

The response of German establishments to the 2008–2009 economic crisis

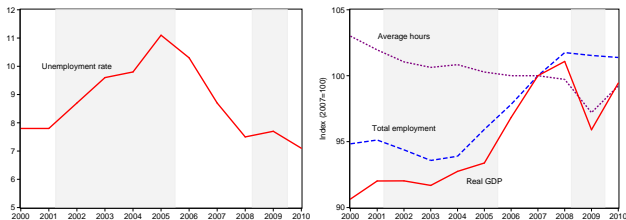
Lutz Bellmann Hans-Dieter Gerner Richard Upward



Report for OECD Employment Analysis and Policy Division

Introduction

- ▶ Resilience of the German labour market in the face of strong decline in GDP during 2008–2009



- ▶ Firms reacted on the intensive margin (hours per worker) rather than extensive margin (number of workers)
- ▶ A number of potential explanations for this phenomenon



Explanations for the German labour market “miracle”

- ▶ Falls in output can be accommodated via three channels:

$$\Delta \log Y = \Delta \log L + \Delta \log \frac{H}{L} + \Delta \log \frac{Y}{H}$$

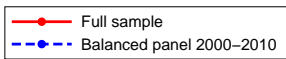
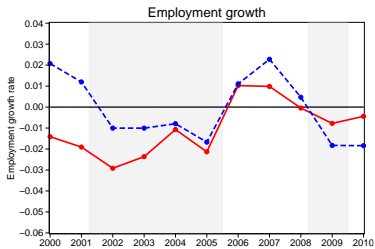
- ▶ Common theme: German firms reacted at the intensive margin rather than the extensive margin
- ▶ Why?

Explanations

1. The use of short-time work (*Kurzarbeit*, STW)  (Hijzen and Venn, 2011; Cahuc and Carcillo, 2011; Arpaia et al., 2010; Boeri and Bruecker, 2011)
2. Working-time accounts (*Arbeitszeitkonten*, WTA)  (Morley et al., 2009; Bogedan et al., 2009; Burda and Hunt, 2011; Boeri and Bruecker, 2011)
3. Bargaining arrangements and wage moderation (Ellguth and Kohaut, 2008; Bellmann and Gerner, forthcoming; Boysen-Hogrefe and Groll, 2010)
4. Recruitment difficulties (Klinger et al., 2011);
5. High-skilled manufacturing employment and firm-specific skills (Möller, 2010)
6. Weak expectations in the upturn of 2005–2008 (Burda and Hunt, 2011)
7. Expectations about the length of the crisis (Bohachova et al., 2011)

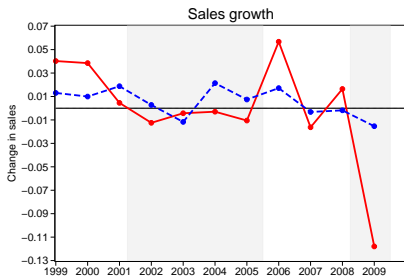
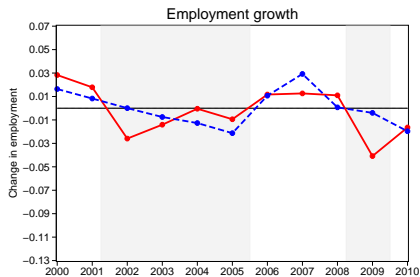
Data

- ▶ IAB establishment panel
- ▶ 4,000–10,000 plants in West Germany (since 1993) and 4,000–6,000 plants in East Germany (since 1996)
- ▶ Covers all sectors; sample currently covers 1% of plants and 7% of employment in Germany
- ▶ Our sample comprises all private-sector plants 1993–2009
- ▶ Information on employment, hiring and separations [▶ Questions](#)
- ▶ Establishments' experience of the crisis



Identifying “crisis” establishments

- ▶ Backward-looking measure: “Have you been affected negatively by the crisis in the last two years” (asked in 2010 survey)



—●— Establishments affected by crisis
- -●- - Other establishments

Job flows and worker flows

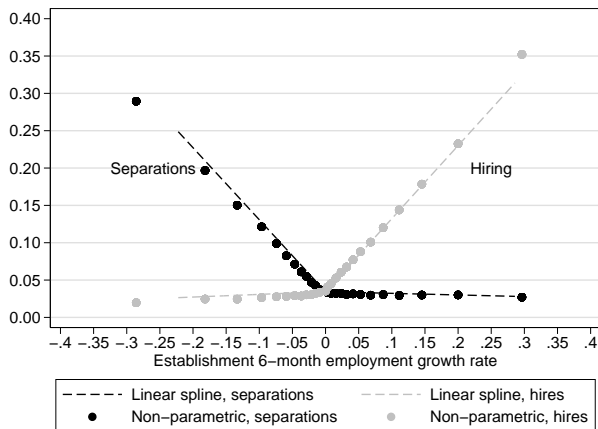


Figure. Relationship between employment growth rates in the first six months of t with worker flow rates over the same period. Sample is 40,757 establishments and 164,019 observations. Estimated from a within-establishment fixed-effect regression with bins for each quantile of employment growth.

Demand shocks and job flows

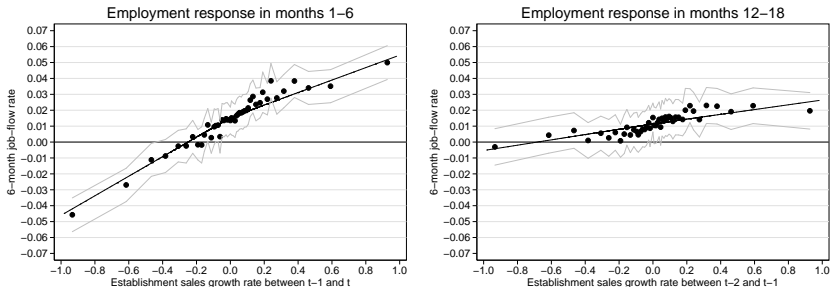


Figure. Relationship between sales growth rates between $t - 1$ and t and employment growth rates over the first six months of each year (top panel) and the first six months of the following year (bottom panel). Sample is 23,262 establishments and 96,353 establishment-years. Estimated from a within-establishment fixed-effect regression with (a) bins for each quantile of sales growth which contain approximately equal numbers of observations and (b) a linear spline.

- ▶ Estimate a linear spline:

$$\Delta n_{it} = \alpha^n + \beta^n(\Delta y_{it} \cdot 1(\Delta y_{it} > 0)) + \gamma^n(\Delta y_{it} \cdot 1(\Delta y_{it} < 0)) + a_i^n + b_t^n + \epsilon_{it}^n.$$

- ▶ If $\gamma^n = 1$ then demand shocks cause proportionate falls in employment (no labour hoarding)
- ▶ We estimate γ^n to be much less than one

	$\hat{\beta}^n$	$\hat{\gamma}^n$	N	N^*
(1) 6-month job flow rate	0.039*** (0.003)	0.062*** (0.003)	23,262	96,353
(2) 12-month job flow rate	0.101*** (0.005)	0.123*** (0.005)	23,261	96,352
(3) Additional controls	0.047*** (0.004)	0.076*** (0.004)	15,408	55,775
(4) 12-month job flow rate with additional controls	0.110*** (0.007)	0.148*** (0.007)	15,408	55,775
(5) 2008-09	0.042*** (0.010)	0.051*** (0.009)	8,737	14,567
(6) Crisis plants	0.038* (0.015)	0.059*** (0.011)	3,496	6,172
(7) Non-crisis plants	0.051*** (0.013)	0.021 (0.014)	4,072	7,216

Table. Short-run relationship between demand shocks and job flows

Demand shocks and worker flows

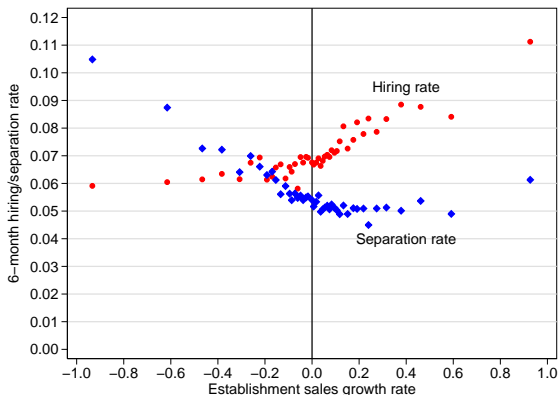


Figure. Relationship between sales growth rates between $t - 1$ and t and worker flows (hires and separations) over the first six months of each year. Sample is 23,262 establishments and 96,353 establishment-years. Estimated from a within-establishment fixed-effect regression with bins for each quantile of sales growth which contain approximately equal numbers of observations.

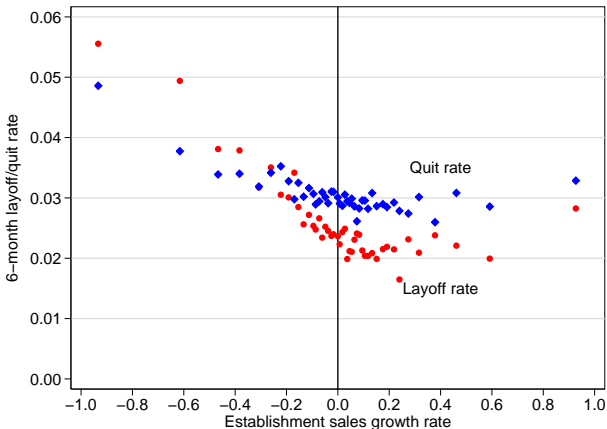
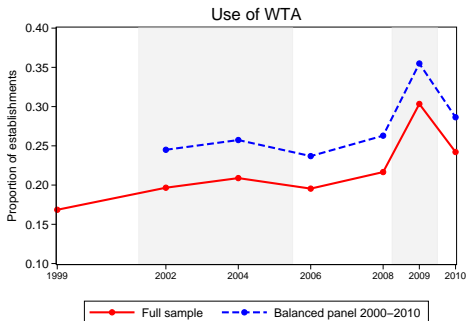
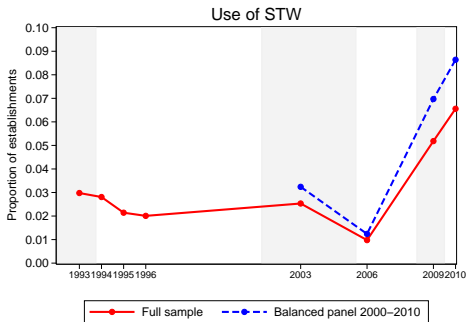


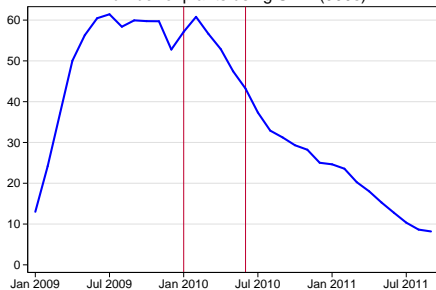
Figure. Relationship between sales growth rates between $t-1$ and t , layoff and quit rates over the first six months of each year. Sample is 23,262 establishments and 96,353 establishment-years. Estimated from a within-establishment fixed-effect regression with bins for each quantile of sales growth which contain approximately equal numbers of observations.

The use and effectiveness of firm-level policies

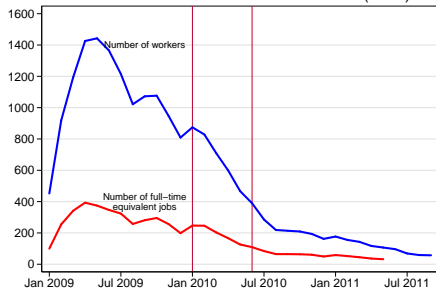
1. Did the establishment use Kurzarbeit in the first half of this year?
2. Did the establishment use working time accounts?
3. Company-level pacts on employment and competitiveness
4. Responses to the crisis (asked in 2010 only), for example:
 - ▶ Reduced overtime or surpluses on working time accounts
 - ▶ Short-time work
 - ▶ Other reductions in working time
 - ▶ Reduced hiring or delayed employment increases
 - ▶ Layoffs



Number of plants using STW (000s)



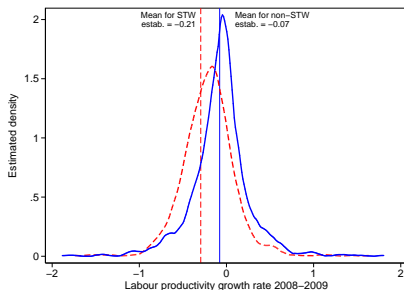
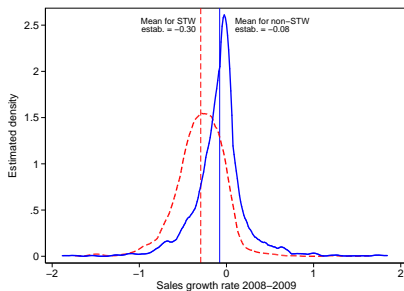
Number of workers on short-time work (000s)



	<i>Crisis</i>	<i>Non-crisis</i>	<i>Difference</i>
Establishment uses short-time work	0.14	0.03	0.11***
Proportion of employees covered	0.06	0.01	0.05***
Establishment uses WTA	0.39	0.33	0.06***
Proportion of employees covered	0.35	0.29	0.05**
Establishment uses PECs	0.03	0.01	0.02***
<i>Responses to 2010 question:</i>			
Reduced overtime or surpluses on working time accounts	0.32	0.09	0.23***
Reduced hiring or delayed employment increases	0.31	0.06	0.26***
Short time work	0.24	0.03	0.22***
Increased use of holidays	0.23	0.05	0.18***
Layoffs	0.15	0.05	0.09***
Other reductions in working time	0.12	0.02	0.10***
Reductions in temporary employment	0.11	0.01	0.09***
Increased use of further training	0.08	0.03	0.05***
Layoff trainees at end of training programme	0.04	0.01	0.03***

Table. Differences between crisis and non-crisis establishments in the use of policy measures. Crisis establishments are identified by the backward-looking self-reported crisis indicator: "Have you been affected negatively by the crisis in the last two years?", asked in 2010. Balanced panel 2000–2010, weighted by longitudinal weights.

Evaluating effectiveness of STW: the selection problem



- ▶ Our estimates of the employment response to sales shocks (γ^n) suggest that labour hoarding increases with the size of the shock
- ▶ STW establishments had larger falls in demand and hence larger falls in labour productivity
- ▶ **But** the difference in the fall in labour productivity is smaller than the difference in the fall in sales
- ▶ A more formal test uses DiD methodology:

$$\Delta n_{it} = \alpha_1^n + \beta_1^n y_{it}^+ + \gamma_1^n y_{it}^- + \beta_2^n (y_{it}^+ D_t^{09}) + \gamma_2^n (y_{it}^- D_t^{09}) + \beta_3^n (y_{it}^+ STW_i) + \gamma_3^n (y_{it}^- STW_i) + \beta_4^n (y_{it}^+ STW_i D_t^{09}) + \gamma_4^n (y_{it}^- STW_i D_t^{09}) + a_i^n + \epsilon_{it}^n. \quad (1)$$

- ▶ The parameters γ_1 to γ_4 identify the response to negative demand shocks.
- ▶ The treatment group: those establishments using STW in the first six months of 2009
- ▶ γ_4 is the DiD response

	<i>Job flows</i>	<i>Hires</i>	<i>Separations</i>	<i>Layoffs</i>
$\hat{\gamma}_1$	0.034*** (0.012)	0.009 (0.008)	-0.025*** (0.009)	-0.022*** (0.008)
$\hat{\gamma}_2$	0.006 (0.019)	0.011 (0.013)	0.005 (0.015)	0.013 (0.011)
$\hat{\gamma}_3$	-0.002 (0.039)	-0.021 (0.024)	-0.019 (0.029)	-0.029 (0.028)
$\hat{\gamma}_4$	0.090** (0.037)	0.038 (0.023)	-0.052* (0.030)	-0.036 (0.027)
Estab. with < 50% coverage:				
$\hat{\gamma}_4$	0.168*** (0.041)	0.065 (0.030)	-0.103*** (0.035)	-0.089*** (0.029)
Estab. with 50 – 75% coverage:				
$\hat{\gamma}_4$	0.162*** (0.053)	0.084* (0.042)	-0.078** (0.036)	-0.051 (0.032)
Estab. with > 75% coverage:				
$\hat{\gamma}_4$	-0.070 (0.077)	-0.047 (0.037)	0.023 (0.065)	0.035 (0.062)

Table. Difference-in-difference estimates of the impact of STW on job flows hires and separations, estimated from Equation (1). Sample is a balanced panel of 3,470 establishments observed over the period 2005–2009.

Why did STW plants have larger falls in employment for a given demand shock?

- ▶ In a direct sense, STW only protects the jobs of those actually on STW.
- ▶ Of the 1,202 establishments in the sample which used STW in 2009, 711 had job losses over that period
- ▶ But only 3 of these had job losses which were greater than the number of non-STW workers (measurement error?)
- ▶ Most establishments only used STW for a minority of their workforce: 75% of establishments have less than 25% of their jobs protected by STW programs.
- ▶ Employment reductions in the face of even large demand shocks are very rarely greater than 10%, so STW does not have a direct role in protecting these jobs
- ▶ Negative (unobserved) selection into treatment → IV estimates

WTA, PEC and labour shortages

- ▶ Did the use of any of these measures reduce the employment response to demand shocks (do they make γ smaller?)
- ▶ Simplified version of DiD model:

$$\Delta n_{it} = \alpha_1^n + \beta_1^n y_{it}^+ + \gamma_1^n y_{it}^- + \beta_2^n (y_{it}^+ \text{WTA}_i) + \gamma_2^n (y_{it}^- \text{WTA}_i) + a_i^n + \epsilon_{it}^n.$$

- ▶ The DiD model is less suitable because characteristics of the establishment are set before the 2008-09 crisis began

	<i>Job flows</i> $\hat{\gamma}_2^n$	<i>Hires</i> $\hat{\gamma}_2^h$	<i>Separations</i> $\hat{\gamma}_2^s$	<i>Layoffs</i> $\hat{\gamma}_2^l$
Used WTA in 2008	0.037** (0.017)	0.010 (0.015)	-0.027** (0.012)	-0.026*** (0.009)
Used WTA in 2008: <80% of workers covered	0.006 (0.026)	0.016 (0.022)	0.010 (0.018)	0.006 (0.014)
80-100% of workers covered	0.065** (0.029)	0.014 (0.025)	-0.051** (0.021)	-0.043** (0.016)
All workers covered	0.049** (0.021)	0.008 (0.018)	-0.041** (0.015)	-0.039** (0.012)
Utilised a PEC in 2008	-0.046 (0.031)	-0.026 (0.027)	0.021 (0.022)	0.017 (0.017)
Experienced labour shortages in 2008	0.042** (0.017)	0.025* (0.014)	-0.017 (0.012)	-0.019* (0.009)

Table. OLS estimates of the impact of WTA, PEC and labour shortages on job and worker flows

The pattern of recovery: preliminary evidence

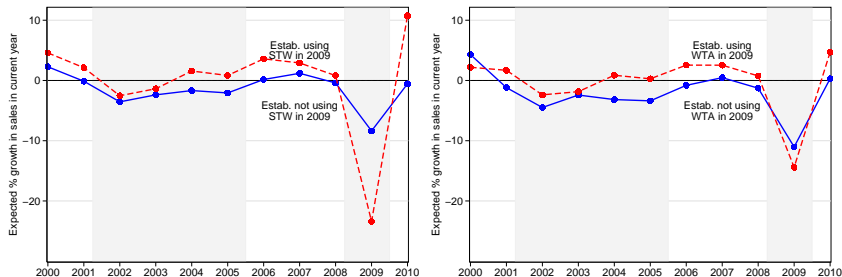


Figure. Expected change in sales 2000–2010, for establishments which reported being affected by the crisis, split between use of STW in 2008 and those that did not (left-hand panel) and by use of WTA in 2008 (right-hand panel).

	<i>Did not use STW in 2009</i>	<i>Used STW in 2009</i>	<i>Raw difference</i>	<i>OLS difference</i>
(a) Staff level too high	0.049	0.108	0.060***	0.025**
(b) High staff turnover	0.041	0.061	0.020***	0.009
(c) Difficulties in hiring qualified workers	0.351	0.523	0.172***	0.015
(d) Staff shortages	0.079	0.115	0.036***	0.027**
(e) High burden from wage costs	0.250	0.360	0.110***	0.039**
(f) Other personnel problems	0.033	0.049	0.016***	0.001

	<i>Did not use WTA in 2009</i>	<i>Used WTA in 2009</i>	<i>Raw difference</i>	<i>OLS difference</i>
(a) Staff level too high	0.041	0.073	0.032***	0.005
(b) High staff turnover	0.030	0.057	0.027***	0.004
(c) Difficulties in hiring qualified workers	0.270	0.486	0.216***	0.050***
(d) Staff shortages	0.061	0.108	0.046***	0.005
(e) High burden from wage costs	0.220	0.313	0.093***	0.039***
(f) Other personnel problems	0.030	0.041	0.011***	0.010**

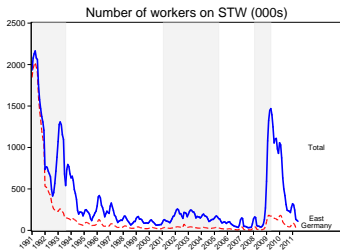
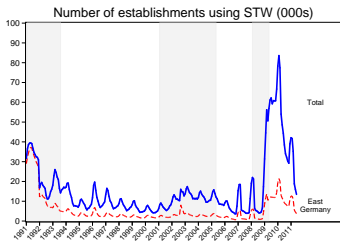
Table. Probability of human resource problems in future years. Dependent variable is the answer to the question "What kind of problems with human resources management do you expect for your establishment/office during the next two years?". OLS difference include controls for establishment size, sector, location.

Conclusions

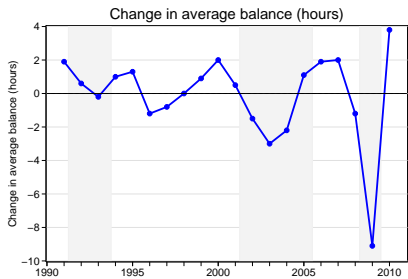
1. The IAB establishment panel captures the key features of the crisis: a significant fall in sales and a much smaller fall in employment
2. Establishments affected by the crisis are heavily concentrated in manufacturing and tend to be more technologically sophisticated
3. This crisis is quite independent of the earlier downturn
4. When establishments shrink they do so by laying off workers
5. **But** the short-run relationship between output shocks and employment response is very small, leading to reductions in labour productivity (per worker)
6. The size of this response is quite stable over time (no evidence that it was smaller in 2008-09)
7. We cannot tell from this data if falls in labour productivity per worker is due to hours adjustment or genuine labour hoarding

Conclusions (cont.)

8. The three most common (self-reported) responses to the crisis are reductions in overtime, reductions in hiring and STW
9. But the evidence from the reported employment, hiring and layoff tells a different story
10. STW establishments had larger falls in employment for a given output shock, of which 57% came from increased separations
11. IV estimates did not yield robust conclusions
12. Reductions in WTA surpluses were too small to account for significant differences in employment responses
13. Rebound from the crisis appears quite strong



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Hiring and separation measures in the IAB panel

1. Did you recruit staff in the first half of <year>?
2. Please indicate the total number of workers recruited.
3. Did you register any staff leaving your establishment/office in the first half of <year>?
4. Please indicate the total number of workers who left your establishment.

Respondents are also asked to distribute the total number of employees who left among the following categories:

1. Resignation on the part of the employee
2. Dismissal on the part of the employer
3. Leaving after termination of the in-company training
4. Expiration of a temporary employment contract
5. Termination of a contract by mutual agreement
6. Transfer to another organization within the establishment
7. Retirement after reaching the stipulated pension age
8. Retirement before reaching the stipulated pensionable age
9. Occupational invalidity/ disability
10. Other