European
Firms
In a
Global
Economy

Balázs Muraközy

Margins of Hungarian exports during crisis

European
Firms
In a
Global
Economy EFIGE

SEVENTH FRAMEWORK PROGRAMME

Margins of Hungarian export during crisis[*]

Balázs Muraközy[†] (Institute of Economics, CERS-HAS)

Abstract: The aim of this paper is to analyze the decline of exports of Hungary during the financial crisis of 2008-2009 in detail. The fall of export is decomposed into intensive and extensive margins in order to investigate the importance of different explanations of the collapse of exports. The results show that relatively few firms exited, while the fall of the intensive margin was responsible for about 80 percent of the fall in exports. The Hungarian pattern is in line with results emphasizing the role of demand, as the fall in the GDP of destination markets is closely related to the fall in exports. The fall in exports of intermediate goods is larger than that of consumption goods, which suggests that inventory adjustments matter. Finally, the decline of exports was significantly larger for foreign-owned firms than for domestic firms, which is in line with explanations emphasizing the role of the production chain.

Keywords: margins of export, financial crisis, exporting

JEL codes: F14, F23

[†] murakozy@econ.core.hu, Institute of Economics, CERS-HAS, Budaörsi út 45, Budapest 1112 Hungary.

1   Introduction

During the financial crisis of 2008-2009 international trade collapsed to a larger extent than GDP; while world industrial production decreased by 6.5 percent, the decline in merchandise trade was 12.8 percent. The subject of this paper, Hungary, a small open economy, was hit by the crisis hardly between 2008 and 2009. In volume terms, GDP fell by 6.8 percent, exports declined by 10.2 percent while imports fell by 14.8 percent.[3] Understanding the detailed mechanisms behind trade collapse may shed light on the mechanisms that can explain it and can also provide important guidance for economic policy when it attempts to mitigate the effect of macroeconomic shocks.

The literature on heterogeneous firms (Melitz, 2003; Chaney, 2008) has shown that different firms may react markedly differently to trade liberalization or macroeconomic crises. For example, more productive firms may cut back their export volume, while smaller firms may exit from exporting. These two types of adjustments are reflected in the extensive and intensive margins: the extensive margin reflects the number of exporting firms and the intensive margin is the average export volume or revenue of exporting firms. Theories of multi-product firms (Bernard et al. 2010; 2011) also show that firms may adjust their exports by introducing new products to their export markets, or start exporting to new countries. Based on these theories, the number of products exported by a firm or the number of export markets served by an exporter can also be considered as part of the extensive margin.

Accordingly, the change in export volume can be decomposed to the change in the extensive and intensive margins, respectively. This decomposition exercise has proved useful when studying the effects of the great recession. The margins of adjustments provide important information about export behavior and may be useful in uncovering the causes of the sharp decline; for instance, it may help distinguish between supply and demand side explanations. The decomposition for different markets and different types of firms helps understand the heterogeneity of the reaction to crisis, and may assist policymakers targeting firms which respond to the greatest extent to the available policy instruments.

---

[3] Source: Eurostat

Indeed, this approach proved very effective for the analysis of the effects of crises for many countries. One of the first examples is Bernard et al. (2009), who investigated the reaction of the margins of US export to the Asian financial crisis in 1997-1998. Motivated by this work, a number of papers employed this approach to study the 2008-2009 crisis. One of the most comprehensive studies is Haddad et al. (2011), who used data from EU countries, Brazil, Indonesia and the United States. The evidence from this study shows that the intensive margin mattered more than the extensive margin. The decrease of the intensive margin is composed of the decline of quantities and prices. There are differences in the composition of the intensive margin across products: while price decrease was dominant in explaining the change in the intensive margin when commodities are considered, the price of manufacturing goods did not decrease. According to the authors, this suggests that the fall of demand played a more important role for commodities, while supply side frictions were more important within manufacturing. Similarly, Gopinath et al. (2011) have shown that prices of non-differentiated goods decreased, while prices of differentiated goods did not change during the crisis.

A number of studies have reinforced that the intensive margin played a more important role in the trade decline during the 2008-2009 crisis. Jing shows this for China, Behrens et al. (2010) for Belgium and Schott (2009) for the USA. Bricongne et al. (2011) analyze monthly French trade data for 2008-2009 to conclude that the role of the extensive margin was relatively minor, and the majority of the large decline in French exports was explained by the fall of the intensive margin of large exporters. They also show, however, that after controlling for sectoral and geographical factors, small and large firms were similarly affected by the crisis.

In this paper we attempt to study the behavior of different margins of Hungarian exports. In particular, our interest lies in three questions. First, we are interested in the role of demand at the destination market (proxied by the change in GDP) as a determinant of the extent of trade decline. Second, we concentrate on the correlation between the extensive and intensive margins across destination markets. Third, we study the heterogeneity of the decline of margins across different product groups, continents and different types of firms.

Our main conclusion, in line with previous findings from other countries, is that the intensive margin played the dominant role in the reaction to the crisis. The change in this margin is also more highly correlated with GDP change than that of the extensive margin. We also show that foreign- and domestic-owned firms reacted quite differently to the crisis: the fall in the exports of foreign-owned firms was much higher at both margins. Finally, very small and very large firms curtailed their exports the most, while medium-sized firms fared the crisis somewhat better.

2   Possible explanations for the trade collapse

Our methodology which emphasizes different margins of adjustment and heterogeneity in terms of products, markets and firms is strongly related to empirical attempts to quantify the different mechanisms responsible for the trade collapse. Several such explanations were suggested in the literature.

A number of authors emphasize that the structure of the demand shock (e.g. the disproportional fall in the demand for durable goods and capital) in itself can explain the majority of the observed trade decline. Eaton et al. (2011) simulate the Eaton-Kortum model to assess the contribution of different channels. They show that about 80% of trade decline can be explained by the demand fall.

In line with this argument, the decline in trade volume differed across product groups. Jing (2011), for example, analyzed Chinese export to find that exports of capital and intermediate goods fall more severely but later than that of consumption goods. The results also suggest that exports in differentiated goods contracted sooner than that of homogeneous ones. Gopinath et al. (2011) found that the evolution of trade prices also differed across product groups. Price decrease was insignificant for differentiated goods, while prices of non-differentiated goods decreased. Price decrease was also larger for durable differentiated goods, but its magnitude was still small.

A second explanation emphasizes the role of global production in the transmission of the crisis. With international fragmentation of production inputs and semi-finished goods may cross border several times until the final good is assembled. In such an integrated global economy, a fall in the demand for the final good may lead to a

disproportional decrease in trade. One of the earliest results underlining the importance of this mechanism was provided by Bernard et al. (2009), who found that related party and arms-length trade behaved differently both in cross section and in time-series during the Asian crisis in 1997-98. Several authors studied the importance of this mechanism during the crisis of 2008-2009 (Anderton and Tewolde, 2011; Bems et al., 2010; Yi, 2009; Cheung and Guichard, 2009).

The third important explanation is the collapse of trade finance (Chor and Manova, 2010). Several models attempt to explain the emergence and characteristics of trade finance (Ahn, 2011; Antras and Foley, 2011). These models emphasize the crucial importance of finance in international trade and suggest that frictions in terms of financing may lead to a large decrease in trade.

Paravisini et al. (2011) use instrumental variable strategy to estimate the effect of finance on exports from Peru. The authors show that trade finance affected the intensive margin and the continuation margin, but it did not have an impact on entry. The decline of financing did work by affecting the variable costs of production, rather than the working capital requirement. Nonetheless their model suggests that trade finance played a smaller role in trade collapse than the fall of demand.

Ahn et al. (2011) argues that the difference between price change of exported vs. domestic sales can be a proxy for supply side shocks, i.e. the trade cost shock. Indeed, this difference was the largest after the fall of Lehman, and it was larger for sea shipping, where it matters the most, than for other transportation modes.

Amiti and Weinstein (2011) use a unique dataset which matches Japanese firms and their main banks. They argue convincingly, that more aggregated data is not suitable because it cannot distinguish between general firm financing and trade finance. The results suggest that the deterioration of the finances of banks leads to smaller export growth of the firms related to them. This effect is large economically.

A forth explanation emphasizes the role of inventory adjustments (Alessandria et al, 2010a; 2010b). As demand falls, importers require smaller inventories, and this

adjustment leads to smaller orders and a sharp drop in trade. After the inventories reach the desired level, trade recovers to some extent.

3   Data and methods

The dataset used in this paper was composed by merging detailed trade data with firm-level financial statements. While the data is available from 2004 to 2009, we have used only 2008 and 2009 to investigate the effect of the crisis on Hungarian exports.

The detailed trade dataset includes firm-product-destination level observations. The product dimension of the data is at the 8-digit Harmonized System level. The dataset includes both the value (in Euros as well as Hungarian Forints) and the physical quantity of each trade flow. Similarly to the external trade data collection systems of other EU member states, different thresholds apply for extra- and intra EU trade. As the difference in the thresholds may affect the decomposition, we implemented all calculations both for total Hungarian trade and extra-EU trade. The results for these two sets of countries were similar and in order to conserve space in this paper we report results only for extra-EU trade. The exception is the case when we report results by continent, when we distinguish between the EU and non-EU Europe.

In this paper we focus on direct trade by firms. In order to do this, the trade data is merged with financial data of manufacturing firms supplied by the National Tax and Customs Administration (NAV). The data includes information from both balance sheets and profit-and-loss statements. This firm-level dataset was merged with the trade data by the Hungarian Statistical Office. Table 1 shows observations per year in the customs data at basic aggregates:

Table 1: Number of observations

	2008	2009
Firms	10288	9796
Firm-product	107221	108230
Firm-country	43664	43489
Firm-product-country	233775	243092

In the paper we distinguish between the extensive and intensive margins of trade. While there are a number of different approaches to define these margins, we use a simple and transparent solution. The *extensive margin* is defined as the number of firm-country combinations, while the *intensive margin* is calculated by dividing the total export revenue in a given direction (measured in Euros) with the extensive margin. Hence it represents the average export revenue of an exporting firm from a destination country where it is active.

Our main aim is to trace the evolution of both the extensive and intensive margins in different directions, for different product groups and for different types of firms. In terms of geography, we calculate both margins for each continent dividing Europe into the EU-27 and the rest of the continent.

When considering product types, we distinguish between durables and non-durables on the one hand, and consumption goods versus goods used mainly in the production process on the other. We use the Broad Economic Category (BEC) classification and the relevant concordance between the Harmonized System and BEC provided by the United Nations.[4] Our main aim is the comparison of different good categories rather than an exhaustive decomposition of total exports. Hence, we report a number of categories which we consider as characteristic in terms of durability or aim of use, and other goods (for example commodities) are not reported to save space.[5]

We also investigate the behavior of different margins of different types of firms. First, we distinguish between foreign-owned and domestic-owned firms. All firms with a foreign share above 10 percent are classified as foreign-owned. We also study the relationship between firm size and export. We classify firms according to the number of their employees. Four categories are created: (i) less than 20 employees, (ii) 21-50 employees, (iii) 51-250 employees and (iv) more than 250 employees.

---

[4] The description of BEC classification can be found at
http://ec.europa.eu/eurostat/ramon/other_documents/bec/BEC_Rev_4.pdf , while the concordance is
http://ec.europa.eu/eurostat/ramon/other_documents/index.cfm?TargetUrl=DSP_OTHER_DOC_DTL#cn
[5] The categories are the following (BEC code at parentheses): Industrial supplies not elsewhere classified (2*), Capital goods (41*), Parts and accessories (42*), Transport equipment (51*+52*), Parts of transport equipment (53*), Durable consumer goods (61*), Semi-durable consumer goods (62*), Non-durable consumer goods (63*)

Our main interest lies in the reaction of margins to economic conditions in the partner country. We proxy the fall in demand with the change in GDP in the destination country. In order to do this, we estimate the following equation:

(1) $d \ln margin_k^j = \beta_0 + \beta_1 d \ln GDP_k + \gamma X_k + \varepsilon_k,$

where k indexes destination markets, $d \ln margin_k^j$ is the ln change in the j margin, where j can be total exports, the intensive or the extensive margin. X_k is a vector of controls, including ln distance or continent dummies where appropriate. Our main interest is in β_1 which shows the elasticity of the margin in terms of destination country GDP. The comparison of this coefficient for different margins may shed light on the adjustment strategies of firms for a fall in demand.

The question of the margin of adjustment can also be examined from another angle by calculating the correlation between the change in total exports and the change in the extensive and intensive margins. In particular, we estimate the regression:

(2) $d \ln export_k = \beta_0 + \beta_1 d \ln margin_k^j + \varepsilon_k$

The R^2 of this equation shows how much of export change is explained by the extensive and the intensive margin, respectively. The advantage of these correlations is that calculating them does not involve an assumption about the relationship between export change and GDP change.

A related method is to study the relationship between the change of extensive and intensive margins. Generally we use scatterplots for this and characterize the relationship with fitting spline functions.

4   Results

4.1   Products

Table 2 shows the change in total export, the extensive and intensive margins by product category. Total manufacturing firm exports fell by 17.7 percent, which is much larger than the fall in Hungarian GDP (6.7 %). The fall is mainly a consequence of the

decrease of the intensive margin, which fell by 14.17 percent. Exit at the firm-country level (the extensive margin) decreased by 3.56 percent.

Considering the differences across product groups, there is a marked difference between consumption goods and goods mainly used for production. The fall in exports of consumption goods was smaller than the average: export of non-durable, semi-durable and durable consumption goods decreased by 6.31, 12.28 and 8.29 percent, respectively. The fall in the exports of different industrial supplies was larger than average, while the fall in the export of capital goods was very similar to the average.

The difference in terms of durability is less pronounced than the difference between consumption goods and industrial supplies. This pattern provides some evidence for the hypothesis that inventory adjustments by firms and the related collapse in the global production chain played a major role in the trade collapse rather than the delayed consumption of durable goods.

The relative importance of the extensive and intensive margin is similar for the different categories of goods: the fall of the intensive margin is much larger than that of the extensive margin. The only exceptions are durable consumption goods and parts of transportation equipment, where the fall of the extensive margin was predominant.

Table 2: Change in different margins by product categories (percent)

Category	Export	Extensive	Intensive
Total	-17.73	-3.56	-14.17
Capital	-17.18	-4.39	-12.79
Durable cons.	-8.29	-10.31	2.02
Ind. supplies	-15.51	-1.15	-14.35
Non-durable cons.	-6.31	-1.68	-4.63
Parts and accessories	-8.85	0.77	-9.62
Parts of trans. equip.	-20.68	8.02	-28.70
Semi-durables cons.	-12.28	-7.45	-4.82
Parts of transport equipment	-66.96	-44.67	-22.28

Our second question concerns the relationship between the fall in GDP at the destination country and the different margins of Hungarian trade. We have estimated the elasticities with (1) and report the point estimates in Table 3.

The elasticity of total exports shows that 1 percent change in destination market GDP leads to 0.89 percent fall in total Hungarian exports to that country. While this point estimate is below one, its confidence interval is relatively large. The regression results also reinforce the earlier conclusion that the adjustment along the intensive margin is a more important factor in explaining the extent of trade decline than the extensive margin.
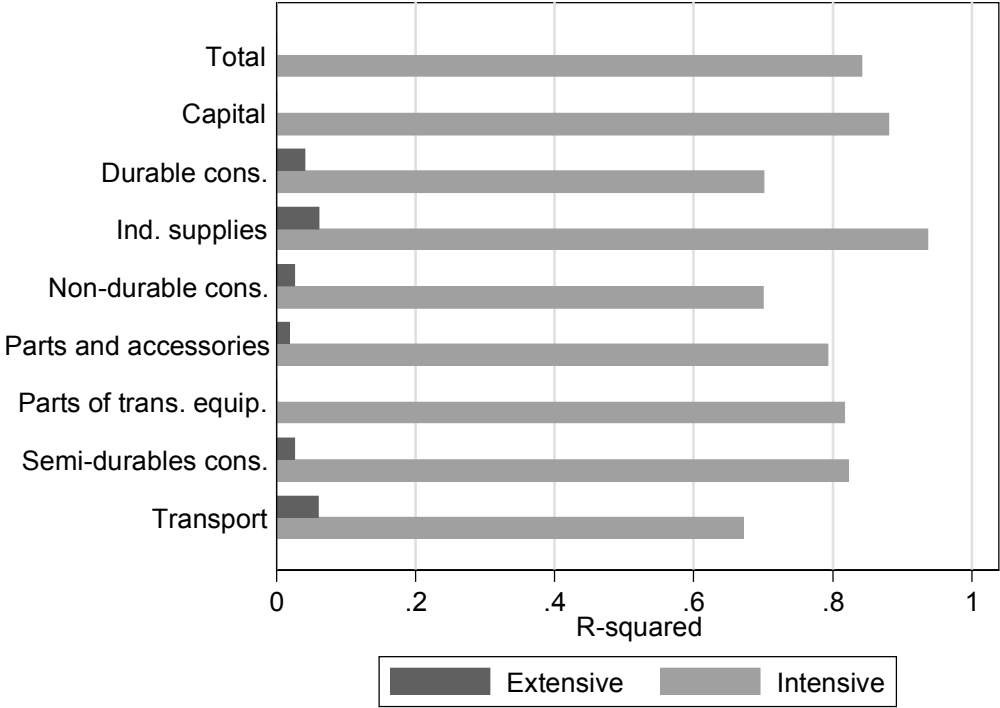
When considering different product groups, the estimates are quite imprecise, and some of them are negative. While in terms of total exports the change in GDP is a relatively good measure of fall in demand, when specific product groups are considered, more refined measures may be more appropriate.

Table 3: The elasticity of different margins with respect to destination GDP

Category	Export	Extensive	Intensive
Total	0.887	0.267	0.620
Capital	1.070	0.308	0.762
Durable cons.	1.467	-1.269	2.736
Ind. supplies	0.696	0.201	0.495
Non-durable cons.	-0.183	-0.768	0.585
Parts and accessories	-0.807	0.376	-1.183
Parts of trans. equip.	1.636	0.236	1.400
Semi-durables cons.	0.306	0.864	-0.558
Parts of transport equipment	3.232	3.332	-0.100

Figure 1 shows the relationship between the two margins and total exports. This confirms from a different angle that the change in total exports is mainly determined by the change in the intensive margin: it explains 83 percent of the variation of total exports change across countries.
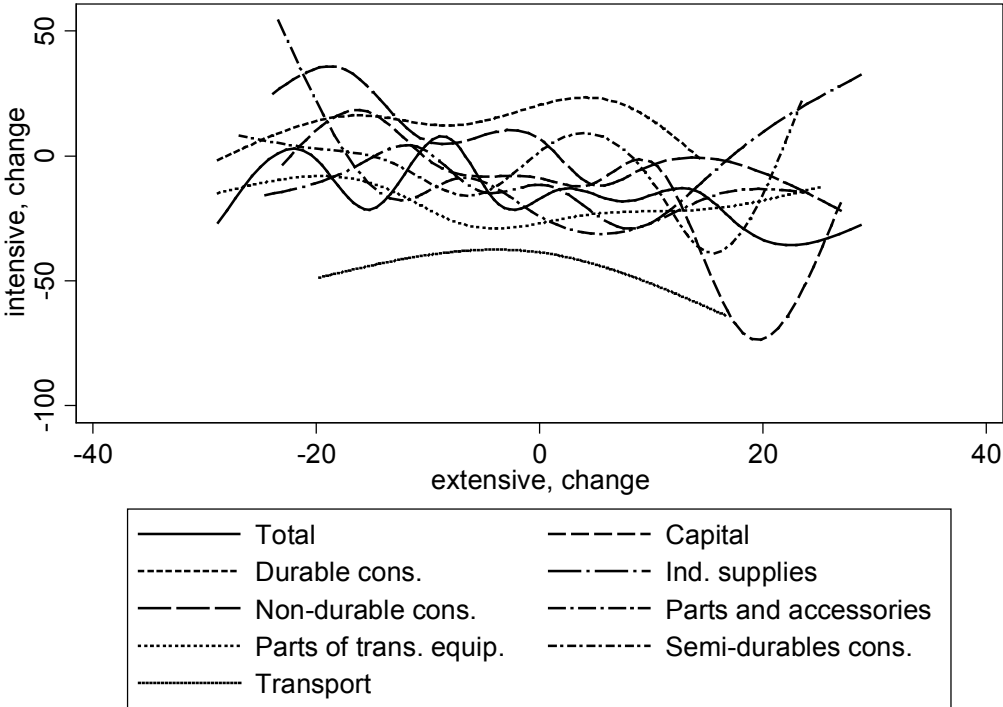
Our final question is whether the intensive and extensive margins moved together. On the one hand, a large fall in demand may lead both to exit and a fall in the export volume of continuing firms, which would imply a positive correlation between the two margins. On the other hand, exit of smaller firms may lead to composition effect and, as a consequence, the average export volume may increase in markets with larger exit.

Figure 2 shows the relationship between the two margins. The curves are splines fitted on the scatterplot picturing the change in the extensive and intensive margins in different countries for different product categories. The figure shows that the relationship between the two margins is not very strong, and it is negative for all product groups. This is in line with the fact that the extensive margin did not react too much for change in demand, so the pattern in Figure 2 mainly reflects the composition effect.

Our main conclusion is that – similarly to other countries – the fall in the intensive margin was more important in Hungarian trade collapse than the extensive margin. While the intensive margin reacted sharply to the fall in demand, the change in the extensive margin was less correlated with GDP change at the country level. Also, the exports of consumption goods fell to a smaller extent than the export of goods mainly used during the production process, and there are only smaller differences in terms of the importance of margins by product category.

4.2   Continents

Table 4 shows the change in different margins by continent. There is considerable heterogeneity in terms of the fall of export by continents. It is far the largest in Africa, followed by Europe. In Asia and America, the decline was somewhat smaller. Trade decline was similar in the EU and non-EU Europe, but its composition differed to some extent: in the EU a number of firms entered new markets, which led to an increase in the extensive margin, while this margin decreases in non-EU Europe.
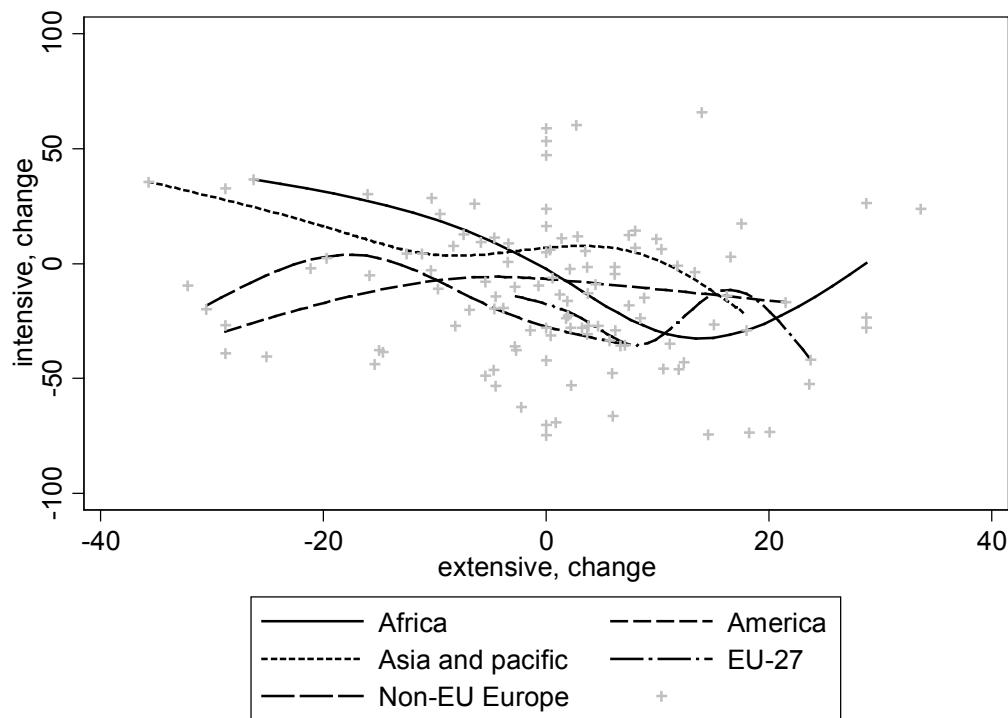
In line with previous results the intensive margin is more important when explaining trade collapse than the extensive margin. The only exception is America, where exit was similarly important as the fall of the intensive margin.

Table 4: Change in different margins by continent

Category	Export	Extensive	Intensive
Africa	-45.21	3.42	-48.62
America	-14.98	-7.27	-7.71
Asia and Pacific	-19.47	-1.77	-17.70
EU-27	-24.91	2.33	-27.24
non-EU Europe	-22.25	-5.67	-16.59

The relationship between the GDP change and the two margins is similar to the aggregate pattern reported in the previous subsection when analyzed by continent: while the fall of GDP is strongly related to the decline of the intensive margin, it is very weakly correlated with the extensive margin. The relationship of the two margins within continents (Figure 3) is also very similar to the aggregate picture.
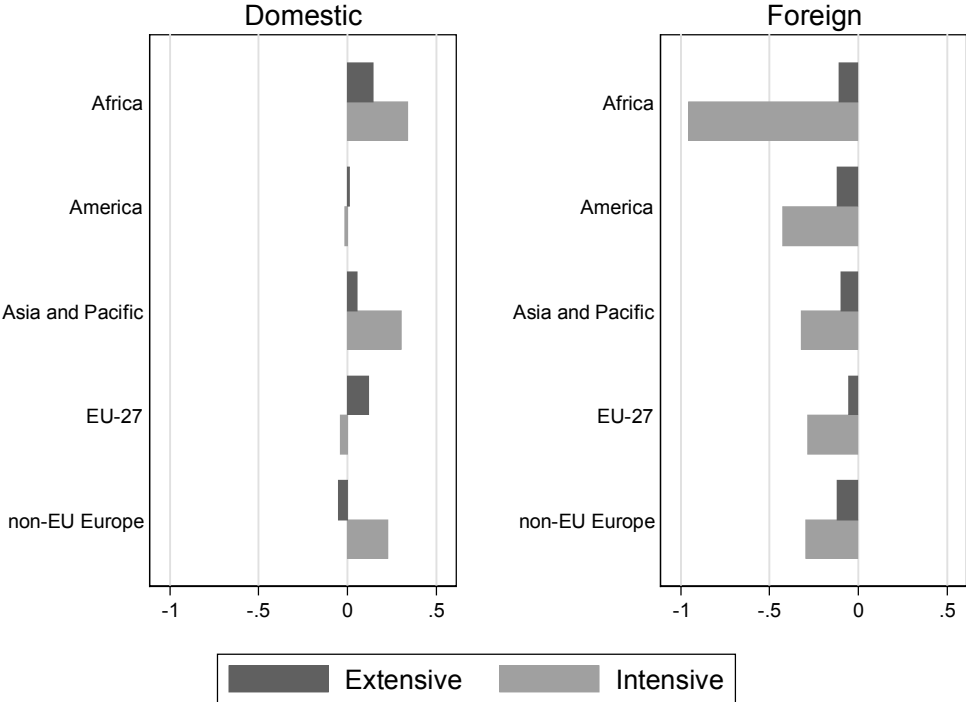
4.3   Domestic and foreign firms

Affiliates of foreign multinationals play a very important role in Hungarian production and trade. These firms may behave differently from their domestic-owned counterparts, as decisions about their Hungarian activities are made in different countries and they are also more deeply integrated into international production networks. These characteristics may imply that foreign-owned firms react more sharply to the crisis (Békés et al., 2011).

This hypothesis is reinforced by the markedly different patterns shown in Figure 4. Both the extensive and intensive margin of foreign firms fell much sharper in each direction than that of domestic-owned firms. The aggregate fall of both margins is mainly explained by the export activities of foreign firms. Domestic firms, on the other hand, entered a large number of new markets, leading to an increase in the extensive margin of domestic firms in each continent except non-EU Europe. The intensive margin of domestic firms also increased in Africa, Asia and non-EU Europe.

The relationship between GDP change and the export margins also differs to some extent between domestic and foreign-owned firms. Table 5shows results of (1) when estimated separately for domestic and foreign-owned firms. The elasticity of both foreign and domestic exports is very close to 1, although it is not very precisely estimated. The point estimates for domestic firms suggest that both margins are related to GDP fall, with a larger response at the intensive margin (but it is very imprecisely estimated). The foreign firm extensive margin, on the other hand, does not seem to be related to the fall of GDP at the destination market, while the intensive margin is strongly affected by the fall in demand.

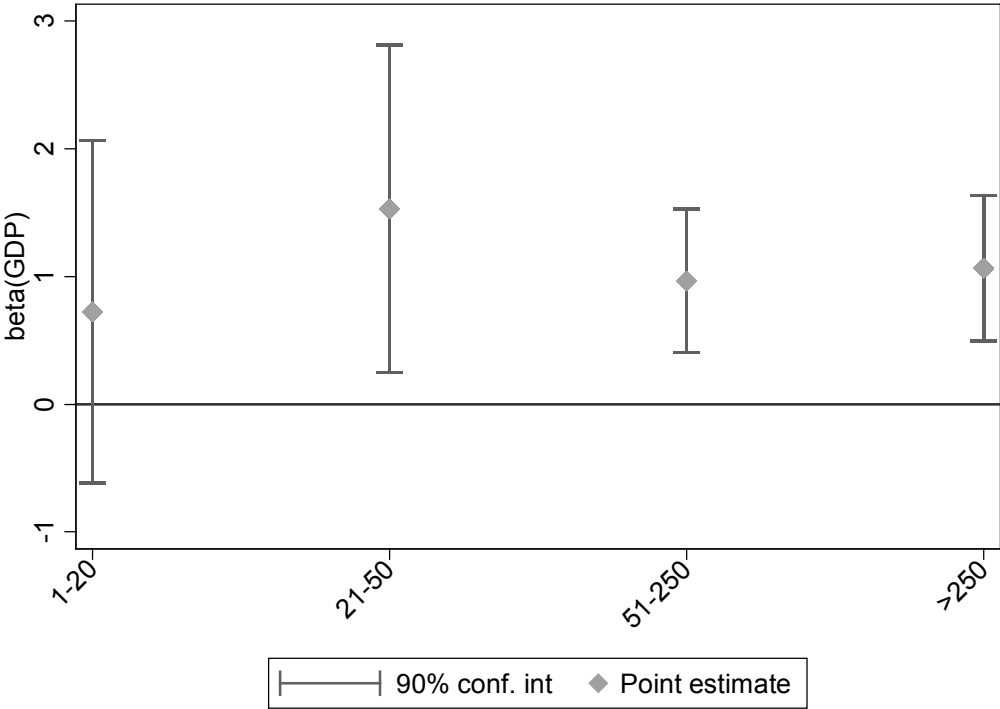|	Domestic firms			Foreign firms		
	Extensive	Intensive	Export	Extensive	Intensive	Export
GDP change	0.397***	0.631	1.028**	0.094	0.987***	1.081***
	(0.139)	(0.431)	(0.420)	(0.087)	(0.372)	(0.361)
America	-0.205**	-0.421*	-0.626**	-0.052	0.826***	0.775***
	(0.081)	(0.251)	(0.244)	(0.051)	(0.216)	(0.210)
Asia and Pacific	-0.086	0.269	0.183	-0.017	0.947***	0.930***
	(0.080)	(0.249)	(0.242)	(0.050)	(0.214)	(0.208)
EU-27	0.002	0.198	0.200	0.063	1.055***	1.118***
	(0.087)	(0.270)	(0.263)	(0.055)	(0.233)	(0.226)
Non-EU Europe	-0.049	0.401	0.352	-0.015	1.197***	1.182***
	(0.091)	(0.283)	(0.276)	(0.057)	(0.244)	(0.237)
ln distance	0.050*	0.249***	0.298***	0.036**	-0.005	0.032
	(0.029)	(0.088)	(0.086)	(0.018)	(0.076)	(0.074)
Constant	-0.223	-1.814**	-2.038***	-0.368**	-1.238*	-1.606**
	(0.248)	(0.769)	(0.748)	(0.155)	(0.662)	(0.643)
Observations	116	116	116	116	116	116
R-squared	0.267	0.426	0.524	0.146	0.256	0.290

4.4 Firm size

Table 6 shows the change in total exports and the two margins for different firm size categories. The smallest and the largest firms cut their exports to the largest extent, while firms with 21 to 50 employees suffered   a much smaller decline. In line with previous studies, the intensive margin is the dominant margin of adjustment, and this is the main driver of the large fall of the exports of very small and very large firms. The decrease of the extensive margin, on the other hand, is quite moderate for all size categories, suggesting that even small exporters did not quit their export markets. There is even a rise in the number of exporters across firms which employ 51-250 people.

Table 6: Change in different margins by employment

	Export	Extensive	Intensive
1-20	-37.32	-4.90	-32.42
21-50	-10.44	-5.64	-4.81
51-250	-8.12	6.94	-15.05
>250	-45.39	-3.60	-41.79

Figure 5 shows the elasticity of exports with respect to GDP for the different firm size categories: export fall was similarly responsive to the fall in demand for small, medium-sized and large firms.

Figure 5: The estimated export elasticity with respect to GDP by firm size

5   Conclusions

Our aim in this paper was to show how different margins of Hungarian exports evolved during the crisis of 2008 and 2009. The crisis hit especially hard Hungary, a small open economy. Our dataset consist of most exporting firms, and their direct exports fell to a very large extent, 17.7 percent.

We show that – similarly to other countries – the fall of the intensive margin was more important, and explained more than 14 percentage points from the total fall in exports. This finding is in line with heterogeneous firm models: if firms have to pay a sunk cost when starting to export, it can be profitable to continue exporting even after a large fall in demand, especially if it is considered transitory.

The fall in the extensive margin was also strongly correlated with the fall in demand (proxied by GDP change) in the destination country, while the extensive margin was less affected by it. There is no evidence that the two margins moved together across countries: if anything, there is a negative relationship between the two.

The behavior of exports was heterogeneous across product groups. The decline was smaller for consumer goods, while it was above average for intermediate goods. This finding is in line with theories emphasizing the collapse of global supply chains and inventory adjustments.

The main patterns were similar across continents: while the fall in exports was relatively large in Africa and the EU, the importance and behavior of the margins were similar in each continent.

Firm heterogeneity, on the other hand, seems to matter. There is a large and characteristic difference between domestic and foreign owned firms. The decline of both the extensive and intensive margins is much larger for foreign firms, while in some cases the margins were even positive for domestic-owned firms. These patterns may result from the fact that foreign-owned firms are more integrated into global production chains and the collapse of these networks was more harmful for them.

Finally, firm size also matters. The intensive margin of very small firms declined by about a third, while, interestingly, exit was relatively rare. Medium sized firms fared the crisis somewhat better: export decline was about 10 percent in their case. The exports of

large firms fell by more than 40 percent, which may be explained by the fact that foreign firms are predominant across such large firms.

References

Ahn, J. (2011): A Theory of Domestic and International Trade Finance, IMF Working Paper No. 11/262.

Ahn, J., M. Amiti and D.E. Weinstein (2011): Trade Finance and the Great Trade Collapse, *American Economic Review: Papers & Proceedings*, 101(3), 298–302.

Alessandria, G., J.P. Kaboski and V. Midrigan (2010a): Inventories, Lumpy Trade, and Large Devaluations, *American Economic Review*, 100(5), 2304-2339.

Alessandria, G., J.P. Kaboski and V. Midrigan (2010b): The Great Trade Collapse of 2008–09: An Inventory Adjustment & quest; *IMF Economic Review*, 58(2), 254-294.

Amiti, M. and D.E. Weinstein (2011): Exports and Financial Shocks, *The Quarterly Journal of Economics*, 126 (4): 1841-1877.

Anderton, R. and T. Tewolde (2011): The global financial crisis: trying to understand the global trade downturn and recovery, ECB Working Paper No. 1370.

Antràs, P. and C.F. Foley (2011): Poultry in Motion: A Study of International Trade Finance Practices, NBER Working Paper No. 17091.

Behrens, K., G. Corcos and G. Mion (2010): Trade Crisis? What Trade Crisis?, CEPR Discussion Paper No. 7956.

Békés, G., L. Halpern, M. Koren and B. Muraközy (2011): Still standing: how European firms weathered the crisis, The third EFIGE policy report, Bruegel Blueprint 15, Bruegel.

Bems, R., R.C. Johnson and K.M. Yi (2010): The role of vertical linkages in the propagation of the global downturn of 2008, Federal Reserve Bank of Philadelphia, mimeo.

Bernard, A.B., J.B. Jensen, S.J. Redding and P.K. Schott (2009): The Margins of US Trade, *American Economic Review: Papers & Proceedings*, 99(2), 487-493.

Bernard, A.B., S.J. Redding and P.K. Schott (2010): Multi-product firms and product switching, *American Economic Review*, 100(1), 70-97.

Bernard, A.B., S.J. Redding and P.K. Schott (2011): Multiproduct Firms and Trade Liberalization, *The Quarterly Journal of Economics*, 126(3), 1271-1318.

Bricongne, J-C., L. Fontagné, G. Gaulier, D. Taglioni and V. Vicard (2011): Firms and the global crisis: French exports in the turmoil, *Journal of International Economics* (August 2011), available: doi:10.1016/j.jinteco.2011.07.002.

Chaney, T. (2008): Distorted Gravity: The Intensive and Extensive Margins of International Trade, *American Economic Review*, 98(4), 1707-1721.

Cheung C. and S. Guichard (2009): Understanding the World Trade Collapse, OECD Economics Department, Working Paper No. 729.

Chor, D. and K. Manova (2010): Off the Cliff and Back? Credit Conditions and International Trade during the Global Financial Crisis, NBER Working Paper No. 16174.

Eaton, J., S. Kortum, B. Neiman and J. Romalis (2011): Trade and the Global Recession, NBER Working Paper No. 16666.

Gopinath, G., O. Itskhoki and B. Neiman (2011): Trade Prices and the Global Trade Collapse of 2008-2009, NBER Working Paper No. 17594.

Haddad, M., A. Harrison and C. Hausman (2011): Decomposing the great trade collapse: products, prices, and quantities in the 2008-2009 crisis, World Bank, Policy Research Working Paper No. 5749.

Jing, R. (2011): China's Exports during the 2008 Crisis—Size and Speed of the Collapse, manuscript.

Melitz, M. (2003): The impact of trade on intra-industry reallocations and aggregate industry productivity, *Econometrica*, 71(6), 1695–1725.

Paravisini, D., V. Rappoport, P. Schnabl and D. Wolfenzon (2011): Dissecting the Effect of Credit Supply on Trade: Evidence from Matched Credit-Export Data, NBER Working Paper No. 16975.

Schott, P.K. (2009): US Trade Margins during the 2008 Crisis, in: Richard Baldwin (eds.): The Great Trade Collapse, Causes, Consequences, Prospects, Voxeu.org.

Yi, K-M (2009): The Collapse of Global Trade: The Role of Vertical Specialisation, in: Richard Baldwin and Simon Evenett (eds.): The Collapse of Global Trade, Murky Protectionism, and the Crisis: Recommendations for the G20, VoxEU.org.