

# Crisis-proof services : Why trade in services did not suffer during the 2008-2009 collapse



## Working Paper Research

by Andrea Ariu

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## **Abstract**

During the 2008-2009 crisis, trade in goods fell by almost 30%. In contrast, trade in business, telecommunication and financial services continued growing at their pre-crisis rates and only services related to transport declined. Using trade data at the firm-product-destination level for Belgium, I show that during the crisis the elasticity of services exports with respect to GDP growth in destination countries was significantly different from that of goods exports. In particular, the negative income shock in partner countries affected exports of goods but not exports of services. This difference is economically sizable: if goods exports had had the same elasticity to GDP growth as services exports, their fall during the 2008-2009 collapse would have been only half what was observed.

JEL Classification: F10, F14, L80.

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## **Author:**

Andrea Ariu, McDonough Business School, Georgetown University, USA, University of Geneva, Switzerland and CRENOS, Italy, e-mail: [aa1540@georgetown.edu](mailto:aa1540@georgetown.edu)

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The views expressed in this paper are those of the authors and do not necessarily reflect the views of the National Bank of Belgium or any other institutions to which one of the author is affiliated.

## TABLE OF CONTENTS

<b>1. Introduction.....</b>	<b>1</b>
<b>2. Data Description .....</b>	<b>3</b>
<b>3. The Crisis in Figures .....</b>	<b>6</b>
<b>4. Regression Analysis .....</b>	<b>12</b>
<b>5. Investigating Mechanisms.....</b>	<b>20</b>
5.1. Robustness Checks and Further Results.....	24
<b>6. Conclusions .....</b>	<b>25</b>
<b>Reference .....</b>	<b>26</b>
National Bank of Belgium - Working papers series.....	31

## 1. Introduction

Between the third quarter of 2008 and the second quarter of 2009, trade in goods experienced the steepest decline ever recorded, with both exports and imports dropping four times more than income (Freund, 2009; Levchenko et al., 2010). The fall was severe, highly synchronized across countries and mostly concentrated in the category of durable goods (Baldwin, 2009). During this period, trade in services remained stable. Business, telecommunication and financial services, which constitute more than half of trade in services in modern economies, continued growing at their pre-crisis rates and only the category of transport services declined. This different reaction is hard to explain based on the existing literature. Most of the studies analyzing trade in services at the micro level suggest that trade in services shares many of the characteristics of trade in goods without any noticeable difference.<sup>2</sup> Moreover, while a large number of papers have attempted to understand the causes of the “*Great Trade Collapse*” (Baldwin, 2009) for trade in goods,<sup>3</sup> the distinctive resilience of trade in services did not garner attention in the international trade literature.<sup>4</sup>

Using firm-product-destination<sup>5</sup> export data for Belgium, I show that services and goods exports experienced a different elasticity with respect to GDP growth in destination countries during the 2008-2009 crisis. In particular, the negative income shock in foreign markets affected exports of goods (especially exports of durable goods), but did not perturb the growth of services exports. This means that the main factor behind the trade in goods collapse (Behrens et al., 2011; Bricongne et al., 2012; Eaton et al., 2015; Levchenko et al., 2010) did not have any effect on trade in services. This difference is economically impor-

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<sup>2</sup>Breinlich & Criscuolo (2011) for the UK, Kelle & Kleinert (2010) for Germany, Walter & Dell’mour (2010) for Austria, Gaulier et al. (2011) for France, Federico & Tosti (2012) for Italy, and Ariu (2015) for Belgium.

<sup>3</sup>See Baldwin (2009), Bems et al. (2013) and Levchenko et al. (2010) for a review.

<sup>4</sup>Borchert & Mattoo (2009) is the only exception.

<sup>5</sup>For the sake of expositional clarity, I use the expression “product” also when referring to a service.

tant: if goods exports had had the same elasticity to GDP growth as services, their fall during the 2008-2009 collapse would have been only half what was observed. The composition of exports and GDP helps understanding the different elasticity. Exports are predominantly composed of durable goods, which is the product category that dropped the most during the crisis (Behrens et al., 2011; Levchenko et al., 2010). Instead, GDP is mostly composed of services and consumable goods, which remained relatively stable during the crisis (Borchert & Mattoo, 2009; Francois & Woerz, 2009). Thus, exports of goods over-reacted with respect to the negative GDP shock in destination countries, while exports of services did not.

The empirical analysis proceeds in three steps. In the first, I provide descriptive evidence on how exporters reacted to the crisis. I decompose over-time changes in exports, separately for goods and services, into changes in the extensive and intensive margins.<sup>6</sup> In the second step, I use a difference-in-difference approach similar to Behrens et al. (2011) to explore the effect of GDP growth in partner countries on exports of goods and exports of services separately. I compare the change of firm-country-product exports between the first six months of 2007 and 2008 (pre-treatment outcome) with the change between the first six months of 2008 and 2009 (post-treatment outcome). In the third step, I put together the information on goods and services exports and perform a triple-difference analysis to understand the magnitude and statistical significance of the role played by GDP growth for services exports with respect to goods exports during the crisis. I compare changes in services exports with changes in goods exports using only firms that export both goods and services. Moreover, I complement the within-firm results with evidence on cross-firm effects. More

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<sup>6</sup>The extensive margins consist of the average number of partner-countries per firm and the average number of products exported per firm-country. The intensive margin consists of the average exports per firm, country and product. Due to data limitations explained in the next section, I cannot analyze entry and exit dynamics. I restrict my analysis to within-firm adjustments, focusing on the firms that were observed continuously during the crisis.

specifically, I use propensity score matching to find for each service exporter the closest goods exporter and apply to the matched firms the same triple-difference strategy.

Borchert & Mattoo (2009) is the first paper to show that services did not collapse during the crisis of 2008-2009. Using aggregate US trade data, they show that both exports and imports of services did not decline. Then, using data on Indian exporters in the IT sector, they suggest that services did not suffer from the 2008-2009 crisis because their demand is less cyclical and they rely less on external capital. The main contribution of this paper is to go beyond their descriptive evidence and provide a micro-econometric analysis of the determinants of the different response of trade in goods and trade in services during the “Great Trade Collapse”. Moreover, by using very disaggregate export data, this paper complements the evidence present in Borchert & Mattoo (2009) with an analysis of the within-firm dynamics of trade margins during the crisis. Finally, this paper brings the trade in services perspective into the large literature analyzing the effect of macroeconomic shocks on trade in goods at the firm-level,<sup>7</sup> especially to the papers focusing on the 2008-2009 crisis.<sup>8</sup>

The paper is organized as follows: Section 2 describes the data; Section 3 presents the descriptive statistics; Section 4 presents the difference-in-difference analysis; Section 5 develops the triple-difference approach; and Section 6 concludes.

## 2. Data Description

The bulk of the data used in this paper is composed of three different datasets provided by the National Bank of Belgium (NBB) concerning trade in services, trade in goods and firm-level accounts.

Data on trade in services come from the NBB Trade in Services dataset used to compile the balance of payments and cover the period from 2006 to 2010. The

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<sup>7</sup>such as Bernard et al. (2009), Amiti & Weinstein (2011) and Iacovone & Zavacka (2009).

<sup>8</sup>See Baldwin (2009), Bems et al. (2013) and Levchenko et al. (2010) for recent reviews.

dataset is formed using different surveys conducted by the NBB<sup>9</sup> and contains information about trade in services at the firm-destination-product level. For any firm present in the dataset is available monthly or quarterly information (depending on the survey) on export values per type of product and destination country. Service products are listed in Table 2 of the Online Appendix and countries are classified using ISO 2-digit codes.<sup>10</sup> I exclude “services to affiliates” (code H7000) from the analysis because this category does not contain information on which specific service is traded and “goods included in the construction services” (code E0002) because it does not strictly represent trade in services. After these cuts the dataset captures more or less 60% of total services exports by Belgium and about 40% of Belgian exporters. It is structured to be representative of all firms exporting services in terms of export size, exported services, firm size and geographical dispersion of exports. The survey nature of the dataset rules out any analysis of entry and exit patterns in foreign markets.<sup>11</sup> Therefore, the analysis in this paper will focus solely on the firms that are continuously observed during the period of analysis.<sup>12</sup> This means that I cannot analyze across-firm adjustments, but I can still explore the service and product margins, and thus within-firm adjustments during the crisis. This limitation should not too serious, since entry and exit account for less than 8% of total exports for both goods and services in normal years (Ariu, 2015) and since

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<sup>9</sup>For more information on the surveys, see Table 1 in the Online Appendix available at [http://www.ariu.eu/Andrea\\_Arius\\_Web\\_Page/Research.html](http://www.ariu.eu/Andrea_Arius_Web_Page/Research.html).

<sup>10</sup>The ISO 2-digit classification includes about 250 countries. The datasets include 230 of them.

<sup>11</sup>One problem is represented by the fact that the firms might be exporting before they get into the data. Another one relates to the fact that when a firm enters the dataset, it is kept for some years even if it does not meet the thresholds to be included any longer. Moreover, even by excluding those firms by checking the conformity with the criteria, it would give an idea of the entry into and exit from the survey, but it is questionable whether this would also be representative of entry into and exit from export markets.

<sup>12</sup>These continuing firms account for about 96% of exports and imports present in the surveys, so we can be confident that the data covers the bulk of Belgian trade.

entry and exit represented a marginal channel of adjustment for firms during the crisis (Behrens et al., 2011; Bricongne et al., 2012).<sup>13</sup> Moreover, despite this constraint, this is the only dataset available that allows for an analysis of trade in services at the firm-product-destination level during the 2008-2009 crisis.

Information on trade in goods is taken from the NBB Trade in Goods Dataset, which contains exports and imports of goods by Belgian firms at the firm-destination-product level. The data are collected monthly and come from the Intrastat (Intra-European) and the Extrastat (Extra-European) declarations. Firms are identified by their VAT number, countries are classified using ISO 2-digit codes, and products are classified using 4-digit HS codes. Data on firm-level accounts come from the Business Register covering the population of firms required to file their (unconsolidated) accounts with the NBB. From this dataset, I take information on full-time equivalent employment, turnover, operating profits, equities, liabilities, stocks and purchases of intermediates for the year 2007. Unfortunately, turnover figures comprise both goods and services together and there is no information available to distinguish between the two. This prevents me from analyzing the dynamics of goods and services in the domestic market. The multinational and foreign ownership status of firms is available from the NBB Survey of Foreign Direct Investments. Finally, I take information on GDP growth in destination countries from the IMF World Economic Outlook database (2012 version)<sup>14</sup> and information on daily exchange rates on the 1<sup>st</sup> of April of each year from the European Central Bank's Statistical Data Warehouse.<sup>15</sup>

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<sup>13</sup>Bernard et al. (2009) show that also during the Asian crisis the extensive margin was a minor adjustment channel and all the action was concentrated on the intensive margin.

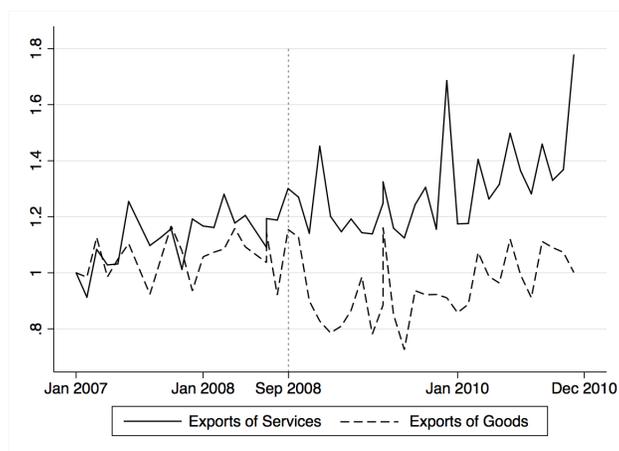
<sup>14</sup>Available at <http://www.imf.org/external/pubs/ft/weo/2012/01/weodata/index.aspx>

<sup>15</sup>Available at: <http://sdw.ecb.europa.eu/>

### 3. The Crisis in Figures

As previously mentioned, the crisis hit goods more severely than services. Figure 1 shows that exports of goods (dashed line) fell by about 30% after September 2008. Services instead (solid line) show no clear sign of discontinuity and they exhibit similar growth patterns before and after September 2008. This phenomenon was not only confined to Belgium, but could be observed worldwide and it was significant in terms of magnitude. In Figures 2 and 3, I plot the ratio of quarterly exports of services over exports of goods for OECD countries, with the first quarter of 2006 normalized to one.<sup>16</sup> Following the Lehman Brothers' collapse in the third quarter of 2008, the increase in the ratio for Belgium - about 25%- is similar to that of the UK, the USA, Germany, and Mexico and is in line with the average for the OECD. This pattern is particularly strong for Canada, Austria, France, and Japan - for which an increase of about 40% can be observed- while it is not clearly present only in very few countries (Australia, Ireland, New Zealand, Greece, and Iceland).

Figure 1: Belgian Monthly Exports, Jan. 2007=1



In the rest of the paper, the analysis will be focused only on the first six

<sup>16</sup>Data come from the OECD database available at <http://stats.oecd.org>

Figure 2: Quarterly Ratio of  $\frac{\text{Services Exports}}{\text{Goods Exports}}$ , 2006Q1=1

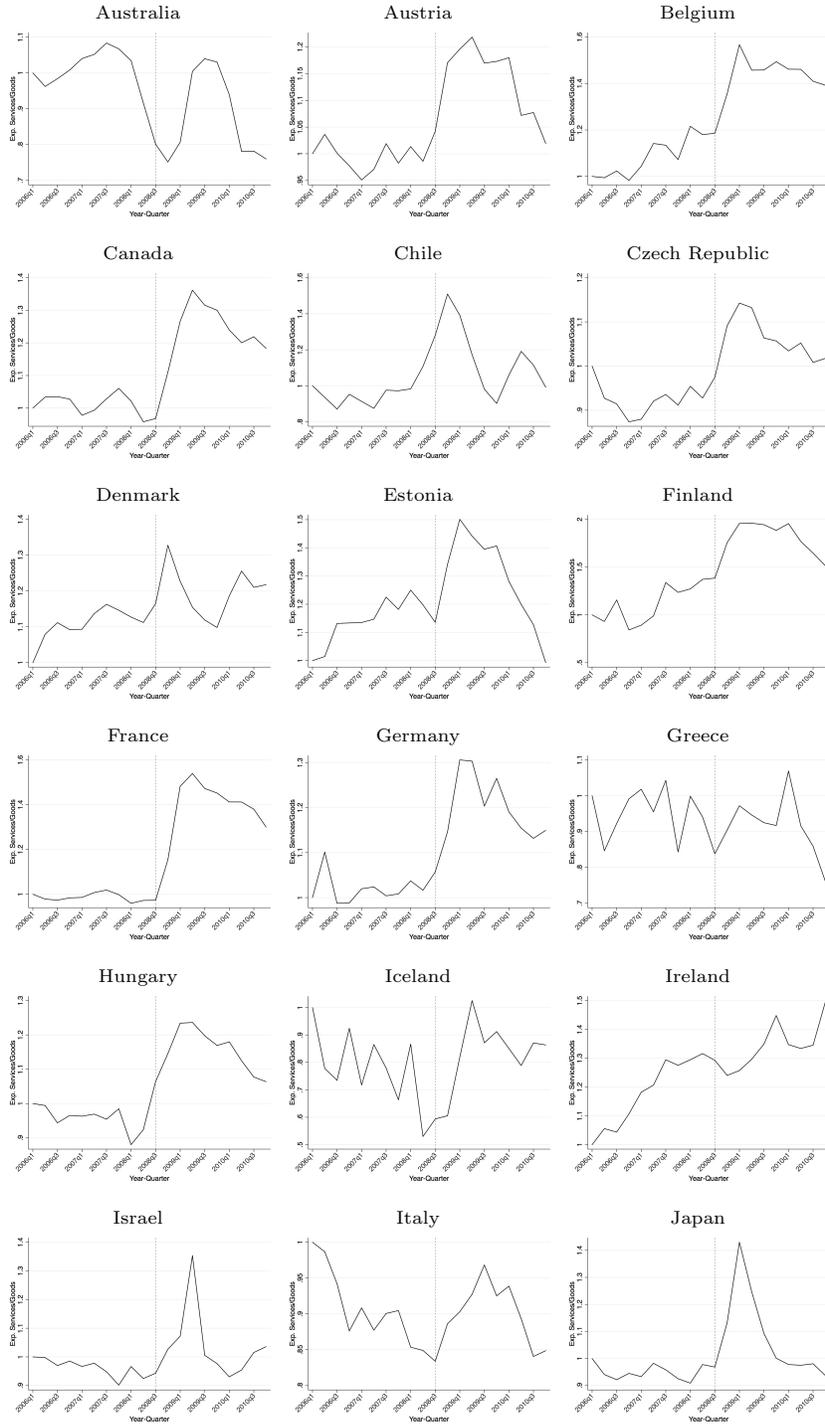
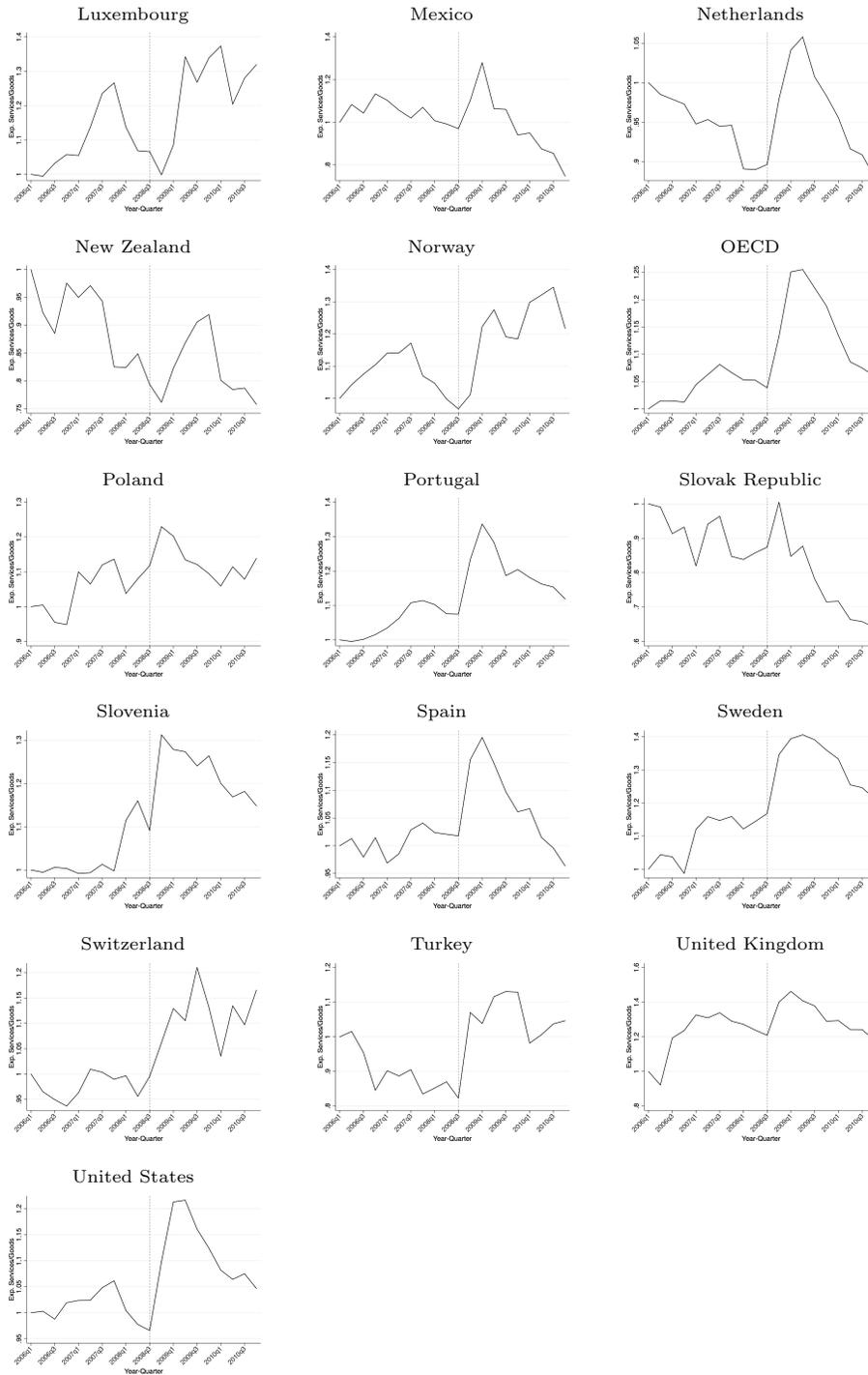


Figure 3: Quarterly Ratio of  $\frac{\text{Services Exports}}{\text{Goods Exports}}$ , 2006Q1=1



months (S1) of each year -as also in Behrens et al. (2011)-. This choice is made in order to i) reduce seasonality issues which are evident in the monthly data; ii) include the maximum number of firms;<sup>17</sup> and iii) do a clear pre-post comparison avoiding the shock present in the statistics of the third and fourth quarters of 2008. The first step towards understanding the composition of the changes in Belgium's exports is to decompose total Belgian exports at time  $t$  (where, in this case  $t = \{2008S1, 2009S1\}$ ), of trade type  $k$  (where  $k = \{Services, Goods\}$ ),  $X_t^k$ , into the number of firms  $f_t$ , the average number of markets served per firm  $\bar{c}_t$ , the average number of exported products per market-firm  $\bar{p}_t$ , and the average exports per firm-market-product  $\bar{x}_t$ :  $X_t^k = f_t^k * \bar{c}_t^k * \bar{p}_t^k * \bar{x}_t^k$ . By taking the ratio between the first six months of 2008 and the first six months of 2009, the change in total exports,  $\Delta X^k = \frac{X_{2009}^k}{X_{2008}^k}$ , can thus be broken down into the change in the extensive margins (firms-services-markets) and the change in the intensive margin (the average exports per firm-market-service):

$$\Delta X^k = \Delta f^k * \Delta \bar{c}^k * \Delta \bar{p}^k * \Delta \bar{x}^k \quad (1)$$

Since I focus only on continuing firms, the change in the number of firms,  $\Delta f$ , is equal to one. Looking at Table 1, the change in Belgian exports between the first six months of 2008 and 2009 is -26.81% for goods and only -3.13% for services. Even if these decreases differ in quantitative terms, qualitatively they are both generated almost entirely by a reduction in the quantities exported per market and product that is only partially counterbalanced (at least for services) by an increase in the average number of products. Both for goods and services trade, Belgian firms did not significantly leave destination markets: they decreased by only -0.33% for services and -1.41% for goods. They stepped up the average number of products provided per destination country: an increase

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<sup>17</sup>Some firms declare exports only quarterly and most firms export only once per year; therefore, carrying out an analysis on continuing firms at the monthly or quarterly level would reduce substantially the number of observations.

Table 1: Change in the Margins of Belgian Exports (2008S1-2009S1)

<b>Panel a: Exports</b>						
Period	Services			Goods		
	2008S1	2009S1	% Change	2008S1	2009S1	% Change
<b>Total</b>	21,757	21,075	-3.13%	99,534	72,853	-26.81%
<b>Extensive Margins:</b>						
Firms	2,107	2,107	-	12,964	12,964	-
Countries	11.41	11.37	-0.33%	8.58	8.46	-1.41%
Products	1.52	1.55	2.00%	3.72	3.79	1.83%
<b>Intensive Margin:</b>						
Average Sales	0.60	0.57	-4.72%	0.24	0.18	-27.09%

**Note:** This table presents the decomposition of the growth rate of Belgian exports between the first six months of 2008 and the first six months of 2009 into the extensive margin (average number of export markets per firm and average number of products per market-firm) and the intensive margin (average exports per firm, market and product). The total and the intensive margins are expressed in millions of Euros, the extensive margins in units.

by 2% for services and 1.83% for goods.<sup>18</sup> They cut their average exports per market-product significantly with a decline of -4.72% for services and a drop of -27.09% for goods. The huge difference in the reaction of the average quantities exported per market and product suggests that the intensive margin is the key to understanding the difference in the reactions of services and goods trade.

By dividing Belgian exports into the different product categories, a great heterogeneity across products, both for services and goods, appears in panel a of Table 2. Services related to transport experienced a drop commensurate to that of goods. On the other hand, business, financial and telecommunication services, which represent more than 50% of Belgian exports, continued their sustained growth. For goods exports, all product categories experienced a decline, yet the bulk of the collapse came from durable and capital goods. By decomposing Belgian exports into EU and non-EU and OECD and non-OECD in panel b of

<sup>18</sup>For goods exports, I use the HS4 classification. Using a more aggregate classification marginally decreases the contribution of the average number of products and increases that of the intensive margin.

Table 2: Change in the Margins of Belgian Exports (2008S1-2009S1)

Panel a: By Product Type					Panel b: By Destination Country				
Services:	Total	Extensive Margins		Intensive	Services:	Total	Extensive Margins		Intensive
	% Change	Countries	Services	Margin		% Change	Countries	Services	Margin
Transport Services	-12.44	-2.18	3.00	-13.09	EU	-4.30	-1.08	1.94	-5.09
Service to non-Residents	-0.34	-0.14	1.29	-1.47	non-EU	-1.14	0.50	2.17	-3.73
Telecommunication Services	11.66	5.13	-1.47	7.80	OECD	-1.05	-0.84	1.74	-1.92
Construction Services	-0.79	-2.77	-0.82	2.87	non-OECD	-14.85	-0.09	2.80	-17.09
Financial and Insurance Services	21.49	1.59	0.26	19.27					
Business Services	4.90	-0.23	2.11	2.97					
<b>Goods:</b>					<b>Goods:</b>				
Durable and Capital Goods	-29.75	-1.50	2.03	-30.02	EU	-26.73	-3.15	1.54	-25.50
Consumable Goods	-7.74	0.17	0.36	-8.22	non-EU	-27.27	-0.76	4.14	-29.63
Energy	-44.47	-3.94	0.04	-42.22	OECD	-26.64	-1.92	2.09	-26.74
Other	-25.51	-1.84	0.28	-24.33	non-OECD	-27.75	-0.59	1.58	-28.45
Panel c: By Ownership and Multinational Status					Panel d: By Firm Characteristics				
Services:	Total	Extensive Margins		Intensive	Services:	Total	Extensive Margins		Intensive
	% Change	Countries	Services	Margin		% Change	Countries	Services	Margin
MNE	7.38	0.63	2.36	4.24	Big	-0.27	-0.38	2.60	-2.42
non-MNE	-8.54	-0.60	1.80	-8.54	Small	-22.65	-1.13	-0.57	-21.32
Foreign Owned	3.17	0.86	3.89	-1.53	Financially exposed	-1.32	0.25	0.97	-2.51
Non-Foreign Owned	-8.64	-0.88	0.89	-8.64	Financially non-exposed	-3.07	-0.74	3.20	-5.37
<b>Panel b: Goods</b>					<b>Goods:</b>				
MNE	-29.77	-1.28	2.44	-30.55	Big	-27.08	-1.85	2.85	-27.76
non-MNE	-25.04	-1.44	1.65	-25.19	Small	-23.98	-0.48	1.28	-24.58
Foreign Owned	-30.32	-2.04	4.53	-31.96	Financially exposed	-29.68	-1.94	1.84	-29.58
Non-Foreign Owned	-22.98	-1.27	0.99	-22.75	Financially non-exposed	-23.82	-0.90	3.36	-25.63

Note: This table presents the decomposition of the growth rate of Belgian exports between the first six months of 2008 and the first six months of 2009 by type of product (panel a), destination country (panel b), ownership status (panel c), and firm characteristics (panel d). The total and the intensive margins are expressed in millions of Euros, the extensive margins in units.

Table 2, a mixed country pattern emerges. Non-EU and extra-OECD services exports experienced a bigger drop than EU and OECD ones. This is because most of the extra-OECD trade is represented by transport services, which is the only service category that collapsed. For goods exports on the other hand, the fall is similar across the different regions.

To discern differences across firms, in panel c of Table 2 I divide exports following their multinational and foreign ownership status. For services, non-multinational and non foreign-owned firms were hit by the crisis, while multinational and foreign-owned firms registered positive figures. However, these decreases are much smaller than those for goods, for which there is no heterogeneity following the multinational and foreign ownership status. Finally, we define in panel d a firm as big if its full-time equivalent employment is higher than the median exporter in the same industry, and as financially exposed if its external financial dependency is higher than the median exporter in the same industry. Based on this distinction, we observe that there is no heterogeneity

for firms exporting goods, while small firms exporting services suffered more from the crisis than big ones. This result is partially driven by the fact that the only service category that experienced a drop, transport services, includes many small firms. In general, these results highlight a more pronounced heterogeneous response of services during the crisis.

Summing up the descriptive evidence on the crisis in Belgium, it seems that services exports did not suffer as much as goods exports. Most of the adjustment was due to a decrease in the intensive margin which was more important for goods than for services. By contrast, the role of the extensive margin was less important, with both service and goods exporters reducing the number of destinations slightly and increasing the number of products per destination. In the case of goods, the fall was evenly spread geographically, while for services only non-OECD exports suffered. Moreover, we observe an important heterogeneity when looking at the different product types. In particular, transport services dropped similarly to trade in goods, while professional, financial and telecommunication services continued to grow at a rapid pace. For trade in goods, the decrease was mostly due to a reduction in durable and capital goods, while consumable goods declined more smoothly. Finally, heterogeneity played a role depending on ownership and multinational status, size, and financial situation for services exports, but not for goods exports.

#### 4. Regression Analysis

To understand which factors could lead to a different response for services, I use a difference-in-difference approach similar to Behrens et al. (2011), in which the change in the logged exports to a particular market  $c$ , of a particular product  $p$ , by a Belgian firm  $f$  between the first six months of 2007 and 2008, and the first six months of 2008 and 2009,  $\Delta X_{fcpt}^k = \log X_{fcpt+1}^k - \log X_{fcpt}^k$ , is regressed, separately for goods and services (remember that  $k = \{Services, Goods\}$ ), against the treatment dummy  $T_t$  that takes value one for the 2008-2009 period; a vector containing our covariate of interest, GDP growth, together with other controls

at the firm, country and product level:  $Z_{fcpt}^k$ , and the interaction of this vector with the treatment dummy,  $Z_{fcpt}^k * T_t$ .

$$\Delta X_{fcpt}^k = \alpha + \beta_0' T_t + \beta_1' Z_{fcpt}^k + \beta_2' Z_{fcpt}^k * T_t + \epsilon_{fcpt}^k \quad (2)$$

In this specification,  $\beta_0'$  represents the treatment-specific effect,  $\beta_1'$  the contribution of GDP growth and the other covariates in normal times, and  $\beta_2'$  the contribution of the same variables during the crisis. The identifying assumption, in the absence of a true control group (which would be represented by firms that were not exposed to the crisis), is based on the assumption that the treatment had differential effects on firms depending on covariates. The main variable of interest is the GDP growth of destination countries. While not being the perfect variable for capturing the income variation, it can proxy the overall demand conditions in all the export markets present in the dataset. With respect to the other control variables, it is necessary to consider which other factors might have led services to react differently from goods during the crisis. On the supply side, Chor & Manova (2012), Ahn et al. (2011), Auboin (2009) and Amiti & Weinstein (2011) identify the severe credit crunch as another element that made the trade collapse worse. Banks reduced the availability of external capital for exporters, thus driving down aggregate trade volumes. To the extent that service exporters rely less on external trade capital, this can be a further reason why services exports did not fall.<sup>19</sup> To control for the possible effects of

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<sup>19</sup>First, this can be related to the fact that many services can be traded over the internet, thus reducing the need for external finance to make the necessary investments to be able to export (Borchert & Mattoo, 2009). Second, payments are faster for services: production and consumption often coincide (this is especially true for modes 2, 3 and 4 defined in the GATS) and the risk of shipping delays are very low. As a result, the working capital needed to support the firm from production to delivery is lower. Moreover, this lack of payment delays lowers the need of export finance insurance. Third, service exporters might not be able to ask for external trade capital and may be used to work without it. This is because services are intangible and highly customized. Thus, they have little value outside the seller-buyer link and they can hardly be used as collateral.

credit constraints I use: the external financial dependence, the share of debts over liabilities, the share of long-term debts, and the share of financial debts. The external financial dependence captures the degree to which investments are not covered by internal resources, capturing the need for external funding to get liquidity. The share of debts over liabilities indicates the importance of debts in relation to overall liabilities. The share of long-term debts measures the leverage of the firm and so the degree to which the firm is free to use its liquidity. The idea is that the higher the share of short-term debts, the lower the freedom to use the liquidity. The share of financial debts controls for how much firms rely on financial debts rather than on commercial ones.

At the same time, Altomonte et al. (2012) and Bems et al. (2011) observe that the international nature of global value chains makes downstream demand shocks propagate through them with magnified upstream volatility due to inventory adjustments. Since services are intangible and thus not storable, they might have suffered less from the inventory adjustment process and from the disruption of global value chains. To control for this, I use the share of intermediates, the share of exports over sales, the share of imports over intermediates, the importance of imports and exports over total turnover and the importance of stocks. All these measures provide evidence of the degree to which firms are oriented towards foreign markets for their sales and how much they rely on external sources for their inputs. Finally, service exporters might differ from goods exporters in various dimensions (size, productivity, multinational status, etc.) and that may lead to a different reaction of service trade to the same shock. To capture this heterogeneity, I use the multinational and foreign-ownership status, the productivity and the size of the firm. These variables should shed some light on the role that firm characteristics played for services and goods exports. Table 3 provides a detailed explanation of the construction and the sources of all the variables used.

In order to avoid issues related to multicollinearity that might arise from the use of many firm-level variables together, I perform a principal component

Table 3: Description of the Variables

Variable Name	Description	Source
<b>Trade Variables:</b>		
Export of Services	2007-2010 monthly exports of services by firm, service, country	1
Export of Goods	2007-2010 monthly exports of goods by firm, service, country	2
<b>Heterogeneity:</b>		
Size	Log of firm size, measured in terms of full-time equivalent employment	3
Productivity	Log of Value added per worker	3
FOR	Dummy indicating foreign ownership	4
MNE	Dummy indicating a multinational firm	4
<b>Global Value Chains:</b>		
Share of Intermediates	Share of intermediates over turnover	3
Share of Exports on Sales	Share of exports over turnover	3
Share of Imports on Intermediates	Share of imports over intermediates	3
Value Added Chain	Exports times imports over turnover	3
Stocks Importance	Ratio of stock over turnover	3
<b>Credit Constraints:</b>		
External Financial Dependence	Investments minus operating profits over investments	3
Share of Debts over Liabilities	Ratio of debts over total liabilities	3
Share of Long-Term Debts	Share of debts due after one year	3
Share of Financial Debts	Share of financial debt	3
<b>Income:</b>		
GDP Growth	Average annual growth rate of GDP	5
Domestic absorption	Change in log households spending by product type (Durables, Consumables, Services)	6
<b>Further Controls:</b>		
Nace codes	NACE rev 1.1 2-digit industry dummies	7
OECD but non-EU	Dummy for countries belonging to the OECD (in 2008) but not to the EU	8
non-OECD non-EU	Dummy for countries belonging neither to the OECD nor to the EU	8
Exchange rate change	% change in the daily exchange rate with the euro between at the 1 <sup>st</sup> of April of each year	9

**Note:** 1= NBB Trade in Services Dataset; 2=NBB Trade in Goods Dataset; 3= NBB Business Registry; 4= NBB Survey of Foreign Direct Investments; 5= IMF World Economic Outlook; 6=OECD Database; 7= NBB Crossroads Bank; 8= OECD and European Commission; 9= European Central Bank.

analysis.<sup>20</sup> More specifically, I collapse all the variables pertaining to the same channel into a synthetic standardized variable capturing their maximum common variability. Besides the aforementioned variables, I use regional dummies to control for regional trends, the exchange rates to control for the strategic use of currencies and industry dummies to control for industry-level dynamics. Since I do not have product characteristics that are comparable across goods and services, I use service or product dummies to control for heterogeneous responses across different products.<sup>21</sup> Since the independent variables vary at a more aggregate level than the dependent variable, I use the multi-level clustering procedure developed by Cameron et al. (2011) and cluster standard errors in the three relevant dimensions used in the analysis: firm, product and country.<sup>22</sup> Finally, to alleviate endogeneity issues for the firm-level variables, I use balance sheet data from 2007 only and trade data from 2006 to compute export and import to turnover ratios.

Column (1) of Table 4 shows the results for goods exports. Both the heterogeneity and GDP growth variables show significant coefficients for both the normal period ( $\beta_1$ ) and the crisis period ( $\beta_2$ ), while the global value chain and the financial constraints do not. The positive coefficient of  $\beta_1$  and the negative one of  $\beta_2$  for the heterogeneity covariate mean that bigger, more productive, foreign-owned or multinational firms are those, in terms of export growth, which tend to grow the most during normal times and suffered the least during the crisis. Looking at the income variation, the growth of goods exports follows GDP growth in destination countries in normal times: a one percent increase

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<sup>20</sup>The results for the specification with the firm-level variables not condensed in the principal component analysis is available in Table 3 of the Online Appendix.

<sup>21</sup>Please note that in order to have a similar level of disaggregation between services and goods, I use the HS classification at the 2-digit level.

<sup>22</sup>The procedure involves the computation of the standard errors clustered at each level of aggregation (in our case firm, country, product, firm-country, firm-product and country-product). These one-way clustered variance matrices are combined together and to the resulting matrix is subtracted the variance matrix that clusters all the dimensions together (firm-country-product in our case).

Table 4: The Role of GDP Growth: Regression on Continuing Firm-Country-Service Triplets

	(1)		(2)		(3)		(4)	
	Goods		Services		Durable Goods		Consumable Goods	
	$\beta_1$	$\beta_2$	$\beta_1$	$\beta_2$	$\beta_1$	$\beta_2$	$\beta_1$	$\beta_2$
GDP Growth	1.1965 <sup>a</sup>	1.4854 <sup>b</sup>	2.0229	-1.3520	1.1359 <sup>c</sup>	1.7470 <sup>b</sup>	1.7523 <sup>b</sup>	0.8069
	(0.458)	(0.666)	(1.839)	(2.495)	(0.584)	(0.803)	(0.579)	(0.780)
Heterogeneity	0.0278 <sup>b</sup>	-0.0388 <sup>b</sup>	0.0154	-0.0175	0.0281 <sup>b</sup>	-0.0293 <sup>c</sup>	0.0185	-0.0436
	(0.013)	(0.015)	(0.067)	(0.096)	(0.013)	(0.015)	(0.020)	(0.028)
Global Value Chains	0.1266	-0.1661	-0.0909 <sup>b</sup>	0.2732 <sup>a</sup>	0.1326	-0.1704	0.1756	-0.1298
	(0.106)	(0.171)	(0.040)	(0.068)	(0.110)	(0.198)	(0.130)	(0.163)
Credit Constraints	0.0034	-0.0147	-0.0460	0.0505	0.0015	-0.0206	0.0202	-0.0182
	(0.010)	(0.014)	(0.046)	(0.075)	(0.010)	(0.016)	(0.013)	(0.022)
Constant		-0.0107		-0.2017		-0.2285 <sup>a</sup>		0.0697
		(0.043)		(0.123)		(0.057)		(0.267)
Obs.	428,002		15,073		287,130		107,440	
$R^2$	0.0096		0.0442		0.0107		0.0077	
Prob > F	0.0000		0.0000		0.0000		0.0000	

**Note:** This table presents the estimated coefficients for GDP growth.  $\beta_1$  refers to the estimated effects in normal time and  $\beta_2$  refers to the estimated effects of the same variables during the crisis. All regressions contain as controls: product/service, industry and regional dummies as well as exchange rate changes. Multi-level clustered standard errors in parentheses (at the firm, product and country level). <sup>a</sup>  $p < 0.01$ , <sup>b</sup>  $p < 0.05$ , <sup>c</sup>  $p < 0.1$ .

in GDP growth is associated with a 1.2% increase in exports. This effect is magnified during crises: a one percent decrease in GDP growth is associated with a 2.68% decrease in export values.<sup>23</sup>

The insignificant coefficients for the global value chains and the financial constraints covariates suggest that they did not play a significant role during the crisis. However, it is also possible that the heterogeneity principal component is capturing part of that variation. For instance, it is known that multinationals can compensate for financial market imperfections (Manova et al., 2015). Therefore, the multinational status might capture part of the financial constraint variation. At the same time, while I use standard measures suggested by the literature,<sup>24</sup> the debate on which variable should be used to capture credit

<sup>23</sup>This is simply given by the sum of the estimated coefficient for normal times, 1.1965 and the coefficient for crisis times, 1.4845.

<sup>24</sup>See for example Manova & Yu (2012), Whited (1992), Fazzari & Petersen (1993), Greenaway et al. (2007), and Ding et al. (2013)

constraints is still open. The main issue is that these variables might capture both demand and supply components, thus raising potential endogeneity concerns.

Switching to column (2) of Table 4, we observe that GDP growth did not play a part for trade in services. The most important factor explaining the fall for trade in goods (Behrens et al., 2011) does not have any effect on the growth of trade in services both in normal times and crisis times. So, the evolution of services exports over time does not seem to be related to changes in the aggregate income in destination markets.<sup>25</sup> At the same time, the crisis did not have heterogeneous effects based on size, productivity and foreign ownership or multinational status for service exporters, and credit constraints did not affect service exporters. The only significant coefficient concerns the global value chain variable: firms which were more involved in foreign markets were those growing the least during normal times, but the crisis reversed this trend.

Behrens et al. (2011), Bricongne et al. (2012), Eaton et al. (2015) and Levchenko et al. (2010) show that a compositional effect led trade in goods to fall more than GDP: durable goods, which constitute a large share of international trade but only a small share of domestic spending, collapsed more than consumables and services, thus having little effect on GDP but a huge one on exports. If the demand for services did not suffer from the decrease in income, the same compositional effect may also explain the resistance of service trade. The results in Table 4 seem to be in line with this hypothesis: income variations in destination countries had little effect on services exports, while they had a magnified effect on trade in goods during the crisis. In order to test this hypothesis more finely, I proceed in two steps. In the first, I divide total exports into durable and consumable exports and check what effect GDP growth has on

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<sup>25</sup>Please note that this result does not preclude the levels of services exports to be significantly correlated with the levels of GDP in destination countries, for example, in a gravity setting. Moreover, I tested for the presence of second- and third-order non-linearities and I did not find any significant result.

Table 5: Domestic Absorption: Regression on Continuing Firm-Country-Service Triplets

	(1)		(2)		(3)		(4)		(5)	
	Goods		Services		Durable Goods		Consumable Goods		Services	
	$\beta_1$	$\beta_2$	$\beta_1$	$\beta_2$	$\beta_1$	$\beta_2$	$\beta_1$	$\beta_2$	$\beta_1$	$\beta_2$
Domestic Absorption	1.0421 <sup>a</sup>	0.8242 <sup>b</sup>	3.5366 <sup>b</sup>	-1.9805						
	(0.307)	(0.396)	(1.497)	(1.783)						
Durables Absorption					0.4127 <sup>a</sup>	0.2832				
					(0.156)	(0.187)				
Consumables Absorption							0.0752	-0.0000		
							(0.864)	(0.000)		
Services Absorption									3.6837 <sup>b</sup>	-2.2452
									(1.823)	(2.065)
Heterogeneity	0.0275 <sup>b</sup>	-0.0396 <sup>b</sup>	-0.0039	0.0013	0.0233 <sup>c</sup>	-0.0194	0.0297	-0.0662 <sup>b</sup>	0.0046	0.0022
	(0.014)	(0.016)	(0.079)	(0.114)	(0.014)	(0.016)	(0.021)	(0.032)	(0.079)	(0.113)
Global Value Chains	0.1169	-0.1294	-0.0505	0.2901 <sup>b</sup>	0.1291	-0.1381	0.1771	-0.1867	-0.0325	0.2489 <sup>c</sup>
	(0.108)	(0.151)	(0.071)	(0.134)	(0.113)	(0.180)	(0.145)	(0.166)	(0.069)	(0.129)
Credit Constraints	0.0110	-0.0155	-0.0186	0.0128	0.0115	-0.0223	0.0216	-0.0183	-0.0168	0.0024
	(0.010)	(0.014)	(0.050)	(0.078)	(0.010)	(0.016)	(0.015)	(0.026)	(0.051)	(0.082)
Constant		-0.0200		-0.2069		-0.0314		-0.1905 <sup>c</sup>		-0.1879
		(0.044)		(0.142)		(0.050)		(0.113)		(0.154)
Obs.		364,339		11,189		232,832		91,135		10,529
R <sup>2</sup>		0.0098		0.0430		0.0113		0.0075		0.0411
Prob > F		0.0000		0.0000		0.0000		0.0000		0.0000

**Note:** This table presents the estimated coefficients for the different variables capturing domestic absorption.  $\beta_1$  refers to the estimated effect in normal times and  $\beta_2$  refers to the estimated effect of the same variables during the crisis. All regressions contain as controls: product/service, industry and regional dummies as well as exchange rate changes. Multi-level clustered standard errors in parentheses (at the firm, product and country level). <sup>a</sup> p<0.01, <sup>b</sup>p<0.05, <sup>c</sup> p<0.1.

them. Here, GDP growth should have a stronger effect on durable and capital goods than on consumable goods. In the second step, I use a measure of domestic absorption by product or service type.<sup>26</sup> If the compositional argument is valid, the exports of durables, consumables and services should be correlated with their corresponding absorption in the destination countries<sup>27</sup> during normal time, but no abnormal reaction during the crisis should be observed. In this case, the decrease in the demand for durables would explain the abnormal fall in goods exports during the crisis and the stability of service absorption would explain the spectacular resilience of trade in services.

Columns (3) and (4) of Table 4 present the results when splitting the sample

<sup>26</sup>See Table 3 for the definition and the source of this variable. Please note that one limitation of this analysis is that I only have the information on the domestic absorption by product type for OECD destinations.

<sup>27</sup>I.e. the exports of durable goods should be correlated with spending on durables in destination countries.

into the exports of durable and consumable goods. Most of the over-reaction of goods trade with respect to GDP variations is clearly due to the fall of durable goods, while consumable goods did not have any abnormal reaction during the crisis. This is a first clue that the compositional effect is in place. In columns (1) and (2) of Table 5, I run the same regression as in columns (1) and (2) of Table 4 using the growth in overall domestic absorption instead of the GDP growth. This is a test to check whether the behavior of domestic spending mimics that of GDP growth. The results confirm the over-reaction of trade in goods during the crisis and thus the validity of domestic absorption as a proxy for income changes, despite its limited geographical coverage.<sup>28</sup> Finally, in columns (3), (4) and (5) of Table 5, the export in durables, consumables and services are related to their respective domestic absorption. As expected, none of them is significantly correlated with their corresponding change in domestic absorption during the crisis ( $\beta_2$  is never significant). Therefore, the compositional argument explains both the service resilience and the over-reaction of trade in goods: the demand for durables - which represent most of the export values - collapsed during the crisis, while that of services and consumables - which constitute most of the domestic income - stayed relatively high. Accordingly, while trade in goods collapsed, trade in services remained relatively stable.

## 5. Investigating Mechanisms

The previous section highlighted the different impact that GDP growth had on services and goods during the crisis. In this section, I test its significance and quantify the economic magnitude. To do so, services exports must be compared with goods exports and thus service exporters with goods exporters. I follow two complementary strategies. In the first one, I consider only firms that export both services and goods, or “bi-exporters”. In the second one, I focus solely on

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<sup>28</sup>Please note that now trade in services is positively correlated with variations in domestic absorption, highlighting the fact that this covariate might be more appropriate for proxying service demand in destination countries during normal times.

firms that export only services or goods, or “mono-exporters”, and for every service exporter I find the closest goods exporter by applying propensity score matching.<sup>29</sup> The advantage of using the first method is that it is like performing a “perfect matching” and so, any difference across goods and services related to both the observable and unobservable components of supply can be ruled out. The advantage of the second one is that the results are not influenced by interactions across goods and services within the same firm. Moreover, the first can provide evidence on the within-firm effects of GDP growth in destination countries and the second complements by providing the across-firm perspective.

With respect to the previous analysis, I have to drop the product dimension since one cannot determine which good should be matched with a particular service and vice-versa. Therefore, the unit of analysis is represented by the change in exports of firm  $f$  in country  $c$  at time  $t$ ,  $\Delta X_{fct}$ . The interaction between a dummy indicating the service flow  $S_f$ , the treatment dummy for the crisis  $T_t$  and GDP growth will provide evidence on the differential impact of the income shock on services exports with respect to goods exports during the crisis. This triple-difference strategy can be expressed analytically as:

$$\Delta X_{fct} = \alpha + \beta'_0 T_t + \beta'_1 GDP_{ct} + \beta'_2 GDP_{ct} * T_t + \gamma'_0 S_f + \gamma'_1 S_f * T_t + \gamma'_2 S_f * GDP_{ct} + \gamma'_3 S_f * GDP_{ct} * T_t + \epsilon_{fct} \quad (3)$$

where  $\beta'_0$ ,  $\beta'_1$  and  $\beta'_2$  have the same interpretation as the difference-in-difference strategy used before.  $\gamma'_0$  is the specific treatment effect controlling for differences across goods and services.  $\gamma'_1$  captures the different responses across goods and services during the crisis.  $\gamma'_2$  controls for specific differences in the effect of GDP growth across goods and services. The coefficient of interest,  $\gamma'_3$ , captures the differential effect of GDP growth on services exports with respect to goods exports during the crisis. Since the GDP growth variable is at the country level,

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<sup>29</sup>I present the results using Mahalanobis Matching (with replacement) in which firms are matched in terms of: size, productivity, capital intensity, average wage, multinational and foreign ownership status. Using other matching functions like Nearest Neighbor or Kernel Matching does not change the results. Table 4 of the Online Appendix reports the statistics and differences for the two groups.

standard errors are clustered accordingly. Moreover, to control for possible firm-level shocks, I use firm-year dummies. Looking at the estimated coefficient of  $\gamma'_3$  in the first column of Table 6 (panel a), the reaction of services exports to the income shock was significantly different from that of goods exports. In particular, to a one percent decline in GDP growth, services exports decrease on average 5.5% less than goods exports. By using the “matched” mono-exporters, and performing the same analysis, the results are the same qualitatively and are also very similar in quantitative terms (first column of Table 6, panel b). Therefore, the different reaction of services holds both within and across firms and it is not influenced by the fact that bi-exporters might represent a particular category of exporters.

To quantify the economic importance of GDP growth during the 2008-2009 collapse for trade in goods, I compare the fall of trade in goods predicted by the previous model with the fall predicted assuming goods exports having the same elasticity as services. This is simply done by comparing the predicted exports when the indicator variable  $S_f$  indicates services and when it indicates goods instead. In this hypothetical case, I find that the fall for goods would have been about half of what was observed during the 2008-2009 crisis. Therefore, the different elasticity of goods and services trade with respect to negative income variations in partner countries played a major role for both the fall of trade in goods and for the resilience of services.

In the descriptive part of the paper, we observed that most of the decline in the exports of goods was accounted for by durable and capital goods. At the same time, while transport services were collapsing as much as goods, financial, telecommunication and business services did not suffer at all during the crisis. To check whether the same patterns can be observed in a regression setting and to refine the results, I divide the exports of goods and services into the different product categories and I apply the same type of analysis for each of them. I divide goods exports into exports of durable goods and exports of consumable goods. The results in columns (2) and (3) of Table 6 indicate that the resilience of services is significant only with respect to durable goods. In

Table 6: Investigating Mechanisms: Regression on Continuing Firm-Countries, GDP Growth

Panel a: Bi-Exporters												
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	All	Durables	Consumables	Business Services	Transport Services	Services to Non Residents	Telecomm. Services	Construction Services	Financial Services	Other Services	OECD	non-OECD
$\gamma_3^{GDPG}$	-5.4887 <sup>b</sup>	-5.1373 <sup>a</sup>	-5.0003	-9.5013 <sup>b</sup>	-6.2693 <sup>a</sup>	-25.4864	4.3487	13.1403	4.3461	-4.1258	-12.5599 <sup>a</sup>	-4.7423
	(2.771)	(1.881)	(3.514)	(4.025)	(2.219)	(15.434)	(5.173)	(12.030)	(15.253)	(8.583)	(3.740)	(3.817)
Obs.	12,846	11,996	8,962	7,183	6,228	481	768	660	1,065	1,735	9,902	6,513
$R^2$	0.0831	0.0901	0.1041	0.0782	0.1063	0.1823	0.1290	0.1239	0.1056	0.0968	0.0844	0.1150
Panel b: Matched Mono Exporters												
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	All	Durables	Consumables	Business Services	Transport Services	Services to Non Residents	Telecomm. Services	Construction Services	Financial Services	Other Services	OECD	non-OECD
$\gamma_3^{GDPG}$	-3.7797 <sup>b</sup>	-4.4216 <sup>b</sup>	-2.1773	-11.8501 <sup>b</sup>	-4.8019	29.9332 <sup>c</sup>	-63.4042 <sup>c</sup>	-2.8044	-0.3856	-5.3368 <sup>a</sup>	-3.5667 <sup>b</sup>	-2.0703
	(1.549)	(1.865)	(1.814)	(4.923)	(3.212)	(17.234)	(34.659)	(4.419)	(2.495)	(1.896)	(1.636)	(4.042)
Obs.	27,208	23,645	16,922	11,908	8,550	7,677	9,431	7,664	8,234	7,772	19,526	15,176
$R^2$	0.0945	0.1016	0.1084	0.0805	0.0767	0.1013	0.0588	0.0879	0.0506	0.1128	0.1131	0.1001

Note: This table reports the estimated coefficients for  $\gamma_3^{GDPG}$  from equation (3) for firms that trade both goods and services (Bi-Exporters) and for matched firms exporting either goods or services (Mono-Exporters). All regressions include firm-year dummies. Clustered standard errors in parentheses (at the country level). <sup>a</sup> p<0.01, <sup>b</sup> p<0.05, <sup>c</sup> p<0.1.

columns (4)-(10) of Table 6, the regressions are carried out across different service categories. As can be seen from the magnitude and significance of the coefficients, most of the effect is accounted for by business services.<sup>30</sup> Therefore, services look more similar to consumables than to durable goods and services like management, legal, accounting and marketing continued to be purchased despite the negative economic situation. This evidence reinforces the argument that services represent non-discretionary components of the production process and their continuous sourcing is vital for the production of final products (Johnson, 2014). Column (9) shows that the same effect is not present for financial services, which is the category that experienced the biggest increase in trade in services during the crisis. Two facts can explain this result. First, the financial sector is highly concentrated, with few firms driving aggregate figures. Thus, even if few financial firms enjoyed higher exports during the crisis, the data tell us that many others were suffering. Second, trade in goods collapsed less for firms which also exported financial services. Therefore, there might not be enough variation to capture the same effect for bi-exporters of financial services. Finally, when

<sup>30</sup>One exception is the significant coefficient of transport services for bi-exporters. This is because for bi-exporters trade in goods collapsed more than transport services. One possible explanation is that these exporters had to comply with goods transport even if the values (and so the quantities) traded decreased.

distinguishing between OECD and non-OECD exports in columns (11)-(12) of Table 6, the service resilience seems to be driven by OECD destination markets only. This result should be interpreted carefully because most Belgian exports go to OECD countries (about 70%) and most of the trade in services outside the OECD is represented by transport services. Again, the variation might not be enough to identify the same effect also in non-OECD export markets.

### 5.1. Robustness Checks and Further Results

To check the robustness of the results, I perform the same analysis as in Table 6 using the measure of domestic absorption in destination countries instead of GDP growth. Even if the sample size is reduced to OECD countries only, all the results are confirmed: in Table 7 the domestic absorption variable is negative and significant for the whole sample (column 1), for durable goods (column 2) and for business services (column 4).<sup>31</sup> Moreover, even the magnitudes are comparable to those of Table 6. Therefore, even using a different variable to proxy income the variation in destination countries, results remain the same.

Using a similar empirical strategy, it is possible to check whether credit constraints played a different role for services with respect to goods during the crisis. Analytically, the empirical specification is very similar to (3):

$$\Delta X_{fct} = \alpha + \beta'_0 T_t + \beta'_1 Fin_f + \beta'_2 Fin_f * T_t + \gamma'_0 S_f + \gamma'_1 S_f * T_t + \gamma'_2 S_f * Fin_f + \gamma'_3 S_f * Fin_f * T_t + \epsilon_{fct} \quad (4)$$

where  $Fin_f$  denotes the principal component variable for credit constraints. The only differences are that standard errors are clustered at the firm level and country-year dummies are used to control for demand shocks in partner countries. Table 8 shows the results for credit constraints. In most specifications,  $\gamma'_3$  is not significant, so, there is no strong evidence supporting a different role of credit constraints for services exports relative to goods exports during the crisis. This result holds both for bi-exporters and mono-exporters, differentiating goods and services into their different categories and interacting the

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<sup>31</sup>The only exception is in the category of consumable goods for which the coefficient is significant for mono-exporters.

Table 7: Investigating Mechanisms: Regression on Continuing Firm-Countries, Domestic Absorption

Panel a: Bi-Exporters										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	All	Durables	Consumables	Business Services	Transport Services	Services to Non Residents	Telecomm. Services	Construction Services	Financial Services	Other Services
$\gamma_3^{Dom. Abs.}$	-4.6093 <sup>c</sup>	-4.0999 <sup>b</sup>	-1.4814	-8.2366 <sup>a</sup>	-2.5431	-8.1924	5.8375	-13.7093	-6.3247	13.0042
	(2.379)	(1.768)	(2.482)	(2.896)	(2.991)	(11.832)	(4.086)	(9.393)	(6.205)	(10.728)
Obs.	10,094	9,428	7,176	6,031	4,697	448	557	561	947	1,541
$R^2$	0.0874	0.1000	0.1149	0.0854	0.1072	0.1835	0.1439	0.1505	0.1275	0.0992

Panel b: Matched Mono Exporters										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	All	Durables	Consumables	Business Services	Transport Services	Services to Non Residents	Telecomm. Services	Construction Services	Financial Services	Other Services
$\gamma_3^{Dom. Abs.}$	-2.7915 <sup>b</sup>	-3.2137 <sup>c</sup>	-4.2041 <sup>b</sup>	-3.6533 <sup>c</sup>	-3.7474	114.1684	1.8508	84.0136 <sup>c</sup>	-4.2233	26.0836
	(1.190)	(1.837)	(1.878)	(2.133)	(4.469)	(70.176)	(2.482)	(43.557)	(4.604)	(17.145)
Obs.	19,574	16,929	12,372	9,303	6,552	6,040	6,486	6,030	6,421	6,136
$R^2$	0.1157	0.1228	0.1297	0.0948	0.0939	0.0810	0.0831	0.0779	0.0823	0.0909

**Note:** This table reports the estimated coefficients for  $\gamma_3^{Dom. Absorption}$  for firms that trade both goods and services (Bi-Exporters) and for matched firms exporting either goods or services (Mono-Exporters). All regressions include firm-year dummies. Clustered standard errors in parentheses (at the country level). <sup>a</sup>  $p < 0.01$ , <sup>b</sup>  $p < 0.05$ , <sup>c</sup>  $p < 0.1$ .

financial constraint variable with the GDP growth variable. Moreover, it holds even when splitting the principal component into the different variables composing it. Thus, to the extent that the variables used are able to capture the credit constraints faced by exporters, they did not play a significant part to explain the different reaction of services exports. Finally, it is also possible to test whether firm-characteristics and global value chains had differential effects for services with respect to goods exports using the same strategy used for credit constraints. The results reported in Tables 5 and 6 of the online appendix suggest that there is no significant effect both looking at bi-exporters and mono-exporters. Therefore, supply-side factors such as credit constraints, global value chains or heterogeneity were not central forces to explain the resilience of services.

## 6. Conclusions

This paper shows that exports of services did not suffer from the 2008-2009 crisis because they are more immune to short-term negative income shocks than goods exports. Using exports at the firm-product-destination level for Belgium,

Table 8: Investigating Mechanisms:: Regression on Continuing Firm-Countries, Credit Constraints

Panel a: Bi-Exporters												
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	All	Durables	Consumables	Business Services	Transport Services	Services to Non Residents	Telecomm. Services	Construction Services	Financial Services	Other Services	OECD	non-OECD
$\gamma_5^{FLN}$	0.4557 (0.340)	0.0938 (0.408)	0.2772 (0.378)	0.6000 (0.385)	0.1076 (0.232)	2.7639 (1.719)	-0.6523 (1.201)	1.2524 (1.099)	1.7447 <sup>b</sup> (0.738)	0.5249 (0.762)	0.0108 (0.095)	0.3557 <sup>b</sup> (0.156)
Obs.	18,790	12,127	13,817	10,360	9,006	699	1,073	1,201	1,708	2,536	9,283	6,146
$R^2$	0.0313	0.0347	0.0327	0.0372	0.0597	0.2547	0.1940	0.1788	0.1834	0.1169	0.0119	0.0728
Panel b: Matched Mono Exporters												
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	All	Durables	Consumables	Business Services	Transport Services	Services to Non Residents	Telecomm. Services	Construction Services	Financial Services	Other Services	OECD	non-OECD
$\gamma_5^{FLN}$	0.0275 (0.123)	-0.0031 (0.128)	0.1837 (0.183)	-0.0190 (0.246)	0.1138 (0.321)	-4.1627 (9.027)	-0.0056 (0.280)	-0.7648 (2.102)	-0.2652 (1.637)	0.9249 (2.144)	-0.1162 <sup>b</sup> (0.048)	0.0592 (0.073)
Obs.	26,317	13,535	19,235	7,182	12,503	1,043	3,079	1,933	2,895	2,090	18,337	14,861
$R^2$	0.0331	0.0180	0.0413	0.0699	0.0644	0.3433	0.2400	0.2421	0.1614	0.1779	0.0038	0.0167

Note: This table reports the estimated coefficients for  $\gamma_5^{FLN}$  for firms that trade both goods and services (Bi-Exporters) and for matched firms exporting either goods or services (Mono-Exporters). All regressions include country-year dummies. Clustered standard errors in parentheses (at the firm level). <sup>a</sup> p<0.01, <sup>b</sup> p<0.05, <sup>c</sup> p<0.1.

I find that the elasticity of services with respect to GDP growth in destination countries during the crisis was significantly different from that of goods. In particular, the negative income shock in partner countries affected exports of goods but not exports of services. This peculiar resilience of trade in services is especially strong with respect to the export of durable goods and it is mostly accounted for by the business services. This difference is economically sizable: if goods exports had had the same elasticity to GDP growth as services, their fall during the 2008-2009 collapse would have been only half what was observed.

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