# Motivation

- The location decision of multinational firms depends on the proximity to:
    - *markets and ease of access*
    - *low costs location*
    - *other firms*

- Intra vs. inter-sectoral linkages

Related Literature

- Barry, Görg and Stöbl (2004): Multinational firms may follow previous investors simply because earlier FDI projects lead to demonstration effects. To be distinguished to the agglomeration effect.

- Gross, Raff and Ryan (2004): Japanese Firm-level data. Evidence on "circular causation": manufacturing FDI attracts manufacturing and services FDI in the 70's but FDI in services attracts manufacturing FDI in the 80's.
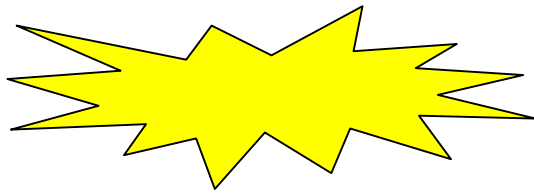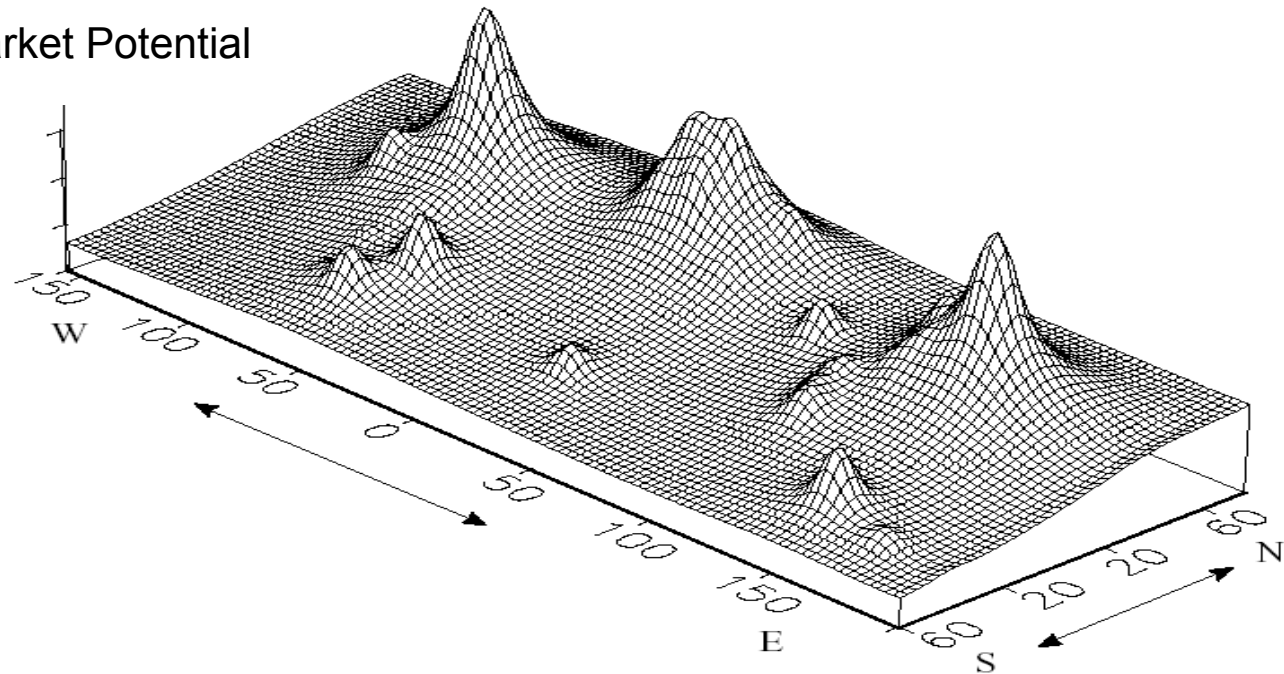
- New database: German firm level activities

Regional Distribution of German FDI (1999, % of Total German FDI)
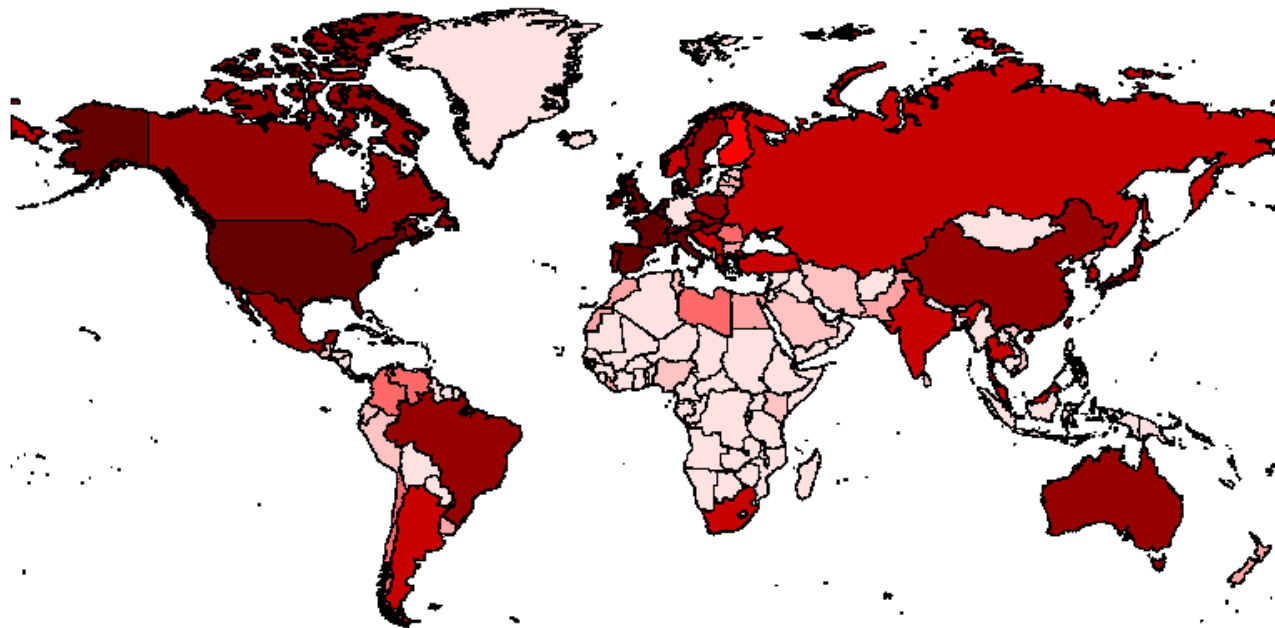
Market Potential

Agglomeration of German Firm

Country	Industry	Share of affiliates in industry *j* in country *i* in total German affiliates in country *i*	Share of affiliates in industry *j* worldwide in total German affiliates worldwide	Threshold values	Number of German affiliates in industry *j* in country *i*
Luxembourg	Financial Intermediation	0.44	0.08	0.24	160
Ireland	Financial Intermediation	0.35	0.08	0.24	100
Colombia	Chemicals	0.29	0.05	0.21	17
Canada	Business Services	0.29	0.13	0.21	151
Tunisia	Electrical Equipment	0.27	0.04	0.18	15
Venezuela	Chemicals	0.25	0.05	0.21	15
United States	Business Services	0.20	0.13	0.21	818
India	Machinery	0.17	0.04	0.10	46
Brazil	Machinery	0.14	0.04	0.10	77
Latvia	Wood Products	0.11	0.00	0.06	6
Brazil	Transport Equipment	0.09	0.03	0.08	50
Mexico	Transport Equipment	0.09	0.03	0.08	15
South Africa	Transport Equipment	0.07	0.03	0.08	27
Czech Republic	Rubber and Plastic Products	0.05	0.02	0.05	57

Notes: Results reported in this Table have been obtained from the database *International Capital Links* from the *Deutsche Bundesbank*. The threshold values are computed as twice the standard deviation from the mean of industry *j*'s shares in all countries. The share of industry *j* in country *i* is significantly different from the mean of *j*'s industry share if it exceeds this threshold value. For the calculation of the mean and the critical values, countries with less than 50 German affiliates are excluded to cope with outliers. Also, affiliates that are active in the wholesale trade sector have been excluded from the analysis.

Methodology

Agglomeration or Demonstration Effect?

Controlling for the attractivity?

Use the total number of German Multinational in the host country

Intra- vs. Inter-sectoral Linkages?

Add three additional explanatory variables

- Percentage of firm active in one sector
- Percentage of firm active in Manufacturing
- Percentage of firm active in Services

Example:

For a firm that is active in the chemicals industry I include, first, the percentage of German firms in the chemicals industry; second, the percentage of German firms in the manufacturing sector excluding firms in the chemicals industry; and, third, the percentage of firms active in services sectors.

Since the three variables add up to one, they are perfectly collinear which implies that the three effects cannot be measured independently. Instead, I arbitrarily choose one variable as reference point and drop it from the regressor list.

Estimation Strategy

- The database provides a sector code for each affiliate, which can be aggregated using the 2-digit NACE classification. The study thus uses four years of data, from 1996 to 1999.

- Since some German firms are not present in all sectors in all countries, the dependent variable take a value of zero for a significant fraction of the observations. **Tobit estimation correcting heteroscedasticity and serial correlation**.

Results

Dependent variable: Individual German Multinationals' Foreign Employment

Proximity to a given market and its ease of access

- Particularly strong in manufacturing industries.

Proximity to low costs location

- In all sectors.

Proximity to other firms

- An increase of the number of firm in Services and Manufacturing has a positive effect on German multinational foreign employment. The agglomeration forces are stronger between sectors than within the industry under consideration or the competition effect in this industry prevails.

Sector NACE: Manufacturing	MK_{jt}	N_{jt}	$Nser_{jt}$	$Nman_{jt}$	ULC_{jt}	$RSKILL_{j}$	$SIZE_{it}$	$RISK_{jt}$	Accession	OECD	Log-Likelihood	Obs.
Food products, beverages and tobacco	0.075** (0.043)	0.389*** (0.000)	1.006*** (0.000)	1.264** (0.026)	-0.173 (0.467)	0.094** (0.018)	0.173*** (0.000)	0.745*** (0.000)	0.785 (0.800)	1.799** (0.013)	-4038.92	736
Textiles and textile products	0.043 (0.128)	0.354*** (0.000)	0.480*** (0.000)	1.640*** (0.000)	-0.498* (0.077)	0.107 (0.113)	0.251*** (0.000)	0.267*** (0.008)	7.668 (0.153)	0.599* (0.092)	-3603.92	607
Wood and wood products	0.078 (0.164)	0.440** (0.043)	0.889*** (0.000)	-0.002 (0.998)	-1.002** (0.025)	0.134 (0.342)	-0.129 (0.200)	0.391*** (0.010)	20.426* (0.073)	0.522 (0.448)	-1242.70	220
Pulp, paper, publishing and printing	0.112*** (0.000)	0.485*** (0.000)	1.286 (0.000)	1.424*** (0.000)	-0.572*** (0.002)	0.045 (0.305)	0.289*** (0.000)	0.240*** (0.003)	10.180** (0.032)	1.089*** (0.001)	-3285,53	614
Chemical and man-made fibres	0.059** (0.010)	-0.048 (0.415)	0.166** (0.015)	1.783*** (0.000)	-0.742*** (0.000)	0.032 (0.240)	0.355*** (0.000)	0.310*** (0.000)	22.967*** (0.000)	-0.004 (0.979)	-6460,65	1300
Rubber and plastic products	0.048* (0.057)	0.172** (0.023)	1.258*** (0.000)	0.957*** (0.001)	-0.635*** (0.002)	0.009 (0.841)	0.177*** (0.000)	0.234*** (0.001)	17.536*** (0.013)	0.439 (0.117)	-5756,85	1058
Other non-metallic mineral products	0.110*** (0.000)	0.352*** (0.000)	0.820*** (0.000)	1.661*** (0.000)	-1.302*** (0.000)	0.063 (0.180)	0.384*** (0.000)	0.395*** (0.000)	51.306*** (0.000)	1.042*** (0.001)	-4239,45	793
Basic metals and fabricated metal products	0.099*** (0.000)	0.274*** (0.000)	0.728*** (0.000)	0.982*** (0.000)	-0.793*** (0.000)	-0.023 (0.383)	0.137*** (0.000)	0.201*** (0.000)	26.452*** (0.000)	1.004*** (0.000)	-9410,15	1705
Machinery and equipment	0.056*** (0.000)	0.216*** (0.000)	0.468*** (0.000)	1.374*** (0.000)	-0.636*** (0.000)	-0.002 (0.929)	0.237*** (0.000)	0.261*** (0.000)	15.235*** (0.000)	0.245*** (0.000)	-8202,87	1413
Electrical and optical equipment	0.118*** (0.000)	0.073 (0.286)	0.243** (0.017)	1.856*** (0.000)	-1.047*** (0.000)	-0.061* (0.068)	0.266*** (0.000)	0.508*** (0.000)	35.279*** (0.000)	0.320*** (0.002)	-6929,35	1184
Transport equipment	0.064** (0.019)	0.140 (0.360)	0.331** (0.037)	1.655*** (0.000)	-0.790*** (0.000)	0.106** (0.019)	0.268*** (0.000)	0.647*** (0.000)	20.519*** (0.001)	0.271 (0.336)	-5679,89	1020
Furniture; manufacturing n.e.c	0.074** (0.036)	0.445*** (0.000)	1.302*** (0.000)	1.658** (0.050)	-0.617*** (0.000)	0.000 (0.997)	0.093* (0.055)	0.300** (0.031)	9.528*** (0.010)	2.247*** (0.000)	-2251,89	396

Sector NACE: Services	MK_{jt}	N_{jt}	$Nser_{jt}$	$Nman_{jt}$	ULC_{jt}	$RSKILL_{jt}$	$SIZE_{it}$	$RISK_{jt}$	Accession	OECD	Log-Likelihood	Obs.
Construction	0.068*** (0.001)	0.233 (0.167)	0.677*** (0.000)	1.511*** (0.003)	-0.545 (0.215)	-0.112 (0.192)	0.289*** (0.000)	0.101 (0.215)	20.771 (0.315)	1.692 (0.174)	-2708,24	521
Wholesale and retail trade	0.011** (0.015)	0.680*** (0.000)	0.902*** (0.000)	0.944*** (0.000)	-1.103*** (0.000	-0.282*** (0.000)	0.305*** (0.000)	-0.06*** (0.000)	11.320*** (0.000)	10.159*** (0.000)	-69024,47	15574
Transport, storage and communication	0.042** (0.021)	0.552*** (0.000)	-0.009 (0.951)	1.665*** (0.000)	-1.198*** (0.000)	-0.065* (0.095)	0.152*** (0.000)	0.214*** (0.003)	56.643*** (0.000)	1.427*** (0.000)	-5033,98	945
Financial intermediation	0.041* (0.063)	0.342*** (0.000)	-0.020 (0.854)	2.161*** (0.000)	-0.496*** (0.003)	0.085* (0.059)	0.224*** (0.000)	0.305*** (0.000)	14.496*** (0.026)	0.127 (0.607)	-4050,52	727
Real estate and business activities	0.035*** (0.005)	-0.091** (0.013)	1.024*** (0.000)	0.577*** (0.000)	-0.010 (0.834)	-0.007 (0.674)	0.162*** (0.000)	0.013 (0.709)	-0.345 (0.603)	-0.668*** (0.000)	-9652,07	1568