Trade Crisis? What Trade Crisis?*

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— Revised version —

Abstract

We investigate the 2008–2009 trade collapse using microdata from a small open economy, Belgium. Belgian exports and imports mostly fell because of smaller quantities sold and unit prices charged rather than fewer firms, trading partners, and products being involved in trade. Our difference-in-difference results point to a fall in the demand for tradables as the main driver of the collapse. Finance and involvement in global value chains played a minor role. Firm-level exports-to-turnover and imports-to-intermediates ratios reveal a comparable collapse of domestic and cross-border operations. Overall, our results reject a crisis of cross-border trade per se.

Keywords: 2008–2009 trade collapse; Belgian microdata; margins of trade; difference-in-difference.

JEL Classification: F01; F10; F14.

*The title of this paper is freely borrowed from Lindsey Brink's March 7, 1990, *Wall Street Journal* article (page A18, eastern edition). Both articles, though dealing with different sets of issues, argue that trade is often said to be in a crisis even when closer scrutiny of the situation or the data suggests that there is no specific 'trade crisis'.

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1 Introduction

World trade in manufactures fell by about 30% in nominal terms between the first quarter of 2008 and the second quarter of 2009 (WTO, 2009). This trade collapse was wide-ranging across industries and highly synchronized across OECD countries (Araújo and Martins, 2009). The trade fall also exceeded that of world GDP, and the fall that a computable general equilibrium model or a simple IRBC model would predict (Benassy-Quéré et al. 2009, Levchenko et al. 2010).

Many explanations for this disproportion have been put forward. Most of them focus on the supply side: a dramatic trade credit crunch (Auboin, 2009; Chor and Manova, 2010); the disruption of global value chains (Yi, 2009); or protectionism raising its ugly head again (Evenett, 2009; Jacks *et al.*, 2011). Others involve the demand side: a disproportionate fall in the demand for tradable goods (Eaton *et al.*, 2011); inventory adjustments (Alessandria *et al.*, 2010); or the postponement of durable goods purchases. In principle all these mechanisms may have played a role, and only empirical analysis can discriminate between them.[1]

Our contribution is threefold. Matching exhaustive data on Belgian exports and imports by firm-country-product with balance sheet information, we first decompose changes in trade values into an intensive and an extensive margin components.[2] Second, we provide a micro-econometric analysis of the determinants of the trade collapse. Last, we assess whether international trade was hit more strongly than production and domestic activity. We aim to understand *why* Belgian exports and imports fell substantially (by 26.23% and 27.77%, respectively), and whether or not it is warranted to talk about a *trade crisis* – a crisis of the activity of trading across national boundaries *per se*.

Our key findings can be summarized as follows. First, using a decomposition similar to Bernard *et al.* (2009), we find that virtually all of the Belgian trade collapse occurred at the intensive margin. Firm exit and the dropping of products and markets played only limited roles relative to price adjustments and output scaling. This finding is very robust and echoes results on the 1997 Asian crisis.[3] Nonetheless, it is remarkable given the magnitude of the recent trade collapse.

Second, we estimate a model of changes in trade at the firm-country-product level in search of evidence for the aforementioned conjectures on the causes of the trade collapse. Using a difference-in-difference specification – with the first semesters of 2007 and 2008 (henceforth 2007S1–2008S1) as the pre-treatment period and the first semesters of 2008 and 2009 (henceforth 2008S1–2009S1) as the post-treatment period – we estimate the differential post-treatment effects of particular firm, country, and product covariates on the fall in exports and imports. The single most important factor explaining changes in exports is

[1] Baldwin (2009) surveys a large number of empirical studies and concludes in favor of demand-side explanations. Bricongne *et al.* (2009) examine the margins of the collapse of French trade, and find a more severe fall in sectors that depend more on external finance, and among firms that default on a payment. Levchenko *et al.* (2010) find some support for the global value chain and durables explanations in an analysis of US industry-level exports and imports. Chor and Manova (2010) find stronger reductions in US imports during the peak of the crisis from countries with higher interbank interest rates and in sectors that rely more on external finance.

[2] Belgian raw trade data contains a large amount of re-exports. See the Appendix for details about how we deal with this issue.

[3] Bernard *et al.* (2009) investigate the contributions of the different margins to changes in US exports to, and imports from, several Asian countries during the 1997 financial crisis. They find that most of the adjustments occurred at the intensive margin, thus favoring a quick subsequent recovery.

the destination country's growth rate of GDP. Had growth rates between 2008S1–2009S1 been the same as between 2007S1–2008S1, Belgian exports would have fallen by about 54% less than what we actually observed. This result is quantitatively close to that reported by Eaton *et al.* (2011), despite a very different dataset and methodology. Another finding is that trade in consumer durables and capital goods fell more severely than trade in other product categories, in particular consumer non-durables. Had the fall in demand across product categories been equal to the fall in consumer non-durables, Belgian exports would have fallen by about 21% less than what we actually observed. Once country- and product-specific components have been controlled for, the remaining contribution of the firm dimension to the trade collapse is more modest. The Belgian credit crunch seems to have somewhat affected exporters: differences in indebtedness and debt maturity can explain up to 33% of the firm-level fall in exports. Similarly involvement in global value chains can explain about 24% of the fall in imports. Though there is some effect of inventory adjustment on imports, this is limited to the distribution sector only. In a nutshell, a generalized fall in demand that affected more strongly consumer durables and capital goods drives most of the changes.

Last, using again a difference-in-difference specification, we examine changes in Belgian firms' exports-to-turnover and imports-to-intermediates ratios, as well as exports-to-production and imports-to-production ratios. To the best of our knowledge, no other study has so far analyzed the recent trade collapse using firm-level data on both trade *and* domestic operations, though doing so is necessary to gauge whether international activity has been disproportionately hit by the crisis. Looking across firms, our analysis reveals almost no significant differential post-treatment effects on changes in these ratios. Factors behind the trade fall affected domestic operations equally. In particular, we find no explanatory power for financial variables: though exporters indeed suffered from restricted access to credit, their domestic and foreign activities were equally hit. Supply-side conjectures, therefore, seem to have little explanatory power when used to compare changes in foreign and domestic operations.

The remainder of the paper is organized as follows. Section 2 decomposes the collapse along various margins and along various country, product, and firm dimensions. Section 3 presents our difference-in-difference approach to disentangle the contributions of firm, product and country characteristics to the observed changes in the intensive margin. Section 4 analyzes the evolution of changes in domestic activity as compared to changes in international activity. Section 5 concludes. Details concerning data sources, as well as the description and the construction of variables, are relegated to the Appendix.

2 The extensive and intensive margins of the trade collapse

To gauge each margin's contribution to the Belgian trade collapse, we decompose the changes in export and import values along the lines suggested by Bernard *et al.* (2009). Exports X in a given period can be written as $X \equiv f\,\overline{c}\,\overline{g}\,\overline{x}$, where f, $\overline{c}$ and $\overline{g}$ denote the the number of exporters, the average number of countries each exporter sells to, and the average number of products each exporter ships to each country, respectively; and where $\overline{x} \equiv X/(f\,\overline{c}\,\overline{g})$ are average sales per exporter-country-product. Defining $\Delta X \equiv X'/X$, where X' refers to exports in another period, and applying the Δ transformation to the

other variables, we can decompose the change in Belgian exports between 2008S1 and 2009S1 as follows: $\Delta X = \Delta f\, \Delta \overline{c}\, \Delta \overline{g}\, \Delta \overline{x}$. Changes in the first three terms are referred to as changes in the *extensive margin*, while changes in the last term are referred to as changes in the *intensive margin*.[4] Information about physical quantities exported allows us to further decompose changes in the intensive margin into changes in average quantities ($\overline{q}$) and in unit prices ($\overline{p}$): $\Delta \overline{x} \equiv \Delta \overline{q} \Delta \overline{p}$. We provide more detailed information about how this latter decomposition is implemented in the Appendix. Changes in imports, ΔM, can be decomposed in the same way.

Table 1: Changes in the margins of total Belgian exports and imports (2008S1–2009S1).

		Extensive margin			**Intensive margin**		
Period	Total	Firms	Countries	Products	Sales	Quantities	Prices
Total exports (all firm-country-product combinations)							
2008 S1	101.25	18,053	6.62	5.58	151,844	115,277	1.32
2009 S1	74.69	18,227	6.49	5.59	112,925	92,221	1.22
$(\Delta - 1)\%$	-26.23	0.96	-1.92	0.16	-25.63	-20.00	-7.04
Margin's contribution			2.68%		97.32%		
Total imports (all firm-country-product combinations)							
2008 S1	106.10	31,497	3.88	7.02	123,681	118,747	1.04
2009 S1	76.64	33,576	3.74	6.78	89,855	98,089	0.92
$(\Delta - 1)\%$	-27.77	6.60	-3.54	-3.32	-27.35	-17.40	-12.05
Margin's contribution			1.79%		98.21%		

Notes: Letting EM and IM denote the extensive and the intensive margins, the total change can be expressed as $\Delta X = \Delta \text{IM} \times \Delta \text{EM}$. Using logarithms, we compute the relative contribution of the intensive and the extensive margins to the total change in trade as $\ln(\Delta \text{IM})/\ln(\Delta X)$ and $\ln(\Delta \text{EM})/\ln(\Delta X)$. Total imports are in billion euros, while average sales are in euros. See the Appendix for further details.

The top panel of Table 1 reveals that, despite a total fall in exports of 26.23%, the number of exporters and the number of products shipped on average by each exporter to each country increased by 0.96% and by 0.16%, respectively. The average number of countries served by Belgian exporters decreased by 1.92%. Changes at the extensive margin hence reduced exports by $(1.0096 \times 0.9808 \times 1.0016 - 1) \times 100\% = -0.82\%$. As can be further seen from Table 1, changes at the extensive margin are dwarfed by changes at the intensive margin. Indeed, the average value of exports per firm-country-product fell by 25.63% between 2008S1 and 2009S1. Changes in the intensive margin are mainly driven by changes in quantities shipped. On average, Belgian exports by firm-country-product decreased in terms of quantities by 20%, while average unit prices also fell, but 'only' by 7.04%. As finally shown by the last line of the top panel of Table 1, the intensive margin contributes to more than 97% of the observed change in exports.[5]

The bottom panel of Table 1 performs the same decomposition for total Belgian imports, which fell by 27.77% across all firm-country-product combinations between 2008S1 and 2009S1. Observe that the overall picture is very similar to that of exports: the intensive margin accounts for almost all the changes, and most of it is driven by a sharp decrease in quantities. A first conclusion thus emerges: *the collapse of both total Belgian exports and imports was overwhelmingly driven by a fall in exports or imports per firm-country-product, itself driven to a large extent by a sharp fall in quantities.*

To gauge whether the foregoing results roughly hold for all firms, sectors, and trading partners, we repeat the decomposition by splitting our sample more finely along various dimensions (e.g., large and

[4] We have no information on the number of trading partners or shipments for each exporter per country-product combination. Thus, our intensive margin $\Delta \overline{x}$ still contains some 'extensive margin' components that we cannot isolate.

[5] Combining the two margins, the total change in Belgian exports is given by $(1.0096 \times 0.9808 \times 1.0016 \times 0.7437 - 1) = -0.2623$ or -26.23%. Using the quantity and price decomposition, this is also equal to $(1.0096 \times 0.9808 \times 1.0016 \times 0.8 \times 0.9296 - 1) \times 100\% = -0.2623$.

Table 2: Changes in the margins of Belgian exports and imports, by subgroupings (2008S1–2009S1).

Subgroups	Total % change	Extensive margin Firms	Countries	Products	*Contrib.*	Intensive margin Sales	*Contrib.*	Sales[1] Quantities	Prices
Product classifications[2]									
Exports class. as 'Other goods'	-21.03	1.09	-1.35	-0.52	**3.39%**	-20.39	**96.61%**	-11.29	-10.26
Exports class. as 'Interm., Capital, & Dura.'	-28.98	1.32	-2.60	0.50	**2.40%**	-28.40	**97.60%**	-24.10	-5.66
Imports class. as 'Other goods'	-25.64	6.42	-1.94	-3.96	**-0.77%**	-25.80	**100.77%**	-11.02	-16.61
Imports class. as 'Interm., Capital, & Dura.'	-29.17	5.36	-3.18	-3.03	**3.14%**	-28.40	**96.86%**	-23.45	-6.46
Regional components									
Exports to EU member states only	-26.06	1.43	-3.07	0.00	**5.62%**	-24.79	**94.38%**	-19.23	-6.88
Exports to OECD non-EU countries	-27.70	1.32	-1.68	4.18	**-11.43%**	-30.33	**111.43%**	-34.94	7.09
Exports to non-OECD non-EU countries	-26.22	0.68	-0.93	0.32	**-0.20%**	-26.27	**100.20%**	-10.96	-17.19
Firm types[3]									
Exports by small firms	-20.52	-2.44	1.14	2.31	**-4.13%**	-21.27	**104.13%**	-23.96	3.54
Exports by large firms	-27.35	0.72	-2.86	3.46	**-3.82%**	-28.23	**103.82%**	-23.44	-6.25
Imports by small firms	-12.80	1.51	0.30	-0.59	**-8.76%**	-13.84	**108.76%**	-10.31	-3.93
Imports by large firms	-30.46	0.62	-1.40	-2.02	**7.79%**	-28.46	**92.21%**	-16.48	-14.35
Ownership structure[4]									
Imports by non-multinational firms	-23.34	1.92	-1.40	-2.12	**6.17%**	-22.07	**93.83%**	-15.80	-7.45
Imports by multinational firms	-36.61	2.14	-1.84	-3.64	**7.58%**	-34.38	**92.42%**	-17.48	-20.49
Imports by non-foreign-owned firms	-19.91	2.06	-1.45	-2.41	**8.35%**	-18.41	**91.65%**	-10.31	-9.03
Imports by foreign-owned firms	-34.57	-0.45	0.16	-1.55	**4.36%**	-33.35	**95.64%**	-22.46	-14.04
Debt structure[5]									
Exports, low share of debts over liabilities	-24.53	0.27	-1.36	3.08	**-6.91%**	-25.98	**106.91%**	-23.25	-3.56
Exports, high share of debts over liabilities	-29.72	-1.55	-1.06	0.68	**5.52%**	-28.34	**94.48%**	-21.78	-8.39
Exports, low share of financial debts	-24.25	-0.70	-0.72	2.27	**-2.95%**	-24.87	**102.95%**	-21.97	-3.72
Exports, high share of financial debts	-29.36	-0.72	-1.44	2.01	**0.53%**	-29.23	**99.47%**	-23.21	-7.84

Notes: See Section 2 for additional details on the decomposition performed. All figures are expressed in terms of percentage changes. We report results for both exports and imports only when the results for those two categories are qualitatively and quantitatively sufficiently different. This table presents only a subset of the results. The full set of results is available as a spreadsheet from the authors upon request.

[1] As a robustness check (available upon request) we also provide an alternative price-quantity decomposition where we only focus on goods which are reported by weight. Results slightly differ from those reported in the paper. The reasons are that: the total trade of goods that are measured in kilograms has decreased less than the trade of goods measures in units; and Belgium trades proportionally more goods measured in kilograms with non-EU countries.

[2] The product classification follows the EU's 'Main Industrial Groupings' in official statistics, as described in the European Commission Regulation No 586/2001 (March 26, 2001). This classification separates products into intermediate, capital, consumer durable, consumer non-durable, and energy products.

[3] We define size in terms of employment and small (large) firms as those being below (above) the 2-digit NACE rev1.1 industry median size across all trading firms. Information on some exporters and importers is lost because of the lack of balance sheet data which is required for figures on employment and other firm characteristics.

[4] A multinational firm is a firm that is registered in Belgium and which owns, either directly or indirectly, more than 10% of the equity of at least one firm registered in another country. A foreign-owned firm is a firm that is registered in Belgium and that has 10% or more of its equity owned by a foreign entity.

[5] The ratios are computed from balance sheet data. The share of financial debts is the ratio of financial debts to total liabilities (thus excluding commercial debt). Information on some exporters and importers is lost because of the lack of balance sheet data.

small firms, less or more productive firms, ownership status, debt structure). Such a finer decomposition can provide some first insights into the key explanations for the fall in trade. As can be seen from Table 2, the overall decomposition of margins, while not identical, remains qualitatively very stable across all specifications. In particular, the intensive margin remains dominant whereas changes at the extensive margin are uniformly small. The key points worth noting from Table 2 are that: (i) trade in 'Intermediates, Capital, & Durables' fell more than trade in 'Other goods'; (ii) the extensive margin was more strongly affected for Belgian trade with its EU partners that for trade with the rest-of-the-world; (iii) larger firms were hit more severely, especially for imports; and (iv) firms with larger debt-to-liabilities ratios or with a larger share of financial (as opposed to commercial) debt experienced slightly larger declines in exports. While firms were, therefore, to some extent affected differently by the crisis, it is fair to say that the magnitudes of those differences are relatively small.

3 Firm-, country-, and product-level characteristics: the determinants of the trade collapse

We now turn to econometric analysis to examine the various conjectures put forward in the literature and to quantify their contribution to the fall in trade. To do so, we look at the *differential impact* of firm, product and country characteristics before and after the start of the collapse. Looking at the differential impact is important for the following reason. If, say, highly leveraged firms experience lower export growth than other firms even in a 'normal' period, nothing could be learned from the simple fact that they suffered a stronger fall in trade during the collapse. However, by comparing the negative effect on export growth of being highly leveraged before and after the start of the collapse – the collapse being a heterogeneous treatment across firms with different characteristics – we can infer whether restricted access to credit played a role or not during the crisis and gauge its magnitude.

3.1 An econometric model of changes in trade values

We saw that the bulk of the 2008S1–2009S1 fall in Belgian trade occurred at the intensive margin. Furthermore 'stayers' – firms exporting in both semesters – accounted then for 98% of both exports and imports in 2008S1 and 2009S1. Therefore we can safely explore the determinants of the fall in trade by restricting our analysis to intensive margin changes in trade among these firms.

The primary data for our analysis are export and import values by firm-country-product in 2007S1, 2008S1, and 2009S1, as well as balance sheet data (see the Appendix for more information). We aggregate the data at the HS4 product level (more than 1,000 product categories) and consider only 'continuing triples', i.e., firm-country-product trade triples that record positive values in two consecutive periods among the three we consider. Our aim is to provide econometric results that can make sense of aggregate changes in trade, and focusing on continuing triples avoids giving too much weight to low-value triples. [6]

We describe our econometric model for exports only, the one for imports being identical. Using data on continuing triples, the dependent variable is the change in log export values of firm f to country c for product p, $\Delta X_{fcp}^t \equiv \log X_{fcp}^{t+1} - \log X_{fcp}^t$, between two consecutive semesters (i.e., log export growth between 2007S1 and 2008S1, as well as between 2008S1 and 2009S1). Using the difference-in-difference terminology, the pre-treatment period (trade collapse) corresponds to 2007S1–2008S1 while the post-treatment period is 2008S1–2009S1. Together with the post-treatment time dummy variable TC^t, we take as regressors a number of firm, country and product characteristics that proxy for the various conjectures to explain the trade collapse, along with their interactions with TC^t. Formally, the estimating equation is given by:

$$\Delta X_{fcp}^t = \alpha + TC^t + \beta_{\mathbf{1}}^{'} \mathbf{W_{fcp}^t} + \beta_{\mathbf{2}}^{'} \mathbf{W_{fcp}^t} TC^t + \varepsilon_{fcp}^t \tag{1}$$

where $\mathbf{W_{fcp}^t}$ is a vector of firm, country, and product characteristics together with a set of 2-digit NACE rev 1.1 industry dummies; and where ε_{fcp}^t is a residual term with the standard properties for the consis-

[6] See the Appendix for more information on continuing triples. We also used (trade) weighted least squares for the continuing triples. The results, given in Behrens *et al.* (2011), are almost identical. We thus present, in what follows, only the unweighted results with continuing triples.

tency of OLS. In the case of firm covariates, we use one-year lagged balance sheet information – i.e., 2006 (2007) data for 2007S1–2008S1 (2008S1–2009S1) export growth – to somewhat mitigate endogeneity of firm characteristics. Having data that varies along three dimensions, we follow the procedure developed by Cameron *et al.* (2011) and apply multi-level clustering to obtain more reliable standard errors. The coefficients $\beta_{\mathbf{1}}$ measure the impact of our covariates in a 'normal' period (2007S1–2008S1), while the coefficients $\beta_{\mathbf{2}}$ capture differential changes induced by the trade collapse treatment (2008S1–2009S1).[7] We will, therefore, be especially interested in the $\beta_{\mathbf{2}}$ coefficients.

Table 3 lists the covariates we use in equation (1), as well as their description. All firm characteristics prefixed by 'D' are binary variables, taking value 1 if that characteristic is above the sectoral median across all trading firms and 0 otherwise. This choice allows us to maximize the number of firms we can use while reducing the risk of bias due to measurement error and potential outliers. It also provides us, as in the case of standardized regression coefficients, with a relevant metric to compare the contribution of the different firm characteristics to changes in trade values.

3.2 Results

Table 3 reports estimated coefficients and standard errors obtained by OLS from (1). We run two separate regressions, one for export growth and one for import growth. For each regression, we report two sets of coefficients in separate columns. The third and fifth columns ('Base') report $\beta_{\mathbf{1}}$ parameters for, respectively, the export and import growth regressions of the pre-treatment period (2007S1–2008S1). The fourth and sixth columns ('DD') provide $\beta_{\mathbf{2}}$ parameters, i.e., *changes* in the responsiveness of export and import growth into the post-treatment period (2008S1–2009S1) of the trade collapse.

Firm characteristics. Table 3 shows that firm-level difference-in-difference coefficients are, in general, small and insignificant, and that the model's explanatory power is very weak. At first sight, our results thus suggest that: (i) the trade collapse has been quite symmetric across firms within a given industry; (ii) some of the supply-side explanations are likely to play a second-order role only.

We now discuss results for each group of covariates. As indicated by the positive and significant coefficient of D_{size} in the column 'Export-Base' of Table 3, exports by large firms grow on average 3.71% faster than those of other firms in a 'normal' year. As further shown by the coefficient of D_{size} in the column 'Export-DD', there has been no significant change in that pattern after the start of the trade collapse. The latter finding also holds for productivity D_{prod}. As for import growth, more productive firms did suffer more during the collapse, though the implied contribution to the fall is small. To assess the magnitude of this effect, we can compute the counterfactual 2008S1–2009S1 import growth without a differential effect of D_{prod} by letting $D_{prod} \times TC^t = 0$. Had firms with above-median productivity been affected by the collapse as those with below-median productivity, the overall fall in exports (27.21%) would have been less severe by 14.74%, i.e. 4.01 percentage points.

[7] The remarkable rise in commodity prices during 2007S1-2008S1 could potentially affect our results. In unreported estimations, available upon request, we also considered 2006S1–2007S1 as a 'normal' period. The results are virtually identical.

Table 3: Export and import growth – firm, country, and product determinants.

Variable	Description	Export growth Base	Export growth DD	Import growth Base	Import growth DD
Firm characteristics					
D_{size}	Size (in term of employment) of the firm	0.0371^{b}	-0.0305	0.0218^{b}	0.0068
		(0.018)	(0.030)	(0.009)	(0.015)
D_{prod}	Value added per worker	0.0108	-0.0101	0.0391^{a}	-0.0425^{a}
		(0.015)	(0.027)	(0.009)	(0.016)
D_{interm_share}	Share of intermediates over turnover	0.0032	-0.0194	0.0071	-0.0279^{c}
		(0.016)	(0.026)	(0.010)	(0.015)
$D_{share\_exp\_sales}$	Share of exports over turnover	-0.0087	-0.0239	0.0191	-0.0571^{b}
		(0.023)	(0.054)	(0.013)	(0.025)
$D_{share\_imp\_interm}$	Share of imports over intermediates	-0.0511^{b}	0.0611^{b}	-0.0280^{b}	0.0017
		(0.021)	(0.031)	(0.011)	(0.014)
$D_{value\_add\_chain}$	Exports times imports over turnover	0.0309	-0.0148	-0.0507^{a}	0.0002
		(0.027)	(0.049)	(0.014)	(0.033)
$D_{ext\_fin\_dep}$	Investments minus operating profits over investments	-0.0350	0.0201	-0.0256^{b}	-0.0035
		(0.022)	(0.027)	(0.012)	(0.017)
$D_{share\_debts\_o\_liab}$	Ratio of debts over total liabilities	-0.0168	-0.0178	-0.0055	-0.0066
		(0.018)	(0.030)	(0.010)	(0.015)
$D_{share\_debts\_due\_after\_one}$	Share of debts due after one year	0.0104	0.0456^{c}	0.0097	0.0102
		(0.021)	(0.024)	(0.013)	(0.017)
$D_{share\_fin\_debt}$	Share of financial debt	0.0209	-0.0668^{b}	0.0011	-0.0043
		(0.022)	(0.029)	(0.011)	(0.019)
D_{share_stock}	Ratio of stock over turnover	0.0104	0.0234	0.0113	-0.0244
		(0.021)	(0.030)	(0.010)	(0.016)
for	Foreign firm dummy	0.0181	-0.0444	0.0029	0.0087
		(0.026)	(0.041)	(0.014)	(0.029)
mne	Multinational firm dummy	0.0114	-0.0255	-0.0304	0.0309
		(0.029)	(0.038)	(0.023)	(0.037)
Country characteristics					
$OECD\_NO\_EU$	Dummy for countries belonging to the OECD but not to the EU	-0.1561^{a}	0.2790^{a}	-0.2988^{a}	0.4841^{a}
		(0.021)	(0.051)	(0.037)	(0.055)
$NO\_OECD\_NO\_EU$	Dummy for countries belonging neither to the OECD nor to the EU	-0.0742^{a}	0.1013^{c}	-0.2255^{a}	0.3854^{a}
		(0.028)	(0.053)	(0.042)	(0.067)
$exch\_rate\_change$	% change in the nominal exchange rate with the Euro between the end of the first quarter of 2007 (2008) and the end of the first quarter of 2008 (2009)	-0.2885^{a}	-0.1769^{c}	-0.2988^{a}	0.2463^{b}
		(0.071)	(0.091)	(0.086)	(0.101)
$growth\_rate\_GDP$	Average annual growth rate of the country's GDP between 2007 (2008) and 2008 (2009)	0.0138^{a}	0.0115^{b}	0.0056	0.0008
		(0.004)	(0.005)	(0.004)	(0.007)
Product characteristics					
$intermediates$	Intermediate goods dummy	0.0126	-0.0485^{c}	-0.0246	-0.0334^{c}
		(0.013)	(0.029)	(0.015)	(0.018)
$capital\_goods$	Capital goods dummy	-0.0055	-0.0746^{c}	-0.0393	-0.0218
		(0.020)	(0.043)	(0.031)	(0.037)
$consumer\_durables$	Durable consumer goods dummy	-0.0171	-0.1135^{a}	-0.0305	-0.0568^{c}
		(0.030)	(0.044)	(0.023)	(0.033)
$energy$	Energy related goods dummy	0.0944^{b}	-0.1324^{c}	-0.0409	0.0387
		(0.041)	(0.075)	(0.065)	(0.063)
$residual$	Goods not belonging to the previous categories	0.0150	-0.0579	-0.0572^{b}	0.0239
		(0.024)	(0.043)	(0.026)	(0.022)
$frac_{lib\_diff}$	Measure of product differentiation (based on Rauch, 1999)	-0.0347^{b}	0.0519^{b}	-0.0255^{b}	0.0497^{a}
		(0.013)	(0.024)	(0.012)	(0.013)
NACE dummies		Yes		Yes	
Observations		400,626		506,114	
R^2		0.0104		0.0091	

Notes: All firm characteristics prefixed with a 'D' are dummy variables that take value one if the firm characteristic is above the NACE rev 1.1 2-digit industry median across trading firms and zero otherwise. All data sources and information on the construction of the variables are provided in the Appendix. The column 'Base' refers to coefficients of firm, country, and product characteristics alone, while the column 'DD' refers to coefficients of interactions of these characteristics with the trade collapse treatment time dummy TC^t. Multi-level clustered standard errors following Cameron *et al.* (2011) are given in parentheses. Coefficients are significant at: ^{a} $p < 0.01$, ^{b} $p < 0.05$, ^{c} $p < 0.1$.

Involvement in global value chains (as measured by the value and the significance of D_{interm_share}, $D_{share\_exp\_sales}$, and $D_{value\_add\_chain}$ in the column 'Export-DD') did not differentially affect export growth in 2008S1–2009S1 as compared to 2007S1–2008S1. This casts doubt on the hypothesis of a disruption of global value chains. Observe further that the differential effect of $D_{share\_imp\_interm}$ is actually positive and significant, indicating that firms with above-median ratios of imports to intermediates experienced a smaller fall in exports! When computing the counterfactual 2008S1–2009S1 export growth in the absence of a differential effect of $D_{share\_imp\_interm}$, i.e., by letting $D_{share\_imp\_interm} \times TC^t = 0$, we find that the overall fall in exports would have been 22.71% stronger! Turning to imports, an above-median

involvement in global value chains, and in particular D_{interm_share} and $D_{share\_exp\_sales}$, does correspond to lower import growth in 2008S1–2009S1. However, the contribution is not very large. When both $D_{interm\_share} \times TC^t = 0$ and $D_{share\_exp\_sales} \times TC^t = 0$, all else equal, we find that 23.84% of the overall import fall would not have occurred in this counterfactual world.

Variables proxying for firms' financial structure (as measured by the value and the significance of $D_{ext\_fin\_dep}$, $D_{share\_debts\_o\_liab}$, $D_{share\_debts\_due\_after\_one}$, and $D_{share\_fin\_debt}$) appear to play some role in 2008S1–2009S1 export changes. Firms with shorter debt maturity and a larger fraction of financial (as opposed to commercial) debt experienced a significantly larger fall of exports during the trade collapse. Our findings thus lend some support to the trade credit crunch hypothesis (Auboin, 2009; Chor and Manova, 2010; Amiti and Weinstein, 2011). How large is that effect? Firms with above-median debt maturity experienced a 4.56% higher export growth, whereas firms with above-median financial debts saw their exports shrink by about 6.68% more. Both values must be contrasted with the 27.21% total fall in export values in our sample. Predicting the counterfactual export growth in the absence of negative financial effects, we find that about one-third (33.06%) of the 2008S1–2009S1 fall in exports can be attributed to our measures of finance. It is worth noting, however, that financial variables do not seem to affect changes in import values at all.[8]

The difference-in-difference coefficient for D_{share_stock}, proxying for inventory capacity, is neither significant for export nor for import growth. The latter finding contrasts with the inventory adjustment explanation as we would expect imports of firms with greater inventory capacity to contract more, all else equal. Still, one may argue that inventory adjustments occur primarily among distributors. Therefore, we also run the same regressions on the sub-sample of firms from the distribution sector (NACE industries 50, 51 and 52), which represented 40.25% of Belgian imports in 2008S1.[9] We find that imports of distributors with above-median inventory-to-sales ratios significantly fell by 3.23 percentage points more than those of other distributors in 2008S1–2009S1. This coefficient accounts for 11.80% of the fall in imports of the distribution sector. However, we find no effects of stocks in the export growth regressions. Overall, we conclude that, although inventory adjustment accounted for some of the import fall in an important sector, it played a minor role in the trade collapse in general.

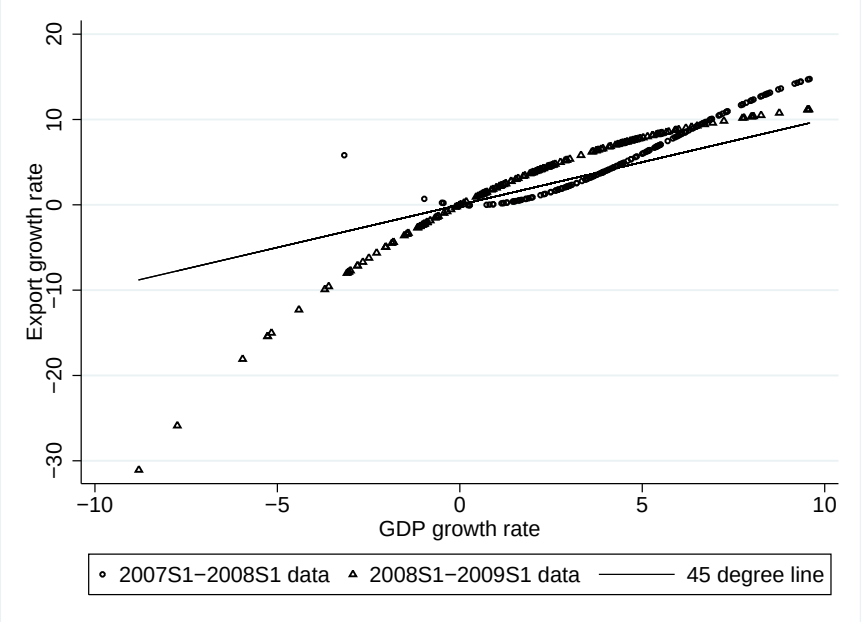
To conclude, note that neither multinationals nor foreign-owned firms have been differentially affected by the trade collapse. Both the export and the import difference-in-difference coefficients are insignificant, thus lending further support to the finding that there was no major disruption of global value chains. Interactions of two-digit NACE industry dummies with the trade collapse treatment TC^t, the reference industry being 'Manufacture of motor vehicles, trailers and semi-trailers', are significant only in 9 cases, thereby suggesting that strong industry patterns are not to blame either.

Country characteristics. We view GDP growth as the key variable to gauge the contribution of a demand shock to the collapse of exports. Two results stand out from our analysis. First, the coefficient differs widely between 2007S1–2008S1 and 2008S1–2009S1. In a 'normal' period, a 1% increase in the

[8] Our variables only imperfectly capture access to credit in general and trade finance in particular. However, contrary to most other work on the trade crisis, we use firm-level measures and do not rely on even more imperfect sectoral measures.

[9] Regression tables are omitted to save space but are available upon request.

Figure 1: Non-linearities in the marginal effect of GDP growth on export growth before and after the start of the trade collapse.



Notes: The convex curve (∘) depicts pre-treatment coefficients, while the concave curve (△) represents post-treatment coefficients.

aggregate demand of an export destination, as proxied by its percentage growth of GDP, translates into a 0.0138 or 1.38% increase in exports to that destination. Our coefficient is broadly consistent with standard cross-section/cross-country gravity models in which the elasticity of trade flows to GDP of the destination is close to unity. However, during the trade collapse, the responsiveness of changes in log export values with respect to percentage growth of GDP of the destination increased significantly $(0.0138 + 0.0115 = 0.0253)$, thus suggesting that the global recession induced a disproportionate fall in the demand for tradable goods.

To gain further insights, we consider the presence of non-linearities. In particular we include GDP growth to the powers two and three, both alone as well as interacted with TC^t, as further regressors in our estimations. Results indicate that there are indeed non-linearities at work in a typical year. However, difference-in-difference coefficients reveal that the trade collapse caused a structural change in the relationship between GDP growth and export growth rates. As can be seen from Figure 1, plotting the estimated marginal effect of GDP growth on export growth in both periods, the post-treatment curve deviates more from the 45 degree line (the unit-elastic benchmark), especially for countries with large GDP drops, than the pre-treatment curve. In other words, exports to countries hit by sharp recessions dropped disproportionately more, and by more than in tranquil times.

Finally, we again make use of our model to gauge the contribution of the demand shock to the change in log export values. To this end, we consider the counterfactual situation where GDP growth rates for 2008S1–2009S1 are replaced with those prevailing in 2007S1–2008S1, all else equal. We find that, had GDP growth between 2008S1–2009S1 been the same as in the previous period, the export drop would have been 54.15% less severe. We may thus conclude that more than half of the export collapse can

be attributed to a generalized fall in the demand for tradable goods. The interpretation of the GDP growth coefficient for imports, which now refers to the exporting country, is more difficult. Yet, as can be seen from Table 3, both the 'Base' and the 'DD' coefficients are insignificant. We can still compute the counterfactual decline of Belgian imports, had Belgian GDP growth remained constant, by using the coefficient found in the export regression and data on Belgian GDP growth. We find that 44.65% of the import drop can be attributed to a fall in demand for tradable goods in Belgium. Hence, slightly less than half of the fall in imports is due to a demand shock.

The difference-in-difference coefficients of the two dummies for trade with non-EU countries and outside of the OECD are both positive, sizeable, and significant for export and import growth. This means that trade with countries outside of the EU helped to mitigate the trade collapse. In a counterfactual world in which trade growth outside of the EU would have followed the same trend as within the EU, exports (imports) would have fallen by 20.86% (38.27%) more than what we observed. The fact that non-EU trade, especially imports, fell less than EU trade suggests indirectly that protectionist measures played only a small role in explaining the Belgian trade collapse (see also Eaton *et al.*, 2011). As for fluctuations in exchange rates, the magnitude of the coefficients indicates that they have affected exports (imports) more (less) strongly during the trade collapse period. However, the implied magnitudes for changes in export and import values are small. From our estimates, fluctuations of the Euro can be blamed for only a small share (5.92%) of the total drop in Belgian exports.

Product characteristics. Our reference group for products in Table 3 is consumer non-durables. Therefore, the foregoing discussions and the magnitudes of the fall in demand apply solely to this category. However, in line with the margin decomposition of Section 2, interactions of product dummies with TC^t for the categories intermediates, consumer durables, and capital goods are all negative and strongly significant in the export growth analysis, thereby indicating that these goods experienced a larger fall. As for imports, the same result holds for intermediates and consumer durables.

What are the causes of such different behavior across product categories? Based on our analysis, the answer is likely to be a differential fall in demand.[10] Evaluating a counterfactual scenario in which the fall in trade would have been the same across product categories and equal to the one of the reference group consumer non-durables, i.e., letting the significant interactions of product dummy coefficients with TC^t be equal to zero, delivers the following results: 21.47% of the export collapse is due to a more severe shock affecting postponable goods, the equivalent figure for imports being 10.95%.

Last, it is worth noting that the difference-in-difference coefficient of the Rauch (1999) measure of product differentiation ($frac_{lib\_diff}$) is positive and significant for both export and import growth. This suggests that more differentiated goods experienced a smaller fall in trade. In particular, had the fall for differentiated goods been as hard as for other goods, the export (import) drop would have been 21.47%

[10] We also estimated our export growth model separately for each of the broad product categories. Results are omitted to save space but are available upon request. Our estimates of the $growth\_rate\_GDP$ coefficient are in line with the ultimate conclusion of Baldwin (2009) that 'postponable goods' have been particularly hit by the negative demand shock affecting tradables. More precisely, the difference-in-difference coefficient we obtain when restricting the sample to consumer durables (0.0127) is higher than that when restricting the sample to consumer non-durables (0.0022). Even higher coefficients (0.0156 and 0.0186) are obtained in intermediates goods and capital goods regressions, respectively.

(23.32%) more severe.

4 Trade crisis or trade collapse?

Our findings thus far do not imply that there has been a trade crisis *per se*. To investigate whether international trade suffered more than domestic activity, we now examine in detail changes in exports-to-turnover and imports-to-intermediates ratios at the firm level. We complement this analysis with evidence about firm-level exports-to-production and imports-to-production ratios using the sub-sample of firms for which production data is available for our period of analysis. The latter set of results, given in Behrens *et al.* (2011), conveys the same message. It is not reported here to save space.

Total manufacturing production value in Belgium fell by 25% in between 2008S1 and 2009S1, a figure that closely matches the 26% (28%) drop in exports (imports) value over the same period. This simple evidence already casts some doubts on the existence of a 'trade crisis' in Belgium. Nevertheless, there might still be compositional effects across firms and industries, and those can provide valuable information on the channel(s) through which the fall in demand affected Belgian exports and imports. We therefore now revisit this issue using a more detailed micro-econometric analysis.

To this end, we use again a difference-in-difference approach where the treatment is the trade collapse. We first construct the log of the firm-level ratio of exports-to-turnover ($\phi^t_{f,X}$) and imports-to-purchased intermediates ($\phi^t_{f,I}$) in the first semester of year t as follows:

$$\phi^t_{f,X} = \log\left(\frac{X^t_f}{Turn^t_f}\right) \quad \text{and} \quad \phi^t_{f,I} = \log\left(\frac{I^t_f}{Inte^t_f}\right), \tag{2}$$

where $Turn^t_f$ ($Inte^t_f$) denotes firm f's turnover (total purchases of intermediates) and X^t_f (I^t_f) stands for exports (imports) aggregated at the firm-level. We consider the three semesters 2007S1, 2008S1, and 2009S1 and regress both $\phi^{t+1}_{f,X} - \phi^t_{f,X}$ and $\phi^{t+1}_{f,I} - \phi^t_{f,I}$ on a constant, the post-treatment time dummy variable TC^t, the same set of (lagged) firm-level characteristics used in the previous Section, and interactions between firm-level characteristics and TC^t. We use OLS and provide robust standard errors.[11]

Table 4 reports our results for exports-to-turnover and imports-to-intermediate purchases ratios. As can be seen from column four of that table, only the difference-in-difference coefficient of D_{size} is significant in explaining changes in exports-to-turnover ratios for the trade collapse period. We may thus conclude that *the negative effect of financial variables identified in the previous section has affected foreign trade and domestic activity equally.* Put differently, the credit crunch has not disproportionately hurt the activity of trading across national borders *per se*.

Turning to magnitudes, the differential effect of D_{size} during the trade collapse is rather small. Starting with an average exports-to-turnover ratio of 0.3627 in 2008, large firms would see their ratio decrease by $0.3627 \times 0.1020 = 0.0370$ points. This is hardly strong evidence of a major trade crisis. Turning to imports-to-intermediates ratios in Table 4, there is slightly more action with five of the

[11] We again also used (trade) weighted least squares to get a closer match with aggregate figures. The results, given in Behrens *et al.* (2011), are almost identical. We thus present, in what follows, only the unweighted results.

Table 4: Changes in firm-level exports-to-turnover and imports-to-intermediates ratios.

Variable	Description	Changes in exp-to-turnover Base	Changes in exp-to-turnover DD	Changes in imp-to-intermed Base	Changes in imp-to-intermed DD
D_{size}	Size (in term of employment) of the firm	0.0936^{a}	-0.1020^{c}	0.0502^{a}	-0.0859^{a}
		-0.032	-0.052	-0.019	-0.032
D_{prod}	Value added per worker	0.0557^{c}	-0.0525	0.0263	0.0138
		-0.03	-0.05	-0.018	-0.029
D_{interm_share}	Share of intermediates over turnover	0.0442	-0.015	0.0583^{a}	-0.0710^{b}
		-0.027	-0.044	-0.017	-0.028
$D_{share\_exp\_sales}$	Share of exports over turnover	-0.1290^{a}	-0.0188	-0.0116	0.0657
		-0.031	-0.05	-0.03	-0.05
$D_{share\_imp\_interm}$	Share of imports over intermediates	0.0012	0.0219	-0.0187	-0.0978^{a}
		-0.029	-0.049	-0.016	-0.027
$D_{value\_add\_chain}$	Exports times imports over turnover	-0.0561	-0.0445	0.0209	-0.0953^{b}
		-0.036	-0.058	-0.029	-0.048
$D_{ext\_fin\_dep}$	Investments minus operating profits over investments	-0.0826^{a}	0.0654	0.0089	-0.0455
		-0.029	-0.048	-0.017	-0.029
$D_{share\_debts\_o\_liab}$	Ratio of debts over total liabilities	0.0225	-0.0297	-0.011	0.0056
		-0.028	-0.046	-0.017	-0.029
$D_{share\_debts\_due\_after\_one}$	Share of debts due after one year	0.0513^{c}	-0.057	0.0108	-0.015
		-0.03	-0.048	-0.018	-0.032
$D_{share\_fin\_debt}$	Share of financial debt	-0.026	-0.0129	-0.0031	0.0423
		-0.03	-0.049	-0.019	-0.032
D_{share_stock}	Ratio of stock over turnover	0.0372	-0.0105	0.0106	0.006
		-0.027	-0.044	-0.017	-0.028
for	Foreign firm dummy	-0.0986^{b}	0.0872	-0.036	0.1283^{b}
		-0.047	-0.071	-0.03	-0.056
mne	Multinational firm dummy	0.0813^{c}	-0.1055	0.035	-0.0432
		-0.044	-0.072	-0.036	-0.061
NACE dummies		Yes		Yes	
Observations		16,610		28,371	
R^2		0.0177		0.0103	

Notes: The column 'Base' refers to coefficients of firm characteristics alone, while the column 'DD' refers to coefficients of interactions of these characteristics with the trade collapse treatment time dummy TC^t. Robust standard errors are given in parentheses. Coefficients are significant at: ^{a} $p < 0.01$, ^{b} $p < 0.05$, ^{c} $p < 0.1$.

difference-in-difference coefficients being significant. The positive value of for in column six actually points to foreign-owned firms increasing their imports-to-intermediates ratios with respect to other firms during the collapse. However, there are three measures of involvement in global value chains that are significantly negative: D_{interm_share}, $D_{share\_imp\_interm}$, and $D_{value\_add\_chain}$. Again, given the value of the coefficients, none of them implies stark changes in imports-to-intermediates ratios. As for interactions of NACE dummies with TC^t, the reference industry being again 'Manufacture of motor vehicles, trailers and semi-trailers', they are generally insignificant. For example, in both exports-to-turnover and imports-to-intermediates regressions, only 1 of the 22 manufacturing industry dummies has a significant coefficient at the 5% confidence level.

The fact that almost all coefficients in the exports-to-turnover, imports-to-intermediates, exports-to-production, and imports-to-production regressions are insignificant and that, even when they are not, their magnitude is small, leads us to conclude that it is not a trade crisis – just a trade collapse caused by a strong decrease in the demand for tradables that has equally affected domestic and foreign activity.

5 What have we learned?

A few clear results emerge from our analysis. First, the overwhelming part of the trade collapse occurred at the intensive margin and is due to a fall in average quantities and unit prices. Exporters and importers showed remarkable resilience in foreign markets. There was no massive exit, which may be explained by large sunk costs of entering foreign markets that create an option value of remaining an exporter or an importer during the crisis (Roberts and Tybout, 1997). Since most of the adjustments took place at the

intensive margin, Belgian trade expectedly bounced back quickly after the collapse.[12]

Second, we find overall only little support for supply-side based explanations of the trade collapse. On the one hand, GDP growth of the destination countries is the single most important determinant of trade growth in our econometric analysis, explaining up to 54% of the fall in exports and 45% of the fall in imports. This applies particularly to the demand for durables and capital goods: trade in these categories fell systematically more, with a greater elasticity to GDP. While studies using more aggregated data (Baldwin, 2009) or calibrated simulations (Eaton *et al.*, 2011) reach qualitatively and quantitatively similar conclusions, we are not aware of any other firm-level analysis confirming these results to date. On the other hand, few firm- or product-level characteristics are systematically related to the fall in trade, especially when compared with the fall in domestic operations. For instance, access to credit (as proxied by financial balance sheet variables) can explain about 33% of the fall in exports, but has no explanatory power regarding exports-to-turnover or exports-to-production ratios. In other words, financial constraints affected foreign and domestic operations equally. Similarly, involvement in global value chains, as measured by either the share of imported intermediates or by export intensity, explains quantitatively some of the collapse of imports, but has little explanatory power on imports-to intermediate or imports-to-production ratios.

To conclude, let us point out two caveats of our analysis. As we acknowledged, we do not observe the number of trading partners a firm has for each product-market combination. The conclusion that trade collapsed due to a price and quantity adjustment relies on the stability of this 'hidden' extensive margin, which we can only conjecture. Also, we do not know to what extent our results generalize to other countries. Developing countries might have been much more severely affected by the credit crunch and the drying up of trade credit. This would cause a larger fall in trade at the extensive margin there, and make a quick recovery less likely.

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[12] In June 2010, Belgium's monthly exports exceeded the 2008S1 average for the first time since the collapse. Monthly exports and imports were quickly approaching their average pre-collapse level by late 2010.

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Appendix.

Balance sheet data and firm-level variables. Firm-level variables are constructed from 2006 and 2007 balance sheet data from the Business Registry covering the population of firms required to file their (unconsolidated) accounts to the National Bank of Belgium (NBB). The data combine annual accounts with data from the Crossroads Bank on firms' main sector, activity and legal status. Overall, most firms that are registered in Belgium (i.e., that exist as a separate legal entity) and have limited liability are required to file annual accounts.

For the 2008S1–2009S1 (2007S1–2008S1) analysis, we selected those companies that filed unconsolidated balance sheets in 2007 (2006) while reporting at least one employee. Annualized balance sheets provide us with information on the (full-time equivalent) number of employees, operating profits, equity and liability values, the amount of liabilities due after or within one year, the amount of liabilities held by financial institutions or commercial parties, the value of intermediate stocks, and the NACE rev1.1 5-digit code of the firm. Data on firm turnover, value added, purchased intermediates, and investments in 2006 and 2007 come from mandatory VAT declarations provided by the NBB. Balance sheets also record information on these four variables, but we prefer to use VAT declarations as information is more accurate and virtually covers the universe of Belgian firms. Multinational status and foreign ownership of a firm come from the yearly Survey of Foreign Direct Investments carried out by the NBB. Finally, firm-level imports and exports, which are needed to construct some firm-level controls, refer to the same year of the balance sheet information. Data have been obtained by aggregating firm-product-country level trade values for a given year at the firm level.

Trade and production data. Import and export data by firm, product, and country for Belgium is collected by the NBB on a monthly basis. More precisely, the information comes from intra-EU (Intrastat) and extra-EU (Extrastat) customs declarations that cover the universe of trade transactions. Firm and trade data were merged using the VAT number which identifies each firm in Belgium. Imports and exports of each firm are recorded in current euros at the 8-digit Combined Nomenclature (CN) level by country of origin/destination. Information on either the number of units or the weight in kilograms (or sometimes both) of traded goods is available and is product specific. Weight is the most widely used quantity unit.

In order to construct the quantity index used in Tables 1 to 2 we have use a 'mixed quantity' unit corresponding to kilograms, whenever recorded, and to units for those products recorded in units only. We then compute the average mixed quantity value across all firm-country-product triples involved in the group considered (example: exports of small firms) separately for 2008 and 2009. We define the average price as the ratio of the average value of trade triples across all firm-country-products involved in the group considered and the average mixed quantity defined above.

Finally, monthly production data are provided by the Belgian National Institute of Statistics. Data are based on mandatory monthly declarations by a sample of about 7,000 firms representing medium and large manufacturing producers in Belgium. Once anonymized, data are then made available to the public at different levels of sectoral aggregation under the Prodcom database brand. Some goods, especially in agriculture and fishery, are not included in the data. We use the firm-level version of that data.

Country and product data. Exchange rate variations between 2008S1 and 2009S1 (as well as between 2007S1

and 2008S1) refer to the change in the nominal interbank exchange rates with respect to the Euro at noon on April 1st, as recorded by the Bank of Canada. We choose April 1st as our midpoint in the first semester of each year (April 2nd in 2007). The average growth rate of GDP between 2008 and 2009 is the average of the two annual growth rates of the GDP at constant prices and comes from the IMF World Economic Outlook database as of October 2009. A mirror definition applies to the average growth rate between 2007 and 2008. The product classification follows the EU's 'Main Industrial Groupings' in official statistics, as described in the European Commission Regulation No 586/2001 (March 26, 2001). This classification separates products into intermediate, capital, consumer durable, consumer non-durable, and energy products. Some HS4 products (mainly agricultural goods) cannot be assigned to one of these categories using the correspondence table provided by the EU; we thus classify them as 'Residual goods'. The product group 'Intermediate, Capital, & Durables' used in the paper refers to the grouping of intermediate, capital goods, and consumer durables. All remaining product categories are subsumed by the 'Other Goods' group. The measure of product differentiation we use is based on the Rauch (1999) classification and corresponds to the share of HS6 codes within an HS4 category that are neither sold on an organized exchange nor referenced priced. We use the 'liberal' classification.

Treatment of re-exports. Using Belgian data has the drawback of including a large amount of re-exports. Indeed, Belgium is a key port of entry to – and exit from – the EU. Many 'Belgian' firms thus trade exclusively with non-resident partners. We deal with this potential problem in two ways. First, we exploit the information gathered by the National Bank of Belgium (NBB) since 2001 and systematically exclude trade by firms identified as non-residents. Non-resident firms are the main re-exporters and are identified by the NBB using information from VAT declarations. Non-resident trade accounted for about 26% (28%) of Belgian exports and 22% (25%) of Belgian imports in 2008 (2009). Second, we control for a firm's industry in our regressions. Doing so should largely capture the remaining re-exports which are strongly concentrated in wholesalers' and retailers' foreign trade.

Continuing triples. In the analysis of Section 3 we use continuing triples. Any firm-country-product trade triple that records positive values in both 2007S1 and 2008S1 (or 2008S1 and 2009S1) is considered a continuing triples for that period. By definition, continuing triples are a subset of stayers' trade triples. They account for the lion's share of trade values in 2007S1, 2008S1, and 2009S1. For example, there were 272,216 continuing triples out of the 433,529 (430,000) export triples in 2008S1 (2009S1), thus corresponding to 62.79% (63.31%) of the number of total triples and to 93.66% (91.83%) of total triples values. Our analysis in Section 3 covers the bulk of continuing triples, but we have to drop some for which firm-level regressors are missing. Considering the period 2008S1–2009S1, there are 204,598 (out of 272,216) continuing export triples for which all data on firm, country, and product characteristics is available. These triples represent 69.50% of 2008S1 export values and 68.41% of 2009S1 export values. The drop in the number of continuing triples is mainly due to Belgian affiliates of foreign groups that do not exist as a separate legal entity in Belgium. Such firms are not required to report unconsolidated accounts.

Stayers. The sample of firms used in our analysis of Section 4 is given by the stayers for which both balance sheet information and VAT declarations are available, i.e., 8,360 (8,250) firms among the 12,964 (12,481) export stayers and 14,388 (13,983) firms among the 23,782 (21,209) import stayers for the period 2008S1–2009S1 (2007S1–2008S1). VAT declarations are virtually exhaustive so that the binding data constraint is the availability of balance sheet information. For example, the data cover 73.07% (73.61%) of 2008S1 (2009S1) exports and 71.33% (70.20%) of 2008S1 (2009S1) imports by stayers.