Reversed Roles?

Wage Effects of the Current Crisis[1]

Lutz Bellmann and Hans-Dieter Gerner

Abstract

The main reason for the "German Job Miracle" (Krugman, New York Times, 12/Nov/2010) may be the fact that in Germany the global crisis of 2008/09 was restricted to export oriented industries like automotive, chemistry and mechanical engineering. These industries differ from others with respect to some important characteristics. The relatively large proportion of qualified employees in these industries could explain labour hoarding in the firms affected by the current crisis. Measures of internal flexibility like working time accounts and short time work as a labour market policy measure may also tend to moderate the effect of the current crisis on the level of employment to some extent. Whereas the adoption of working time accounts stabilizes the development of wages, short time work requires some "co-financing" from the respective employees. Since mostly firms with a high proportion of qualified workers are hit by the current crisis, we expect it to have a reversed effect on the relative earnings position of more qualified in relation to less qualified. For our investigations we look at both, the employment and wage effects at the establishment level. We focus on the 1st half of the years 2008 and 2009, since for Germany this interval encloses the time shortly before the economic slump (1st half of 2008) and the peak of the negative development of GDP (1st half of 2009).

First of all, our estimations indicate strong negative employment effects for firms affected by the global crisis. Falls in employment are strongest in plants with a relatively low proportion of qualified workers. Moreover, we find only weak evidence for working time accounts and short time work playing a moderating role in the employment adjustment to the current situation. Finally, our results indicate that the economic crisis is associated with a decline in wages, but only in those establishments which do not operate working time accounts. In sum, we do not find evidence for the current crisis having a reverse effect on the relative earnings position of more qualified in relation to less qualified employees. Obviously once again, the higher qualified are better off than the lower qualified.

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1. Introduction

Since the middle of 2008 many countries all over the world, including Germany, are faced with the deepest recession since the Great Depression in 1929 (Stiglitz 2009). In consideration of the severity of the crisis, economists have estimated a potential job loss of 3.2 million employees in the 1st half of 2008 compared to the 1st half of 2009 for Germany (cf. Möller/Walwei 2009, 6). Until now however, the actual increase in unemployment remains fairly moderate. Between March 2008 and March 2009 in Germany, the number of unemployed increased by only around 2 % (form 3,507,383 to 3.585.784). The most prominent argument for this phenomenon is that firms affected by the current crisis are hoarding their labour force (Möller 2010). It is shown for Germany that the firms most affected by the crisis tend to be in high productivity exporting industries, such as automotive and mechanical engineering. These firms also have higher than average investment in human capital, and therefore have greater incentives to operate labour hoarding. In addition, because the crisis appears to have been so concentrated in a relatively small (albeit highly productive) sector of the economy, total job losses have been mitigated.

While the increase of unemployment in Germany at an aggregate level until now is fairly moderate, the effect of the crisis on the relative income distribution between more and less qualified employees remains unclear. For example do the employees partly co-finance the labour hoarding strategies of their employers by making wage concessions? For Germany, the most cited instruments for the implementation of labour hoarding strategies are working time accounts and short-time work (Möller/Walwei 2009, Möller 2010). But there is little detailed empirical evidence. Because mainly sectors with a high proportion of qualified workers and high wages are hit by the economic crisis, we expect the current downturn to have a reverse effect in contrast to the development observed during the last 30 years on the

relative earnings position of more qualified in relation to less qualified employees (Atkinson 2007).

In our empirical analysis we focus on the 1st half of the years 2008 and 2009 using establishment level panel data. Basically, we compare the development in the number of employees and the development of wages between firms which are subject to the global crisis (Stiglitz 2009) and those which are not by applying simple difference-in-difference estimators. Whether or not an establishment is subject to the global crisis, we are identifying by exploring the firms reported business expectations for the next year expressed in the 1st half of 2008 and 2009 respectively. All measures of firm performance, such as sales, refer to the previous calendar year. Since 2009 is the most recent wave of data, this would not allow us to identify firms hit by the crisis. Instead, therefore, we use a measure based on the change in business expectations between 2008 and 2009. The survey asks "How do you expect the business volume to develop in the current year compared to the previous? The respondents can indicate whether they expect their business volume to remain constant, to increase, to decrease or whether they have no idea in this regard.

A strong relationship between the reported business expectations (proportion of plants which report to expect the business volume to decrease) at the firm level and the gross domestic product (GDP) can be seen in figure 1. It shows the change in the proportion of German firms which report negative business expectations for the current year compared to the year before (dark bars). The white bars represent the difference of the current real GDP and the real GDP of the previous year. Obviously, there is a clear negative relationship between the development of the GDP and the development of the proportion of establishments which report negative business expectations, except in those years shortly before a recession with a very low growth rate of the real GDP. To pick up the very unexpectedness of the current crisis in the 1st half of 2008, finally, in our analysis a plant is regarded to be hit by the global

crisis if it reports negative business expectations in 2009 but not in 2008[2].

In our econometric analysis we control potential confounders within a (OLS) regression framework and alternatively by using propensity score matching techniques. The latter is applied since the association between the change of the employment level and the incidence of the current crisis is likely to be interdependent. Hence, it is essential to reduce the possible bias in the estimation caused by the endogeneity of the incidence of the crisis. The application of matching methods restricts the focus on comparable groups of crisis and non-crisis plants with respect to the confounding variables (Smith/Todd 2005). Furthermore, no functional assumption for the connection between the confounders and the outcome variables is needed (Angrist/Pischke 2009).

Fig. 1: Development of the Establishment Level Business Expectations and the Real GDP
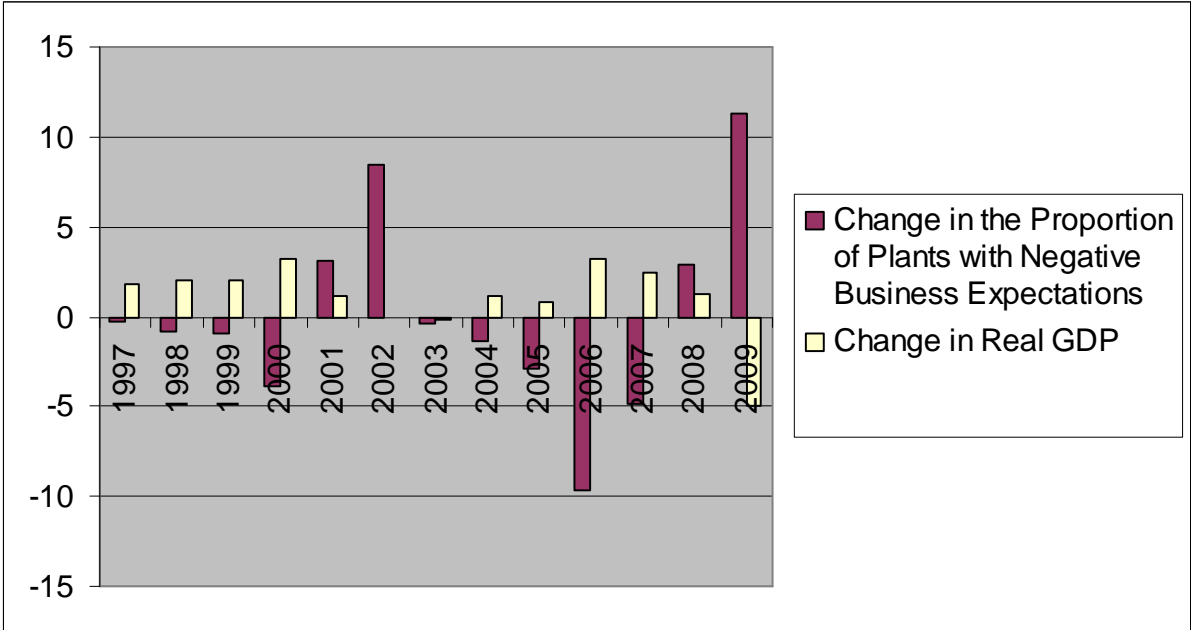
Source: German Statistical Office and IAB Establishment Panel, own calculations

In particular, our empirical analysis is structured as follows: First of all, we investigate, whether there are differences in the development of the number of employees and in the

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[2] It should be stressed that our results do not depend on the particular definition of the crisis indicator. We also used for example just a negative business expectation reported in 2009 as an indicator for a firm being subject to the economic crisis. The results, however, do not change significantly.

development of the wages between the plants which are affected by the global crisis and those which are not. To see whether establishments with a high proportion of qualified employees mainly adopt labour hoarding, we perform separate analyses for plants with a high and those with a low proportion of qualified workers. Finally, we study whether instruments like working time accounts and short time work exert moderating effects on the development of wages and employment.

In the next section we will develop our hypotheses and review the relevant literature. Then, we describe the IAB Establishment Panel Survey, the operationalisation of our key variables, and present our empirical analysis. Our last section concludes.

2. Hypotheses

Since the advent of the recession in 2008, many companies have faced a dramatic decline in demand for their products and services. The way these companies respond, depends on the severity of the recession as well as on their short-term and long-term expectations. Cost cutting measures are of utmost importance for the firms (Heckmann et al. 2009 and for a European perspective cf. Eurofound 2009a, 71ff.). Strategies to reduce costs mainly consist of different measures to decrease the level of production with the consequence of reduced working time and measures to decrease wage costs. According to the study of Bell/Blanchflower (2009) using OECD macroeconomic data Germany was hit by the global crisis very hard in terms of the decline in GNP, the overall employment effect, however, was relatively small between 2008 and 2009. As already mentioned, in the light of severity of the crisis, economists estimated for Germany a potential job loss of 3.2 million employees in the 1st half of 2008 compared to the 1st half of 2009 (Möller/Walwei 2009, 6). One reason for this phenomenon may be the fact that in Germany, especially the export oriented industries like automotive or mechanical engineering, are most badly affected. In these sectors the proportion of qualified workers is high and hence the investments in human capital, which

could explain labour hoarding at the firm level. Table 1 shows that the crisis is concentrated especially on the stars of the German economy like automotive industry, chemistry and mechanical engineering.

Table 1 about here

In this context and moreover, the emerging shortage of skilled workers caused by the demographic change in many European countries gives firms incentives both to hoard their employees and to train them within the time period of low plant utilization rather than to fire them (Möller 2010). Additionally, the industrial relations framework, both in terms of the objective rules and the spirit of cooperation, influences the possible outcome.

Institutional settings like working time accounts or short time work potentially play an important role in retraining sharp adjustments in employment. Working time accounts can stabilize the firms' employment level, because adjustments in the time worked are accomplished over a certain period of time. Furthermore, temporary shifts in working time do not trigger wage adjustments. On the one hand, this means that establishments usually save overtime premia within an economic boom. On the other hand, for the employees, working time accounts act as an insurance against lower wages within an economic downturn (at least temporarily). In sum, working time accounts are smoothing the incomes of the employees over the business cycle.

In spring 2009, the European Foundation for the Improvement of Living and Working Conditions (2009b) conducted a large-scale representative survey addressed to managers and employee representatives. The focus of this survey was on the incidence of different forms of flexible working time arrangements. The proportion of companies with 10+ employees using working time accounts has reached 50 % in Germany, which is the fourth position in the international ranking shown in Figure 2. Furthermore, the possibility to

accumulate credit hours for more than one year on long-term accounts is considerably less widespread in the other EU countries than in Germany.

Fig. 2: Proportion of Companies with Working Time Accounts
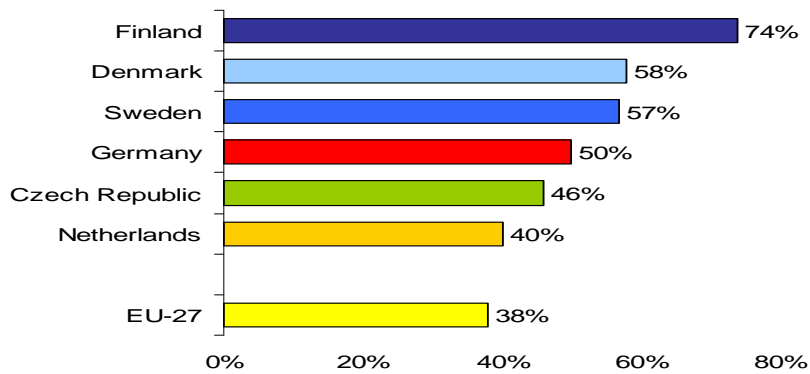
Source: European Foundation for the Improvement of Living and Working Conditions (2009b) and own calculations

A second important institutional feature which serves as another possible stabilizer is the renewed short-time work allowance programme, which was used by 55,000 establishment and 1,250,000 employees during March 2009. This very expensive measure was financed by the German federal government. The basic idea of this policy instrument is that employers reduce the working time of their employees if they are faced with a strong negative demand shock for example. Simultaneously, weekly wages are reduced proportionately to the cut in hours worked. Employees are compensated for around 60 % of the difference between the net income before and the net income after the working time reduction by the German Federal Employment Agency. Besides the gross earnings for the hours still worked, employers have to pay the full social security contribution for the employees' income before the cut in working time has taken place. The maximum duration of short time work is 24 months. Since some firms pay their employees a compensation for their income loss when applying short time work, the income effect of this instrument is not always negative. In the current crisis the program is innovative in the sense that incentives are introduced to combine short-time work with further training. This was done also in order to reach the international standards. Until now Germany's rank in the respective league is in the midfield

(Behringer et al. 2008) although the demographic change will confront Germany with a major challenge. The employment effect of short time work, estimated by Crimmann/Wießner (2009), was 362,000 full-time equivalents.

3. Data

For our analysis we use information from the IAB Establishment Panel (cf. Fischer et al. 2009). The basis for its sampling is the establishment file of the Federal Employment Agency in Germany, where all German establishments are recorded which have at least one employee covered by social security. The IAB Establishment Panel surveys approximately 16,000 establishments on an annual basis. The personal interviews are conducted with high-ranked managers of the firms by TNS Infratest Munich on behalf of the Institute for Employment Research (IAB). The annual questionnaire (2009: 94 questions) covers, for example, information about the development and the structure of the workforce, the business development and the sum of the earnings. Since we study the development of the average wages and the number of the employees on the firm level, we use a balanced panel for the survey years 2008 and 2009. Descriptive statistics for key variables can be found in table 2.

Table 2 about here

Table 2 shows clear differences with respect to the employment structure and the main characteristics of establishments which are subject to the global crisis and the others. The typical establishments affected by the crisis as defined in our analysis are larger, more export oriented, more productive, more often with sectoral and firm-level collective bargaining, more often located in Western Germany, and have more often works councils. The employees of the crisis establishments are better qualified and work less often as part-timers or on a temporary basis. The crisis establishments are more likely to use working time accounts and short time work, but these instruments are adopted not only by them. Another important issue, as already mentioned, is the fact that the economic crisis is not equally distributed

over the industries.

4. Multivariate Analysis

4.1 Methodology

In the first step of our multivariate analysis we compare the change in the wages per employee and the number of employees from the 1st half 2008 to the 1st half 2009 between firms, which are subject to the global economic crisis and those which are not. This is done by applying a simple difference-in-difference estimator of the following form (Meyer 1995):

$$(1) \qquad \log(Y_{it}) = \beta_0 + \beta_1 C_i + \beta_2 T_{2009} + \beta_3 C_i T_{2009} + x'_{it}\gamma + \varepsilon_{it} \qquad t : 2008, 2009$$

Y_{it} is the outcome variable (average wages and number of employees) in firm i, year t. C_i is a dummy, which is one if the firm is subject to the crisis in 2009. T_{2009} is a time dummy for the year 2009. Furthermore, $C_i T_{2009}$ is an interaction term of the crisis dummy and the time dummy. Therefore, β_3 gives the difference in the development of the outcome variables between crisis plants and non-crisis plants. Finally, x_{it} is a vector of control variables and ε_{it} is an error term. Estimation is done by OLS. Standard errors are adjusted using a modified sandwich estimator which takes into account correlated observations within firms (White 1980, Rogers 1993).

Alternatively, we control the potential confounders in x_{it} from (1) by applying propensity score matching techniques. One advantage of a resulting conditional difference-in-differences matching estimator over the simple difference-in-differences estimator within an OLS framework is that there is no functional assumption between the confounders and the outcome variables needed (Angrist/Pischke 2009). However, if we restrict our analysis to the

common support region, which helps to overcome selectivity problems, the interpretation of the results should also be restricted to this region (Smith/Todd 2005, Gelman/Hill 2009). Our basic matching approach is a 1:1 nearest neighbor algorithm with a caliper of 0.01 without replacement. The calculation of the propensity scores is based on the logit estimation reported in the appendix. This gives a suitable balancing quality measured by a mean standardized bias of 1.479 for example (Caliendo 2006).

In this context it should be stressed furthermore, that our results are not sensitive with respect to the matching algorithm we have chosen. This means, if we apply other matching techniques like radius matching or nearest neighbor matching with more than only one neighbor etc., the basic pattern of the results does not change. After we have selected a subsample of treatment and control plants via our basic matching approach, we regress the the outcome variables again on the crisis dummy, the year dummy, the corresponding interaction term, and an intercept (Gelman/Hill 2009, 206). Again, we are adjusting the standard errors for correlated observations within firms.

4.2 Results

To start with the discussion of the effects the crisis had on the development of the average wages and the number of employees, we consider difference-in-difference estimates for the unmatched and the matched samples. Table 3, first and second column, indicate no significant differences in the development of the average wages between crisis and non-crisis establishments, but a significant difference in the development of the number of employees. Whereas the number of employees does not change significantly in non-crisis firms, we find in crisis firms a significant decrease of 6 % on the basis of the unmatched sample (see column 3). The difference in the development of the number of employees between crisis and non-crisis plants in the matched sample is still significant negative but the amount is smaller (-4 %, see column 4). The results for the selection equation (logit model) and tests for the matching quality are presented in the appendix. One reason for this lower

difference in the development of the number of employees may be the fact, that within the matched subsample, the proportion of plants from the production sector is higher. In particular, further regressions on the basis of the unmatched sample without plants from the service sector show also a lower difference of around 4 percent. Note finally, that the significant negative fall in employment for the crisis firms does not arise because they were experiencing employment falls before the crisis hit. A comparison of employment changes between 2007 and 2008 shows that the development in the number of the employees in crisis plants was even slightly better than in non-crisis plants, which is plausible with respect to the definition of our crisis indicator.

Table 3 about here

To identify probable differences in the effect of the global crisis on the outcome variables between firms with a high and those with a low proportion of qualified workers, we divide our dataset into the quartiles of the proportion of qualified workers in 2008. The findings for the different outcome variables are listed in table 4 and table 5 respectively.

Table 4 about here

The conclusion for the development of the average wages remains (see table 4): There are no significant differences between crisis and non-crisis establishments. However, we can infer from table 5 that the development of the number of employees differs not only between crisis and non-crisis establishments (table 3) but also between those with a high and those with a low proportion of qualified workers. This is, we find based on the unmatched sample the strongest decline (-13.2 percent, see column 1 table 5) in those crisis-firms with the lowest proportion of qualified workers. The same pattern holds in the matched subsample: But again, in this case the effects are lower (-6.3 percent, see column 2 table 5). To see whether the differences between firms with a low and firms with a high proportion of qualified

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workers are significant, we apply a Hausman-White-Test (White 1994) based on the Seemingly-Unrelated Cluster-Adjusted Sandwich-Estimator, proposed by Weesie (1999). This procedure finally shows for the unmatched sample that the negative employment effect in plants with a proportion of qualified workers within the 25 percent quartile is significantly stronger than in the firms within the other quartiles. For the matched sample this basic pattern remains. The only exception is the difference between the plants with the lowest proportion of qualified workers and those for the highest one which is not significant (with a p-value of 0.11).

Table 5 about here

We now investigate the role of instruments like working time accounts or short time work in moderating the impact of the crisis on the development of the outcome variables. To do so, we firstly estimate for example the crisis effect in firms with working time accounts and in firms without working time accounts. Afterwards we compare the effects by applying a Hausman-White-Test again. For short time work we follow the same estimation strategy. Table 6 and table 7 show the results for the two outcome variables. Again we find no significant effects with respect to differences in the development of the average wages between crisis plants and non-crisis plants on the basis of the unmatched sample. The estimations based on the matched sample reveal a weak significant negative wage effect of the crisis for plants without working time accounts. However, this effect is insignificant for plants with working time accounts. Of special interest is the fact, that the difference of the crisis effects between establishments with and those without working time accounts is large and significant (with a p-value of 0.02). This result corroborates the hypothesis of inter-temporal smoothed earnings achieved by the adoption of working time accounts (Carstensen 2000). Thus, working time accounts act as an implicit insurance against earnings variation.

Table 6 about here

When we look at the development of the number of employees within our unmatched sample, firms with working time accounts seem to suffer from a stronger crisis effect than those without this instrument (see column 1 and column 3, table 7). First of all, an explanation for this counter-intuitive result may be that firms without working time accounts are hit by the economic crisis less seriously, so perhaps we are identifying some kind of selection effect. Second, a Hausman-White-Test suggests equal crisis effects in firms with and those without working time accounts. On the basis of our matched sample, we find the expected difference between plants with and those without working time accounts (see column 2 and column 4, table 7), whereby this difference is also not significant at any conventional level. Hence, we can conclude that we only find weak evidence for working time accounts playing a moderating role in employment adjustment to the arising economic crisis between the 1st half 2008 and the 1st half 2009 (in the matched sample).

Table 7 about here

Finally, firms which apply short time work, exhibit no significant crisis effects for the development of the number of employees, while firms, which do not use this instrument, reveal a significant negative crisis effect. Furthermore a Hausman-White-Test indicates that this difference is significant. It may be also of interest that short time work plants show strong time effects, which could be interpreted as a strong selection effect of firms which apply short time work in comparison to firms without short time work schemes (for those firms we identify no significant time effect). This holds for the matched as well as for the unmatched sample. Therefore, we can summarise: We only find weak evidence for working time accounts (only in the matched sample) and short time work playing a moderating role in the employment adjustment within the current crisis. Plants which apply short time work reduce their employment between the 1st half 2008 and the 1st half 2009, irrespective of whether they are subject to the current economic crisis or not. This result makes sense, because firms which

are using short time work are required to demonstrate that they are in a bad economic situation in order to be subsidised by a short time work allowance. The identification of a causal effect of working time accounts and short time work finally, is left for further research.

5. Conclusions

Despite the "German Job Miracle", our empirical study reveals substantial employment reductions in establishments affected by the global crisis. Falls in employment are strong in establishments affected by the crisis and vary with respect to the proportion of qualified employees in the establishment. In our estimations based on the full sample, firms which are faced with the economic crisis, reduce their number of employees from the 1st half 2008 to the 1st half 2009 by around 6 percent, while there is no employment adjustment in non-crisis firms for the same time. Furthermore, the largest negative employment effects are in plants with relatively low proportions of qualified workers. The same pattern is found on the basis of the matched sample, although differences in employment reductions are smaller. Altogether, our results indicate that although the crisis hit establishments with a relatively high proportion of qualified workers more often, the higher qualified are better off than the lower qualified, because the establishment affected by the crisis tend to hoard their qualified employees.

Finally, we find only weak evidence for working time accounts (only in the matched sample) playing a moderating role in employment adjustment to the current situation, and also only weak evidence for effects of short time work. We find evidence (at least in the matched sample) that the economic crisis is associated with a decline in wages, but only in those establishments which do not operate working time accounts. This result corroborates with the hypothesis that working time accounts tend to smooth earnings.

We have shown, in Germany, the decline in employment has been concentrated in only a

minority of firms, and in fact those firms are concentrated in the high productivity manufacturing sector. Amongst those firms affected, firms with a higher proportion of less qualified workers reduced employment by a greater amount. Therefore, an obvious empirical extension to our work will be to examine the effects of job loss on those workers affected. Additional studies are needed to asses the associated permanent income costs. These effects could be mitigated through either generous unemployment benefit systems or strict labour market regulations (cf. Gangl 2006 for an international perspective). The incidence of rising unemployment on earnings losses and the associated decline in household incomes as well as the effectiveness of the existing income safety net in Germany are investigated by Bargain et al. (2010).

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Table 1: *Proportion of Establishments affected by the global crisis (examples)*

Manufacturing Industry	0.45
...Automotive	0.52
...Chemistry	0.45
...Food Industry	0.19
...Mechanical Engineering	0.61
Construction	0.24
Hotels and Restaurants	0.22
Banking and Insurance	0.12
Wholesale and Retail	0.24
Service Activities	0.20
...Advertising and Market Research	0.37
...Legal and Tax Consulting	0.14
...Management Consulting	0.22
...R&D	0.35
...Temporary Employment Agencies	0.66
Total	***0.27***

Source: IAB Establishment Panel 2009

Table 2: Descriptive Statistics for the estimation sample

	Not Subject to the Global Crisis		Subject to the Global Crisis	
	2008	*2009*	*2008*	*2009*
ln(N)	2.985	2.988	3.629	3.575
Exporting Firm	0.187	0.202	0.390	0.406
% Sales Exported	0.052	0.053	0.125	0.128
Eastern German		0.442		0.409
Sectoral Collective Bargaining	0.369	0.361	0.392	0.389
Firm-level collective Bargaining	0.063	0.066	0.072	0.078
Works Council	0.233	0.233	0.316	0.316
% qualified	0.669	0.669	0.703	0.702
% part-time	0.232	0.215	0.143	0.136
% temporary	0.011	0.010	0.026	0.011
Weekly working time	39.387	39.329	39.188	39.113
Working time accounts		0.489		0.626
Short time work		0.085		0.323
Number of observations		4,640		1,955

Source: IAB Establishment Panel 2008 and 2009,
Information for working time accounts and short time work is available for the year 2008, only.

Table 3: *Difference-in-Difference Estimates on the development of average wages and the number of Employees*

	Dependent Variable			
	ln(wages/Employee)$_{it}$		*ln(Number of Employees)$_{it}$*	
	unmatched	*matched*	*unmatched*	*machted*
Crisis	0.032***	0.037	0.175***	-0.004
Year 2009	-0.007	-0.001	-0.004	-0.003
*Crisis*Year 2009*	-0.014	-0.008	-0.060***	-0,040***
% qualified	0.644***	-	0.698***	-
% part-time	-0.771***	-	0.045	-
Weekly working time	0.004	-	-0.007	-
Exporting Firm	0.112***	-	0.664***	-
Eastern Germany	-0.243***	-	-0.249***	-
Sectoral collective Bargaining	0.076***	-	0.382***	-
Firm-level collective Bargaining	0.076***	-	0.452***	-
Works Council	0.180***	-	1.880***	-
9 Establishment size Dummies	***	-	-	-
39 Sector Dummies	***	-	***	-
Number of observations	13,190	6,380	13,190	6,380
R²	0.591	-	0.523	-

***/**/*, significant on the 1/5/10 % level
Source: IAB Establishment Panel 2008 and 2009

Table 4: Difference-in-Difference Estimates on the development of average wages for different proportions of qualified workers

	Dependent Variable: ln(wages)$_{it}$,							
Propor- tion of qualified	< 25 % quantile		> 25% quantile < 50% quantile		> 50 % quantile < 75 % quantile		> 75 % quantile	
	un- matched	matched	un- matched	matched	un- matched	matched	un- matched	matched
Crisis, Dummy	0.102***	0.067	0.011	0.037	0.020	0.026	-0.003	0.012
Year Dummy	-0.017	-0.012	-0.027**	-0.034	0.006	0.017	0.004	-0.015
Crisis* Year	0.021	0.025	-0.027	-0.002	-0.022	-0.023	-0.025	-0.008
Number of obser- vations	3,456	1,520	3,530	1,800	2,916	1,540	3,288	1,240
R^2	0.491	-	0.512	-	0.503	-	0.499	-

The proportions of qualified workers are measured at firm level before the crisis. Also included are the following variables: % part-time, weekly working time, exporting firm, Eastern Germany, sectoral collective bargaining, firm-level collective bargaining, works council, 9 establishment size dummies and 39 sector dummies.

    ***/**/*, significant on the 1/5/10 % level

Source: IAB Establishment Panel 2008 and 2009

Table 5: Difference-in-Difference Estimates on the development of the number of employees for different proportions of qualified workers

	Dependent Variable: ln(Number of Employees)$_{it}$,							
Propor- tion of qualified	< 25 % quantile		> 25% quantile < 50% quantile		> 50 % quantile < 75 % quantile		> 75 % quantile	
	un- matched	matched	un- matched	matched	un- matched	matched	un- matched	matched
Crisis, Dummy	0.361***	-0.037	0.120**	0.075	0.144**	0.134	0.101	0.126
Year Dummy	0.016	-0.020	-0.007	-0.005	-0.019**	-0.010	-0.000	0.020
Crisis* Year	-0.132***	-0.062***	-0.048***	-0.020*	-0.031**	-0.033***	-0.042***	-0.037**
Number of obser- vations	3,456	1,520	3,530	1,800	2,916	1,540	3,288	1,240
R^2	0.491	-	0.512	-	0.503	-	0.499	-

The proportions of qualified workers are measured at firm level before the crisis. Also included are the following variables: % part-time, weekly working time, exporting firm, Eastern Germany, sectoral collective bargaining, firm-level collective bargaining, works council, 9 establishment size dummies and 39 sector dummies.

    ***/**/*, significant on the 1/5/10 % level

Source: IAB Establishment Panel 2008 and 2009

Table 6: Difference-in-Difference Estimates on the development of the average wages for plants with and without working time accounts and plants with and without short time workers in 2009

	Dependent Variable: $ln(wages)_{it}$							
	Without working time accounts		With working time accounts		Without short time workers		With short time workers	
	un-matched	matched	un-matched	matched	un-matched	matched	un-matched	matched
Crisis, Dummy	0.042**	0.054	0.022	0.025	0.035***	0.047*	0.011	0.008
Year Dummy	-0.018**	-0.003	0.006	--0.008	-0.004	0.005	-0.039***	-0.047***
Crisis Year*	-0.018	-0.035*	-0.018	0.013	0.006	-0.001	-0.033	-0.020
Number of obser-vations	6,206	2,600	6,984	3,756	11,138	5,172	2,052	1,160
R²	0.535	-	0.562	-	0.584	-	0.570	-

also included: % qualified, % part-time, weekly working time, exporting firm, Eastern Germany, sectoral collective bargaining, firm-level collective bargaining, works council, 9 establishment size dummies and 39 sector dummies.

  ***/**/*, significant on the 1/5/10 % level

Source: IAB Establishment Panel 2008 and 2009

Table 7: Difference-in-Difference Estimates on the development of the number of employees for plants with and without working time accounts and plants with and without short time workers in 2009

	Dependent Variable: $ln(Number\ of\ Employees)_{it}$							
	Without working time accounts		With working time accounts		Without short time workers		With short time workers	
	un-matched	matched	un-matched	matched	un-matched	matched	un-matched	matched
Crisis, Dummy	0.171***	0.053	0.140***	-0.003	0.117***	0.021	0.109	-0.041
Year Dummy	-0.002	0.004	-0.003	-0.010	0.004	0.016	-0.089***	-0.073***
Crisis Year*	-0.049***	-0.043***	-0.068***	-0.035***	-0.057***	-0.051***	-0.011	0.001
Number of obser-vations	6,206	2,600	6,984	3,756	11,138	5,172	2,052	1,160
R²	0.391	-	0.501	-	0.477	-	0.609	-

also included: % qualified, % part-time, weekly working time, exporting firm, Eastern Germany, sectoral collective bargaining, firm-level collective bargaining, works council, 9 establishment size dummies and 39 sector dummies.

  ***/**/*, significant on the 1/5/10 % level

Source: IAB Establishment Panel 2008 and 2009

Appendix:

Results of the Logit Estimation (Dependent Variable Crisis Dummy) and mean comparisons before and after 1:1 nearest neighbour matching without replacement[a]

	Logit Model (Coeff.)	Before Matching			After Matching		
		Mean, Crisis=0	Mean, Crisis=1	p-Value	Mean, Crisis=0	Mean, Crisis=1	p-Value
Employment Expectations							
• *positive in 2008[b]*	0.181**	0.145	0.213	0.000	0.169	0.179	0.427
• *negative in 2008[b]*	-0,494***	0.084	0.061	0.002	0.072	0.069	0.730
• *uncertain in 2008[b]*	0.184	0.037	0.043	0.208	0.044	0.043	0.931
% qualified	0.248*	0.669	0.703	0.000	0.700	0.697	0.742
% part-time	-0.589	0.232	0.143	0.000	0.167	0.162	0.502
Weekly working time	0.001	39.37	39.19	0.001	39.35	39.39	0.606
Exporting Firm	0.191**	0.187	0.390	0.000	0.319	0.319	1.000
Eastern Germany	-0.309***	0.441	0.409	0.013	0.426	0.418	0.641
Sectoral Bargaining	0.001	0.369	0.392	0.080	0.391	0.381	0.561
Firm-level Bargaining	-0.105	0.064	0.072	0.192	0.066	0.069	0.724
Works Council	-0.180*	0.234	0.316	0.000	0.277	0.270	0.634
MSB							1.479
Number of observations	6,586	4,633	1,953	-	1,595	1,595	-

also included: 9 establishment size dummies and 39 sector dummies.
***/**/*, significant on the 1/5/10 % level
[a] *The matching for the results in tables 4-7 was done separately for the different columns. Table 8 only reports the matching results for the whole sample (Table 3).*
[b] *In comparison to plants with neutral employment expectations.*
Source: IAB Establishment Panel 2008 and 2009