

# Cross-Border and Foreign-Affiliate Sales of Services

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# Global service trade

- Service trade has increased at least as fast as trade in goods in the last two decades
- Improvements in tradability of services result from
  - Digitalization
  - Progress in communication technology
  - Growing network of multinational firms
- Service trade has become important in WTO negotiations
- Service trade has been fostered by deregulation on other levels (EU Service directive)

# (German) Service Trade is Trade in Business Services: Service Trade by Category, 2001-2010 in billion Euro

Category	Imports	Exports	Category	Imports	Exports
Transport	372.2	398.7	Construction	56.2	78.1
Insurance	324.4	321.6	Finan. Serv.	38.8	61.5
R&D	91.9	102.2	Communication	43.6	29.7
Comp./Inform.	75.5	80.5	Travel	68.9	4.4
Busin. Serv.	287.1	232.7	Other Serv.	86.6	46.8
Total	1460.3	1367.0			

Source: Biewen et al. (2013) Microdatabase: Statistics on international trade in services. Technical Documentation, Deutsche Bundesbank.

# Service Trade is mainly Business-to-Business

- Services are an important input in the value chain of many producers
- There are many more importers (163,442) than exporters (39,948)
- The concentration in both importing and exporting are high:
  - Firms that import from more than 50 countries (0.5% of the firms) import 48.5% of the value
  - Firms that export to more than 50 countries (0.9% of the firms) export 48.1% of the value
- Many importers and exporters are from the manufacturing sector
- Many importers and exporters are units of multinational firms

# Service trade pattern at the micro level

- WTO distinguishes four modes
  - Mode 1, 2, and 4 collapsed into one category: cross-border supply
  - Mode 3 commercial presence
- We study the (export) choice between commercial presence and cross-border supply
  - Value added generated at home or abroad
  - Commercial presence is more strongly affected by foreign regulation
- Do firms actually face a discrete choice?
- How strongly is this choice affected by political barriers?

# Choice of channel

- The research that is based on aggregate data...
  - often finds the channels to be complements
  - finds sector characteristics to be important
  - is likely to be affected by aggregation biases
  - finds attractive markets usually to attract service trade through both channels
- We study the channels at firm level and find...
  - strong evidence for a discrete choice
  - firm characteristics to be the main drivers of the decision
  - sector characteristics of trading firms to be important

# The Data

- Two confidential micro data sets from the *Deutsche Bundesbank*
- Whole population of German exporters and importers
- Cross-border supply from *Balance of Payments Statistics*
  - Every transaction with more than 12,500 Euro
  - Sector classification of trading firm
- Service exports through affiliates sales from *Microdata Direct Investment (MIDI)*
  - Information on foreign affiliates
  - Some information on parent firms including sector classification

# The Sample

- Data for 2005
- We excluded tourism and financial services
- Data for trade with 48 countries
- We use 9,848 observations (firm-country-service group-export channel)
  - 9,529 observations on cross-border exporters
  - 319 on German firms owning foreign service affiliates
- Firms use in 201 cases both channels for the same service group-country combination



# Discrete choice framework

- We assume a CES production function of a final good producer that includes intermediate services
  - Service supplier compare profits of the two channels when offering the services, respectively
  - If relative profits larger one, they choose production abroad

$$\frac{\pi_k^{fa}}{\pi_k^{cb}} = (\delta w_H)^{\sigma-1} \left[ \left( \frac{1}{w_F} \right)^{\sigma-1} - \frac{F_F}{B_F} \left( \frac{1}{\gamma_i} \right)^{\sigma-1} \right] \quad (1)$$

- $w$  wage
- $\delta$  trade costs of cross-border supply
- $F$  fixed costs
- $\sigma$  elasticity of substitution
- $B$  size of foreign demand
- $\gamma$  firm-specific productivity level

# Estimating a discrete choice

- Firm-country-product group-supply channel-combination unit of observation
- The strategies are actually mutually exclusive
  - Correlation between cross-border supply and commercial presence -0.98
  - 201 out of 9,647 combinations report both strategies

$$\begin{aligned} Mode_{ijf} = & \beta_0 + \beta_1 \ln(Productivity_i) + \beta_2 \ln(Wage_f) + \beta_3 \ln(Trade\ costs_{jf}) \\ & + \beta_4 \ln(Foreign\ operation\ costs_{jf}) + \beta_5 \ln(Market\ size_f) + u_{ijf} \end{aligned}$$

# Probit Regression Results: Choice of Channel, Marginal Effects

	P1 ( <i>GDP per capita</i> )	P2 ( <i>Wages</i> )
<i>Internationalization</i>	0.0004** (6.18)	0.0004** (6.31)
<i>ln(Wage)</i>		-0.0028* (-2.25)
<i>ln(GDP per capita)</i>	-0.001 (-1.12)	
<i>ln(Distance)</i>	0.0004 (0.06)	0.0003 (0.31)
<i>Border</i>	0.003 (0.98)	0.003 (1.46)
<i>ln(GDP)</i>	0.005** (5.31)	0.004** (4.51)
<i>Aff sales</i>	0.080** (4.83)	0.064** (3.66)
<i>Organizational costs</i>	0.013** (3.06)	0.017** (4.31)
<i>FDI restrictions</i>	0.007 (1.20)	0.001 (0.23)
<i>Heterogeneity</i>	0.001* (2.13)	0.001* (2.09)
Observations	10,997	9,647
Countries	76	48
Pseudo R2	0.22	0.23

# GOL Regression Results: Choice of Channel including no-supply, zero inflated sample

	Export participation	Cross-border vs. affiliate sales
<i>Internationalization</i>	0.063** (8.45)	0.063** (8.45)
$\ln(\text{Wage})$	0.385** (15.08)	-0.333** (4.08)
$\ln(\text{Distance})$	-0.544** (25.99)	0.306** (3.65)
<i>Border</i>	0.132** (3.57)	0.168 (1.00)
$\ln(\text{GDP})$	0.538** (37.15)	-0.009 (0.13)
<i>Aff sales</i>	2.88** (10.00)	2.350 (1.84)
<i>Organizational costs</i>	0.244* (2.20)	1.22** (4.77)
<i>FDI restrictions</i>	0.002 (0.02)	0.109 (0.27)
<i>Heterogeneity</i>	-0.013 (0.39)	0.189 (1.20)
Observations	131,140	131,140
Pseudo R2	0.29	0.29

# Robustness

We found our results robust with respect to the following checks and changes

- Poolability over the different sectors
- Change in ordering of the choices → using a MNP yields comparable results
- Regrouping of the foreign affiliate observations that included both channel users

# Summary

- We conducted a firm level analysis of the choice of service export channel
- We found at firm level mutually exclusive choices → we used a discrete choice framework
- Firm, service group, and country level variables are important
- Sector classification of the trading firm explains a lot
- Signs and size of coefficients robust to changes of sample and different decision structures
- The pattern of coefficients similar for different sectors
  - Exceptions: insurance, transport
  - Business services are very similar
- We used nearly the whole population of service exporters