



A global value chain analysis of macroeconomic imbalances in Europe

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Contribution to the Project

This paper is part of WP401 which analyses the macroeconomic imbalances in the EMU. This analysis is a prerequisite for designing the institutions of the EMU.

A global value chain analysis of macroeconomic imbalances in Europe

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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. Firstly, 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. Secondly, we decompose the changes in the trade balances into the effects of shifts in final demand on the one side and changes in the global production patterns on the other. Thirdly, 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 would expand similarly in all EMU member states. Thereby we evaluate how the macroeconomic imbalances would have evolved in the case of more balanced demand developments in the EMU in the past, as well as how adjustment could possibly happen in the future.

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

JEL Codes: C67, E60, F14, F15

1 Introduction

Macroeconomic imbalances¹ are at the heart of the crisis in the European Monetary Union (EMU). Before 2007/08, EMU member states embarked on different growth paths: Germany and other countries in the ‘North’² 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.³

At the root of these developments were large inflation differentials between EMU member states, which accumulated into substantial shifts in relative price competitiveness.⁴ 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.

¹We use the term ‘macroeconomic imbalances’ in this paper as a synonym for ‘current account imbalances’ or ‘trade imbalances’.

²Throughout the 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.

³Trade deficits of catching-up countries are not necessarily harmful if they come along with high growth rates that permit those countries to equilibrate their external position in the future. Such trade deficits should not be termed ‘imbalances’. The developments in the South however were mostly not the results of a catching-up process, but stemmed from unsustainable consumption and construction booms.

⁴Price competitiveness is certainly only one aspect of competitiveness. See Aiginger et al. (2013) for a broader concept of development.

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.⁵

A broad and intensive debate has emerged about the causes and cures of macroeconomic imbalances. Some economists have long criticised the role of the current account surplus countries and have repeatedly highlighted their responsibility with regard to reducing these imbalances. According to their line of argument, the surplus countries in the 'North' benefitted from booming demand in the 'South'. As a consequence they should now strengthen their domestic expenditures in order to boost demand and exports in the South. Many others contrarily asserted that the imports of surplus countries would come from China and other emerging economies, and that the benefits of a demand expansion in the North for Southern Europe would be rather limited. According to them, adjustment would only be brought about by reducing domestic demand in the South and improving its competitiveness vis-à-vis countries outside the EU.

Our paper aims at contributing to this debate. Firstly, we will assess if and to what extent the current account surpluses in the North coincide with the deficits in the South. Secondly, we disentangle the effect on the emergence of macroeconomic imbalances of shifting global demand on the one side and changing production patterns on the other. The exports of a certain country can rise both through an increase in final demand for a certain product to which a country contributes some value added, or through a rising share of value added in the production of goods which are already demanded. Increasing imports are likewise either a result of rising domestic final demand, or of an increase in the foreign value added share in imported products. Disentangling these effects permits to assess whether imbalances have become 'structural', i.e. that they are the consequence of a transformation of global value chains, or if they can be adjusted by final demand shifts. Thirdly, we will discuss to what extent an increase in domestic demand in Northern Europe or a decrease in Southern Europe would support the elimination of these imbalances if they would happen separately. Furthermore, we will calculate

⁵See Ederer and Reschenhofer (2013) for a more elaborate discussion of the evolution of macroeconomic imbalances.

a hypothetical scenario in which final demand would expand similarly in all EMU member states. Thereby we assess how imbalances would have evolved in the case of more balanced demand developments in the EMU in the past, as well as how adjustment could possibly happen in the future.

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 understanding 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’.⁶ To our knowledge however there are no studies which use this database to analyse the emergence of macroeconomic imbalances in the EMU.⁷ 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, as well as the decomposition techniques which will be used in the paper (Section 2). Section 3 discusses the bilateral trade balances within the EU. Section 4 explains how we decompose

⁶See 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.

⁷In a recent paper by Nagengast and Stehrer (2014), the concept of trade in value added is used to investigate imbalances in intra-European trade. The authors however focus on the difference between gross trade and trade in value added. Here, we are directly analysing the value-added trade balances because they reveal the actual trade imbalances between countries and country groups.

the changes in the trade balance before and after the crisis into those which are due to changes in final demand and those which stem from changing global production patterns. Section 5 discusses how bilateral trade balances would change as a consequence of increases or decreases in foreign and domestic demand in the EU. 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 WIOD consists of a time series of world input-output tables from 1995 to 2011, which were 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 countries, including all EU-27 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.⁸

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

⁸See Timmer (2012) for a detailed description of the World Input-Output Database.

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), which accounts for the value added of one country directly and indirectly contained in final demand expenditures of another.⁹

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

$$x = Ax + f = Lf \quad (1)$$

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.

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

⁹See Stehrer (2012) for a detailed discussion of the difference between the concepts of gross trade and trade in value added.

little value.¹⁰

In section 4, we decompose the total changes in trade balances between two periods into two underlying effects.¹¹ Exports and imports can change either because of a shifting structure of foreign and domestic demand, shifts in the relative weight of the demand of particular countries in total world demand, or through a reorganisation of production networks. The decomposition is done by keeping production structures of one period constant and calculating the effect of changing demand structures, and vice versa. The first effect - the ‘final demand effect’ (FD effect) - measures to what extent a country has increased its value added because of shifts in the global demand structure, i.e. by higher demand for products which are partly produced in its economy. The second effect - the ‘value chain effect’ (VC effect) - indicates to what extent a country has increased its value added because of changes in the global production system. The second effect can be the result of changes in the domestic production structure such as the increasing use of imported intermediates, or of the increasing use of its own intermediates elsewhere. These changes reflect a country’s repositioning inside the global value chain. The decomposition technique can be summarised as:¹²

$$\begin{aligned} v_1 \cdot L_1 f_1 - v_0 \cdot L_0 f_0 &= (v_1 \cdot L_1 f_1 - v_0 \cdot L_0 f_1) + (v_0 \cdot L_0 f_1 - v_0 \cdot L_0 f_0) \\ &= (v_1 \cdot L_1 f_0 - v_0 \cdot L_0 f_0) + (v_1 \cdot L_1 f_1 - v_1 \cdot L_1 f_0) \end{aligned} \quad (3)$$

Note that the two right-hand expressions are both extensions of the left-hand expression. The first one is obtained by adding and subtracting the term $v_0 \cdot L_0 f_1$, and the second one is expanded with the term $v_1 \cdot L_1 f_0$. The first term on the right side of the equation indicates the change in the Leontief inverse L in value added terms (by multiplying it with the value added vector v) using final demand f of period 1 as a weight. The second term indicates the change in final demand weighted by the Leontief inverse of period 0. The second line uses weights of the period 0 for f and period 1 for $v \cdot L$. As

¹⁰See Stehrer (2012) for the accounting relations between aggregate and bilateral trade in value added.

¹¹See Vries et al. (2013) and Dietzenbacher and Lahr (2008) for similar decompositions of value added. A discussion about the method and its limitation can be found in Dietzenbacher and Los (2000).

¹²Each term in the formula is expressed by its value relative to the GDP of the period which corresponds to the final demand vector of this term.

there is no reason to choose one form over the other, usually the arithmetic average is used.

$$\begin{aligned}
v_1 \cdot L_1 f_1 - v_0 \cdot L_0 f_0 &= \frac{1}{2}(v_1 \cdot L_1 - v_0 \cdot L_0)(f_0 + f_1) + \\
&\quad \frac{1}{2}(v_0 \cdot L_0 + v_1 \cdot L_1)(f_1 - f_0) \\
&= \frac{1}{2}(\Delta v \cdot L)(f_0 + f_1) + \frac{1}{2}(v_0 \cdot L_0 + v_1 \cdot L_1)(\Delta f)
\end{aligned} \tag{4}$$

Changes of the technical component are weighted with the sum of final demand of both periods, while the changes of final demand is weighted by the sum of the technical component (Dietzenbacher and Los (2000)). This decomposition technique can be applied to (total and bilateral) exports and imports, given that both indicators are measured in value added terms.

In the following sections our analysis is focused on seven European countries: Austria, France, Germany, Greece, Italy, Spain, Portugal. Austria and Germany are representatives of ‘Northern Europe’, France and Italy of ‘Western Europe’ and Greece, Spain, Portugal of ‘Southern Europe’. We do not include countries of ‘Eastern Europe’ into our analysis because our focus is on the discussion whether the surpluses of the ‘North’ are the flip-side of the deficits in the ‘South’. As the ‘West’ is sometimes affiliated with the deficit countries in the South, we include it into our analysis.

When we discuss bilateral trade balances, we usually aggregate the trading partners of our countries under consideration into groups in order to simplify the analysis.¹³ The first group (G1) is named ‘Northern Europe’. It includes Germany and its immediate neighbours Austria and Netherlands, as well as Sweden. 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’ and the United Kingdom (G3). The fourth group (G4) broadly reflects ‘Eastern Europe’. The classification into country groups follows certain criteria which are discussed in the A.2. Throughout the paper, we use the geographical labels

¹³In order to preserve the detailed entanglements of the WIOT, we aggregated always after the applying the Leontief-Inverse. Also note: The gross trade of aggregates does not contain intra-trade.

instead of referring to group numbers, even if those labels do not exactly correspond to the geographical position of the countries.

3 Bilateral Trade

In this section we look at bilateral trade balances¹⁴ within the EMU, applying the concept of ‘trade in value added’. 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 (see section 2). Since the establishment of the monetary union and until the eve of the financial and economic crisis of 2008/09, the member states built up large surpluses and deficits. In 2007, the total surpluses of the North with the rest of the EMU countries amounted to 120 Billion Euro (Figure 1). These surpluses are by definition the mirror image of the deficits in the West and South. A reduction of the surpluses in the North (e.g. by increasing domestic demand and imports) would consequently also reduce the deficits in the South. If, on the other hand, the ‘adjustment burden’ is laid on the South, and their deficits decrease due to shrinking domestic demand and imports, the surpluses in the North would similarly decrease.

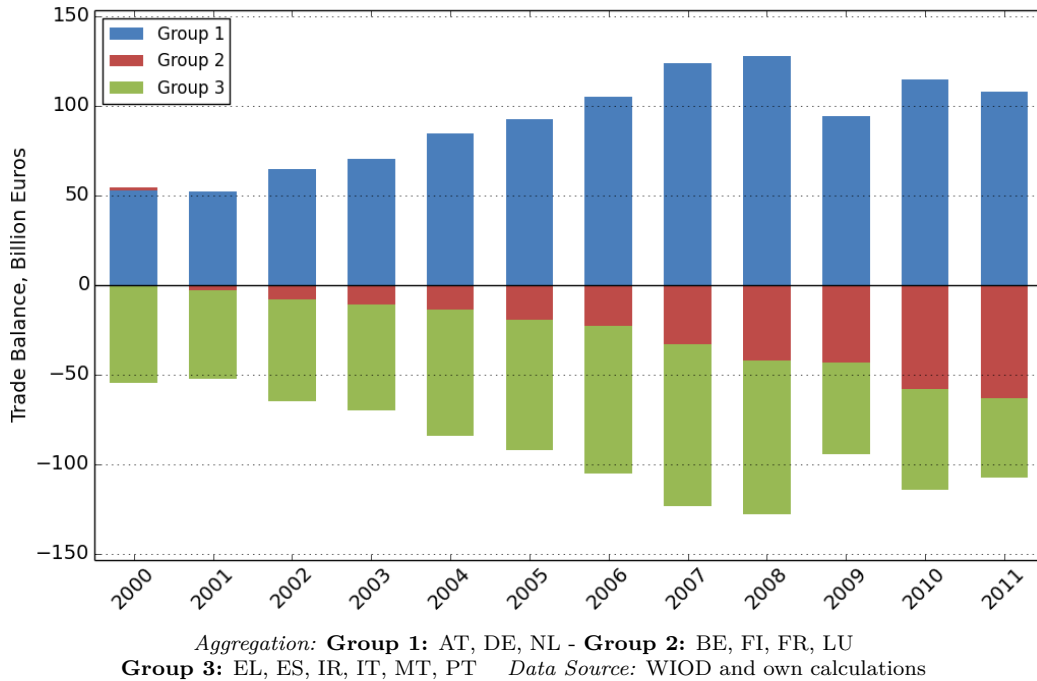
Developments before the Crisis

Between 1995 and 2000, all countries under consideration increased their exports to and imports from countries outside the EU (Figure 2 and 3). 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.¹⁵ The benefits of globalisation however were distributed unevenly across countries. In the Northern European countries such as Austria and

¹⁴The 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.

¹⁵Sometimes these developments are called the ‘second unbundling’, see Baldwin (2012)

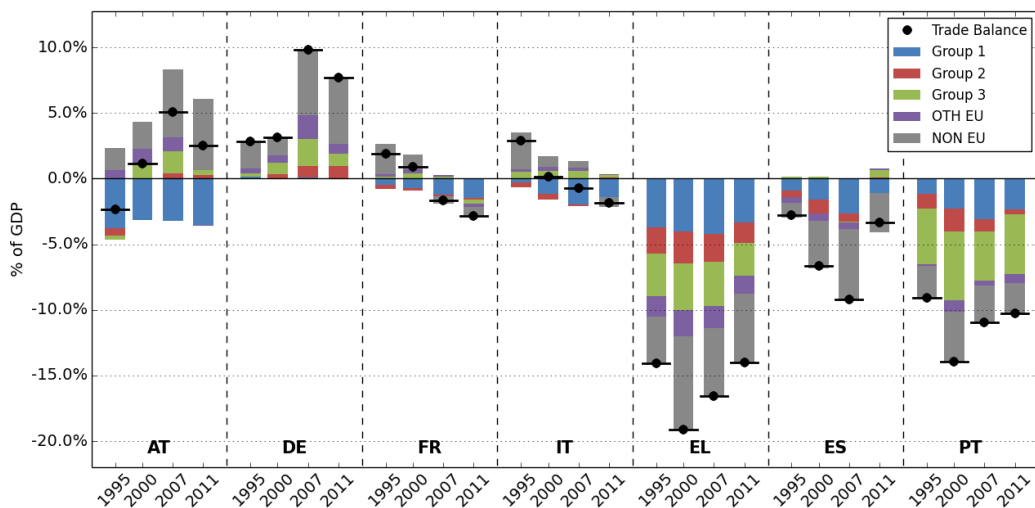
Figure 1: Trade Balance, 2000-2012



Germany, extra-EU trade balances remained broadly stable. In Western and Southern Europe they decreased, albeit marginally. Within Europe, we observe a similar pattern of ever closer integration. The trade balances with other European 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.

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 EU, exports to all countries contributed strongly, particularly to Southern and Eastern Europe. Imports and thus foreign value added which was created by German final demand increased only marginally, both

Figure 2: Trade in Value Added (95, 00, 07, 11)



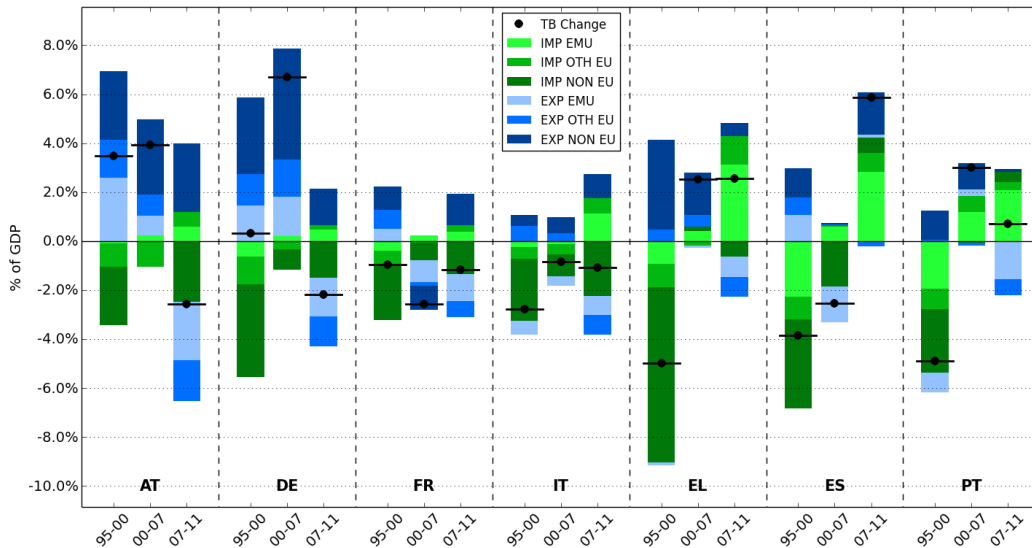
Trade balances in value-added terms (Split-up for trading partner groups). The corresponding changes are displayed in Figure 3.
 Aggregation: **Group 1:** AT, DE, NL - **Group 2:** BE, FI, FR, LU
Group 3: EL, ES, IR, IT, MT, PT Data Source: WIOD and own calculations.

with EU countries and with countries outside the EU, and even decreased with Western and Southern Europe. 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 Southern Europe 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 Europe countries. Germany exhibited a substantial surplus with France, Italy, Spain, and the UK. With Northern and Eastern Europe, trade was more or less balanced.

A similar pattern as in 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 Northern Europe, and particularly with Germany, which remained broadly constant over time. The balances with Western and Southern Europe however increased strongly and amounted to 3 percent in 2007.

France and Italy suffered a continuation of the deterioration of their trade

Figure 3: Trade in Value Added (95-00, 00-07, 07-11)



Changes of the trade balances in value-added terms (Split-up for trading partner groups and flows).
 Figure 2 displays the corresponding levels.
 Data Source: WIOD and own calculations.

balances between 2000 and 2007, and in particular with Northern Europe 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 Northern Europe countries, 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 Northern Europe. Exports to non-EU countries on the other hand increased moderately. In 2007, the trade balance with Northern Europe 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 EU also played a (minor) role. Nevertheless, trade balances exhibited a substantial deficit in 2007, the major

part of which was with the EU. In Spain, the trade balance on the other hand continued to decline between 2000 and 2007, mainly due to declining exports to the EU 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 EU 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 EU 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 Northern Europe 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.

Developments after the Crisis

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 EU declined strongly as a consequence of falling demand, particularly from Southern Europe, and accounted for the major part of the reduction. Imports from the EU 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 Western and Southern Europe 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 EU (and particularly into the South) and imports from the EU declined; with the rest of the world they both increased. As opposite to the North, in France and Italy the overall trade balance how-

ever continued to decline. In 2011, both the trade balance with the EU and with the rest of the world was negative, with Northern Europe countries contributing the largest part to the deficit.

In the Southern European countries, the trade balances improved substantially during that period. Imports from the EU decreased in all countries, an immediate consequence of falling domestic demand in the South. Exports to the EU 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 Northern Europe still amounted to 4 and 3 percent of GDP, respectively. The Spanish trade balance with the EU however was close to zero. All in all, imbalances within the EU 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 EU 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 EU, 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 EU. In the West and South, a deteriorating competitiveness position both within the EU 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 far¹⁶ through a reduction of exports to the EU in the North and imports from the EU in the South, both of which are an immediate consequence of falling domestic demand in the South. EU imports in the North and consequently EU 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.

¹⁶Until 2011, the latest year in the WIOD dataset.

4 Shifts in Demand and Production Patterns

The changes in (value added) trade balances which we discussed in the previous section can possibly stem from two different developments. The first is a shift in final (global) demand for those products which are partly produced in a certain country (whose firms are part of the global value chain for these products). The second cause is a shift in production patterns (or value chains), which would change the value added produced in a certain country for the same amount of global final demand. By decomposing the overall changes in trade balances into these two effects, we can distinguish between the effects of increasing or decreasing final demand, and those which stem from an increasing or decreasing share of value added of one country's producers in the global value chain.¹⁷ The decomposition helps us to assess to which extent changes in the external balances are due to shifting global demand patterns¹⁸, and which are 'structural', i.e. the result of changing global production patterns.¹⁹ The latter effect is a combination of changes in the production technology and of changing positions of a country within the global value chain. A positive 'value chain effect' reflects that a country has changed its production patterns so as to increase its supply for the production of goods for global demand. A positive 'final demand effect' means that global final demand for products to which a country contributes some value added has increased. Changes in overall and bilateral trade balances will be split into these two effects.

From 1995 to 2000, developments were qualitatively similar across Europe, even though quantitative differences stand out (Figure 4). All countries gained from increasing final demand from countries outside the EU. Furthermore, Austria and Germany, and to a smaller extent also France and Spain benefitted from rising demand inside the EU. For Italy, Greece and Portugal on the other hand, foreign demand from the EU did not contribute to changes in their trade balances. Rising final domestic demand led to a deterioration of trade balances in all countries. Likewise, the value chain effect (VC effect) vis-à-vis non-European countries was negative for all coun-

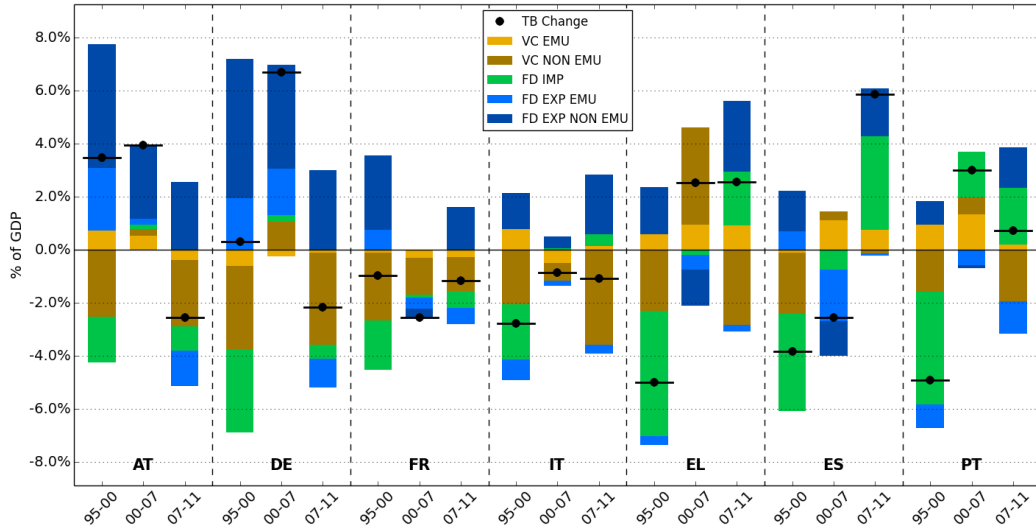
¹⁷The decomposition technique is explained in section 2.

¹⁸Shifting global demand patterns for their part can be the result of shifting preferences, changes in relative prices, and growth differentials in the global economy.

¹⁹Changes in relative prices would also have an effect on global value chains, particularly in the medium and long run.

tries. It seems that Europe generally has lost some of its share in global value chains during that period. Inside Europe on the other hand, shifts in the value chains contributed little to changes in trade balances.²⁰

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



Decomposition of the changes in the trade balances (value-added) in value-chain and final-demand effects.

Data Source: WIOD and own calculations

These patterns changed to a certain extent after the establishment of the EMU. In Austria and Germany, final demand in the world economy continued to contribute to the increase in their trade surpluses, both inside and outside the EU. In all other countries, the FD effect was negative (Greece, Spain) or close to zero. The Northern European countries improved their positions in the value chain for products demanded outside the EU, but lost some of their shares in value added vis-à-vis European countries. The patterns for Western and Southern Europe are somewhat heterogeneous. In France and Italy, the VC effects were marginally negative, whereas Greece, Portugal and Spain exhibited a positive effect, at least vis-à-vis the EU. Greece also seemed to have improved its position in value chains for extra-EU demand. Shifts in final domestic demand in general have contributed little to changes in trade balances.

²⁰This general assessment does not apply to Portugal, where decreasing domestic final demand improved the trade balance.

Summarising, we find that the North thrived not so much because its firms positioned themselves better within global value chains, but because global final demand for their products (or products to which they contributed value added) increased. The FD effect was particularly strong vis-à-vis the EU. The Northern economies seemed to have been in a good position inside the global value chains already before the period under consideration. Nevertheless, they also improved their positions in global value chains to meet extra-EU demand. The Southern European countries on the other hand mostly benefitted from increasing value added for products demanded inside Europe, albeit only marginally.

Between 2007 and 2011, final demand from outside the EU contributed favourably to the changes in trade balances in all countries. The FD effect was even positive in countries like Greece, Italy, Portugal and Spain. Final demand from the EU on the contrary contributed negatively everywhere. The negative FD effect was most pronounced in the Northern European countries and in Portugal. These Trends in general are a consequence of falling or stagnating domestic demand due to the European crisis (see section 3). The value chain effects vis-à-vis extra-EU countries on the other hand were negative for all countries. It seems that during the crisis, Europe has lost some of its shares in global value chains that it had gained in the period before. The VC effect is particularly large in Greece and Italy, but also in Austria and Germany. Vis-à-vis Europe, only Greece and Spain seemed to have improved their positions in value chains. Finally, (falling) domestic final demand contributed favourably to trade balances in the crisis-prone countries Greece, Ireland, Portugal and Spain.

In general, the major part of the changes in trade balances stemmed from shifts in final demand. This is hardly surprising, given that changes within the global value chains usually take longer and are the result of investment in new technologies. It is therefore also interesting to observe the long-term trends of these shifts. From 1995 to 2011, the VC effect with the rest of the world was negative for all countries. As regards to European value chains, the effect was negative in the North and West, but positive in the South. It seems that Southern Europe has benefitted from improving its position in the value chains within Europe, whereas it has suffered from sluggish demand developments. The North on the other hand had mostly benefitted from strong demand but lost out in terms of their position in the value chains.

5 Demand Spillovers and Trade Balances

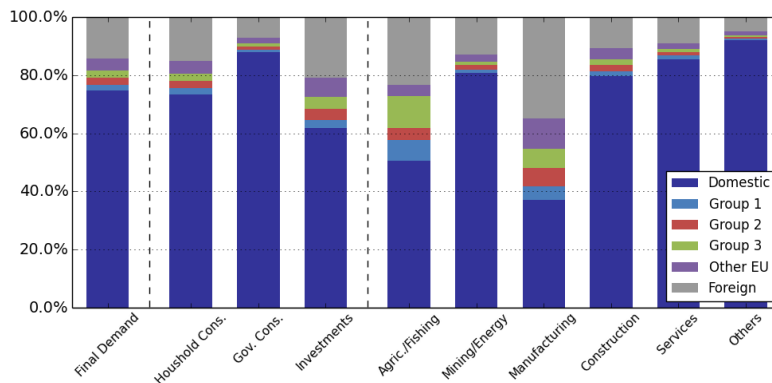
In the previous sections we analysed the role of foreign and domestic demand developments in the emergence of macroeconomic imbalances. We saw that sluggish domestic demand in the North and exuberant demand in the South contributed considerably to increasing surpluses and deficits before the crisis. 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 economists, particularly outside Germany, including the European Commission and the IMF. According to this line of argument, increasing demand in Germany would raise its imports from the other EU countries.²¹ 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: the severe decline in domestic demand in the South led to a significant reduction in trade deficits (see section 3). In this section we aim at quantitatively assess (separately) to which extent these two adjustment strategies would work. Furthermore, we will calculate a third scenario in which final demand increases equally (and equal to the EMU average) in all countries, and simulate its impact on trade balances. We thereby evaluate ex post how macroeconomic imbalances would have evolved under that scenario and outline what could be a possible ex-ante adjustment strategy. The calculated scenarios are purely 'mechanical' as to their impact. We do not include indirect effects via changes in income, rising or falling wages and prices and thus changes in competitiveness (see below).

Despite the fact that Germany benefited a lot from foreign demand and did not contribute much to growth in the rest of the EU, the direct expansionary effect of an increase in German final demand on other European countries would be rather small. 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 5). Even in Germany, which - given its size - is a relatively open economy, of

²¹The increase in domestic demand in Germany could be brought about by rising real wages, private or public investment. A detailed discussion of the ideal policy mix to stimulate demand is beyond the scope of this paper.

100 Euro spent, more than 70 Euro of the created value added would remain inside the domestic economy. Only 8 percent would fall upon the rest of the EU countries, and 14 percent on the economies outside the EU. Within Europe, Southern Europe would benefit most, followed by the West. There are minor differences between the categories of final demand: An increase in 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 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.

Figure 5: Trade in Value Added, Germany, 2011, Final Demand Breakup



Splitting up of the origin of the value-added which is generated by the final demand (entire and separated in types and sectors) in Germany.

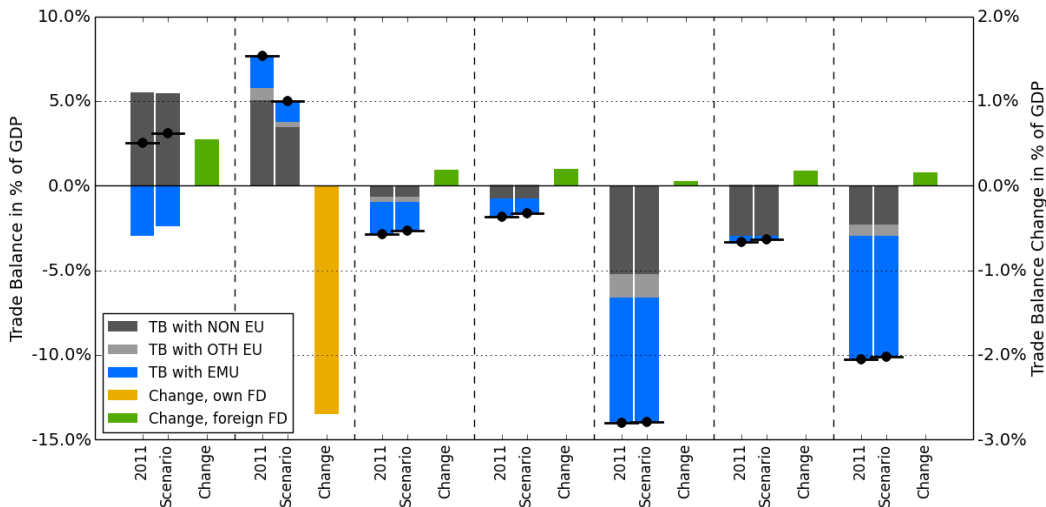
Aggregation: **Group 1:** AT, DE, NL - **Group 2:** BE, FI, FR, LU

Group 3: EL, ES, IR, IT, MT, PT Data Source: WIOD and own calculations

Total final demand in Germany accounts for roughly 15 percent of GDP in the EU. The total value of GDP which is created by German final demand

in the Southern and Western Europe varies between 2 and 5 percent. An increase in (nominal) German final demand by 10 percent would raise GDP by 0.2 to 0.5 percent in the aforementioned country groups. It would reduce the trade surplus in Germany by 1 percent and would decrease the deficit in Western and Southern European countries by between 0.05 and 0.35 percent (Figure 6). It would therefore only partly reduce the German trade surplus, but its potential to balance the deficits of the South are rather limited. In order to eliminate the German trade surplus completely, final demand would need to increase (nominally) by 30 percent. An increase of this size does not seem very realistic in the near future. Whether it increases only in Germany or in all surplus countries in the EMU²², changes the results only marginally, given that Germany is by far the largest country in this group.

Figure 6: Change in the Trade Balance, 10% FD Increase in Germany



Comparison of the actual trade balances (value-added) 2011 to a fictitious trade balance scenario in which Germany would have a 10% increased final demand

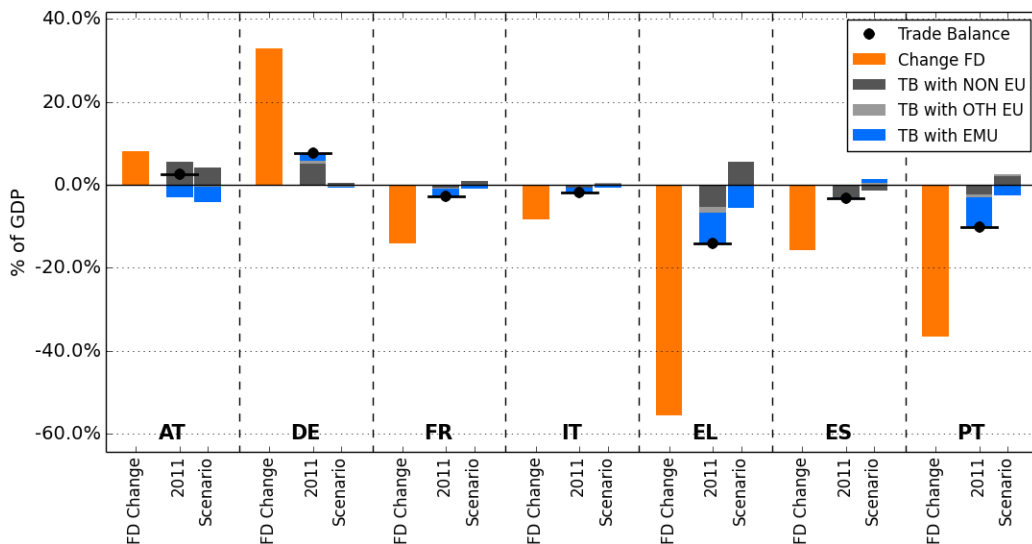
Data Source: WIOD and own calculations

We now calculate how much each deficit country's own domestic demand must decrease in order to reduce its deficit. For some of these countries, the results are even less disenchanted than those of an increase in German demand. In Greece, domestic final demand would have to decrease by 55 percent in order to reduce the trade deficit to zero. In Portugal, this reduction

²²The EMU member states which exhibited a trade surplus in 2011 are Austria, Belgium, Germany, Ireland, Luxemburg and the Netherlands.

would amount to 35 percent, in France and Spain to 15 percent, and in Italy to almost 10 percent. Such a scenario would have devastating social and economic effects on the countries, and is completely unrealistic for most countries. These changes in final demand however would have an impact on the trade balances both with EMU- and with non-EMU countries. In some countries, in particular in Greece and Portugal, trade balances vis-à-vis the EMU would remain in deficit, and would be equalised by those vis-à-vis countries outside the EMU.

Figure 7: FD Changes Necessary for Equalised Trade Balance



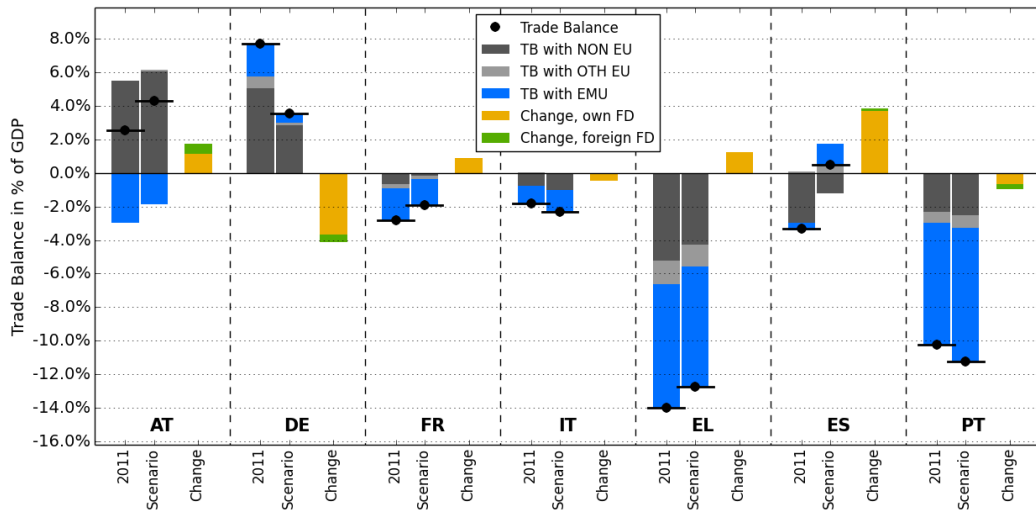
Final demand change necessary to reduce trade balances to zero. Comparison of the actual trade balances (value-added) 2011 to a fictitious trade balance scenario in which final demand in the particular country would have increased or decreased.

Data Source: WIOD and own calculations

A more realistic scenario for further adjustment of trade (im)balances is a combination of the two aforementioned strategies. We calculate a scenario in which we assume away all growth differences between EMU member states between 2000 and 2011, and hypothetically suppose that domestic demand in all countries has grown to the same extent as the EMU as a whole. Even if this is an arbitrary assumption, this scenario allows us furthermore to ex-post evaluate the contribution of growth differentials to the emergence of macroeconomic imbalances. Under the assumption of equal growth, German final demand would have been (nominally) 15 percent higher at the end of

that period. On the other side of the spectrum is Spain, where it would be 15 percent lower than in 2011. In Austria, France and Greece final demand would sink, whereas it would be marginally higher in Italy and Portugal.²³ The results of this simulation are summarised in figure 8. In Germany, three quarters of the trade surplus vis-à-vis the other EMU countries would be eliminated. Two thirds of this reduction stem from higher imports due to increasing domestic demand; the rest is due to lower exports to other EMU countries. The country which would be affected most by increasing demand in Germany is Austria, where the trade deficit towards the EMU would shrink, both due to higher exports and lower imports. In most of the other countries under consideration, the changes in trade balances would stem from a reduction or increase of their own final demand. In Spain and Greece, trade balances would improve; in the latter case, the (small) deficit towards the EMU would even turn into a remarkable surplus. In France, Ireland and Italy, the changes in the trade balances would be marginal. Portugal would suffer a further increase in its already large deficit, both because its own imports increase and its exports to Spain decrease.

Figure 8: Change in the Trade Balance, Same Growth Rate FD EMU



Comparison of the actual trade balances (value-added) 2011 to a fictitious trade balance scenario in which all EMU members would have had the same final demand growth between 2000 and 2011

Data Source: WIOD and own calculations

²³The assumptions for this scenario regarding final demand growth in all EMU countries can be found in the appendix (A.1).

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 East. 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 to increase their shares in global production. Only in Spain, strong increases in domestic demand had a significant impact on the trade deficit before 2007. A decrease of its final demand to a certain extent would therefore immediately reduce the deficit and turn it into a surplus.

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 apply 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) rises as a result of increasing German demand, the 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 surplus 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 trade linkages within the European Union, and their role in the emergence of macroeconomic imbalances. Our aim is to evaluate if surpluses in the North correspond with deficits in the South, and whether an increase in domestic demand in the surplus countries, and particularly in Germany (or stronger domestic demand growth in the past) would reduce imbalances, or if a reduction of final demand in the South (or less buoyant demand in the past) is the ‘right’ adjustment strategy. Exports and imports, and consequently trade balances have been calculated in value added terms on the basis of the World Input-Output Database (WIOD). By doing so, we eliminated the value in exports and imports which was added by third countries (other than the two trading partners). It consequently allowed us to directly link trade flows and production between economies.

We firstly calculated bilateral trade balances and discussed their role in

the emergence of macroeconomic imbalances. We found that exports of Northern European economies increased strongly between 2000 and 2007, both into the EU and to the rest of the world. Exports of Western and Southern European countries on the other hand in general evolved less favourably, particularly into the EU. This supports the hypothesis that the increasing divergence in price competitiveness stimulated exports in Northern Europe and dampened them in the West and South.²⁴ Imports in the North more or less stagnated, which further backs up this hypothesis. In the South, they expanded substantially only in Spain and contributed there to the rising trade deficit. This is a consequence of the low real interest rates, which led to a boom in domestic demand. All in all we can say that the North benefitted from strong demand in the South, and an ever better competitiveness position both within the EU and vis-à-vis the rest of the world. In the South, demand from the North contributed almost nothing to their export performance. A deteriorating competitiveness dampened exports, particularly within the EU.

In a second step, we disentangled the effects of changing (domestic and foreign) final demand on the one side and of changes in global production patterns (value chains) on the other. In general, we find that the major part of the changes in trade balances stemmed from shifts in final demand. The North thrived not so much because its firms positioned themselves better within global value chains, but because global final demand for their products (or products to which they contributed a certain value added) increased. This effect was particularly strong vis-à-vis the EU. The Northern economies seemed to have been in a good position inside the global value chains already before the period under consideration. Nevertheless, they also improved their positions in global value chains to meet extra-EU demand. The Southern European countries did not benefit from rising foreign demand, both from the EU and the rest of the world. Their own demand effect was negative in Spain and amounted to zero in the other economies. Some of the countries (Greece, Portugal, Spain) seemed to have repositioned themselves better within global value chains. France and Italy on the contrary lost some of its share in the production of demanded goods.

Thirdly, we evaluated whether or to what extent the emergence of macroeconomic imbalances was driven (and can consequently be adjusted) by dif-

²⁴See Ederer and Reschenhofer (2013) for an elaborate discussion of the causes of these imbalances.

ferent demand developments in the EMU. Our findings indicate that neither an increase in domestic demand in the North nor the decrease of it in the West and South can reduce the imbalances entirely. Domestic production still contributes the lion's share to a country's final demand. A combination of these two strategies, in the style of a balanced growth scenario, would adjust trade surpluses and deficits to a certain extent. Some of the deficits however seem to have long-time roots and need to be corrected by policies which aim at improving the countries' positions within global value chains.

The changes within global value chains would be brought about by the establishment of new firms and industries, as well as technological change. These processes usually take some time; the necessary changes will therefore happen over several years. Furthermore, new investments need support by good public infrastructure and other incentives Aiginger (2014). During the period of adjustment therefore, deficit countries would need financial means to support their industrial sector so as to reposition themselves in the value chains. Until then, monetary transfers from surplus to deficit countries would 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 would need 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. Analysing interactions between demand, price competitiveness and trade balances would however require a full macroeconomic model. Such an analysis is beyond the scope of this paper and is left for further research.

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A Appendix

A.1 Balanced Growth Scenario

Table A.1: FD Growth

Country	FD Growth	Adj. Factor
AT	44.05 %	0.97
BE	51.16 %	0.92
DE	21.58 %	1.14
ES	67.61 %	0.83
FI	58.21 %	0.88
FR	46.13 %	0.95
EL	53.21 %	0.91
IE	37.69 %	1.01
IT	35.95 %	1.02
LU	69.51 %	0.82
MT	36.58 %	1.02
NL	41.71 %	0.98
PT	35.23 %	1.03
EMU	39.86 %	1.00

Data Source: WIOD and own calculations

Notes: **FD Growth...** Cumulative growth of final demand from 2000 to 2011.

Adj. Factor... FD growth of EMU divided by FD growth of country.

A.2 Group Classification

Most of the analysis is based on a classification of EU member states into different country groups. Here, we briefly explain the motivation and the criteria for splitting EU member countries into 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:²⁵

- **Group 1:** $CA > 0$, $CAC > 2\%$, $GDPpC > 80\%$
Austria, Germany, Netherlands, Sweden
- **Group 2:** $CA > 0$, $CAC < 2\%$, $GDPpC > 80\%$
Belgium, Denmark, Finland, France, Luxemburg

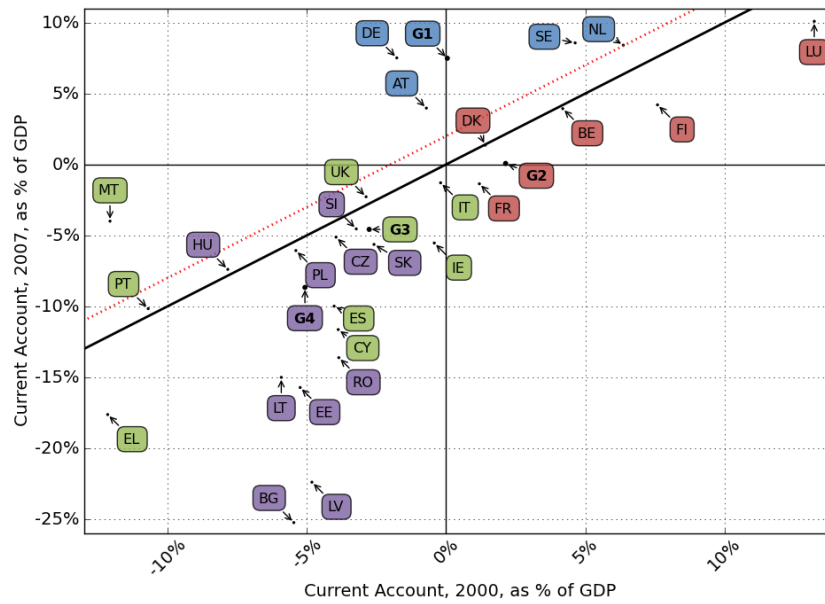
²⁵The only country which does not fit into one of the four groups is Malta. According to our criteria, it would be in a separate group ($CA < 0$, $CAC > 2\%$, $GDPpC > 80\%$). To avoid a group with only one member we decided to put Malta into Group three (see below).

- **Group 3:** $CA < 0$, $CAC < 2\%$, $GDPpC > 80\%$
Cyprus, Greece, Spain, Ireland, Italy, Malta, Portugal, United Kingdom
- **Group 4:** $CA < 0$, $CAC < 2\%$, $GDPpC < 80\%$
Bulgaria, Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Romania, Slovakia, Slovenia

The first group correspond to what is usually named ‘Northern Europe’. Group one includes Germany and its immediate neighbours Austria and Netherlands, as well as Sweden. In group two 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’. Interestingly, by applying our criteria, the United Kingdom is also a member of this group, although it is clearly not in the South of Europe. Nevertheless, the developments are similar, so that we decided to keep it in group three. The fourth group broadly reflects ‘Eastern Europe’. Malta (see footnote 7) and Slovenia are somewhat special cases. Strictly applying our criteria, Slovenia would be in group three. However, its GDP per capita is close to the threshold, so that we decided to put it into the groups with its ‘economic and geographical neighbours’. Figure A.1 shows the first two criteria for all EU countries and the four country groups.

All groups consist of EMU and non-EMU member states. Distinguishing non-EMU countries into those which maintain fixed and flexible exchange rate regimes further complicates the analysis. Sweden and the United Kingdom, which are part of group one and three respectively, have flexible exchange rates vis-à-vis the Euro. In group two, Denmark, which is the only non-EMU country, maintains a stable exchange rate. In group four, we find EMU countries, as well as non-EMU countries with fixed and flexible exchange rates. Currency regimes are likely to have an impact on the development of growth patterns. In countries with flexible exchange rates, huge current account surpluses and deficits are less likely to emerge. We take this matter into account when we go beyond the group level, and analyse the specific developments on the country level.

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.



Project Information

Welfare, Wealth and Work for Europe

A European research consortium is working on the analytical foundations for a socio-ecological transition

Abstract

Europe needs change. The financial crisis has exposed long-neglected deficiencies in the present growth path, most visibly in the areas of unemployment and public debt. At the same time, Europe has to cope with new challenges, ranging from globalisation and demographic shifts to new technologies and ecological challenges. Under the title of Welfare, Wealth and Work for Europe – WWWforEurope – a European research consortium is laying the analytical foundation for a new development strategy that will enable a socio-ecological transition to high levels of employment, social inclusion, gender equity and environmental sustainability. The four-year research project within the 7th Framework Programme funded by the European Commission was launched in April 2012. The consortium brings together researchers from 34 scientific institutions in 12 European countries and is coordinated by the Austrian Institute of Economic Research (WIFO). The project coordinator is Karl Aiginger, director of WIFO.

For details on WWWforEurope see: www.foreurope.eu

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