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Migration and Export Behaviour of Central European Firms

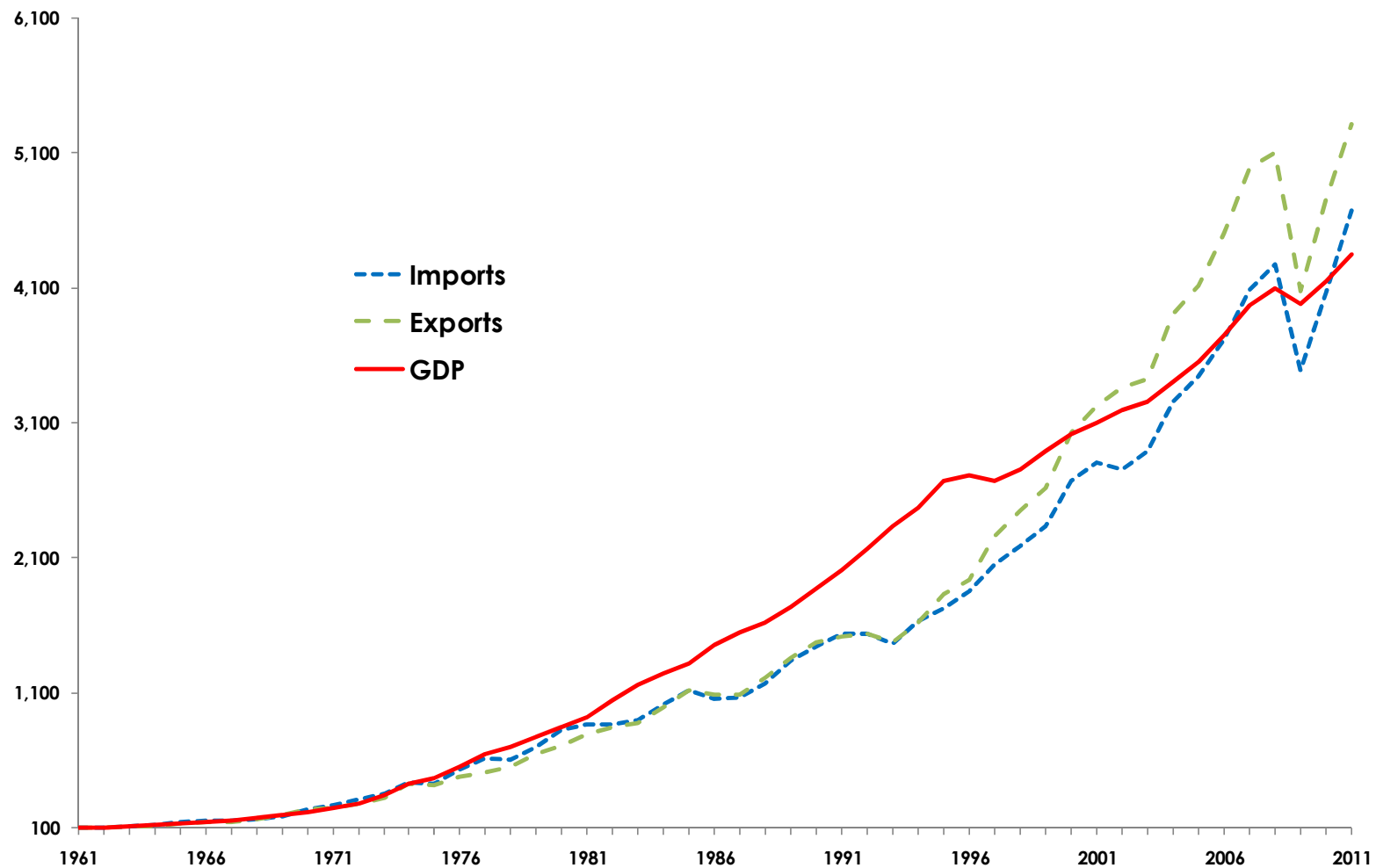
Dieter Pennerstorfer

Workshop on Effects of International Linkages and Trade, Dec. 7th 2012

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- Motivation (Economic Policy)
 - Motivation (Academic)
 - Theoretical Background
 - Data
 - A Note on Methodology
 - Results
 - Conclusion
 - Additional Slides
 - Econometric Issues, Related Literature, Identification Strategy, Alternative Model Specifications

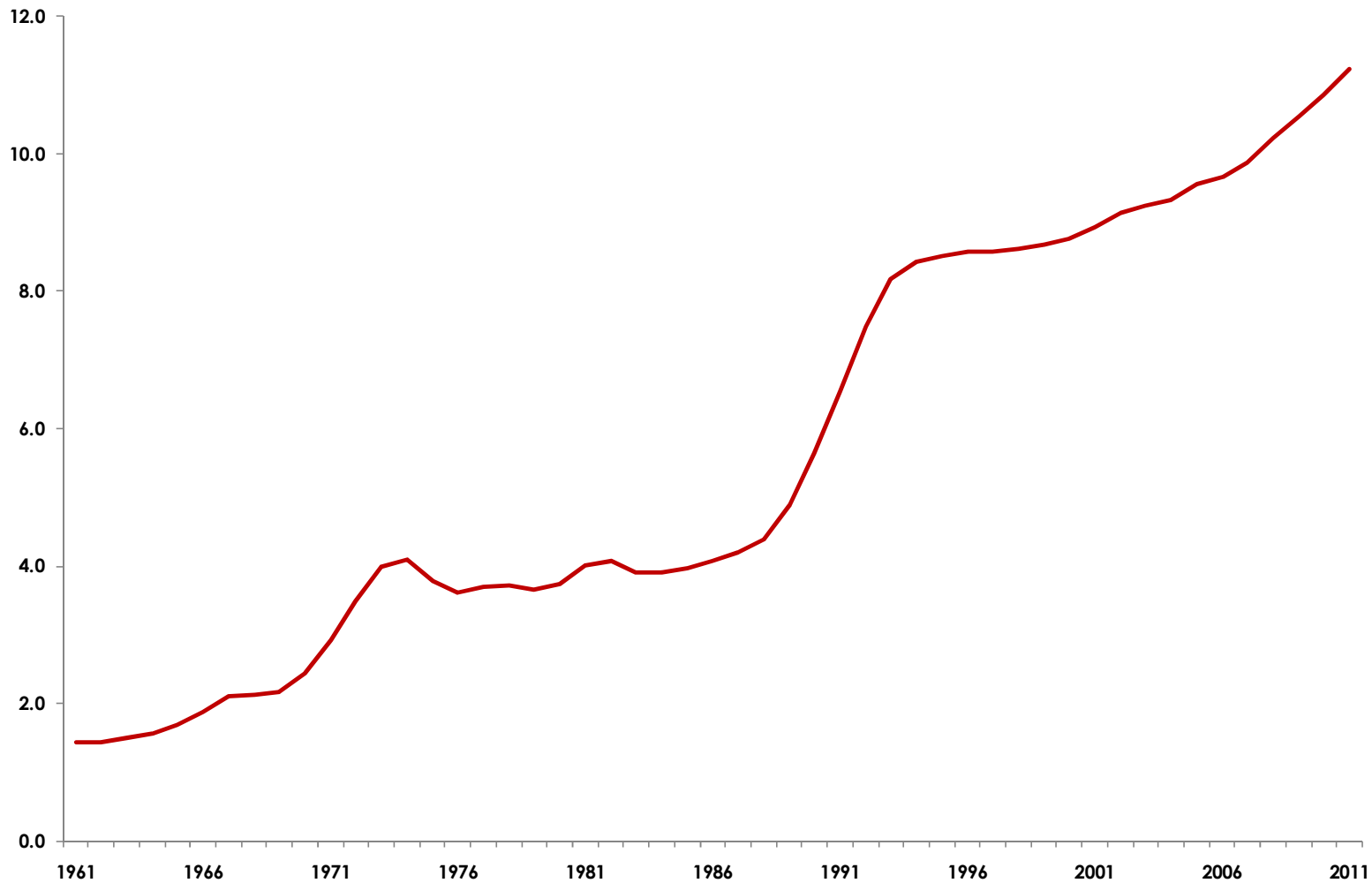
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- Increase in Economic Integration
 - Globally:
 - Reduction of Transport Costs
 - Reduction of Tariffs and Trade Barriers
 - Central Europe:
 - 1989: Fall of Iron Curtain
 - 2004/07: Enlargement of European Union (NMS-10+2)
 - 2011: End of “Transition Period” (free movements of workers and services)
 - Convergence (high growth rates)
 - Immigration to Austria and other “old” Member States

Year 1961=100



Foreigners in Austria (based on Nationality)

Share of foreigners among total population, in %



Source: Statistik Austria, WIFO-Calculations.

$$\begin{aligned}
P_{ij}Q_{ij} = & Y_i^{\frac{\sigma-1}{\gamma+\sigma}} \times Y_j^{\frac{\gamma+1}{\gamma+\sigma}} \times C_{ij}^{-\frac{\sigma(\gamma+1)}{\gamma+\sigma}} \times T_{ij}^{-\frac{\sigma(\gamma+1)}{\gamma+\sigma}} \times Z_{ij}^{-\frac{\sigma(\gamma+1)}{\gamma+\sigma}} \\
& \times \left(\sum_{k \neq i} P_{ik}^{*1+\gamma} \right)^{-\frac{(\sigma-1)(\gamma-\eta)}{(1+\gamma)(\gamma+\sigma)}} \times \left(\sum_{k \neq j} P_{kj}^{*1-\sigma} \right)^{\frac{(\gamma+1)(\sigma-\mu)}{(1-\sigma)(\gamma+\sigma)}} \\
& \times \left[\left(\sum_{k \neq i} P_{ik}^{*1+\gamma} \right)^{\frac{(1+\eta)}{(1+\gamma)}} + P_{ii}^{1+\eta} \right]^{-\frac{(\sigma-1)}{(\gamma+\sigma)}} \times \left[\left(\sum_{k \neq j} P_{kj}^{*1-\sigma} \right)^{\frac{(1-\mu)}{(1-\sigma)}} + P_{jj}^{1-\mu} \right]^{-\frac{(\gamma+1)}{(\gamma+\sigma)}}
\end{aligned}$$

η ... Supply: elasticity of transformation between any two goods in home country i

μ ... Supply: CET among exportable goods in home country i

σ ... Demand: CES between domestic goods and imported goods in the destination country j

γ ... Demand: CES among importable goods in the destination country j

Authors	Estimated elasticity of export to immigrants	Sample	Specification-method
Bandyopadhyay, Coughlin, and Wall (2008)	0.14	50 US states, 29 countries, 1990, 2000	Panel, OLS with country-time and trading partner pairs FE
Briant, Combes, and M. Lafourcade (2009)	0.07–0.10	93 French Departments, 1999–2001	Pooled cross section, 2SLS, country and Department FE
Dunlevy (2006)	0.24–0.47	50 US states, 87 countries, 1990–1992	Pooled cross-section, OLS with country and state FE
Dunlevy and Hutchinson (1999)	0.08	US, with 17 countries, 1870–1910	Pooled cross-section, simple gravity specification
Head and Ries (1998)	0.10	Canada and 136 trading partners, 1980–1992	Pooled cross-section, simple gravity specification
Girma and Yu (2002)	0.16	UK and 48 trading partners	Pooled cross-section, simple gravity specification
Rauch and Trindale (2002)	0.22–0.47	Ethnic Chinese in 120 countries	Pooled cross-section, simple gravity specification
Wagner, Head, and Reis (2002)	0.09	5 Canadian provinces, 160 countries, 1992–1995	Pooled cross-section, OLS with country FE

Source: Peri and Requena-Silvente (2010), Table 1

- First analysis investigating this relationship using micro (firm-level) data
- What's the purpose of a firm-level analysis?
 - Additional evidence
 - Does an increase in trade come from an increase in the number of firms (“extensive margin”) or from an increase in export volumes (“intensive margin”)?
 - Do migrants reduce fixed or variable costs of exporting?
 - See Chaney (2008) and Melitz (2003) for theoretical guidance

- Foreign trade is (increasingly) important
- Public debate on migration focuses on issues related to labour market, housing market or integration/existence of parallel societies

- “Extensive margin elasticity”
- Probit model analyzing the export propensity, controlling for various fixed effects

- “Intensive margin elasticity”
- Panel estimation with random or fixed firm-effects, controlling for various (other) fixed effects

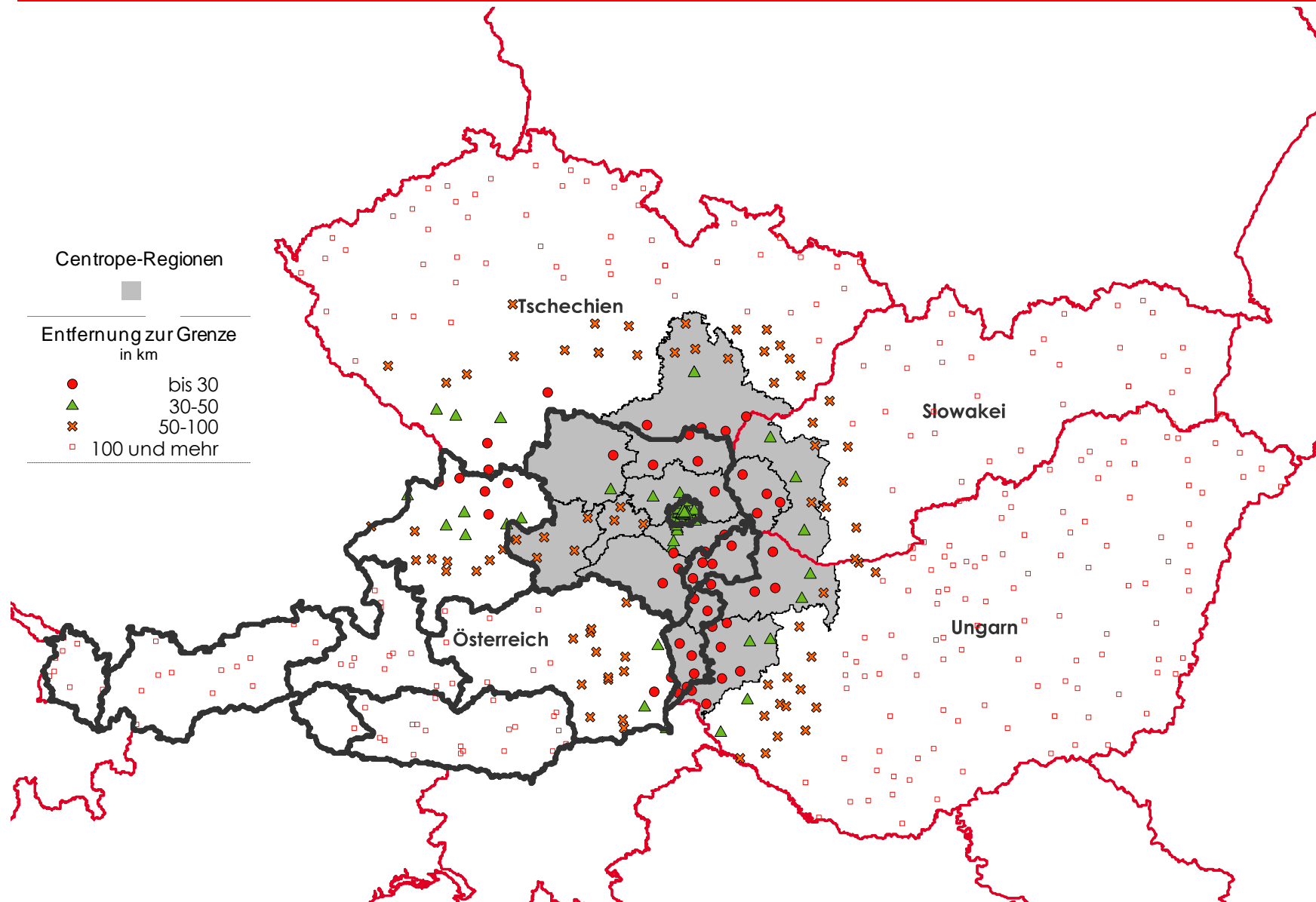
Berman and Hericourt (2010): Financial factors and the margins of trade

Koenig, Mayneris and Poncet (2010): Local export spillovers in France

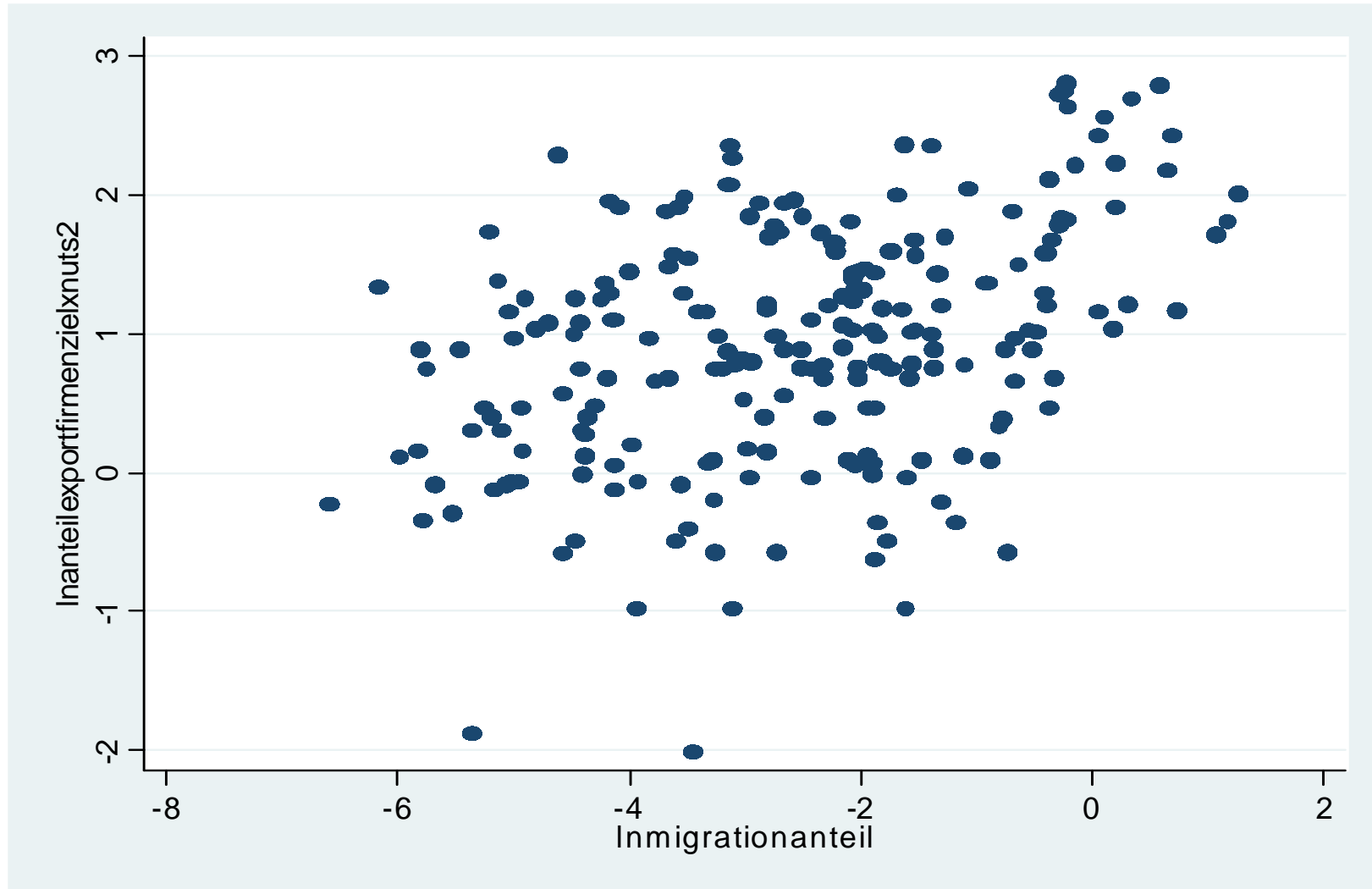
- Survey (2010): among 8,300 firms in Austria, Hungary, Slovakia and the Czech Republic
- European Labour Force Survey (LFS, 2007)
- Supplement data with regional and destination characteristics (mainly from Eurostat)

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- Firms – Destination (87,393)
 - Export (1/0), Volume of Sales, Share of Total Sales
 - Firms (8,299)
 - Size (# of Employees)
 - Age
 - Industry (one-digit NACE level)
 - Owned Domestically / Foreign / Partly Foreign
 - Headquarter / Subsidiary / Individual Enterprise
 - Location (district)
 - Region (NUTS 2 level) (28)
 - GDP
 - GDP / Capita
 - Population Density

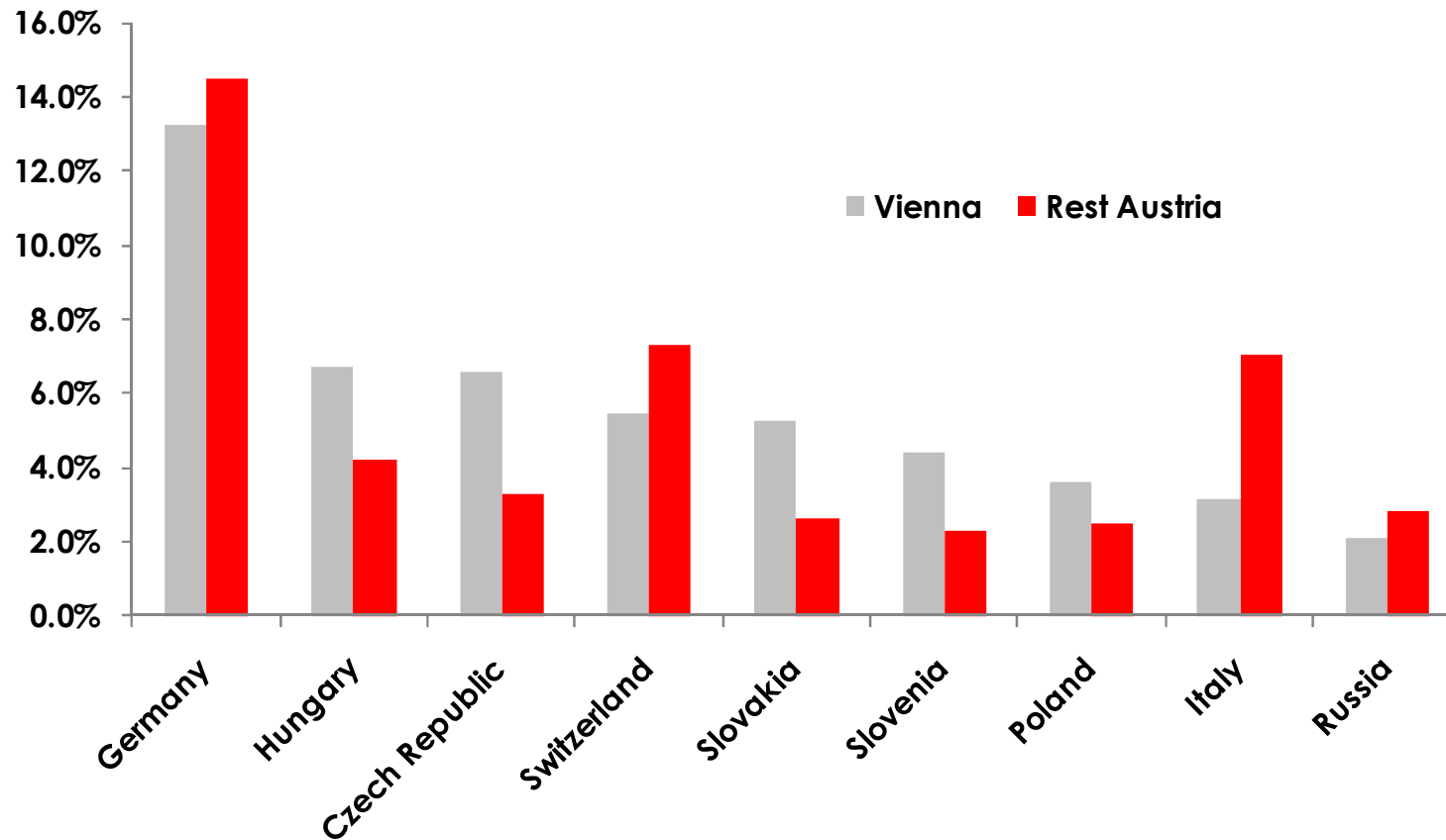
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- Region-Destination
 - Immigration (share of immigrants among all residents)
 - Distance (Euclidean distance from district to capital of destination)
 - Home Country-Destination
 - Common Border
 - Same/similar Language
 - Destination (18 in total, between 8 and 16 per firm)
 - GDP
 - GDP per Capita
 - European Union



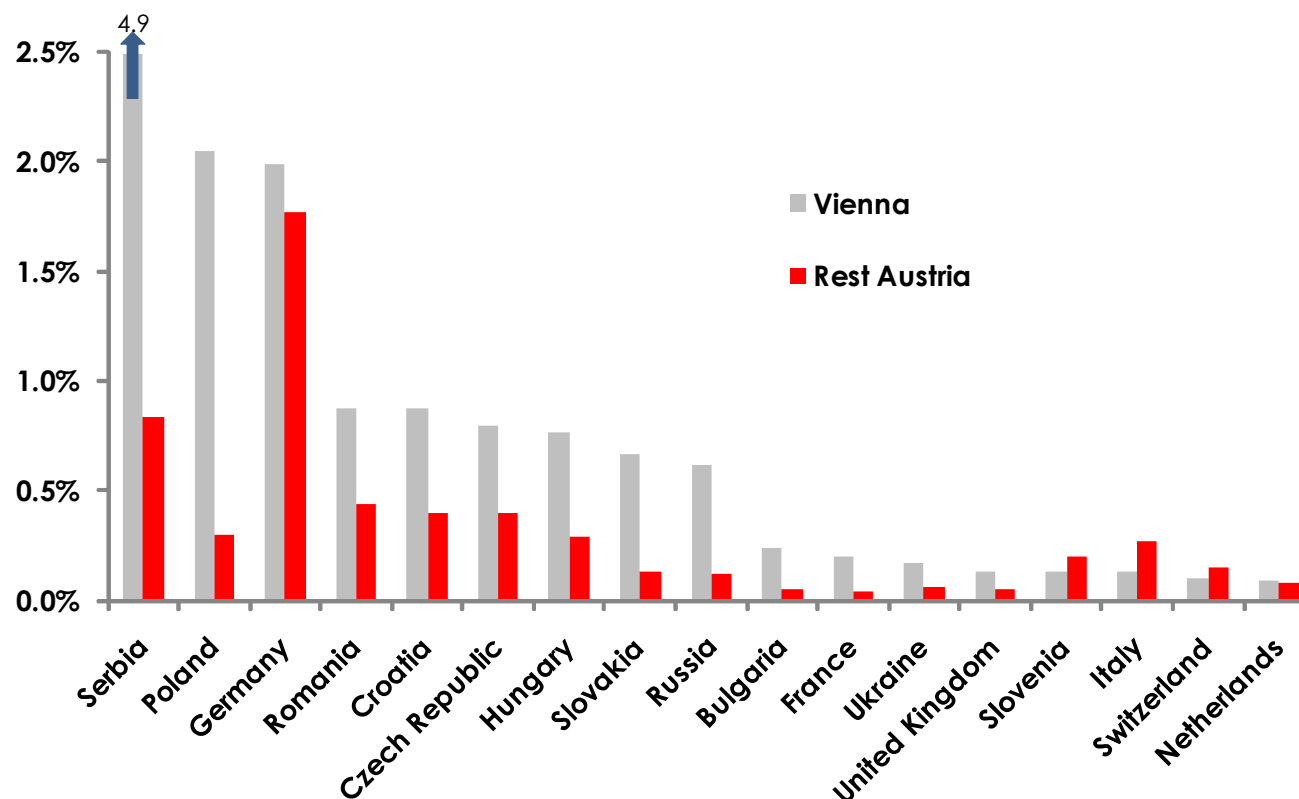
Home Country Destination	Austria	Czech Republic	Hungary	Slovakia	Total
Czech Republic	3,001	0	1,500	2,298	6,799
Hungary	3,001	0	0	2,298	5,299
Slovakia	3,001	1,500	1,500	0	6,001
Slovenia	3,001	0	1,500	0	4,501
Russia	3,001	1,500	1,500	0	6,001
Poland	3,001	1,500	0	2,298	6,799
Germany	3,001	1,500	1,500	2,298	8,299
Italy	3,001	1,500	1,500	0	6,001
Switzerland	3,001	0	1,500	0	4,501
Austria	0	1,500	1,500	2,298	5,298
Romania	0	1,500	1,500	2,298	5,298
Bulgaria	0	1,500	1,500	2,298	5,298
Ukraine	0	1,500	1,500	2,298	5,298
France	0	1,500	1,500	0	3,000
Great Britain	0	1,500	1,500	0	3,000
The Netherlands	0	1,500	1,500	0	3,000
Serbia	0	0	1,500	0	1,500
Croatia	0	0	1,500	0	1,500
Total	27,009	18,000	24,000	18,384	87,393



Share of firms that make parts of their sales in a particular destination country



Share of residents who are born abroad, in %

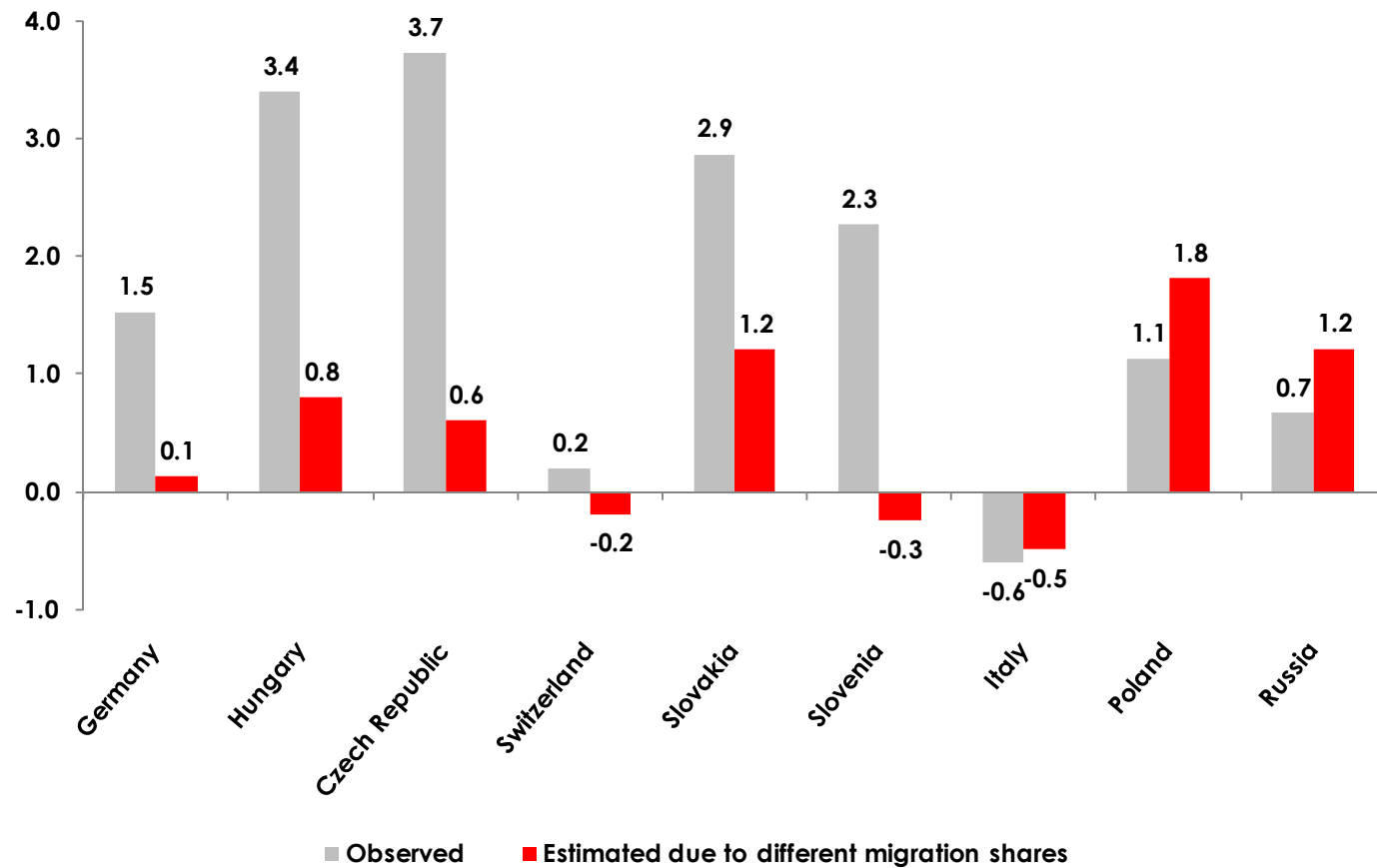


Source: European Labour Force Survey 2007, Eurostat 2007, WIFO-Calculations.

Variable	Export Propensity (Elasticity)	Sales
Immigration (share, in log)	0,304***	0,081**
Distance (log)	-0,304***	-0,055
Border	0,498***	0,227*
Language	0,495***	0,128
In GDP region	-0,030	0,067
In GDP / capita region	-0,242***	-0,215
In Pop. density region	0,058**	0,020
EU	-0,050	0,059
In GDP destination	0,249***	0,146***
In GDP / capita dest.	0,576***	0,292**
Size (# of Employees, log)	0,772***	0,897***
Size, sqarued (# of Employees, log)	-0,078***	-0,034
Age (log)	-0,032	-0,004
Foreign	0,869***	0,632***
Partly foreign	1,521***	0,547*
Headquarter	0,430***	0,728***
Subsidiary	0,280***	1,120***
Constant		-2,587
Type of FE	Industry	Industry

Differences in Export Behaviour due to Migration

Contribution of immigrants to explain differences in export behaviour of firms in Austria; in percentage points



Source: European Labour Force Survey 2007, Eurostat 2007, FAMO und AFLA Unternehmensbefragung 2010, Calculations.

- Migration increases export propensity („extensive margin“) and – to a much smaller extent – export volume of exporting firms („intensive margins“)
- Strong evidence that immigration influences mainly fixed costs of trade
- But: Immigration also increases imports
 - Migration increases trade, but does not necessarily improve balance of trade
- Additional contribution in debate on migration
- But: It remains unclear, how migrants affect trade

Thank you!

- Reverse causality: Exports increase immigration
 - effect very small (NUTS-2-region!)
 - Immigration is lagged by 2 years
- Reverse causality: Exports influence employment growth and profitability
 - Include firm characteristics only as robustness check
- Omitted variables: E.g. agglomeration might influence productivity (and therefore export probability) and immigration
 - Include proxies for agglomeration (Pop. Density; GDP / capita) or region-specific fixed effects

- Some explanatory variables only vary between (28) home regions, (18) destination countries, or (321) region-destination combinations
 - Moulton bias (1990)
 - Clustered w.r.t. region-destination (export probability)
 - Heteroscedasticity consistent estimates of the covariance matrix (White, 1980) (export volume)
- Export volume observed only for exporting firms – selection bias?
 - Robustness: Performing a 2SLS-procedure (Heckman, 1976)
- Non-random sample selection (stratified w.r.t. industry, home region and firm size)
 - Industry fixed effects in all, region FE and firm size in some specifications

- Berman and Hericourt (2010): 5,000 firms from 9 home countries and 3 years; better financial health increases probability to export in a certain country, but not its volume
- Koenig, Mayneris and Poncet (2010): 8,071 firms, 6 years; trade flows by firm, product, year and destination country (roughly 700,000 observations); spillover effects reduce fixed rather than variable costs of exporting
- Peri and Requenta-Silvente (2010): 50 regions, 14 years, 77 host countries; Immigrants influence extensive margins more than intensive margins

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- Melitz (2003): “The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity”
 - Chaney (2008): “Distorted Gravity: The Intensive and Extensive Margins of International Trade”
 - “In this paper, I add firm heterogeneity in productivity, as well as fixed cost of exporting.” (p. 1707)

$$X_{ij}^h = \mu_h \times \frac{Y_i \times Y_j}{Y} \times \left(\frac{w_i \tau_{ij}^h}{\theta_j^h} \right)^{-\gamma_h} \times (f_{ij}^h)^{\left[\frac{\gamma_h}{\sigma_h - 1} - 1 \right]}$$

$$c_{ij}^h(q) = \frac{w_i \tau_{ij}^h}{\varphi} q + f_{ij}^h$$

$$-\frac{d \ln X_{ij}}{d \ln \tau_{ij}} = \gamma = \underbrace{(\sigma - 1)}_{\substack{\text{Intensive} \\ \text{margin} \\ \text{Elasticity}}} + \underbrace{(\gamma - (\sigma - 1))}_{\substack{\text{Extensive} \\ \text{margin} \\ \text{Elasticity}}}$$

$$-\frac{d \ln X_{ij}}{d \ln f_{ij}} = \frac{\gamma}{\sigma - 1} - 1 = \underbrace{0}_{\substack{\text{Intensive} \\ \text{margin} \\ \text{Elasticity}}} + \underbrace{\frac{\gamma}{\sigma - 1} - 1}_{\substack{\text{Extensive} \\ \text{margin} \\ \text{Elasticity}}}$$

- 1.: Does migration reduce costs of exporting?
- 2.: If so: Does it affect only fixed and/or variable costs?

$$\frac{dP(X_{frd} > 0)}{d \ln Migr_{rd}} = 0 \quad \text{and} \quad \frac{d(\ln X_{frd} | X_{frd} > 0)}{d \ln Migr_{rd}} = 0 \quad \rightarrow \quad \text{no impact on costs}$$

$$\frac{dP(X_{frd} > 0)}{d \ln Migr_{rd}} > 0 \quad \text{and} \quad \frac{d(\ln X_{frd} | X_{frd} > 0)}{d \ln Migr_{rd}} = 0 \quad \rightarrow \quad \text{impact on fixed costs}$$

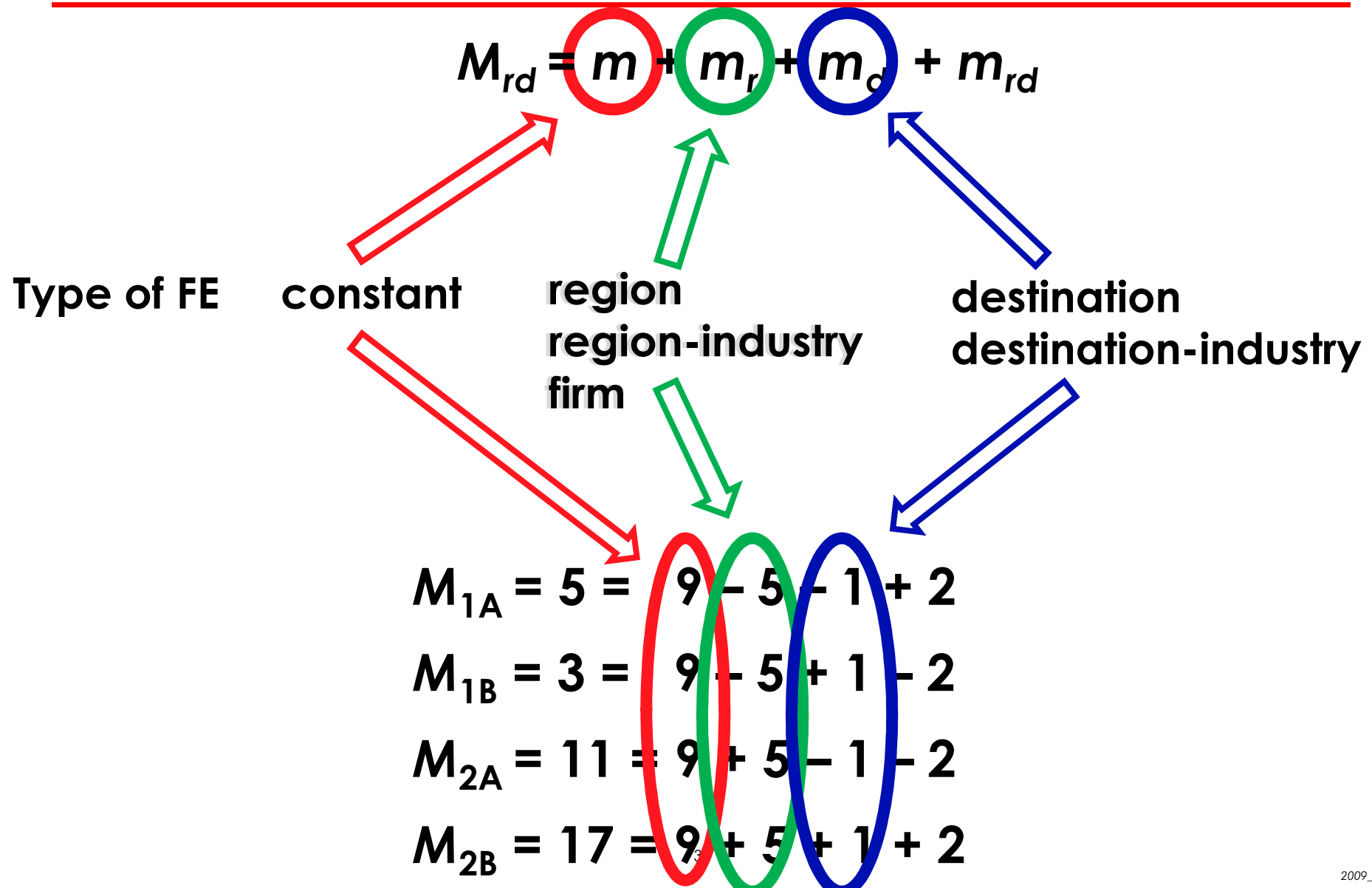
$$\frac{dP(X_{frd} > 0)}{d \ln Migr_{rd}} > 0 \quad \text{and} \quad \frac{d(\ln X_{frd} | X_{frd} > 0)}{d \ln Migr_{rd}} > 0 \quad \rightarrow \quad \text{impact on variable costs (also)}$$

- Best strategy:
 - Controlling firm-destination-effects with FE (also erase home-region effect)
 - Identifying the effect over time: how does a change in migration (over time) effects export behavior of firms (over time)
- Drawbacks:
 - stock of migrants doesn't change quickly (need for long time periods)
 - „fixed“ firm-destination effects might not be useful for long time periods
- Anyway:
 - only corss-section data; other identification strategy needed

$$M_{rd} = m + m_r + m_d + m_{rd}$$

	Region 1	Region 2	Mean
Destination A	5	11	8
Destination B	3	17	10
Mean	4	14	9

$$\begin{aligned}
 M_{1A} &= 5 = 9 - 5 - 1 + 2 \\
 M_{1B} &= 3 = 9 - 5 + 1 - 2 \\
 M_{2A} &= 11 = 9 + 5 - 1 - 2 \\
 M_{2B} &= 17 = 9 + 5 + 1 + 2
 \end{aligned}$$



Export Propensity: Including Firm Characteristics

Variable	PROP [7]	PROP [8]	PROP [9]	PROP [10]
In Immigration	0.129***	0.149***	0.125***	0.148***
In Distance	-0.125***	-0.112***	-0.044	0.016
Border	0.195***	0.162***	0.156***	0.079
Language	0.162**	0.141**	0.107	0.047
In GDP region	-0.012		-0.010	
In GDP / capita region	-0.100**		-0.119***	
In Pop. density region	0.023		0.025*	
EU	-0.002	-0.054		
In GDP destination	0.098***	0.094***		
In GDP / capita dest.	0.202***	0.276***		
constant	0.313***	0.354***	0.327***	0.359***
(ln Size) ²	-0.032***	-0.037***	-0.033***	-0.038***
In Age	-0.013	0.004	-0.010	0.005
Foreign	0.278***	0.292***	0.286***	0.294***
Partly foreign	0.414***	0.448***	0.429***	0.455***
Headquarter	0.154***	0.142***	0.156***	0.144***
Subsidiary	0.103**	0.131***	0.114***	0.135***
constant	-3.588***	-6.576***	-0.503	-3.438***
Type of FE	industry	region-industry	destination-industry	region-industry destination-industry
N	69,217	57,096	62,625	53,982
log likelihood	-8,879.35	-8,286.65	-8,667.39	-8,114.13

Export Propensity: 2 Stage Least Squares

Variable	SALES [11]	SALES [12]	SALES [13]	SALES [14]
In Immigration	0.041	0.074*	0.047	0.094*
In Distance	0.009	-0.018	0.172*	0.172*
Border	0.192	0.236*	0.343**	0.406**
Language	0.101	0.051	0.063	0.059
In GDP region	0.183		0.059	
In GDP / capita region	0.002		-0.029	
In Pop. density region	-0.112		-0.079	
EU	0.138	0.053		
In GDP destination	0.102**	0.126***		
In GDP / capita dest.	0.147	0.198		
constant	-0.403	-0.673	2.817	0.559
Mills' ratio	-0.459***	-0.187	-0.354*	0.065
Type of FE	industry	region-industry	destination-industry	region-industry destination-industry
N (1 st stage probit)	44,490	44,490	44,490	44,490
N (2 nd stage regression)	1,028	1,028	1,028	1,028
R ²	0.097	0.445	0.133	0.470

Variable	SHARE [1]	SHARE [2]	SHARE [4]	SHARE [6]
In migration	0.084*	0.084**	0.087**	0.069**
In distance	0.163	−0.048	0.097	−0.106
Common Border	0.404**	0.285**	0.331**	0.184
Same Language	0.015	0.067	0.036	0.125
In gdp region			0.096	0.163
In gdp/capita region			−0.797***	−0.685***
In population density region			0.04	−0.007
EU		0.019		0.046
In gdp destination		0.164***		0.194***
In gdp/capita destination		0.319**		0.319***
constant	0.497	−4.462***	7.658***	−0.292

Type of FE	firm destination- industry	firm	destination- industry	industry
N	1,044	1,044	1,044	1,044
R ²	0.044	0.045	0.257	0.182

Variable	PROP [15]	SALES [15]
In Immigration	0.091***	0.028
In Emigration (share)	0.102***	0.114 ***
In Other Immigration	0.027	0.139
In Distance	-0.078**	-0.060
Border	0.336***	0.331 **
Language	0.359***	0.369 *
In GDP region	0.037	0.317
In GDP / capita region	-0.033	-0.051
In Pop. density region	0.005	-0.295 **
EU	0.404***	0.387 *
In GDP destination	0.111***	0.175 **
In GDP / capita dest.	-0.245*	-0.477
constant	-0.619	1.836
Type of FE	industry	industry
N	38,864	662
log likelihood / R ²	-5,618.39	0.099

Variable	PROP [16]	SALES [16]
In Immigration x Czech Republic	0.180***	0.094
In Immigration x Hungary	0.117***	0.047
In Immigration x Slovakia	0.204***	0.067
In Immigration x Slovenia	0.203***	0.002
In Immigration x Russia	0.103***	0.014
In Immigration x Poland	0.089***	0.093 *
In Immigration x Germany	-0.008	0.007
In Immigration x Italy	0.076***	0.062
In Immigration x Switzerland	0.355***	-0.136
In Immigration x Austria	0.085***	0.036
In Immigration x Romania	0.158***	0.191 **
In Immigration x Bulgaria	0.180***	0.022
In Immigration x Ukraine	0.172***	0.525 *
In Immigration x France	0.124***	0.072
In Immigration x United Kingdom	0.129***	0.381 ***
In Immigration x The Netherlands	0.260***	0.154 **
In Immigration x Serbia	.	.
In Immigration x Croatia	0.343***	0.091
constant	-4.160***	0.676
Region and Destination variables	included	included
Type of FE	industry	industry
N	70,068	1,044
log likelihood / R ²	-9,160.61	0.098