

## Romanian Journal of Fiscal Policy

Volume 6, Issue 1(10), January-June 2015, Pages 28-46

### **Dynamics in European Exports in Times of Crisis: The Impact on Growth at Home and Abroad**

**Janez Kren**

*University of Leuven (KU Leuven), Center for Economic Studies and Leuven Center for Irish Studies*

**Terence Huw Edwards**

*Loughborough University, School of Business and Economics*

**Jan Van Hove**

*University of Leuven (KU Leuven), Center for Economic Studies and Leuven Center for Irish Studies, INFER – International Network for Economic Research*

#### **ABSTRACT**

While the financial crisis of 2008-2009 led to the great collapse of international trade, the European debt crisis in 2010-2013 did not have such a drastic impact on trade. The collapse has been studied a lot in recent empirical literature, but the European debt crisis has not been investigated thoroughly yet. This paper looks into the impact of economic growth in European exporters and in their export destination markets on export performance as reflected in total export growth and growth in various export margins. Our findings point to an important role for both demand and supply side factors.

**Key words:** trade collapse, trade structure, European trade, economic crisis

**JEL Classification:** F14

#### **1. Introduction**

The global financial crisis of 2008-2009 had a tremendous impact on economic growth as well as on international trade. This period, broadly referred to as the Great Recession, witnessed a dramatic fall in global gross domestic product (GDP). At the same time, global exports and imports collapsed even more drastically, leading to the so-called Great Trade Collapse. Economic growth remained sluggish ever since in many countries, while global trade experienced a remarkable recovery after the crisis (Studnicka and Van Hove, 2015). Hence, growth and trade appeared to be very much linked during the crisis, but this link is

far from obvious in the subsequent recovery period. In particular for Europe, the global crisis was followed by a European debt crisis, causing a so-called 'double dip crisis', during which various EU member states suffered near collapse due to unsustainable public finances and a failing bank sector.

This paper looks into the impact of economic growth on dynamics in European exports during the period 2003-2013. Europe was hit hard by the global financial crisis leading to a substantial decline in European exports since mid-2008. By early 2011 European exports recovered to their pre-crisis levels, and have kept on increasing ever since. Trade was not much to blame for this global crisis, but it did play a role in shaping the European debt crisis. As argued by Berger & Nitsch (2014) and Chen et al. (2013) macroeconomic imbalances were caused by asymmetric trade shocks before the crisis. The rise of China and other emerging economies generated demand for machinery from Germany, while for southern European countries these emerging economies were competitors on export markets. This led to large current account deficits that were made possible by cheap financing within the European Monetary Union. The 2010-2013 Eurozone crisis led to austerity measures in some, mostly peripheral, EU members aimed at improving competitiveness through internal devaluation. The financial sector and the real economy were both strongly affected, but the impact on the total value of international trade was not that obvious. However, one would expect that the Eurozone crisis has some impact on European export patterns as well.

The literature provides substantial evidence on the evolution and determinants of trade during the trade collapse period. The existing evidence emphasizes the role of demand factors. Haddad et al. (2010) decompose product-level trade into extensive and intensive trade margins, and the latter into price and quantity effects for imports of US, Brazil, Indonesia and the EU. They find that the extensive margin plays only a small role. At the intensive margin there was a negative change in prices and an even larger negative change in the quantity for most traded products. This suggests that the collapse is mostly demand related. However, there are differences between various types of good. Eaton et al. (2011) come to a similar conclusion using a general equilibrium trade model with four types of shocks. The demand shock appears to play the most important role.

However, apart from demand, also supply factors as well as the interconnectedness of trading partners appear to affect the trade evolution during the crisis period. Chor & Manova (2012) stress the importance of access to the trade credit. This implies that the collapse in trade was affected through contractions in the financial sector. Levchenko et al. (2010) conclude based on disaggregated US data that most of the unexpected reduction is due to up- and downstream linkages (highly interconnected global trade chains) and the composition of trade which includes more durable goods compared to GDP. Similarly, Anderton & Tewolde (2011), who analyse OECD members' total trade flows on macro-level data, find that high import-intensity of exports and import-intensive investment expenditures explain most of the decline at the country-level. Stockbuilding, business confidence and credit conditions played a role too. Finally, Bems et al. (2012) point to the additional role of protectionist policies and inventory adjustments. Hence, generally speaking, one can say that the evidence so far suggests that a variety of demand and supply side factors led to the collapse of global trade during the global financial crisis.

Some studies analyse firm level trade data to measure the impact of the crisis. Behrens et al. (2013) find that Belgian firms' export declined mainly at the intensive margin during the crisis, and recovered afterwards. By contrast, the extensive margin was not affected. Similar results were obtained by Bricogne et al. (2012) on French firm level data. In addition they find some evidence of a larger collapse in sectors depending on external finance. Békés et al.

(2011) study the impact of the crisis on a survey sample of firms from 7 EU countries. They find a heterogeneous response from firms even within sectors. There are differences between the countries too. This is driven by the destinations in which firms are active, e.g. a negative impact due to more trade with US and positive impact from trade with China and India, as well as domestic policy variables, e.g. in countries with larger stimulus the firms suffered less.

In contrast with the extensive evidence on the great trade collapse, empirical evidence on the impact of the European debt crisis on international trade is still very scarce. For more information about the European debt crisis from a macroeconomic and monetary perspective see for example Lane (2012) and De Grauwe & Ji (2013).

Therefore, this paper extends this recent literature by studying individual EU members before and during the trade collapse, and afterwards during the European debt crisis. Our aims are two-fold. First, we aim to identify the determinants of export performance before, during and after the crisis period(s), and compare them to the long-run determinants. We follow a very detailed approach by analysing quarterly product-level bilateral export data for 27 EU countries (all EU member states except Croatia). This approach allows us to test various hypotheses. First, in line with the literature, we test whether low economic growth (i.e. declining demand) is responsible for the negative impact of the crisis on exports. Related to this, we test whether the real effective exchange rate is affecting export growth too. Secondly, we test whether export dynamics are due to supply side factors, in particular exporters' supply potential, exporters' labour cost evolutions and access to credit financing. The latter factors are particularly interesting in the context of the European debt crisis and its aftermath. Thirdly, we test whether European exporters strongly focused on the intra-EU market, respectively on the Chinese export market (as the main emerging market), experience different export growth rates. Finally, the fourth hypothesis we test is whether product diversification (the number of exported products) or geographical diversification (the number of export destinations) shelters exporters during and after the crisis too. In other words, we test whether countries with more diverse exports, in terms of the number of products or in terms of the number of destination markets, were less exposed during the recession.

Our second aim is to analyse through which margins these determinants affect export growth. Following Bernard et al. (2009) and Haddad et al. (2010), we distinguish between the intensive and extensive margin of exports. We further decompose the extensive margin into the (net) export destination extensive margin and the (net) export product extensive margin, as exports can either be geographically diversified or be characterised by product differentiation. Studying the role of various factors affecting export performance for each of these margins is an innovative approach within the literature.

The remainder of the paper is organised as following. In the second section we present some stylised facts regarding EU members' exports. In section 3, we formally decompose export growth into intensive and extensive margins based on the methodology developed in Bernard et al. (2009). Section 4 discusses the empirical estimation methodology. Section 5 contains the results of the empirical analysis and a discussion of these results. The last section provides conclusions and a discussion on possible future research.

## 2. Stylised Facts on EU Exports and Crisis

In this section we provide stylised fact regarding the impact of the crisis on EU members exports in terms of total value, and later on number of products and destinations.

Trade data comes from Eurostat's Comext dataset. It includes information for all 27 EU members including for years before their accession to the EU. We use total bilateral exports by each EU 27 member state for each product from January 2003 to March 2013. Like in Levchenko et al. (2010) or Eaton et al. (2011) monthly data are converted into quarterly in order to reduce the noise.

Data comes disaggregated by products based on the 8-digit Combined Nomenclature (CN8). One major issue is changes in nomenclature. To account for this at least partially, we use the Van Beveren et al. (2012) algorithm and concordance files to create a time-consistent nomenclature<sup>1</sup>. Confidential trade and corrections due to erroneous codes are omitted, which results in 8,149 distinct product categories in every period. A summary of the number of changes in provided in Table .

**Table Changes in nomenclature 2003-2013.**

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Definition change	n/a	0	11	3	163	0	0	75	1	141	1
New category	n/a	273	97	486	917	75	127	180	137	902	35
Removed category	503	175	740	1039	96	257	306	281	818	42	n/a
	10,40	10,17	10,09								
No. of categories	4	4	6	9,842	9,720	9,699	9,569	9,443	9,299	9,383	9,376
After concordance	8,149	8,149	8,149	8,149	8,149	8,149	8,149	8,149	8,149	8,149	8,149
1 to 1	86.2%	87.6%	88.3%	89.9%	90.7%	91.0%	92.0%	93.3%	94.5%	94.7%	94.8%
2 to 1	9.5%	8.7%	8.3%	7.1%	6.3%	6.0%	5.3%	4.3%	3.5%	3.1%	3.0%
3 to 1	2.4%	2.0%	1.9%	1.7%	1.7%	1.7%	1.4%	1.2%	0.9%	0.9%	0.9%
4 to 1	0.9%	0.7%	0.6%	0.5%	0.4%	0.5%	0.4%	0.4%	0.4%	0.4%	0.5%
5 or more to 1	1.1%	1.0%	1.0%	0.8%	0.8%	0.8%	0.8%	0.7%	0.7%	0.9%	0.9%

*Changes at 8-digit level, without confidential trade and corrections due to erroneous codes. New categories are created at the beginning and removed at the end of the year.*

We restrict the bilateral dimension to the 100 largest trading partners. Based on 2012 data, they jointly account for 98.9% of total exports. They include all 27 EU countries and 73 other countries and territories. This makes data more tractable, but still includes most of the trade. For list of partners see Table 1.

<sup>1</sup> For years after 2010 concordance files were added from Eurostat Ramon server.

**Table 1 List of included trading partners**

<b>EU Core</b>	France, Netherlands, Germany, UK, Ireland, Denmark, Belgium, Luxembourg, Sweden, Finland, Austria (11)
<b>EU South</b>	Italy, Greece, Portugal, Spain, Malta, Cyprus (6)
<b>EU CEE</b>	Estonia, Latvia, Lithuania, Poland, Czech Republic, Slovakia, Hungary, Romania, Bulgaria, Slovenia(10)
<b>Other European</b>	Iceland, Norway, Switzerland, Gibraltar, Turkey, Albania, Ukraine, Belarus, Moldova, Russian Fed., Croatia, Bosnia and Herzegovina, Macedonia, Serbia & Montenegro & Kosovo <sup>2</sup> (14)
<b>Africa</b>	Morocco, Algeria, Tunisia, Libya, Egypt, Senegal, Côte d'Ivoire, Ghana, Togo, Nigeria, Cameroon, Gabon, Angola, Kenya, South Africa (18)
<b>North America</b>	United States, Canada (2)
<b>Latin America and Caribbean</b>	Mexico, Panama, Cuba, Dominican Rep., Colombia, Venezuela, Ecuador, Peru, Brazil, Chile, Uruguay, Argentina (12)
<b>Middle East and Central Asia</b>	Georgia, Azerbaijan, Kazakhstan, Lebanon, Iraq, Iran, Israel, Jordan, Saudi Arabia, Kuwait, Bahrain, Qatar, UAE, Oman, Pakistan, India, Bangladesh (17)
<b>East, SE Asia with Oceania</b>	Thailand, Vietnam, Indonesia, Malaysia, Singapore, Philippines, China, Rep of Korea, Japan, Taiwan, Hong Kong, Australia, New Zealand (13)

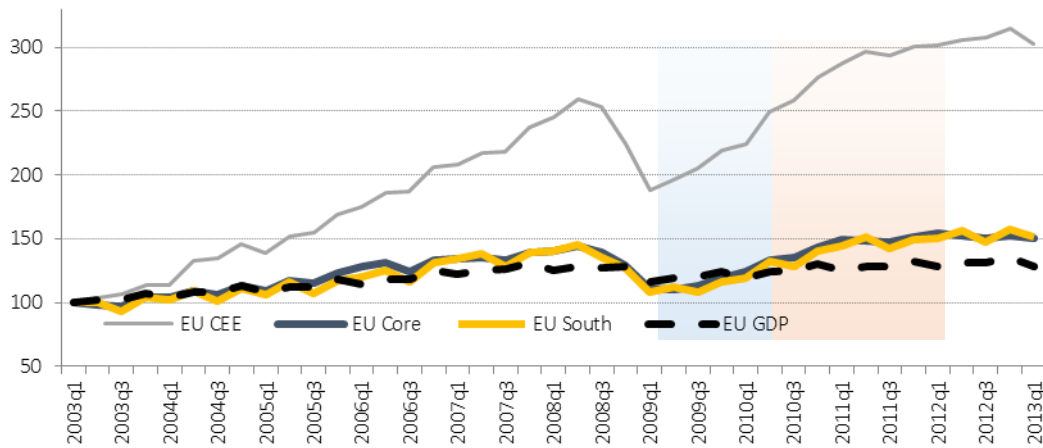
*Number in parenthesis is a number of partners included. First three rows include 27 EU countries that are also exporters in the data.*

Figure 1 and Figure 2 give a graphical overview of total exports from the first quarter of 2003 up to the first quarter of 2013. The numbers reported are unweighted averages broken down by region as defined in Table 1. In Figure 1 exports are presented as an index with base in 2003q1, while Figure 2 presents yearly growth rates. Throughout this paper we use quarterly data with growth rates from the corresponding quarter of the previous year, for example growth between 2003q1 and 2004q1. This approach reduces the effect of seasonal fluctuations.

The figures show that in the period before the crisis exports grew in all parts of the EU, but especially in Central and Eastern European countries (henceforth abbreviated as CEE) because of the catching up during the transition and EU accession periods. There is a clearly visible collapse in the second half of 2008. At first glance it seems that all parts of EU experienced a similar downfall and recovery because of the 2008-2009 global crisis. They are also confronted with the same slowdown in export growth more recently, coinciding with a slowdown of GDP growth. Quarterly total EU GDP index and its yearly growth are added to the figures for comparison.

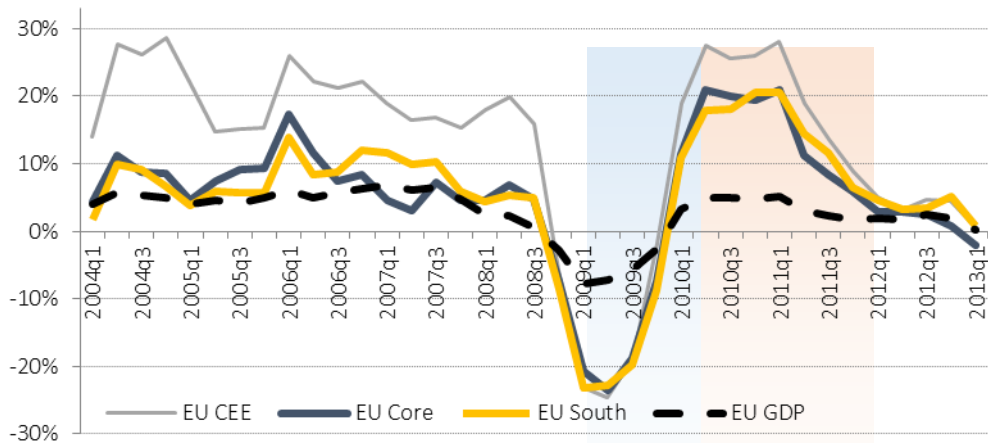
<sup>2</sup> In 2005 Serbia, Montenegro and Kosovo became separate statistical entities. Hence for the following years we group them together and are throughout counted as one partner.

**Figure 1 Total value of exports, average by region, 2003q1=100**



*Export from 27 exporters to 100 largest partners. Country averages are not weighted. EU GDP is total GDP of 27 EU members. Source: Comext, own calculations.*

**Figure 2 Yearly growth of average exports by region**



*Export from 27 exporters to 100 largest partners. Country averages are not weighted. EU GDP is total GDP of 27 EU members. Source: Comext, own calculations.*

Generally speaking, we can hence distinguish four phases based on the yearly growth rates in order to simplify the further analysis. They are:

- (1) Pre-crisis: 2003q1 to 2008q3
- (2) The collapse: 2008q4 to 2009q4
- (3) Recovery: 2010q1 to 2011q4
- (4) Post-recovery: 2012q1 to 2013q1

Phase (2) and (3) are shaded blue and red respectively on both figures. This general picture obviously hides differences across individual EU countries. In the remainder of this paper we will study whether the determinants of export growth differ across these four phases as well as across these three EU regions.

### 3. Trade Dynamics Decomposition: Empirical Methodology and Evidence

To analyse the underlying dynamics in exports by each EU member state we decompose total export growth into an intensive margin and two extensive margins. We use and later extend the methodology used by Haddad et al. (2010) which itself is based on Bernard et al. (2009) where it was originally used on US firm-level trade data during the 1997 Asian financial crisis.

In a first step we decompose total export growth into an intensive and extensive margin. The total value of exports  $X$  in a given period  $t$  is the sum of  $x_t^i$  values of every product  $p$  – destination  $d$  pair  $i = (p, d)$ . When taking a time difference they are separated into three groups: the first group consists of continuously traded products ( $C$ ), the second group contains new product-destination trade relations only at period  $t$  ( $N$ ), and the third group consists of exiting product-destination trade relations only at  $t-1$  ( $E$ ):

$$X_t = \sum_{i \in I} x_t^i$$

$$X_t - X_{t-1} = \sum_{i \in I} x_t^i - \sum_{i \in I} x_{t-1}^i = \sum_{i \in C} x_t^i - x_{t-1}^i + \sum_{i \in N} x_t^i - \sum_{i \in E} x_{t-1}^i \quad (1)$$

where the finite set  $I$  contains all  $i$  and consists of subsets  $C$  (continuous),  $N$  (new) and  $E$  (exit). Note that by definition  $x_{t-1}^{i \in N} = 0$  and  $x_t^{i \in E} = 0$ . Expression (1) can be divided by  $X_{t-1}$  to obtain percentage growth. Changes for all products are hence summed by group and then divided by  $X_{t-1}$ . This gives an intensive margin ( $im$ ) and two extensive margins ( $em$ ) for every exporter. Furthermore both new and exit extensive margins can be combined to obtain net entry  $em$ .

$$\frac{X_t - X_{t-1}}{X_{t-1}} = \frac{\sum_{i \in C} x_t^i - x_{t-1}^i}{X_{t-1}} + \frac{\sum_{i \in N} x_t^i}{X_{t-1}} - \frac{\sum_{i \in E} x_{t-1}^i}{X_{t-1}} =$$

$$= im + em_{new} - em_{exit} = im + em \quad (2)$$

Because net entry  $em$  depends also on the value of new and exit products, it is not possible to say for certain what is happening with the actual number of product-destinations. This definition differs from previously used definitions of the extensive margin that focus on numbers only.

Figure 3 shows the average margins for all 27 exporters. Throughout the decade most of the growth contribution comes from the intensive margin, on average around 80%. The same holds also for the trade collapse and recovery periods. These are similar results to Haddad et al. (2010) who also use the same methodology on product-level data for Brazil, Indonesia, US and the EU as a whole. However, in the post-recovery phase the intensive margin has almost no impact and most of the export growth is achieved through other channels.

As noted by Bernard et al. (2009) the short term extensive margin is relatively small because new exports and exits are on average smaller compared to continuous product-destinations. In their estimation the contribution of the extensive margin based on 1-year differences, it is on average 25%, but using 5-year differences it increases to around 50%, and in 10-year difference to 65%. Hence even if the contribution of the extensive margin is small in the short run, it does matter a lot in the longer run.

In the second step we extend the decomposition by separating the extensive margins further into trade of existing products to new destinations, and the trade of new products. This enables us to clearly identify whether the changes in the extensive margins are driven by actual new products or by firms engaging in more markets with the same products. To achieve this, we repeat the calculations from equation (2) but only with product totals for all destinations. This results in product-only extensive margins, which we abbreviate as  $em^p$  and  $im^p$ . These are then subtracted from product-destination margins obtained earlier. The difference between them corresponds to trade in a new destination of existing products, or their exit from a destination.

$$\Delta_{\%}X = im + [em_{new} - em_{new}^p] + em_{new}^p - [em_{exit} - em_{exit}^p] - em_{exit}^p \quad (3)$$

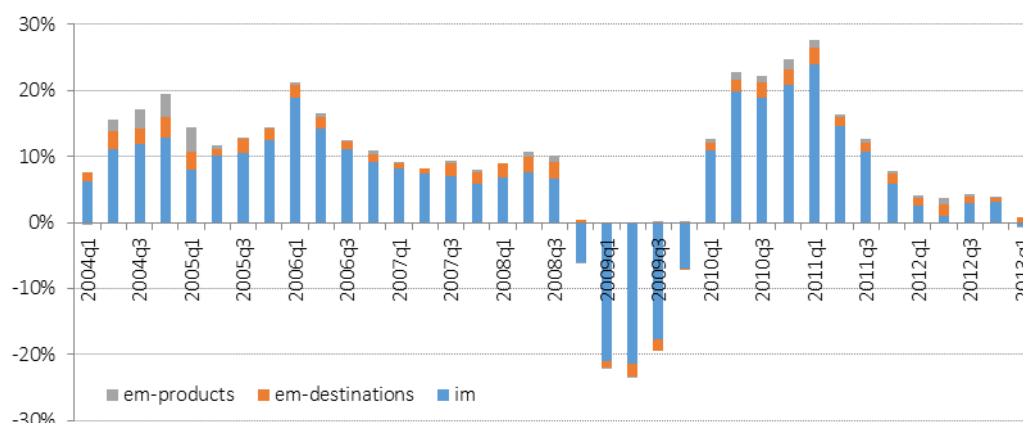
$$\Delta_{\%}X = im + em_{new}^d + em_{new}^p - em_{exit}^d - em_{exit}^p$$

Again new and exit margins can be combined, resulting in  $im + em^d + em^p$  where  $em^d + em^p = em$ .

Average margins are presented in Figure 3. The destination extensive margin always exceeds the product extensive margin, except for the year 2005. During the trade collapse both margins were negative, but compared to the intensive margin, their overall impact was small. Since 2010 the extensive margins are similar to their pre-crisis percentages.



**Figure 3 Average margins with net extensive margin broken down**



*Comext export data for 27 exporters and 100 largest partners. Country averages are not weighted. Own calculations.*

Table provides average margins for each of four elements of *em* by phase. Even though the net effect is small, there are interesting underlying dynamics. During the collapse there were more destination exits than entries, mostly because of fewer entries than in previous phases (on average 0,082 before and 0.060 during the collapse). During the recovery period, the net entry destinations margin was positive again on, to a similar degree compared to before the crisis. Net entry product margin is close to zero during the collapse, but in 2010 and 2011q1 it becomes positive again, mostly because of new products that were exported. Finally, the net entry product margin is close to zero again in 2012. Nevertheless, all this changes on *em* are relative small compared to those on *im*.

**Table 3 Average margin by phase**

Phase	(1) em-d new	(2) em-d exit	(3) em-d net	(4) em-p new	(5) em-p exit	(6) em-p net	(7) em	(8) im	(9) total growth
Pre-crisis	7.49	-5.63	1.86	2.11	-1.27	0.85	2.71	9.81	12.52
The collapse	5.34	-6.22	-0.89	1.21	-1.31	-0.10	-0.99	-14.57	-15.56
Recovery	7.12	-5.34	1.77	1.85	-0.99	0.86	2.63	15.74	18.37
Post-recovery	6.76	-5.70	1.06	1.24	-0.92	0.33	1.38	1.82	3.20

*Percentage points*

$$(3) = (1) + (2) \quad (6) = (4) + (5) \quad (7) = (3) + (6) \quad (9) = (7) + (8)$$

Hence growth of average EU exports is driven primarily by growth in the intensive margin. As for extensive margin is concerned, the growth contribution comes from the growth in the number of destinations.

## 4. Empirical Methodology

In the previous section we decomposed total exports into three margins: the intensive margin, the net product extensive margin, and the net destination extensive margin. In this section we aim to explain the cross-temporal and cross-country heterogeneity in these margins, and hence the heterogeneity in total export growth, for exports by EU member states between 2004q1 and 2013q1. We estimate the following specification:

$$margin_{jt} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 \cdot eurozone + \gamma_{year} + \gamma_j \quad (4)$$

Where *margin* corresponds to 1) total export growth, 2) the intensive margin of exports (*im*), 3) the net destination extensive margin (*destination em*), or 4) the net product extensive margin (*product em*) for (European) exporter *j* in period *t*. Matrices **X** contain variables for three groups of explanatory variables. **β** are the vectors with the corresponding regression coefficients. We add both year fixed effects and exporter fixed effects, denoted by  $\gamma$ . Year fixed effects capture time-specific variation that affects all EU countries. Furthermore, we add a constant term  $\beta_0$  and  $\beta_4$  is the coefficient for a Eurozone dummy equal to one if the exporter belongs to the Eurozone. All variables that are either share or percentage change are transformed into percentage form (e.g. 0.20 growth of exports is now 20%). This is just a linear transformation that does not change the underlying model.

This baseline regression is estimated for the full sample (27 EU countries), as well as for each of 3 regions, and for each of the 4 phases separately (see previous section). This allows us to analyse whether the determinants vary across regions or whether they are evolving over time. In particular we wonder whether the determinants of export dynamics are different for exporters in different parts of the EU and/or before, during or after the crisis. There are 37 periods and 24 exporters<sup>3</sup>. Hence the maximum number of observations in each regression is: 888 in the full sample, 296, 222, 370 in regional subsamples, and 513, 135, 216, 135 in the separate phase regressions.

To determine the appropriate econometric estimation method we perform a series of tests on the regression of export growth on the selected variables. First, as a response to a highly significant Hausman test ( $p=0.0000$ ), we choose to use a fixed effects estimation method instead of a random effects estimation method. The joint significance of all intercepts is 0.0001. Furthermore, the Modified Wald test detects heteroskedasticity ( $p=0.0000$ ), and with the Wooldridge test for autocorrelation we reject no AR(1) null ( $p= 0.0001$ ). As expected, Pesaran's test of cross sectional independence strongly rejects the null hypothesis of no cross-sectional dependence ( $p = 0.0000$ ), meaning that there is a correlation between exports in each period. As a result we need to use Driscoll-Kraay standard errors which are heteroskedasticity, autocorrelation and contemporaneous correlation robust (Hoechle, 2007). They are used for all baseline regressions.

Note that we could estimate the specification by dynamic panel methods, such as Anderson-Hsiao IV or Arellano-Bond GMM estimation methods. Both are usually used when the number of cross-sectional units is large compared to the time dimension. In case of panel data with a small N, as is in our case, they can, however, be severely biased and imprecise (Bruno, 2006). Moreover, in case of cross-sectional dependence, which is severe in our sample, all estimation procedures that rely on IV and GMM are inconsistent (Sarafidis & Robertson, 2009). As a result we do not use the dynamic panel techniques.

---

<sup>3</sup> Eurostat does not provide credit data for Denmark, Sweden and UK. Hence for Core EU only Eurozone countries are included. Another possible candidate could be interbank interest rate like in Chor & Manova (2012). But this interest rate is under direct influence of ECB's expansionary monetary policy. Hence it does not represent the actual cost of or access to credit. Moreover, it is set for the entire Eurozone, even though the actual financial sectors are very heterogeneous. Hence we do not use it.

We regress growth in total exports as well as growth in each margin on a set of 11 explanatory variables. This will enable us to test the hypotheses that were outlined in the introduction, namely what is the impact of a decline in world demand, changes on the supply side in the labour market and the financial sector, the product-destination composition of exports, and through which margin they all affect export growth. Table 4 provides a summary overview of all explanatory variables.

**Table 4 List of all explanatory variables**

Code	Variable name	Description
DEMAND SIDE:		
WGDP	Export-share weighted gross domestic product growth	Percentage change compared to corresponding period of previous year. Based on millions of US dollars, volume estimates, fixed PPPs, OECD reference year, annual levels, seasonally adjusted. For 39 countries <sup>4</sup> . Source: OECD.Stat.
REER	Change in real effective exchange rate	Broad group (41 industrial countries), CPI deflated, percentage change compared to corresponding period of the previous year
SUPPLY SIDE:		
EGDP	Exporter's home gross domestic product growth	Percentage change compared to corresponding period of previous year.
EGDP_PC	Exporter's home GDP per capital level	Euro per inhabitant, volume reference and exchange rates 2005, at market prices. Quarterly data for most, except one quarter of annual for: Romania (2003-), Greece (2012-), and Italy (2012q3-)
ULC	Change in real unit labour cost	Quarterly data, percentage change compared to corresponding period of the previous year, not seasonally adjusted. No data for DK, SE and UK.
IRATE	Private sector interest rates	Annualised agreed percentage rate interest rates from monetary financial institutions for loans to non-financial corporations for new business, 1 million euros or less, maturity less than 1 year.
DESTINATIONS AND PRODUCT COMPOSITION:		
PRODUCTS	Number of products exported.	Number of distinct products that were exported in a given quarter. Source: Comext.
DEST_PP	Average number of destinations exported per product.	Number of product-destinations pairs divided by number of distinct products, for every quarter for every exporter. Source: Comext.
INTRA	Share of intra-EU trade	Country's share of export to EU destinations in total exports. Source: Comext.
CHINA	Share of trade to China	Country's share of export to China destinations in total exports. Source: Comext.
EUROZONE	Eurozone dummy	Value 1 for: Austria, Belgium, Cyprus (2008-), Estonia (2011-), Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta (2008-), Netherlands, Portugal, Slovakia (2009-), Slovenia (2007-), and Spain.

*Source: Eurostat, unless specified otherwise*

The first group of explanatory variables reflects export demand. We use two measures to capture the demand side effects. First, we use quarterly GDP growth for 39 export partner countries<sup>5</sup>. All GDP growth rates are weighted by the lagged share of each export destination in a particular EU member state's total exports. By using lagged weights we avoid potential endogeneity. As such this weighted GDP growth measure (WGDP) reflects the average economic growth in each EU member state's export markets. A priori we expect that an on-average negative demand shock in export markets leads to a deterioration in export growth. As a second demand-related variable we use the change in real effective exchange rates (REER) with 41 countries. An increase in this variable means a strengthening of the currency

<sup>4</sup> All OECD members, except Greece. Developing countries include: Argentina, Brazil, India, Indonesia, Russia, South Africa.

<sup>5</sup> They include 33 OECD members (all except Greece) and six emerging economies: Argentina, Brazil, India, Indonesia, Russian Federation and South Africa. Unfortunately OECD provides data for China only for the last few periods. Hence China is excluded.

what makes exports more expensive in the importer countries and therefore the exporter loses competitiveness. Hence we expect a negative coefficient.

The second group of explanatory variables consists of supply side variables. Ideally, we want information about business demographics to capture enterprise births and deaths. If there are fewer firms on the market, then one would expect there to be fewer firms exporting, which would reduce the extensive margin. Unfortunately, data have very limited coverage. Hence we use exporter's GDP growth (EGDP) instead as a proxy for the general economic climate in the producing and exporting economy<sup>6</sup>. Secondly, we also add growth in GDP per capita (EGDP\_PC) as this indicator is typically used as proxy for changes in the capital-labour ratio and hence in the exporter's capital intensity. Next, we add changes in real unit labour costs (ULC). These reflect the evolution in cost competitiveness. It has been argued by Ordóñez et al. (2015) that labour unit costs in the Eurozone have diverged in the period before the crisis. As labour unit cost evolutions explain at least partly the asymmetries in economic growth within the EU, we wonder whether they also play a role in the evolution of EU exports. Due to the cost argument we expect a negative effect on export growth caused by larger growth in labour unit costs. Finally, we add interest rates to non-financial corporations (IRATE), which most directly capture access to credit as well as the costs of trade credit. As argued in Chor & Manova (2012) and Amiti & Weinstein (2011) firms in international trade face longer payments cycles and associated uncertainty. Hence they may not be able to engage in exporting without the trade credit. As a result high interest rates are expected to reduce export growth.

The third group of variables captures the geographical orientation and product composition of EU members' exports. As variables for the former we use the share of intra-EU exports (INTRA) and the share of exports to China (CHINA), which is not included in the weighted GDP growth variable directly. We expect a negative impact of a larger share of intra-EU exports for two reasons. First, the EU market is a relatively stable but also saturated market. As such, potential export growth is restricted, compared to larger export potentials in emerging markets. Secondly, since the EU was hit not only by the global financial crisis, but also by the consecutive sovereign debt crisis, reduced economic growth in the EU is likely to cause lower export growth too. The opposite holds for the share of exports to China. As the main emerging economy, China reflects a large potential for European exports. A more intensive trade relationship with China is likely to boost exports. For the product composition of EU exports we include the number of products that are exported in a given quarter (PRODUCTS) and the average number of export destinations across exported products in a given quarter (DEST\_PP). As such we will be able to test whether countries with more product diversification or more geographical diversification in their exports were able to withstand the crisis better. Finally, we also add a Eurozone dummy (EUROZONE) to test for specific Eurozone effects.

By controlling for various potential explanations for the observed dynamics in export growth and the related margins, we aim to shed some light on the precise determinants of the underlying dynamics. This will derive a more complete explanation for the export dynamics before, during and after the crisis.

---

<sup>6</sup> Since exports are by definition part of GDP there could be some correlation and endogeneity. Although one could subtract exports from GDP to correct for this, we follow the literature and use total GDP, including exports.

## 5. Determinants of European Export Growth

Results for the baseline regression are reported in Tables 5 to 8, respectively for total export growth, the intensive margin, and both net extensive margins as response variables. Note that the selected explanatory variables explain a substantial share of variation in export growth, especially during collapse and recovery phase where within-R<sup>2</sup> are 0.779 and 0.578 respectively.

In general, in Table 5, we observe an important role for economic growth in the export markets to explain differences in export growth in EU countries between 2004 and 2013. On average a one percentage point increase in the importing partners' overall GDP growth leads to a 3.39 percentage points increase in exports by a European Union member state. Separate regressions for each phase reveal that this coefficient is even higher during the collapse and following recovery period, while even negative before the crisis and insignificant in the post-recovery phase. The importance of the demand side was already stressed by several related studies, like Eaton et al. (2011), Levchenko et al. (2010) and Bems et al. (2012). In particular, our finding is in line with the finding of Freund (2009) that during the economic downturn the income elasticity increases. In addition, our decomposition allows us to measure how this demand effect affects the different margins. Comparing Tables 6, 7 and 8, we find that most of the export demand driven changes are on the intensive margin. In addition, contribution to the destination extensive margin is positive and significant too, but the estimated coefficient is much smaller. This implies that the partners' economic growth increases mainly the intensity of exports by EU member states, but it also creates new destinations for existing products.

Surprisingly, in the pre-crisis phase, the weighted partner GDP growth coefficient is negative. One possible explanation is that economic growth in rapidly growing emerging countries before the crisis caused severe competition on export markets, in particular to southern EU members, as is argued by Chen et al. (2013). Hence it is plausible to have a negative partner growth impact on export growth. This would also explain why the WGDP coefficient is lower for South EU than for Core EU and CEE. This negative coefficient is observed only on both extensive margins. This means that European exporters were losing destinations and products, while exports neither increased, nor decreased on markets where they remained active, due to growth in partners' GDP in the pre-crisis phase.

**Table 5 Baseline regression: export total growth**

Variable	Overall	Core	South	CEE	Pre-crisis	Collapse	Recovery	Post-recovery
WGDP	3.391*** <i>0.455</i>	3.924*** <i>0.622</i>	2.433*** <i>0.520</i>	4.177*** <i>0.551</i>	-1.377** <i>0.640</i>	3.169*** <i>0.285</i>	8.407*** <i>1.169</i>	0.684 <i>1.200</i>
REER	-0.287** <i>0.108</i>	-1.350*** <i>0.352</i>	-1.220*** <i>0.360</i>	-0.202* <i>0.112</i>	-0.307* <i>0.152</i>	-0.438* <i>0.195</i>	-0.026 <i>0.206</i>	-0.411 <i>0.213</i>
EGDP	0.402*** <i>0.116</i>	0.024 <i>0.293</i>	0.339 <i>0.363</i>	0.354*** <i>0.114</i>	0.184 <i>0.156</i>	0.581** <i>0.138</i>	0.334 <i>0.318</i>	0.517*** <i>0.078</i>
EGDP_PC	-0.003* <i>0.002</i>	-0.002 <i>0.002</i>	0.008 <i>0.005</i>	-0.007 <i>0.005</i>	-0.006** <i>0.003</i>	0.008* <i>0.003</i>	-0.007** <i>0.003</i>	0.004 <i>0.004</i>
ULC	-0.351** <i>0.146</i>	-0.019 <i>0.390</i>	-0.703** <i>0.317</i>	-0.479*** <i>0.152</i>	-0.229 <i>0.153</i>	-0.245*** <i>0.034</i>	-0.608*** <i>0.146</i>	-0.872** <i>0.171</i>
IRATE	0.677** <i>0.315</i>	1.146 <i>1.169</i>	2.174 <i>1.845</i>	0.861*** <i>0.238</i>	0.751 <i>0.516</i>	0.006 <i>0.107</i>	2.373 <i>1.505</i>	0.373 <i>1.385</i>
PRODUCTS	0.001 <i>0.001</i>	-0.009*** <i>0.002</i>	0.000 <i>0.004</i>	0.003 <i>0.003</i>	0.007** <i>0.003</i>	-0.004 <i>0.007</i>	0.001 <i>0.005</i>	0.009* <i>0.003</i>

Variable	Overall	Core	South	CEE	Pre-crisis	Collapse	Recovery	Post-recovery
DEST_PP	0.556** <i>0.251</i>	0.569* <i>0.305</i>	-0.645 <i>0.779</i>	1.122 <i>1.367</i>	1.692** <i>0.783</i>	0.629 <i>0.543</i>	0.453 <i>0.861</i>	-0.331 <i>0.168</i>
INTRA	-0.173 <i>0.158</i>	0.359 <i>0.335</i>	0.050 <i>0.183</i>	-0.638* <i>0.318</i>	0.071 <i>0.212</i>	-0.292 <i>0.310</i>	-0.215 <i>0.337</i>	-0.053 <i>0.154</i>
CHINA	0.141 <i>0.684</i>	1.370 <i>1.118</i>	-1.424 <i>1.146</i>	-2.420** <i>1.148</i>	0.053 <i>1.245</i>	-1.230 <i>0.698</i>	-2.502** <i>0.942</i>	0.046 <i>0.401</i>
EUROZONE	1.626 <i>2.407</i>		3.794 <i>4.437</i>	5.494* <i>2.745</i>	-2.542 <i>3.160</i>	3.676*** <i>0.617</i>	16.646* <i>7.227</i>	0.000 <i>0.000</i>
Observations	784	288	187	309	377	120	191	96
Groups	24	8	6	10	24	24	24	24
Within R <sup>2</sup>	0.733	0.713	0.754	0.832	0.196	0.779	0.578	0.201

Fixed effects: year, declarant. AR(1) lag order Driscoll-Kraay standard errors in italics: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Table 6 Baseline regression: export intensive margin**

Variable	Overall	Core	South	CEE	Pre-crisis	Collapse	Recovery	Post-recovery
WGDP	2.996*** <i>0.357</i>	3.519*** <i>0.499</i>	2.174*** <i>0.388</i>	3.563*** <i>0.510</i>	0.245 <i>0.263</i>	2.565*** <i>0.277</i>	7.449*** <i>1.114</i>	1.927 <i>1.187</i>
REER	-0.242*** <i>0.078</i>	-1.404*** <i>0.289</i>	-0.741** <i>0.297</i>	-0.183** <i>0.083</i>	-0.337*** <i>0.116</i>	-0.111 <i>0.156</i>	0.042 <i>0.115</i>	-0.494*** <i>0.059</i>
EGDP	0.292*** <i>0.078</i>	-0.091 <i>0.301</i>	0.737** <i>0.349</i>	0.312*** <i>0.086</i>	0.315*** <i>0.105</i>	0.283* <i>0.108</i>	0.374* <i>0.191</i>	0.605** <i>0.150</i>
EGDP_PC	-0.001 <i>0.001</i>	0.000 <i>0.001</i>	0.003 <i>0.003</i>	-0.007* <i>0.004</i>	-0.002* <i>0.001</i>	0.009** <i>0.003</i>	-0.007** <i>0.002</i>	0.009* <i>0.003</i>
ULC	-0.344*** <i>0.112</i>	-0.079 <i>0.338</i>	-0.550* <i>0.291</i>	-0.425*** <i>0.097</i>	-0.152 <i>0.127</i>	-0.202*** <i>0.024</i>	-0.530*** <i>0.085</i>	0.264** <i>0.075</i>
IRATE	0.249 <i>0.165</i>	1.994* <i>0.991</i>	2.615** <i>1.240</i>	0.517*** <i>0.170</i>	-0.189 <i>0.284</i>	-0.233 <i>0.228</i>	2.657* <i>1.226</i>	0.172 <i>1.231</i>
PRODUCTS	0.001 <i>0.001</i>	-0.004* <i>0.002</i>	0.001 <i>0.003</i>	0.000 <i>0.001</i>	-0.001 <i>0.002</i>	-0.004 <i>0.006</i>	0.000 <i>0.008</i>	0.001 <i>0.004</i>
DEST_PP	0.328* <i>0.182</i>	0.336 <i>0.237</i>	0.594 <i>0.624</i>	0.393 <i>0.912</i>	0.377 <i>0.538</i>	0.226 <i>0.692</i>	-0.105 <i>0.581</i>	-1.048*** <i>0.131</i>
INTRA	-0.217** <i>0.098</i>	0.442** <i>0.212</i>	-0.411* <i>0.209</i>	-0.600*** <i>0.195</i>	-0.123 <i>0.156</i>	-0.379 <i>0.242</i>	-0.470 <i>0.263</i>	-0.618** <i>0.170</i>
CHINA	0.021 <i>0.534</i>	1.264** <i>0.590</i>	0.311 <i>1.111</i>	-1.929** <i>0.931</i>	-0.399 <i>0.895</i>	0.158 <i>0.676</i>	-1.596* <i>0.768</i>	2.108*** <i>0.345</i>
EUROZONE	0.644 <i>1.571</i>		-1.518 <i>3.808</i>	2.639 <i>1.944</i>	-2.528 <i>1.921</i>	-0.793 <i>0.693</i>	14.905** <i>5.454</i>	0.000 <i>0.000</i>
Observations	784	288	187	309	377	120	191	96
Groups	24	8	6	10	24	24	24	24
Within R <sup>2</sup>	0.770	0.781	0.729	0.863	0.207	0.770	0.658	0.331

Fixed effects: year, declarant. AR(1) lag order Driscoll-Kraay standard errors in italics: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Table 7 Baseline regression: export destination extensive margin**

Variable	Overall	Core	South	CEE	Pre-crisis	Collapse	Recovery	Post-recovery
WGDP	0.347*** <i>0.089</i>	0.278*** <i>0.083</i>	0.041 <i>0.219</i>	0.699*** <i>0.154</i>	-0.452** <i>0.212</i>	0.524*** <i>0.045</i>	0.470 <i>0.264</i>	0.704 <i>0.732</i>
REER	-0.039* <i>0.023</i>	-0.095 <i>0.063</i>	-0.103 <i>0.164</i>	-0.048 <i>0.036</i>	0.028 <i>0.050</i>	-0.251** <i>0.063</i>	-0.015 <i>0.102</i>	0.398* <i>0.161</i>
EGDP	0.034 <i>0.035</i>	0.049 <i>-0.046</i>	-0.416* <i>-0.218</i>	0.015 <i>-0.038</i>	-0.090* <i>-0.043</i>	0.185*** <i>-0.025</i>	-0.080 <i>-0.104</i>	-0.463 <i>-0.236</i>
EGDP_PC	0.000 <i>0.000</i>	0.000 <i>0.000</i>	0.002 <i>0.002</i>	0.000 <i>0.001</i>	0.000 <i>0.000</i>	-0.003*** <i>0.000</i>	0.000 <i>0.001</i>	-0.002 <i>0.001</i>
ULC	-0.040 <i>0.041</i>	0.029 <i>0.044</i>	0.004 <i>0.162</i>	-0.020 <i>0.048</i>	-0.134*** <i>0.035</i>	-0.039 <i>0.025</i>	-0.059 <i>0.103</i>	-0.552*** <i>0.064</i>
IRATE	0.130 <i>0.087</i>	-0.058 <i>0.163</i>	-1.410 <i>0.875</i>	0.193** <i>0.089</i>	0.158 <i>0.212</i>	0.112* <i>0.042</i>	-0.318 <i>0.227</i>	-0.245 <i>1.002</i>
PRODUCTS	0.000 <i>0.000</i>	-0.001** <i>0.000</i>	0.001 <i>0.001</i>	-0.001 <i>0.001</i>	0.000 <i>0.001</i>	-0.003 <i>0.003</i>	0.006* <i>0.003</i>	0.002 <i>0.007</i>
DEST_PP	0.160* <i>0.087</i>	0.194** <i>0.078</i>	0.011 <i>0.334</i>	-0.146 <i>0.498</i>	0.285* <i>0.139</i>	0.208 <i>0.513</i>	0.136 <i>0.310</i>	0.777** <i>0.188</i>
INTRA	0.101 <i>0.062</i>	0.008 <i>0.049</i>	0.467*** <i>0.099</i>	-0.175 <i>0.133</i>	-0.045 <i>0.093</i>	-0.032 <i>0.090</i>	0.294 <i>0.159</i>	0.428 <i>0.276</i>
CHINA	0.054 <i>0.233</i>	-0.267 <i>0.213</i>	-0.636 <i>0.679</i>	0.000 <i>0.379</i>	-0.157 <i>0.308</i>	-0.261 <i>0.973</i>	0.017 <i>0.502</i>	-1.788** <i>0.466</i>
EUROZONE	0.696 <i>0.713</i>		3.889 <i>2.319</i>	1.302* <i>0.675</i>	-0.017 <i>0.556</i>	3.898*** <i>0.538</i>	0.632 <i>2.155</i>	0.000 <i>0.000</i>
Observations	784	288	187	309	377	120	191	96
Groups	24	8	6	10	24	24	24	24
Within R <sup>2</sup>	0.205	0.298	0.370	0.371	0.123	0.393	0.080	0.275

Fixed effects: year, declarant. AR(1) lag order Driscoll-Kraay standard errors in italics: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Table 8 Baseline regression: export product extensive margin**

Variable	Overall	Core	South	CEE	Pre-crisis	Collapse	Recovery	Post-recovery
WGDP	-0.096 <i>0.124</i>	0.036 <i>0.225</i>	0.100 <i>0.165</i>	-0.137 <i>0.102</i>	-1.422*** <i>0.443</i>	0.109* <i>0.044</i>	0.277* <i>0.146</i>	0.265 <i>0.238</i>
REER	-0.052 <i>0.044</i>	0.197 <i>0.135</i>	-0.150 <i>0.193</i>	-0.037 <i>0.071</i>	-0.142* <i>0.080</i>	-0.067 <i>0.050</i>	-0.047 <i>0.044</i>	-0.108 <i>0.061</i>
EGDP	0.124** <i>0.049</i>	0.145* <i>0.073</i>	-0.055 <i>0.165</i>	0.077 <i>0.049</i>	0.037 <i>0.099</i>	0.113** <i>0.029</i>	0.048 <i>0.049</i>	0.097 <i>0.063</i>
EGDP_PC	-0.001 <i>0.001</i>	-0.002 <i>0.002</i>	0.004** <i>0.001</i>	0.000 <i>0.003</i>	-0.002 <i>0.002</i>	0.000 <i>0.001</i>	-0.001 <i>0.001</i>	0.001* <i>0.000</i>
ULC	0.046 <i>0.065</i>	0.058 <i>0.213</i>	0.050 <i>0.188</i>	-0.008 <i>0.065</i>	0.026 <i>0.153</i>	-0.026 <i>0.048</i>	-0.013 <i>0.030</i>	0.007 <i>0.131</i>
IRATE	0.359 <i>0.226</i>	-0.486 <i>0.430</i>	0.473 <i>0.945</i>	0.285 <i>0.198</i>	1.250*** <i>0.335</i>	0.163 <i>0.120</i>	-0.158 <i>0.347</i>	-0.211 <i>0.607</i>
PRODUCTS	0.001 <i>0.001</i>	-0.002 <i>0.001</i>	-0.001 <i>0.001</i>	0.005*** <i>0.002</i>	0.008*** <i>0.002</i>	0.003 <i>0.006</i>	-0.003 <i>0.002</i>	-0.008** <i>0.003</i>
DEST_PP	0.225 <i>0.165</i>	0.042 <i>0.293</i>	-0.430* <i>0.239</i>	1.312*** <i>0.357</i>	0.936* <i>0.503</i>	0.258 <i>0.407</i>	0.449 <i>0.240</i>	0.094 <i>0.303</i>
INTRA	0.089 <i>0.071</i>	0.006 <i>0.197</i>	0.086 <i>0.160</i>	0.204* <i>0.112</i>	0.272** <i>0.115</i>	0.109 <i>0.099</i>	0.004 <i>0.102</i>	-0.058 <i>0.115</i>

Variable	Overall	Core	South	CEE	Pre-crisis	Collapse	Recovery	Post-recovery
CHINA	-0.239 <i>0.365</i>	-0.015 <i>0.705</i>	-0.927 <i>0.660</i>	-0.361 <i>0.661</i>	-0.053 <i>1.309</i>	-1.236 <i>1.161</i>	-0.926** <i>0.359</i>	-0.501 <i>0.624</i>
EUROZONE	-0.095 <i>0.991</i>		-1.151 <i>4.092</i>	2.943*** <i>0.829</i>	0.189 <i>2.445</i>	0.434 <i>0.656</i>	-0.447 <i>1.363</i>	0.000 <i>0.000</i>
Observations	784	288	187	309	377	120	191	96
Groups	24	8	6	10	24	24	24	24
Within R <sup>2</sup>	0.265	0.474	0.217	0.332	0.391	0.095	0.103	0.118

*Fixed effects: year, declarant. AR(1) lag order Driscoll-Kraay standard errors in italics: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1*

The other demand side variable is the real effective exchange rate. As expected, the estimated effects are negative. An average real depreciation of the currency by one per cent increases export growth by 0.29 percentage points. For Core and South EU the coefficients are even larger at 1.35 and 1.22 respectively. In all cases REER affects exports only through the intensive margin. Even though REER is important in general, there are differences across time. Coefficients are not significant during the collapse and recovery phase, hence they do not seem to matter much at that time. By contrast, the impact is negative again during the post-recovery phase.

Although we confirm that demand effects played a crucial role in the European export dynamics during and after the crisis, also supply side effects are important. On the supply side the most important factors are the real unit labour cost and the exporters' GDP. On the one hand, a one per cent increase in real unit labour costs (ULC) decreases export growth on average by 0.35 percentage points. Clearly, higher labour costs increase production costs, which hampers exports. Separate regressions again show a higher coefficient in the collapse phase and immediately afterwards, especially for CEE and South EU. As labour costs matter in particular for the competitiveness of labour intensive activities, it is not surprising that the more labour abundant EU countries are severely injured by increasing labour costs during and after the global economic downturn. Similar to the demand side, total export growth is affected mostly through the intensive margin, but during the post-recovery phase also partially through the destination extensive margin. On the other hand, the general economic climate is positively correlated with export growth. A one per cent growth in the exporter's GDP (EGDP) on average corresponds to 0.40 per cent growth of exports. Similarly to unit labour costs, the exporter's GDP starts to matter from the crisis period onwards and it affects mainly the intensive margin, although also the product extensive margin is positively affected in general. However, faster growing exporters were able to increase their destination extensive margin, as well as their product extensive margin, during the collapse. Hence domestic economic growth appears to enable exporters to increase the number of products and destination markets during the global crisis.

The exporter's GDP per capita, which captures differences in the exporters' general economic development, plays no role for export growth on average. However, there is some limited evidence suggesting that it acts as a smoothing mechanism on the intensive margin. Countries with a high GDP per capita experienced a lower export growth in the pre-crisis and recovery phase. But when growth was declining, that is during the collapse and post-recovery periods, a higher GDP per capita leads to higher export growth. This actually confirms the popular argument that the richer countries suffered less the crisis.

The model includes also one financial variable, namely the short-term interest rate for non-financial corporations that reflects trade credit conditions. Often the coefficient for IRATE is significantly positive, suggesting that higher interest rates are on average correlated with



higher export growth. Hence we find no evidence for a negative country-level effect of access to and costs of trade finance. A similar counterintuitive result for trade credit was obtained by Levchenko et al. (2010) as well, who find that US imports fell less in sectors that are dominated by countries with larger credit crunches.

Finally, we look at the four explanatory variables about geographical orientation and product composition. They are all insignificant during the collapse and recovery for all four response variables<sup>7</sup>. Hence there is no evidence that country level diversification of products or destinations had any impact on the export growth during and right after the crisis. By contrast, in the post-recovery phase there are significant results for the intensive margin for the number of destinations, the share of intra-EU exports (both negative) and the share of exports to China (positive). Hence the export growth during the post-recovery phase is stimulated by a stronger focus on emerging markets rather than on the EU market or many other markets. However, the extensive margins show opposite signs and the overall effect on export growth is zero. For example: higher CHINA is correlated with higher intensive margin ( $\beta=2.11$ ), but with lower destination *em* ( $\beta=-1.79$ ). The opposite holds for the share of intra-EU trade, meaning that countries with a lot of intra-EU trade are exporting less on the existing markets, but on the other hand, they are finding new destinations for their existing products.

The last variable in the model is the Eurozone dummy. It seems to have positive impact on export growth through the destination margin during the collapse (3.90 percentage points higher growth for Eurozone countries), and through the intensive margin during recovery period (14.9 percentage points higher for Eurozone countries). In other cases there is no significant impact either way. Hence Eurozone exporters withstood the crisis better than non-Eurozone exporters, mainly thanks to growth in the destination extensive margin during the crisis (an increase in the number of destinations for their exported products) as well as thanks to growth in the intensive margin during the recovery (an increase value of trade in existing products to existing markets).

## 6. Discussion and Conclusions

In this paper we study the export dynamics of the EU countries from 2003q1 until 2013q1. We observe some differences in the trend of products, destinations and total value of exports across the European Union. From a long-term perspective, the crisis had an impact only on the export intensity, and almost no impact on the number of products traded or the number of export destinations. We also show that there is substantial cross-country heterogeneity between EU countries as well as before, during and after the crisis.

To investigate the short-term changes in export growth we use Bernard et al. (2009) decomposition. We use quarterly data, because the collapse and recovery occur rather quickly. Hence annual data would not capture the events in all magnitude. To avoid seasonality effects we always take the yearly change by comparing to the corresponding quarter of the previous year. The obtained margins show that during the collapse, most of the changes were on the intensive margin. But since 2010 the export intensity is no longer changing, and all the export growth comes from the extensive margin, most of it through new destinations for existing products.

---

<sup>7</sup> Except on one occasions when CHINA coefficient is negative, what opposite to our expectations.

Next, we used a panel regression for all three margins to find key covariates. Summarizing, these are the main conclusions as to the determinants of export growth during and immediately after the crisis. First, during the trade collapse and recovery afterwards export growth is strongly affected by the destination market's GDP. Hence demand matters a lot. Demand from foreign markets increases in particular the intensive margin, hence the value of existing trade. Hence European exporters who are strongly focused on the EU market hamper their export growth opportunities, although that seems to be a long-run effect that did not play a particular role during the crisis period. Secondly, the exporter's home GDP growth increases exports too pointing to important supply side effects apart from a clear demand side effect. Thirdly, high unit labour costs deteriorate international competitiveness. In particular they reduce growth in the export intensive margin during and right after the crisis. Finally, Eurozone membership appears to protect exporters during and after the crisis. We find no evidence for trade credit, exchange rates, geographical orientation or product composition as determinants of export dynamics during this phase.

In the post-recovery phase the determinants of export growth are slightly different. Export's home GDP and unit labour costs are the main determinants, while export demand is not significant anymore. In this phase the geographical variables on average have no effect on total growth, but have an opposite effect on the intensive and extensive margin, which suggests that there is some geographical re-orientation towards non-EU markets. For example countries with a high share of intra-EU trade have a lower intensive margin and higher destination extensive margin. Eurozone exporters are no longer sheltered from the crisis, mainly due to the European sovereign debt crisis that followed the global crisis.

## References

- Amiti, M., Weinstein, D. E, 2011. Exports and Financial Shocks. *The Quarterly Journal of Economics*, 126(4), pp.1841-1877.
- Anderton, R. , Tewolde, T., 2011. The Global Financial Crisis: Understanding the Global Trade Downturn and Recovery<sup>1</sup>. *The World Economy*, 34(5), pp.741--763.
- Behrens, K., Corcos, G. , Mion, G., 2013. Trade Crisis? What Trade Crisis?. *The Review of Economics and Statistics*, 95(2), pp.702-709.
- Békés, G., Halpern, L., Koren, M. , Muraközy, B., 2011. Still standing: how European firms weathered the crisis - The third EFIGE policy report, Bruegel.
- Bems, R., Johnson, R. C. , Yi, K.-M., 2012. The Great Trade Collapse. NBER Working Paper Series, Working Paper No. 18632.
- Berger, H. , Nitsch, V. 2014. Wearing corset, losing shape: The euros effect on trade imbalances. *Journal of Policy Modeling*, 36(1), pp.136 - 155.
- Bernard, A. B., Jensen, J. B., Redding, S. J. , Schott, P. K. 2009. The Margins of U.S. Trade Long Version. NBER Working Paper Series, Working Paper No. 14662
- Bricongne, J.-C., Fontagné, L., Gaulier, G., Taglioni, D. , Vicard, V., 2012. Firms and the global crisis: French exports in the turmoil. *Journal of International Economics*, 87(1), pp.134-146.
- Bruno, G. S. F., 2005. Estimation and inference in dynamic unbalanced panel-data models with a small number of individuals. *Stata Journal*, 5(4), pp.473-500.

- Chen, R., Milesi-Ferretti, G. M. , Tressel, T. 2013. External imbalances in the eurozone. *Economic Policy*, 28(73), pp.101-142.
- Chor, D. , Manova, K., 2012. Off the cliff and back? Credit conditions and international trade during the global financial crisis. *Journal of International Economics*, 87(1), pp.117-133.
- Eaton, J., Kortum, S., Neiman, B. , Romalis, J., 2011. Trade and the Global Recession. NBER Working Paper Series, Working Paper No. 16666.
- Freund, C., 2009. The trade response to global downturns: historical evidence. The World Bank, Working Paper No. 5015.
- Grauwe, P. D. , Ji, Y., 2013. Self-fulfilling crises in the Eurozone: An empirical test. *Journal of International Money and Finance*, 34(0), pp.15 - 36.
- Haddad, M., Harrison, A. , Hausman, C., 2010. Decomposing the Great Trade Collapse: Products, Prices, and Quantities in the 2008-2009 Crisis. NBER Working Paper Series, Working Paper No. 16253.
- Hoechle, D., 2007. Robust standard errors for panel regressions with cross-sectional dependence. *Stata Journal*, 7(3), pp.281-312.
- Lane, P. R., 2012. The European Sovereign Debt Crisis. *Journal of Economic Perspectives*, 26(3), pp.49-68.
- Levchenko, A. A., Lewis, L. T. , Tesar, L. L., 2010. The Collapse of International Trade During the 2008-2009 Crisis: In Search of the Smoking Gun. NBER Working Paper Series, Working Paper No. 16006.
- Ordóñez, J., Sala, H. , Silva, J. I., 2015. Real unit labour costs in Eurozone countries: drivers and clusters. *IZA Journal of European Labor Studies*, 4(1), pp.1--19.
- Sarafidis, V. , Robertson, D., 2009. On the impact of error cross-sectional dependence in short dynamic panel estimation. *Econometrics Journal*, 12(1), pp.62-81.
- Studnicka, Z. , Van Hove, J., 2015. Export Survival and Economic Growth: Evidence from European Exports in Times of Crisis. KU Leuven, *mimeo*.
- Van Beveren, I., Bernard, A. B. , Vandenbussche, H., 2012. ConCORDING EU Trade and Production Data over Time. CEPR Discussion Paper Series, No.9254.