

Do foreign workers reduce trade barriers?

Microeconomic evidence using linked employer-employee data

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Introduction

- ▶ Importance of informal trade barriers
 - ▶ Information, business contacts, language, contract enforcement, preferences (Anderson & van Wincoop 2004)
- ▶ Basic hypothesis: foreign employees reduce trade costs
- ▶ We estimate the relationship between worker nationality and firm exporting behaviour.
 - ▶ using linked employer-employee data for Germany
 - ▶ three methods to deal with potential endogeneity of the workforce
- ▶ Stronger tests of the hypothesis:
 1. Workers' occupations
 2. Destination-specific effects
 3. Strength of ties to home country
 4. Strength of effect for manufactured goods and services
- ▶ In almost every case, the results are consistent with the hypothesis

Related literature

- ▶ Considerable evidence from gravity models of a link between trade flows and stocks of migrants.
 - ▶ Only small number of migrants required for export effects (Gould 1994)
 - ▶ Common language effects (Frankel 1997)
 - ▶ Wide variation in estimated elasticities (Wagner et al. 2002)
 - ▶ Import vs. export effects (Head & Ries 1998; Girma & Yu 2002)
- ▶ Microeconomic literature on individual firms' exporting behaviour
 - ▶ Interaction of firm-level heterogeneity and sunk costs (reviewed in Greenaway & Kneller 2007)
 - ▶ Less is known about how trade barriers affect individual firms
 - ▶ Relationship between characteristics of individual workers and exporting behaviour (Molina & Muendler 2009; Mion & Opromolla 2011)

Plant-level 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 private-sector plants in industries which export (i.e. we exclude non-tradeable sectors)
- ▶ Exports are recorded as the proportion of sales in the previous calendar year

Worker-level data

- ▶ *Beschäftigtenstatistik*: employment statistics register of the German Federal Office of Labour
- ▶ Covers all workers and trainees registered by the social insurance system
- ▶ Establishment identifier which can be used to link to the plant-level data
- ▶ Our sample comprises all workers who are employed by the surveyed plants on 30th June, excluding apprentices and part-time workers
- ▶ We use worker-level information from two years before the plant interview date
- ▶ Nationality of workers

Most common nationalities working in sample plants

	%
Germany	92.03
Turkey	2.57
Yugoslavia	1.20
Italy	0.84
Greece	0.49
France	0.35
Austria	0.30
Poland	0.24
Portugal	0.21
Spain	0.19
Netherlands	0.13
United Kingdom	0.12

Plant-level descriptive statistics

	Zero exports	Exports <10%	Exports 10–50%	Exports >50%
No. of establishment-years	56,845	9,210	13,393	6,263
Average sales (€m)	2.4	6.9	13.6	26.0
% of sales exported	0.0	5.6	28.7	76.3
Average employment	8.0	22.3	47.7	76.3
% Foreign-owned	1.5	3.8	7.8	16.0
% with “good” profits	29.7	29.8	33.6	41.2
% in manufacturing	19.8	33.7	41.2	39.7

Worker-level descriptive statistics

	Exports	Zero	<10%	10–50%	>50%
Average daily wage (€)	90.0	116.5	114.3	116.9	
% No apprenticeship or Abitur	8.3	11.5	13.8	12.8	
% Apprenticeship or Abitur	86.7	81.3	76.2	74.5	
% University degree	5.0	7.1	10.0	12.6	
% Foreign nationals:					
All	4.0	4.8	6.7	11.1	
Basic manual	8.5	11.2	13.3	17.9	
Qualified manual	4.4	5.1	5.7	6.1	
Engineers and technicians	2.8	2.6	2.7	6.3	
Basic service	6.8	8.8	8.2	15.5	
Qualified service	4.7	4.2	1.4	4.3	
Semi-professional	3.1	5.5	7.06	4.7	
Professional	1.9	2.5	2.8	2.8	
Basic business	3.1	3.1	2.2	6.1	
Qualified business	1.8	1.4	3.9	6.5	
Manager	1.4	2.4	3.8	8.3	

Methods

- ▶ The proportion of foreign workers in a plant may not be exogenous w.r.t. exporting propensity
 - ▶ Factors which are correlated with transaction costs and hiring decisions (e.g. location)
 - ▶ Reverse causality
 - ▶ Non-random hiring of foreign workers w.r.t. transaction costs
- ▶ We can control for observable factors (like location) using a simple linear probability model:

$$\Pr(\text{exporter}_{it}) = \beta_0 + \beta_F \bar{F}_{it-1} + \beta_x \mathbf{x}_{it} + u_{it} \quad (1)$$

where \bar{F}_{it-1} is the proportion of foreign workers in firm i at time $t - 1$.

Methods cont'd

- ▶ What about correlation between unobservable export propensity u_{jt} and $\bar{F}_{j,t-1}$?
- ▶ Fixed effects estimation
- ▶ Proposed instrumental variable: the proportion of foreign workers in the local labour market

$$z_{jt} = \frac{\left(\sum_j^{J_r} \sum_{i=1}^{N_{jt}} F_i \right) - \sum_{i=1}^{N_{jt}} F_i}{\left(\sum_j^{J_r} N_{jt} \right) - N_{jt}} \quad (2)$$

where J_r is the number of firms in the region r where firm i is located.

Basic OLS results: estimates of export propensity

	(1)	(2)	(3)	(4)
Share of foreign workers (\bar{F}_{jt})	0.619 (0.043)	0.088 (0.027)	0.085 (0.026)	0.091 (0.027)
Foreign-owned plant		0.136 (0.011)	0.133 (0.011)	0.133 (0.011)
Border distance (in 100 km)				-0.018 (0.007)
Border <i>Kreis</i>				0.055 (0.010)
East Germany				-0.118 (0.006)
Region		16	443	
Year (1993–2008)		15	15	15
Urbanisation		9	9	9
Industry		10	10	10
Employment size cat.		9	9	9
Skill		2	2	2
Occupation		8	8	8
R^2	0.020	0.354	0.377	0.353

79,815 observations; 19,648 plants

Specific effect for managers

	(5)	(6)
\bar{F}_{jt} (All workers)	0.078 (0.027)	0.083 (0.027)
\bar{F}_{jt} (Managers)	0.149 (0.035)	
Dummy: any foreign manager		0.044 (0.013)
Foreign-owned plant	0.130 (0.011)	0.129 (0.011)
Border distance (100 km)	-0.018 (0.007)	-0.018 (0.007)
Border <i>Kreis</i>	0.055 (0.010)	0.055 (0.010)
East Germany	-0.118 (0.006)	-0.117 (0.006)
R^2	0.353	0.353

79,815 observations; 19,648 plants; regressions also include dummy variables for year, urbanisation, industry, employment size, skill and occupation.

Export region effects

	(7)	(8)	(9)	(10)
	Exports to all destinations (yes = 1)	Exports to EMU (yes = 1)	Exports to all destinations (yes = 1)	Exports to NMS (yes = 1)
\bar{F}_{jt} (All countries)	0.082 (0.027)	0.009 (0.031)	0.067 (0.036)	-0.051 (0.030)
\bar{F}_{jt} (EMU countries)		0.233 (0.061)		0.017 (0.047)
\bar{F}_{jt} (NMS countries)		-0.042 (0.081)		0.104 (0.070)
R^2	0.343	0.333	0.338	0.236
Years	1998–2007	1998–2007	2004–2007	2004–2007
Number of observations	65,313	65,313	28,737	28,737
Number of plants	17,920	17,920	11,190	11,190

Regressions also include the border distance (in 100km) as well as dummy variables for foreign plant ownership, border Kreis, Eastern Germany, year, urbanisation, industry, employment size, skill and occupation.

Recent migration effects

1. Specific effects for *Non-Gastarbeiter*

- ▶ Share of all foreign workers has only an effect for *Non-Gastarbeiter*: 0.009 vs. 0.183
- ▶ Share of foreign managers larger for *Non-Gastarbeiter*: 0.325 vs. 0.137

2. Splitting between East and West Germany

- ▶ Very similar parameter estimates for share of foreign workers

3. Splitting the proportion of foreigners by time since first appearance in the BS:

- ▶ < 5 , $5 - 10$, $11 - 15$, > 15 years
- ▶ Coefficient for of all foreigners is largest for those who appeared in the BS more than 15 years ago
- ▶ Coefficients for foreign managers do not vary

⇒ Ambiguous evidence on the relative strength of recent migration effects

Manufactured vs. service exports

	All foreign workers		Excluding <i>Gastarbeiter</i>	
	Manuf.	Services	Manuf.	Services
Share of foreign workers	-0.029 (0.049)	0.108 (0.029)	-0.016 (0.088)	0.288 (0.051)
R^2	0.387	0.118	0.387	0.120
Number of obs.	36,967	42,848	36,967	42,848
Number of plants	8,289	11,359	8,289	11,359

Regressions also include the border distance (in 100km) as well as dummy variables for foreign plant ownership, border Kreis, Eastern Germany, year, urbanisation, industry, employment size, skill and occupation.

Lagged and fixed effects estimates

	Lagged exports	Fixed effects	
	All	Manuf.	Services
Share of foreign workers	0.029 (0.012)	0.016 (0.081)	0.055 (0.023)
export_{t-1}	0.720 (0.005)		
R^2	0.700	0.007	0.004
Number of observations	57,969	36,967	42,848
Number of plants	13,944	8,289	11,359

Regressions also include the border distance (in 100km) as well as dummy variables for foreign plant ownership, border Kreis, Eastern Germany, year, urbanisation, industry, employment size, skill and occupation.

Credibility of fixed effects estimates

- ▶ As opposed to OLS, FE can control for the correlations of unobserved transaction costs and the share of foreigners (no problem if the firm has self-selected into a particular region).
- ▶ However:
 - ▶ Not much time-variation, neither in the share of foreigners nor in the export propensity.
 - ▶ Clear evidence of measurement error in the data, which increases in importance for FE.
 - ▶ FE assumes an immediate impact of foreign workers.
 - ▶ It is questionable that the effect is symmetric.
 - ▶ If a German person leaves, the within-share of foreign workers rises!

2SLS estimates

	\bar{F}_{jt}	Exporter
Share of foreign workers in the region z_{jt}	0.809 (0.017)	
Share of foreign workers in the plant \bar{F}_{jt}		0.455 (0.132)
R^2	0.252	0.347
Number of observations		79,815
Number of plants		19,648

Regressions also include the border distance (in 100km) as well as dummy variables for foreign plant ownership, border Kreis, Eastern Germany, year, urbanisation, industry, employment size, skill and occupation.

Discussion of the IV estimates

- ▶ The coefficient on z_{jt} is an indication of how much firms hire from the local labour market.
 - ▶ It is actually quite close to one.
- ▶ But that is precisely why instrumenting the share of foreign managers does not work:
 - ▶ The first stage coefficient is much lower and imprecisely estimated.
- ▶ We reject exogeneity of \bar{F}_{it-1} (p-value 0.004).
- ▶ We cannot include *Kreis* dummies, because there is not enough time-series variation within *Kreises* and years.
- ▶ But it is important to include local labour market controls (e.g. distance to the border); without this the IV is potentially endogenous.

Discussion of the IV estimates

- ▶ Why is the IV-estimate always larger than the OLS estimate?
 - ▶ LATE
 - ▶ OLS has been downward biased due to measurement error.
- ▶ Could the instrument be endogenous? Only ...
 - ▶ if we have not controlled for location properly (locations with a high proportion of foreigners may also be a locations with low trade costs).
 - ▶ if export-oriented firms have chosen to set-up plants in regions with high migrant densities.
 - ▶ if there are regional clusters of exporting plants which *ceteris paribus* attract foreigners.

Summary

- ▶ There is a strong correlation between exporting behaviour and worker nationality.
- ▶ This is partly due to the foreign ownership of a plant as well as the industrial, occupational and geographical location of foreign workers.
- ▶ But even *ceteris paribus*, we find a significant association.
- ▶ The relationship is larger for:
 - ▶ managers
 - ▶ workers from non-Gastarbeiter countries
 - ▶ exports to regions from which foreign workers originate
 - ▶ non-manufactured exports.
- ▶ Fixed-effects estimates are still significant, but smaller.
- ▶ IV estimates are positive significant, but poorly determined.
- ▶ ⇒ Evidence that informal trade barriers matter!

Occupation group	Most common occupational titles
Basic manual occupations	Chemical plant operatives (9%) Metal workers (9%) Assistants (8%) Goods examiners, sorters (6%) Electrical parts assemblers (6%) Packagers, goods receivers, dispatchers (5%) Other assemblers (5%) Plastics processors (4%)
Qualified manual occupations	Electrical fitters, mechanics (13%) Engine fitters (12%) Plant fitters (10%) Turners (7%) Toolmakers (6%) Motor vehicle repairers (5%)
Engineers and technicians	Other technicians (18%) Mechanical engineers (13%) Electrical engineers (11%) Foremen, master mechanics (10%)
Basic service occupations	Stores and transport workers (25%) Motor vehicle drivers (20%) Warehouse managers, warehousemen (19%)
Qualified service occupations	Railway drivers (28%) Railway controllers and conductors (21%) Firefighters (18%) Hairdressers (9%)
Associate professional	Journalists (41%) Librarians, archivists (14%) Technical and vocational instructors (11%) Other teachers (9%)
Professional	Social scientists, statisticians (41%) Visual and commercial artists (14%) Legal representatives and advisors (11%) Interior designers (10%) Pharmacists (5%)
Basic business occupations	Salespersons (37%) Commercial agents (22%) Typists (22%) Office auxiliary workers (10%)
Qualified business occupations	Office specialists (67%) Data processing specialists (13%) Wholesale and retail trade buyers (12%) Accountants (4%)
Managers	Entrepreneurs, managing directors, divisional managers (67%) Management consultants, organisers (16%) Chartered accountants (9%)

Table: Occupational classifications

Occupation-specific effects

\bar{F}_{jt} (Basic manual occupations)	0.094 (0.028)
\bar{F}_{jt} (Qualified manual occupations)	0.018 (0.034)
\bar{F}_{jt} (Engineers and technicians)	0.160 (0.054)
\bar{F}_{jt} (Basic service occupations)	0.045 (0.027)
\bar{F}_{jt} (Qualified service occupations)	-0.045 (0.048)
\bar{F}_{jt} (Associate professional occupations)	0.189 (0.068)
\bar{F}_{jt} (Professional occupations)	0.079 (0.054)
\bar{F}_{jt} (Basic business occupations)	0.0062 (0.035)
\bar{F}_{jt} (Qualified business occupations)	0.165 (0.049)
\bar{F}_{jt} (Managers)	0.138 (0.036)
R^2	0.355
Number of obs.	79,815
Number of plants	19,684

2SLS destination-specific estimates

	Exports to EMU			Exports to NMS		
	\bar{F}_{jt} (EMU)	\bar{F}_{jt} (NMS)	Exporter	\bar{F}_{jt} (EMU)	\bar{F}_{jt} (NMS)	Exporter
z_{jt} (EMU countries)	0.853 (0.030)	0.030 (0.010)		0.794 (0.047)	0.038 (0.018)	
z_{jt} (NMS countries)	-0.086 (0.081)	0.265 (0.074)		0.070 (0.138)	0.273 (0.103)	
F_{jt} (EMU countries)			0.741 (0.352)			-0.461 (0.427)
F_{jt} (NMS countries)			-2.231 (4.519)			0.094 (5.145)
R^2	0.130	0.017	0.307	0.116	0.026	0.229
Number of observations		66,349			28,774	
Number of plants		18,703			11,225	

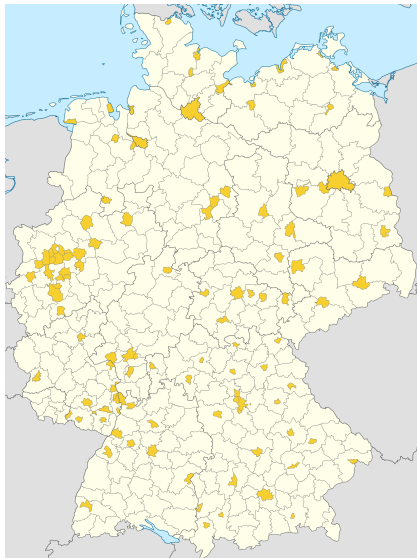


Figure: German *Landkreise*