THE NEW SCHOOL FOR SOCIAL RESEARCH

Enno Schröder

Eurozone Imbalances: Measuring the Contribution of Expenditure Switching and Expenditure Volumes 1990-2013

April 2015
Working Paper 08/2015
Department of Economics
The New School for Social Research

The views expressed herein are those of the author(s) and do not necessarily reflect the views of the New School for Social Research. © 2015 by Enno Schröder. All rights reserved. Short sections of text may be quoted without explicit permission provided that full credit is given to the source.

Eurozone Imbalances: Measuring the Contribution of Expenditure Growth and Expenditure Switching

Enno Schröder*

September 11, 2015

The paper introduces a method to decompose the dynamics of the trade ratio into expenditure growth and expenditure switching. Expenditure switching is an observable variable that can be measured; it has a theoretical interpretation in terms of relative price effects, disproportionate income-expenditure effects, and non-price competitiveness effects. The decomposition is applied to 11 eurozone countries 1990-2013. Most countries, including Germany, experienced a switch of expenditure away from domestic output towards foreign output; expenditure switching was most unfavorable for Finland, France, and Italy. The large gaps between domestic and foreign expenditure growth account for the German trade surplus and the Spanish deficit.

Keywords: external adjustment, expenditure switching, competitiveness, decomposition, euro area
JEL codes: F14 – Empirical Studies of Trade; F41 – Open Economy Macroeconomics; F43 – Economic Growth of Open Economies

*Institute for New Economic Thinking, 300 Park Avenue South, New York, NY 10010; Department of Economics, New School for Social Research. Email: enno@ineteconomics.org. In developing the ideas presented here, I have received helpful input from Duncan Foley, Goncalo Fonseca, Arjun Jayadev, Josh W. Mason, Guy Numa, Servaas Storm, and Lance Taylor. I also thank the audiences in the INET Lunch Seminar and at the New School for Social Research. I declare that I have no relevant or material financial interests that relate to the research described in this paper.

"Competitiveness will play a key role in redressing external imbalances on a sustainable basis. For the rebalancing process to be durable, it cannot be linked to expenditure reduction only, but also to a switch of expenditure away from imports and towards domestic production. ... The role of relative wages and prices is key" (Buti and Turrini, 2012, p.3).

1. Introduction

The dynamics of the trade ratio (the value of exports over the value of imports) are composed of domestic expenditure growth, foreign expenditure growth, and expenditure switching. Expenditure switching refers to changes in the allocation of expenditure between domestic goods and foreign goods. The theory of demand holds that changes in international relative prices will induce economic agents to switch expenditure between countries. Empirical studies of trade elasticities employ econometric methods to estimate the size of this effect (e.g. Orcutt, 1950; Goldstein and Khan, 1985; Marquez, 2002; Imbs and Mejean, 2015). This paper measures the extent of expenditure switching regardless of its varied causes, which include but are not limited to relative price changes. The decomposition does not yield point estimates of structural parameters but rather measures expenditure switching ex-post. The ex-post measure is composed of relative price effects in the tradition of the elasticities approach to the balance of payments (Bickerdike, 1920; Robinson, 1937), of disproportionate income-expenditure effects in the tradition of the multiplier and absorption approaches (Harrod, 1933; Machlup, 1943; Alexander, 1952), and of the effects on exports of non-price competitiveness factors (e.g. Fagerberg, 1988; Carlin et al., 2001).

The decomposition is applied to eleven members of the European Monetary Union in the period 1990-2013. The euro period is of particular interest, because the dispersion of current account balances increased markedly in the period leading up to the Great Recession (EC, 2009). What factors have caused the current account imbalances to expand before the crisis and to contract during the crisis is the subject of ongoing debate. The notion of competitiveness – understood in the narrow sense of price competitiveness – has assumed center stage in it. Inside the eurozone competitiveness dynamics are frequently gauged by the relative development of national price and cost indicators, and particular attention is paid to the evolution of unit labor costs (ULCs) from the introduction of the euro to the onset of the crisis. Over 1999-2007 labor costs were growing by more than 2.5% annually in Greece, Italy, Ireland, Portugal, and Spain but remained constant in Germany (table 1). The ULC divergence is said to have caused expenditure switching in favor of Germany and to the detriment of the deficit countries.

This "ULC channel" is only part of the story because there are variables other than labor costs that determine competitiveness – when defined as the capacity for selling in international markets – and there are variables other than competitiveness that determine

Table 1: ULCs, Trade, and Expenditure 1999-2013

	AUT	BEL	DEU	ESP	FIN	FRA	GRC	IRL	ITA	NLD	PRT
1999-2007, mean % growth											
Unit labor costs	0.7	1.5	0.0	3.1	1.1	1.7	3.3	3.8	2.5	2.0	2.6
Domestic expenditure	3.5	4.3	1.9	8.4	5.2	4.5	7.5	10.9	4.3	4.9	5.1
Export revenue	7.9	6.9	8.3	7.6	7.1	4.8	11.6	9.8	5.6	7.0	6.8
Import expenditure	6.8	7.0	7.0	9.9	8.6	6.6	11.2	10.0	7.4	6.6	6.0
2008-2013, mean % growth											
Unit labor costs	2.4	2.7	2.3	0.2	3.7	1.8	0.4	-0.2	2.3	2.3	0.2
Domestic expenditure	2.6	2.9	2.3	-2.0	2.6	1.6	-5.2	-4.1	-0.2	0.7	-1.7
Export revenue	3.1	3.8	3.4	3.3	-0.3	2.5	1.4	3.3	1.4	4.0	4.0
Import expenditure	3.4	4.6	4.0	-1.7	2.1	2.6	-4.4	1.7	-0.1	3.9	0.0

Source: AMECO (2015, variable codes in brackets): Unit labor costs (PLCD) refer to the total economy. Domestic expenditure (UUNF) is measured in euros. Export revenue (UXGS) and import expenditure (UMGS) cover goods and services and are measured in euros.

the trade balance.[1] Sales in world markets are influenced not only by price but also by non-price competitiveness factors (e.g. product quality, consumer taste, product innovations, the geographical and industrial specialization pattern). The trade balance, crucially, is a function not only of competitiveness but also of aggregate income and expenditure. The "expenditure channel" refers to the divergent expenditure dynamics and their corresponding effect on import demand. Expenditure growth was exceptionally low in Germany and Austria, and exceptionally high in "the boom-and-bust countries" Greece, Spain, and Ireland (table 1).

For a discussion of the eurozone imbalances in the broader context of the eurozone crisis, refer to the contributions in Blankenburg et al. (2013). For a summary by IMF economists of the possible causes of the divergence in ULCs and domestic expenditure, refer to Kang and Shambaugh (2013, pp.3-6) and Tressel et al. (2014, pp.6-9). This paper simply measures the extent to which expenditure growth and expenditure switching account for the evolution of trade flows, regardless of what forces have driven expenditure and regardless of what forces have driven inflation. It finds that most euro member states experienced a switch of expenditure away from domestic output towards foreign output. Germany and Spain, two countries with quite different ULC dynamics, experienced unfavorable expenditure switching of roughly the same magnitude over 1999-2007. The German trade surplus and the Spanish deficit can be attributed to the large gaps between domestic

[1] This broader definition corresponds to the OECD's definition: "Competitiveness is a measure of a country's advantage or disadvantage in selling its products in international markets." http://stats.oecd.org/glossary/detail.asp?ID=399 (accessed on March 7, 2015).

and foreign expenditure growth. Expenditure switching does not account for the 2007 trade deficits in Spain, Greece, Ireland, and Portugal. Expenditure switching was most unfavorable for Finland, France, and Italy, which indicates competitiveness problems in these countries.

2. Related Literature

2.1. Expenditure and Relative Prices in the Eurozone

European Commission reports recognised as early as 2006 that current accounts were mainly driven by expenditure dynamics: "The evolution of the current account mainly reflects relative developments in domestic and foreign demand (and, to a lesser extent, competitiveness developments)" (EC, 2006, p.41). Later EC reports arrive at the same conclusion (EC, 2009; EC, 2010). Gaulier and Vicard (2012) find that eurozone current account dynamics over 1999-2007 are positively correlated with ULC growth and import growth, but not with export growth. There is hardly any correlation between exports and ULCs (the "Eurozone Kaldor Paradox"). The empirical pattern, the authors conclude, carries the qualitative signature of a demand shock, rather than a competitiveness shock. Wyplosz (2013) analyzes correlations too, and reaches the same conclusion.

Evidence from time series econometrics points in the same direction. A number of studies relate aggregate export and import flows to domestic income (or alternatively to domestic expenditure), foreign income (or to foreign expenditure), and various indicators of international relative prices/costs (Arghyrou and Chortareas, 2008; Christodoulopoulou and Tkacevs, 2014; Comunale and Hessel, 2014; Diaz-Sanchez and Varoudakis, 2015). The results suggest that the expenditure channel was statistically and quantitatively significant. Evidence in support of the ULC channel is much weaker.

However, the econometric literature on trade elasticities moved away from the estimation of aggregate time series models towards the estimation of disaggregated models and the use of industry-level data. Aggregate elasticities computed as weighted averages of industry-level point estimates are larger in magnitude than traditional trade elasticities based on aggregate data. The former are two or three times larger than the latter (Imbs and Mejean, 2015, p.3). ECB (2012, table 4) takes industry-level point estimates from three different studies and computes aggregate elasticities as weighted averages for eurozone countries. The results strongly support elasticity optimism. The conclusion might be drawn that the ULC divergence did engender large expenditure switching effects – in contrast to the time series evidence cited above.

2.2. Non-Price Competitiveness

Labor costs are but one variable which influence international competitiveness, and the "Kaldor Paradox" provides prima facie evidence that it is not the most important one (Kaldor, 1978). Kaldor observed that some countries were gaining (losing) world market

shares while their relative ULCs were rising (declining). More recent data, too, displays if anything a positive correlation between export market shares and ULCs (Fagerberg, 1996; Correa-Lopez and Domenech, 2012). Gaulier and Vicard (2012) highlight the absence of a correlation between ULCs and export performance in the eurozone over 1999-2007.

Kaldor attributed the market share gains to product quality upgrading. In empirical work the challenge is to operationalise product quality and other dimensions of non-price competitiveness. One approach, which circumvents direct measurement, is to posit a model that lends a theoretical interpretation to regression residuals, or alternatively to estimated fixed effects. Benkovskis and Wörz (2014) interpret residuals as changes in consumer taste and product quality, and conclude that non-price competitiveness is more important for export performance than price. Another approach, which relies on direct measurement, estimates the relation between export performance and non-price competitiveness. Studies that emphasise innovation and technology as important drivers of competitiveness use patent statistics, R&D expenditure, and investment shares as proxy variables (e.g. Fagerberg, 1988; Fagerberg, 1994; Carlin et al., 2001; Fagerberg et al., 2007). EC (2012) reviews recent literature on the drivers of export performance, and the factors considered include the degree of product differentiation, innovation, human capital, foreign direct investment, the quality of institutions, as well as a country's specialization in terms of product and destination markets. "Export performance appears to be only partly related to price competitiveness, leaving an important explanatory role for non-price competitiveness" (EC, 2012, p.29).

Chen et al. (2013) focus on differences in the composition of exports across euro area countries and present regression results which suggest that peripheral countries faced intensified competition from China while Germany benefited from strong foreign demand for machines and industrial equipment. The export composition also helps explain the export performance during the crisis period (Tressel and Wang, 2014). These results highlight the importance of structural differences between euro member states (Simonazzi et al., 2013).

This paper does not refine econometric theory nor does it include new variables; it proposes an empirical approach that provides a new perspective on the data. As a complement to the *estimation* of elasticities, the trade ratio decomposition *measures* expenditure switching ex-post.

3. The Trade Ratio Decomposition

The decomposition of identities is a flexible method to assess the quantitative significance of distinct components. The most common application is the decomposition of the ratio of government debt to GDP (e.g. Hall and Sargent, 2011). Mason and Jayadev (2014) decompose household debt, Burda and Hunt (2011) decompose German GDP growth, and this paper decomposes the trade ratio.

The trade ratio TRV is the value of exports $PX \cdot X$ over the value of imports $PM \cdot M$:

$$TRV \equiv \frac{PX \cdot X}{PM \cdot M} \equiv R \cdot \frac{X}{M}. \tag{1}$$

X denotes real exports associated with a domestic-currency export price index PX, and M denotes real imports associated with a domestic-currency import price index PM. $PM \equiv \frac{PF}{S}$ is composed of the nominal exchange rate S expressed as the price of domestic currency in terms of foreign currency, and the foreign-currency price index PF. $R \equiv \frac{S \cdot PX}{PF}$ denotes the terms of trade.

Let DA denote real domestic expenditure (the same concept as absorption and domestic demand). The identity $M \equiv \frac{M}{DA} \cdot DA$ facilitates the interpretation of the home country's real imports as the product of *domestic import intensity*, $DMI \equiv \frac{M}{DA}$, and real domestic expenditure:

$$M \equiv DMI \cdot DA. \tag{2}$$

A change in DMI reflects expenditure switching by domestic agents; a change in DA is a growth effect.

In a two-country world, domestic exports are foreign imports. The identity $X \equiv \frac{X}{FA} \cdot FA$ facilitates the interpretation of the foreign country's real imports as the product of *foreign import intensity*, $FMI \equiv \frac{X}{FA}$, and real foreign expenditure:

$$X \equiv FMI \cdot FA. \tag{3}$$

A change in FMI reflects expenditure switching by foreign agents; a change in FA is a growth effect.

As a result, the trade ratio can be expressed as

$$TRV \equiv R \cdot \frac{FMI}{DMI} \cdot \frac{FA}{DA} \equiv R \cdot RMI \cdot RA. \tag{4}$$

The advantage of this expression is that the contribution of the terms of trade R, the *relative import intensity* $RMI \equiv \frac{FMI}{DMI}$, and *relative expenditure* $RA \equiv \frac{FA}{DA}$ can be quantified.

Let the hat indicate the log-differential of a continuous-time variable: $\hat{Z} \equiv d\,log\,Z/dt$ ($\approx$ growth rate). The application of logarithms to equation (4) and differentiation with respect to time gives:

$$\hat{TRV} \equiv \hat{R} + R\hat{MI} + \hat{RA}. \tag{5}$$

The trade ratio increases, ceteris paribus, if the terms of trade increase $\hat{R} > 0$, if foreign agents and/or domestic agents switch expenditure from foreign goods towards domestic goods $R\hat{MI} > 0$, and if foreign expenditure grows faster than domestic expenditure $\hat{RA} > 0$.

Effective expenditure switching is defined as

$$\hat{ES} \equiv \hat{R} + R\hat{MI}. \tag{6}$$

An increase in RMI, composed of real magnitudes, may not translate into effective switching if the terms of trade counteract the increase. Values can decrease while volumes increase, and vice versa. $\hat{ES} > 0$ will be called *favorable* expenditure switching, and $\hat{ES} < 0$ *unfavorable* switching.

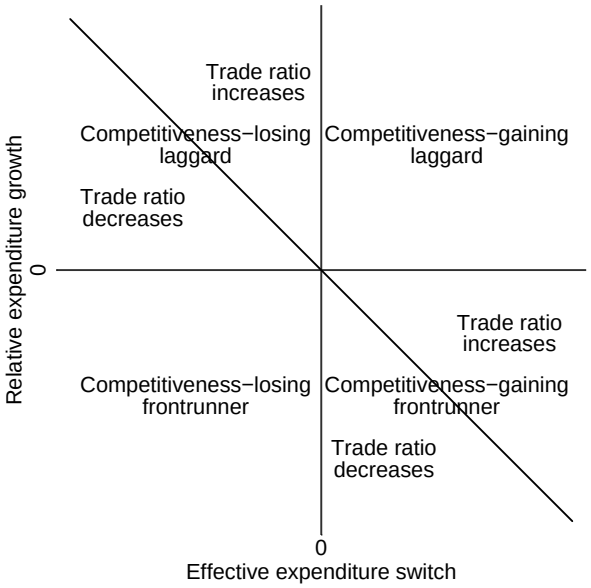


Figure 1: Classification Scheme

The decomposition

$$T\hat{R}V \equiv \hat{ES} + \hat{RA} \tag{7}$$

can be plotted in two dimensions. The quadrants in figure 1 correspond to different combinations of relative expenditure growth and expenditure switching. Countries in the top half of the diagram, where domestic expenditure is growing slower than foreign expenditure ($\hat{RA} > 0$), will be called "laggards", and countries in the bottom half ($\hat{RA} < 0$) will be called "frontrunners". Countries in the right half of the diagram, where expenditure switching is favorable ($\hat{ES} > 0$), are gaining competitiveness, and countries in the left half ($\hat{ES} < 0$) are losing competitiveness. The two separable contributions may reinforce or counteract each other, and the net result will be an increase or decrease in the trade ratio. The diagonal locus ($T\hat{R}V = 0$) separates the region in which the trade ratio is improving, the top-right triangle, from the region in which the trade ratio is deteriorating, the bottom-left triangle.

4. The Determinants of Expenditure Switching

Effective expenditure switching is an observable variable that in theory is influenced by many factors. Basic demand theory suggests that domestic expenditure, foreign expenditure, relative price, and non-price competitiveness factors are its principal determinants. Recall that the variable is composed of the terms of trade, the foreign import intensity,

and the domestic import intensity ($\hat{ES} \equiv \hat{R} + F\hat{MI} - D\hat{MI}$). The elasticity of imports with respect to domestic expenditure can be understood as an estimable parameter. If it is larger than one, the domestic import intensity ($DMI \equiv \frac{M}{DA}$) will increase as domestic expenditure grows – unfavorable expenditure switching. If the elasticity of exports with respect to foreign expenditure is larger than one, the foreign import intensity ($FMI \equiv \frac{X}{FA}$) will increase as foreign expenditure grows – favorable switching. These are cases of expenditure growth-induced expenditure switching (in figure 1 they correspond to a mix of vertical and horizontal movements). Econometric evidence suggests that expenditure elasticities are larger than one (Harmsen et al., 2011; Chen et al., 2013; Comunale and Hessel, 2014; Christodoulopoulou and Tkacevs, 2014).[2]

If the Marshall-Lerner condition holds, a shock to R will call forth a sufficiently strong quantity response such that expenditure switching will be unfavorable. This is a classic case of relative price-induced expenditure switching (in figure 1 it corresponds to a horizontal movement to the right). Note that if elasticity optimism was warranted and the Marshall-Lerner condition was satisfied, "ULC pessimism" would remain a viable hypothesis. ULC elasticities of export demand could be low even if price elasticities were high, because ULCs make up only a small fraction of total unit costs in manufacturing (Storm and Naastepad, 2015a; Storm and Naastepad, 2015b). For instance, assuming firms set the gross output price as a markup on unit costs and cost pass-through is complete, if the price elasticity of export demand is two and the share of labor costs in total unit costs is a quarter, then the elasticity of export demand with respect to ULCs will be just one half. In other words, ULC pessimism and price elasticity optimism could co-exist.

A shock to domestic non-price competitiveness will raise exports, which unambiguously implies favorable switching, and a shock to foreign non-price competitiveness will raise imports, which unambiguously implies unfavorable switching (horizontal movements in figure 1). A formal representation of these propositions, which takes into account global value chains, is given in the appendix. Expenditure, relative price, and non-price competitiveness factors generate observed expenditure switch patterns.

5. Data

To foreshadow the main point of this section, real foreign expenditure (FA) of Austria, for example, is computed as a trade-weighted average of real domestic expenditure (DA) of Austria's trading partners. Germany is Austria's main trading partner, so Germany's DA gets a large weight in Austria's FA.

The extent of coverage is constrained by the availability of observations on real domestic expenditure. In order to capture important EU11 trading partners in East Asia and

[2] Kennedy and Thirlwall (1979) emphasise that the import content varies across the expenditure categories $C+I+G$. Investment tends to induce more imports than government expenditure, for example. Bussière et al. (2013) confirm this pattern. This paper focuses on aggregate expenditure, which implies that expenditure switching, as measured here, includes the effects of changes in the expenditure composition.

Eastern Europe, DA is constructed from real consumption (C) and real gross fixed capital formation (I) of the private sector and government sourced from the United Nations (UN, 2014). The dataset is chosen so as to maximise the coverage of trading partners; the last observation is 2013. Gross fixed capital formation is the preferred concept, as it captures actual expenditure flows and excludes inventory changes. The source variables are chain-weighted quantity indices with base year 2005. The non-additivity property of chain-weighted indices means that in general $C + I \neq DA$, and the inequality increases with the distance to the base year. Therefore DA is computed as follows:

$$\hat{DA}_{it} = s^C_{it} \cdot \hat{C}_{it} + s^I_{it} \cdot \hat{I}_{it}. \tag{8}$$

Domestic expenditure growth is a weighted sum of the growth rates of real consumption and real gross fixed capital formation. i indexes countries, t indexes time, and the hat indicates the growth rate $\hat{Z}_t = (Z_t - Z_{t-1})/Z_{t-1}$ of any variable Z. The weights s^C_{it} and s^I_{it} are the shares of the respective expenditure component in domestic expenditure at time $t-1$ expressed in nominal domestic-currency units ($C^\$$, $I^\$$):

$$s^C_{it} = C^\$_{it-1} / \left(C^\$_{it-1} + I^\$_{it-1} \right) \quad \text{and} \quad s^I_{it} = I^\$_{it-1} / \left(C^\$_{it-1} + I^\$_{it-1} \right). \tag{9}$$

The level DA_{it} is derived from the growth rates $\hat{DA}_{it}$; the index is set to 100 in the year 2000.

The result is a dataset comprising 206 economies, a vast extension of coverage compared to existing databases. The growth rate of DA in this dataset and the growth rate of the same variable in the AMECO database (variable code OUNF) overlap for 900 observations. The correlation coefficient between the two variables is 0.99 – the newly constructed variable achieves global coverage while faithfully reproducing the official counterpart.

The same aggregation method is used to compute FA:

$$\hat{FA}_{it} = \sum_j w_{ijt} \cdot \hat{DA}_{jt}. \tag{10}$$

Foreign expenditure growth is a trade-weighted sum of the trading partners' real domestic expenditure growth. The sum is over all trading partners, indexed by j. The level FA_{it} is derived from the growth rates $\hat{FA}_{it}$; the index is set to 100 in the year 2000.

The weights w_{ijt} are the shares of bilateral trade values (exports + imports) in total trade of country i at time $t-1$ expressed in current dollars:

$$w_{ijt} = \frac{X^\$_{ijt-1} + M^\$_{ijt-1}}{\sum_j \left(X^\$_{ijt-1} + M^\$_{ijt-1} \right)} \tag{11}$$

The bilateral trade flows $X^\$_{ijt}$ and $M^\$_{ijt}$ are sourced from the IMF (DOTS, 2014). The number of EU11 trading partners with non-missing observations on bilateral trade *and* real domestic expenditure varies over time (e.g. 189 countries in 2013).

The remaining variables are defined as follows: UN (2014) provides trade flows of goods and services in current domestic-currency values ($X^{\$}$ and $M^{\$}$) and as chain-weighted quantity indices with base year 2005 (X and M). The trade ratio is $TRV = X^{\$}/M^{\$}$, the real trade ratio $TRQ = X/M$, the terms of trade $R = TRV/TRQ$, the domestic import intensity $DMI = M/DA$, and the foreign import intensity $FMI = X/FA$.

6. Results

Table 2 presents summary statistics of the variables.[3] On average foreign expenditure grew faster than domestic expenditure, effective expenditure switching was mildly unfavorable, and the trade ratio increased. Changes in the terms of trade were small and did not cumulate – the standard deviation is relatively low and the mean growth rate is almost zero. The indicator of foreign expenditure lumps together trading partners with high and low growth rates, hence its low range and low standard deviation. A common element in business cycles across countries causes the variation in relative expenditure growth to be lower than the variation in domestic expenditure growth. An empirical fact associated with globalization is that global trade grows faster than global value added, and the EU11 is no exception – the import intensity increased rapidly.

The summary statistics mask considerable variation across countries and over time. Table 5 in the appendix reports the means of all variables by country and by period; the utmost right column reports the unweighted means across the EU11.[4] There is a trend, consistent with the emergence of viable low-wage competitors in East Asia and Eastern Europe, toward unfavorable switching and increasing relative expenditure. The average EU11 country experienced favorable expenditure switching in the preparatory period (1990-1998), unfavorable switching in the euro period (1999-2007), and even stronger unfavorable switching in the crisis period (2008-2013). Relative expenditure remained constant in the preparatory period, was increasing in the euro period, and sharply increasing in the crisis period. Whereas domestic expenditure growth did pick up in 1999-2007 compared to 1990-1998, it did more so in the trading partner economies. Foreign expenditure growth remained positive during the crisis.

The average country was a competitiveness-losing laggard during the euro period. The positive contribution from relative expenditure growth could not compensate for the negative contribution from unfavorable expenditure switching, and thus the trade ratio decreased. The average country remained in the position of a competitiveness-losing laggard during the crisis, but this time the positive growth effect more than compensated for the negative switch effect, and the trade ratio increased. The number of competitiveness-losing laggards increased from two during the preparatory period, to eight during the euro period, to nine during the crisis period. The euro area countries relied more and more on foreign

[3] The decomposition was derived in continuous-time, but implemented with discrete-time variables. The discrete-time version gives rise to interaction terms, which are omitted from the reported results.

[4] The complete decomposition by year is available upon request.

Table 2: Summary Statistics, Growth Rates in %, 1990-2013

	Obs	Mean	StDev	Min	Max
Trade ratio: $\hat{TRV} = \hat{R} + \hat{X} - \hat{M} = \hat{ES} + \hat{RA}$	264	0.6	3.8	-9.2	17.2
Effective expenditure switching: $\hat{ES} = \hat{R} + \hat{RMI}$	264	-0.2	3.3	-9.5	14.6
Relative expenditure: $\hat{RA} = \hat{FA} - \hat{DA}$	264	0.8	2.6	-5.5	13.4
Real foreign expenditure: $\hat{FA}$	264	2.4	1.4	-2.5	5.7
Real domestic expenditure: $\hat{DA}$	264	1.6	3.1	-10.8	9.9
Terms of trade: $\hat{R}$	264	-0.1	1.8	-5.9	6.3
Relative import intensity: $\hat{RMI} = \hat{FMI} - \hat{DMI}$	264	-0.1	3.3	-11.4	16.5
Foreign import intensity: $\hat{FMI} = \hat{X} - \hat{FA}$	264	2.8	5.6	-18.0	20.4
Domestic import intensity: $\hat{DMI} = \hat{M} - \hat{DA}$	264	2.9	4.6	-17.0	17.1

Notes: The trade ratio is the value of exports over the value of imports. Effective expenditure switching is composed of the terms of trade and the relative import intensity. Relative expenditure is foreign expenditure over domestic expenditure. Domestic expenditure is measured in real terms (an index set to 100 in 2000). Foreign expenditure is a trade-weighted average of trading partners' domestic expenditure. The domestic import intensity is defined as real imports divided by real domestic expenditure, the foreign import intensity as real exports divided by real foreign expenditure, and the relative import intensity as the foreign import intensity divided by the domestic import intensity. Sections 3 and 5 state the precise variable definitions. The table shows growth rates, indicated by the hât. The growth rate of a ratio equals the numerator's growth rate minus the denominator's growth rate (plus an interaction term).

expenditure growth to prevent their trade balances from deteriorating.[5]

Foreign expenditure dynamics are similar across countries. Foreign expenditure was growing by 2.4% on average in the preparatory period, by 3.3% in the euro period, and by 1.1% in the crisis period. The deviations of individual countries from the period-means are relatively small. It is therefore the relatively large variation in domestic expenditure which accounts for most of the cross-country variation in relative expenditure.

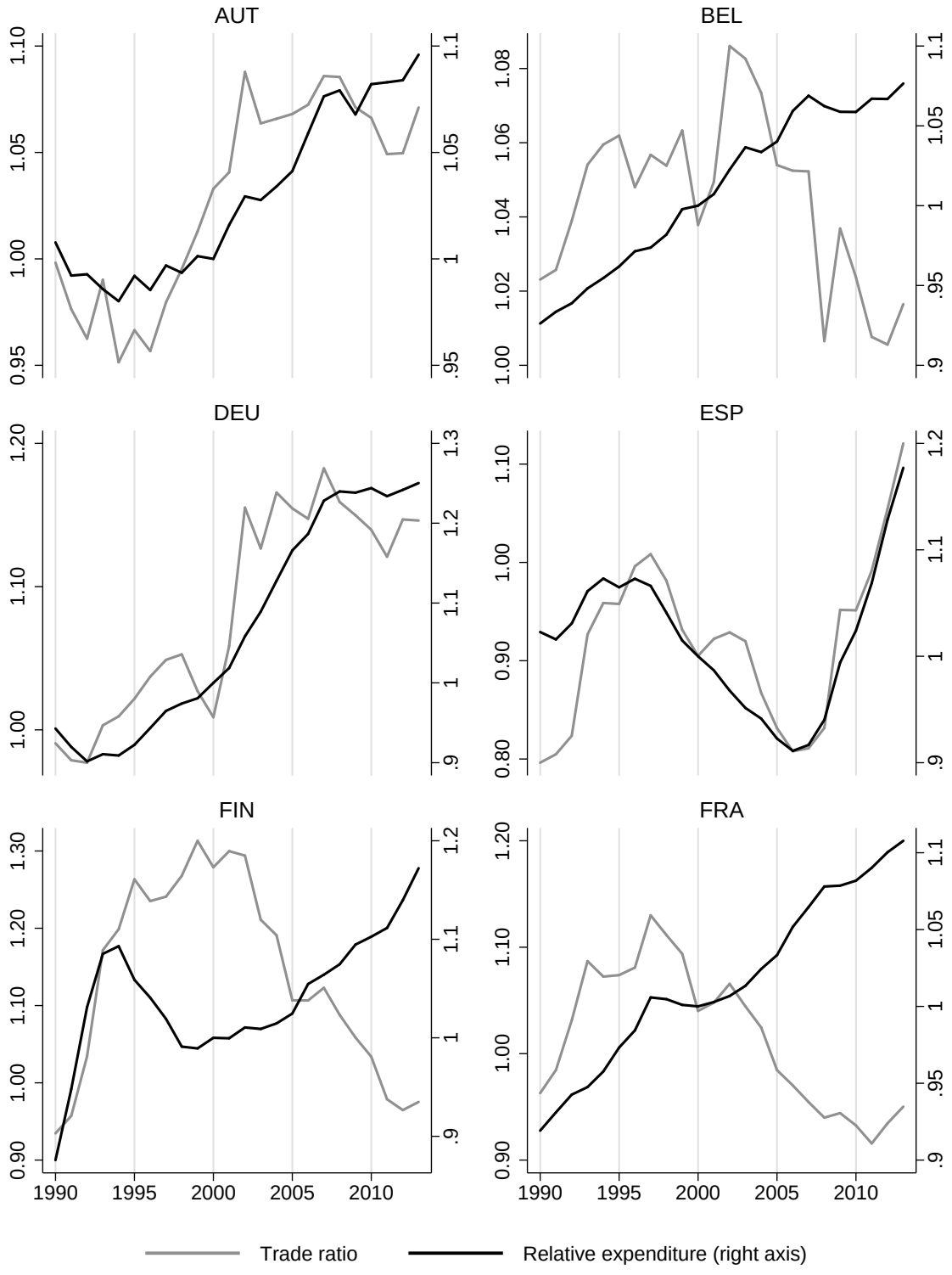
Figures 2 and 3 show the evolution of the trade ratio and relative expenditure by country. The axes' scales are country-specific in order to highlight the variation over time. A few points are worth noting. Germany and Austria are twins: the trade ratio tended to decrease in the early 1990s and during the crisis, when domestic expenditure growth outpaced foreign expenditure growth, and to increase otherwise. France and Italy are twins too: the trade ratio increased in the early 1990s, peaked in 1996-1997, and deteriorated since then, while relative expenditure was increasing through almost the entire period (the time series plots conceal that expenditure growth was lower in Italy than in France). In Greece, the sharp crisis-induced improvement of the trade ratio dwarfs the quantitatively less significant changes until 2007, and the same is true for Portugal. In Finland, the Nordic financial crisis in the early 1990s displays as a sharp upward movement of both the trade ratio and relative expenditure.

Table 3 and figure 4 summarise the key results of the decomposition in cumulative terms. The frontrunners are in the bottom half of each plot and the laggards are in the top half; countries in the left half are losing competitiveness and countries in the right half are gaining competitiveness. The scatter plot points tend to move from the bottom-right quadrant to the top-left quadrant over time – the visual representation of the trend toward unfavorable switching and increasing relative expenditure.

Focusing on the euro period, it can be observed that expenditure switching was most unfavorable for Finland, France, and Italy (discussed below). The countries that recorded large trade deficits in 2007 – Spain, Greece, Ireland, and Portugal – experienced either favorable expenditure switching (Ireland and Greece) or unfavorable switching to the same extent as core countries (Spain and Portugal). That is, the large pre-crisis deficits cannot be attributed to switching effects. Germany, at the top of the scatter plot, and Ireland and Spain, at the bottom, recorded the largest gaps between domestic and foreign expenditure growth. Germany comes out on top because expenditure growth was even more depressed than in Italy and Portugal (Italy was growing slowly throughout the sample period and Portugal was growing slowly after a boom in the late 1990s).

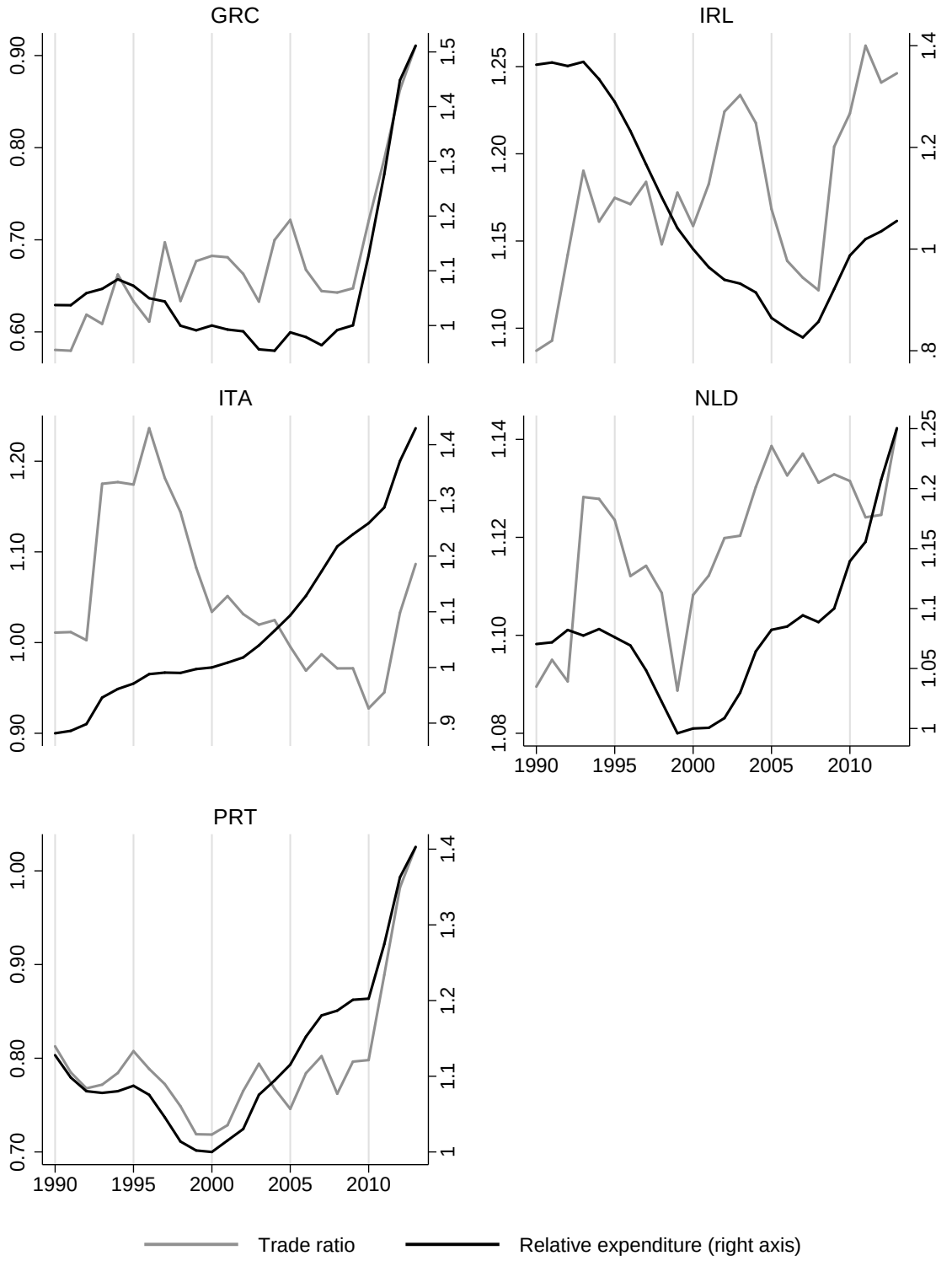
Focusing on the crisis period, it can be observed that Spain and Portugal achieved rebalancing to some extent through favorable expenditure switching, but the contribution from expenditure growth, i.e. from the domestic expenditure collapse, was greater. Greece could not induce favorable switching, but its expenditure collapse was extraordinary deep,

[5] This finding is consistent with Timmer et al. (2013) who introduce the concept "Global Value Chain (GVC) income". In advanced economies, the domestic value added content of production tends to decline – a competitiveness loss – but the decline in shares does not necessarily imply a reduction of GVC income in absolute terms, because GVC income in the world as a whole is increasing.



Notes: The trade ratio is defined as the value of exports over the value of imports. Relative expenditure is defined as real foreign expenditure over real domestic expenditure (both variables are indices normalized to 100 in 2000). Rising relative expenditure indicates that trading partners' expenditure is growing faster than domestic expenditure. Sections 3 and 5 state the precise variable definitions.

Figure 2: Trade Ratio and Relative Expenditure 1990-2013



Notes: The trade ratio is defined as the value of exports over the value of imports. Relative expenditure is defined as real foreign expenditure over real domestic expenditure (both variables are indices normalized to 100 in 2000). Rising relative expenditure indicates that trading partners' expenditure is growing faster than domestic expenditure. Sections 3 and 5 state the precise variable definitions.

Figure 3: Trade Ratio and Relative Expenditure 1990-2013 (continued)

Table 3: Key Results: Cumulative Contributions in % by Period

	AUT	BEL	DEU	ESP	FIN	FRA	GRC	IRL	ITA	NLD	PRT	EU11
1990-1998												
Trade ratio	0.9	2.4	8.3	18.1	36.9	14.8	-1.3	4.3	14.5	3.4	-10.0	8.4
Effective expenditure switch	2.5	-3.3	6.2	18.0	17.5	4.7	-1.6	31.8	1.0	8.2	3.1	8.0
Relative expenditure	-1.6	5.8	2.0	0.1	16.5	9.7	0.3	-20.9	13.4	-4.4	-12.7	0.7
1999-2007												
Trade ratio	9.1	-0.1	12.3	-19.3	-11.4	-14.1	-2.6	-1.7	-13.7	2.6	7.1	-2.9
Effective expenditure switch	0.8	-8.2	-10.8	-8.3	-17.5	-18.9	5.2	31.2	-27.1	-4.2	-8.0	-6.0
Relative expenditure	8.2	8.8	26.0	-12.0	7.3	5.9	-7.4	-25.1	18.3	7.0	16.4	4.9
2008-2013												
Trade ratio	-1.4	-3.4	-3.1	34.5	-13.1	-0.5	46.2	10.4	10.1	0.5	27.8	9.8
Effective expenditure switch	-3.2	-4.1	-4.8	4.9	-21.2	-4.4	-8.2	-13.7	-9.8	-12.1	7.5	-6.3
Relative expenditure	1.9	0.7	1.8	28.2	10.2	4.1	59.3	27.9	22.0	14.3	19.0	17.2

Notes: The trade ratio is the value of exports over the value of imports. Effective expenditure switching is composed of the terms of trade and the relative import intensity. Relative expenditure is real foreign expenditure over real domestic expenditure. Sections 3 and 5 state the precise variable definitions. Cumulative growth over a period, e.g. 1999-2007, is calculated as $Z_{2007}/Z_{1998} \times 100 - 100$, where Z is the level of the variable of interest. Interaction terms (not reported) account for the difference between the cumulative change in the trade ratio ($\hat{TRV}$) and the sum of effective expenditure switching ($\hat{ES}$) and relative expenditure growth ($\hat{RA}$), i.e. $\hat{TRV} = \hat{ES} + \hat{RA} +$ interaction term.

so the trade ratio improved.

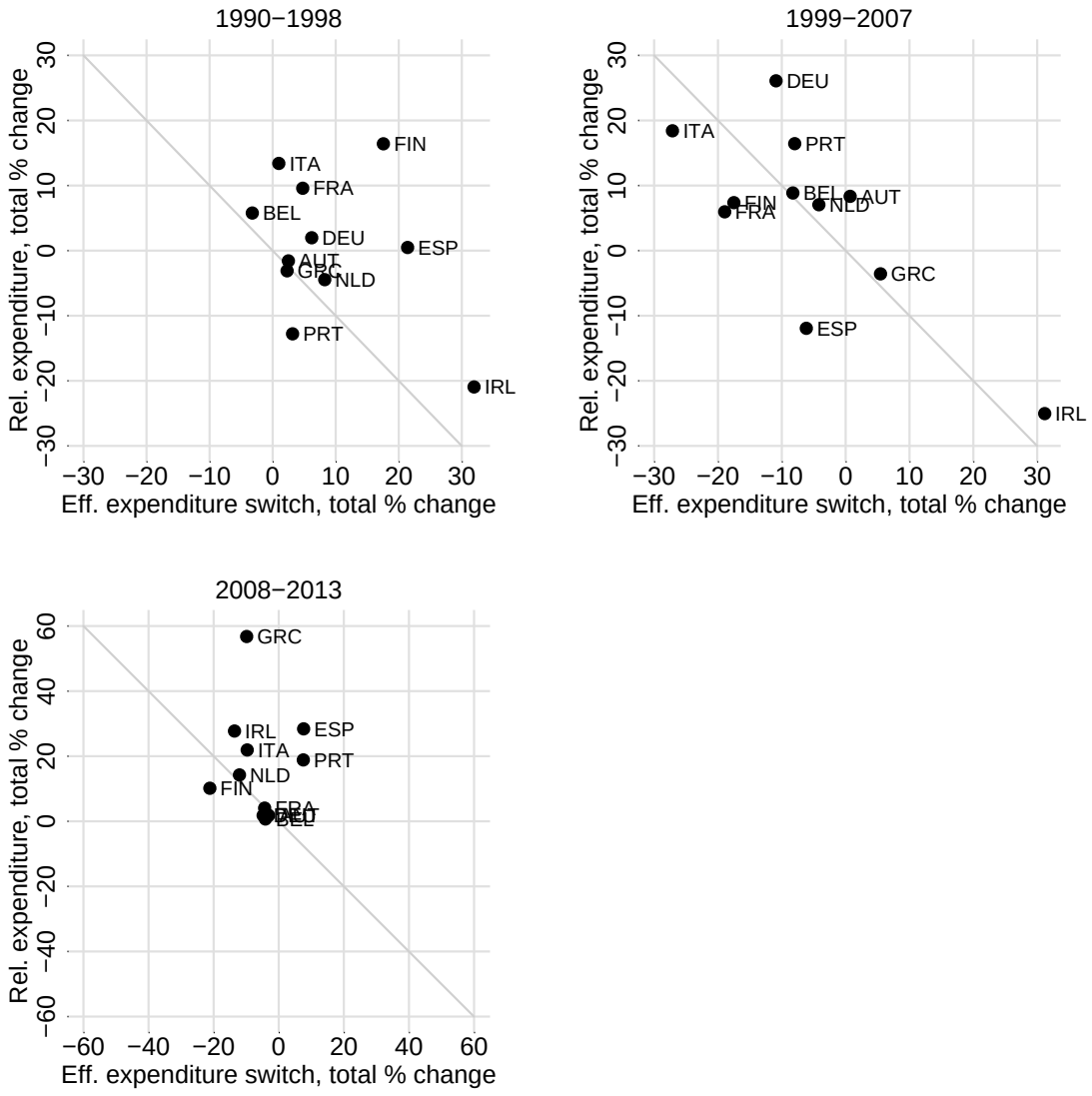
The four largest economies and Greece, for its prominence in the economic policy debate, will be analyzed in more detail below.

6.1. Germany and Spain

Favorable expenditure switching neutralised the unification boom's effect on the trade balance. Favorable switching also contributed to the emergence of the trade surplus in 2001-2002. But Germany otherwise experienced unfavorable expenditure switching, beginning in 1995 and lasting through the crisis. Over 1995-2013, unfavorable expenditure switching implied a cumulative decline in the trade ratio of -17%, in spite of the wage moderation.[6]

Aside from the short-lived unification boom, German expenditure growth persistently fell short of foreign expenditure growth. The average growth rate of domestic expenditure over 1995-2007 was 1%, compared to the foreign growth rate of 3.3% (0.9% compared

[6]The German wage moderation began in 1995 (e.g. Lapavitsas et al., 2010; Dustmann et al., 2014)



Notes: Data from table 3. The trade ratio is the value of exports over the value of imports. Effective expenditure switching is composed of the terms of trade and the relative import intensity. Relative expenditure is real foreign expenditure over real domestic expenditure. Sections 3 and 5 state the precise variable definitions. Cumulative growth over a period, e.g. 1999-2007, is calculated as $Z_{2007}/Z_{1998} \times 100 - 100$, where Z is the level of the variable of interest. The axis range in the bottom-left plot is twice the range of the other plots.

Figure 4: Scatter Plots by Period, Effective Expenditure Switching vs Relative Expenditure

to 1.2% over the crisis period). It is remarkable and a sign of the depth of the German slump that the level of real domestic expenditure in 2005 was 0.5% lower than in 2000. What accounts for the trade surplus is the exceptional slack in domestic expenditure, in particular over 2001-2005.

In Spain, expenditure switching was favorable in every year from 1990-1997, and sharply so during the EMS crisis in 1993. Domestic expenditure fell by -2.7% in 1993 but the average change in relative expenditure over 1990-1997 was small, and thus the Spanish trade balance turned from a deficit in 1990 into a surplus in 1997.

1995 marks the beginning of the Spanish boom. It lasted 13 years in which domestic expenditure was growing by 4.3% on average and foreign expenditure could not keep up. Favorable expenditure switching occurred temporarily in 2001-2003, like in Germany, but overall expenditure was switched away from Spanish output, like in Germany. By 2007 the Spanish economy had developed a sizable deficit.

Domestic expenditure collapsed when the crisis hit, and continued to decline through 2013. Favorable expenditure switching contributed to the shrinking of the trade deficit over 2008-2013 (a 5% cumulative increase in the trade ratio), but the contribution from expenditure dynamics was greater (a 28% cumulative increase in the trade ratio). In short: the expenditure boom produced a deficit and the collapse made it disappear, while expenditure switching merely acted in a supporting role.

The claim that Spain developed a competitiveness problem over 1999-2007 is justified if competitiveness refers to relative ULCs and nothing else. But if competitiveness refers to a country's advantage or disadvantage for selling in international markets, the claim cannot be upheld. Spanish export revenue was growing by 7.5% on average during the euro period. Spanish exports proved robust during the crisis, growing faster than German exports (table 1). The country, quite simply, was on too high a growth path. The combination of large external deficits and high expenditure growth rates could have been manageable perhaps if investment had driven expenditure and the country's productive capacity had increased more rapidly, but Spain's expenditure dynamics were driven by consumption and real estate investment, and these were driven by debt. Expenditure adjustment was a question of time.[7]

Germany and Spain, two countries with wildly different ULC dynamics, experienced unfavorable expenditure switching of roughly the same magnitude over the euro period. Meanwhile domestic expenditure diverged: the long German slump translated into huge surpluses and the Spanish boom into huge deficits. Germany was a competitiveness-losing laggard to the extreme and Spain a competitiveness-losing frontrunner to the extreme.

6.2. France and Italy

In France, domestic expenditure growth was relatively weak over 1990-1997, and expenditure switching was overall favorable. Thus the trade account turned from a deficit in 1990

[7] The distinction between consumption and productive investment in the context of current account problems in a monetary union was made by Ingram (1973), and taken up by Giavazzi and Spaventa (2011).

to a surplus that peaked in 1997.

The period 1998-2007 witnessed only small changes in relative expenditure, which can be attributed to a domestic expenditure boom in 1998-2000. The surplus was shrinking and then turned into a deficit, for the first time in 2005, because of persistent unfavorable expenditure switching. This pattern, i.e. a small positive expenditure growth effect and a larger negative switching effect, continued into the crisis and the trade account deteriorated further. The French trajectory since the mid-1990s is characterised by persistent unfavorable expenditure switching.

The Italian trade account was balanced in the early 1990s. Domestic expenditure collapsed in the turmoil of the EMS crisis in 1993 while foreign expenditure growth remained positive. In addition Italy experienced sharp favorable expenditure switching in 1993 (the largest annual switching effect in the sample). The combined force of switching and growth effects meant that Italy ran sizable trade surpluses in the mid-1990s as a result.

Domestic expenditure was weak throughout the entire sample period, growing faster than foreign expenditure only in 1998, yet the domestic slack could not prevent the emergence of a trade deficit. It merely contained its size. Italy experienced persistent unfavorable switching since the mid-1990s. The positive expenditure growth effect could not compensate for the large negative switching effect.

France and Italy do have competitiveness problems. Both countries entered the euro with trade surpluses which had emerged in the first half of the 1990s, and experienced persistent unfavorable expenditure switching since then. Export growth rates were low, the lowest in the EU11 over the euro period (table 1). Economic stagnation averted a further deterioration of the external accounts since the onset of the crisis, but the problem of international competitiveness needs to be addressed in order to avoid balance of payments difficulties if and when growth picks up.

6.3. Greece

In figure 4 Greece and Ireland appear as healthy catch-up economies during the euro period – competitiveness-gaining frontrunners which balance high domestic growth rates with favorable expenditure switching. I will not comment on the Irish experience. The practice of transfer pricing and related schemes which allow multinational firms to benefit from the Irish tax code pose challenges to the interpretation of the Irish national accounts and balance-of-payments data. The first fact to appreciate with regard to Greece is that the country was running trade deficits ever since systematic recording of balance of payments data began. The trade ratio's historical average is 0.65, i.e. exports amounted to no more than 0.65% of imports over 1960-2013, and the last data point, 0.91 in 2013, represents the highest value on record (based on AMECO data from 1960-2013). The pre-crisis current account deficits can hardly be viewed as the result of a competitiveness problem newly acquired through ULC increases over 1999-2007.

The Greek trade balance was deteriorating during the euro period mainly because the importance of trade has grown. The trade balance can be decomposed into the direction

of trade and the trade intensity:

$$\frac{X^{\$} - M^{\$}}{Y^{\$}} \equiv \frac{X^{\$} - M^{\$}}{X^{\$} + M^{\$}} \cdot \frac{X^{\$} + M^{\$}}{Y^{\$}} \tag{12}$$

$Y^{\$}$ is GDP, $X^{\$}$ and $M^{\$}$ are exports and imports of goods and services, measured in euros (AMECO, 2015). The first fraction on the right-hand side is the direction of trade, and the second is the trade intensity. On average over 1990-1998, the direction of trade assumed the value -0.23 and the trade intensity was 38%. In 2007, the direction of trade had hardly changed (-0.21), but trade flows made up a larger share of GDP (57%). The ULC divergence, which allegedly caused a competitiveness problem, either did not influence the direction of trade, or counteracting factors concealed a systematic relation between the variables.

The size of the Greek current account deficit used to be contained by transfer payments and a positive balance on income account (Holinski et al., 2012; Kang and Shambaugh, 2013). The combined balance on the income and transfer accounts turned from 5.4% (the mean over 1990-1998) to -3.4% in 2007. That is, the large current account deficit in 2007, before the expenditure collapse, can be explained in no small part by unfavorable developments on the income and transfer accounts which bear little relation to labor cost competitiveness.

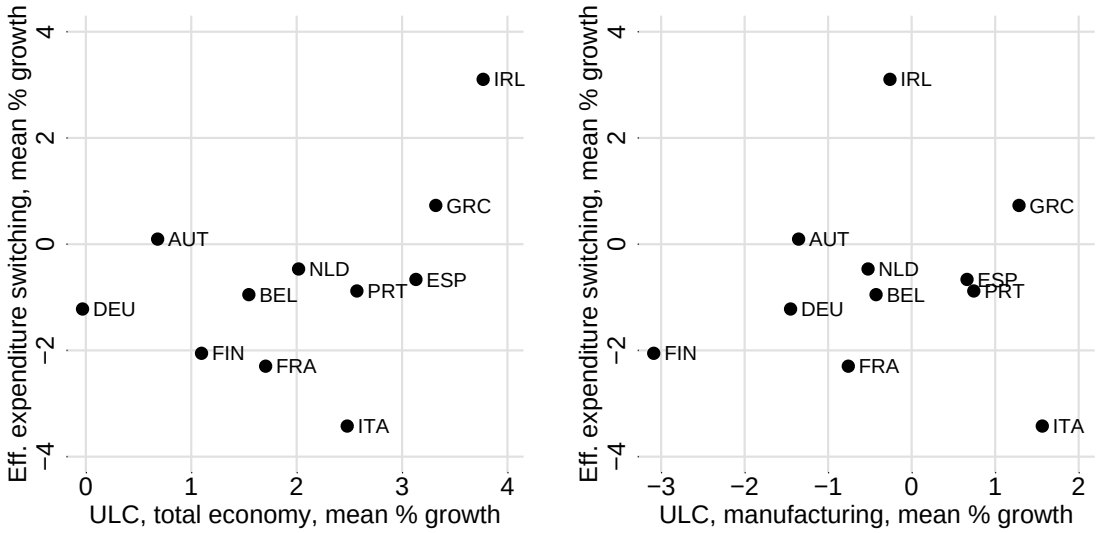
The comments made above with regard to Spain apply equally to Greece. Greece can hardly be said to have developed a competitiveness problem over 1999-2007; it recorded the EU11's highest export revenue growth rates during the period (table 1). The country was on too high a growth path, and expenditure adjustment was a question of time. In contrast to Spain, Greece did manage to increase labor productivity and catch-up to some extent, but it entered the euro with a huge trade deficit to begin with.[8]

6.4. Assessing the ULC Channel

The trade ratio decomposition measures expenditure growth and expenditure switching effects, but it does not identify nor quantify causal mechanisms. Cost advantages, product quality upgrades, product innovations, the pattern of product market specialization – the decomposition is silent about the sources of export growth and expenditure switching. Nevertheless, the decomposition creates an empirical record, and a defensible proposition must be consistent with it.

There is no correlation between ULCs and exports, nor is there one between ULCs and expenditure switching (figure 5). Of course it can be maintained that a country's export performance is highly elastic with respect to ULCs, but then a counteracting force would have to be at work, which compels the variables to appear unrelated on the surface. The alternative, short of econometric analysis, is to take the facts at face value: a sharp increase

[8] The analysis by Kang and Shambaugh (2013) slices the data differently but concurs with the assessment in this section.

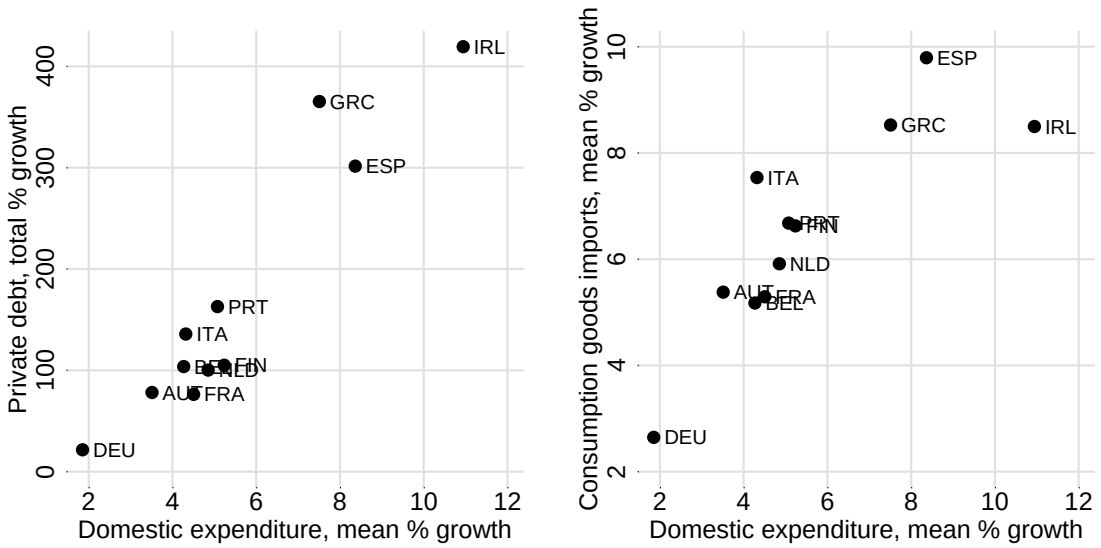


Notes: ULCs are from AMECO (2015). By construction, ULCs of the total economy (PLCD, left panel) include domestic industries which provide inputs to the export sector, but include many non-tradable goods and services as well. ULCs of the manufacturing sector (PLCM, right panel) better capture tradable goods, but do not reflect labor cost developments in domestic industries which provide inputs to the manufacturing sector. Effective expenditure switching is defined in sections 3 and 5.

Figure 5: The ULC Channel: ULCs vs Effective Expenditure Switching 1999-2007

in ULCs did not prevent Spain, for example, from recording high export revenue growth rates and displaying the same expenditure switch pattern as Germany. The prima facie evidence suggests that the observed ULC divergence did not influence export performance and expenditure switching very much. The eurozone imbalance debate would benefit from a healthy dose of *ULC skepticism*.[9]

[9]The decomposition cannot answer why ULCs do not seem to promote export growth nor induce expenditure switching. One explanation, which was mentioned in section 4, involves the distinction between the price elasticity of export demand and the ULC elasticity of export demand. ULC elasticities could be low even if price elasticities were high (Storm and Naastepad, 2015a; Storm and Naastepad, 2015b). Another line of reasoning questions the validity of using conventional *aggregate* ULC indicators as measures of labor cost competitiveness. Aggregate ULCs increase when i) the ULCs in tradable goods sectors increase, ii) the ULCs in non-tradable goods sectors increase, iii) a country's sectoral composition changes in favor of sectors with relatively high ULCs. The evolution of conventional ULCs was driven to a large extent by compositional dynamics and labor cost increases in the non-tradable goods sector (Gaulier and Vicard, 2012; Felipe and Kumar, 2014). EC (2014) computes a new measure of labor cost competitiveness based on disaggregated data: sectoral ULCs are computed first, and then aggregated over sectors. "The new measure does not point to large losses in competitiveness in vulnerable countries prior to 2006 (or 2007), ... a country can build external vulnerabilities without losing cost-competitiveness in each sector of specialisation" (EC, 2014, p. 38).



Notes: Domestic expenditure is taken from table 1. Consumption goods imports from OECD (2014) are measured in euros. Debt data from BIS (2014): Debt refers to the stock of outstanding loans and debt securities with domestic and foreign counterparties measured in euros. The private non-financial sector includes non-financial corporations, households, and non-profit institutions serving households. Total debt growth over 1999-2007 is calculated as $Z_{2007q4}/Z_{1998q4} \times 100 - 100$, where Z is the debt level.

Figure 6: The Expenditure Channel: Debt, Expenditure, and Consumption Goods Imports 1999-2007

6.5. Assessing the Expenditure Channel

The expenditure channel stands out in scatter plots. The OECD publishes trade flows broken down by end-use category: manufacturing imports are classified as capital goods, consumption goods, and intermediate goods (OECD, 2014). Figure 6 visualises the positive correlation between private debt and aggregate expenditure, and between expenditure and imports for consumption purposes. Countries tend to cluster around the median, while Germany in the bottom-left and the boom-and-bust countries in the top-right stand out. The link between domestic expenditure and consumption goods imports is striking.[10]

The figure helps in the resolution of what is a puzzle from the perspective of standard demand theory. German cost competitiveness gains and moderate income growth should have depressed imports, but German import expenditure was growing rapidly (table 1). Broken down by end-use category, the data shows that growth of German consumption

[10]This paper takes expenditure dynamics as given, and does not discuss their source. The correlation between private debt and domestic expenditure suggests that there is merit to explanations which focus on the financial sector. Waysand et al. (2010), Hale and Obstfeld (2014), and Hobza and Zeugner (2014) document with bilateral data the historically unprecedented rise in cross-border gross financial flows in the eurozone.

Table 4: Expenditure Booms 1990-2013, Summary Statistics

	$\hat{TRV}$	$\hat{ES}$	$\hat{FA}$	$\hat{DA}$
Finland 1995-1999	1.9	3.9	2.8	4.9
France 1998-2000	-2.7	-2.5	3.5	3.7
Germany 1990-1992	0.2	2.1	2.3	4.3
Greece 1997-2003	0.2	1.5	3.3	4.6
Ireland 1994-2007	-0.4	3.3	3.1	6.9
Netherlands 1995-2000	-0.3	1.0	2.9	4.3
Portugal 1990-1992	-2.3	-0.6	3.3	5.1
Portugal 1996-2000	-2.6	-0.1	2.4	5.0
Spain 1997-2007	-1.8	-0.4	3.1	4.6
Unweighted mean	-0.7	1.3	3.0	5.1

Notes: Booms are defined as episodes in which real domestic expenditure grows by at least 3% for at least three consecutive years. TRV denotes the trade ratio, ES effective expenditure switching, FA real foreign expenditure, and DA real domestic expenditure. The table shows mean growth rates in %. Sections 3 and 5 state the precise variable definitions.

goods imports was low indeed – 2.6% is an extremely low value in this sample – and growth of intermediate goods imports was high. German firms built production chains across borders (e.g. Marin, 2006; Simonazzi et al., 2013), the German consumer hardly increased spending.

The figures 2 and 3 clearly show the strong and lasting expenditure booms in Spain 1995-2007 and Ireland 1994-2007 (the Greek boom 1995-2007 does not stand out because the axis scale is forced to accommodate the deep expenditure collapse 2008-2013). Table 4 lists all boom episodes in this sample, defined as episodes in which expenditure grows by at least 3% for at least three years.[11] Booms tend to be associated with a deterioration of the trade account, but not necessarily so. The "Nokia boom" is a striking example of a boom over the course of which the trade balance did not deteriorate, and even improved. Between 1993 and 2000, Finnish real exports were growing well beyond 10% annually on the back of a rapid expansion of the ICT industry, a welcome contribution to recovery from the Nordic financial crisis. Since around the turn of the century and along with Nokia's demise as the world's biggest manufacturer of mobile phones, the picture looks pretty bleak in the sense that the Finnish trade ratio is deteriorating in spite of sluggish domestic expenditure growth. Finland, like France and Italy, needs to address international competitiveness problems.

[11] This criterion defines the Spanish boom as 1997-2007, and the Greek boom as 1998-2004. I am tempted to view the countries' experience as continuous boom episodes, lasting from 1995 to 2007 in both cases.

7. Conclusions

The paper introduced a method to decompose the dynamics of the trade ratio into expenditure growth and expenditure switching. It finds that most member states, including Germany, experienced unfavorable expenditure switching from the introduction of the euro through the crisis. The implied deterioriation of the trade balance was countered by low rates of domestic expenditure growth (relative to trading partners). Domestic expenditure growth was lowest in Germany, which ensured that a trade surplus could emerge in spite of unfavorable expenditure switching. The Spanish expenditure boom converted the mid-1990 surpluses into the 2007 deficit; the bulk of adjustment during the crisis occurred through expenditure compression. The magnitude of unfavorable expenditure switching was largest in Finland, France, and Italy; in surplus initially, the countries experienced a persistent decline in competitiveness and a deterioriation of the trade balance. Greece experienced favorable expenditure switching but failed to adjust to a deficit which existed long before the eurozone was created.

There is no correlation between ULCs and export performance – the Kaldor Paradox – nor is there one between ULCs and expenditure switching. While it is possible that confounding factors just happened to offset ULC-induced expenditure switching, it stands to reason that the causal relation between the two variables is weak. Conventional ULC indicators do not seem to measure international competitiveness, broadly defined. Hence a reversal of the ULC divergence is unlikely to bring about large expenditure switching effects, and reforms designed to engineer such a reversal should not be regarded as expenditure-switching policies.

References

Alexander, Sidney S. (1952) 'Effects of a Devaluation on a Trade Balance.' *Staff Papers - International Monetary Fund* 2(2), 263–278

AMECO (2015) 'Annual Macroeconomic Database.' Database, European Commission, Directorate General for Economic and Financial Affairs. (Accessed March 1, 2015)

Arghyrou, Michael G., and Georgios Chortareas (2008) 'Current Account Imbalances and Real Exchange Rates in the Euro Area.' *Review of International Economics* 16(4), 747–764

Benkovskis, Konstantins, and Julia Wörz (2014) 'What Drives the Market Share Changes? Price Versus Non-Price Factors.' Working Paper 1640, European Central Bank

Bickerdike, C. F. (1920) 'The Instability of Foreign Exchange.' *The Economic Journal* 30(117), 118–122

BIS (2014) 'Long Series on Credit to the Private Non-Financial Sector.' Database, Bank for International Settlements, December. (Accessed March 1, 2015)

Blankenburg, Stephanie, Lawrence King, Sue Konzelmann, and Frank Wilkinson (2013) 'Prospects for the Eurozone.' *Cambridge Journal of Economics* 37(3), 463–477

Burda, Michael C., and Jennifer Hunt (2011) 'What Explains the German Labor Market Miracle in the Great Recession?' *Brookings Papers on Economic Activity* pp. 273–335

Bussière, Matthieu, Giovanni Callegari, Fabio Ghironi, Giulia Sestieri, and Norihiko Yamano (2013) 'Estimating Trade Elasticities: Demand Composition and the Trade Collapse of 2008–2009.' *American Economic Journal: Macroeconomics* 5(3), 118–151

Buti, Marco, and Alessandro Turrini (2012) 'Slow but Steady? Achievements and Shortcomings of Competitive Disinflation Within the Euro Area.' ECFIN Economic Brief 16, European Commission, Directorate-General for Economic and Financial Affairs

Carlin, W., A. Glyn, and J. Van Reenen (2001) 'Export Market Performance of OECD Countries: An Empirical Examination of the Role of Cost Competitiveness.' *The Economic Journal* 111(468), 128–162

Chen, Ruo, Gian Maria Milesi-Ferretti, and Thierry Tressel (2013) 'External Imbalances in the Eurozone.' *Economic Policy* 28(73), 101–142

Christodoulopoulou, Styliani, and Olegs Tkacevs (2014) 'Measuring the Effectiveness of Cost and Price Competitiveness in External Rebalancing of Euro Area Countries: What Do Alternative HCIs Tell Us?' Working Paper 1736, European Central Bank, September

Comunale, Mariarosaria, and Jeroen Hessel (2014) 'Current Account Imbalances in the Euro Area: Competitiveness or Financial Cycle?' DNB Working Paper 443, Netherlands Central Bank, Research Department

Correa-Lopez, Monica, and Rafael Domenech (2012) 'The Internationalization of Spanish Firms.' Working Paper 12/30, BBVA Research, December

Diaz-Sanchez, Jose L., and Aristomene Varoudakis (2015) 'Tracking the Causes of Eurozone External Imbalances: New Evidence and Some Policy Implications.' *International Economics and Economic Policy* pp. 1–28

DOTS (2014) 'Direction of Trade Statistics.' Database, International Monetary Fund, Statistics Division. (Accessed September 8, 2014)

Dustmann, Christian, Bernd Fitzenberger, Uta Schönberg, and Alexandra Spitz-Oener (2014) 'From Sick Man of Europe to Economic Superstar: Germany's Resurgent Economy.' *The Journal of Economic Perspectives* 28(1), 167–188

EC (2006) 'The EU Economy 2006 Review: Adjustment Dynamics in the Euro Area - Experiences and Challenges.' European Economy 6, European Commission, Directorate-General for Economic and Financial Affairs

_ (2009) 'Special Issue: Competitiveness Developments Within the Euro Area.' Quarterly Report on the Euro Area 8(1), European Commission, Directorate-General for Economic and Financial Affairs, Brussels

_ (2010) 'Surveillance of Intra-Euro-Area Competitiveness and Imbalances.' European Economy 1/2010, European Commission, Directorate-General for Economic and Financial Affairs

_ (2012) 'A Closer Look at Some Drivers of Trade Performance at Member State Level.' Quarterly Report on the Euro Area 11(2), European Commission, Directorate-General for Economic and Financial Affairs, Brussels

_ (2014) 'A Competitiveness Measure Based on Sector Unit Labour Costs.' Quarterly Report on the Euro Area 13(2), European Commission, Directorate-General for Economic and Financial Affairs, Brussels, June

ECB (2012) 'Competitiveness and External Imbalances within the Euro Area.' Occasional Paper 139, European Central Bank, December

Fagerberg, Jan (1988) 'International Competitiveness.' *The Economic Journal* 98(391), 355–374

_ (1994) 'Technology and International Differences in Growth Rates.' *Journal of Economic Literature* 32(3), 1147–1175

_ (1996) 'Technology and Competitiveness.' *Oxford Review of Economic Policy* 12(3), 39–51

Fagerberg, Jan, Martin Srholec, and Mark Knell (2007) 'The Competitiveness of Nations: Why Some Countries Prosper While Others Fall Behind.' *World Development* 35(10), 1595–1620

Felipe, Jesus, and Utsav Kumar (2014) 'Unit Labor Costs in the Eurozone: The Competitiveness Debate Again.' *Review of Keynesian Economics* 2(4), 490–507

Foster-McGregor, Neil, and Robert Stehrer (2013) 'Value Added Content of Trade: A Comprehensive Approach.' *Economics Letters* 120(2), 354–357

Gaulier, Guillaume, and Vincent Vicard (2012) 'Current Account Imbalances in the Euro Area: Competitiveness or Demand Shock?' Quarterly Selection of Articles 27, Banque de France

Giavazzi, Francesco, and Luigi Spaventa (2011) 'Why the Current Account May Matter in a Monetary Union. Lesson from the Financial Crisis in the Euro Area.' In *The Euro Area and the Financial Crisis,* ed. Miroslav Beblavý (Cambridge University Press) pp. 199–221

Goldstein, Morris, and Mohsin S. Khan (1985) 'Income and Price Effects in Foreign Trade.' In *Handbook of International Economics, Ch. 20,* ed. Ronald W. Jones and Peter B. Kenen, vol. Volume 2 (Elsevier) pp. 1041–1105

Hale, Galina, and Maurice Obstfeld (2014) 'The Euro and The Geography of International Debt Flows.' Working Paper 20033, National Bureau of Economic Research, April

Hall, George J., and Thomas J. Sargent (2011) 'Interest Rate Risk and Other Determinants of Post-WWII US Government Debt/GDP Dynamics.' *American Economic Journal: Macroeconomics* 3(3), 192–214

Harmsen, Richard T., Jarkko Turunen, and Tamim Bayoumi (2011) 'Euro Area Export Performance and Competitiveness.' IMF Working Paper WP/11/140, Strategy, Policy and Review Department, International Monetary Fund, Rochester, NY, June

Harrod, Roy (1933) *International Economics* (Cambridge University Press)

Hobza, Alexandr, and Stefan Zeugner (2014) 'Current Accounts and Financial Flows in the Euro Area.' *Journal of International Money and Finance* 48, Part B, 291–313

Holinski, Nils, Clemens Kool, and Joan Muysken (2012) 'Persistent Macroeconomic Imbalances in the Euro Area: Causes and Consequences.' *Federal Reserve Bank of St. Louis Review*

Imbs, Jean, and Isabelle Mejean (2015) 'Elasticity Optimism.' *American Economic Journal: Macroeconomics* 7(3), 43–83

Ingram, James C. (1973) 'The Case for European Monetary Integration.' Essays in International Finance 98, International Finance Section, Princeton University

Kaldor, Nicholas (1978) 'The Effects of a Devaluation on Trade in Manufactures.' In 'Further Essays on Applied Economics' (New York: Holmes & Meier)

Kang, Joong Shik, and Jay C. Shambaugh (2013) 'The Evolution of Current Account Deficits in the Euro Area Periphery and the Baltics; Many Paths to the Same Endpoint.' IMF Working Paper 13/169, International Monetary Fund

Kennedy, Charles, and Anthony Philip Thirlwall (1979) 'The Input-Output Formulation of the Foreign Trade Multiplier.' *Australian Economic Papers* 18(32), 173

Lapavitsas, Costas, Annina Kaltenbrunner, Duncan Lindo, J. Michell, Juan Pablo Painceira, Eugenia Pires, Jeff Powell, Alexis Stenfors, and Nuno Teles (2010) 'Eurozone Crisis: Beggar Thyself and Thy Neighbour.' *Journal of Balkan and Near Eastern Studies* 12(4), 321

Machlup, Fritz (1943) *International Trade and the National Income Multiplier* (New York: Augustus M. Kelley)

Marin, Dalia (2006) 'A New International Division of Labor in Europe: Outsourcing and Offshoring to Eastern Europe.' *Journal of the European Economic Association* 4(2-3), 612–622

Marquez, Jaime R. (2002) *Estimating Trade Elasticities* (Kluwer Academic Publishers)

Mason, Josh W., and Arjun Jayadev (2014) 'Fisher Dynamics in US Household Debt, 1929-2011.' *American Economic Journal: Macroeconomics* 6(3), 214–234

McCombie, J. S. L., and Anthony Philip Thirlwall (1994) *Economic Growth and the Balance-of-Payments Constraint* (Palgrave Macmillan)

OECD (2014) 'STAN Bilateral Trade Database by Industry and End-Use Category, Rev. 4.' Structural Analysis Statistics, Organisation for Economic Co-operation and Development. (Accessed March 7, 2015)

Orcutt, Guy H. (1950) 'Measurement of Price Elasticities in International Trade.' *The Review of Economics and Statistics* 32(2), 117–132

Robinson, Joan (1937) 'The Foreign Exchanges.' In 'Essays in the Theory of Employment' (Oxford: Blackwell)

Simonazzi, Annamaria, Andrea Ginzburg, and Gianluigi Nocella (2013) 'Economic Relations Between Germany and Southern Europe.' *Cambridge Journal of Economics*

Storm, Servaas, and C. W. M. Naastepad (2015a) 'Crisis and Recovery in the German Economy: The Real Lessons.' *Structural Change and Economic Dynamics* 32, 11–24

_ (2015b) 'Europe's Hunger Games: Income Distribution, Cost Competitiveness and Crisis.' *Cambridge Journal of Economics* 39(3), 959–986

Thirlwall, Anthony Philip (1979) 'The Balance of Payments Constraint as an Explanation of International Growth Rate Differences.' *BNL Quarterly Review* 32(128), 45–53

_ (2011) 'Balance of Payments Constrained Growth Models: History and Overview.' *PSL Quarterly Review*

Timmer, Marcel P., Bart Los, Robert Stehrer, and Gaaitzen J. de Vries (2013) 'Fragmentation, Incomes and Jobs: An Analysis of European Competitiveness.' *Economic Policy* 28(76), 613–661

Tressel, Thierry, and Shengzu Wang (2014) 'Rebalancing in the Euro Area and Cyclicality of Current Account Adjustments.' IMF Working Paper 14/130, International Monetary Fund

Tressel, Thierry, Shengzu Wang, Joong Shik Kang, Jay C. Shambaugh, Jörg Decressin, and Petya Koeva Brooks (2014) 'Adjustment in Euro Area Deficit Countries: Progress, Challenges, and Policies.' IMF Staff Discussion Notes 14/7, International Monetary Fund

UN (2014) 'National Accounts Main Aggregates.' Database, United Nations Statistics Division. (Accessed March 7, 2015)

Waysand, Claire, Kevin Ross, and John de Guzman (2010) 'European Financial Linkages: A New Look at Imbalances.' IMF Working Paper WP/10/295, International Monetary Fund, Rochester, NY, December

Wyplosz, Charles (2013) 'The Eurozone Crisis and the Competitiveness Legend.' *Asian Economic Papers* 12(3), 63–81

A. The Determinants of Expenditure Switching

Suppose that aggregate expenditure, relative price, and non-price competitiveness determine trade flows according to constant-elasticity demand functions:

$$\hat{X} = x_R \cdot \hat{R} + x_{FA} \cdot \hat{FA} + x_M \cdot \hat{M} + x_{DU} \cdot \hat{DU} \quad (13)$$

$$\hat{M} = m_R \cdot \hat{R} + m_{DA} \cdot \hat{DA} + m_X \cdot \hat{X} + m_{FU} \cdot \hat{FU}. \quad (14)$$

$\hat{DU}$ and $\hat{FU}$ denotes domestic and foreign non-price competitiveness, and the other variables were defined in section 3. $x_R < 0$ is the elasticity of real exports wrt the terms of trade, $x_{FA} > 0$ the elasticity of real exports wrt real foreign expenditure, $0 < x_M < 1$ the elasticity of real exports wrt real imports, $x_{DU} > 0$ the elasticity of real exports wrt domestic non-price competitiveness, $m_R > 0$ the elasticity of real imports wrt the terms of trade, $m_{DA} > 0$ the elasticity of real imports wrt to real domestic expenditure, $0 < m_X < 1$ the elasticity of real imports wrt real exports, and $x_{DU} > 0$ the elasticity of real imports wrt foreign non-price competitiveness. To account for global value chains, exports appear as argument in the import demand function and imports appear as argument in the export demand function.[12] This partial analysis treats $\hat{R}$, $\hat{DA}$, $\hat{FA}$, $\hat{DU}$, and $\hat{FU}$ as exogenous variables.

Effective expenditure switching is composed of ex-post variables. If the demand functions (13) and (14) actually governed the observable variables, then shocks, parameter values, and exogenous variables would determine the sign and magnitude of expenditure switching. To understand what expenditure switch would measure, start from

$$\hat{ES} + \hat{RA} = \hat{R} + \hat{X} - \hat{M}, \quad (15)$$

substitute the demand functions into the equation, and solve for effective expenditure switching:

$$\begin{aligned} \hat{ES} = & \left(1 + \frac{(1-m_X)\,x_R - (1-x_M)\,m_R}{1 - m_X \cdot x_M}\right) \cdot \hat{R} + \\ & \left(\frac{(1-m_X)\,x_{FA}}{1 - m_X \cdot x_M} - 1\right) \cdot \hat{FA} + \left(1 - \frac{(1-x_M)\,m_{DA}}{1 - m_X \cdot x_M}\right) \cdot \hat{DA} + \\ & \frac{(1-m_X)\,x_{DU}}{1 - m_X \cdot x_M} \cdot \hat{DU} - \frac{(1-x_M)\,m_{FU}}{1 - m_X \cdot x_M} \cdot \hat{FU}. \end{aligned} \quad (16)$$

A shock to R causes unfavorable effective switching if a *GVC-adjusted Marshall-Lerner condition* holds,

$$1 + \frac{(1-m_X)\,x_R - (1-x_M)\,m_R}{1 - m_X \cdot x_M} < 0, \quad (17)$$

[12] In European countries the foreign value-added content of aggregate exports varies roughly between 20% and 50% (Foster-McGregor and Stehrer, 2013).

and favorable switching otherwise. (Setting x_M and m_X to zero gives a traditional Marshall-Lerner condition.) A shock to FA causes favorable expenditure switching if

$$\frac{(1-m_X)\,x_{FA}}{1-m_X\cdot x_M}>1, \tag{18}$$

and unfavorable switching otherwise. A shock to DA causes favorable expenditure switching if

$$\frac{(1-x_M)\,m_{DA}}{1-m_X\cdot x_M}<1, \tag{19}$$

and unfavorable switching otherwise. A shock to DU unambiguously causes favorable switching

$$\frac{(1-m_X)\,x_{DU}}{1-m_X\cdot x_M}>0, \tag{20}$$

and a shock to FU unambiguously causes unfavorable switching

$$\frac{(1-x_M)\,m_{FU}}{1-m_X\cdot x_M}>0. \tag{21}$$

B. The BOP-Neutral Rate of Expenditure Growth

The nullcline ($T\hat{R}V=0$) can be related to the "balance of payments-constrained growth rate" (Thirlwall 1979).[13] Begin with

$$T\hat{R}V\equiv\hat{R}+\hat{X}-\hat{M}, \tag{22}$$

substitute the demand functions into the equation, impose $T\hat{R}V=0$, and solve for $\hat{DA}$. The algorithm gives:

$$\begin{aligned}\hat{DA}^{*} \;=\; & \left[\left(1+\frac{(1-m_X)\,x_R-(1-x_M)\,m_R}{1-m_X\cdot x_M}\right)\cdot\hat{R}+\right.\\ & \frac{(1-m_X)\,x_{FA}}{1-m_X\cdot x_M}\cdot\hat{FA}+\\ & \left.\frac{(1-m_X)\,x_{DU}}{1-m_X\cdot x_M}\cdot\hat{DU}-\frac{(1-x_M)\,m_{FU}}{1-m_X\cdot x_M}\cdot\hat{FU}\right]\cdot\frac{1-m_X\cdot x_M}{(1-x_M)\,m_{DA}}.\end{aligned} \tag{23}$$

$\hat{DA}^{*}$ can be labeled the *BOP-neutral rate of expenditure growth.*

The fraction that multiplies the large square bracket is positive. It implies that a shock to R raises the BOP-neutral rate if the GVC-adjusted Marshall-Lerner condition holds,

$$1+\frac{(1-m_X)\,x_R-(1-x_M)\,m_R}{1-m_X\cdot x_M}<0, \tag{24}$$

[13] McCombie and Thirlwall (1994) and Thirlwall (2011) discuss extensions of the original model.

and lowers it otherwise. A shock to FA unambiguously raises the BOP-neutral rate

$$\frac{(1-m_X)\,x_{FA}}{1-m_X\cdot x_M}>0. \tag{25}$$

A shock to DU raises the BOP-neutral rate

$$\frac{(1-m_X)\,x_{DU}}{1-m_X\cdot x_M}>0, \tag{26}$$

and a shock to FU lowers the BOP-neutral rate

$$\frac{(1-x_M)\,m_{FU}}{1-m_X\cdot x_M}>0. \tag{27}$$

Thirlwall assumes $\hat{R}=0$ in the long run, abstracts from global value chains x_M, $m_X=0$, and does not explicitly model non-price competitiveness x_{DU}, $m_{FU}=0$. Given these assumptions, the BOP-neutral rate simplifies to what may be termed the *expenditure variant of Thirwall's law*:

$$\hat{DA}=\frac{x_{FA}}{m_{DA}}\cdot\hat{FA}. \tag{28}$$

The formal equivalence between the equations and Thirwall's law does not engender the equivalence of their interpretations. Recall that the rationale for speaking of a BOP-constrained growth rate is that many developing countries a) are unable to place liabilities denominated in international means of payment and b) require imported capital goods to grow. The economy's growth rate is constrained by the quantity of capital goods imports, which in turn is constrained by export revenues because only exports provide access to international means of payment. However, firms in the euro area can place liabilities denominated in dollars and euros, and euro area banks have access to the refinancing operations of the ECB as long as they command eligible collateral. The current international monetary system allows many countries to finance large external deficits for extended periods of time, and for this reason Thirlwall's law cannot be understood as explanation of the euro area growth experience. Equation (23) should not be interpreted as a growth prediction or growth explanation. If actual expenditure growth is lower than $\hat{DA}^*$, the trade ratio improves, and if actual expenditure growth is higher than $\hat{DA}^*$, the trade ratio deteriorates. Hence the label BOP-*neutral* rate of expenditure growth.

Table 5: Trade Ratio Decomposition by Period, Growth Rates in %

	AUT	BEL	DEU	ESP	FIN	FRA	GRC	IRL	ITA	NLD	PRT	EU11
1990-1998												
Trade ratio	0.1	0.3	0.9	2.3	3.6	1.6	0.2	0.5	1.7	0.4	-1.1	0.9
Effective expenditure switch	0.3	-0.4	0.7	2.3	1.9	0.5	0.5	3.2	0.3	0.9	0.4	1.0
Relative expenditure	-0.2	0.6	0.2	0.1	1.8	1.0	-0.3	-2.6	1.4	-0.5	-1.5	0.0
Foreign expenditure	2.3	2.4	2.5	2.4	2.1	2.5	2.1	2.4	2.5	2.4	2.2	2.4
Domestic expenditure	2.5	1.8	2.3	2.4	0.5	1.5	2.5	5.2	1.1	2.9	3.8	2.4
Terms of trade	-0.3	0.2	0.9	1.3	-0.1	0.0	1.2	-1.0	0.5	0.4	1.7	0.4
Relative import intensity	0.6	-0.6	-0.2	1.0	2.0	0.5	-0.7	4.2	-0.1	0.5	-1.2	0.5
Foreign import intensity	2.8	2.3	3.7	7.1	5.7	3.9	3.4	11.3	3.2	4.0	3.1	4.6
Domestic import intensity	2.2	2.8	3.9	6.1	3.5	3.5	4.1	6.8	3.5	3.6	4.4	4.0
1999-2007												
Trade ratio	1.0	0.0	1.4	-2.1	-1.3	-1.7	0.3	-0.2	-1.6	0.3	0.8	-0.3
Effective expenditure switch	0.1	-0.9	-1.2	-0.7	-2.1	-2.3	0.7	3.1	-3.4	-0.5	-0.9	-0.7
Relative expenditure	0.9	0.9	2.6	-1.4	0.8	0.6	-0.4	-3.1	1.9	0.8	1.7	0.5
Foreign expenditure	2.6	3.0	3.5	3.2	3.8	3.2	3.9	3.0	3.6	3.1	3.5	3.3
Domestic expenditure	1.7	2.0	0.9	4.6	2.9	2.6	4.3	6.4	1.6	2.3	1.7	2.8
Terms of trade	-0.3	-0.4	-0.4	0.4	-1.7	-0.3	0.2	-0.4	-0.9	0.2	0.0	-0.3
Relative import intensity	0.4	-0.6	-0.9	-1.1	-0.4	-2.0	0.5	3.5	-2.6	-0.7	-0.9	-0.4
Foreign import intensity	4.0	1.9	4.2	1.9	3.4	1.0	4.5	5.3	0.1	2.4	1.5	2.7
Domestic import intensity	3.6	2.5	5.1	3.0	3.9	3.1	3.8	1.8	2.7	3.1	2.4	3.2
2008-2013												
Trade ratio	-0.2	-0.5	-0.5	5.6	-2.3	-0.1	6.0	1.7	1.7	0.1	4.3	1.4
Effective expenditure switch	-0.5	-0.7	-0.8	1.3	-3.9	-0.7	-1.7	-2.4	-1.6	-2.1	1.3	-1.1
Relative expenditure	0.3	0.1	0.3	4.3	1.6	0.7	7.9	4.2	3.4	2.3	3.0	2.5
Foreign expenditure	0.8	0.9	1.2	1.3	1.6	1.1	1.1	0.7	1.4	1.7	0.3	1.1
Domestic expenditure	0.5	0.8	0.9	-2.8	0.0	0.4	-6.1	-3.2	-1.9	-0.6	-2.5	-1.3
Terms of trade	-0.5	-0.3	-0.2	-0.6	-0.9	-0.1	-0.3	-0.8	-0.3	-0.3	0.2	-0.4
Relative import intensity	0.0	-0.3	-0.6	1.9	-3.0	-0.6	-1.4	-1.6	-1.2	-1.8	1.1	-0.7
Foreign import intensity	0.6	1.3	1.2	0.4	-2.7	0.2	-2.3	1.3	-1.8	0.3	2.2	0.1
Domestic import intensity	0.6	1.6	1.7	-1.4	0.2	0.8	-0.9	3.0	-0.6	2.2	1.1	0.8

Notes: The trade ratio is the value of exports over the value of imports. Effective expenditure switching is composed of the terms of trade and the relative import intensity. Relative expenditure is foreign expenditure over domestic expenditure. Domestic expenditure is measured in real terms (an index set to 100 in 2000). Foreign expenditure is a trade-weighted average of trading partners' domestic expenditure. The domestic import intensity is defined as real imports divided by real domestic expenditure, the foreign import intensity as real exports divided by real foreign expenditure, and the relative import intensity as the foreign import intensity divided by the domestic import intensity. Sections 3 and 5 state the precise variable definitions. The table shows mean growth rates. The growth rate of a ratio equals the numerator's growth rate minus the denominator's growth rate (plus an interaction term).