The German labor market response in the world recession – de-mystifying a miracle

Joachim Möller

Abstract This paper aims at analyzing the astonishingly mild response of the German labor market to the severe demand shock that occurred in the aftermath of the financial crisis. It stresses the role of institutions such as working-time accounts which create a large scope for a buffering capacity within the firm. It is argued that labor market reforms and the behavior of social partners have strengthened the adjustment possibilities when facing a temporary slump. The crisis mainly affected export-oriented manufacturing firms in Germany's thriving regions. Before the crisis those firms were the engines of growth and suffered from a shortage of qualified professional workers. Moreover, training costs are relatively high and dismissals would entail a significant loss in firm-specific human capital. Supported by the generous short-time work schemes, these factors contributed to the high willingness of crisis-stricken firms to pursue a strategy of massive labor hoarding. By contrast, the comparatively high employment protection does not seem to play a major role in explaining the adjustment behavior of German firms in the current crisis.

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Die Reaktion des deutschen Arbeitsmarktes auf die Weltrezession – Entzauberung eines Wunders

Zusammenfassung Der Beitrag analysiert die Bestimmungsfaktoren für die – sowohl im internationalen Vergleich als auch im Vergleich zu früheren Krisen – überraschend verhaltene Reaktion des deutschen Arbeitsmarktes auf die durch die Finanzmarktkrise ausgelöste Weltrezession. Betont werden die institutionellen Regelungen wie Arbeitszeitkonten, die darauf ausgerichtet sind, innerhalb der Firmen einen großen Spielraum für die Absorption ökonomischer Schocks zu schaffen. Es wird argumentiert, dass auch die Arbeitsmarktreformen und das Verhalten der Sozialpartner die Anpassungsmöglichkeiten bei einem temporären Nachfrageausfall begünstigen. Die Krise hat zudem vornehmlich die exportorientierten starken Firmen in den wirtschaftlich prosperierenden Regionen Deutschlands getroffen. Vor dem Ausbruch der Krise waren diese Firmen Wachstumsträger, die zum Teil auch unter Fachkräftemangel litten. Exportorientierte Betriebe stellen besonders hohe Anforderungen an die Qualifikation der Belegschaften. Einarbeitungskosten sind dort besonders hoch, sodass Entlassungen mit einem bedeutenden Verlust an firmen-spezifischem Humankapital einhergehen würden. Unterstützt durch die großzügigen Regelungen zum Kurzarbeitergeld haben die genannten Faktoren die Bereitschaft der krisengeschüttelten Firmen erhöht, auf eine Strategie des Arbeitskräftehortens zu setzen. Der in Deutschland vergleichsweise hohe Kündigungsschutz scheint hingegen bei der Erklärung des Anpassungsverhaltens der Unternehmen in der Krise nur eine untergeordnete Rolle zu spielen.

1 Introduction

In a recent New York Times column, Paul Krugman denotes the German labor market response to the world recession as "Germany's jobs miracle." So far, the very modest increase in unemployment in face of a 5% drop in GDP is mysterious to many observers indeed. For many years the German labor market was said to be the paradigm of inflexibility. This time it is different. In the adjustment to the enormous shock on the export markets the German system behaved in an exemplary manner. There is also no sign of panic, although Germany heavily depends on its export markets which more or less collapsed. "Crisis? What crisis?" is a common perception in Germany and there is no indication for *German angst* to be a mass phenomenon.

The fact is that Germany experienced a decline in employment that was much smaller than had been feared. Up to now there have been no waves of mass dismissals despite the terrible demand shock. Apparently the German labor market system has undergone a strange mutation from a bulwark of eurosclerosis into a champion of flexibility. The specific type of German flexibility, however, does not stem from high labor turnover rates (hiring and firing), but through an unprecedented level of buffer capacity within firms. Hence the smooth adjustment to the shock is due to *internal* rather than *external* adjustments.

In the following I will try to shed some light on the specific way German firms adjusted to the shock. The paper challenges the view that the evidence can be explained just by the combination of employment protection regulation and short-time work schemes. Among others, the specific character of the current crisis plays a role as well since mainly export-oriented manufacturing firms in Germany's thriving regions were affected. Under the given circumstances it was rational for these firms to deliberately choose a strategy of massive labor hoarding. Besides subsidies for reducing the working week through short-time work schemes this strategy was fostered by flexible working hours (*working-time accounts*) and social partnership between management and unions (*alliances for jobs, opening clauses in collective agreements*). Additionally, there are some indications of a reduction in the intensity of work so that the productivity per working hour fell. Altogether these factors formed a protective shield for German workers, a shield that has so far repelled the threat of massive employment losses. To understand the evidence it is important to consider the interaction between the nature of the shock and the institutional framework as well as the economic situation before the shock.[1]

The remainder of the paper is organized as follows: In Sect. 2 the labor market responses to the world recession are analyzed from an international perspective. Section 3 describes the economic situation in Germany before the shock and gives some quantitative appraisal of the expected consequences for the labor market. Section 4 investigates how the crisis affected the German economy and how firms' behavior can be understood under the given circumstances and prevailing institutions. A conclusion is presented in Sect. 5. The main arguments are formulated in 14 theses.

2 The financial crisis and labor market reactions from an international perspective

Thesis 1): Although the world recession hit Germany more than the average OECD country, the response of employment was unexpectedly mild and so far the increase in unemployment has been the lowest of all OECD countries.

Figure 1 depicts the shocks in real GDP from the second quarter of 2008 to the second quarter of 2009 on the horizontal and the corresponding changes in the unemployment rates on the vertical axis for the OECD countries. One would have expected a clearly negative correlation: the more a country was hit by the world recession the higher the labor market reactions in terms of unemployment. The pattern, however, is not that clear. Surprisingly, there is no significant cross-country correlation between the two variables. Spain, for instance, has experienced a less-than-average decline in real GDP, but has had a tremendous increase in the unemployment rate of almost eight percentage points. Germany is at the other extreme. Together with Japan it has had the strongest decline in GDP of all G7 countries. Both countries are known as strong exporters and were severely hit by the worldwide collapse in demand for goods. Despite the magnitude of the real GDP shock, the German unemployment rate has shown almost no reaction. As an astonishing fact, Germany shows the lowest increase in unemployment among all OECD member countries.

Thesis 2): The international differences in immunizing employment from the shock were not primarily due to employment protection regulations.

A possible hypothesis is that employment protection laws may have effectively prevented firms from dismissing workers. In order to find some evidence in favor or against this hypothesis, I simply ran a cross-section regression for the change in the unemployment rate from the second quarter of 2008 to the second quarter of 2009 for 30 OECD countries. A constant, the corresponding real GDP shock

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[1] The importance of considering the interactions between shocks and institutions in order to understand international differences in unemployment has been stressed, among others, by Blanchard and Wolfers (2000).

Fig. 1 Real GDP shock and change in unemployment rates for 30 OECD countries (2009.Q2 vs 2008.Q2). Data Source: OECD. Unemployment rates are harmonized
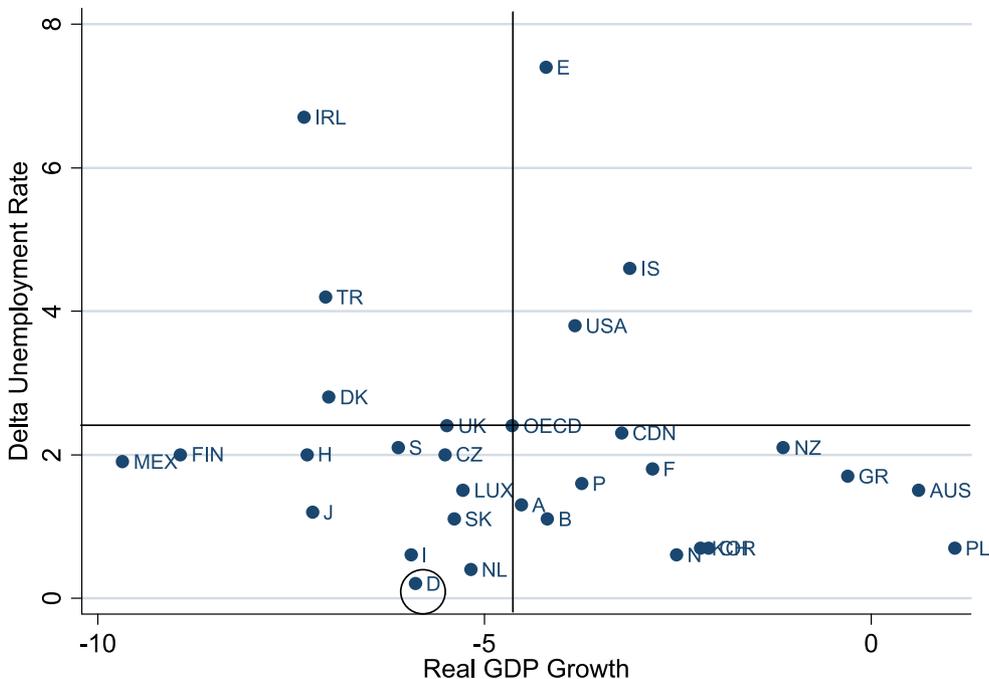

Table 1 Regression of change in standardized unemployment rates on real GDP shock and OECD-employment protection index (30 OECD countries)

| | Dependent variable: Δ unemployment rate | | | |
| | OLS | | Median regression | |
	Coef.	t-stat.	Coef.	t-stat.
Employment protection index	−0.269	−0.500	−0.479	−1.270
Real GDP growth	−0.140	−1.470	−0.125	−1.640
Constant	2.068	2.180	2.237	2.710
N		30		
R^2 (pseudo R^2)		0.050		0.079

Notes: Authors' own calculations using OECD data. The change in standardized unemployment rate and real GDP growth rate is for 2009.Q2 vs 2008.Q2. *t*-statistics for OLS are calculated using heteroscedasticity consistent standard errors; *t*-statistics for quantile (median) regression are calculated on the basis of bootstrap standard errors with 500 replications.

and the OECD employment protection index[2] were used as explanatory variables. To account for the influence of possible outliers on the results, I used a median regression beside standard OLS. Table 1 shows the results. It turns out that in both variants the employment protection index exhibits the expected negative sign, but is not statistically significant. The same is true if alternative employment protection indices published by the OECD are used.[3] Also, Spearman rank correlation tests between the change in the unemployment rate and these alternative employment protection indices were not significant at any conventional level. Hence I conclude that the varying level of employment

protection among OECD countries is not able to explain the marked differences in their labor market reactions to the world recession.

3 The initial situation and the size of the shock in Germany

3.1 The situation on the eve of the world recession

Thesis 3): The German economy was in rather good shape at the beginning of the crisis. The labor market reforms of 2003 to 2005 contributed to the favorable initial position.

To understand the German "miracle" it is useful to bring to mind the situation on the eve of the world recession. In early 2008, the future prospects of the German economy

[2] See www.oecd.org/employment/protection.
[3] These indices are: protection of permanent workers against individual dismissal, regulation on temporary forms of employment and specific requirements for collective dismissal. See footnote 2 for the source.

seemed to be extraordinarily bright. For more and more German regions, especially in the South, full employment was a realistic perspective. German products like machinery, equipment, and automobiles were in high demand on the world market – much sought after not only by Germany's traditional customers but also by emerging markets. After several years of wage restraint, real unit labor costs had experienced a substantial decline, especially in comparison to Germany's main competitor countries. The main macroeconomic variables looked favorable: The budget consolidation was well under way, the inflation tamed, employment was rising and there was neither a sign of a stock market nor of a housing price bubble. The irruption of the world recession caught the German economy by surprise and at a time when the dominant theme of the economic policy debate was a shortage of skilled workers.

Major labor market reforms were undertaken under Chancellor Gerhard Schröder in the years 2003 to 2005. These reforms were aimed at fostering flexibility of workers and their integration into the labor market by encouraging and pressing them at the same time (*Fordern und Fördern*). Some institutional restrictions (concerning temporary employment agencies, temporary contracts and working hours, for instance) were loosened. With the exception of older workers, the entitlement period for unemployment benefits was shortened to 12 months.[4]

Although not all elements of the labor market reforms turned out to be well-designed, they were on their way to changing the German labor market for the better during the upswing years 2006 to 2008. What were the positive signals? First of all, it was the decline of long-term unemployment. For the first time since the 1960s, the hard core of unemployment started melting significantly. Second, the matching process improved (i.e., the Beveridge Curve shifted inwards, see Bach et al. (2009)). Third, the convergence process in East Germany – having paused for a decade or so – regained momentum.

3.2 The size of the aggregate shock

Thesis 4): Even taking the falling long-running trend in GDP growth rates into account, the 2008/2009 cyclical downturn is the sharpest in Germany after World War II.

According to the state of statistical information in fall 2009, the decline in real GDP for the current year will be around –5% in Germany. This is by far the biggest recession since World War II. In comparison: the previous (negative) record holder of cyclical downturn was the first oil price reces-
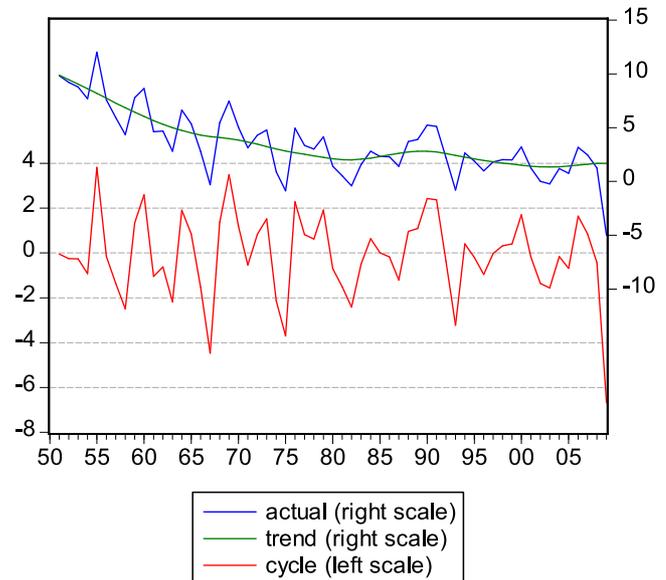

Fig. 2 Actual real GDP growth, trend and cylical component, Germany 1950 to 2009. Trend calculated by using a Hodrick–Prescott filter with smoothing parameter $\lambda = 100$. Source for original data: Deutsche Bundesbank; the year 2009 was not included in the calculation of the HP filter; the trend value for 2009 was extrapolated from the previous year; actual growth rate of GDP for 2009 based on the current forecast of the federal government

sion in the mid-1970s when GDP shrank by 0.9%. However, comparing the sheer numbers without considering the context might be somewhat misleading. In the 1960s and 1970s, the trend growth rate was markedly higher than it is today. For example, in the late 1960s the trend growth rate of real GDP exceeded 4%. When in 1967 real GDP fell by around 0.4% this was a decline *relative to the trend rate* of almost 5%. In Fig. 2 I therefore decomposed the actual real GDP growth into a trend and a cyclical component using a Hodrick–Prescott filter. It is shown that the trend growth rate has fallen substantially. The cyclical component clearly traces the three sharpest recessions in the past, 1967, 1975, and 1993, with contraction rates of cyclical real GDP between 3 and 4.5%. Although from this perspective past recessions appear more severe, the downturn in 2009 – with a shrinkage of real GDP *relative to the trend rate* exceeding 6% – markedly surpasses the biggest downturns experienced until then.

3.3 The relationship between GDP and employment growth

Thesis 5): In the past, the cyclical as well as the trend components of real GDP and employment growth used to move together very closely. Typically, but not always, the cyclical component of employment changes followed that of real GDP growth with a lag.

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[4] After 12 months of unemployment social assistance became means tested.

Fig. 3 Trend (*left*) and cylical component (*right*) of real GDP and employment growth (1975 to 2009). Trend calculated by using a Hodrick–Prescott filter with smoothing parameter $\lambda = 100$. Source for original data: Deutsche Bundesbank; the year 2009 was not included in the calculation of the HP filter; the trend value for 2009 was extrapolated from the previous year; actual growth rate of GDP for 2009 based on the forecast of the federal government, actual growth rate of employment for 2009: IAB forecast (Bach et al. 2009)

Figure 3 compares trend and cyclical components of real GDP and employment[5]. It is evident that both components of the two variables are positively correlated.[6] Note that the co-movement of the cyclical components is especially close. This is true for frequencies and – before 2009 – also for amplitudes. Given this descriptive evidence there is some indication that a 1% change in the cyclical component of GDP entails a change in employment of about the same order of magnitude.

The right panel of Fig. 3 underlines that employment typically follows the business cycle with a certain lag. It seems that in a typical recession employment losses follow the decline in GDP growth by roughly a year. An exception is the 1993 downturn where the fall in employment apparently had a lead over real GDP.

Thesis 6): So far, the behavior of cyclical employment has been much more favorable than could have been expected from past experience.

Table 2 shows the results of regressing the cyclical component of employment on current and lagged values of the cyclical component of real GDP as well as on the lagged endogenous variable. This dynamic specification explains nearly 90% of the variation of the cyclical behavior of employment. The estimation results are used to forecast

Table 2 Regression of employment on real GDP (*Y*) (cyclical components, 1975–2008). Source: Authors' own calculations using data from Deutsche Bundesbank, Federal Employment Agency (BA); data from 1976 to 1992 are for West Germany, from 1993 to 2008 for Germany; D1992 is a dummy for unification (D1992 = 1 for the year 1992 and D1992 = 0 elsewhere)

Variable	Dep. variable employment (CC)	
	Coef.	*t*-stat.
Constant	0.159	1.696
Employment CC ($t-1$)	0.210	1.914
Real GDP CC	0.673	8.048
Real GDP CC ($t-1$)	0.298	2.897
Real GDP CC ($t-2$)	0.165	2.108
D1992	−4.595	−7.913
Test statistics		
Adj. R^2	0.882	
N	32	
s.e.	0.521	
LM (1) x^2 [p-val.]	0.729	[0.392]
LM (2) x^2 [p-val.]	2.637	[0.267]

Notes: Employment (*L*) is measured as persons being eligible to social contributions (*Sozialversicherungspflichtige Beschäftigte*); real GDP (*Y*) is measured as a chain index; the cyclical components (CC) of the growth rates of the variables are calculated by a HP-filter with smoothing parameter $\lambda = 100$; lags of the explanatory variables are given in parentheses.

the cyclical component of employment for 2009.[7] Figure 4 shows the model's one-step-ahead forecasts. As can be seen from the figure, the cyclical change in employment that

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[5] Being aware of the fact that the Hodrick–Prescott filter is sensitive to fluctuations at the right margin, the trend values for 2009 were extrapolated from the year 2008.

[6] The correlation coefficient for the trend component is 0.47 and for the cylical component is 0.74 (sample period 1975 to 2008).

[7] This is done by assuming an actual trend component of real GDP growth of 1.7 and using the current expectations of the federal government for real GDP growth of –5.0% in 2009.
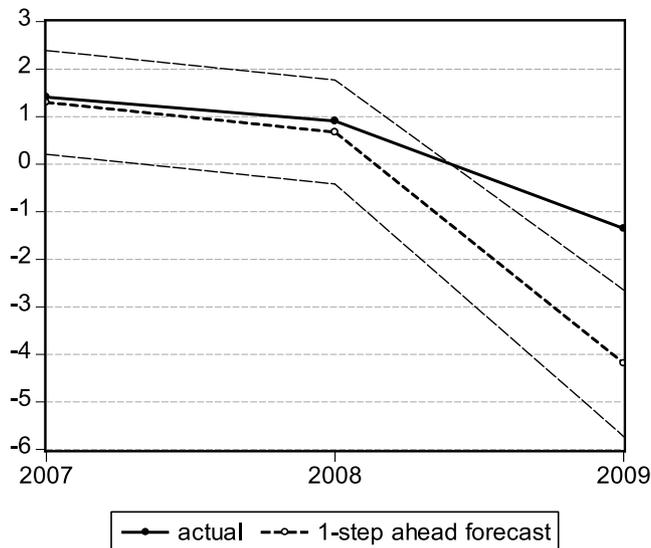
Fig. 4 Actual and one-step-ahead forecasts of the cyclical component of employment growth (2007 to 2009). The *dashed lines* below and beyond the forecast indicate a 95% confidence interval

could be expected from this approach given the statistical information of November 2009 clearly lies outside the model's 95% confidence interval. This would indicate a structural break. It seems that employment prospects for the near future look less gloomy as could have been expected from past experiences. This is in accordance with estimations of leading experts.

From the close relationship of cyclical components of production and employment one would have expected a cyclical decline in employment of –4.2% in 2009 and –3.3 in 2010.[8] Even assuming a trend growth rate of employment of 1% that partly compensates the shock, this would be equivalent to a loss of about 1.5 million jobs eligible to social contribution payments between 2008 and 2010.[9] Typically, more than 80% (or 1.2 million) of the affected employees would sooner or later appear as registered unemployed. This contrasts sharply with the likely development of the German labor market. Current forecasts imply that the increase in unemployment between 2008 and 2010 is in the order of magnitude of 0.75 million only.[10] This discrepancy needs to be explained.

4 The nature of the shock, firms' behavior and the role of institutions

4.1 Firms and regions primarily affected

Thesis 7): Exporting firms in manufacturing and regions with a high share of those firms were the main victims of the world recession. This implies that the crisis primarily hit strong firms in economically strong regions.

The drop in orders during the 2008/2009 slump primarily affected German exporters. In this context it is important to note that internationally active firms are a positive selection (cf. e.g., Fryges and Wagner 2008). On average, export-oriented firms are more productive and profitable. Hence the world recession of 2008/2009 mostly hit the strongest firms.

To obtain more information on the German regions that were heavily affected by the crisis I regressed the difference between unemployment rates from October 2009 and October 2008 on the October 2009 unemployment rates for a cross-section of 413 regions at county level (NUTS 3). Since there is some indication for heteroscedasticity in the data, I also used a weighted regression with the number of unemployed persons as analytical weights. Table 3 gives the corresponding results. It shows that in both variants the coefficient for the levels of the unemployment rate is negative and statistically highly significant. This result corroborates the diagnosis that the world recession of 2008/2009 especially hit Germany's hot spot regions.[11]

In an extended regression model – also shown in Table 3 – regional export shares and shares of manufacturing workers are included as two additional variables. The coefficients of both variables turn out to be positive and statistically significant at any conventional level. In addition, the coefficient for the level of the unemployment rate now becomes statistically insignificant. Hence the convergence property of the recession is due to the fact that regions with high shares of manufacturing workers and high export shares are those that tend to have lower unemployment rates.

Manufacturing boomed during Germany's last recovery between the 4th quarter of 2004 and the 1st quarter of 2009. The first column of Table 4 shows that during this time the output growth rate for manufacturing was about twice the rate for the aggregate economy. At the same time, Table 4 also confirms that manufacturing firms were the main victims of the economic shock in 2008/2009. During the first four quarters of the 2008/2009 recession, the total German

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[8] The one-step-ahead forecast assumes a cyclical component of real GDP in 2009 of –6.7% (–5.0% real GDP growth minus the trend rate of 1.7%) and of –0.7% for 2010 (1.0% real GDP growth minus 1.7% trend rate).

[9] The employment eligible to social contribution payments was roughly 27.5 million in 2008. A decline of –3.2 in 2009 and –3.3 in 2010 would imply a reduction of 0.88 million in 2009 and 0.61 million in 2010.

[10] The German Council of Economic Advisers (2009), for instance, expects that unemployment will not pass over the level of 4 million in 2010 (compared to 3.268 million in 2008). Although this would be a considerable

increase of about 0.5 million relative to the previous year, it is far below the fears at the beginning of the crisis.

[11] This also implies that it fostered regional convergence inside Germany. There is some indication that in former crises the reverse is true.

Table 3 Regression of the change in unemployment rates on the level of the unemployment rate (413 German NUTS 3 regions)

| | OLS | | Weighted OLS | | Weighted OLS | | Weighted OLS | |
	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
Unemployment rate	−0.094	−7.990	−0.078	−3.890	−0.064	−3.490	−0.009	−0.400
ln (export share)	–	–	–	–	0.307	4.060	0.347	4.390
Employment share secondary sector	–	–	–	–	–	–	0.031	5.050
Constant	2.068	15.760	2.237	7.690	−0.142	−0.390	−1.823	−4.070
N			413				335	
R^2		0.145		0.117		0.107		0.136

Notes: Data source: Authors' own calculations using data from the statistical department of the Federal Labor Agency and from the INKAR database of the Federal Office for Building and Regional Planning (BBR), Bonn. The change of the unemployment rate is calculated from October 2008 to October 2009. The unemployment rate is for October 2009 (following a uggestion of Cannon and Duck (2000) to avoid Galton's fallacy). *t-statistics* are calculated using heteroscedasticity consistent standard errors. Weighted OLS: Least Squares Estimates with the regional number of unemployed persons in October 2009 as analytical weights. Due to limited data availability for the export shares and the share of employment in the secondary sector, the corresponding regression could be run only for 335 NUTS 3 regions. The latter two variables are 2004/2005 averages.

Table 4 Change in GDP in manufacturing and in the total economy

| | Change in GDP in percent | |
	Total	Manufacturing
Recovery 2004 Q4–2008 Q1	9.4	18.8
Recession 2008 Q2–2009 Q2	−5.9	−19.3

Notes: Federal Statistical Office and calculations by the IAB; I am grateful to Sabine Klinger for providing me with the data.

economy shrank by 6.9%, whereas the corresponding figure for manufacturing industries was almost 20%.

Thesis 8): Especially those firms were hit by the world recession that had the most severe recruitment problems before the crisis.

The Institute for Employment Research (IAB) regularly conducts a representative survey on vacancies and recruitment processes. In the second quarter of 2009 firms were asked how strongly they had been hit by the world recession ("existential menace," "partly affected," and "not affected"). Figure 5 summarizes the answers for various industries. In the total economy 7% of firms reported that their existence was being threatened and another 32% that they were partly affected by the crisis. The corresponding shares in manufacturing were much higher. A total of 70% of the producers of metals and metal products said they were affected by the crisis, thereof 20% were even threatened in their existence. Somewhat lower, but still very high shares were reported for chemicals and plastics, wooden products and printing as well as for machinery, electrotechnics and automotive industries. By contrast, the vast majority of firms in private, social and public services and – perhaps surprisingly – also

in the banking and insurance sector (and other business related services) reported that they were not severely affected.

Figure 6 plots the share of firms with recruitment problems in 2008 against the share of firms affected by the world recession of 2008/2009 for eight distinct industries. It turns out that three out of the four industries reporting the biggest impact of the crises were also among those that had the highest share of problems in filling vacancies. This is strong evidence in favor of the thesis that the crisis especially hit those firms that had been suffering from a shortage of a trained workforce (*Fachkräftemangel*).

4.2 The role of institutional settings

Thesis 9): Changes in the labor market institutions as well as social partnership have strengthened various channels for extending internal flexibility.

An important aspect of the change in labor market institutions during the last one or two decades has been the increasing role of flexible working hours through working-hours accounts. Already in 1999, 37% of workers were using working-hours accounts. Up to 2003 the share had increased to 41% (Bauer and Munz 2005, p. 46, Footnote 10) and probably has grown further since then.[12] In the upswing period from 2005 to the beginning of 2008 a sizeable surplus of working hours was accumulated on these accounts (IAB 2009). Hence, at the beginning of the world recession, a non-negligible buffer stock was available. Therefore,

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[12] Preliminary results for the 2009 wave of the IAB establishment panel indicate that this share the share of firms with working-time accounts has increased from 21% in 1999 to 32% in 2009. For exporting firms the share is even higher (40%). I am grateful to Lutz Bellman for providing me with this information.

Fig. 5 Share of firms existentially, partly or not affected by the crisis (by industry, in percent). Source: Institute for Employment Research, Survey of Vacancies in the Total Economy, wave 2009 Q2
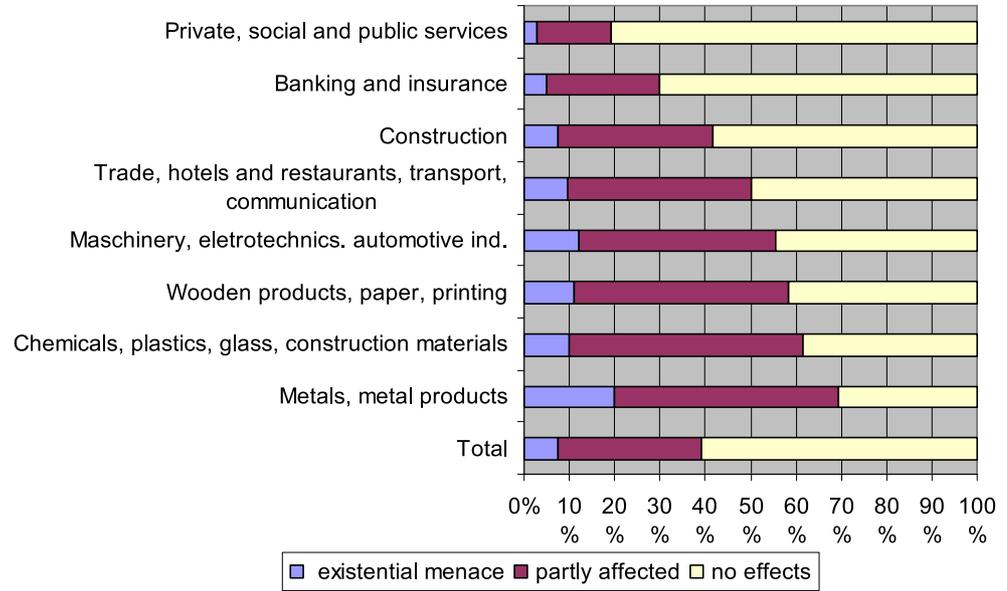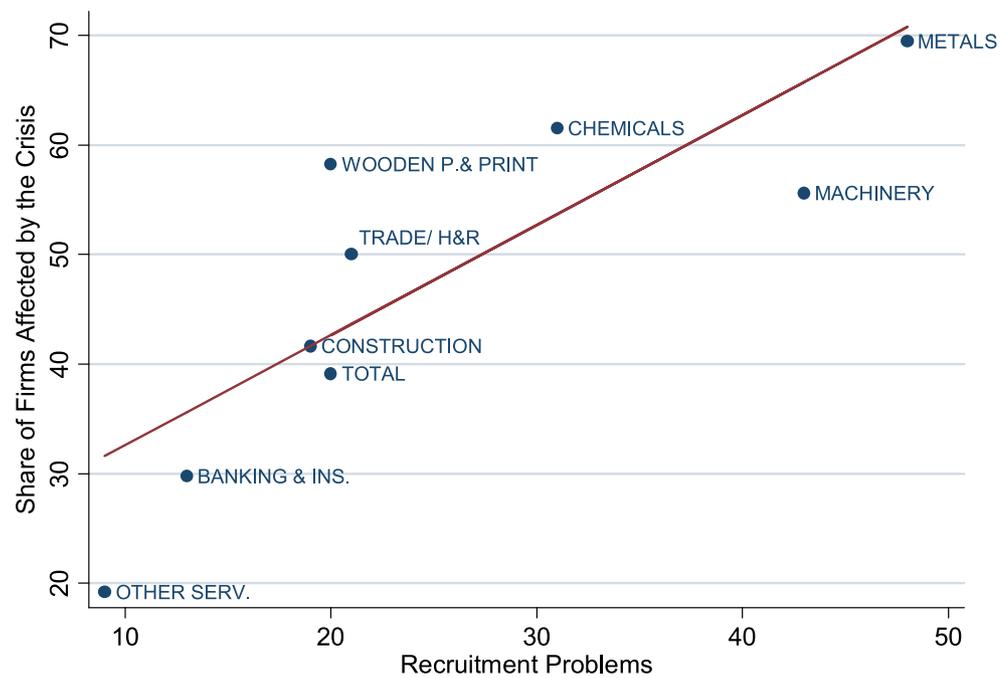

Fig. 6 Share of firms affected by the crisis 2008/2009 and share of firms with recruitment problems in 2008 (in percent) Source: Institute for Employment Research, Survey of Vacancies in the Total Economy, wave 2008 Q4 and 2009 Q2

firms could react to the crisis by pushing their workers to reduce their surpluses or even to accumulate deficits.

What has also become more and more wide-spread is increased cooperation of individual firms and their employees or worker councils. These so-called *alliances for jobs* usually imply that workers agree to wage restraints or even wage shortages. In exchange they are guaranteed job stability. One might expect that in the case of a large negative shock to the economy, *alliances for jobs* might help the

firms to overcome the crisis by reducing the wage bill per worker.[13]

Thesis 10): Institutions and firms' behavior are geared to dampen the employment effects of external shocks, especially in export-oriented manufacturing firms.

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[13] A similar effect would result from reducing overtime work.

Export manufacturers are known for their specialized and highly trained workforce. For a typical firm this is an enormous asset. This firm-specific human capital would be lost in case of dismissals. In a recovery search, hiring and training costs for professional workers are by no means trivial.[14] This will be aggravated in the future because the recruitment of skilled workers of this category will probably become more and more difficult given Germany's demographic prospects. Therefore, firms are interested in keeping their core workforce stable. If faced with a temporary demand shock they will likely choose a strategy of labor hoarding.

Firms exposed to the fluctuation of the world market typically possess some experience in dampening the effects of an external shock. Beside the instruments described in the previous thesis the arsenal includes profit-sharing schemes and the use of temporary workers. Furthermore, firms can react to demand fluctuations by transferring some of the risk to suppliers. In case of internationally active firms this might also include a variation in the extent of cross-boarder outsourcing or offshoring. In addition, adjustment policies in periods of slack demand also include a higher effort in re-structuring and re-organizing production processes and intensifying the internal or external training of workers. Hence, during slumps the workforce will be partly employed in activities with no immediately measurable output. As a result, this contributes to the decline of productivity during recessions but increases the productivity reserves in the next upswing.

4.3 Labor hoarding

Thesis 11): Rather than being forced by employment protection, the absence of a large wave of dismissals so far is a deliberate and voluntarily taken decision by firms.

The fact that employment has hardly reacted to the sharp drop in GDP either means that employers cannot adjust or that they deliberately choose not to adjust. The first explanation refers to employment protection or other institutional constraints, the second to labor hoarding. Out of 30 countries Germany holds rank 22 in the OECD index of employment protection. Hence, worker protection against dismissals is quite strong. However, as argued above, employment protection is not very likely to be an important factor for explaining the international evidence on labor market reactions to the real GDP shock in 2008/2009. Moreover, the high level of employment protection had

not prevented employment to fall sharply and the unemployment rate to increase quickly in previous recessions. My reading of the empirical evidence is that employment protection is not a major factor in explaining the current character of shock absorption. It is rather labor hoarding – promoted by labor market policies – that plays the dominant role.

Thesis 12): Shock absorption through internal flexibility was much higher than expected from past experience. Labor hoarding comes along with a massive reduction in working hours and a moderate reduction in productivity.

Labor hoarding can be accomplished through two main channels, a reduction in hours worked and a reduction in work intensity or productivity per working hour. The calculations in Table 5 show a decomposition of the response to the cyclical shock in real GDP of –6.7% – as the difference between the expected –5% and the trend rate of +1.7%. On the basis of a one-step-ahead forecast from the regression shown in Table 2, one can calculate an expected response of the working population to the real GDP shock of –4.19% which is equivalent to –1.69 million persons. Compared to the impact of the cyclical shock of –2.69 million this would mean an expected shock absorption of roughly 1 million workers. However, the actual cyclical working population response was –0.59% only. Hence the actual shock absorption was 2.45 million, or 1.45 million persons more than could have been expected from past experience.

According to the lower panel of Table 5 the reduction in working time was a major factor for cushioning the collapse in the demand for goods. The total volume of reduced working time is equivalent to that of 1.39 million persons with average working hours. The short-time work schemes on the one hand and balances in working-hours accounts on the other were responsible for shock absorption in the aggregate that was equivalent to 360,000 and 244,000 employees, respectively. The reduction in overtime was equivalent to 285,000 persons.

It is worthwhile to mention that also the change in the productivity per hour contributed significantly to the buffering effect. The reduction of almost 1% in the productivity per hour corresponds to roughly 1 million persons. It should be stressed that a drop in the productivity per hour is a novelty in the recent economic history of Germany. For decades this variable has only been rising.

Thesis 13): Theoretically, the incidence of labor hoarding increases with uncertainty about future economic conditions and the amount of sunk training costs or firm-specific human capital in case of dismissals. Labor hoarding can be stimulated by wage subsidies in periods of slack demand.

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[14] Bach and Spitznagel (2009) cite evidence for the costs of replacement in the order of magnitude up to 32,000 €.

Table 5 Decomposition of the cyclical responses to the cyclical GDP shock (2009)

	Growth rates			Labor force equivalence (in 1,000 persons)		
	Actual	Trend	Cycle	Actual	Trend	Cycle
(1) Real GDP	−5.00	1.69	−6.69	2,014	680	2,693
(2) Expected employment response	–	–	−4.19	–	–	−1,689
(3) Expected buffering (2)–(1)	–	–	2.49	–	–	1,004
(4) Employment	−0.28	0.32	−0.59	−112	128	−240
(5) Actual buffering (4)–(1)	–	–	6.09	–	–	2,454
(6) Unexpected buffering (5)–(3)	–	–	3.60	–	–	1,450
(7) Working time	−3.79	−0.33	−3.45	1,525	134	1,391
(8) Thereof ...						
(8) ... short-time work schemes	–	–	−0.89	–	–	360
(10) ... overtime	–	–	−0.71	–	–	285
(11) ... working time account balances	–	–	−0.61	–	–	244
(12) Productivity per hour	−0.94	1.70	−2.64	377	−685	1,063

Notes: The cyclical GDP shock is calculated from the actual GDP shock (−5%) minus the trend rate (1.7%); the expected buffering is computed from the regression in Table 2; source of the working-time components: IAB; note that these components are extrapolated from the values for the first three quarters of the year.

In general, if a firm is faced with a drop in the demand for its products but expects an upswing in the near future, it will typically choose some form of labor hoarding. This is so because dismissals, recruitment, and training are costly. More precisely, hoarding behavior occurs if the expected discounted present value of keeping the skilled workers is lower than the sum of dismissal costs plus the expected discounted present value of future re-hiring and re-training costs. If the timing of the recovery is not known with certainty, the firm faces a nontrivial stochastic inter-temporal decision problem. Excluding a possible recall of workers, dismissals can be considered as an employer's action that irreversibly destroys the former investment into the worker's firm-specific human capital.[15] Technically speaking, the possibility of laying-off workers can be modeled as an option to the firm. Because of uncertainty there is value in waiting before exerting the option. Hence there exists a zone of inactivity, the extent of which depends on several parameters. It can be shown that typically the amount of sunk training costs as well as the level of uncertainty increases the value of waiting and therefore fosters labor hoarding, whereas high wage or remanence costs work in the opposite direction.[16] Since the short-work scheme acts as a wage subsidy during periods of slack demand it favors labor hoarding.

### 4.4 Short-time work schemes

Thesis 14): The use of the short-time work subsidy scheme is at the highest level since the early 1990s. At the time of the German reunification the instrument was mostly used to dampen the structural reunification shock in the eastern part of the country. Today it is widespread mainly among exporting manufacturers in the western part of Germany.

Figure 7 shows the number of short-time workers. Short-time work subsidies have peaked during the time of German reunification, the recession of 1993 and since the beginning of 2009. While at the time of reunification short-time work was highly concentrated in eastern Germany, the lion's share of short-time work now falls on the western part of Germany. This is a reflection of the fact that the share of exporting firms is considerably higher in western Germany.

It can be assumed that the use of the short-time work scheme today has a completely different meaning than during the 1990s: When at the time of reunification the East was under heavy pressure to re-structure the whole economy, short-time work was used as a device for alimenting workers for a certain time. Typically the affected workers did not resume their work after the short-time work had ended. In the present recession the picture has been completely different. Firms have mostly been using short-time work subsidy schemes in order to (at least partly) finance the costs of labor hoarding.[17]

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[15] See the branch of literature starting with Bentolila and Bertola (1990) applying the Dixit and Pindyck real option theory of investment with uncertainty and irreversibility to the hiring/firing decision of firms (for a comprehensive overview see Dixit and Pindyck 1994).

[16] It should be noted that introducing subsidies for short-time work also lowers the threshold for hiring workers.

[17] Short-time work is designed to finance 60 (without children) to 66% (with children) of the earnings gap (relative to "normal" earnings). For the

Fig. 7 Short-time workers 1991–2009 (in 1,000 persons). Source: Statistic Department of the Federal Employment Agency
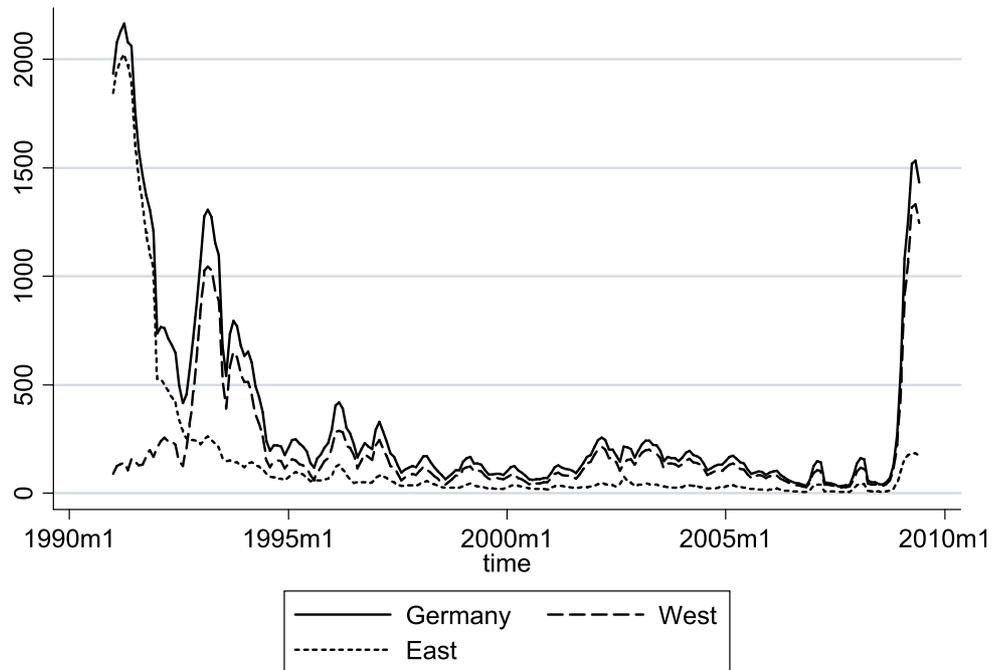
The regional dispersion of short-time work is closely linked to the share of manufacturing. The highest shares are found in the state of Baden-Württemberg. Looking at industries, the share of short-time work usage is extremely high in the automotive, metals, plastics, and textile sectors. For example, from April 2008 to March 2009 the cumulated share of short-time work notices in relation to the total number of workers was as high as about 50% in the automotive and in the metals sector. Assume that all notices will result in actual utilization of the short-time work scheme, the subsidized reduction in working hours is 40% and the average duration is six months. This means that for these industries a one-year cyclical drop in demand of 10% could have been neutralized through the instrument. This is almost half the actual drop in manufacturing output of 19.3% recorded between the 2nd quarter of 2008 and the 2nd quarter of 2009.

5 Conclusions

The paper investigates the German labor market's mysterious employment stability in response to the unparalleled real GDP shock of 2008/2009. It is argued that shock absorption worked through a tremendous increase in labor hoarding. Therefore, the basic question is why firms affected by the

world recession have primarily chosen this strategy instead of adjusting their workforce by laying off redundant workers. Several aspects play a role in this context. First of all, important institutional mechanisms exist that are designed to foster internal flexibility as opposed to external flexibility. Among these are working-hours accounts, collective agreements for flexible working time and – last but not least – the short-time work scheme. In addition, basically two factors have determined the preference for labor hoarding: first is the fact that economically strong firms were affected by the collapse in world demand. Before the crisis those firms had experienced a period of strong growth and typically were suffering from a shortage of trained workers. Finally, the subsidies for short-time working hours influenced the firm's decision towards labor hoarding. However, the short-time work scheme cannot alone explain the enormous cushioning of employment in the face of the world recession. Flexible working-hours accounts and more traditional forms of a reduction in working hours also played a major role.

All in all, the German labor market's response to the world recession of 2008/2009 has been exemplary. This has been due to favorable initial conditions and a helpful interplay between firms' behavior, shock absorbing institutions, and the consequent use of labor market instruments. There are several caveats to be mentioned, however. The German labor market will only get off lightly if in the end there is a quick recovery of the global business climate and if the crisis in demand does not turn into a structural one. Moreover, the unusual amount of labor hoarding will put some stress on the firms' financial situation and will in-

employer it does not reduce labor costs proportionately with working hours. Some of the fixed costs of labor remain with the employer. These costs are siginificant as shown by Bach et al. (2009).

crease unit labor costs. And the flip side of the employment stability is an extended period of jobless growth during the recovery.

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