Main Tables and Additional Tables accompanying The Effect of FDI on Job Separation

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Abstract

A novel linked employer-employee data set documents that expanding multinational enterprises retain more domestic jobs than competitors without foreign expansions. In contrast to prior research, a propensity score estimator allows enterprise performance to vary with foreign direct investment (FDI) and shows that the foreign expansion itself is the dominant explanatory factor for reduced worker separation rates. Bounding, concomitant variable tests, and robustness checks rule out competing hypotheses. The finding is consistent with the idea that, given global factor price differences, a prevention of enterprises from outward FDI would lead to more domestic worker separations. FDI raises domestic-worker retention more pronouncedly among highly educated workers and for expansions into distant locations.

Keywords: Multinational enterprises; international investment; demand for labor; worker layoffs; linked employer-employee data

JEL Classification: F21, F23, J23, J63

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Table 1: DESCRIPTIVE STATISTICS: MNE AND NON-MNE SUBSAMPLES

	MNE subsample		non-MNE subsample	
	mean	s.d.	mean	s.d.
Outcome: Worker separation				
Displaced between t and $t+1$	.14	.34	.18	.38
Treatment: FDI exposure and expansion				
Total employment abroad in 1,000s in $(t-1)$	3.99	6.10	.00	.00
Indic.: Foreign employment change from $t-1$ to t	.64	.48	.02	.15
Foreign employment growth from $t-1$ to t in 1,000s	.65	2.99	.009	.17
Worker-level variables				
Annual wage in EUR	35,317.8	11,611.6	26,847.8	13,872.2
Age	41.01	10.44	40.69	11.77
Female	.23	.42	.33	.47
White-collar worker	.44	.50	.38	.49
Upper-secondary schooling or more	.16	.37	.08	.28
Current apprentice	.02	.15	.04	.19
Part-time employed	.05	.21	.12	.33
Establishment-level variables				
Employment at domestic establishment	2,683.8	7,935.3	926.9	3,153.3
Indic.: Establishment in East Germany	.09	.29	.10	.30
Number of observations	38,046		55,101	

Sources: Linked MIDI and BA data, $t = 2000$. 5% random sample of workers in FDI exposed and non-FDI exposed manufacturing establishments.

Table 2: Specifications 1 and 2 of the propensity score

	Specification 1		Specification 2	
	Odds Ratio	Std. Err.	Odds Ratio	Std. Err.
	(1)	(2)	(3)	(4)
Age	.994	.006	1.005	.006
Age-squared	1.003	.007	.994	.007
ln(*wage*)	4.980	.149***	1.039	.040
Female	1.242	.027***	1.027	.024
In marginal employment	4.967	.433***	1.215	.124
In other type of employment	1.838	.154***	1.095	.098
White-collar worker	.748	.015***	1.016	.023
Upper-secondary schooling or more	1.097	.028***	.969	.027
Current apprentice	2.584	.260***	.972	.107
Part-time employed	1.549	.067***	1.005	.048
Share with upper sec. school or more			1.216	.132*
Average age			.983	.003***
Share in apprenticeship			.033	.016***
Share in marginal employment			.464	.098***
Share in other types of employment			1.395	.600
Share of females			1.353	.100***
Share in part-time employment			.454	.074***
Average yearly wage in EUR			1.001	.00008***
Share of white-collar workers			.548	.045***
Plant-fixed wage component			2.743	.491***
Const.	1.60e-06	3.93e-07***	.056	.020***
Obs.	93,147		93,147	
Pseudo R^2	.069		.135	

Standard errors: * significance at ten, ** five, *** one percent.
Sources: Linked MIDI and BA data, $t = 2000$. 5% random sample of workers in FDI exposed and non-FDI exposed manufacturing establishments.

Table 3: Covariate Balancing, Before and After Matching

	No. of treated	No. of controls	Share of treated before	Logit ps. R^2 before	Logit ps. R^2 after	Median bias before	Median bias after	Share of treated lost
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Specification 2: Worker and plant characteristics								
WW	25,640	67,500	.275	.131	.035	18.306	2.637	.00004
APD	14,643	78,497	.157	.195	.051	17.481	3.049	.002
CEE	18,914	74,226	.203	.147	.052	13.570	5.180	.0005
EMU	21,759	71,381	.234	.174	.055	19.583	3.412	.000
OIN	17,974	75,166	.193	.240	.055	16.878	5.652	.000
Specification 3: Spec. 2 plus sector-level trade measures								
WW	25,640	67,500	.275	.159	.031	18.742	3.682	.0002
APD	14,643	78,497	.157	.231	.021	25.274	2.935	.066
CEE	18,914	74,226	.203	.179	.059	18.648	6.692	.002
EMU	21,759	71,381	.234	.205	.036	20.926	3.272	.0002
OIN	17,974	75,166	.193	.280	.058	25.014	5.912	.000
Specification 4: Spec. 3 plus lagged wage and lagged plant size								
WW	25,640	67,500	.275	.162	.037	19.262	3.608	.0001
APD	14,643	78,497	.157	.232	.067	25.580	3.092	.003
CEE	18,914	74,226	.203	.180	.064	20.115	4.766	.002
EMU	21,759	71,381	.234	.205	.038	22.389	2.922	.0002
OIN	17,974	75,166	.193	.284	.075	26.703	6.327	.001

Sources: Linked MIDI and BA data, $t = 2000$. 5% random sample of workers in FDI-exposed and non-FDI exposed manufacturing plants. Locations (see Table 14): WW (World-Wide abroad), APD (Asia-Pacific Developing countries), CEE (Central and Eastern European countries), EMU (European Monetary Union member countries), and OIN (Overseas Industrialized countries).

Table 4: Average Treatment Effect on the Treated

	OLS	ATT		
		Spec. 2 worker & plant predictors	Spec. 3 *adding* sector predictors to (2)	Spec. 4 *adding* lagged predictors to (3)
	(1)	(2)	(3)	(4)
WW	-.045 (.003)***	-.021 (.010)**	-.014 (.012)	-.026 (.009)***
APD	-.043 (.003)***	-.007 (.018)	-.019 (.007)***	-.069 (.018)***
CEE	-.045 (.003)***	-.027 (.012)**	-.019 (.013)	-.068 (.017)***
EMU	-.043 (.003)***	-.031 (.009)***	-.022 (.009)**	-.007 (.011)
OIN	-.035 (.003)***	-.039 (.012)***	-.002 (.013)	-.056 (.018)***

Standard errors (in parentheses): * significance at ten, ** five, *** one percent.
Sources: Linked MIDI and BA data, $t = 2000$. 5% random sample of workers in FDI exposed and non-FDI exposed manufacturing establishments.

Table 5: ATT, High and Low Education Levels

	OLS	ATT		
		Spec. 2 worker & plant predictors	Spec. 3 *adding* sector predictors to (2)	Spec. 4 *adding* lagged predictors to (3)
	(1)	(2)	(3)	(4)
WORKERS WITH UPPER-SECONDARY EDUCATION OR MORE				
WW	-.045 (.007)***	-.029 (.032)	-.071 (.016)***	-.119 (.033)***
APD	-.034 (.008)***	-.076 (.020)***	.002 (.043)	-.008 (.046)
CEE	-.048 (.008)***	-.118 (.040)***	-.144 (.040)***	-.057 (.041)
EMU	-.029 (.008)***	-.068 (.026)**	-.095 (.031)***	-.004 (.034)
OIN	-.025 (.008)***	-.046 (.027)*	-.122 (.041)***	-.018 (.041)
WORKERS WITH LESS THAN UPPER-SECONDARY EDUCATION				
WW	-.045 (.003)***	-.019 (.006)***	-.028 (.006)***	-.027 (.010)***
APD	-.045 (.004)***	-.060 (.018)***	-.023 (.018)	-.021 (.018)
CEE	-.046 (.003)***	-.019 (.011)*	-.029 (.016)*	-.027 (.013)**
EMU	-.047 (.003)***	-.023 (.008)***	-.006 (.011)	-.013 (.009)
OIN	-.038 (.003)***	-.028 (.010)***	-.039 (.011)***	-.041 (.016)***

Standard errors (in parentheses): * significance at ten, ** five, *** one percent.
Sources: Linked MIDI and BA data, $t = 2000$. 5% random sample of workers in FDI exposed and non-FDI exposed manufacturing establishments. Number of observations: 10,652 workers with upper secondary education and 82,495 workers with less than upper secondary education.

Table 6: ATT, White-collar and Blue-collar Workers

	OLS	ATT		
		Spec. 2 worker & plant predictors	Spec. 3 *adding* sector predictors to (2)	Spec. 4 *adding* lagged predictors to (3)
	(1)	(2)	(3)	(4)
		WHITE-COLLAR WORKERS		
WW	-.045 (.004)***	-.041 (.019)**	-.051 (.019)***	-.022 (.024)
APD	-.041 (.005)***	-.042 (.021)*	-.018 (.027)	-.012 (.043)
CEE	-.049 (.005)***	-.022 (.024)	-.023 (.034)	-.026 (.025)
EMU	-.036 (.004)***	-.026 (.019)	-.021 (.020)	-.011 (.016)
OIN	-.036 (.005)***	-.017 (.026)	-.020 (.019)	-.023 (.022)
		BLUE-COLLAR WORKERS		
WW	-.045 (.004)***	-.016 (.006)***	-.035 (.006)***	-.023 (.006)***
APD	-.045 (.005)***	-.008 (.009)	-.021 (.009)**	-.022 (.009)**
CEE	-.044 (.004)***	-.017 (.007)**	-.011 (.008)	-.009 (.008)
EMU	-.051 (.004)***	-.044 (.009)***	-.037 (.008)***	-.037 (.008)***
OIN	-.036 (.004)***	-.010 (.011)	.004 (.012)	.007 (.013)

Standard errors (in parentheses): * significance at ten, ** five, *** one percent.
Sources: Linked MIDI and BA data, $t = 2000$. 5% random sample of workers in FDI exposed and non-FDI exposed manufacturing establishments. Number of observations: 37,981 white-collar and 55,166 blue-collar workers.

Table 7: Concomitant Variables

	Replication regression		Regression with controls	
	ATT	Std.Err.	ATT	Std.Err.
	(1)	(2)	(3)	(4)
WW treatment effect	-.026	.004***	-.021	.004***
Change of intermediate-goods imports 2000-01 from region				
APD			-.015	.020
CEE			.010	.056
EMU			.001	.014
OIN			.025	.067
Change of final-goods imports 2000-01 from region				
APD			-.002	.003
CEE			-.002	.007
EMU			-.005	.013
OIN			-.013	.018
Change of exports 2000-01 to region				
APD			-.007	.017
CEE			.008	.060
EMU			.0002	.012
OIN			-.004	.013
Obs.	36,140	36,140	36,140	36,140

Standard errors (in parentheses): * significance at ten, ** five, *** one percent. *Sources*: Linked MIDI and BA data, $t = 2000$. 5% random sample of workers in FDI exposed and non-FDI exposed manufacturing establishments. Regression on matched sample, including a constant. Changes in imports and exports at *NACE* 2-digit sector level.

Table 8: ATT under WW Control Group

	OLS	ATT		
		Spec. 2 worker & plant predictors	Spec. 3 *adding* sector predictors to (2)	Spec. 4 *adding* lagged predictors to (3)
	(1)	(2)	(3)	(4)
APD	-.050 (.003)***	-.035 (.022)	-.020 (.022)	-.014 (.019)
CEE	-.050 (.003)***	-.031 (.015)**	-.030 (.014)**	-.048 (.015)***
EMU	-.048 (.003)***	-.066 (.015)***	-.017 (.019)	-.019 (.012)
OIN	-.040 (.003)***	-.042 (.018)**	-.017 (.019)	-.018 (.021)

Standard errors (in parentheses): * significance at ten, ** five, *** one percent.
Sources: Linked MIDI and BA data, $t = 2000$. 5% random sample of workers in FDI exposed and non-FDI exposed manufacturing establishments.

Table 9: ATT with Foreign Turnover as Treatment

	OLS	ATT		
		Spec. 2 worker & plant predictors	Spec. 3 *adding* sector predictors to (2)	Spec. 4 *adding* lagged predictors to (3)
	(1)	(2)	(3)	(4)
WW	-.042 (.003)***	-.067 (.011)***	-.065 (.012)***	-.038 (.011)***
APD	-.047 (.003)***	-.061 (.032)*	-.040 (.032)	-.049 (.030)
CEE	-.039 (.003)***	-.053 (.016)***	-.020 (.018)	-.016 (.017)
EMU	-.035 (.003)***	-.016 (.009)*	-.022 (.009)**	-.013 (.009)
OIN	-.038 (.003)***	-.139 (.022)***	-.075 (.020)***	-.074 (.018)***

Standard errors (in parentheses): * significance at ten, ** five, *** one percent.
Sources: Linked MIDI and BA data, $t = 2000$. 5% random sample of workers in FDI exposed and non-FDI exposed manufacturing establishments.

Table 10: ATT for Varying Employment Expansion Thresholds

	OLS	Std. Err.	ATT	Std. Err.
	(1)	(2)	(3)	(4)
Treatment: Employment expansion > 1 percent				
WW	-.044	.003***	-.021	.014
APD	-.043	.003***	-.017	.023
CEE	-.046	.003***	-.067	.017***
EMU	-.042	.003***	-.031	.012**
OIN	-.035	.003***	-.014	.012
Treatment: Employment expansion > 5 percent				
WW	-.043	.003***	-.024	.005***
APD	-.043	.003***	-.011	.018
CEE	-.046	.003***	-.043	.019**
EMU	-.041	.003***	-.040	.012***
OIN	-.035	.003***	-.068	.015***
Treatment: Employment expansion > 10 percent				
WW	-.045	.003***	-.018	.014
APD	-.040	.004***	-.019	.026
CEE	-.046	.003***	-.024	.018
EMU	-.047	.003***	-.018	.023
OIN	-.025	.003***	-.013	.007*

Results for specification 4.
Sources: Linked MIDI and BA data, $t = 2000$. 5% random sample of workers in FDI exposed and non-FDI exposed manufacturing establishments.

Table 11: Ownership Inference

Affiliate-parent pair	Iteration (Length of Walk) 1	2	3	5	9	100
201-101	.9	.90	.900	.92250	.92306	.92308
201-202	.1					
201-301		.05		.00125		
202-101			.225	.22500	.23077	.23077
202-201		.25		.00625		
202-301	.5					
301-101		.45	.450	.46125	.46153	.46154
301-201	.5					
301-202		.05		.00125		
909-101		.54	.540	.64350	.64609	.64615
909-201	.6		.100		.00006	
909-202	.4	.06		.00150		
909-301		.20	.030	.00500	.00001	

Table 12: Raw separation probabilities by sector and region of FDI exposure

	WW	APD	CEE	EMU	ODV	OIN	OWE	RCA
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
plants without FDI exposure in region l								
food and tobacco	.217	.207	.210	.215	.208	.208	.209	.207
textile, apparel, leather	.203	.201	.197	.199	.193	.196	.194	.191
wood and paper products	.210	.189	.192	.200	.191	.195	.196	.191
chemicals	.136	.139	.135	.140	.142	.140	.141	.142
non-metallic products	.154	.152	.149	.153	.151	.152	.151	.146
metallic products	.172	.162	.160	.170	.162	.162	.167	.156
non-electrical machinery	.138	.136	.138	.135	.137	.136	.133	.132
electronics and optic. equipmt.	.168	.182	.179	.171	.176	.176	.174	.170
transportation equipm.	.166	.146	.144	.153	.150	.153	.143	.120
other manufacturing	.219	.206	.208	.217	.206	.208	.213	.205
plants with FDI exposure relative to plants without FDI exposure								
food and tobacco	-.066	-.048	-.058	-.065	-.046	-.042	-.044	-.047
textile, apparel, leather	-.037	-.102	-.039	-.028	-.027	-.037	-.033	-.056
wood and paper products	-.071	-.026	-.031	-.053	-.046	-.061	-.051	-.062
chemicals	.039	.046	.058	.035	.035	.043	.036	.082
non-metallic products	-.020	-.031	-.008	-.021	-.022	-.026	-.017	-.001
metallic products	-.056	-.060	-.039	-.056	-.058	-.046	-.060	-.049
non-electrical machinery	-.001	.004	-.003	.005	.000	.004	.012	.034
electronics and optic. equipmt.	.005	-.043	-.030	-.002	-.022	-.016	-.014	.001
transportation equipm.	-.070	-.061	-.048	-.058	-.063	-.065	-.048	-.021
other manufacturing	-.067	-.046	-.043	-.075	-.043	-.049	-.069	-.044

Sources: Linked MIDI and BA data, $t = 2000$. 5% random sample of workers in FDI-exposed and non-FDI exposed manufacturing plants. Locations (see Table 14): WW (World-Wide abroad), APD (Asia-Pacific Developing countries), CEE (Central and Eastern European countries), EMU (European Monetary Union member countries), ODV (Other Developing countries), OIN (Overseas Industrialized countries), OWE (Other Western European countries), and RCA (Russia and Central Asian countries).

Table 13: Raw separation probabilities by sector and region of FDI expansion

	WW	APD	CEE	EMU	ODV	OIN	OWE	RCA
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
plants without FDI exposure in region l								
food and tobacco	.211	.207	.207	.210	.206	.207	.208	.208
textile, apparel, leather	.198	.195	.193	.197	.189	.193	.197	.190
wood and paper products	.195	.189	.193	.192	.190	.188	.192	.188
chemicals	.160	.144	.152	.153	.149	.151	.138	.148
non-metallic products	.152	.147	.146	.150	.153	.151	.149	.147
metallic products	.164	.159	.162	.169	.153	.155	.160	.155
non-electrical machinery	.138	.136	.137	.133	.138	.133	.130	.139
electronics and optic. equipmt.	.176	.181	.179	.177	.176	.174	.177	.170
transportation equipm.	.147	.134	.149	.145	.130	.139	.129	.116
other manufacturing	.204	.207	.201	.201	.204	.204	.208	.206
plants with FDI exposure relative to plants without FDI exposure								
food and tobacco	-.053	-.047	-.038	-.054	-.062	-.041	-.045	-.069
textile, apparel, leather	-.035	-.084	-.019	-.045	.012	-.035	-.097	.060
wood and paper products	-.054	-.035	-.052	-.045	-.066	-.040	-.044	-.062
chemicals	-.021	.036	.002	-.002	.020	.007	.067	.029
non-metallic products	-.025	-.009	-.001	-.017	-.044	-.041	-.017	-.012
metallic products	-.052	-.066	-.056	-.074	-.030	-.030	-.052	-.054
non-electrical machinery	-.003	.003	-.002	.014	-.006	.014	.034	-.022
electronics and optic. equipmt.	-.022	-.048	-.041	-.024	-.036	-.014	-.059	.003
transportation equipm.	-.049	-.052	-.060	-.054	-.048	-.046	-.031	.003
other manufacturing	-.022	-.058	.012	.010	-.031	-.061	-.062	-.090

Sources: Linked MIDI and BA data, $t = 2000$. 5% random sample of workers in FDI-exposed and non-FDI exposed manufacturing plants. Locations (see Table 14): WW (World-Wide abroad), APD (Asia-Pacific Developing countries), CEE (Central and Eastern European countries), EMU (European Monetary Union member countries), ODV (Other Developing countries), OIN (Overseas Industrialized countries), OWE (Other Western European countries), and RCA (Russia and Central Asian countries).

Table 14: Regions

Region codes	Description
Focal Regions	
APD	Asia-Pacific Developing countries including China, Mongolia and North Korea; including Hong Kong, South Korea, Singapore, Taiwan; including dominions of OIN and EMU countries; excluding South Asia (India, Pakistan)
CEE	Central and Eastern European countries including EU accession countries and candidates excluding Russia and Central Asian economies
EMU	European Monetary Union participants 12 EU members that participate in Euro in 2001 excluding Denmark, Sweden, the UK and CEE countries (non-participating EMU signatories)
OIN	Overseas Industrialized counries including Canada, Japan, USA, Australia, New Zealand
Other Regions	
ODV	Other Developing countries including South Asia (India/Pakistan), Africa, Latin America, the Middle East; and EMU, OIN, OWE dominions
OWE	Other Western European countries including Denmark, Norway, Sweden, Switzerland, the UK
RCA	Russia and Central Asian economies;

Table 15: Specifications 3 and 4 of the propensity score

	Specification 3		Specification 4	
	Odds Ratio	Std. Err.	Odds Ratio	Std. Err.
	(1)	(2)	(3)	(4)
Age	1.010	.006	1.011	.006 *
Age-squared	.988	.007 *	.987	.007 *
ln($wage$)	1.052	.041	1.073	.059
Female	1.021	.025	1.022	.025
In marginal employment	1.221	.126 *	1.237	.128 **
In other type of employment	1.042	.095	1.024	.095
White-collar worker	1.014	.023	.995	.023
Upper-secondary schooling or more	.962	.027	.958	.027
Current apprentice	1.058	.119	1.086	.123
Part-time employed	1.033	.050	1.029	.050
Share with upper sec. school or more	1.326	.152 ***	1.525	.175 ***
Average age	.989	.003 ***	.986	.003 ***
Share in apprenticeship	.006	.003	.005	.002 ***
Share in marginal employment	.406	.086 ***	.379	.081 ***
Share in other types of employment	9.823	4.239 ***	12.946	5.540 ***
Share of females	1.397	.114 ***	1.340	.109 ***
Share in part-time employment	.450	.073 ***	.536	.087 ***
Average yearly wage in EUR	1.001	.00008 ***	1.001	.00008 ***
Share of white-collar workers	.926	.077	.877	.074
Plant-fixed wage component	2.634	.472 ***	2.560	.460 ***
Const.	.050	.020 ***	.050	.020 ***
Sector-level imports and exports	yes		yes	
Lagged plant size and wage	no		yes	
Obs.	93,147		93,147	
Pseudo R^2	.163		.165	

Standard errors: * significance at ten, ** five, *** one percent.
Sources: Linked MIDI and BA data, $t = 2000$. 5% random sample of workers in FDI exposed and non-FDI exposed manufacturing establishments.