

Foreign-owned Plants and Job Security

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Introduction

- ▶ Increasing importance of foreign-owned firms in OECD labour markets.
- ▶ In 2004, about 12% of West German manufacturing workers were employed by foreign-owned establishments.
- ▶ Foreign-owned establishments (may) affect the labor market of the host country in various dimensions:
 - ▶ Higher wages, but partly because they are larger and more productive.
 - ▶ Higher investment in human capital, but again due to pre-existing differences.
 - ▶ Productivity spillovers to domestically-owned firms, but evidence is mixed.
 - ▶ Insecurity of employment?

Introduction

- ▶ Insecurity of employment? Impact is ambiguous:
 - ▶ Foreign-owned plants are less rooted, can more easily shift production and are thus more likely to exit the market.
 - ▶ By contrast, foreign-owned plants may avoid shutdown due to better characteristics (access to resources, size, productivity).
 - ▶ Analogous arguments for labour adjustment.
 - ▶ However, separation rates for (surviving) foreign-owned plants may be lower if they have a higher level of technology.
- ▶ We use linked employer-employee data for Germany (LIAB) to examine
 - ▶ whether foreign-owned establishments are more likely to exit the market.
 - ▶ whether workers in (surviving) foreign-owned establishments have higher separation rates.
- ▶ Overall, results do not support the claim that foreign-owned companies are significantly changing the stability of employment.

Previous Evidence

Study	Country	Results (controlling for observables)
Görg & Strobl (2003)	Ireland, Manufacturing	Higher exit rates of foreign-owned plants.
Bernard & Sjöholm (2003)	Indonesia	Higher exit-rates of foreign-owned plants.
Bernard & Jensen (2007)	U.S.	Plants belonging to multinationals have higher exit rates.
Alvarez & Görg (2007)	Chile	Domestically market oriented multinationals are more footloose, foreign-owned plants which export do not have higher exit rates.

The LIAB Data

- ▶ Linked employer-employee data of the Institute for Employment Research (IAB) of the German Federal Employment Agency.
- ▶ IAB Establishment Panel:
 - ▶ Annual panel since 1993 (1996) in Western (Eastern) Germany.
 - ▶ Currently 9,856 plants in Western Germany and 5,593 plants in Eastern Germany
 - ▶ Covers about 1% of all plants and 7% of all employment in Germany.
- ▶ Employment statistics register (*Beschäftigtenstatistik*):
 - ▶ Covers all employees or trainees subject to social security.
 - ▶ Covers about 80% of all employment.
- ▶ The two data-sets are linked using a plant identification number.

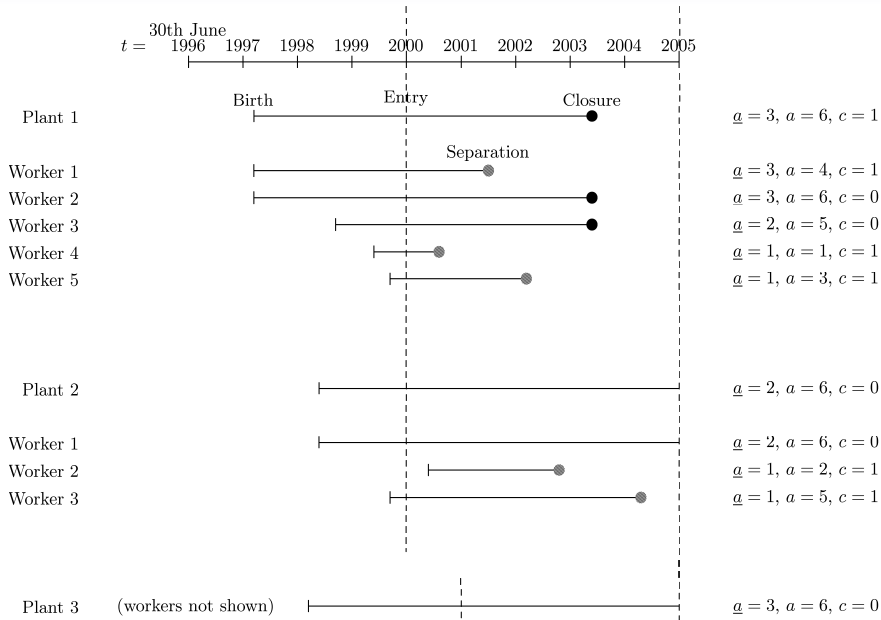
The LIAB Data

- ▶ Information on ownership:
 - ▶ Available for all plants only for the years 2000 and 2004.
 - ▶ Between 2001–2003, only plants joining the panel provide information on ownership.
 - ▶ “Is the establishment mainly or solely in:”
 1. West German ownership
 2. East German ownership
 3. Foreign ownership
 4. Public ownership
 5. No majority ownership.

The Regression Sample

- ▶ Private sector of Western Germany.
- ▶ Plants which are either observed on 30/06/2000 or which enter the Establishment Panel between 2001 and 2004.
- ▶ Plants are followed until they close down or until they are right-censored (30/06/2005).
- ▶ Covariates cannot be observed for all years.
- ▶ All employees in the employment register who were employed by the surveyed plants on June 30th 2000, 2001, ..., 2004.
- ▶ 8,192 domestic and 755 foreign-owned plants.
- ▶ 1,067,691 workers employed in domestic plants and 261,814 workers employed in foreign-owned plants.

Data Structure



Regression Sample: Plant entry and exit

<i>Year</i>	<i>No. of plants J_t on 30 June</i>	<i>Plants exiting $EX_{t,t+1}$</i>	<i>Plants entering $EN_{t,t+1}$</i>
2000	4,209	129	1,547
2001	5,627	238	1,247
2002	6,636	323	1,164
2003	7,477	351	780
2004	7,906	358	—
total	31,855	1,399	4,738

- ▶ Standard stock-flow identity: $J_t = J_{t-1} - EX_{t-1,t} + EN_{t-1,t}$
- ▶ Exits are genuine plant closings (no attrition).
- ▶ Entering plants are left-truncated.
- ▶ Raw hazard to closure of 0.0439 (1,399 divided by 31,855).

Regression sample: Worker entry and exit

Year	No. of workers N_t on 30 June	No. of workers exiting $ex_{t,t+1}$, because		No. of workers joining $en_{t,t+1}$, because	
		firm closes	worker separates	firm joins	worker hired
2000	570,949	2,987	70,845	176,474	90,535
2001	764,126	10,678	105,131	93,867	84,248
2002	826,432	10,107	92,311	49,645	79,787
2003	853,446	8,966	92,927	110,542	73,458
2004	935,553	10,422	113,535		
total	3,950,506	43,160	474,749	430,528	328,028

- ▶ Standard stock-flow identity: $N_t = N_{t-1} - ex_{t-1,t} + en_{t-1,t}$.
- ▶ 8.3% of exits are because of plant closure.
- ▶ Thus the raw worker hazard is a competing risks:
 - ▶ the raw worker hazard to separating is 0.1202 (474,749/3,950,506).
 - ▶ the raw worker hazard to plant closure is 0.0109 (43,160/3,014,953).
- ▶ The worker hiring rate is 0.1088 (328,028/3,014,953).

Estimation methods

- ▶ The hazard function h_{ja} for plant j is defined as the probability that a plant closes at some point between age (elapsed duration) $a - 1$ and a , conditional on having survived to age $a - 1$.

$$h_{ja} = \Pr(a - 1 < A_j \leq a \mid A_j > a - 1) \quad a = 1, 2, \dots$$

where A_j is the latent age of plant j .

- ▶ The likelihood contribution for plant j is

$$L_j = \frac{h_{ja_j}^{c_j} (1 - h_{ja_j})^{(1-c_j)} \prod_{k=1}^{a_j-1} (1 - h_{jk})}{S_j(\underline{a}_j - 1)}$$

where $c_j = 1$ if the plant closes down and zero otherwise and \underline{a}_j is the age at which plant j enters the data.

Estimation methods

- ▶ Survival up to age $\underline{a}_j - 1$ is given by

$$S_j(\underline{a}_j - 1) = \prod_{k=1}^{\underline{a}_j - 1} (1 - h_{jk})$$

- ▶ which leads to the convenient cancelling result (Jenkins, 2005):

$$L_j = h_{j\underline{a}_j}^{c_j} (1 - h_{j\underline{a}_j})^{(1-c_j)} \prod_{k=\underline{a}_j}^{\underline{a}_j - 1} (1 - h_{jk})$$

- ▶ and so the log-likelihood becomes

$$\log L_j = \sum_{k=\underline{a}_j}^{\underline{a}_j} [y_{jk} \log h_{jk} + (1 - y_{jk}) \log(1 - h_{jk})].$$

Estimation methods

- ▶ where the precise form of the hazard is given by the complementary log-log link function:

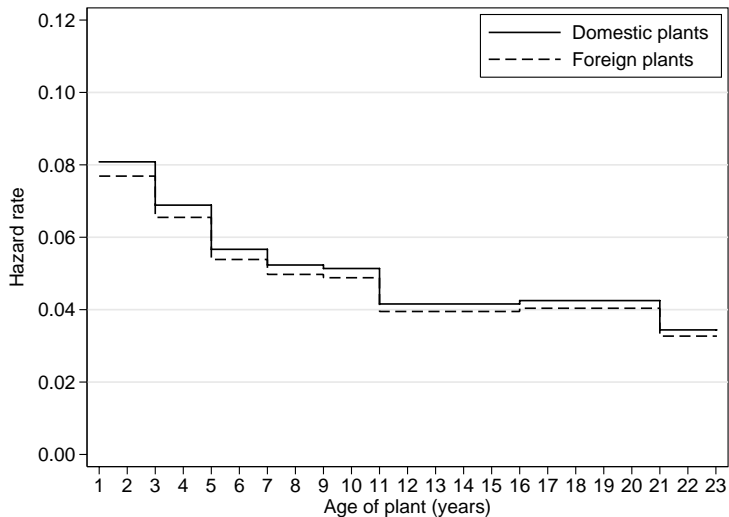
$$h_{jk} = 1 - \exp(-\exp(\mathbf{x}'_j\boldsymbol{\beta} + \gamma_k)) \quad k = \underline{a}_j, \dots, \underline{a}_k.$$

- ▶ Unobserved heterogeneity can be included by adding a term to the hazard function and integrating it out.
- ▶ Analogues model for worker hazards, except that elapsed and completed durations are measured by tenure rather than by plant age.
- ▶ Worker separation is defined to occur when worker i leaves plant j , but plant j does not close.

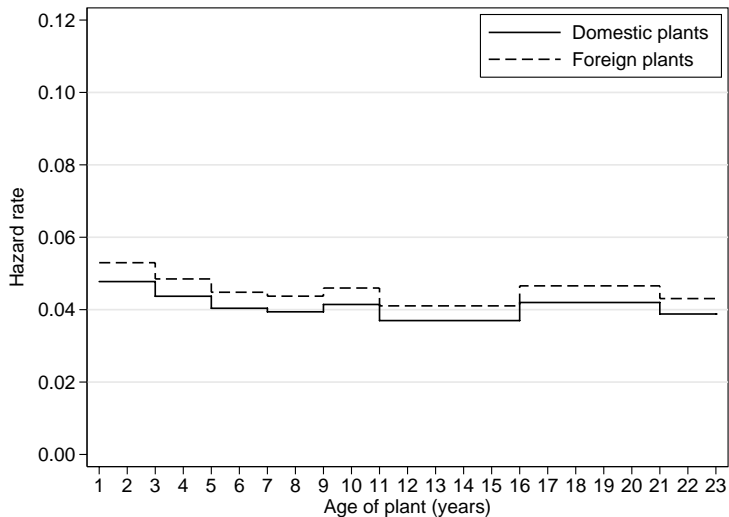
Results: Control variables in plant-level hazard models

- ▶ Hazard is strongly declining in plant size.
- ▶ Existence of a works council increases the exit probability.
- ▶ Firm-level bargaining and a good profit situation increases the surviving rate.
- ▶ Worker characteristics are generally less important, but a significant negative relationship between average tenure and plant closure.

Results: Raw plant hazard



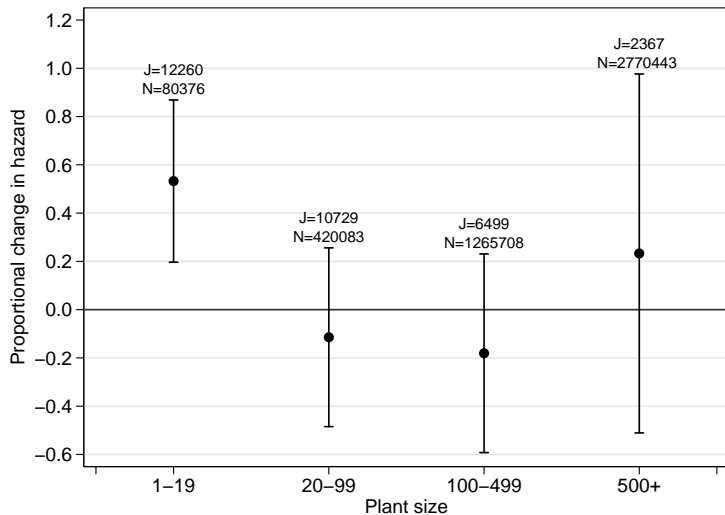
Results: Plant hazard conditional on x_j



Results: Summary of plant-level hazard models

	<i>Coeff.</i>	<i>Std. Err.</i>
Raw effect	-0.052	(0.097)
Including \mathbf{x}_j	0.106	(0.106)
Interaction model:		
Foreign ownership	0.344	(0.138)
Exporting	-0.010	(0.076)
Foreign owned and exporting	-0.485	(0.201)

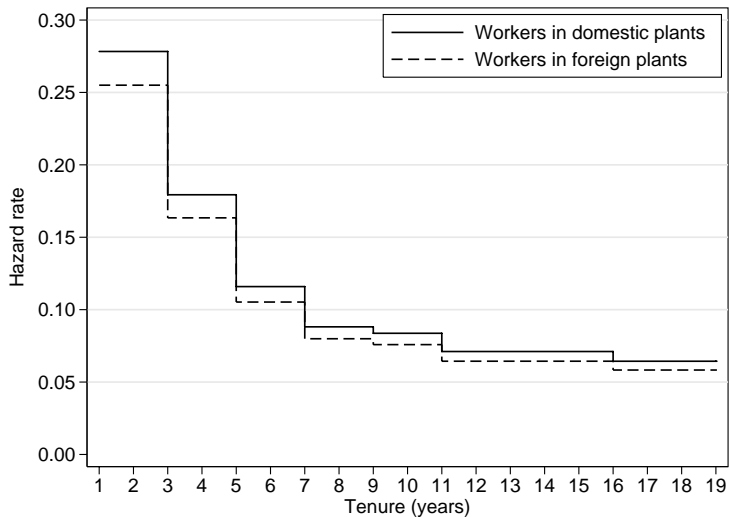
The effect of foreign ownership on plant closure by size



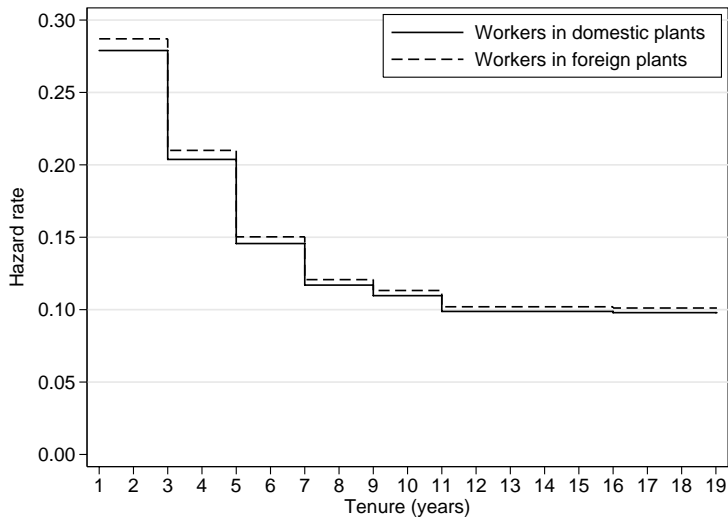
Results: Control variables in worker-level hazard models

- ▶ Very small and very large plants appear to have the lowest separation rates.
- ▶ Separations are decreasing in profitability.
- ▶ Plants which export, which have a works council and which are not part of a larger firm have a lower separation rate.
- ▶ The separation rate is lowest for young plants and plants aged over 20.

Results: Raw worker hazard to separation



Results: Raw worker hazard to separation conditional on x_i



Results: Summary of worker-level hazard models

	<i>Coeff.</i>	<i>Std. Err.</i>
Raw effect	-0.102	(0.004)
Including x_i	0.036	(0.004)
Interaction model:		
Foreign ownership	0.110	(0.007)
Exporting	-0.117	(0.004)
Foreign owned and exporting	-0.117	(0.008)

Conclusions

- ▶ Overall, foreign ownership seems to have little effect on plant hazard (to closure) and worker hazard (to separation).
- ▶ However, foreign-owned plants which are small and which do not export their output have significantly higher closure rates and worker separation rates.
- ▶ Including unobserved heterogeneity does not change the results.
- ▶ It will be interesting to look at the effect of takeover on job stability (although the number of observed takeovers is fairly small).
- ▶ Foreign-owned plants may also differ in their hirings behavior.

Daten-Wunschzettel

1. Being part of a multinational company may be the more important variable, but unfortunately this is not available in our data-set.
2. The country of ownership is also of great interest.
3. Ownership information on all plants would (*inter alia*) allow to investigate spillovers.

Hazard based models

	Plant Hazard		Worker Hazard	
	Coeff.	Std. Err.	Coeff.	Std. Err.
Plant is foreign-owned	0.106	(0.106)	0.034	(0.004) **
Works council	0.354	(0.086)**	-0.100	(0.005) **
Plant exports	-0.063	(0.073)	-0.142	(0.004) **
Plant is not part of a larger firm	0.012	(0.073)	-0.045	(0.003) **
Sectoral bargaining agreement	-0.041	(0.067)	0.011	(0.005) **
Firm-level bargaining agreement	-0.395	(0.156)**	0.006	(0.007)
Investment (relative to median) ^a	0.637	(1.677)	-0.246	(0.008) **
5-9 workers	-0.344	(0.096)**	0.056	(0.034) *
10-19 workers	-0.478	(0.100)**	0.111	(0.031) **
20-49 workers	-0.551	(0.101)**	0.078	(0.030) **
50-99 workers	-0.742	(0.126)**	0.154	(0.030) **
100-199 workers	-1.103	(0.151)**	0.169	(0.030) **
200-499 workers	-1.259	(0.165)**	0.163	(0.030) **
500-999 workers	-1.539	(0.249)**	0.088	(0.030) **
≥ 1000 workers	-2.155	(0.367)**	0.046	(0.030)
Plant size bigger than initial size	-0.347	(0.065)**		
Profits "good"	-0.083	(0.147)	-0.010	(0.006) *
Profits "satisfactory"	0.207	(0.144)	0.069	(0.006) **
Profits "just sufficient"	0.544	(0.146)**	0.178	(0.006) **
Profits "bad"	1.039	(0.148)**	0.193	(0.007) **
Firm age (years)			0.037	(0.001) **
Firm age ²			-0.117	(0.004) **

Continued

Continued: Hazard based models

	Plant Hazard		Worker Hazard	
	Coeff.	Std. Err.	Coeff.	Std. Err.
Local unemployment rate	0.028	(0.010)**		
Industry concentration index	-1.557	(3.147)		
Industry employment growth rate	1.445	(0.615)**		
(Proportion of) non-German worker(s)	0.036	(0.172)	0.066	(0.005) **
(Proportion of) female(s)	-0.151	(0.113)	-0.002	(0.004)
log average wage	-2.843	(0.911)**	-0.151	(0.013) **
log (average) wage ²	0.394	(0.115)**	-0.048	(0.002) **
(Average) age	0.026	(0.167)	0.228	(0.004) **
(Average) age ² /100	-0.096	(0.407)	-0.826	(0.011) **
(Average) age ³ /10000	0.146	(0.323)	0.871	(0.009) **
(Proportion) apprenticeship, no Abitur	-0.185	(0.155)	-0.008	(0.006)
(Proportion) no apprenticeship, Abitur	-0.816	(0.825)	-0.113	(0.006) **
(Proportion) apprenticeship Abitur	-0.803	(0.335)**	0.220	(0.009) **
(Proportion) technical college degree	-0.498	(0.422)	0.017	(0.009) *
(Proportion) university education	0.037	(0.292)	0.059	(0.009) **
(Proportion) education unknown	-0.145	(0.158)	0.154	(0.009) **
Average tenure	-0.125	(0.023)**		
Average tenure ² /100	0.415	(0.101)**		

Regressions also include dummies for location, industry, year and occupation.

^aCoefficients are $\times 10^{-4}$.