# Crisis-Proof Services: Why Trade in Services Did Not Suffer During the 2008-2009 Crisis*

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**Abstract**

In this paper we investigate why export of services did not collapse during the 2008-2009 crisis using a micro-level dataset on firm-country-product exports for Belgium. Our results reveal that the main reason for the peculiar resilience of services exports is that they are, contrary to exports of goods, immune to negative income shocks. Using a triple difference approach, we show that this difference is statistically significant and we find evidence of a relative counter-cyclicality of exports of services with respect to exports of goods. In terms of magnitude, we observe that to a one percent drop in GDP growth, it is associated an increase in exports of services equal to 0.05% of the decrease of exports of goods. At the same time, we do not find any significant difference across goods and services exports in response to the credit crunch caused by the crisis.

**Keywords:** Trade Collapse, Belgium, Services and Goods Trade.
**JEL Classification:** F10, F14, L80.

PRELIMINARY, please do not circulate

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# 1 Introduction

Between the third quarter of 2008 and the second quarter of 2009 trade in goods experienced the steepest decline ever recorded (Baldwin, 2009) with both exports and imports unexpectedly falling four times more than income (Freund, 2009). Surprisingly, in this period of economic turmoils, trade in services help up incredibly well and some types of services markedly continued growing without hesitations.

The fall for trade in goods was very severe, highly synchronized across countries and mostly concentrated in the category of durable goods (Baldwin, 2009). Instead, trade in services barely suffered from the crisis, with an observed decline of at most one tenth of that of trade in goods (Francois and Woerz, 2009; Arajo and Oliveira Martins, 2011). This small drop was concentrated only in the transport services, while the other services kept growing along their paths. Moreover, there is evidence that countries specialized in the provision of services, like India, suffered relatively less from the crisis (Borchert and Mattoo, 2009). This peculiar response of trade in services becomes even more intriguing when considering that most of the studies analyzing trade in services at micro-level[1] find that trade in services shares the same characteristics of trade in goods. Despite these puzzles, while a large amount of research has attempted to understand the causes of the "Great Collapse" for trade in goods,[2] the peculiar resilience of trade in services did not get the attention of the international trade literature.

In this paper we analyze the peculiar response of trade in services during the Great Trade Collapse of 2008-2009 in order to understand why trade in services reacted differently with respect to trade in goods. We benefit from a unique micro-level dataset with firm-country-product[3] exports of goods and services of Belgian firms and we are

[1]Breinlich and Criscuolo (2011) for the UK, Kelle and Kleinert (2010) for Germany, Walter and Dell'mour (2010) for Austria, Gaulier et al. (2011) for France and Federico and Tosti (2012) for Italy.

[2]See (Baldwin, 2009) for a review. The emerging consensus on the causes of the "Great Trade Collapse" for goods points at both demand and supply shocks as main drivers of the sudden fall. From the demand side, Behrens et al. (2011), Bricongne et al. (2012) and Eaton et al. (2011) provide evidence of a disproportionate fall in the demand for "postponable" goods, such as consumer durables and investment goods. As pointed out by Alessandria et al. (2011), this pushed firms to use intensively inventories and to stop the provision of intermediates, thus reinforcing the negative effect on trade. Moreover, since "postponable" goods constitute a small part of countries' GDP, but a large share of international trade, this demand shocks had dramatic consequences for trade in goods, but relatively small impact on GDP. From the supply side, Chor and Manova (2012) and Auboin (2009) argue that the difficulties of the financial sector led to a severe credit crunch that impeded firms to get enough funds to continue operating in the export markets for goods. As highlighted by Bems et al. (2011), Levchenko et al. (2010) and Altomonte et al. (2012), the interruption of a link in an international production chain can cause the destruction of the entire chain, thus having magnified effects on trade flows. Finally, Evenett (2009) and Jacks et al. (2011) argue that protectionism measures played a further negative role in the collapse.

[3]For the sake of expositional clarity, we use the expression "product" also when we refer to a service.

able to provide evidence on the reaction of firms to the crisis. The analysis is divided into three parts. In the first we perform a descriptive comparison of goods and services trade by decomposing changes in Belgian exports into changes in the extensive and the intensive margins, where the former refers to changes in the average number of destination countries per firm and the average number of products exported per firm-country and the latter to the average exports per firm, country and product. In the second we use a Diff-in-Diff type of approach similar to Behrens et al. (2011), in which changes of firm-country-product exports between the first semesters of 2007 and 2008 are used as pre-treatement period and the changes between the first semesters of 2008 and 2009 as post-treatement period and we analyze the effect of firm, product and country covariates to changes in trade in goods and trade in services separately. In the third part of the analysis we focus on demand determinants and we perform a triple-difference analysis in which we compare changes in exports of services in the pre and post period to changes in exports of goods in the pre and post period by using only firms that export both goods and services. In this way we perform a "perfect matching" since we compare changes in exports of goods and services in the pre and post period for the same firm, thus ruling out any possibility of differences both in terms of observables and unobservables.

Our results reveal that besides the difference in the magnitude of the response to the crisis of goods and services, there are some qualitative similarities. Both the 3% drop of exports of services and the 27% fall of exports of goods were mostly driven by changes in the average quantities exported per market and product, while we do not find evidence of within firm reallocations in terms of number of destination countries and number of products. This means that, both for goods and services, firms did not drop destination countries and products and they only adjusted the values shipped per destination and product. We do not observe relevant heterogeneity in destination countries but an important differential response across different products and firms. In particular, the small decline of services was mostly driven by the transport services, while business, financial and telecommunication services continued growing along their trends. For trade in goods, all the product categories dropped, but the fall was mostly concentrated on the durable and investments goods. In terms of firm heterogeneity, we observe that for exporters of services the non-multinational, non foreign-owned, smaller and more financially exposed exporters of services suffered relatively more from the crisis, while for exporters of goods we do not find any relevant difference.

Looking at the determinants of the crisis, we show that the different behavior of

goods and services trade is mainly due to a different elasticity to demand. From one hand, the evolution over time of trade in goods is heavily related to changes in GDP of partner countries and demand shocks magnify the reaction. On the other hand, changes over time of trade in services are not related to changes in GDP in partner countries, and even dramatic shocks as the 2008-2009 crisis, do not interfere with their growth paths. In order to understand if this difference is statistically significant, we perform a triple difference approach by comparing changes in exports of services with changes in exports of goods for the firms that export both of them. We find that trade in services is counter-cyclical with respect to goods: a one percent decrease in GDP in partner countries implies an average increase of trade in services which is 0.05% of the magnitude of the decrease of trade in goods. This means that, if we suppose the drop in exports of goods (26,681 Millions of Euros) being entirely driven by demand, we should observe an increase of 133 Millions of euros in exports of services, which would mean an increase of about 0.6%. The same result is confirmed both qualitatively and quantitatively if we perform propensity score matching and compare firm-country-product exports of firms exporting only services and firms exporting only goods. Therefore, the reaction of services exports to demand shocks is significantly different than for exports of goods, and, if anything, they are counter-cyclical relatively to goods. By applying the same strategy to understand if credit constraints matter less for services than for goods, we do not find strong evidence.

Borchert and Mattoo (2009) is the only available paper that analyzes trade in services during the trade crisis. Using the descriptive evidence of IT indian exporters, they propose two reasons for the different behavior of services: they are less dependent on external trade finance and the demand for some services is less cyclical than for goods. They argument that, especially for electronically-delivered services, the need for external trade finance is lower than for trade in goods. Moreover, when firms need external capital for financing trade, there is descriptive evidence that they can rely more on advance payments. On the demand side, they argue that demand for services is less discretionary, since they are not storable and they represent fundamental inputs for the production process. The main contribution of this paper is to go beyond the descriptive analysis of Borchert and Mattoo (2009) and provide a microeconometric analysis of the determinants of the different response of trade in goods and trade in services trade during the "Great Trade Collapse". With our unique data and a particular empirical strategy, we are able to test their hypotheses based on the descriptive evidence drawn from a particular set of Indian firms. Secondly, it is the first paper to describe the be-

havior of trade in services during the crisis at micro-level by using a unique dataset on firm-country-product exports of Belgium during the 2008-2009 crisis. As highlighted by Behrens et al. (2011) and Bricongne et al. (2012) in the analysis of Belgian and French exporters of goods during the crisis, the big advantage of using data at the firm level is that we are able to disentangle the effects of the crisis by looking at within-firm reallocations in terms of changes in the number of products, destination countries and averages exports per country and product. Thirdly, this paper offers to the literature analyzing trade during the crisis[4] a new perspective by adding one dimension to the analysis and by showing that exports of goods and services reacted differently even for the firms that export both of them. Finally, this paper offers important policy implications. Our analysis demonstrates the relative stability of services exports during periods of economic instability, therefore, countries specializing in the international distribution of services can more easily overcome difficult economic periods and enjoy relatively higher stability.

The paper is organized as follows: in section 2 we describe the data, in section 3 we present the descriptive statistics of the crisis, in section 4 we outline our diff-in-diff strategy and show the results, in section 5 we develop the diff-in-diff-in-diff specification and present the results, in section 6 we provide further results and robustness checks, and section 7 presents some concluding remarks.

# 2 Data Description

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

Data on trade in services comes from the NBB Trade in Services dataset used in order to compile the Balance of Payments and covers the period from 2006 to 2011. The dataset is formed using different surveys conducted by the NBB[5] and contains information about trade in services at the firm-destination-product level, so for any Belgian firm present in the dataset we have, depending on the survey, monthly or quarterly information on exports' values per type of product and destination country.

[4]Bernard et al. (2009) for the Asian crisis and Baldwin (2009) Behrens et al. (2011), Bricongne et al. (2012), Eaton et al. (2011), Alessandria et al. (2011), Chor and Manova (2012), Auboin (2009), Bems et al. (2011), Levchenko et al. (2010), Altomonte et al. (2012), Evenett (2009) and Jacks et al. (2011) among many for the 2008-2009 collapse.

[5]For more information on the surveys see Table **??**. Two surveys include all services and target the most important firms in the economy, The others target either specific services or small firms.

The dataset captures more or less 60% of total export of services made by Belgium and about 40% of Belgian exporters. The survey nature of the dataset makes impossible any analysis of entry and exit patterns in foreign markets.[6] Therefore, the analysis of this paper will be focused only to the firms that we observe continuously during the period of analysis. This means that we are not able to make any analysis on entry and exit into export markets. However, we can still analyze the service and product margins, and so within-firm adjustments during the crisis. Moreover, as shown by Behrens et al. (2011) and Bricongne et al. (2012) for exports of goods, entry and exit played only a marginal role in the crisis. In terms of representativeness, these continuing firms represent about 96% of exports and imports present in the surveys (Table 1), therefore, we can be confident that the data covers the bulk of Belgian trade. Despite this constraint, this is the only dataset available that can allow the analysis of trade in services at the micro level during the 2008-2009 crisis. Moreover, in the robustness checks we are going to test the generality of our results using the universe of Belgian exports during the crisis of 2001.[7]

Information on trade in goods is taken from the NBB Trade in Goods Dataset, which contains exports and imports of goods performed by Belgian firms at the firm-destination-product level. The data is collected monthly and comes from the Intrastat (Intra-European) and the Extrastat (Extra-European) declarations. Firms are identified thanks to the VAT number, countries are classified using the ISO 2-digit codes and products are classified using the CN nomenclature at 8-digit level. Data on firm-level accounts come from the Business registry covering the population of firms required to file their (unconsolidated) accounts to the NBB. From this dataset we take information on full time equivalent employment, turnover, operating profits, equities, liabilities, stocks and purchases of intermediates for the year 2007. Multinational and foreign ownership status of firms are taken from the NBB Survey of Foreign Direct Investments. Finally, we take information on GDP growth in destination countries from the IMF World Economic Outlook database (2012 version)[8] and information on daily exchange rates on the $1^{st}$ of April of each year considered from the Statistical Data Warehouse of the European Central Bank.[9]

[6]Indeed, looking at Table 1, we can see that the dataset seems to be good in capturing entry, but not very precise predicting exit. This is because when a firm enters into the dataset, it is kept for some years even if after few years it does not fulfill the thresholds to enter into it.

[7]For information on the NBB dataset on trade in services during the period 1995 to 2005 please refer to Ariu (2012).

[8]available at http://www.imf.org/external/pubs/ft/weo/2012/01/weodata/index.aspx

[9]available at: http://sdw.ecb.europa.eu/

# 3 The Numbers of the Crisis

As previously mentioned, the crisis hit more severely goods than services. Looking at Figure 1 we can see that after September 2008 there is a clear rupture and exports of goods fell of a magnitude of about 30%, while for service there is not a definite sign of discontinuity and they kept the same pace. In order to reduce seasonality issues we follow Behrens et al. (2011) by focusing the comparison between trade in goods and trade in services using only on the first semesters of each year. The first step in order to understand the composition of the changes in exports of Belgium is to decompose total Belgian exports at time $t$ (where, in this case $t = \{S12008, S12009\}$), of trade type $y$ (where $y = \{Services, Goods\}$), $X_t^y$, into the number of firms $f_t$, the average number of served markets per firm $\bar{c}_t$, the average number of exported products per market-firm $\bar{s}_t$ and the average exports per firm-market-product (service) $\bar{x}_t$: $X_t^y = f * \bar{c}_t * \bar{s}_t * \bar{x}_t$. By taking the ratio between the first semester of 2008 and the first semester of 2009 we can thus decompose the change in total exports into the change in the extensive margins (firms-services-markets) and the change in the intensive margin (the average exports per firm-market-service):

$$\Delta X^y = \Delta f * \Delta \bar{c} * \Delta \bar{s} * \Delta \bar{x} \tag{1}$$

Since we focus only on continuing firms, the contribution of the change in the number of firms, $\Delta f$, is zero. Looking at Table 2 we can appreciate that the change in Belgian exports between the first two semesters of 2008 and 2009 is of -26.81% for goods and only -3.13% for services. These are both due to a reduction in the quantities exported per market and product, but they dramatically differ in terms of magnitude. Another important evidence rising from Table 2 is that, both for services and goods, there were not significant within-firm changes in terms of average number of services and goods and in terms of average number of countries served. This means that belgian firms, both for goods and services trade, did not lose destination markets and they did not decrease the number of products provided for each market.

By decomposing Belgian exports into EU and non-EU and in OECD and non-OECD in Table 3, we can see a mixed country pattern. Intra-EU and extra-OECD exports of services experienced a more important drop with respect to non-EU and OECD. For exports of goods instead, the fall is similar in all the country categories. This fact is mostly due to a reduction in the transport services concentrated especially in non-OECD countries. By dividing Belgian exports into the different product categories, we

can appreciate in Table 4 a big heterogeneity across products, both for services and goods. Services related to transport experienced a drop that is commensurate to that of goods. Instead business services and telecommunications continued growing without hesitations. Therefore, besides transport services, the other services did not suffer from the crisis and they continued their normal growth. If we consider also that Financial, Insurance and Business Services represent more than 50% of Belgian exports, this is a quite important result that can have relevant policy implications. For exports of goods, we can see that all product categories experiences a decline, however the bulk of the collapse is represented by the intermediates and durable goods.

In order to discern differences across firms, we divide exports following the multinational and foreign ownership status, size and financial situation of the exporter. In Table 3 we can appreciate that for services, non multinational and non foreign-owned firms suffered from the crisis, while multinational and foreign owned registered positive figures. These small declines are much smaller than the declines for exports of goods, for which we do not observe any heterogeneity following the multinational and foreign ownership status. Finally, by defining a firm as big if it has the full time equivalent employment higher than the median exporter in the same industry and financially exposed if it has higher external financial dependency than the median firm in the same industry, we can appreciate from Table 6 that there is not heterogeneity for firms exporting goods, while small firms exporting services suffered more from the crisis than big ones.

Summing up the descriptive evidence on the crisis in Belgium, it looks like exports of services did not suffer as much as goods' exports. Both service and goods exporters kept the same number of destinations and products per destination, adjusting only at the intensive margin, although, they did it with very different magnitudes. We find that there is not a particular pattern looking at the partner countries for both goods and services, but there is a great heterogeneity looking at the different product types. In particular, transport services dropped similarly to trade in goods, while professional, financial and telecommunication services continued growing at a very high pace. For trade in goods we find that the decrease is mostly due to a reduction in the intermediates and durable goods, while other types of goods declined more smoothly. Finally, we observe an important heterogeneous response of firms, based on the ownership and multinational status, size and financial situation for exports of services, but not for exports of goods. Firm, country and product dimensions provide together important information on the nature of the crisis, therefore we are going to take them into con-

sideration in our empirical strategy.

# 4 Diff-in-Diff of the Crisis

In order to understand which factors led to a different response of exports of services with respect to exports of goods, we use a type of Diff-in-Diff 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 S12007 and S12008, S12008 and S12009 and S12009 and S12010, $\Delta X_{fcp}^{y,t} = logX_{fcp}^{y,t+1} - logX_{fcp}^{y,t}$, is regressed, separately for goods and services (remember that $y = \{Services, Goods\}$), against the treatment dummy $T^t$ a vector containing firm, country and product characteristics, $Z_{fcp}^{y,t}$, and the interaction of this vector with the treatment dummy, $Z_{fcp}^{y,t} * T^t$.

$$\Delta X_{fcp}^{y,t} = \alpha + \beta_0' T^t + \beta_1' Z_{fcp}^{y,t} + \beta_2'^t Z_{fcp}^{y,t} * T^t + \epsilon_{fcp}^t \tag{2}$$

In this specification $\beta_0'$ represents the treatment specific effect, $\beta_1'$ the contribution of the firm, country and service characteristics in normal times, $\beta_2'^{2009}$ the contribution of these same variables during the crisis in 2009 and $\beta_2'^{2010}$ after the crisis for 2010. Thanks to the longer time span than Behrens et al. (2011), we are able to analyze also the the features of the rebound in 2010 and we can control for any delayed affect. Since we do not have services characteristics, $Z_{fcp}^{y,t}$ contains service or product dummies in order to capture heterogeneity across goods and across services. Given that our variables of interest vary along three dimensions, (firm, product and country) we use the multi-level clustering procedure developed by Cameron et al. (2011) to correct standard errors. Finally, in order to alleviate endogeneity issues of our firm-level variables, we use the balance sheet data from 2007 only and the trade data from 2006 for computing export and import to turnover ratios. In the first specification we use dummy variables for all our firm-level variables indicating if a firm is above or below the median among all exporters. In this way the interaction between the firm-level variable and the crisis dummy would tell what happened in terms of export growth, for example, during 2009 to a firm that in 2007 was among the most productive. In a second specification we also make use of our covariates in levels. Our independent variables aim to capture the features observed in the descriptive statistics and capture the different effect that where considered the cause of the fall for goods and those that were considered as responsible for the resilience of services. We use the size, productivity and multinational and foreign ownership status of the firm to control for heterogeneity across firms, different variables

that measure their exposure to external finance, variables capturing the involvement in global value chains, the importance of stocks and typical demand determinants as GDP growth, exchange rates and dummies for OECD (but not EU) destinations and non-OECD (and non EU) destinations. The complete list of variables, their description and their source is presented in Table 7.

Focusing the attention to the left part of Table 8 we replicate in a slightly different setting[10] the results of Behrens et al. (2011) for trade in goods. By looking at the coefficients of $\beta_2'^{2009}$ we can appreciate that the main determinant of the trade collapse for goods is represented by a fall in demand, represented by the positive and significant coefficient of GDP growth, accompanied to a smaller extent by supply explanations such as credit constraints and global value involvement. With the extension to the period after the peak of the crisis, we see that the firm-level problems that characterized the collapse somehow lose importance, and the demand determinants play only a marginal role. This might be due to the fact that 2010 was only the initial part of the recovery and at that time trade in goods did not recover fully from the drop of the year before. Looking instead at the results for trade in services on the right side of Table 8, we clearly see that demand and all the other factors that characterized the huge drop for trade in goods did not play any role both before, during and after the crisis. This means that the growth of trade in services does not depend significantly on demand and supply determinants, and it shows to be immune to shocks at the supply and demand level. By performing the same regressions using continuous firm-level variables (Table 9), we get the same qualitative results both for goods and services exports.

Our results suggest that at the supply level services seem to be less affected than goods by financial constraints. This result is in line with the idea of Borchert and Mattoo (2009) that services do not need as much external capital as goods to be traded internationally. Their argument is based on the observation that service exporters can more easily rely on advance payments and on the fact that services rely less on external finance for exports because the intangible nature of the production does not offer a sufficient collateral. Therefore, their need for external funds is less binding than for goods exporters and the financial crisis had a lower impact on trade in services. At the demand level, we find evidence that services are more immune to variations in GDP and other demand determinants. This surprisingly result provides econometric evidence of the different reaction of services both during periods of "normal" changes in

[10]The main differences are based on the fact that a) we use product dummies instead of product characteristics to capture heterogeneity across products. b) we use also data for 2010 to analyze any delayed effect of the crisis and the beginning of the rebound.

income and during particularly important income shocks. As pointed out by Borchert and Mattoo (2009), this resilience of services can be the result of the fact that they are non-discretionary and essential components of production. Therefore, their flow must be continuous, it cannot be easily modified and it cannot be stopped. Moreover, services are intangible, therefore, they cannot be stored and this makes any inventory adjustment impossible, since "old" services cannot be used for current production. Thus, the non-discretionality, intangibility and non storability of services makes them less dependent on the economic cycle. In the next section we are going to test the significance and the magnitude of these differences across goods and services.

# 5 Diff-in-Diff-in-Diff of the Crisis

The previous section highlighted the different role that supply and demand factors had on services and goods during the crisis. In this section we go more in depth into the analysis and we test the significance and magnitude of the differences across goods and services during the crisis by focusing on the financial and country determinants highlighted in the previous section. A possible problem to test the differences in the role of GDP growth and external finance across exports of goods and services can be represented by the fact that firms exporting services might be different from those exporting goods. In order to solve this problem we use two strategies: first, we consider only firms that export both services and goods, second, we apply propensity score matching and we find for every service exporter the closest goods exporter, focusing only on firms that export either services or goods. In the first specification we compare changes in exports of services before and during the crisis with changes in exports of goods before and during the crisis for the same firm, so we rule out any difference across goods and services related to both observables and unobservables components of supply. In this way, it is like performing a "perfect matching" since we compare the same firm when exporting services and when exporting goods. With the second specification we can do the same type of comparison, but we are able to match exporters of services with exporters of goods only on observables. With respect to the previous analysis, we have to drop the product dimension, since we cannot say which product should be matched with a particular services and vice-versa. Therefore, the unit of analysis are the exports of a firm $f$ in a country $c$ at time $t$, $\Delta X^t_{fc}$. The interaction between a dummy indicating the service flow $S_f$, the treatment dummy for the crisis $T^t$ and the GDP growth $GDP^t_c$ will provide evidence on the differential impact of GDP on exports

of services with respect to exports of goods. This way of proceeding is equivalent to the following triple difference strategy:

$$\Delta X_{fc}^t = \alpha + \beta_0' T^t + \beta_1' GDP_c^t + \beta_2' GDP_c^t * T^t + \gamma_0' S_f + \gamma_1' S_f * T^t + \gamma_2' S_f * GDP_c^t + \gamma_3'^t S_f * GDP_c^t * T^t + \epsilon_{fc}^t \quad (3)$$

Where $\beta_0'$, $\beta_1'$ and $\beta_2'$ have the same interpretation as the Diff in Diff strategy we used before. $\gamma_0'$ is the specific treatment effect controlling for differences across goods and services. $\gamma_1'$ captures the different response across goods and services during the crisis. $\gamma_2'$ controls for specific differences in the effect of GDP growth across goods and services. Our variable of interest, $\gamma_3'^t$ captures the differential effect of GDP growth on export of services (with respect to exports of goods) during (for 2009) and after (for 2010) the crisis. Since The GDP growth is at the country level, we cluster standard errors accordingly. Moreover, in order to control for firm-level determinants, we use firm-year dummies. Looking at the estimated coefficient of $\gamma_3'^{2009}$ in the first column of table 11, we can see that the GDP growth had a negative and significant effect on exports of services with respect to exports of goods during the crisis of 2009, but not during the beginning of the rebound in 2010. This means that export of services are significantly counter-cyclical with respect to goods, at least for important negative shocks. Our estimates say that to one percent decrease in income growth, it is associated an increase of exports of services equal to 0.05% of the decrease of trade in goods. By using the "matched" mono-exporters, (Table 10 reports the statistics and differences for the control and the treatment group) and perform the same analysis, we can appreciate from the second column of Table 11 that the results are the same both qualitatively and very similar also in quantitative terms. Therefore, it looks like the counter-cyclicality of services with respect to goods is not influenced by the fact that bi-exporters represent a particular category of exporters.

Having found evidence of a significant differential effect of the GDP growth on export of services with respect go exports of goods, we can apply the same type of analysis to check if there is a differential effect of credit constraints on the export growth for services with respect to goods. In this case the interaction between a dummy indicating the service flow $S_f$, the treatment dummy for the crisis $T^t$ and the external financial exposure variable[11] $FIN_f^t$ will provide evidence on the role of credit constraints. Analytically the equation to be estimated is very similar to (3):

$$\Delta X_{fc}^t = \alpha + \beta_0' T^t + \beta_1' FIN_c^t + \beta_2' FIN_c^t * T^t + \gamma_0' S_f + \gamma_1' S_f * T^t + \gamma_2' S_f * FIN_c^t + \gamma_3'^t S_f * FIN_c^t * T^t + \epsilon_{fc}^t \quad (4)$$

The only differences are that we cluster standard errors at the firm level and we use country-year dummies to control for demand determinants. The results in Table 12

[11] Measured as investments minus operating profits over investments.

do not provide as solid results as for the GDP growth. In most of the specifications the coefficient is not significant, therefore we do not find strong evidence supporting a different role of credit constraints for exports of services relative exports of goods.

# 6 Robustness Checks

The main concern with the previous analysis is given by the fact that the data for exports of services comes from survey collection. Therefore, there might be problems of selection that can arise and bias our results. One way to deal with this problem is to control for the probability of falling into the survey. This procedure involves the estimation of a probit equation in the first step, the computation of the inverse mills ratio and the estimation of the same equations as before with the inverse mills ratio as control for the selection motive. While simple, this way of proceeding involves the choice of an exclusion restriction which is not trivial. Based on the work of Ariu and Mion (2012) we choose the age of firm. **SHALL I DO IT?* DOES IT MAKE SENSE?*

Another way in which we deal with this problem and check the generality of the results is to use the data during the crisis of 2001. As pointed out by Freund (2009) the crisis of 2001 was not as strong as the 2008-2009 one, but it still represents a shock that is exogenous for a small economy like Belgium. The advantages of using the data from 2001 come from the fact that we get rid of the selection issue, since we observe all flows above 12,500 euros, and secondly we can test the generality of our results using a similar source of variation in another point in time. The problems instead are relative to the fact that the crisis of 2001 was very mild with respect to the 2008-2009 and the variation provided is much less sharp. Moreover we must acknowledge that the two crisis were different in terms of causes, scope and timing, so one should take these fact into account in the interpretation of the results. In particular, we should take into account the facts that there is not a clear date for the start of the crisis and that the 2003 does not fully represent the beginning of the rebound for that crisis.

Tables 13 and 14 report the results of the same Diff-in-Diff strategy described in section 4 applied to the data of the crisis of 2001 using dummies and continuous variables. Both tables confirm the fact that exports of goods in normal times are positively and significantly affected by GDP growth and the fact that services are not statistically affected, both in normal and in crisis time. However, contrary to the results of the crisis of 2008-2009, we see that the crisis of 2001 did not magnify the reaction of trade in goods. This fact might be due to the smooth variation in GDP growth that in fact did

not constitute a real income shock. Another similarity with the previous analysis is the fact that we do not observe any effect of the GDP in the second year of the crisis, which we might consider as the end of the crisis and the beginning of the rebound. When taking again the triple difference approach of section 5 for the data of 2001, we observe in Table 15 that there is not a differential effect of GDP growth between services and goods. Again, this might be due to the low variation in GDP growth during the 2001 crisis. On the other hand, we find confirmation that credit constraints did not have a differential effect for services and goods also for the crisis of 2001.

# 7 Conclusions

This paper shows that exports of services are immune to income shocks, and even dramatic negative events, as the 2008-2009 crisis did not affect them. At the same time we find that changes in income are a fundamental drivers for the exports of goods and negative shocks have magnified effects on them. This difference shows to be statistically significant and we find that to a one percent decrease in GDP growth is associated an increase of trade in services equal to 0.05% of the decrease in exports of goods. This means that if the crisis would have been totally driven by an income shock, we should have observed an increase of trade in services of 133 Millions Euros, which means an increase of 0.6%. These results provide strong policy implications: countries specializing their exports towards services can benefit from a lower sensitivity from demand shocks, thus alleviating the consequences of an economic turmoil thanks to the special nature of services.

# References

Alessandria, G., Kaboski, J. P., and Midrigan, V. (2011). Us trade and inventory dynamics. *American Economic Review*, 101(3):303–07.

Altomonte, C., Mauro, F. D., Ottaviano, G. I. P., Rungi, A., and Vicard, V. (2012). Global value chains during the great trade collapse: A bullwhip effect? CEP Discussion Papers dp1131, Centre for Economic Performance, LSE.

Arajo, S. and Oliveira Martins, J. (2011). The great synchronisation : tracking the trade collapse with high-frequency data. Open Access publications from Universit Paris-Dauphine urn:hdl:123456789/8088, Universit Paris-Dauphine.

Ariu, A. (2012). Services versus goods trade: Are they the same? Working Paper Research 237, National Bank of Belgium.

Ariu, A. and Mion, G. (2012). Trade in Services and Occupational Tasks: An Empirical Investigation. *CEPR Working Paper 8761*.

Auboin, M. (2009). Restoring trade finance: What the g20 can do. In *The Collapse of Global Trade, Murky Protectionism, and the Crisis*. Richard Edward Baldwin Simon Evenett, London, UK.

Baldwin, R. E. (2009). The great trade collapse: Causes, consequences and prospects. Technical report, CEPR: London, UK.

Behrens, K., Corcos, G., and Mion, G. (2011). Trade crisis? what trade crisis? *The Review of Economics and Statistics, forthcoming*.

Bems, R., Johnson, R. C., and Yi, K.-M. (2011). Vertical linkages and the collapse of global trade. *American Economic Review*, 101(3):308–12.

Bernard, A. B., Jensen, B. J., Redding, S. J., and Shott, P. K. (2009). The Margins of US Trade. *American Economic Review*, 99(2):487–93.

Borchert, I. and Mattoo, A. (2009). The crisis-resilience of services trade. Policy Research Working Paper Series 4917, The World Bank.

Breinlich, H. and Criscuolo, C. (2011). International Trade in Services: a Portrait of Importers and Exporters. *Journal of International Economics, Elsevier*, 84(2):188–206.

Bricongne, J.-C., Fontagn, L., Gaulier, G., Taglioni, D., and Vicard, V. (2012). Firms and the global crisis: French exports in the turmoil. *Journal of International Economics*, 87(1):134 – 146.

Cameron, A. C., Gelbach, J. B., and Miller, D. L. (2011). Robust inference with multiway clustering. *Journal of Business & Economic Statistics*, 29(2):238–249.

Chor, D. and Manova, K. (2012). Off the cliff and back? credit conditions and international trade during the global financial crisis. *Journal of International Economics*, 87(1):117–133.

Eaton, J., Kortum, S., Neiman, B., and Romalis, J. (2011). Trade and the global recession. NBER Working Papers 16666, National Bureau of Economic Research, Inc.

Evenett, S. J. (2009). What can be learned from crisis-era protectionism? an initial assessment. CEPR Discussion Papers 7494, C.E.P.R. Discussion Papers.

Federico, S. and Tosti, E. (2012). Exporters and importers of services: firm-level evidence on italy. Temi di discussione (Economic working papers) 877, Bank of Italy, Economic Research and International Relations Area.

Francois, J. F. and Woerz, J. (2009). Follow the bouncing ball – trade and the great recession redux. In Baldwin, R. E., editor, *The Great Trade Collapse: Causes, Consequences and Prospects*. CEPR, UK.

Freund, C. (2009). The trade response to global downturns : historical evidence. Policy Research Working Paper Series 5015, The World Bank.

Gaulier, G., Mirza, D., and Milet, E. (2011). French Firms in International Trade in Services. *Economie et Statistique*, (435-436):125–147.

Jacks, D. S., Meissner, C. M., and Novy, D. (2011). Trade booms, trade busts, and trade costs. *Journal of International Economics*, 83(2):185–201.

Kelle, M. and Kleinert, J. (2010). German firms in service trade. *Applied Economics Quarterly (formerly: Konjunkturpolitik), Duncker & Humblot, Berlin*, 56(1):51–72.

Levchenko, A. A., Lewis, L. T., and Tesar, L. L. (2010). The collapse of international trade during the 2008-2009 crisis: In search of the smoking gun. NBER Working Papers 16006, National Bureau of Economic Research, Inc.

Walter, P. and Dell'mour, R. (2010). Firm-Level Analysis of International Trade in Services. *IFC Working Papers No.4*.

Figure 1: Monthly Exports 2006-2010

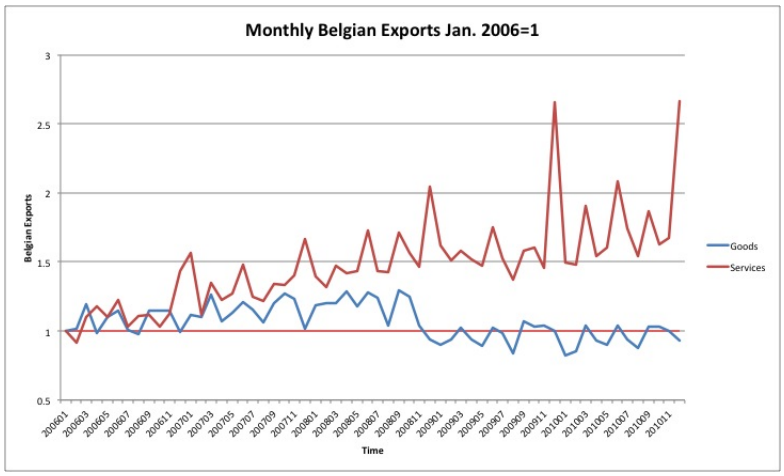


Table 1: Firm Export Dynamics

| **Panel a: Services** | | | | | | |
|---|---|---|---|---|---|---|
| | 2008S1-2009S1 | | | 2007S1-2008S1 | | |
| | Number | Trade Shares | | Number | Trade Shares | |
| | of Firms | 2008S1 | 2009S1 | of Firms | 2007S1 | 2008S1 |
| Stayers | 2,107 | 98% | 95% | 3,358 | 97% | 95% |
| Entrants | 2,384 | 0% | 5% | 1,913 | 0% | 5% |
| Exiters | 1,370 | 2% | 0% | 1,251 | 3% | 0% |
| **Panel b: Goods** | | | | | | |
| | 2008S1-2009S1 | | | 2007S1-2008S1 | | |
| | Number | Trade Shares | | Number | Trade Shares | |
| | of Firms | 2008S1 | 2009S1 | of Firms | 2007S1 | 2008S1 |
| Stayers | 12,964 | 98% | 98% | 12,481 | 96% | 96% |
| Entrants | 5,263 | 0% | 2% | 5,572 | 0% | 4% |
| Exiters | 5,089 | 2% | 0% | 4,662 | 4% | 0% |

**Note:** This table divides firms into Stayers (those firms that export in both the years considered), Exiters (those that export only in the first year) and Entrants (those that export only in the second year) and presents the number of firms for every category and their share of exports for the periods 2008-2009 and 2007-2009.

Table 2: Change in the margins of total Belgian exports (2008S1-2009S1)

| **Panel a: Exports** | | | | | | |
|---|---|---|---|---|---|---|
| | Services | | | Goods | | |
| Period | S1 2008 | S1 2009 | (Δ-1)% | S1 2008 | S1 2009 | (Δ-1)% |
| **Total** | 21,757 | 21,075 | -3.13% | 99,534 | 72,853 | -26.81% |
| **Extensive Margins:** | | | | | | |
| 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% |
| **Intensive Margin:** | | | | | | |
| 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 semester of 2008 and the first semester 2009 into the extensive margin (average number of export markets per firm and average number of product per market-firm) and the intensive margin (average exports per firm, market and product).

Table 3: Change in the margins of Belgian exports (2008S1-2009S1) by country of destination

| | Total | Extensive Margins | | Intensive |
|---|---|---|---|---|
| | % Change | Countries | Services | Margin |
| **Panel a: Services** | | | | |
| EU | -4.30 | -1.08 | 1.94 | -5.09 |
| non-EU | -1.14 | 0.50 | 2.17 | -3.73 |
| OECD | -1.05 | -0.84 | 1.74 | -1.92 |
| non-OECD | -14.85 | -0.09 | 2.80 | -17.09 |
| **Panel b: Goods** | | | | |
| EU | -26.73 | -3.15 | 1.54 | -25.50 |
| non-EU | -27.27 | -0.76 | 4.14 | -29.63 |
| OECD | -26.64 | -1.92 | 2.09 | -26.74 |
| non-OECD | -27.75 | -0.59 | 1.58 | -28.45 |

**Note:** This table presents the decomposition of the growth rate of Belgian exports between the first semester of 2008 and the first semester 2009 for EU, non-EU, OECD and non-OECD countries.

Table 4: Change in the margins of Belgian exports (2008S1-2009S1) by product and service type

| | Total | Extensive Margins | | Intensive |
|---|---|---|---|---|
| | % Change | Countries | Services | Margin |
| **Panel a: Services** | | | | |
| Goods Transport | -22.25 | -3.77 | -0.33 | -18.94 |
| People Transport | -1.98 | 1.94 | 1.80 | -5.55 |
| Auxiliary Services for Transport | -10.62 | -4.21 | 1.99 | -8.52 |
| Service to non-Residents | -0.34 | -0.14 | 1.29 | -1.47 |
| Telecommunication Services | 11.66 | 5.13 | -1.47 | 7.80 |
| Construction Services | -0.79 | -2.77 | -0.82 | 2.87 |
| Financial and Insurance Services | 21.49 | 1.59 | 0.26 | 19.27 |
| Business Services | 4.90 | -0.23 | 2.11 | 2.97 |
| **Panel b: Goods** | | | | |
| Intermediates | -31.24 | -0.61 | 1.51 | -31.85 |
| Capital Goods | -23.64 | -1.62 | 1.87 | -23.81 |
| Consumer Durables | -38.23 | -4.21 | 1.99 | -36.00 |
| Consumer non Durables | -7.74 | 0.17 | 0.36 | -8.22 |
| Energy | -44.47 | -3.94 | 0.04 | -42.22 |
| Other | -25.51 | -1.84 | 0.28 | -24.33 |

**Note:** This table presents the decomposition of the growth rate of Belgian exports between the first semester of 2008 and the first semester 2009 for EU and non-EU countries, type of service exported, multinational status of the firm and type of firm.

Table 5: Change in the margins of Belgian exports (2008S1-2009S1) by ownership status

| | Total | Extensive Margins | | Intensive |
|---|---|---|---|---|
| | % Change | Countries | Services | Margin |
| **Panel a: Services** | | | | |
| MNE | 7.38 | 0.63 | 2.36 | 4.24 |
| non-MNE | -8.54 | -0.60 | 1.80 | -8.54 |
| Foreign Owned | 3.17 | 0.86 | 3.89 | -1.53 |
| Non-Foreign Owned | -8.64 | -0.88 | 0.89 | -8.64 |
| **Panel b: Goods** | | | | |
| MNE | -29.77 | -1.28 | 2.44 | -30.55 |
| non-MNE | -25.04 | -1.44 | 1.65 | -25.19 |
| Foreign Owned | -30.32 | -2.04 | 4.53 | -31.96 |
| Non-Foreign Owned | -22.98 | -1.27 | 0.99 | -22.75 |

**Note:** This table presents the decomposition of the growth rate of Belgian exports between the first semester of 2008 and the first semester 2009 by ownership status of the firms.

Table 6: Change in the margins of Belgian exports (2008S1-2009S1) by firm characteristics

| | Total | Extensive Margins | | Intensive |
|---|---|---|---|---|
| | % Change | Countries | Services | Margin |
| **Panel a: Services** | | | | |
| Big | -0.27 | -0.38 | 2.60 | -2.42 |
| Small | -22.65 | -1.13 | -0.57 | -21.32 |
| Financially exposed | -1.32 | 0.25 | 0.97 | -2.51 |
| Financially non-exposed | -3.07 | -0.74 | 3.20 | -5.37 |
| **Panel b: Goods** | | | | |
| Big | -27.08 | -1.85 | 2.85 | -27.76 |
| Small | -23.98 | -0.48 | 1.28 | -24.58 |
| Financially exposed | -29.68 | -1.94 | 1.84 | -29.58 |
| 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 semester of 2008 and the first semester 2009 by size and debt structure of the firms (we define a firm as big if the number of full time equivalent employees is above the median and as financially exposed if the share of financial debts of the firm is above the median).

Table 7: Description of the variables

| Variable Name | Description | Source |
|---|---|---|
| Trade Variables: | | |
| Export of Services | 2007-2010 monthly exports of services by firm, service, country | NBB Trade in Services Dataset |
| Export of Goods | 2007-2010 monthly exports of goods by firm, service, country | NBB Trade in Goods Dataset |
| Firm-level variables: | | |
| $D_{size}$ | Log of firm size, measured in terms of full-time equivalent employment | NBB Business Registry |
| $D_{productivity}$ | Log of Value added per worker | NBB Business Registry |
| $D_{intermediate\,share}$ | Share of intermediates over turnover | NBB Business Registry |
| $D_{share\,exp\,sales}$ | Share of exports over turnover | NBB Business Registry |
| $D_{share\,imp\,interm}$ | Share of imports over intermediates | NBB Business Registry |
| $D_{value\,added\,chain}$ | Exports times imports over turnover | NBB Business Registry |
| $D_{ext\,fin\,dep}$ | Investments minus operating profits over investments | NBB Business Registry |
| $D_{share\,debts\,over\,liab}$ | Ratio of debts over total liabilities | NBB Business Registry |
| $D_{share\,debts\,due\,after\,one\,year}$ | Share of debts due after one year | NBB Business Registry |
| $D_{share\,fin\,debt}$ | Share of financial debt | NBB Business Registry |
| $D_{share\,stock}$ | Ratio of stock over turnover | NBB Business Registry |
| $FOR$ | Dummy indicating foreign ownership | NBB Survey of Foreign Direct Investments |
| $MNE$ | Dummy indicating a multinational firm | NBB Survey of Foreign Direct Investments |
| Nace codes | NACE rev 1.1 2-digit industry | NBB Crossroads Bank |
| Country-level variables: | | |
| $OECD\,Not\,EU$ | Dummy for countries belonging to the oecd (in 2008) but not to the eu | OECD and European Commission |
| $Not\,OECD\,Not\,EU$ | Dummy for countries belonging neither to the oecd nor to the eu | OECD and European Commission |
| $Exchange\,rate\,change$ | % change in the daily exchange rate with the Euro between at the $1^{st}$ of april of each year | European Central Bank |
| $GDPgrowth$ | Average annual growth rate of the countrys GDP | IMF World Economic Outlook |

**Note:** 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 all trading firms (so both those trading services and those trading goods) and zero otherwise. All firm characteristics prefixed with a C indicate that we use the actual value of the variable.

Table 8: DD Regression on continuing firm-country-service triplets, dummy variables

| | Goods | | | Services | | |
|---|---|---|---|---|---|---|
| | $\beta_1$ | $\beta_2^{2009}$ | $\beta_2^{2010}$ | $\beta_1$ | $\beta_2^{2009}$ | $\beta_2^{2010}$ |
| **Firm Characteristics** | | | | | | |
| $D_{size}$ | 0.0395$^b$ | -0.0287 | 0.0015 | -0.0584 | 0.5499 | 0.2511 |
| | (0.017) | (0.029) | (0.028) | (0.207) | (0.409) | (0.398) |
| $D_{productivity}$ | 0.0105 | -0.0108 | 0.0722$^a$ | 0.0986 | -0.0082 | -0.0682 |
| | (0.017) | (0.028) | (0.024) | (0.097) | (0.157) | (0.137) |
| $D_{intermediate\ share}$ | 0.0096 | -0.0285 | 0.0122 | -0.0197 | 0.0575 | 0.0660 |
| | (0.016) | (0.025) | (0.033) | (0.125) | (0.186) | (0.166) |
| $D_{share\ exp\ sales}$ | -0.0059 | -0.0520$^c$ | -0.0038 | 0.0481 | 0.0283 | -0.3216$^b$ |
| | (0.016) | (0.028) | (0.024) | (0.105) | (0.147) | (0.137) |
| $D_{share\ imp\ interm}$ | -0.0356$^b$ | 0.0558$^b$ | 0.0377 | -0.0998 | 0.2219 | 0.1949 |
| | (0.015) | (0.026) | (0.028) | (0.108) | (0.162) | (0.162) |
| $D_{value\ added\ chain}$ | -0.0005 | -0.0295 | -0.0177 | 0.0075 | -0.0661 | 0.0167 |
| | (0.016) | (0.028) | (0.036) | (0.136) | (0.208) | (0.226) |
| $D_{ext\ fin\ dep}$ | -0.0477$^b$ | 0.0351 | -0.0038 | -0.0637 | 0.2205 | 0.0260 |
| | (0.023) | (0.029) | (0.030) | (0.080) | (0.135) | (0.131) |
| $D_{share\ debts\ over\ liab}$ | -0.0278 | -0.0053 | 0.0764$^c$ | -0.0876 | 0.0374 | 0.0897 |
| | (0.019) | (0.029) | (0.043) | (0.097) | (0.157) | (0.143) |
| $D_{share\ debts\ due\ after\ one\ year}$ | 0.0197 | 0.0298 | 0.0233 | -0.1467 | 0.2921$^b$ | 0.0515 |
| | (0.020) | (0.024) | (0.034) | (0.091) | (0.140) | (0.142) |
| $D_{share\ fin\ debt}$ | 0.0114 | -0.0509$^c$ | -0.0140 | -0.0273 | 0.0034 | 0.0533 |
| | (0.021) | (0.027) | (0.035) | (0.103) | (0.189) | (0.175) |
| $D_{share\ stock}$ | 0.0098 | 0.0315 | 0.0281 | -0.0892 | 0.2339 | 0.1630 |
| | (0.021) | (0.029) | (0.038) | (0.095) | (0.150) | (0.138) |
| $FOR$ | 0.0033 | -0.0212 | 0.0526 | -0.0509 | 0.0589 | -0.1045 |
| | (0.025) | (0.043) | (0.060) | (0.126) | (0.172) | (0.180) |
| $MNE$ | 0.0160 | -0.0383 | 0.0020 | 0.0381 | -0.1199 | 0.0486 |
| | (0.029) | (0.038) | (0.048) | (0.079) | (0.140) | (0.140) |
| **Country Caracteristics:** | | | | | | |
| $OECD\ Not\ EU$ | -0.1604$^a$ | 0.2848$^a$ | 0.2535$^a$ | 0.0486 | -0.1359 | -0.0644 |
| | (0.030) | (0.056) | (0.045) | (0.087) | (0.155) | (0.116) |
| $Not\ OECD\ Not\ EU$ | -0.0773$^b$ | 0.1088$^c$ | 0.1626$^a$ | 0.1760$^c$ | -0.1961 | -0.1783 |
| | (0.034) | (0.060) | (0.054) | (0.095) | (0.138) | (0.139) |
| $Exchange\ rate\ change$ | -0.2851$^a$ | -0.1463 | -0.1100 | 0.1552 | -0.2725 | -0.6093 |
| | (0.085) | (0.134) | (0.201) | (0.369) | (0.526) | (0.655) |
| $GDPgrowth$ | 0.0101$^c$ | 0.0139$^c$ | -0.0015 | 0.0142 | -0.0075 | -0.0131 |
| | (0.005) | (0.008) | (0.009) | (0.017) | (0.027) | (0.021) |
| Constant | | -0.1129 | | | 0.1076 | |
| | | (0.176) | | | (0.408) | |
| Service Dummies | | Yes | | | Yes | |
| Industry Dummies | | Yes | | | Yes | |
| Observations | | 650,570 | | | 23,249 | |
| $R^2$ | | 0.0147 | | | 0.0529 | |

**Note:** This table presents the estimated coefficients for the variable of interest in this study (the complete table is available upon request) $\beta_1$ refers to the estimated effects in normal time, $\beta_2^{2009}$ refers to the estimated effect of the same variables during the crisis in 2009 and $\beta_2^{2010}$ to the estimated effect of the same variables after the peak of the crisis in 2010. On the left side estimates for exports of goods and on the right for exports of services. Multi-level clustered standard errors in parentheses (at the firm, service or product and country level). $^a$ p<0.01, $^b$ p<0.05, $^c$ p<0.1

Table 9: DD Regression on continuing firm-country-service triplets, continuous variables

| | Goods | | | Services | | |
|---|---|---|---|---|---|---|
| | $\beta_1$ | $\beta_2^{2009}$ | $\beta_2^{2010}$ | $\beta_1$ | $\beta_2^{2009}$ | $\beta_2^{2010}$ |
| **Firm Characteristics** | | | | | | |
| $C_{size}$ | 0.0260$^a$ | -0.0187$^c$ | -0.0128 | -0.0000 | -0.0000 | 0.0001 |
| | (0.008) | (0.011) | (0.015) | (0.000) | (0.000) | (0.000) |
| $C_{productivity}$ | 0.0333$^b$ | -0.0422$^b$ | -0.0185 | -0.0090 | -0.0017 | -0.0713 |
| | (0.015) | (0.019) | (0.025) | (0.039) | (0.052) | (0.051) |
| $C_{intermediate\ share}$ | 0.0055 | -0.0039 | -0.0253 | 0.0171 | -0.2233 | -0.0477 |
| | (0.005) | (0.006) | (0.023) | (0.187) | (0.289) | (0.246) |
| $C_{share\ exp\ sales}$ | -0.3424 | -0.5167 | -0.1336 | -0.2919 | 0.5367 | 0.0856 |
| | (0.338) | (0.392) | (0.496) | (0.358) | (0.541) | (0.422) |
| $C_{share\ imp\ interm}$ | -0.5168 | -0.1397 | 0.3377 | 0.3992 | -1.5467$^b$ | 0.2211 |
| | (0.365) | (0.583) | (0.479) | (0.376) | (0.717) | (0.522) |
| $C_{value\ added\ chain}$ | 0.0133 | 0.0011 | -0.0039 | -0.0035 | 0.0162$^a$ | -0.0039 |
| | (0.009) | (0.014) | (0.011) | (0.002) | (0.004) | (0.003) |
| $C_{ext\ fin\ dep}$ | 0.0000 | 0.0001 | -0.0001 | 0.0000 | -0.0000 | -0.0000 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| $C_{share\ debts\ over\ liab}$ | -0.0195 | -0.0429 | 0.0379 | -0.2010 | 0.2775 | 0.3361 |
| | (0.043) | (0.058) | (0.085) | (0.225) | (0.353) | (0.295) |
| $C_{share\ debts\ due\ after\ one\ year}$ | 0.0505 | -0.0474 | 0.1114 | 0.1781 | -0.1919 | -0.4595 |
| | (0.043) | (0.064) | (0.112) | (0.216) | (0.379) | (0.323) |
| $C_{share\ fin\ debt}$ | -0.0236 | -0.0029 | 0.0136 | -0.2391 | 0.2993 | 0.3723 |
| | (0.038) | (0.046) | (0.067) | (0.181) | (0.323) | (0.263) |
| $C_{share\ stock}$ | 0.0013 | 0.0336 | 0.0661 | -0.0582 | 0.1566 | 0.4269 |
| | (0.131) | (0.140) | (0.133) | (0.423) | (0.647) | (0.597) |
| $FOR$ | -0.0286 | -0.0085 | 0.0844 | -0.0280 | -0.0079 | -0.0574 |
| | (0.029) | (0.043) | (0.059) | (0.117) | (0.159) | (0.183) |
| $MNE$ | -0.0146 | -0.0116 | 0.0130 | 0.0496 | -0.1949 | 0.0742 |
| | (0.027) | (0.041) | (0.058) | (0.091) | (0.161) | (0.122) |
| **Country Caracteristics:** | | | | | | |
| $OECD\ Not\ EU$ | -0.1665$^a$ | 0.2906$^a$ | 0.2583$^a$ | 0.0536 | -0.1356 | -0.0686 |
| | (0.030) | (0.056) | (0.046) | (0.087) | (0.156) | (0.121) |
| $Not\ OECD\ Not\ EU$ | -0.0824$^b$ | 0.1124$^c$ | 0.1713$^a$ | 0.1864$^b$ | -0.2175 | -0.1726 |
| | (0.034) | (0.062) | (0.055) | (0.091) | (0.138) | (0.131) |
| $Exchange\ rate\ change$ | -0.2907$^a$ | -0.1369 | -0.1361 | 0.1650 | -0.2568 | -0.5746 |
| | (0.089) | (0.141) | (0.209) | (0.369) | (0.534) | (0.656) |
| $GDPgrowth$ | 0.0095$^c$ | 0.0141$^c$ | -0.0013 | 0.0152 | -0.0098 | -0.0128 |
| | (0.005) | (0.008) | (0.010) | (0.017) | (0.026) | (0.021) |
| Constant | | -0.0404 | | 0.0655 | | |
| | | (0.145) | | (0.371) | | |
| Service Dummies | | Yes | | Yes | | |
| Industry Dummies | | Yes | | Yes | | |
| Observations | | 650,570 | | 23,249 | | |
| $R^2$ | | 0.0143 | | 0.0566 | | |

**Note:** This table presents the estimated coefficients for the variable of interest in this study (the complete table is available upon request) $\beta_1$ refers to the estimated effects in normal time, $\beta_2^{2009}$ refers to the estimated effect of the same variables during the crisis in 2009 and $\beta_2^{2010}$ to the estimated effect of the same variables after the peak of the crisis in 2010. On the left side estimates for exports of goods and on the right for exports of services. Multi-level clustered standard errors in parentheses (at the firm, service or product and country level). $^a$ p<0.01, $^b$ p<0.05, $^c$ p<0.1

Table 10: Treated and Control Group Characteristics

| | Control | Treated | Diff |
|---|---|---|---|
| log Size | 2.983 | 3.091 | -0.107 |
| | (0.0445) | (0.046) | (0.064) |
| log Productivity | -2.302 | -2.350 | 0.048 |
| | (0.020) | (0.021) | (0.029) |
| log Capital Intensity | -3.952 | -4.020 | 0.068 |
| | (0.043) | (0.052) | (0.067) |
| log Average Wage | -2.867 | -2.893 | 0.026 |
| | (0.015) | (0.013) | (0.020) |
| MNE | 0.052 | 0.055 | -0.002 |
| | (0.006) | (0.006) | (0.008) |
| FOR | 0.130 | 0.132 | -0.002 |
| | (0.009) | (0.009) | (0.013) |

**Note:** This table presents the characteristics and the differences of Control and Treated groups, in terms of size, productivity, capital intensity, average wage, multinational status and foreign ownership. In the last column there is the t statistic of a t-test where the null hypothesis is that the difference is equal to zero. $^{b}$ indicates significance of the difference at the 5% level.

Table 11: DDD Regression on continuing firm-countries, GDP Growth

| | Bi-Exporters | Mono-Exporters |
|---|---|---|
| $\gamma_3^{2009,\,GDP\,Growth}$ | -0.0549$^{b}$ | -0.0466$^{a}$ |
| | (0.027) | (0.013) |
| $\gamma_3^{2010,\,GDP\,Growth}$ | -0.0196 | 0.0097 |
| | (0.017) | (0.011) |
| Firm-Year Dummies | Yes | Yes |
| Observations | 22,162 | 40,272 |
| $R^2$ | 0.0763 | 0.0717 |

**Note:** TO BE WRITTEN

Table 12: DDD Regression on continuing firm-countries, Credit Constraints

| | Bi-Exporters | Mono-Exporters |
|---|---|---|
| $\gamma_3^{2009,\,FIN}$ | 0.0682 | -0.0934 |
| | (0.154) | (0.101) |
| $\gamma_3^{2010,\,FIN}$ | -0.2507$^{c}$ | 0.1091 |
| | (0.132) | (0.103) |
| Firm-Year Dummies | Yes | Yes |
| Observations | 20,702 | 38,577 |
| $R^2$ | 0.0302 | 0.0265 |

**Note:** TO BE WRITTEN

Table 13: DD Regression on continuing firm-country-service triplets, dummy variables 2001

| | Goods | | | Services | | |
|---|---|---|---|---|---|---|
| | $\beta_1$ | $\beta_2^{2001}$ | $\beta_2^{2002}$ | $\beta_1$ | $\beta_2^{2001}$ | $\beta_2^{2002}$ |
| **Firm Characteristics** | | | | | | |
| $D_{size}$ | 0.0285 | -0.0096 | -0.0336 | -0.0263 | -0.0686 | 0.0651 |
| | (0.020) | (0.026) | (0.023) | (0.046) | (0.094) | (0.058) |
| $D_{productivity}$ | 0.0252$^{c}$ | -0.0179 | 0.0012 | 0.0377 | -0.0273 | 0.0011 |
| | (0.014) | (0.022) | (0.021) | (0.044) | (0.074) | (0.065) |
| $D_{intermediate\ share}$ | 0.0137 | -0.0108 | -0.0225 | 0.0022 | -0.0691 | -0.0212 |
| | (0.016) | (0.021) | (0.023) | (0.049) | (0.089) | (0.068) |
| $D_{share\ exp\ sales}$ | -0.0667$^{a}$ | 0.0166 | 0.0562$^{a}$ | -0.2212$^{a}$ | 0.1609$^{c}$ | 0.1456$^{c}$ |
| | (0.014) | (0.021) | (0.019) | (0.059) | (0.088) | (0.079) |
| $D_{share\ imp\ interm}$ | 0.0012 | 0.0462 | 0.0073 | 0.0961 | -0.1647 | -0.1997$^{c}$ |
| | (0.019) | (0.038) | (0.024) | (0.109) | (0.176) | (0.118) |
| $D_{value\ added\ chain}$ | -0.0130 | -0.0140 | -0.0016 | -0.0448 | -0.0904 | 0.0872 |
| | (0.017) | (0.034) | (0.019) | (0.076) | (0.137) | (0.110) |
| $D_{ext\ fin\ dep}$ | 0.0117 | 0.0109 | -0.0048 | 0.0487 | -0.0296 | -0.0062 |
| | (0.013) | (0.020) | (0.020) | (0.039) | (0.062) | (0.065) |
| $D_{share\ debts\ over\ liab}$ | 0.0191 | -0.0690$^{a}$ | -0.0166 | -0.0083 | 0.0235 | 0.0072 |
| | (0.014) | (0.022) | (0.016) | (0.053) | (0.072) | (0.086) |
| $D_{share\ debts\ due\ after\ one\ year}$ | 0.0319$^{b}$ | -0.0208 | -0.0184 | 0.0733 | -0.0570 | -0.0281 |
| | (0.015) | (0.026) | (0.020) | (0.077) | (0.111) | (0.129) |
| $D_{share\ fin\ debt}$ | -0.0094 | 0.0321 | 0.0066 | -0.0426 | 0.0191 | 0.0043 |
| | (0.014) | (0.024) | (0.018) | (0.070) | (0.089) | (0.106) |
| $D_{share\ stock}$ | 0.0276$^{c}$ | -0.0216 | -0.0002 | -0.0704 | -0.0282 | 0.0732 |
| | (0.016) | (0.021) | (0.027) | (0.117) | (0.195) | (0.168) |
| $FOR$ | -0.0338 | 0.0479 | 0.0201 | -0.0597 | 0.1555 | 0.0018 |
| | (0.022) | (0.043) | (0.024) | (0.092) | (0.139) | (0.105) |
| $MNE$ | 0.0123 | -0.0324 | -0.0106 | 0.1451 | -0.1350 | 0.0164 |
| | (0.017) | (0.026) | (0.025) | (0.100) | (0.118) | (0.143) |
| **Country Caracteristics:** | | | | | | |
| $OECD\ Not\ EU$ | 0.0189 | 0.0292 | -0.0076 | 0.0346 | -0.0691 | -0.0174 |
| | (0.021) | (0.043) | (0.021) | (0.082) | (0.131) | (0.113) |
| $Not\ OECD\ Not\ EU$ | 0.0504$^{b}$ | -0.0001 | -0.0766$^{a}$ | 0.1702 | -0.2255 | -0.3017$^{b}$ |
| | (0.022) | (0.029) | (0.029) | (0.137) | (0.186) | (0.154) |
| $Exchange\ rate\ change$ | -0.2495$^{a}$ | 0.0093 | 0.1251 | -0.2860 | 0.1119 | 0.1986 |
| | (0.055) | (0.113) | (0.111) | (0.259) | (0.280) | (0.478) |
| $GDPgrowth$ | 0.0136$^{b}$ | 0.0004 | -0.0028 | 0.0148 | -0.0091 | 0.0134 |
| | (0.006) | (0.007) | (0.008) | (0.021) | (0.032) | (0.032) |
| Constant | | -0.3054$^{a}$ | | | -0.0958 | |
| | | (0.108) | | | (0.202) | |
| Service Dummies | | Yes | | | Yes | |
| Industry Dummies | | Yes | | | Yes | |
| Observations | | 574,221 | | | 19,415 | |
| $R^2$ | | 0.0052 | | | 0.0371 | |

**Note:** This table presents the estimated coefficients for the variable of interest in this study (the complete table is available upon request) $\beta_1$ refers to the estimated effects in normal time, $\beta_2^{2009}$ refers to the estimated effect of the same variables during the crisis in 2009 and $\beta_2^{2010}$ to the estimated effect of the same variables after the peak of the crisis in 2010. On the left side estimates for exports of goods and on the right for exports of services. Multi-level clustered standard errors in parentheses (at the firm, service or product and country level). $^{a}$ p<0.01, $^{b}$ p<0.05, $^{c}$ p<0.1

Table 14: DD Regression on continuing firm-country-service triplets, continuous variables

| | Goods | | | Services | | |
|---|---|---|---|---|---|---|
| | $\beta_1$ | $\beta_2^{2009}$ | $\beta_2^{2010}$ | $\beta_1$ | $\beta_2^{2009}$ | $\beta_2^{2010}$ |
| **Firm Characteristics** | | | | | | |
| $C_{size}$ | 0.0188$^a$ | -0.0157$^c$ | -0.0253$^a$ | 0.0056 | -0.0225 | -0.0179 |
| | (0.006) | (0.008) | (0.009) | (0.016) | (0.025) | (0.024) |
| $C_{productivity}$ | 0.0112 | -0.0116 | -0.0152 | 0.0080 | -0.0360 | -0.0512 |
| | (0.014) | (0.020) | (0.016) | (0.030) | (0.048) | (0.040) |
| $C_{intermediate\ share}$ | 0.0839$^c$ | -0.1105$^b$ | -0.0874$^c$ | -0.0149 | -0.0054 | 0.0430 |
| | (0.048) | (0.052) | (0.048) | (0.011) | (0.015) | (0.034) |
| $C_{share\ exp\ sales}$ | -0.2442 | 0.2230 | -0.0785 | 0.0014 | -0.0192 | 0.0036 |
| | (0.158) | (0.159) | (0.178) | (0.010) | (0.015) | (0.040) |
| $C_{share\ imp\ interm}$ | -0.1475 | -0.0249 | 0.1508 | -0.0090 | 0.0106 | 0.0188 |
| | (0.192) | (0.268) | (0.342) | (0.021) | (0.015) | (0.024) |
| $C_{value\ added\ chain}$ | 0.3121$^c$ | -0.6935$^b$ | -0.9035 | -0.0017 | 0.0017$^c$ | 0.0008 |
| | (0.166) | (0.334) | (0.740) | (0.001) | (0.001) | (0.002) |
| $C_{ext\ fin\ dep}$ | 0.0000 | -0.0000 | -0.0000 | 0.0000 | -0.0000 | -0.0000 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| $C_{share\ debts\ over\ liab}$ | 0.0377$^c$ | -0.1443$^a$ | -0.0378 | 0.1503$^b$ | -0.0801 | -0.2390$^c$ |
| | (0.023) | (0.045) | (0.042) | (0.074) | (0.129) | (0.141) |
| $C_{share\ debts\ due\ after\ one\ year}$ | 0.0935$^b$ | -0.0326 | -0.0245 | 0.0496 | -0.0461 | 0.1039 |
| | (0.046) | (0.071) | (0.067) | (0.209) | (0.282) | (0.279) |
| $C_{share\ fin\ debt}$ | -0.0689$^b$ | 0.1185$^a$ | 0.0838 | -0.1570 | 0.1676 | 0.0867 |
| | (0.030) | (0.043) | (0.056) | (0.121) | (0.170) | (0.160) |
| $C_{share\ stock}$ | 0.0395 | -0.0359 | -0.0387 | -0.5067 | -0.0980 | 0.5627 |
| | (0.026) | (0.026) | (0.026) | (0.419) | (0.424) | (0.418) |
| $FOR$ | -0.0499$^b$ | 0.0543 | 0.0423$^c$ | -0.0152 | 0.0562 | -0.0229 |
| | (0.020) | (0.036) | (0.025) | (0.105) | (0.153) | (0.109) |
| $MNE$ | 0.0073 | -0.0375 | 0.0030 | 0.1654 | -0.1783 | -0.0299 |
| | (0.019) | (0.029) | (0.026) | (0.106) | (0.127) | (0.150) |
| **Country Caracteristics:** | | | | | | |
| $OECD\ Not\ EU$ | 0.0179 | 0.0262 | -0.0068 | 0.0119 | -0.0655 | 0.0047 |
| | (0.021) | (0.042) | (0.022) | (0.078) | (0.134) | (0.111) |
| $Not\ OECD\ Not\ EU$ | 0.0482$^b$ | -0.0023 | -0.0760$^a$ | 0.1840 | -0.2492 | -0.2979$^c$ |
| | -0.022 | (0.029) | (0.029) | (0.157) | (0.207) | (0.166) |
| $Exchange\ rate\ change$ | -0.2587$^a$ | 0.0180 | 0.1402 | -0.2612 | 0.0976 | 0.1709 |
| | (0.056) | (0.113) | (0.111) | (0.254) | (0.282) | (0.473) |
| $GDPgrowth$ | 0.0131$^b$ | 0.0007 | -0.0020 | 0.0108 | -0.0053 | 0.0186 |
| | (0.006) | (0.008) | (0.008) | (0.021) | (0.033) | (0.031) |
| Constant | | -0.3640$^a$ | | -0.0427 | | |
| | | (0.122) | | (0.179) | | |
| Service Dummies | | Yes | | Yes | | |
| Industry Dummies | | Yes | | Yes | | |
| Observations | | 574,221 | | 19,415 | | |
| $R^2$ | | 0.0051 | | 0.0384 | | |

**Note:** This table presents the estimated coefficients for the variable of interest in this study (the complete table is available upon request) $\beta_1$ refers to the estimated effects in normal time, $\beta_2^{2009}$ refers to the estimated effect of the same variables during the crisis in 2009 and $\beta_2^{2010}$ to the estimated effect of the same variables after the peak of the crisis in 2010. On the left side estimates for exports of goods and on the right for exports of services. Multi-level clustered standard errors in parentheses (at the firm, service or product and country level). $^a$ p<0.01, $^b$ p<0.05, $^c$ p<0.1

Table 15: DDD Regression on continuing firm-countries, GDP Growth

| | Bi-Exporters | Mono-Exporters |
|---|---|---|
| $\gamma_3^{2009,\,GDP\,Growth}$ | 0.0141 | 0.0193 |
| | (0.053) | (0.020) |
| $\gamma_3^{2010,\,GDP\,Growth}$ | 0.0412 | -0.0347 |
| | (0.032) | (0.021) |
| Firm-Year Dummies | Yes | Yes |
| Observations | 6,330 | 47,473 |
| $R^2$ | 0.1583 | 0.0795 |

**Note:** TO BE WRITTEN

Table 16: DDD Regression on continuing firm-countries, Credit Constraints

| | Bi-Exporters | Mono-Exporters |
|---|---|---|
| $\gamma_3^{2009,\,FIN}$ | -0.1330 | -0.0521 |
| | (0.317) | (0.080) |
| $\gamma_3^{2010,\,FIN}$ | -0.2557 | -0.1252$^c$ |
| | (0.189) | (0.073) |
| Firm-Year Dummies | Yes | Yes |
| Observations | 5,994 | 46,690 |
| $R^2$ | 0.0395 | 0.0203 |

**Note:** TO BE WRITTEN