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Export Scope and Characteristics of Destination Countries: Evidence from German Transaction Data

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Export Scope and Characteristics of Destination Countries: Evidence from German Transaction Data*

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Abstract:

This paper uses information on export transactions by German firms from 2011 to document the role of characteristics of destination countries for export scope, where export scope is defined as the number of different products a firm exports to a destination market. It demonstrates that in line with theoretical hypotheses intra-firm differences in export scope across destination countries are related to differences in the distance between Germany and the countries of destination, differences in the economic size and the per capita income of these countries, and in the ease of doing international trade with the countries.

JEL Classification: F14

Keywords: Export Scope, Transaction level data, Germany

* All computations were done at the research data center of the Federal Statistical Office in Wiesbaden. The transaction level data used are strictly confidential but not exclusive, see www.forschungsdatenzentrum.de for access. To facilitate replication the Stata do-file used is available from the author on request.

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1. Motivation

Export activities differ widely between firms, and the reasons why this is the case are core topics in the huge and growing literature on the micro-econometrics of international firm activities. Recently, empirical studies in this field are more and more based on transaction data that are usually collected by the customs in a country and that include information on which firms trade which goods of which value and weight with customers in which countries (see Wagner 2016a for a survey of this literature).

Empirical studies based on this type of data reveal a number of interesting new stylized facts. Studies on Germany which is number three among the exporters in world merchandise trade (World Trade Organization 2016, p. 94) are a case in point. Exports tend to be highly concentrated in the largest exporting firms. While there are 100,000 and more exporting firms, the largest 3 exporters cover more than ten percent of total exports, the largest 50 exporters contribute more than a third of all exports, and the share of the largest 100 exporters is 40 percent. On average, the exporting firms serve more than 60 different markets. The bulk of firms is active on a much smaller number of export markets – the median value is 6 markets in 2010 to 2012. Some firms, however, export to a much larger number of markets. Firms from the top one percent of the distribution of the number of markets export to more than 1,000 different markets, where exporters with the very largest number of markets served cover many thousand export markets. Multi-market exporters play a decisive role for exports as a whole – the share of exporters with the 100 largest numbers of markets is 30 percent of total exports (for details, see Wagner 2018).

We now have sound empirical evidence that the extensive margins of exports (participation in exports; number of goods exported; number of countries exported to) in German firms are positively linked with firm characteristics like size, productivity,

human capital intensity, innovativeness, firm age, and foreign ownership (Wagner 2018).

Less well documented are the links between the export activities of firms and characteristics of destination countries. Wagner (2017) reports that, in line with stylized facts based on aggregate data, the quantity of exports declines significantly with distance between Germany and the destination country within a firm for a given product. Wagner (2016b) finds that, in line with theory, the quality of exported goods and distance to destination countries are statistically positively correlated.

To the best of my knowledge we have no information on the link between the export scope – the number of different products a firm exports to a destination market – and characteristics of this market.[1] This note attempts to fill this gap by looking at export transactions from German firms.

2. Hypotheses and data

The number of different goods exported by firm i to destination j is defined as the *export scope*$_{ij}$ in a given year, where products are distinguished here according to the Harmonized System at 6-digit level (HS6). A German firm with a given portfolio of products has to decide which of these products to export to which destination countries, i.e. it has to choose its export scope for each market j. Export costs vary between products and between destination countries. For a given product, export costs will increase with distance of the destination country to Germany due to higher

[1] Note that Arkolakis and Muendler (2013) deal with a different topic by looking (among others) at the mean exporter scope (defined as the average number of products per firm) and its association with the size of the destination markets using data from Brazil, Chile, Denmark and Norway. Boehe, Qian and Peng (2016) look at another different topic from the international marketing strategy literature. In their paper export scope refers to the dispersion of activities of a firm across foreign countries which is also known under the export market concentration versus diversification debate.

transportation costs including longer time to send a good to the destination market. For exports to be profitable, these costs have to be covered by the price of the good the firm can set on the destination market. The larger the distance to Germany and the higher these export costs are, the more difficult this will be. Therefore, we expect the number of different goods to be exported by one firm to one destination – the export scope - to decrease ceteris paribus with distance to Germany:

H1: *The export scope of a firm decreases with distance to the destination country.*

Data on *distance to export destination* between Germany and the destination countries of exports are taken from the CEPII's *GeoDist* database (Mayer and Zignago 2011). The "distw" – measure is used that calculates the distance between two countries based on bilateral distances between the biggest cities of those two countries, those inter-city distances being weighted by the share of the city in the overall country's population (see Mayer and Zignago (2011, p. 11) for details).

Besides distance-related transportation costs there are other destination – specific costs the exporting firm has to consider.[2] Ease of trading across borders in a country is proxied by an index that is taken from the World Bank's *Doing Business* project. It measures the time and cost (excluding tariffs) associated with exporting and importing a standardized cargo of goods by sea transport (including document preparation, customs clearance and inspections, but excluding the cost of transportation itself). The index measures the distance of a country to a best-practice frontier on a scale from 0 to 100, where 0 represents the lowest performance and

[2] Evidently, tariffs and non-tariff barriers do matter here, too, but these are product-specific, and, therefore, cannot be measured adequately for trade with a country as a whole.

100 the frontier. The data used can be downloaded free of charge at http://www.doingbusiness.org/data/exploretopics/trading-across-borders/frontier.

For reasons identical to those discussed with regard to distance of a destination country to Germany, we expect the number of different goods to be exported by one firm to one destination – the export scope - to be higher ceteris paribus when the *Doing Business* index is higher.

H2: *The export scope of a firm increases with the value of the Doing Business index of the destination country.*

Destination markets do not only differ with regard to export costs, they do differ with regards to (potential) gains, too. Firms can expect that it is easier to recover any fixed costs related to exporting a good to a country when the local market is larger. Therefore, we expect the export scope of a firm to increase ceteris paribus with the size of the destination market.

H3: *The export scope of a firm increases with the size of the destination market.*

Market size here is proxied by the Gross Domestic Product (GDP) of the country of destination, measured in Millions of US-Dollar in current prices. Information is taken from the World Bank World Development Indicators database (see http://data.worldbank.org/indicator/NY.GDP.MKTP.CD).

Furthermore, firms can expect that it is easier to recover export related costs and to sell products at profitable prices when the average income of the customers in

the market is higher. Therefore, we expect the export scope of a firm to increase ceteris paribus with the per capita income in the destination market.

H4: *The export scope of a firm increases with the per capita income in the destination market.*

GDP per capita is measured in current prices and U. S. dollars. Data are from the International Monetary Fund's World Economic Outlook Data Base, April 2012 edition (see https://www.imf.org/external/pubs/ft/weo/2012/01/weodata/index.aspx).

Following the standard approach from the huge gravity literature in the empirical models estimated here a dummy-variable that takes the value 1 if a country is landlocked and has no direct access to the sea is included as a control variable. Information is taken from the CEPII's *GeoDist* database (Mayer and Zignago 2011).

3. Econometric investigation

The empirical investigation uses transaction data for German exports in 2011 (described in detail in Wagner 2018) to test the four hypotheses detailed in section 2. The dependent variable in the empirical models is the export scope, measured by the log of the number of different HS6-goods exported by a firm i to a destination country j. If a firm exports to, say, eight countries, we have, therefore, eight observations for the export scope of this firm.

In a first step, the four hypotheses are tested one at a time. Results are reported in column 1 to 4 of table I. Note that each empirical model includes fixed effects for 119,210 firms, so that the estimated coefficient indicates the within-firm variation of export scope across destination countries due to variation of the

respective destination country characteristic. Standard errors are clustered at the level of the exporting firm.

Results reported in column 1 to 4 are fully in line with the theoretical hypotheses. Export scope within a firm tend to be smaller in destination countries that are farther away from Germany and larger in countries for which Doing Business with is easier, that are larger and have a higher per-capita income.[3]

Column 6 shows that these results hold ceteris paribus, too. The bottom line, then, is that within a firm the export scope varies with characteristics of the destination countries is a way that is consistent with the four hypotheses developed in section 2 above.

References

Arkolakis, Costas and Marc-Andreas Muendler (2013), Exporters and Their Products: A Collection of Empirical Regularities. *CESifo Economic Studies* 59 (2), 223-248.

Boehe, Dirk Michael, Gongming Qian, and Mike W. Peng (2016), Export intensity, scope, and destinations: Evidence from Brazil. *Industrial Marketing Management* 57 (1), 127-138.

Mayer, Thierry and Soledad Zignago (2011), Notes on CEPII's distance measures: The GeoDist database. CEPII Document de Travail No 2011-25, December.

Wagner, Joachim (2016a): A survey of empirical studies using transaction level data on exports and imports. *Review of World Economics* 152 (1), 215-225.

Wagner, Joachim (2016b): Quality of Firms' Exports and Distance to Destination Countries: First Evidence from Germany. *Open Economies Review* 27 (4), 811-818.

[3] For completeness, column 5 reports the results for the control variable landlocked.

Wagner, Joachim (2017): Distance-sensitivity of German exports: first evidence from firm-product level data. *Applied Economics Letters* 24 (3), 140-142.

Wagner, Joachim (2018): Active on Many Foreign Markets: A Portrait of German Multi-market Exporters and Importers from Manufacturing Industries. *Journal of Economics and Statistics* 238 (2), 157-182.

World Trade Organization (2016): World Trade Statistical Review 2016. Download: https://www.wto.org/english/res_e/statis_e/wts2016_e/wts16_toc_e.htm.

Table I: Export scope and characteristics of destination countries - German exports in 2011

Characteristic of destination country	Model	1	2	3	4	5	6
Log (Distance to Germany) in km	ß	-0.194					-0.198
	p	0.000					0.000
Log (Doing Business Index)	ß		0.278				0.071
	p		0.000				0.000
Log (Gross Domestic Product) in Million US-$	ß			0.118			0.144
	p			0.000			0.000
Log (Gross Domestic Product per head)	ß				0.160		0.004
	p				0.000		0.000
Landlocked (Dummy; 1 = yes)	ß					0.219	0.170
	p					0.000	0.000
Constant	ß	2.409	-0.244	-0.561	-0.630	0.913	0.209
	p	0.000	0.000	0.000	0.000	0.000	0.000
Firm fixed effects		yes	yes	yes	yes	yes	yes
R-squared		0.5608	0.5407	0.5588	0.5556	0.5413	0.5943
Number of firm-good-country Combinations		1,017,587	1,017,587	1,017,587	1,017,587	1,017,587	1,017,587
Number of firms		119,210	119,210	119,210	119,210	119,210	119,210

Note: The dependent variable is the log of the number of different HS6-goods exported by a firm to a destination country. For a definition of the country characteristics see text. Standard errors are clustered at the level of the exporting firm.

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