure. Thus, including tenure would take away variation from wages and therefore bias the estimated wage elasticity (Hirsch, Schank and Schnabel, 2010*a*; Booth and Katic, 2011).

Having estimated the labour supply elasticities at the industry level, we check whether they are in line with the theoretical framework of monopsonistic competition. This is done by correlating the industry-specific labour supply elasticities with (i) indicators on worker composition, (ii) the average degree of worker representation and (iii) the amount of vacancies. Note that a high share of vacancies in a monopsonistic labour market is a direct prediction of the theoretical model, while our hypothesis in terms of worker composition and worker representation are based on existing empirical studies (cf. Section 2).

A key prediction of the monopsonistic model of the labour market is that firms are supply-side constrained in equilibrium and therefore operate with a constant amount of vacancies. Given this theoretical prediction, the existence of vacancies in an industry constitutes an indicator for the existence of monopsony power. We therefore expect to find higher degrees of monopsonistic competition in industries with a larger share of vacancies among total employment. Because specific groups of workers are exposed to a higher degree of monopsonistic competition, we expect the degree of monopsonistic competition in an industry to be higher with increasing shares of women or migrants in the workforce. Even though the model already controls for sex and nationality at the individual level, this only implies allowing for differences in the separation probability. The wage elasticity of the separation rate is still assumed to be homogenous across individuals. To the extent that e.g. men not only make more transitions per se but are also more sensitive to the wage in their decision, the average estimated wage elasticity will be higher with increasing shares of men at the industry level.

4 Data

The data set used to estimate Equation 5 is the LIAB, a linked employer-employee data set for the German labour market.[5] The basis of the worker history is the integrated notification procedure for health insurance, the statutory pension scheme, and unemployment insurance (*Employment Statistics Register*). At the beginning and at the end of any employment spell, employers have to notify the social security agencies. This information is exact to the day. For spells spanning more than one calendar year, an annual report for each employee registered within the social insurance system is compulsory and provides an update on, for example, the wage and the current occupation of the employee. Further worker characteristics included are the year of birth, sex, and nationality.

The LIAB combines this information on workers' employment and unemployment history with plant-level information from the IAB Establishment Panel, an annual representative survey of German establishments that employ at least one worker who pays social security contributions. Starting in 1993, the establishments covered by the survey were questioned each year about various issues, such as the number of employees, the composition of the workforce, sales, and investments. Using the unique establishment identification number, one can match the information on workers with the establishment panel, and obtain a linked employer-employee data set providing detailed information on individual and establishment characteristics.

The longitudinal version of the LIAB ("LIAB LM2")[6] allows to follow firms and workers over time and thereby to control for heterogeneity at both levels. This data set is constructed as follows: First, establishments who participated in the IAB Establishment Panel between 2000 and 2002 are selected.[7] In a second step, the Employment Statistics Register is used to link the sample of establishments with the employee history information for all individuals who worked at least one day in one of the selected establishments between 1997 and 2003. At the individual level, the information is updated at least once a year when the annual notification is supplied by the employer. At the establishment level, a new wave is provided each year as of June 30. The analysis is thus able

[5]The LIAB is described in Alda, Bender and Gartner (2005) Detailed information on the data on individual workers can be obtained from Klosterhuber, Heining and Seth (2013), while a discussion of the data on the firm side (IAB Establishment Panel) is provided by Ellguth, Kohaut and Möller (2014).

[6]The longitudinal LIAB versions "LM3" as well as the LM9310 both offer data for more recent years; however, in these versions the matching between firms and workers is poor (i.e. a significant share of workers is matched to the wrong establishment.)

[7]To be exact, establishment that participate in the time period 1999-2001 or 2000-2002 are selected. Because weights are only available for the second group, the analysis is restricted to these establishments.

to include time-varying covariates.

To compute separation elasticities from the LIAB, labour market states and direct job-to-job transitions as well as workers' wages have to be identified at an individual level. At each point in time, three labour market states can be differentiated: employment (E) covered by social security, unemployment (U), if the worker is receiving transfer payments, and non-participation (N). Non-participants are those individuals not recorded in the data sets. Therefore, this state includes individuals out of the labour market and workers not covered by social security legislation, e.g. civil servants and self-employed workers. As the distinction between unemployment and non-participation is not relevant for the analysis, these two labour market states are considered jointly as non-employment. Employment spells ending in non-employment are dropped from the dataset since the focus of interest is on job-to-job transitions

Both, firms' reports of a new employee and individuals' notifications of moving into or out of unemployment, are not always exactly consistent with the actual change of labour market state. For example, workers might report to the unemployment office only a few days after having been laid off. These potential measurement errors are dealt with as follows: A direct job-to-job transition is defined as a worker making a transition from one firm to another with the two employment records being less than 8 days apart. In cases where the gap equals or exceeds 8 days, the transition is from employment to non-employment. Recalls are defined as one single employment spell if the time gap between two employment notifications at the same firm does not exceed 120 days. If the non-employment spell is equal to or larger than 120 days, the worker in question is completely dropped as a distinction between a transition from employment to non-employment and a continuous employment would be arbitrary. Additionally, all employment spells that are shorter than three days are eliminated, as are individuals with more than 300 employment spells.

The data provide precise information on the daily wage of every spell. However, no information on working hours is provided. To ensure comparability between daily wage rates, the analysis is restricted to regular, full-time employees. Workers in vocational training, marginal employees, and part-time workers are thus excluded. Furthermore, all employment spells with wages in the bottom one percent of the wage distribution are excluded. This procedure is not sufficient for the upper end of the wage distribution because wages are right-censored at the social security contribution limit. To avoid possible biases in the estimated wage elasticity of labour supply, all workers whose wages are at this limit at least once during the observation period are dropped. Finally, in order to exclude transitions to non-employment due to (early) retirement, only individuals aged 16 to 55 on 1 January 2000, the beginning of our observation

period, are included in the analysis.

The resulting sample contains a total of 696,208 (215,780) employment spells in West Germany (East Germany) of which 98,498 (32,033) end in a job-to-job transition (Table 1). The remaining spells are right-censored. The annual transition probability is similar in East and West Germany and equals almost six percent. Note that the number of workers is only slightly below the number of spells. At first sight this seems odd as a job-to-job transition would result in at least two employment spells per worker. This is however not entirely true for the discussed sample because the subsequent employment spell is only fully observed if the establishment also participates in the IAB Establishment Panel.

The descriptive evidence on the main explanatory variables is in line with expectations – although it should be taken into account that the sample is conditioned on individuals in employment who do not make a transition to non-employment. Not surprisingly, the average daily wage is higher in West Germany (€99.43) than in East Germany (€73.60). The average educational attainment is higher in East compared to West Germany which may be partly explained by focusing on employment spells ending in job-to-job transitions. On the firm-side, 23 percent of all firms report a low profitability during the last year in West Germany, while this figure only amounts to 16 percent in East Germany. This difference is due to 40 percent of all establishments not answering this question in East Germany. A dummy for non-response is therefore included in the regression analysis.

5 Results

In the following, we present estimates of the labour supply elasticity to the firm using the exponential model for job-to-job transitions described in Section 3. Tables 2 and 3 contain the results of the baseline specification, which pools all industries, for East and West Germany respectively, using four different models: While Model 1 only contains industry and year dummies in addition to log wages, Model 2 adds individual-level controls and Model 3 also includes controls at the establishment level in order to account for demand-side effects. Model 4 additionally controls for the existence of a works council and collective bargaining coverage.

The coefficients of the control variables do not differ qualitatively in East and West Germany and are in line with the existing literature on labour market transitions in Germany (Bachmann, 2005; Kluve, Schaffner and Schmidt, 2009). Women are less likely than men to change employers. The transition probability decreases with age but at a diminishing rate as workers get older. In contrast, employees with a university degree are more likely and workers holding

a schooling degree as highest educational attainment are less likely to make a job-to-job transition compared to individuals who received vocational training. Non-Germans also show – as expected – a lower separation probability in West Germany, while the opposite is true in East Germany. The East German sample on migrants in highly selective, however, as the share of non-Germans among all workers is extremely low in general and is further reduced by focusing on employment spells not ending in non-employment.

Turning to the establishment-level controls, workers in firms pursuing outsourcing have a higher separation probability (Model 3 in Tables 2 and 3). This shows the importance of controlling for demand-side factors: Some workers change employers with an increasing threat of job loss. This decision is independent of the wage. Reorganisation within the establishment and the firm's profitability during the last year have, in contrast, no statistically significant influence on the likelihood to change employers.

Collective bargaining coverage is negatively correlated with the job-to-job transition probability in West, but not in East Germany. The missing relevance of collective bargaining for the separation probability in East Germany can be explained by much lower coverage rates (Table 1). The point estimate of the presence of a works council is negative in East and West Germany alike, although only statistically significant in the West, which is in line with the literature on workers' voice and the labour turnover rate. For example, Hirsch, Schank and Schnabel (2010*b*) show for Germany that the separation rate is reduced by the presence of a works council through voice, monopoly (i.e. wage) and insurance effects.

The coefficient of interest is the one on the (log) daily wage. It can directly be interpreted as the wage elasticity of the separation rate of job-to-job transitions (cf. Section 3). The estimation results show that a wage increase of one percent leads to a decrease in the probability to make a separation, conditional on job survival until time t, of 1.2 – 1.5 percent in East Germany and of 1.5 – 1.6 percent in West Germany. In East Germany, this elasticity decreases continuously across specifications as additional control variables are added that take away variation from the transition rates. For example, women have on average lower wages and lower transition probabilities. Controlling for sex therefore forces the model to separately use the variation in transition rates for men and women, thereby leading to a lower estimated wage elasticity. Adding a control variable with the opposite correlation, such as age, may lead to higher estimates of the wage elasticity. For example, older workers earn on average higher wages and are characterized by lower transition probabilities. This relationship appears to be more important in West Germany, where the inclusion of worker-specific control variables – including age – leads to a slight increase in the estimated

wage elasticity of job-to-job transitions.

Assuming that separations to non-employment are wage inelastic, the labour supply elasticity to the individual firm is twice the wage elasticity of separations to employment (cf. Equation 4). Thus, taking values of 2.4 – 3 in East Germany and 3 – 3.2 in West Germany, the average labour supply elasticity to the individual firm is considerably lower than suggested by the neoclassical model of the labour market which assumes that labour supply to the individual firm is perfectly elastic. This result is in line with other estimates of the labour supply elasticity (Ransom and Oaxaca, 2010; Hirsch, Schank and Schnabel, 2010*a*).

To obtain the wage elasticity of labour supply by sector, we now estimate the baseline specification separately for each industry and East and West Germany. We do so using Model 3 which is our preferred specification because it controls for worker-level heterogeneity and demand-side factors through the inclusion of firm-level variables. Concerning Model 4, it is unclear whether the existence of a works council and coverage by a collective bargaining agreement should be included as additional control variables at the establishment level. While works councils and union coverage tend to increase wages and reduce separation rates (Hirsch, Schank and Schnabel, 2010*b*), this variation might be part of the explanation for differences in the degree of monopsonistic competition. In any case, Model 3 provides more conservative estimates than Model 4 since the inclusion of collective bargaining coverage and the existence of a works council further reduces the estimated wage elasticities of labour supply.

Before turning to the labour supply elasticities, we provide a descriptive overview of the average daily wage and the job-to-job transition probability by industry (Tables 4 and 5). It is tempting to describe a labour market segment that is characterized by monopsonistic competition as one in which wages are low and job-to-job transitions are rare. However, the wage level itself is mainly influenced by composition effects of the workforce leading to productivity differences, and the degree of observed transition dynamics may be equally affected by third factors, such as the share of temporary workers. This ambiguity in the direct relationship between wages and job-to-job transitions is also present in Tables 4 and 5. For example, in East Germany electricity and water supply is characterized by high wages (€85.96) and a high annual job-to-job transition probability (8.45 percent). Along the same line, wholesale and repairs have low average wages of €58 and a low separation rate of 5 percent. Similar examples can be found for West Germany: Electricity and water supply is equally characterized by high wages (€107.64) and a high job-to job transition probability (11.6 percent), and public and private services have low wages (€86.36) and low separation rates (4.75 percent). However, in other industries the relation between

the average wage level and the job-to-job transition rate is reversed: Financial services show high average wages and a low transition probability in West and East Germany alike, while the opposite is true for the hotel and restaurant industry which the lowest wages and the highest transition probability among all industries.

From a theoretical point of view, however, it is not the level of job separations that characterizes the degree of monopsony power in a market but its sensitivity to the wage. Recall from Section 2 that monopsonistic competition is defined as a situation in which workers do not change employers necessarily if they could earn a higher wage in another job. What is therefore needed for an assessment of the degree of monopsonistic competition in an industry is a connection between worker mobility and wages at the individual level, i.e. the wage elasticity of the separation rate from which the labour supply elasticity can be inferred.

The estimation results of the labour supply elasticities for East and West Germany are presented in Tables 4 and 5. These results reveal considerable differences between industries, ranging from zero (retailing, hotels and restaurants) to 4.5 (financial services) in East Germany and from 0.7 (retailing) to 4.8 (transportation and communication) in West Germany. Industries with especially low labour supply elasticities, and consequently a higher degree of monopsonistic competition, include construction, wholesale, retailing, as well as hotels and restaurants. In contrast, agriculture and mining, electricity and water supply, financial services, and education are characterized by relatively high labour supply elasticities in East and West Germany alike.

One of the key predictions of the monopsony model is that firms operate with a constant amount of vacancies because labour demand exceeds labour supply at the going wage rate. Therefore, we test the internal validity of the model by analyzing if those industries with a high estimated labour supply elasticity are characterized by few vacancies and vice versa. The amount of vacancies in an industry is measured by the number of vacancies all firms offer divided by the total number of jobs. These figures are derived from the establishment-side information contained in the data. The expected negative correlation between the estimated labour supply elasticities and the amount of vacancies can be observed in both East and West Germany (Table 6).

The source of the differences in the degree of monopsonistic competition across industries lies in the behaviour of workers who do not change jobs to obtain a higher wage, in the importance of job-specific human capital, and in the extent of workers representation at the firm level (cf. Section 2). We therefore expect to find higher degrees of monopsonistic competition in industries with a low share of workers employed in firms with a works council or with a high share

of women and migrants. Previous empirical literature has shown that both groups are characterized by lower separation rate elasticities due to non-wage employer preferences, imperfect mobility or incomplete information.

To analyse the importance of the sources of monopsonistic competition for each industry, Table 6 shows simple correlation coefficients of the estimated wage elasticities of labour supply and the share of women, the share of non-Germans, as well as the share of workers employed in firms with works councils. All correlation coefficients have the expected sign, although they are statistically insignificant except for the share of workers in firms with works councils. In addition, the correlation coefficient for the share of non-Germans is extremely small in magnitude in East Germany which can be explained by the generally low share of non-Germans in the workforce (Table 1). The existence of works councils thus appears to decrease information asymmetries, thereby lowering the degree of monopsonistic competition in the labour market. The evidence for the importance of worker composition is weaker; however, it may only materialize in industries with an extremely high share of the considered worker group. Further, interactions with other sources of monopsony, such as the importance of job-specific human capital, the extent of worker representation and local employer concentration, can influence the result.

Even though no direct correlation can be established between worker composition and the degree of monopsonistic competition, those industries with very high or low point estimates of the labour supply elasticity show the expected characteristics. For example, the labour supply elasticitiy is low for hotels and restaurants and high for electricity and water supply (Tables 4 and 5). In West Germany, the share of women and non-Germans is above average for hotels and restaurants (women: 51 percent, non-Germans: 21 percent) and below average for electricity and water supply (women: 19 percent, non-Germans: 2 percent). The same is true in East Germany, where women (non-Germans) represent 61 percent (2.4 percent) of the workforce in the hotel and restaurant industry and only 28 percent (0.11 percent) in electricity and water supply.

As for the expected effects of the introduction of a uniform minimum wage at €8.50 in 2015, the central question is to which extent low-wage industries that are strongly affected by the minimum wage introduction are characterized by monopsonistic competition. The industries with the lowest average wages, hotels and restaurants as well as retailing, both show very low labour supply elasticities in East and West Germany (Tables 4 and 5). Using more recent data from 2014, the year before the minimum wage introduction, Bellmann et al. (2015) show that 17.6 percent of all workers in the hotel and restaurant industry and 11.9 percent of all workers in retailing earn wages below €8.50. This bite

of the minimum wage will be even higher when focusing only on East Germany. Despite this severe cut into the wage distribution, our results suggest that adverse employment effects might be lower than expected because both industries are characterized by a high degree of monopsonistic competition.

Other low-wage industries can much less be described as monopsonistic labour markets. Average wages in agriculture and mining, for example, are low in East and West Germany. Bellmann et al. (2015) calculate that the minimum wage affects 12.7 percent of all workers in agriculture[8], while the estimated labour supply elasticities are high with 3.4 in East and 4.7 in West Germany. Although no pre-defined critical value exists above which a labour market can unambiguously be described as perfectly competitive, an elasticity higher than three shows that workers react strongly to the wage when considering job-to-job transitions: A firm that increases wages by 1 percent is able to recruit 3 percent more workers. In an industry that simultaneously faces low wages and high labour supply elasticities, the minimum wage poses a serious threat to employment.

Further examples of low-wage industries with low degrees of monopsonistic competition are public and personal services as well as business services. Both industries have relatively low average wages with minimum wage bites of 11.7 percent (public and personal services) and 4.9 percent (business services) (Bellmann et al., 2015). The estimated wage elasticities are rather high, especially in East Germany, taking values of 2.4 for business services and 3.8 for public and private services (Tables 4 and 5). Consequently, jobs are at risk of getting destroyed in the public and private service industry in East Germany. The business service sector is more diverse, making an analysis of its sub-sectors necessary. The data allow us to identify the following 3-digit industries as part of business services in East Germany without incurring a small cell size problem in terms of the number of observed firms: "Real estate activities", "legal, accounting, book-keeping activities; market research", "architectural and engineering activities", "industrial cleaning and security services", and "miscellaneous business activities". A separate analysis of these sub-sectors reveals that the labour supply elasticity is very high for real estate activities, but below two for industrial cleaning and security services.[9] Thus, those sub-sectors with low average wages also show a low elasticity of labour supply and vice versa. Therefore, the expected employment effects of the minimum wage introduction are less negative for business services in East Germany than the analysis at the 1-digit industry

[8]The bite is much lower in the mining sector which suggests separate estimations of the labour supply elasticities for mining and agriculture. Due to the low number of firms in the mining sector covered in the dataset this is however not possible.

[9]The detailed results of the analysis at the 3-digit industry level can be obtained from the authors upon request. The results have to be interpreted with care because the sampling strategy of the data only ensures representativeness at the 1-digit industry level.

level suggests at first sight.

6 Conclusion

In this paper, we have analysed the degree of monopsony power of German employers following a semi-structural approach based on the dynamic model of monopsonistic competition proposed by Manning (2003*a*). In doing so, we compute the degree of monopsony power for different industries separately for East and West Germany. Using a unique linked employer-employee data set for Germany allows to control for heterogeneity of both firms and workers, and for demand side effects.

Our findings are that, first, the labour supply elasticity to the individual firm is considerably lower than suggested by the neoclassical model of the labour market which is in line with existing estimates. Second, we find important differences in labour supply elasticities between industries. Therefore, the labour markets of individual industries are characterized by varying degrees of monopsony power. Worker composition and worker representation through works councils appear to be the central reasons. Finally, we show that the estimated labour supply elasticities are negatively correlated with the amount of vacancies at the sectoral level. This is consistent with the monopsonistic model of the labour market which predicts the existence of a positive stock of vacancies.

Since the degree of monopsony power is one important determinant of the employment effects of minimum wages, our results have crucial policy implications. Given our finding of monopsony power on the German labour market, the negative employment effects of the minimum wage introduction may be less severe than suggested by a neoclassical model of the labour market. However, as large inter-industry differences in monopsony power exist, the employment effects of the minimum wage are likely to be unevenly distributed across labour market segments. While monopsony power may mitigate adverse employment effects in some low-wage industries, such as hotels and restaurants or retailing, this is not the case for agriculture and mining or public and personal services where the minimum wage also severely cuts into the wage distribution. This calls for very close monitoring and a rigorous evaluation of the minimum wage as well as – if necessary – for swift political action.

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7 Tables and Figures

Table 1: Sample Description

	East Germany		West Germany	
	Mean	sd	Mean	sd
Daily wage	73.60	22.93	99.43	27.13
Log(Daily wage)	4.24	0.34	4.56	0.30
Age	40.99	8.87	38.74	9.16
Non-German	0.55	7.37	8.55	27.97
Female	44.23	49.67	27.44	44.62
Educational attainment: School degree	3.23	17.68	15.21	35.91
Educational attainment: Vocational training	79.78	40.16	72.54	44.63
Educational attainment: University degree	16.99	37.56	12.25	32.79
Firm profitability: Low	16.25	31.63	22.84	35.36
Firm profitability: Normal	19.01	31.96	26.92	35.31
Firm profitability: High	21.16	35.21	27.43	36.78
Firm profitability: Non-response	3.42	14.09	3.69	15.51
Firm profitability: Not applicable	40.16	47.43	19.13	37.99
Reorganisation: yes	42.19	44.65	63.99	43.07
Reorganisation: no	57.59	44.57	35.74	42.99
Reorganisation: Non-response	0.22	3.42	0.27	4.79
Outsourcing	12.87	25.78	14.80	29.46
Share of women	46.65	27.31	32.84	23.81
Share of temp. workers	10.53	20.36	5.36	9.63
Works council: yes	80.99	37.73	91.59	26.42
Works council: no	16.50	36.24	6.72	24.33
Works council: Non-response	2.51	12.90	1.69	10.74
Collective bargaining: Industry level	64.97	44.94	81.45	36.72
Collective bargaining: Firm level	15.29	32.39	10.26	28.55
Collective bargaining: No agreement	19.39	37.47	8.15	25.55
Collective bargaining: Non-response	0.36	3.93	0.14	2.70
Spell duration	2,363.71	1,336.96	2,325.36	1,330.83
Transition probability	0.0596		0.0573	
Observation numbers				
Job-to-job transitions	32,033		98,498	
Employment spells	215,780		696,208	
Workers	214,234		690,389	
Firms	3,184		4,512	

Notes: The unit of observation are continuous employment spells that do no result in non-employment.
Source: LIAB, version "LM2". Authors' calculations.

Table 2: Separation rate to employment in East Germany

	Model 1	Model 2	Model 3	Model 4
Log(Daily wage)	−1.503***(0.118)	−1.467***(0.148)	−1.239***(0.122)	−1.204***(0.122)
Female		−0.188** (0.083)	−0.154***(0.038)	−0.151***(0.038)
Age		−0.141***(0.014)	−0.131***(0.016)	−0.132***(0.016)
Age^2		0.001***(0.0002)	0.001***(0.0002)	0.001***(0.0002)
Educational attainment:				
School degree		−0.048 (0.080)	−0.097 (0.076)	−0.095 (0.075)
University degree		0.512***(0.099)	0.479***(0.086)	0.473***(0.084)
Non-German		0.204** (0.086)	0.169** (0.079)	0.176** (0.080)
Profitability:				
Low			0.136 (0.108)	0.134 (0.107)
High			−0.175 (0.141)	−0.179 (0.141)
Non-response			0.715** (0.307)	0.715** (0.303)
Not applicable			−0.177 (0.210)	−0.176 (0.222)
Reorganisation:				
yes			−0.123 (0.116)	−0.119 (0.117)
Non-response			0.513 (0.828)	0.587 (0.902)
Outsourcing			0.671***(0.174)	0.675***(0.173)
Share of women			−0.001 (0.003)	−0.001 (0.003)
Share of temp. workers			0.013***(0.003)	0.013***(0.004)
Works council:				
yes				−0.094 (0.123)
Non-response				−0.159 (0.183)
Collective bargaining:				
Industry level				0.026 (0.114)
Firm level				0.094 (0.152)
Non-response				−0.888***(0.311)
Industry dummies	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes
Federal states dummies	yes	yes	yes	yes
LogLikelihood	-87,957	-85,768	-83,135	-83,090
Observations	555,686	555,686	555,686	555,686

Legend: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
Notes: Clustered standard errors at the establishment level in parentheses.
Source: LIAB, version "LM2". Authors' calculations.

Table 3: Separation rate to employment in West Germany

	Model 1	Model 2	Model 3	Model 4
Log(Daily wage)	−1.579***(0.069)	−1.638*** (0.078)	−1.623*** (0.084)	−1.531*** (0.078)
Female		−0.124*** (0.034)	−0.117*** (0.033)	−0.109*** (0.034)
Age		−0.066*** (0.009)	−0.067*** (0.009)	−0.069*** (0.009)
Age^2		0.0005***(0.0001)	0.0005***(0.0001)	0.0005***(0.0001)
Educational attainment:				
School degree		−0.179*** (0.046)	−0.191*** (0.046)	−0.183*** (0.047)
University degree		0.614*** (0.052)	0.603*** (0.049)	0.583*** (0.049)
Non-German		−0.308*** (0.046)	−0.321*** (0.051)	−0.314*** (0.051)
Profitability:				
Low			0.157 (0.108)	0.149 (0.108)
High			−0.130 (0.118)	−0.133 (0.118)
Non-response			0.624*** (0.176)	0.640*** (0.176)
Not applicable			−0.170 (0.213)	−0.111 (0.227)
Reorganisation:				
Yes			−0.122 (0.091)	−0.099 (0.091)
Non-response			−0.212 (0.232)	−0.137 (0.235)
Outsourcing			0.468*** (0.129)	0.483*** (0.132)
Share of women			−0.0002 (0.002)	−0.0002 (0.002)
Share of temp. workers			0.006*** (0.002)	0.006** (0.002)
Works council:				
Yes				−0.214** (0.104)
Non-response				−0.371** (0.144)
Collective bargaining:				
Industry level				−0.171* (0.097)
Firm level				−0.133 (0.120)
Non-response				−0.574 (0.602)
Industry dummies	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes
Federal states dummies	yes	yes	yes	yes
LogLikelihood	-275,085	-268,203	-265,195	-264,756
Observations	1,789,889	1,789,889	1,789,889	1,789,889

Legend: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
Notes: Clustered standard errors at the establishment level in parentheses.
Source: LIAB, version "LM2". Authors' calculations.

Table 4: Wage elasticity by industry - East Germany

	Industry averages[a]			Elasticity of[b]		Observations	
	Wages		Trans.	Job-to-job	Labour	Spells	Transi-
	Mean	sd	prob.	transitions	supply		tions
Agriculture and mining	54.42	23.70	0.0592	−1.681***(0.322)	3.362	7,362	970
Manufacturing	67.16	23.82	0.0455	−1.531***(0.342)	3.062	59,092	6,984
Electricity and water supply	85.96	17.87	0.0845	−1.754** (0.792)	3.508	7,579	1,686
Construction	60.51	19.99	0.0948	−1.153***(0.316)	2.307	10,812	2,603
Wholesale and repairs	58.06	20.17	0.0505	−1.068** (0.416)	2.137	4,141	516
Retailing	49.52	20.88	0.0730	0.043 (0.236)	−0.086	2,282	386
Hotels and restaurants	40.18	14.69	0.1394	−0.163 (0.414)	0.327	647	163
Transportation and communication	72.94	17.28	0.0683	−0.874 (0.580)	1.748	11,330	2,010
Financial services	86.35	20.26	0.0639	−2.259***(0.327)	4.518	6,644	1,079
Business services	61.22	29.72	0.0958	−1.207***(0.265)	2.414	8,058	1,749
Public administration	73.27	20.37	0.0439	−1.037***(0.381)	2.074	47,497	5,441
Education	65.54	31.10	0.1264	−1.620***(0.207)	3.240	16,188	4,370
Health	69.75	22.60	0.0488	−1.285***(0.152)	2.569	23,645	2,789
Public and private services	53.68	26.20	0.0573	−1.937***(0.233)	3.874	10,503	1,287
All industries	73.60	22.93	0.0596	−1.239***(0.122)	2.478	215,780	32,033

Legend: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
Notes: **(a)** Descriptive evidence at the industry level. The average wage level is calculated based on a different sample, i.e. before employment spells resulting in non-employment are excluded. **(b)** Results from separate estimations of Model 3 by industry (cf. Section 5). The elasticity of job-to-job transitions is the coefficient of log(daily wage). Clustered standard errors at the establishment level in parentheses. The elasticity of labour supply equals the elasticity of job-to-job transitions multiplied by −2.
Source: LIAB, version "LM2". Authors' calculations.

Table 5: Wage elasticity by industry - West Germany

	Industry averages[a]			Elasticity of[b]		Observations	
	Wages		Trans.	Job-to-job	Labour	Spells	Transi-
	Mean	sd	prob.	transitions	supply		tions
Agriculture and mining	83.10	19.31	0.1041	−2.370***(0.309)	4.741	9,426	2,177
Manufacturing	99.17	27.65	0.0464	−1.636***(0.157)	3.272	346,922	42,253
Electricity and water supply	107.64	26.10	0.1163	−1.726***(0.465)	3.452	9,519	2,545
Construction	87.85	24.67	0.0809	−0.701***(0.216)	1.402	17,739	3,460
Wholesale and repairs	91.77	31.63	0.0735	−1.324***(0.146)	2.649	19,746	3,333
Retailing	73.19	25.60	0.1025	−0.351** (0.137)	0.702	11,475	2,527
Hotels and restaurants	56.75	22.11	0.1937	−0.542***(0.199)	1.083	2,238	732
Transportation and communication	92.57	23.75	0.0425	−2.402***(0.213)	4.805	41,452	4,475
Financial services	110.33	27.98	0.0653	−1.625***(0.263)	3.250	60,191	9,418
Business services	84.14	38.76	0.1367	−1.544***(0.165)	3.088	32,066	8,989
Public administration	87.52	23.18	0.0474	−1.755***(0.186)	3.510	63,134	7,386
Education	86.74	30.86	0.0689	−1.691***(0.215)	3.383	11,791	1,757
Health	84.18	27.14	0.0644	−1.355***(0.089)	2.709	52,632	7,465
Public and private services	86.36	33.04	0.0475	−1.377***(0.175)	2.754	17,877	1,981
All industries	99.43	27.13	0.0573	−1.623***(0.084)	3.246	696,208	98,498

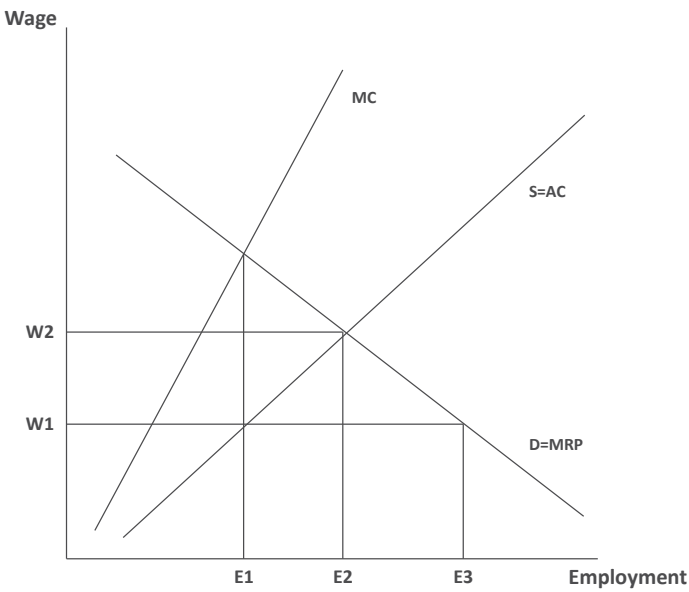
Legend: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
Notes: **(a)** Descriptive evidence at the industry level. The average wage level is calculated based on a different sample, i.e. before employment spells resulting in non-employment are excluded. **(b)** Results from separate estimations of Model 3 by industry (cf. Section 5). The elasticity of job-to-job transitions is the coefficient of log(daily wage). Clustered standard errors at the establishment level in parentheses. The elasticity of labour supply equals the elasticity of job-to-job transitions multiplied by −2.
Source: LIAB, version "LM2". Authors' calculations.

Table 6: Correlation of labour supply elasticities with industry-level indicators

	East Germany		West Germany	
	Correlation	p-value	Correlation	p-value
Share of vacancies among all jobs	−0.342	0.036	−0.248	0.097
Share of workers in firms with works council	0.281	0.088	0.479	0.001
Share of women	−0.054	0.749	−0.095	0.532
Share of non-Germans	−0.008	0.963	−0.205	0.172

Notes: Correlation coefficient of industry-specific labour supply elasticities (cf. Tables 4 and 5) and industry-level indicators. To increase the number of observations, the elasticities and the industry-level indicators are based on a 3-digit industry classification. The industries were partly aggregated to ensure that at least 30 firms are observed within each industry, resulting in 38 industries in East and 46 industries in West Germany. Note that the share of vacancies among all jobs is calculated based on the firm-side information ('Betriebspanel') in our data.
Source: LIAB, version "LM2". Authors' calculations.

Figure 1: The firm in a monopsonistic labour market



Legend: S = Labour supply; AC=Average cost of labour; MC= Marginal cost of labour; D=Demand for labour; MRP=Marginal revenue product of labour.
Source: Own illustration, based on Manning (2003*a*).