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Imbalances in the EMU
A Global Value Chain Analysis**

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Growth patterns and trade imbalances in the EMU - A global value chain analysis

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Abstract

This paper assesses whether or to what extent the macroeconomic imbalances, which emerged in the ‘North’ and ‘South’ of the European Monetary Union before the financial and economic crisis of 2008/09, are symmetric. First, we show that the imbalances stemmed from different growth patterns and quantify the contributions of foreign and domestic demand to GDP growth in the EMU countries. Second, we calculate bilateral exports and imports between all EU member states, applying the concept of ‘trade in value added’, and discuss their role in the emergence of trade surpluses and deficits. Third, we quantify to what extent an increase in domestic demand in the North and a decrease in the South would support the elimination of these imbalances. Finally, we calculate a hypothetical scenario in which final demand expands to such extent that all intra-EMU trade is balanced. We thereby evaluate whether or to what extent the macroeconomic imbalances can be eliminated by demand adjustments in the EMU countries.

Keywords: European Monetary Union, macroeconomic imbalances, global value chains, input-output analysis

JEL Codes: C67, E60, F14, F15

1 Introduction

Macroeconomic imbalances are at the heart of the crisis in the European Monetary Union (EMU). Before 2008, EMU member states embarked on different growth paths: Germany and other countries in the ‘North’¹ featured strong exports and weak domestic demand, and consequently accumulated large current account surpluses. By contrast, the economies in the ‘South’ were characterised by weaker exports and a boom in domestic demand, and built up high external deficits. These developments were not sustainable and made the latter highly vulnerable during the financial and economic crisis. They are also a major cause for the subsequent sluggish and uneven recovery in the EMU, as well as for the crisis of public finances and the financial sector in many Southern European economies.

At the root of these developments were large inflation differentials between EMU member states, which accumulated into substantial shifts in relative price competitiveness. In Northern Europe, and particularly in Germany, inflation was constantly below the ECB’s target, whereas in the South it continuously exceeded it. The large price divergences did not only lead to shifts in relative competitiveness between the member states, but also vis-à-vis countries outside the EMU. For the low-inflation countries in the North, the Euro exchange rate was weaker than it would have been in the case of country-specific currencies, and vice versa in the South. This stimulated exports in the North and held them back in the South. Since the ECB sets interest rates in accordance with the overall inflation rate in the Euro area, its monetary policy further reinforced these differentials. Real interest rates for the North were too high and weakened domestic demand. In Southern Europe (and in Ireland) real interest rates were low and led to a debt-driven consumption and investment boom. Whereas the single monetary policy supported the emergence of macroeconomic imbalances, no European institution was in the position to bring countries’ inflation rates back to the common target (Ederer and Reschenhofer (2013)).

The emergence of the macroeconomic imbalances was symmetric. Large current account surpluses in the North were accompanied by huge deficits in

¹Throughout this paper, we use the labels ‘North’ and ‘South’ as well as ‘Northern’ and ‘Southern’ Europe as synonyms for current-account surplus and deficit countries, regardless of their geographical position. See Section 2 for further discussion.

the South. On the face of it, these imbalances stemmed from bilateral trade between the two country groups. This however is not necessarily the case. Surpluses and deficits can possibly also arise from trade with third countries. Whether or not the surpluses and deficits correspond to each other has major implications for economic policies. If the North benefited before the crisis from booming demand in the South, but contributed little or nothing to growth in the latter, it would need to strengthen its domestic expenditures in order to eliminate imbalances. If surpluses and deficits on the other hand mainly exist with China and other emerging economies, the South would benefit very little from expanding domestic demand in the North.

Our paper aims at clarifying this question. First, we show how much GDP growth in the North benefited from demand in the South and vice versa. We quantify the contribution of both foreign and domestic final demand to GDP growth by means of an input-output analysis (see below). Second, we calculate bilateral trade balances in value added, and discuss whether and to what extent the surpluses of the North coincide with the deficits of the South. Our findings broadly support the hypothesis that before the crisis, GDP growth in the North was to a large extent driven by domestic demand in the South, whereas the former contributed little to GDP growth in the latter. The emerging imbalances were therefore at least partly symmetric.

Third, we assess whether and to what extent an increase in domestic demand in the North would support the elimination of these imbalances. We simulate different adjustment scenarios and calculate their impact on trade balances. We find that an increase in domestic demand in the North would have a small impact on growth and trade deficits in the South. Eliminating deficits through a sole reduction in domestic demand in the South however would lead to a drastic decline in GDP in those countries. We thus calculated a third (hypothetical) scenario in which domestic demand in both the North and the South increases or decreases to the extent that the all trade balances would be eliminated. Thus, we aim at assessing how much of the imbalances are due to asymmetric growth patterns, and to what extent they are rather ‘structural’, in the sense that they cannot be remedied by shifts in demand alone.

The increasing international fragmentation of production has become ever more important over the last three decades (Baldwin (2012)). Recently, global input-output tables have become available and allow for a better un-

derstanding of the implications of trade and production linkages between countries. A series of papers based on the newly established World Input-Output database (WIOD) deals with a broad range of different aspects of ‘globalisation’.² To our knowledge however there are no studies which use this database to analyse the emergence of macroeconomic imbalances in the EMU. Yet, without taking into account the link between trade and production in and between the European economies, any analysis of the problem of macroeconomic imbalances is rather limited. Our paper intends to close this gap. We will discuss the aforementioned questions by applying the concept of ‘value added trade balances’. In this concept, the value which was added by ‘third’ countries (other than the two trading partners) is eliminated from exports and imports. It allows to calculate the bilateral trade flows between two economies without any distortions from the increasing fragmentation of global value chains, and consequently also to evaluate their impact on each countries’ GDP. Using WIOD data makes it possible to trace back the effect of changes in demand in a certain country on trade and output in all other European economies.

The rest of the paper starts with a section on data and methodology. In particular we describe the World Input-Output Database and explain the concept of value added trade balances (Section 2). Section 3 calculates the contributions of domestic demand both from inside and outside the EMU to GDP growth before the crisis. Section 4 calculates the bilateral trade balances within the EMU. Section 5 discusses how the bilateral trade balances would change as a consequence of increases or decreases in foreign and domestic demand in EMU member states. Finally, section 6 concludes.

2 Data and Methodology

All calculations in this paper are based on data from the World Input-Output Database (WIOD). The core of the WIOD consists of a time series of world input-output tables from 1995 to 2011, which have been constructed on the basis of national input-output tables and bilateral trade statistics. It distinguishes between 35 industries and 59 product groups and covers 40 coun-

²See for instance Baldwin and Lopez-Gonzalez (2013), Foster-McGregor and Stehrer (2013) and Timmer et al. (2013). For an overview of the research based on WIOD data see www.wiod.org.

tries, including all 27 EU countries and other major industrial and emerging economies. In total it covers more than 85 percent of world GDP. The world input-output tables are supplemented by data on different final demand categories and on value added for each country and industry.³

Gross trade flows measure the total value of products traversing the borders between countries. They contain the value added during all previous stages of production. Globalisation led to a surge in both gross exports and imports from the 1990s onwards, which is the consequence of the increasing fragmentation of global value chains and a growing intra-industry trade (Baldwin (2012)). Exports typically entail imports of intermediate goods. Imports of final goods on the other hand are largely determined by final demand. If we want to assess the export and import developments in relation to the emergence of macroeconomic imbalances, the concepts of gross trade is therefore misleading.

What is more, bilateral gross trade flows do not correctly picture the linkages between production in a country and its trade relations with other countries. A country for instance can export more to another country than it imports from it, and consequently have a bilateral trade surplus. Nevertheless, the exported products usually include value added from third countries. A bilateral surplus consequently does not say anything about the positive or negative effect of trade relations with a specific country on the domestic economy. We therefore calculate all export and import flows as well as trade balances on the basis of the concept called ‘trade in value added’ (TiVA, see Stehrer (2012)), which accounts for the value added of one country directly and indirectly contained in final demand expenditures of another (see below).

Measuring trade flows in value added is based on the input-output approach (Leontief (1936)). The well-known fundamental equation of this approach is

$$x = Ax + f = Lf \tag{1}$$

with x denoting a $CG \times 1$ vector of gross output (C being the number of countries and G the number of products), A is a $CG \times CG$ matrix of input-output coefficients, and f denotes the $CG \times 1$ vector of final demand. $L = (I - A)^{-1}$ is the Leontief inverse, with I denoting the identity matrix.

³See Timmer (2012) for a detailed description of the World Input-Output Database.

Exports (in value added) of a country r represent the value added created in the domestic economy by foreign final demand. They can be expressed as $t_{\text{TiVA},X}^r = v^r \cdot Lf^{-r}$, where v^r is a value added coefficient vector with zeros for all countries but country r . f^{-r} denotes the consumption vector of all countries but r . $t_{\text{TiVA},M}^r = v^{-r} \cdot Lf^r$ denotes value added imports. They represent the value added created in foreign countries by the final demand of country r . The difference between imports and exports results in the net trade in value added:

$$t_{\text{TiVA},\text{Net}}^r = t_{\text{TiVA},X}^r - t_{\text{TiVA},M}^r \quad (2)$$

The same concept can be applied to bilateral trade relations. The only difference is that in the case of exports, the final demand vector includes only data for the particular trading partner and zeros for the rest of the countries. For bilateral imports, the value added coefficient vector is zero except for the partner country. A country's overall trade surplus or deficit in value added is equal to net trade measured in gross terms. However, this identity is not valid for bilateral trade relations. A country might import a large amount of intermediate products from another country, to which the latter has added little value.⁴

To simplify the analysis, we usually aggregate countries into groups. The first group (G1) is named 'Northern Europe'. It includes Germany and its immediate neighbours Austria and Netherlands. In group two ('Western Europe', G2) we find countries such as France and Belgium which exhibit positive albeit substantially decreasing current account balances over the period. The third group mainly corresponds to the countries usually termed 'Southern Europe' (G3). The fourth group ('Other EU') broadly reflects 'Eastern Europe' (and the UK). The classification into country groups follows certain criteria which are discussed in the A.2. Throughout the paper, we use the geographical labels instead of referring to group numbers, even if those labels do not exactly correspond to the geographical position of the countries.

In the following sections our analysis is focused on seven European countries: Austria, France, Germany, Greece, Italy, Spain, Portugal. Austria and

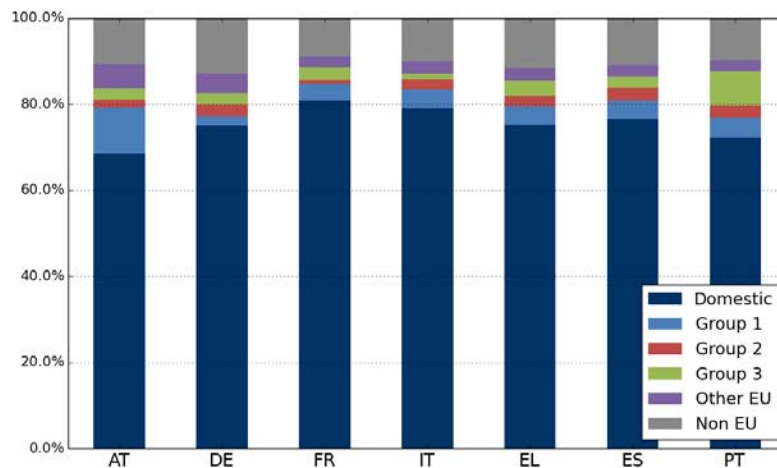
⁴See Stehrer (2012) for a detailed discussion of the accounting relations of aggregate and bilateral trade in value added.

Germany are representatives of G1 (‘Northern Europe’), France and Italy of G2 (‘Western Europe’) and Greece, Spain, Portugal of G3 (‘Southern Europe’). We focus on the imbalances in the EMU.

3 Growth patterns

The question whether or to what extent Germany and other Northern European countries benefited from demand in the South and vice versa, has been hotly debated among economists and politicians alike. In this section, we quantify the contributions of domestic demand inside and outside the EMU to GDP growth between 2000 and 2007.

Figure 1: Regional decomposition of value added induced by domestic demand in EMU countries, 2007



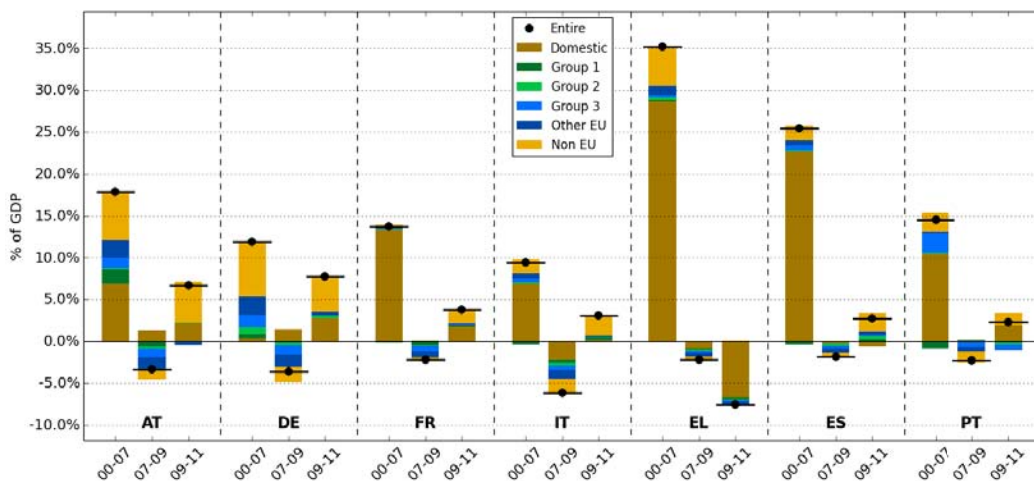
Data Source: WIOD, own calculations. The numbers indicate the share of value added in a certain region in the total value added induced by domestic demand in particular EMU countries.

Breaking up its effects, we find that despite increasing globalisation the lion’s share of GDP created by domestic demand still remains within the same country, a fact which is true for all European economies (Figure 1). Even in Germany, which - given its size - is a relatively open economy, of 100 Euro value added created by domestic demand, more than 70 Euro remain inside the domestic economy. In France, Italy and Spain the domestic share of GDP generated by domestic demand amounts to 80 percent. Even in

smaller economies like Austria, Greece and Portugal the domestic share varies between 70 and 80 percent.

These numbers represent the shares of value added in *a certain year* (in the above case in 2007). However, if we look into the sources of economic *growth*, a different picture emerges (Figure 2). In Germany, almost the *entire* value added growth between 2000 and 2007 was driven by foreign demand. Of the 12 percent by which GDP increased cumulatively, domestic final demand contributed less than half percent. The rest was induced by demand from other EU member states, primarily in Eastern Europe and countries outside the EU. The largest contributor inside the EMU were the economies of the South.

Figure 2: Sources of GDP growth



Data Source: WIOD, own calculations. Contributions of final demand inside and outside the EMU to cumulative GDP growth in particular EMU countries.

By contrast, Western and Southern Europe followed a completely different pattern. In France, Greece, Italy, Portugal and Spain, domestic demand induced between three thirds and almost the entire amount of GDP growth. The remaining part was more or less equally split between the countries inside and outside the EU. Final demand from the North contributed nothing or even negatively to the expansion of GDP in the South. In Austria, roughly one third of output growth was each driven by domestic demand, the EU member states and countries outside the EU.

In absolute terms, the difference between the increase in GDP as a conse-

quence of expanding domestic demand in Germany (7 Billion Euros, in prices of 2000) and France, Italy and Spain (170, 130 and 75 Billion, respectively) is striking. Even in such small economies as Austria, Greece and Portugal, domestic demand contributed more to GDP growth in absolute numbers than in Germany, the largest country in the EMU.

Since the crisis, these patterns changed considerably. In Germany, demand from the other EMU countries faltered whereas domestic demand contributed more than a third of GDP growth. The major part of German GDP growth however was driven by demand from outside the EU. In the South, domestic demand contributed only marginally (or even negatively) to GDP growth. The North however continued to contribute very little.

To summarise, our findings confirm the hypothesis that the North, and in particular Germany, benefited enormously from the rapidly expanding economies in the West and South before the crisis. Even if the *share* of German domestic production that satisfies foreign final demand is low, the economic *dynamic* in this period stemmed mostly from abroad. In Western and Southern Europe on the contrary, growth was mainly driven by domestic demand.

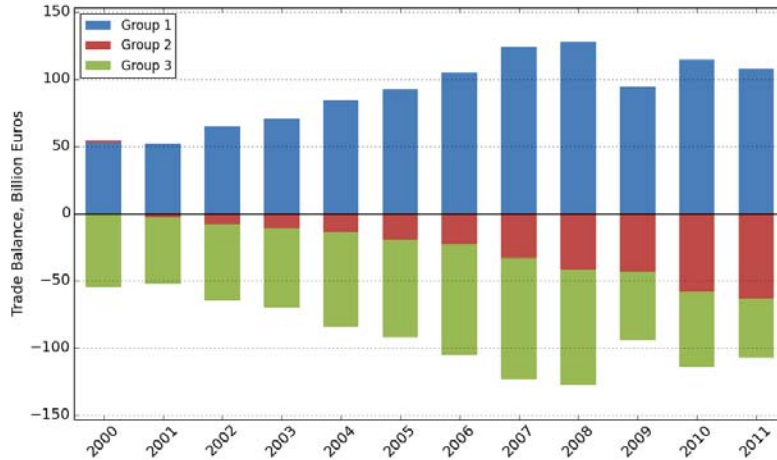
4 Bilateral Trade

We now look into the trade imbalances which emerged before the crisis as a consequence of these different growth patterns. We particularly ask whether and to what extent the surpluses in the North correspond with the deficits of the South. For this purpose, we calculate bilateral exports and imports, and the resulting trade balances.

On the face of it, surpluses and deficits emerged symmetrically in the EMU. In 2007, current account surpluses of roughly 130 Billion Euro faced current account deficits of a total of 120 Billion Euro (Figure 3). The imbalances were particularly large in Northern and Southern Europe. This suggests that the surpluses of the North coincided with the deficits of the South. It is however possible that these imbalances stemmed (at least partly) from trade with countries outside the EMU. A surplus of, say Germany with China could go along with a deficit of Spain with Latin America.

In order to analyse the ‘true’ correspondence of surpluses and deficits,

Figure 3: Current Account, 2000-2011



Data Source: WIOD and own calculations

we calculate bilateral trade balances⁵ for the EMU member states, applying the concept of ‘trade in value added’ (see section 2). This concept deducts the value which was added by ‘third’ countries (other than the two trading partners) from exports and imports. The value added trade balances are the difference between the (domestic) value added created by foreign demand and the (foreign) value added created by domestic demand. The bilateral trade balances may therefore differ from bilateral gross trade balances. The overall trade balance of a country is nevertheless the same, regardless of whether the concept of gross trade or of trade in value added is applied (Stehrer (2012)).

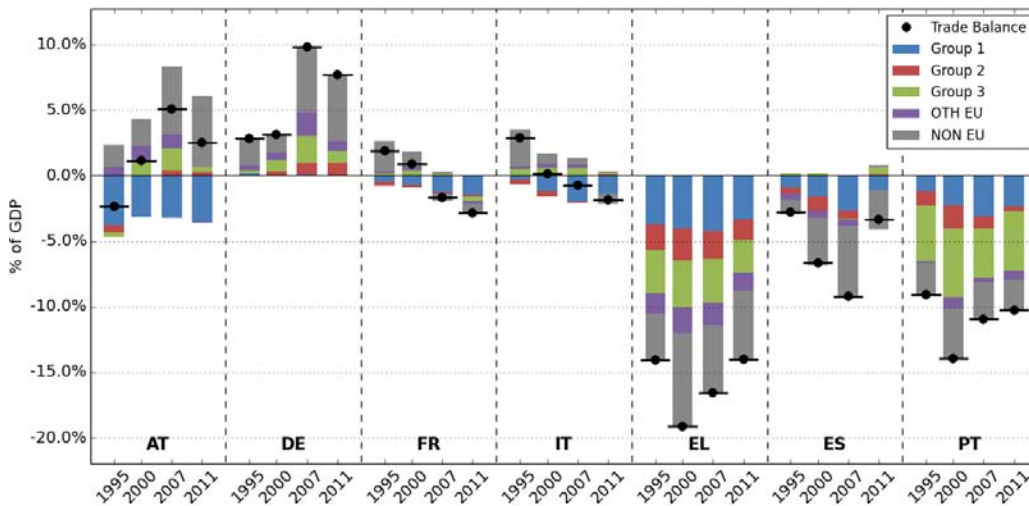
Between 1995 and 2000, all countries under consideration increased their exports to and imports from countries outside the EU (Figure 4 and 5). These developments reflect the intensification of global integration from the 1990s onwards, which has been characterised by higher vertical specialisation, the splitting-up of (global) value chains, and an increase in inter-industry trade.⁶ The benefits of globalisation however were distributed unevenly across countries. In the Northern European countries such as Austria and Germany, Non-EU trade balances remained broadly stable. In Western and Southern

⁵The trade balances include trade in goods as well as in services. Since they are based on the World Input-Output Database (WIOD), the numbers deviate from official trade statistics.

⁶Sometimes these developments are called the ‘second unbundling’, see Baldwin (2012).

Europe they decreased, albeit marginally. Within Europe, we observe a similar pattern of ever closer integration. The trade balances with EU countries improved in the North, stagnated in the West and deteriorated in the South. Exports to the EU strongly increased in Austria and Germany, but lagged behind in the West and South of Europe. In Greece and Italy, they even stagnated, and in Portugal they declined. This picture reflects the fact that the deterioration of trade balances in the West and South started as early as in the 1990s.

Figure 4: Trade in Value Added (95, 00, 07, 11)



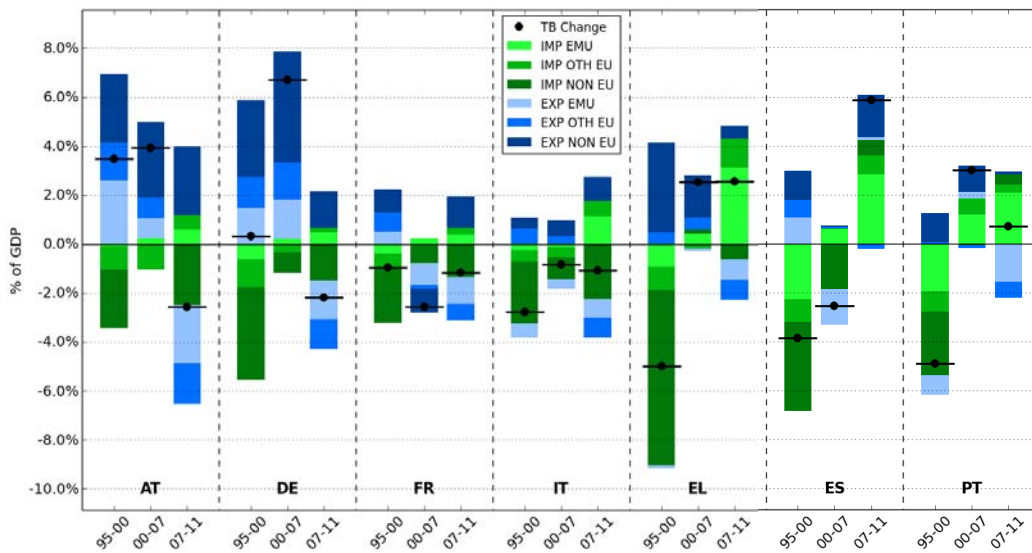
Data Source: WIOD and own calculations

After the establishment of the EMU, in some countries the patterns changed to a certain extent. In Germany, the overall trade balance increased substantially between 2000 and 2007. Exports (as percent of GDP) continued to increase strongly both with other EU countries and with the rest of the world. Within the EMU, exports to all countries contributed strongly, particularly to the South. Imports and thus foreign value added which was created by German final demand increased only marginally, both with EU countries and with countries outside the EU, and even decreased with the West and the South. Trade with the EU and with the rest of the world both accounted for half of the increase in the total surplus. The change in the balance with the South contributed one fifth of the overall increase. In 2007, the

balance with other EU countries contributed one half to the overall German trade surplus. Almost one third was accounted for by Southern European countries. Germany exhibited a substantial surplus with France, Italy, and Spain. With the North, trade was more or less balanced.

A pattern similar to Germany can be observed in Austria. The trade balance improved substantially between 2000 and 2007, three quarters of which were accounted for by trade with extra-EU countries. At the end of that period, trade with countries outside the EU amounted to 5 percent of GDP. Trade within the EU was balanced. An Austrian peculiarity is the large deficit with the North, and particularly with Germany, which remained broadly constant over time. The balances with the West and South however increased strongly and amounted to 3 percent in 2007.

Figure 5: Trade in Value Added (95-00, 00-07, 07-11)



Data Source: WIOD and own calculations

France and Italy suffered a continuation of the deterioration of their trade balances between 2000 and 2007, and in particular with the North and the countries outside the EU. In France, these changes mainly stemmed from declining exports to both EU and extra-EU countries. At the end of that period, France exhibited a substantial deficit with the North, whereas trade with the other country groups inside and outside the EU was rather balanced.

In Italy, the trade balance deteriorated only slightly, mostly due to increasing imports from outside the EU, and particularly from the North. Exports to non-EU countries on the other hand increased moderately. In 2007, the trade balance with the North amounted to almost 2 percent of GDP.

Greece, Portugal and Spain had experienced substantial declines in their (already negative) trade balances as early as from 1995 onwards (see above). In 2000, Greece and Portugal exhibited deficits of almost 20 and 15 percent, respectively. Between 2000 and 2007 however they decreased, albeit only to a certain extent. Exports to non-EU countries increased in both economies. In Portugal, a reduction of imports from the EMU also played a (minor) role. Nevertheless, trade balances exhibited a substantial deficit in 2007, the major part of which was with the EMU. In Spain, the trade balance on the other hand continued to decline between 2000 and 2007, mainly due to declining exports to the EMU and increasing imports from the rest of the world. Extra-EU trade contributed two thirds to the Spanish deficits at the end of that period.

To summarise, the exports of the Northern European economies increased strongly between 2000 and 2007, both to the EMU and to the rest of the world. Imports on the opposite rose only marginally, with the result of ever larger trade surpluses. Exports of Western and Southern European countries into the EMU on the other hand fell (France, Spain) or stagnated between 2000 and 2007. Those to the rest of the world increased marginally (Greece, Portugal) or stagnated. Only in Spain, rising imports (from outside the EU) on the other hand contributed substantially to the deterioration of trade balances. At the end of the period, all countries exhibited deficits. Trade with the North accounted for a deficit of between 2 and 5 percent of GDP. Greece, Spain and Portugal had also substantial deficits with the rest of the world, whereas extra-EU trade was rather balanced in France and Italy.

After the financial and economic crisis, between 2007 and 2011, imbalances were partly corrected. The Austrian and German trade surplus in percent of GDP decreased by roughly 2 points. Exports into the EMU declined strongly as a consequence of falling demand, particularly from Southern Europe, and accounted for the major part of the reduction. Imports from the EMU however also declined, albeit only marginally; the North contributed to the crisis of the South by importing less from these countries. With the rest of the world, the process of integration continued, and both exports

and imports increased. This is due to the fact that the emerging economies overcame the crisis quickly, and exhibited strong economic growth. At the end of that period, the trade surplus with the West and the South had been reduced significantly. Austria and Germany nevertheless exhibited large surpluses with the rest of the world in 2011.

In France and Italy, trade exhibited a similar pattern of change between 2007 and 2011. Exports into the EMU (and particularly into the South) and imports from the EMU declined; with the rest of the world they both increased. As opposite to the North, in France and Italy the overall trade balance however continued to decline. In 2011, both the trade balance with the EU and with the rest of the world was negative, with the North contributing the largest part to the deficit.

In the Southern European countries, the trade balances improved substantially during that period. Imports from the EMU decreased in all countries, an immediate consequence of falling domestic demand in the South. Exports to the EMU however also decreased in Greece and Portugal, and stagnated in Spain. Trade with the world outside the EU contributed perceptibly to the improvement of trade balances only in Spain, where exports increased. In Portugal and Greece, extra-EU balances remained unchanged. In 2011, Greece and Portugal still exhibited large trade deficits; those with the North still amounted to 4 and 3 percent of GDP, respectively. The Spanish trade balance with the EMU however was close to zero. All in all, imbalances within the EMU were reduced to a certain extent after the crisis, mainly because of falling demand from the Southern European countries. The surpluses and deficits with the rest of world persisted. In Greece and Portugal, large deficits with the EMU continued to exist.

The developments shed some light on the causes of macroeconomic imbalances, as well as on the adjustment process so far. The shifts in relative prices within the EMU, strong demand developments in the South, and an ever improving competitiveness position vis-à-vis the rest of the world all have boosted exports in the North. Final demand and imports in these countries on the other hand contributed almost nothing to economic growth in the EMU. In the West and South, a deteriorating competitiveness position both within the EMU and with the rest of the world, as well as the demand boom in Spain caused large and increasing deficits.

Adjustment since the crisis has happened so far⁷ through a reduction of exports to the EMU in the North and imports from the EMU in the South, both of which are an immediate consequence of falling domestic demand in the South. EMU imports in the North and consequently EMU exports in the South however declined which partly counteracted the adjustment process and reinforced imbalances. The ‘adjustment burden’ of the current strategy so far has been laid entirely on the South, which negatively affected all countries in the EMU. Increasing exports into extra-EU countries on the other hand stabilised the surpluses of the North and helped to reduce the deficits in the South.

5 Demand Spillovers and Trade Balances

In the previous sections we analysed the role of foreign and domestic demand in the emergence of macroeconomic imbalances. We saw that low domestic demand in the North and buoyant demand in the South contributed considerably to increasing surpluses and deficits before the crisis. We now turn to the question whether or to which extent these imbalances can be reduced by increasing domestic demand in the North, particularly in Germany, or by decreasing demand in the South. The first adjustment strategy is supported by many, particularly outside Germany, including the European Commission and the IMF. According to their line of argument, increasing demand in Germany would raise its imports from the other EU countries. Consequently, the German surplus and the trade deficits in the South would both shrink. So far however, final demand in Germany has increased only marginally after the crisis. The major part of the adjustment seemed to have followed the second strategy: a severe decline in domestic demand in the South led to a significant reduction in trade deficits (see section 4). In this section we assess to which extent domestic demand would need to adjust in order to eliminate the surpluses and deficits, and which effect such an adjustment has on the economies. We firstly assess the aforementioned two adjustment strategies and then calculate a hypothetical scenario in which domestic demand increases or decreases in all EMU economies so as to eliminate all imbalances. We thereby evaluate ex post how growth patterns should have evolved under such a scenario and outline what could be a possible ex ante adjustment

⁷Until 2011, the last year in the WIOD dataset.

strategy.

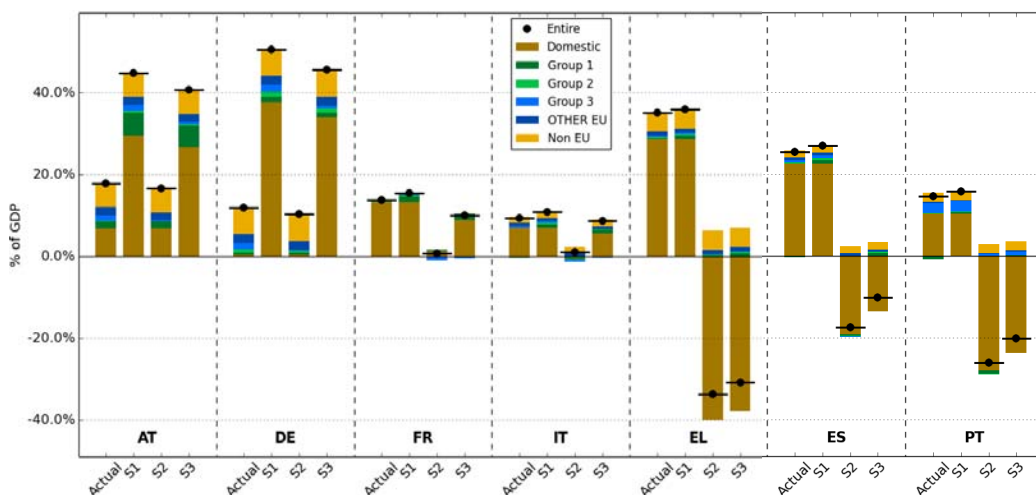
Despite the fact that Germany benefitted substantially from foreign demand and did not contribute much to growth in the rest of the EMU (see section 3), the direct expansionary effect of an increase in German final demand on other European countries would be rather small. As already mentioned, the reason is that even with increasing globalisation, the lion's share of value added created by domestic demand still remains within the same country in all European economies (Figure 1). Even in Germany, which - given its size - is a relatively open economy, of 100 Euro of the value added induced by additional domestic demand, more than 70 Euro would remain inside the domestic economy. Only 5 percent would fall upon the rest of the EMU countries, and 14 percent on the economies outside the EU. Within the EMU, Southern Europe would benefit most, followed by the West. There are minor differences between the categories of final demand: Investment would create the highest value added outside the EU, but also in the other EU countries, because investment expenditures are mostly spent on manufacturing products, which in general have a higher foreign value added content. Increasing government consumption would have the lowest effect on foreign value added, because public consumption usually goes to a large extent into domestic sectors. Likewise, the results differ according to the sector in which demand increases. Spending on products of the agriculture and the manufacturing sector would raise foreign value added most, both inside and outside the EU. The South would benefit particularly from expenditures in the agriculture sector. The demand categories and sectors however differ in size. The biggest category is private household consumption. Raising the expenditures proportionately (by say, 10 percent) in this category would have more than double the effect of increasing investment or government consumption. Likewise, manufacturing is the sector where an increase in German final demand would have the largest effect on other European countries.

In the first scenario, we calculate the effects of an increase in final demand in the surplus countries to such an extent that their trade surplus would be eliminated. In such a scenario, final demand in Germany - by far the largest country in this group - would need to rise by 50 percent with respect to its 2007 level.⁸ As a consequence, the German value added induced by domestic

⁸For the exact growth rates for final demand in all countries under the three scenarios see section A.1 in the Appendix.

demand would increase by 40 percent (see Figure 6). The effect on the other EMU economies however would be rather small. An increase in German final demand by 50 percent as in our scenario would raise GDP in Western and Southern EMU countries by around 1 to 2 percent. If final domestic demand does not only increase in Germany but in all surplus countries in the EMU,⁹ the results would change only marginally. In such a scenario, the trade surpluses of the North would be eliminated by definition. The effect on the balances of deficit countries however would be rather small (see Figure 7). Deficits would be eliminated only in France and Italy whereas substantial deficits remain in Greece, Portugal and Spain.

Figure 6: Growth Scenarios



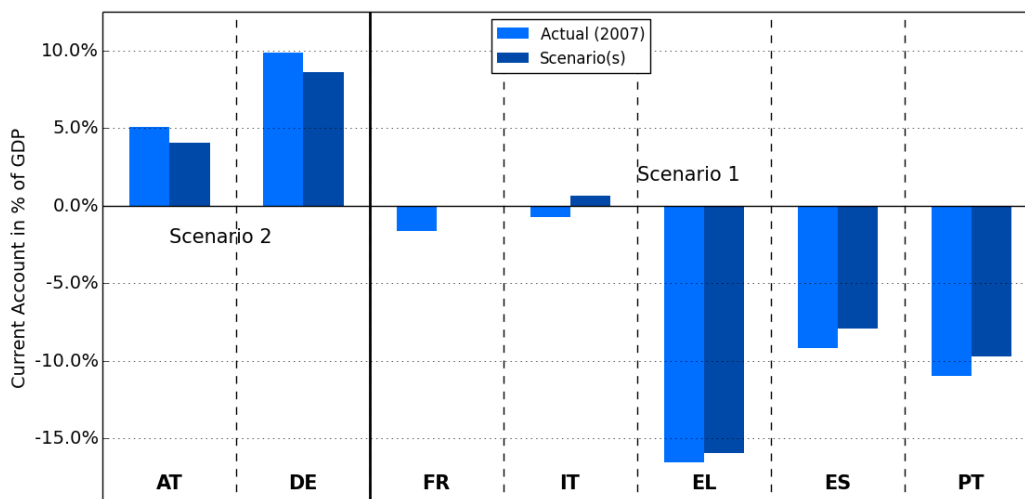
Data Source: WIOD, own calculations.

In a second scenario, we reduced domestic demand in the deficit countries to such an extent that their trade balances would be zero. To achieve such a result, demand would need to shrink by almost 60 percent in Greece, 40 percent in Portugal and Spain, and around 10 percent in France and Italy. This would lead to a decrease in GDP in Germany and Austria by only a few percent. As a consequence, substantial trade surpluses would persist in the North.

⁹The EMU member states which exhibited a trade surplus in 2007 are Austria, Belgium, Germany, Ireland, Luxemburg and the Netherlands.

If we combine the first two scenarios into a third one in which we adjust demand in surplus *and* deficit countries, the results do not change dramatically. Domestic demand still needs to increase e.g. around 45 percent in Germany and decrease around 55 percent in Greece. Given that domestic demand is by far the most important variable determining value added in a country, it is not surprising that in order to eliminate surpluses and deficits, domestic demand has to adjust substantially in all countries.¹⁰

Figure 7: Change in CA, Scenarios 1 and 2



Data Source: WIOD, own calculations.

The results of these scenarios are in accordance with the findings from the previous sections. Whereas an increase in domestic demand in Germany would reduce its surplus, most of the imports would come from the North and the rest of the world. Western and Southern Europe would therefore benefit only marginally. Some of the trade deficits, particularly in Greece and Portugal, but also in France and Italy seem to be ‘structural’, in the sense that they are the result of long-time developments, and are a consequence of their position (and its shifts) within global value chains. To adjust these deficits, the countries consequently need to restructure their economies so as

¹⁰In our scenarios, we eliminate the *overall* trade balance of surplus and deficit countries, which included trade with countries outside the EMU. Thus, small intra-EMU trade imbalances remain.

to increase their shares in global production.

Some limitations have to be made with respect to these results. Throughout this section, we have only calculated the direct effects of an increase or decrease in final consumption of a country on its own trade balance and those of other countries. Because we use the concept of trade in value added, this effect takes into account all the value added directly induced by these demand changes. Both exports and imports reflect the value added generated by foreign and domestic demand. The value added produced by third countries (and thus also the imports of intermediate goods) is by definition excluded from trade balances. Nevertheless, if GDP in a ‘third’ country (e.g. the United Kingdom) rise as a result of increasing German demand, this additional income would induce also additional consumption in this country, and would consequently increase the value added imports from France and others. This effect is not included in the changes in bilateral balances between Germany and France calculated here. The overall effect on trade balances thus is understated in our analysis. As the trade linkages of the South however are small with the countries which directly benefit most from an increase in German demand in the North and East, it is doubtful however that accounting for these indirect effects would substantially change the results of our analysis.

Secondly, we have to take into account an indirect effect on trade balances via wage and price changes. Increasing demand in Germany or other surplus countries would lead to a tightening of their labour markets (given that most of the value added to produce this additional demand remains inside the domestic economy), and would consequently raise wages and prices. The opposite would happen in deficit countries which reduce their domestic demand. These adjustments would result in changes in the relative competitiveness position of countries, and would therefore also contribute to reduce imbalances. Lower price competitiveness in surplus countries would reduce exports and consequently trade surpluses, and vice versa in deficit countries. Since labour and product markets usually do not react immediately, this channel would probably take some time to have an impact.

Thirdly, an adjustment of relative prices inside the EU would lead to a relatively weaker (better) competitiveness position of surplus (deficit) countries towards the rest of the world. The Euro exchange rate with other currencies so far has been deterred by high inflation in Southern Europe. The sur-

plus countries have benefitted from a rather low exchange rate, relative to their strong export performance. The aforementioned adjustment of relative prices would therefore lead to a deterioration of the price competitiveness of the latter vis-à-vis countries outside the EMU. Deficit countries on the other hand would gain competitiveness. These exchange rate adjustments would lead to a reduction of the trade surpluses and deficits which exist with other countries.

6 Conclusion

In this paper, we have investigated the growth patterns and trade linkages within the EMU, and their role in the emergence of macroeconomic imbalances. Our aim was to evaluate to what extent other EMU countries benefited from demand in the North and South, and to what extent this led to the emergence of macroeconomic imbalances in the EMU.

First, we calculated how much domestic demand in the South contributed to GDP growth in the North before the crisis, and vice versa. Our findings confirm the hypothesis that the North benefited substantially from the boom in the South, whereas the former contributed almost nothing to economic growth in the latter.

Second, we calculated bilateral trade balances in the EMU and with the rest of the world. We found that exports of the North increased strongly between 2000 and 2007, both into the EMU and to extra-EMU countries. Exports the West and South in general evolved less favorably, particular into the EMU. These findings support the hypothesis that the increasing price divergence in the EMU stimulated exports in the North and weakened them in the West and South. Imports of the North more or less stagnated, whereas in the South they expanded substantially. As a consequence, the trade balances of the North with the rest of the EMU increased markedly, and vice versa in the South.

Third, we evaluated to what extent the macroeconomic imbalances could be resolved by an increase of demand in the North or a decrease in demand of the South. Our findings indicate that neither strategy alone would eliminate the imbalances completely. A balanced scenario, in which demand increases or decreases in all EMU countries would be necessary to reduce surpluses and

deficits to zero. Some of the deficits however seem 'structural' in the sense that they cannot be eliminated by shifts in domestic demand alone. They apparently have longer-time roots and need to be corrected by policies which aim at improving the countries' positions within the global value chain.

These changes could possibly be brought about by the establishment of new firms and industries, as well as technological change. These processes usually take some time. Furthermore, new investments need support by good public infrastructure and other incentives. During the period of adjustment therefore, deficit countries would need financial means to support their industrial sector so as to reposition themselves in the global value chains. Until then, monetary transfers from surplus to deficit countries would be necessary to support these changes. These transfers would replace the capital exports from the North to the South which mainly financed consumption and construction booms before the crisis. An adequate organisational structure should be put into effect to channel monetary transfers and private capital exports into productive investments instead.

The preceding argument however does not imply that the divergence of unit labour costs, which was at the root of the emergence of macroeconomic imbalances, does not need to be corrected. The reduction of the large gaps in price competitiveness is a precondition for deficit countries to improve their positions within global value chains. Reducing the competitiveness gap between EMU countries would also lead to a better position vis-à-vis non-EMU countries, because the Euro exchange rate would better reflect each country's relative price level. These adjustments would support the development of new industries and the establishment of new enterprises and thus the necessary structural change in these countries.

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A Appendix

A.1 Balanced Current Account

Table A.1: Final demand growth rates under different scenarios

Country	Scenario 1	Scenario 2	Scenario 3
AT	29.44 %	-	25.74 %
BE	27.73 %	-	22.99 %
DE	49.25 %	-	44.31 %
ES	-	-39.75 %	-34.40 %
FI	33.13 %	-	29.64 %
FR	-	-12.87 %	-4.82 %
EL	-	-57.95 %	-56.10 %
IE	37.45 %	-	33.89 %
IT	-	-8.37 %	-1.40 %
LU	101.22 %	-	94.87 %
NL	45.79 %	-	40.72 %
PT	-	-41.89 %	-37.12 %

Data Source: WIOD and own calculations

Notes: Scenario 1 - Adjustment in surplus countries; Scenario 2 - Adjustment in deficit countries;
Scenario 3 - Adjustment in all EMU countries

A.2 Group classification

Most of the analysis is based on a classification of EMU member states into different country groups. Here we briefly explain the motivation and the selection criteria for these groups. We apply three different criteria:

1. **CA:** Current Account (in percent of GDP, accumulated over the period 2000-2007)
2. **CAC:** Changes in Current Account (difference between 2000 and 2007 in percent of GDP)
3. **GDPpC:** GDP per Capita (2000, EU27 = 100%)

The first criterion can be interpreted as a variable which reflects the state of the current accounts. We accumulated it over the whole pre-crisis period so as to avoid that the classification into a particular group depends on a specific year. By doing so, we distinguish countries with a positive current account from those with negative ones. The second criterion can be seen as reflecting macroeconomic developments over the period from 2000 to 2007. This allows us to separate countries with ameliorations and deteriorations in their external balances. The third criterion - GDP per capita - has been introduced to capture the specific characteristics of ‘catching-up countries’. Due to strong economic growth and high investment, these countries usually import more than they export, and finance their catching-up process through foreign direct investment flows. Their current account deficits could therefore be interpreted not as poor macroeconomic developments, but rather as a sign of a catching-up process.

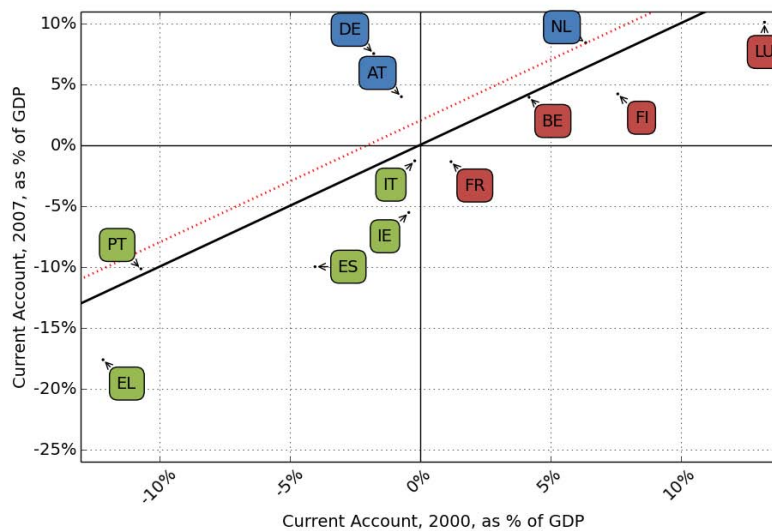
For each criterion we defined a threshold which allows us to split the countries into groups. For the first criterion, the boundary is defined as having a positive or negative accumulated current account. For the second criterion, an increase in the current account balance of 2 percent of GDP has been chosen as threshold; by doing that we capture only countries which improved their current account balance substantially and the classification into groups is less arbitrary. The threshold value for the third criterion is a GDP per capita of less than 80 percent of the EU27 average in the year 2000. The three criteria would theoretically allow eight different groups, but as it turns out, only four country groups emerge:

- **Group 1:** $CA > 0$, $CAC > 2\%$, $GDPpC > 80\%$
Austria, Germany, Netherlands
- **Group 2:** $CA > 0$, $CAC < 2\%$, $GDPpC > 80\%$
Belgium, Finland, France, Luxemburg
- **Group 3:** $CA < 0$, $CAC < 2\%$, $GDPpC > 80\%$
Cyprus, Greece, Spain, Ireland, Italy, Portugal

The first group correspond to what is usually named ‘Northern Europe’. It includes Germany and its immediate neighbours Austria and Netherlands. In the second group we find countries such as France and Belgium which exhibit positive albeit substantially decreasing current account balances over

the period. This group is named ‘Western Europe’. The third group mainly corresponds to the countries usually termed ‘Southern Europe’. Figure A.1 shows the first two criteria for all EU countries and the four country groups.

Figure A.1: Current Account 2000 and 2007, as % of GDP



Data Source: AMECO and own calculations | Notes: Red dotted line indicates the threshold for the CAC criterium.