Variations in Service Trade

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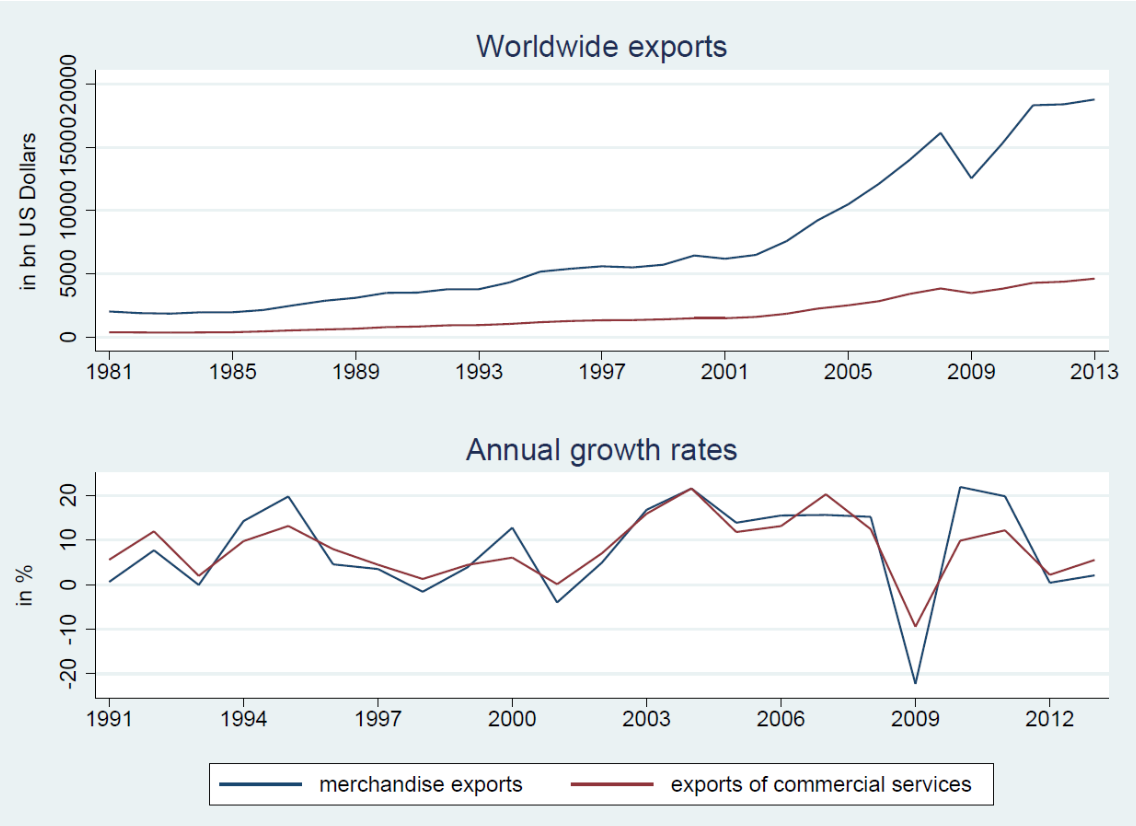
Overview

1. Motivation
2. Data and some facts on German service trade
3. Drivers of service trade growth: Margins of service trade
4. Summary

Motivation

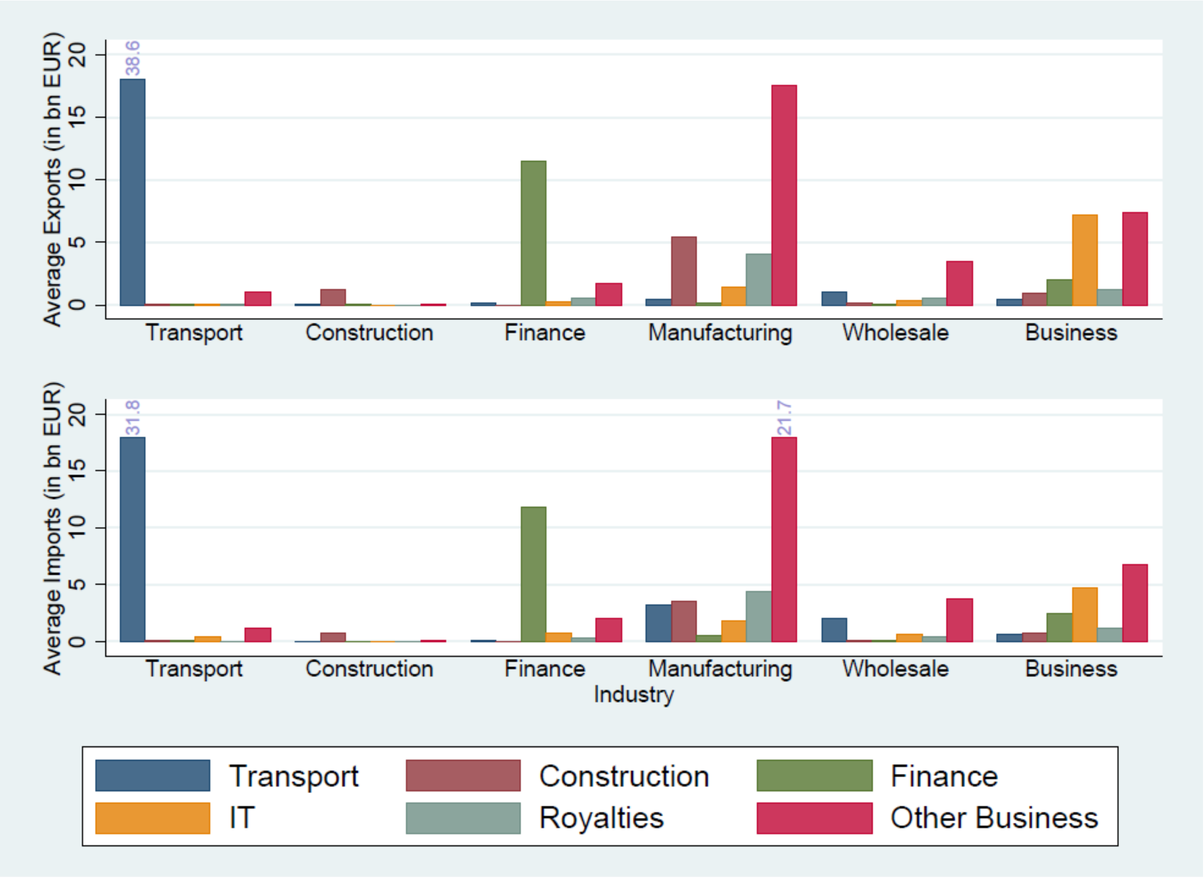


Source: data from UNCTAD, own calculations

- Increasing role of international trade in services: 12 percent of worldwide GDP in 2012
- International trade in services responded more resilient to the crisis 2008/2009 than goods trade.

Motivation

Average service trade by industry, 2001-2012



Source: ITS data, own calculations

- Services do not only enter the value chain as inputs in goods production (*e.g.* R&D or design) but are also part of firms' output across all industries.

Motivation

- In this paper we ask, *what role do individual firms play in shaping aggregate service trade*?
  - importance of the extensive and intensive margins for explaining the variation in aggregate service exports and imports (similar to trade in goods, e.g. Bernard et al. 2009, Eaton et al. 2007)

- To understand the microeconomic underpinnings, we disentangle the drivers of service trade along three dimensions:
  - cross-sectional variation
  - time-series variation
  - contributions to variations in growth rates

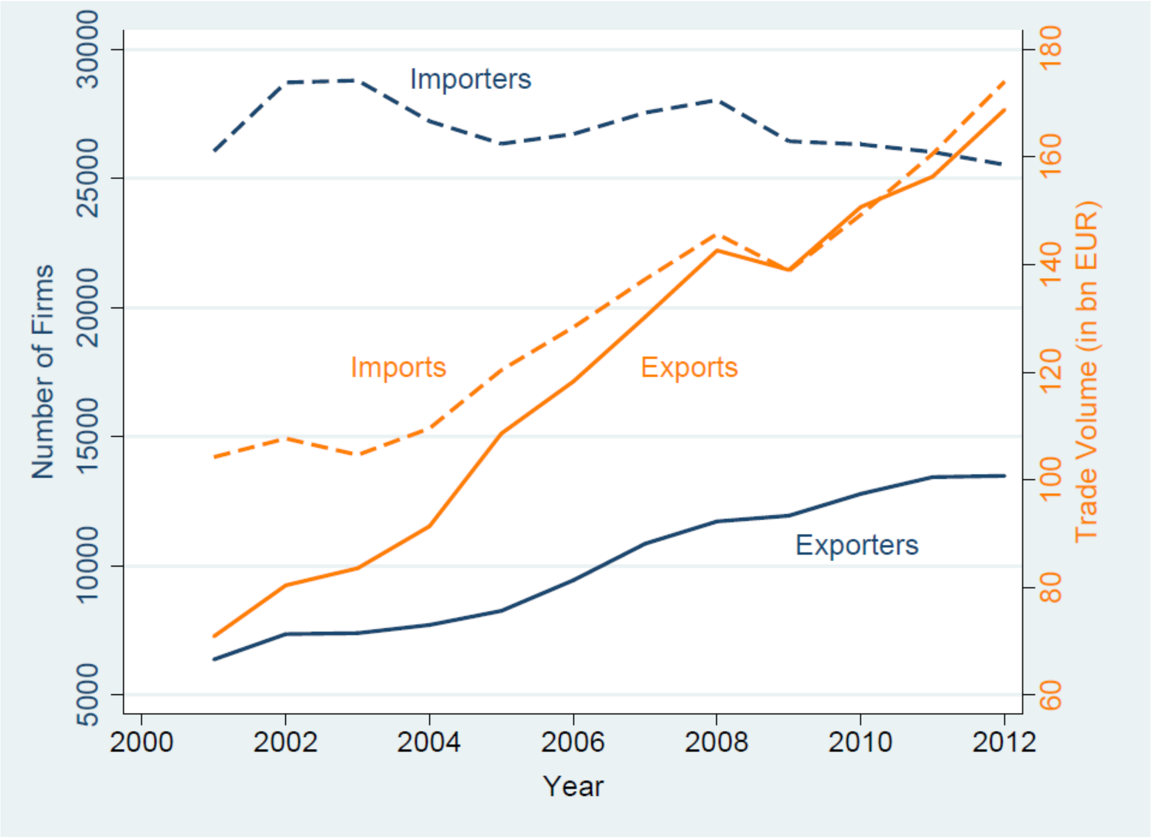
- In this presentation we also ask, how does firms‘ behaviour affect trade outcomes across trading partners?
  - a geographical breakdown: European Union, USA, Japan, ASEAN 6 (Indonesia, Malaysia, Philippines, Singapore, Thailand, Vietnam) and China

Data

We use the International Trade in Services Statistics compiled by the Deutsche Bundesbank that provides detailed information

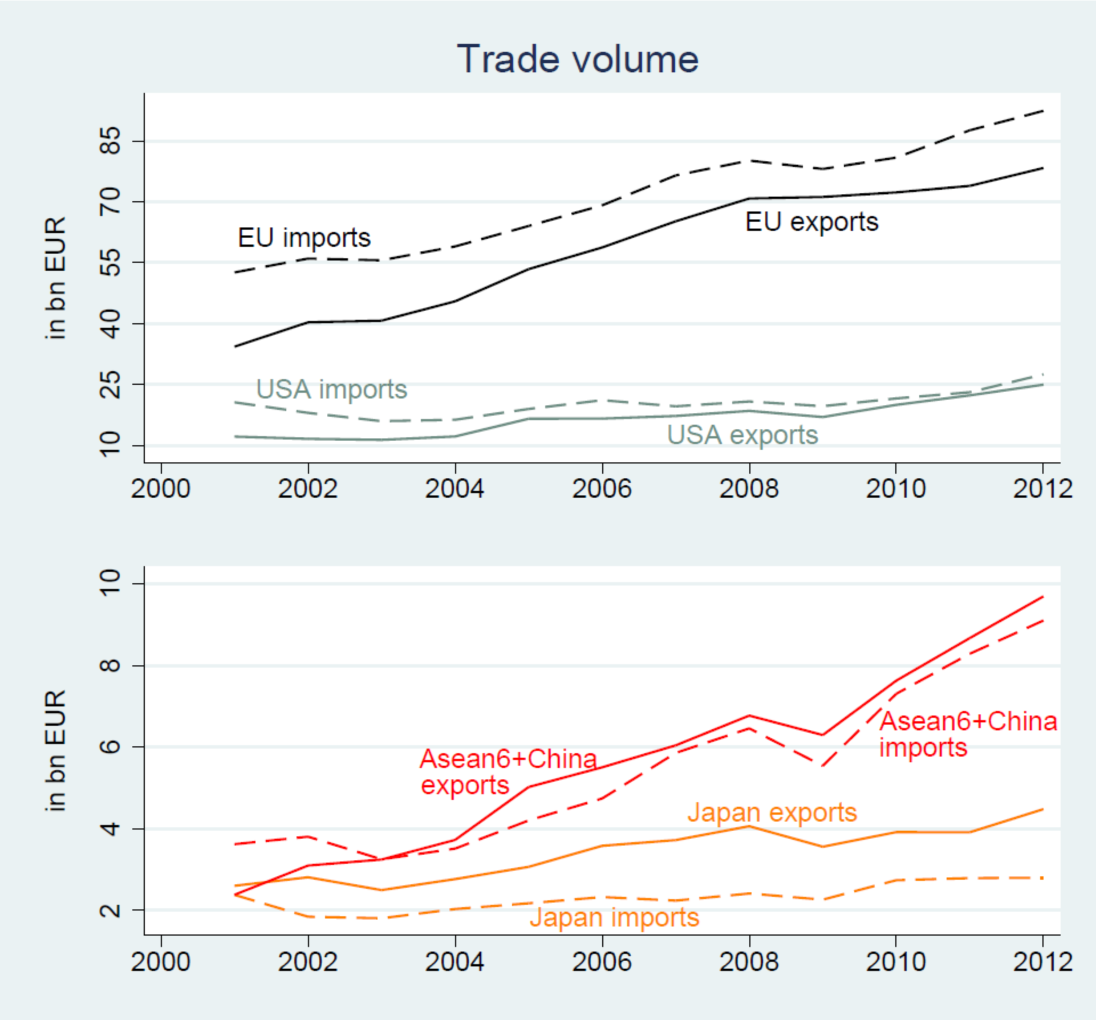
- on service transactions between German residents – firms, banks, individuals, public authorities – and non-residents
- with a reporting threshold of 12,500 €
- on service transactions at the firm-level – traded volumes, service types, trading partners
- for 2001-2012, monthly frequency

Some facts on German Service Trade
Traded volumes and number of firms, full sample

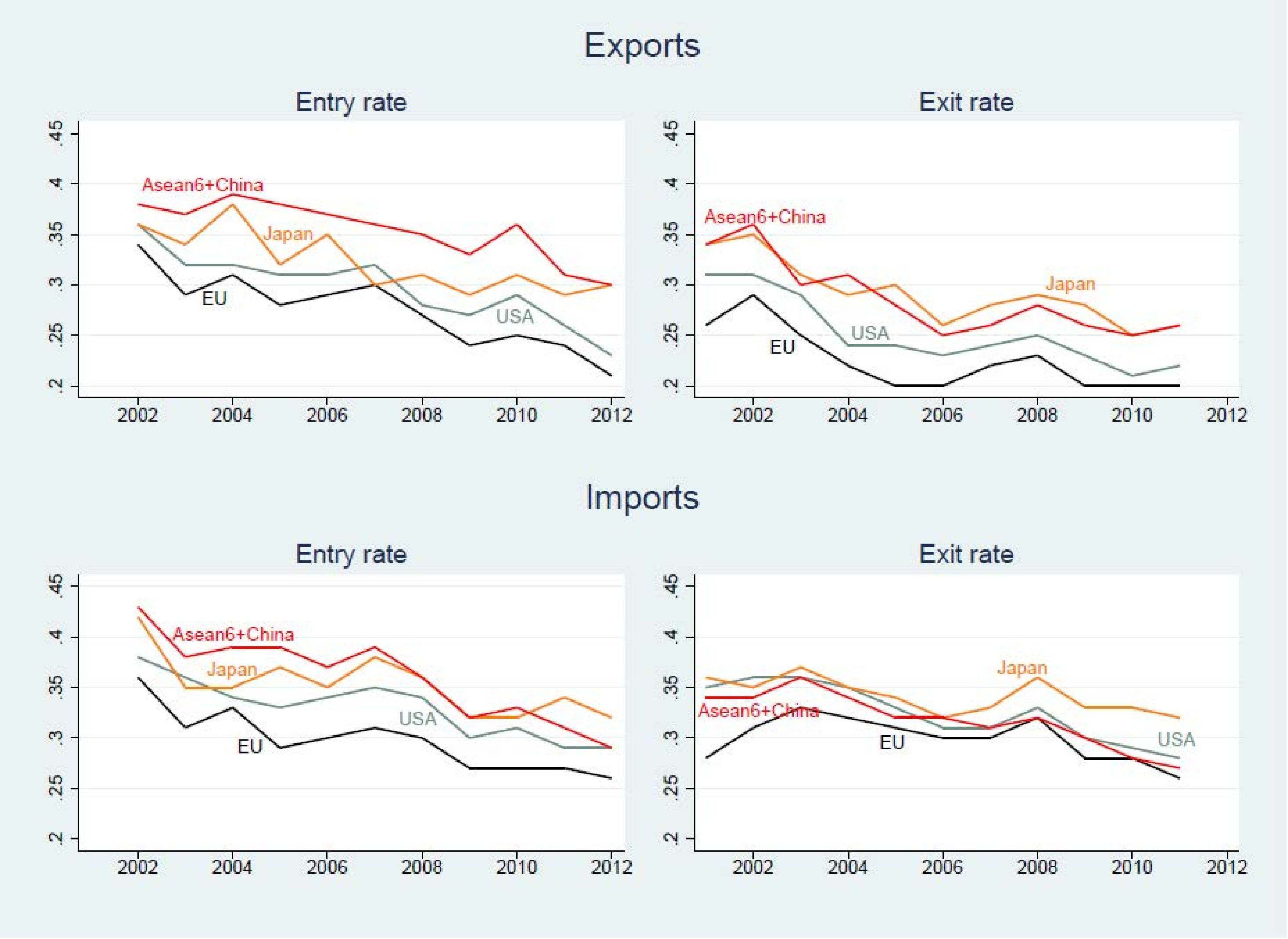


- Increase of exports by nearly 140 and imports by 70 percent, respectively

Some Facts on German Service Trade
Traded volumes, geographical breakdown



Some Facts on German Service Trade
Entry and exit rates, geographical breakdown



Cross-sectional Variation
Decomposition

- Extending the decomposition of Bernard *et al.* (2011), we decompose aggregate trade with country *c* into *extensive* and *intensive* margins:

$$x_{ct} = f_{ct}\, s_{ct}\, d_{ct}\, a_{ct}\ \ \bar{x}_{ct}$$

  - ➢ *aggregate exports or imports* x_{ct}
  - ➢ *extensive margins:*
    - number of firms f
    - number of services traded s
    - trade density d
    - activity a
  - ➢ *intensive margin:*
    - average trade per transaction $\bar{x}_{ct}$

- *Similar for* $firm-level{:}\ x_{ft} = c_{ft}\, s_{ft}\, d_{ft}\, a_{ft}\ \ \bar{x}_{ft}$

Cross-sectional Variation
Main results

- Disentangling the contribution of each margin to the cross-sectional variation of trade by regressing the log of each margin on the log of total exports or imports

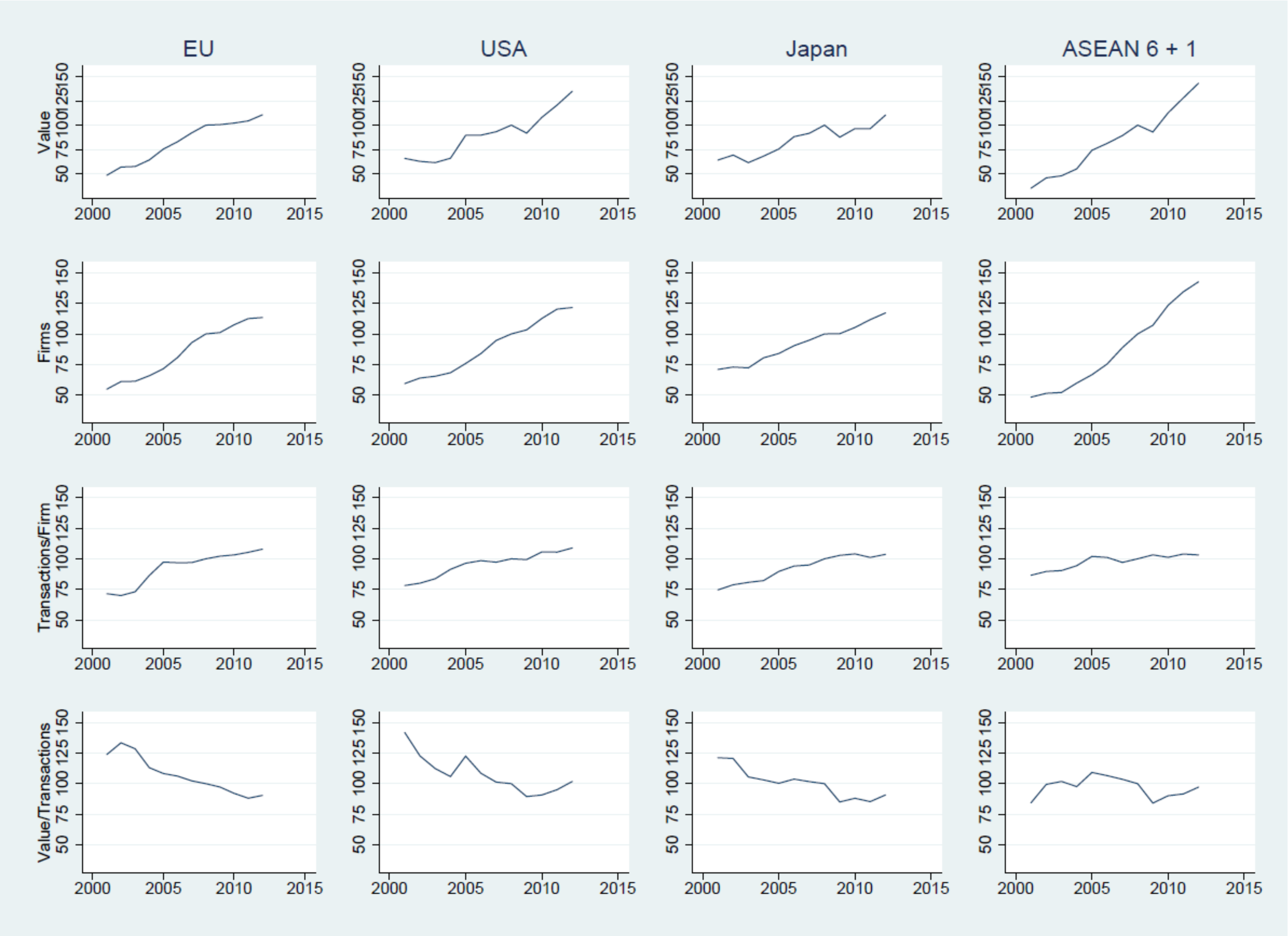
$country - level$

- Extensive margins account for a large share of the variation in exports and imports (69% for exports and 73% for imports).
- number of firms and service types as most important extensive margins

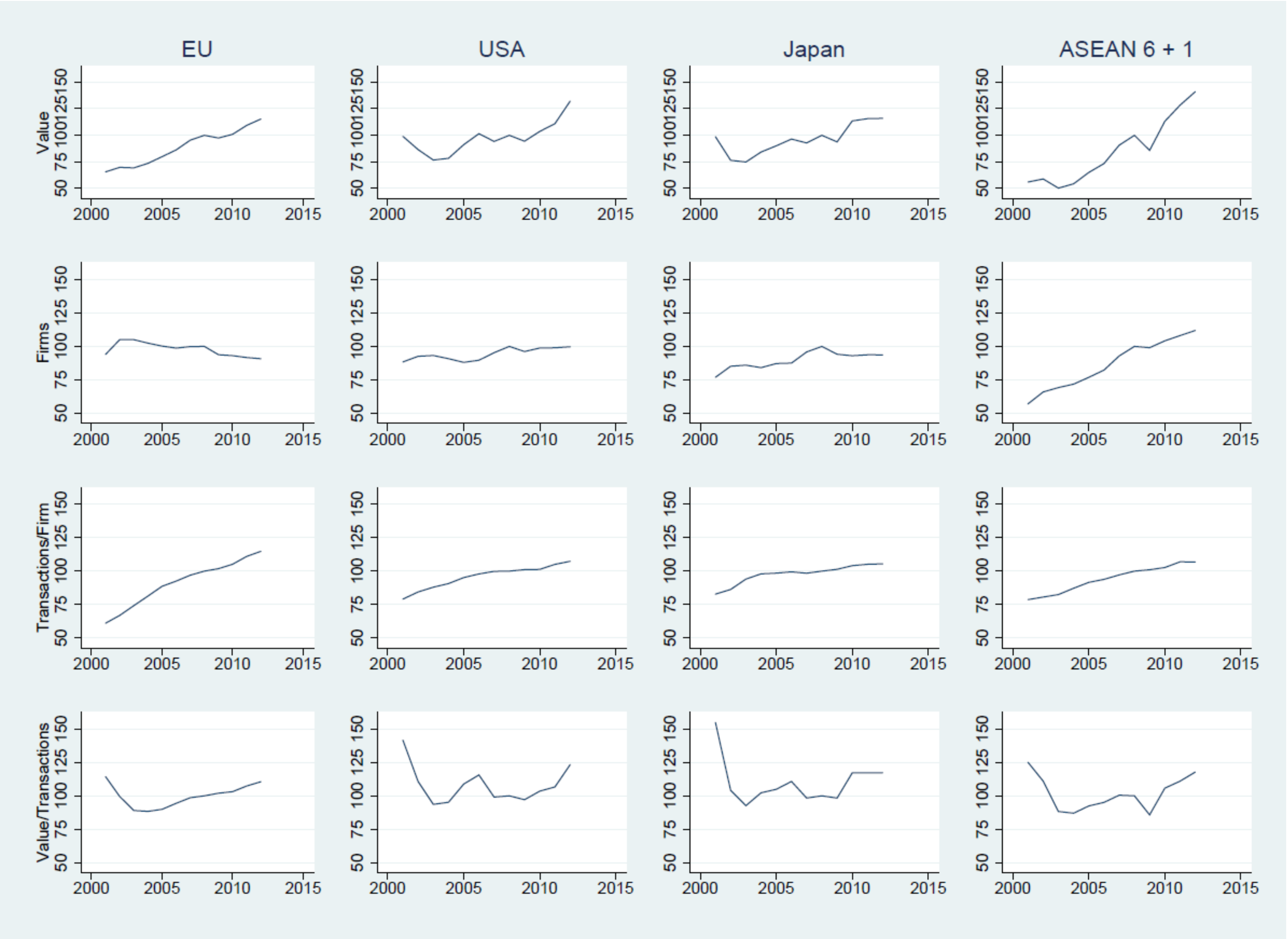
$firm - level$

- Intensive margin gets more important (50% for exports and 40% for imports).
- number of countries and activity as most important extensive margins

Evolution of Margins over Time
Service exports, geographical breakdown



Evolution of Margins over Time
Service imports, geographical breakdown



Time-series Variation
Mid-point growth rate

- We follow Haltiwanger (1992) and use **mid-point growth rates** to characterize individual service trade growth:

$$\gamma_{fsct} = \frac{x_{fsct} - x_{fsct-1}}{0.5\left(x_{fsct} + x_{fsct-1}\right)}$$

  - takes explicitly the impact of created and destroyed flows into account

- Aggregate service trade growth can be written as

$$\gamma_t = \sum_{fsc} \omega_{fsct}\, \gamma_{fsct}$$

with weights given by

$$\omega_{fsct} = \frac{x_{fsct} + x_{fsct-1}}{\sum_{fsc} x_{fsct} + \sum_{fsc} x_{fsct-1}}$$

Growth due to…

- growing trade volumes (intensive margin)
- new services
- new trade relationships
- new firms

Time-series Variation
Mid-point growth rate, full sample

Contributions to Mid-Point Growth in Service Trade, full sample, yearly data

	2001-2008		2008-2009		2009-2010		2010-2011		2010-2012	
	exports	imports	exports	imports	exports	imports	exports	imports	exports	imports
Firm Entry and Exit										
Entry	4.5	3.0	2.8	1.6	2.5	1.6	1.4	1.4	1.5	1.0
Exit	−2.2	−2.7	−1.8	−1.6	−1.3	−1.6	−1.1	−1.5	−0.9	−1.2
Net Entry	2.3	0.3	1.0	0.0	1.2	0.0	0.3	−0.1	0.5	−0.2
Trade Relationships										
Born	3.4	3.8	2.7	3.0	3.1	3.5	3.0	2.7	3.4	2.6
Retired	−2.3	−3.3	−2.4	−3.2	−2.0	−3.8	−1.9	−2.2	−1.9	−1.9
Net Country	1.1	0.5	0.4	−0.2	1.1	−0.3	1.1	0.5	1.5	0.6
Service-Switching										
Added	3.4	5.1	4.3	5.4	2.3	4.9	2.3	4.0	3.6	3.6
Dropped	−2.6	−4.5	−2.4	−4.0	−2.6	−4.1	−1.8	−3.1	−1.7	−2.9
Net Service	0.8	0.5	1.9	1.4	−0.3	0.9	0.5	0.9	1.9	0.7
Intensive Margin										
Increases	25.1	25.9	19.6	20.9	25.2	25.9	20.5	25.5	20.8	24.2
Decreases	−19.3	−22.5	−25.5	−26.9	−19.1	−19.1	−18.7	−19.5	−17.1	−17.2
Net Intensive	5.8	3.4	−5.9	−6.0	6.1	6.7	1.8	6.0	3.7	6.9
Total Change	10.0	4.8	−2.6	−4.8	8.1	7.2	3.7	7.3	7.6	8.0

Time-series Variation
Mid-point growth rate, geographical breakdown, exports

Contributions to Mid-Point Growth in Service Exports, yearly data

	2001-2008				2008-2009				2009-2010				2010-2011			
	EU	USA	J	A6+1	EU	USA	J	A6+1	EU	USA	J	A6+1	EU	USA	J	A6+1
Firm Entry and Exit																
Entry	5.2	4.6	4.9	5.7	3.6	2.3	4.2	3.7	2.7	2.7	6.0	6.4	1.9	2.6	2.1	2.8
Exit	−2.6	−3.6	−2.8	−2.3	−2.2	−3.0	−3.9	−2.7	−2.0	−1.8	−1.9	−1.9	−1.7	−1.1	−3.2	−2.2
Net Entry	2.6	1.0	2.1	3.4	1.4	−0.7	0.3	1.0	0.6	0.9	4.1	4.6	0.2	1.5	−1.1	0.6
Service-Switching																
Added	2.6	3.5	2.2	2.9	3.4	2.0	2.9	2.7	1.6	2.3	2.9	2.1	1.7	1.3	0.7	2.2
Dropped	−1.7	−3.7	−2.1	−1.9	−1.6	−2.4	−1.0	−1.1	−2.6	−1.8	−0.5	−1.3	−1.3	−1.2	−1.0	−1.0
Net Service	0.9	−0.2	0.2	1.0	1.8	−0.5	1.9	1.6	−1.0	0.5	2.4	0.9	0.4	0.2	−0.3	1.2
Intensive Margin																
Increases	22.4	21.0	19.3	27.3	19.4	14.6	15.9	13.7	19.2	29.2	22.0	28.8	18.3	21.4	15.8	25.1
Decreases	−15.5	−15.9	−15.2	−16.8	−22.1	−21.9	−31.3	−23.6	−17.3	−14.4	−18.9	−15.1	−16.7	−12.0	−14.5	−14.1
Net Intensive	6.9	5.1	4.1	10.4	−2.7	−7.3	−15.4	−9.9	1.9	14.8	3.1	13.7	1.6	9.4	1.3	11.0
Total Change	10.3	5.9	6.3	14.9	0.5	−8.5	−13.2	−7.3	1.6	16.2	9.6	19.1	2.2	11.0	−0.1	12.8

Time-series Variation
Mid-point growth rate, main findings

- Qualitative patterns are by and large the same as in full sample

- During the great trade collapse 2008/2009
  - exports to Japan and imports from ASEAN 6+China were hit most compared to other trading partners
  - extensive margin contributed positively to service trade growth and alleviated the decline in the intensive margin across all other sub-samples, except for the USA

- Negative impact of extensive margins of service exports in Japan in 2011, particular firm entries, while for imports from Japan the extensive margins (service switching and firm entry) outweigh the decline in the intensive margin

Time-series Variation
Services, countries and size classes

- To further analyze the drivers of service trade growth over time, we next look at the impact of services, countries and size classes of firms.

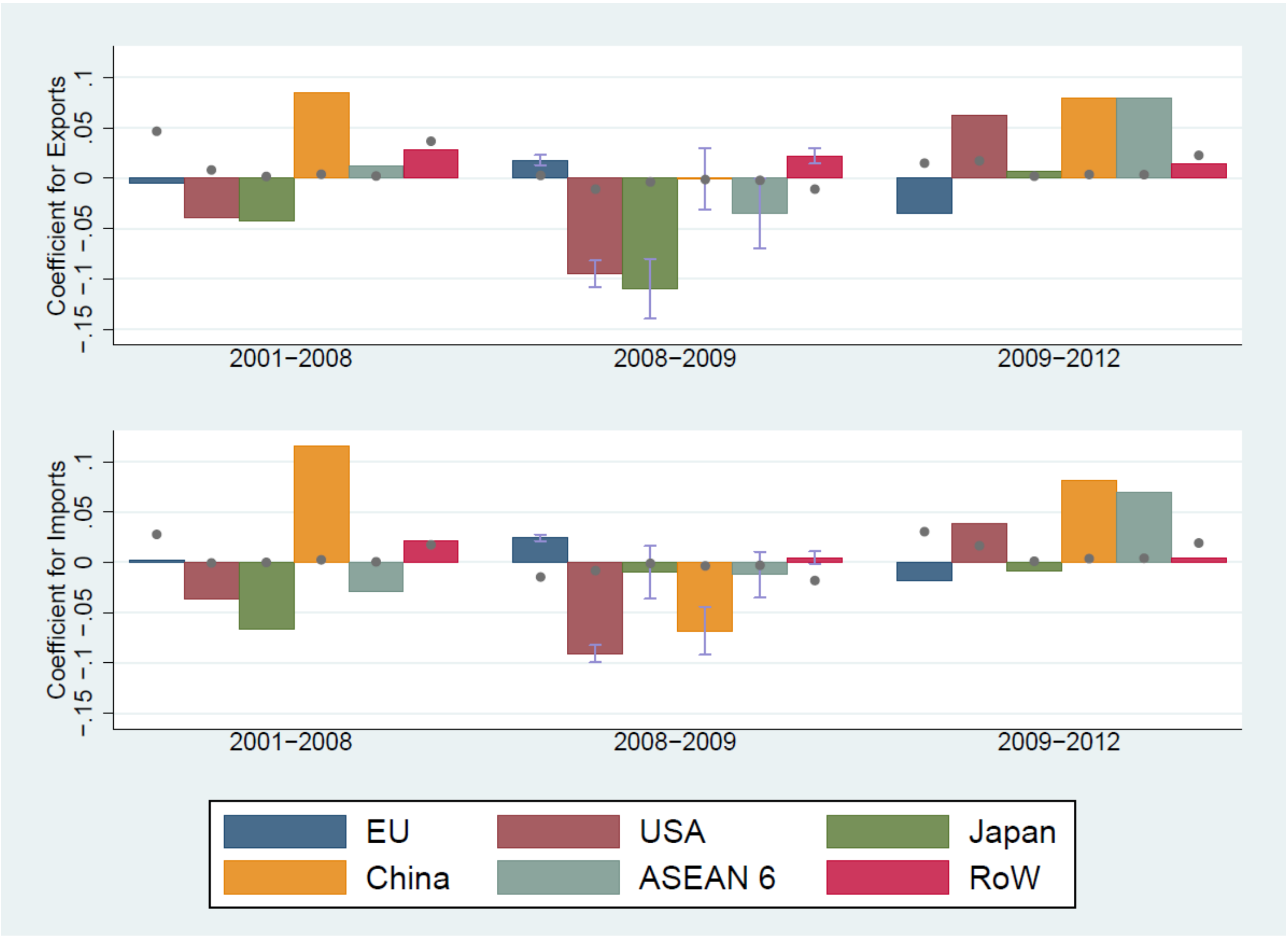
- Similar to Bricogne *et al.* (2012) we decompose individual mid-point growth rates and run a restricted WLS:

$$\gamma_{fsct} = \alpha_t + \delta_{st} + \delta_{ct} + \delta_{qt} + \epsilon_{fsct} \text{ s.t.}$$

$$\sum_n \omega_{nt}\,\delta_{nt} = 0 \text{ with } n \in \{s, c, q\}$$

  - ➢ service categories dummies δ_{st}
  - ➢ country groups dummies δ_{ct}
  - ➢ size classes dummies δ_{ct}

Time-series Variation
Absolute contribution and relative performance: country groups



Time-series Variation
Absolute contribution and relative performance: services, size classes

- Service categories:
  - During 2001-2008 none of the services categories showed significant performance relative to the average.
  - Transport services fell more than the average during the crisis 2008/2009, however they contribute positively in 2009/2010 mirroring the recovery of international goods trade.
  - Positive contribution of royalties, IT and other business services to growth during 2008/2009

- Size classes:
  - Outperformance of large firms holds for imports only. Smaller exporting firms below the median clearly outperform larger firms.
  - Nevertheless, large firms seem to have been better able to manage the trade collapse.

Contributions to Variations in Growth

To analyse the determinants of aggregate service trade volatility, we decompose service trade growth into shocks stemming from the macro- and the firm-level following di Giovanni *et al.* (2014).

Our key findings are that

- firm-specific shocks
  - closely resemble the dynamics of aggregate service trade volatility
  - are more important for variations in service trade growth on average
- shocks at the macro-level become relatively more important during the great trade collapse and the subsequent Eurozone crisis
- the firm-component is mostly driven by the co-movement of shocks among firms rather than idiosyncratic shocks to individual firms themselves

Summary

- Rising importance of service trade
  - Service traders do not only belong to the service sector itself, but are spread across all industries.

- The extensive margin is the main contributor to the cross-sectional variation of service trade.

- Time-series variation
  - The variation of aggregate service trade ist driven by the intensive margin.
  - During the trade collapse 2008/2009 extensive margins alleviated the decline in the intensive margin.

- High dynamic in service trade with emerging countries (ASEAN 6+China)

Thank you for your attention!

APPENDIX

Appendix
Heterogeneity between firms, pooled 2001-2012

		percentiles				
	mean	1st	25th	50th	75th	99th
Exports						
Number of services	1.6	1	1	1	2	9
Number of countries	5.5	1	1	2	6	45
Number of transactions within a year	27.4	1	2	8	20	324
Avg. exports per firm-service-country	271	1	18	41	124	3,668
Avg. exports per transaction	276	1	28	63	177	3,543
Total exports per firm	11,928	3	95	517	2921	181,087
Number of observations (firm-year)	120,791					
Imports						
Number of services	2.3	1	1	1	3	13
Number of countries	4.5	1	1	2	5	37
Number of transactions within a year	21.1	1	1	4	14	267
Avg. imports per firm-service-country	131	1	14	26	64	1,610
Avg. imports per transaction	122	2	21	38	80	1,173
Total imports per firm	4,882	4	50	187	837	66,881
Number of observations (firm-year)	323,714					

Notes: Sales are reported in thousand Euro.

Appendix
Distribution of services and trading partners, pooled 2001-2012

	At least ... services					
	1	2	3	5	10	
% of exporters	100	27.2	13.0	4.7	0.7	
% of exports	100	70.5	57.0	41.9	24.2	
% of importers	100	44.7	26.3	12.0	2.6	
% of imports	100	90.1	80.0	66.8	46.9	
	At least ... countries					
	1	2	3	5	10	30
% of exporters	100	57.8	43.4	29.9	15.7	2.6
% of exports	100	93.7	90.8	86.5	78.3	50.4
% of importers	100	55.9	39.9	25.2	11.7	1.7
% of imports	100	94.2	91.7	87.9	78.9	53.9

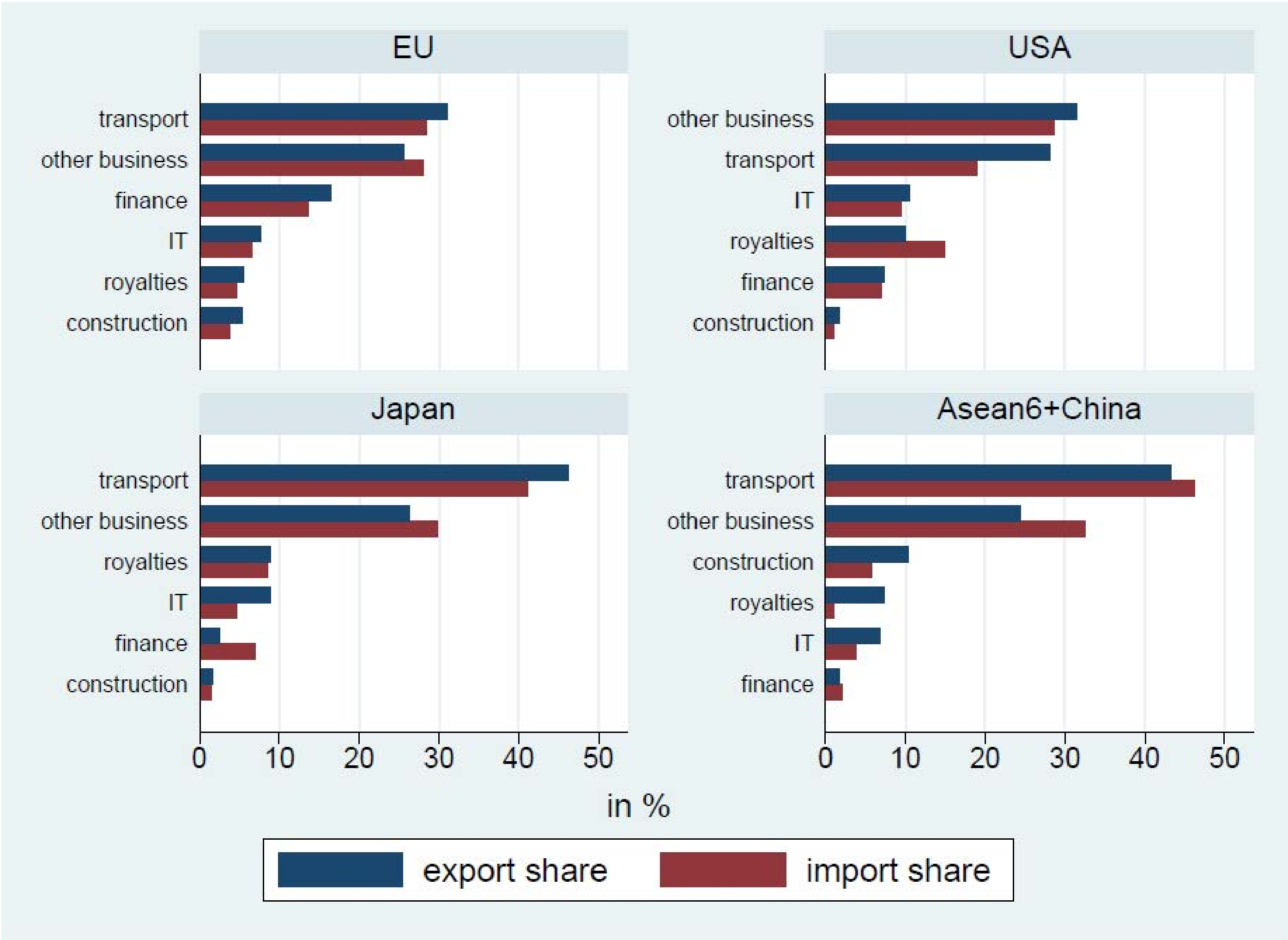
Appendix

Heterogeneity within firms, pooled 2001-2012

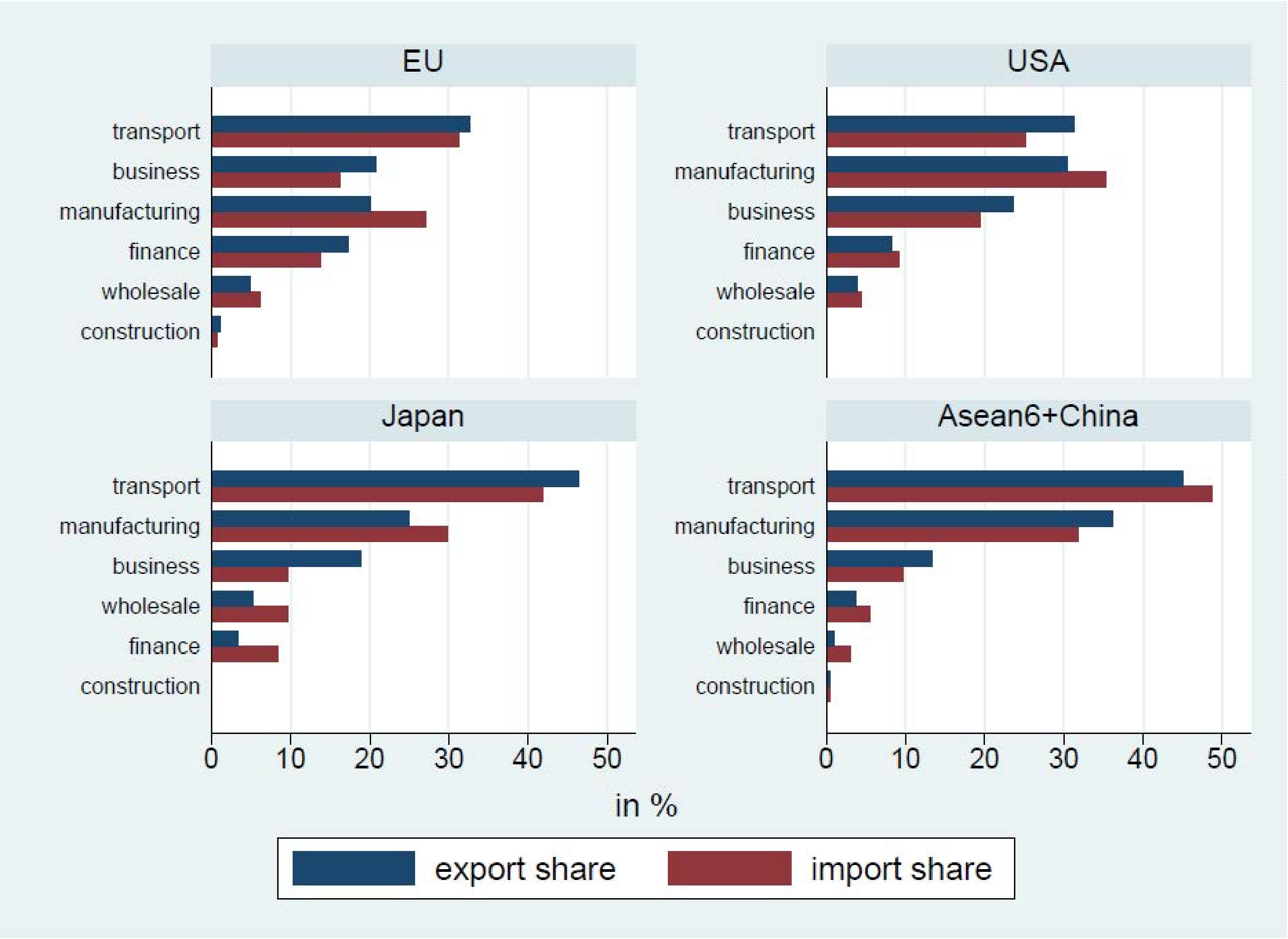
	Rank of service							Rank of country					
	1	2	3	4	5	10		1	2	3	4	5	10
% of exports													
All firms included	93.4	19.2	7.4	3.6	2.0	0.3	All firms included	76.0	20.6	10.6	6.8	4.9	1.6
Exact 2 services	81.4	18.6	–	–	–	–	Exact 2 countries	77.8	22.2	–	–	–	–
Exact 3 services	74.3	19.4	6.3	–	–	–	Exact 3 countries	68.3	22.5	9.2	–	–	–
Exact 5 services	67.7	20.2	7.7	3.1	1.2	–	Exact 5 countries	58.4	21.6	10.7	5.9	3.3	–
Exact 10 services	59.9	20.8	9.1	4.5	2.5	0.1	Exact 10 countries	46.5	19.5	11.4	7.4	5.1	0.8
% of imports													
All firms included	86.4	21.5	9.3	4.9	2.9	0.5	All firms included	77.3	22.0	11.1	6.9	4.8	1.5
Exact 2 services	77.8	22.2	–	–	–	–	Exact 2 countries	75.5	24.5	–	–	–	–
Exact 3 services	70.0	21.5	8.5	–	–	–	Exact 3 countries	66.2	23.4	10.4	–	–	–
Exact 5 services	62.5	21.1	9.5	4.7	2.3	–	Exact 5 countries	56.6	22.1	11.3	6.4	3.6	–
Exact 10 services	54.2	20.4	10.5	5.9	3.6	0.3	Exact 10 countries	46.0	20.2	11.6	7.5	5.1	0.8

Notes: This table shows the average shares (in percent) of exports/imports for the services and countries ranked first, second, third, etc. and firms that trade types exact 2, 3, 5 or 10 services or with 2, 3, etc., markets, respectively.

Some Facts on German Service Trade
Trade by service categories, geographical breakdown



Appendix
Trade by industries, geographical breakdown



Appendix
Country-level margins, 2001-2012

	Exports			Imports		
Margin	Full Sample	EMU	Top Traders	Full Sample	EMU	Top Traders
Firms	0.590	0.609	0.348	0.650	0.659	0.439
	(0.010)	(0.036)	(0.005)	(0.009)	(0.059)	(0.007)
Services	0.316	0.084	0.296	0.318	0.051	0.324
	(0.006)	(0.012)	(0.005)	(0.008)	(0.012)	(0.007)
Density	-0.294	-0.050	-0.226	-0.287	0.040	-0.224
	(0.007)	(0.013)	(0.006)	(0.009)	(0.009)	(0.010)
Activity	0.077	0.045	0.096	0.052	0.005	0.062
	(0.004)	(0.011)	(0.004)	(0.004)	(0.018)	(0.006)
Intensive	0.312	0.312	0.486	0.266	0.246	0.399
	(0.010)	(0.039)	(0.007)	(0.008)	(0.073)	(0.009)
Obs	2,645	152	2,381	2,719	152	2,493

Appendix
Firm-level margins, 2001-2012

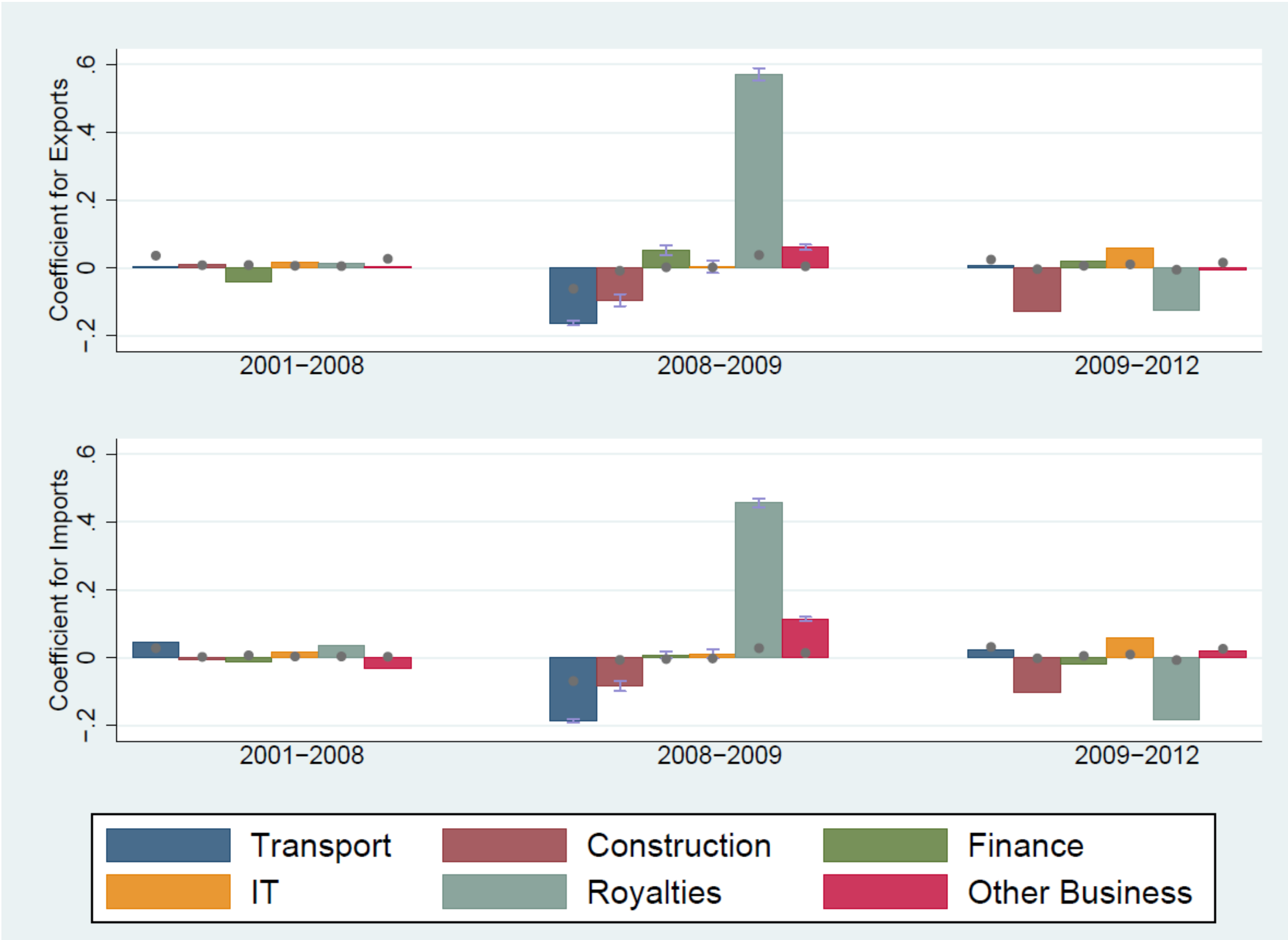
	Exports			Imports		
Margin	Full Sample	EMU	Top Traders	Full Sample	EMU	Top Traders
Countries	0.290	0.205	0.382	0.345	0.227	0.391
	(0.003)	(0.002)	(0.043)	(0.002)	(0.002)	(0.031)
Services	0.091	0.084	0.272	0.206	0.185	0.180
	(0.002)	(0.002)	(0.047)	(0.002)	(0.002)	(0.031)
Density	-0.058	-0.040	-0.162	-0.139	-0.095	-0.070
	(0.001)	(0.001)	(0.028)	(0.001)	(0.001)	(0.017)
Activity	0.185	0.220	0.135	0.191	0.212	0.129
	(0.002)	(0.002)	(0.019)	(0.001)	(0.001)	(0.012)
Intensive	0.492	0.531	0.373	0.397	0.472	0.370
	(0.003)	(0.003)	(0.046)	(0.002)	(0.002)	(0.034)
Obs	120,791	80,580	1,301	323,714	186,780	3,327

Time-series Variation
Mid-point growth rate, geographical breakdown, imports

Contributions to Mid-Point Growth in Service Imports, yearly data

	2001-2008				2008-2009				2009-2010				2010-2011			
	EU	USA	J	A6+1	EU	USA	J	A6+1	EU	USA	J	A6+1	EU	USA	J	A6+1
Firm Entry and Exit																
Entry	3.1	5.9	4.2	4.7	2.0	3.4	6.8	3.3	2.3	2.6	2.9	3.4	1.8	1.7	2.6	3.2
Exit	−2.7	−6.1	−3.6	−4.2	−2.2	−3.4	−3.9	−3.5	−3.5	−2.0	−7.3	−3.4	−2.0	−1.8	−1.6	−2.1
Net Entry	0.4	−0.2	0.6	0.5	−0.2	0.1	2.9	−0.2	−1.2	0.6	−4.4	0.0	−0.2	−0.1	1.0	1.1
Service-Switching																
Added	4.1	4.9	5.6	4.7	3.3	2.8	3.8	3.9	3.4	3.2	3.3	4.0	2.7	2.6	4.8	3.2
Dropped	−3.4	−4.0	−4.8	−3.4	−2.9	−3.0	−4.4	−3.1	−2.3	−3.4	−2.1	−2.1	−2.2	−2.8	−2.4	−2.3
Net Service	0.7	0.9	0.8	1.3	0.4	−0.2	−0.6	0.9	1.1	−0.3	1.2	2.0	0.4	−0.2	2.4	0.9
Intensive Margin																
Increases	23.8	22.0	23.0	25.1	21.8	18.5	22.6	14.5	22.6	24.3	39.7	37.8	24.3	21.8	21.0	25.5
Decreases	−18.9	−22.5	−24.2	−18.6	−24.5	−24.1	−31.3	−30.4	−19.0	−15.4	−17.6	−12.3	−16.6	−14.7	−22.6	−14.9
Net Intensive	4.9	−0.5	−1.2	6.4	−2.7	−5.5	−8.7	−15.9	3.6	8.9	22.2	25.5	7.7	7.1	−1.5	10.6
Total Change	6.0	0.1	0.2	8.2	−2.6	−5.7	−6.4	−15.3	3.5	9.3	19.0	27.5	8.0	6.8	1.9	12.6

Time-series Variation
Absolute contribution and relative performance: services



Contributions to Time-Series Variation
Absolute contribution and relative performance: size classes