

# Current Account Imbalances in the European Monetary Union

August 2017

Philipp Bergner

Department of Economics

Lund University

Supervisor: Thomas Fischer

## **Abstract**

This paper investigates empirical determinants of current account positions worldwide with a focus on the countries that started out as the European Monetary Union (including Greece that joined in 2001). Specifically, it addresses the question whether current accounts inside the Eurozone have reacted more sensitively to changes in macroeconomic fundamentals due to the facilitation of inter-country financial flows and the abolishment of foreign currency risk. Comparing estimation results for different country samples over the period from 1998 to 2009, I find some indication that capital outflows/inflows might have reacted more sensitively to different development levels, growth rates, and competitiveness levels inside the European Monetary Union. Measuring these differences as interaction effects, I do not find that current account positions are significantly more sensitive in the Euro area compared to other advanced economies however. Therefore, evidence that the common currency facilitated current account divergence in the period under consideration is found to be weak.

Keywords: current account, currency union, European Monetary Union

# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
<b>2</b>	<b>The Current Account</b>	<b>2</b>
2.1	Definition . . . . .	2
2.2	Theories for Current Account Imbalances . . . . .	3
2.3	Relevance of Current Account Imbalances . . . . .	6
<b>3</b>	<b>Current Accounts in the European Monetary Union</b>	<b>8</b>
<b>4</b>	<b>Empirical Determinants of Current Accounts</b>	<b>10</b>
4.1	Empirical Literature on Current Accounts Worldwide . . . . .	10
4.2	Empirical Literature on Current Accounts in the Eurozone . . . . .	13
<b>5</b>	<b>Data and Methodology</b>	<b>16</b>
<b>6</b>	<b>Results and Discussion</b>	<b>22</b>
6.1	Cross-Sectional Sample . . . . .	22
6.2	Cross-Sectional Sample with Time Structure . . . . .	28
<b>7</b>	<b>Concluding Remarks</b>	<b>33</b>
	<b>References</b>	<b>35</b>
	<b>Appendix I</b>	<b>40</b>
	<b>Appendix II</b>	<b>44</b>

## List of Figures

1	CA/GDP Ratios in the Central EMU . . . . .	9
2	CA/GDP Ratios in the Southern EMU . . . . .	9

## List of Tables

1	Cross-Section Results for Different Country Sets . . . . .	22
2	Cross-Section Results with Interaction Effects . . . . .	26
3	Panel Results for Different Country Sets . . . . .	29
4	Panel Results with Interaction Effects . . . . .	31
5	List of Countries Included . . . . .	40
6	List of Variables Included . . . . .	41
7	CA/GDP Ratios in the EMU . . . . .	42
8	Summary Statistics for Full Sample . . . . .	43
9	Summary Statistics for Advanced Economies . . . . .	43
10	Summary Statistics for Euro Countries . . . . .	44
11	Harris-Tzavalis Unit-Root Tests . . . . .	44
12	Dynamic Model for Different Country Sets . . . . .	46
13	Pooled OLS for Different Country Sets . . . . .	46

# 1 Introduction

This Paper examines the determinants of current account (CA) positions with a focus on the European Monetary Union (EMU), that is arguably the most economically important currency union of all times. Currency unions, in general, alleviate foreign exchange risks in capital transactions between their member states and offer them facilitated access to international capital markets. At the same time, the EMU has seen remarkable CA divergence during the years from its establishment until the sovereign debt crisis. Therefore, it could be assumed that capital has been driven by changes in macroeconomic fundamentals in a stronger way in the EMU than in other country samples for this period of time. This paper seeks to explore whether this has indeed been the case for the period from 1998 to 2009. Specifically, it computes marginal effects for the driving forces of CA imbalances for different sets of countries, one being the EMU. That way it can be determined how different country samples differ with respect to their CA determination and how countries in the EMU compare to them. In a second step, the countries forming the EMU are interacted with other advanced economies in order to determine whether the coefficients differ significantly from those estimated for countries that can be considered similar with respect to their political and economic structure.

The rest of the paper is structured as follows. Section 2 gives an introduction to the CA in general and discusses models that can explain the differentials observed in it theoretically. A brief discussion of the potential dangers of large CA deficits justifying the topic as a research interest is also included in this part. Section 3 shows the behavior of CA positions in the EMU in recent years. Section 4 summarizes the empirical literature both on CAs in general and on their occurrence in the EMU. Section 5 describes the data and the estimation procedure, Section 6 presents the results, and section 7 offers some concluding remarks.

## 2 The Current Account

### 2.1 Definition

Worldwide financial integration enables countries or economies to consume either more or less than they produce via the opportunity of international borrowing or lending. Thus, it becomes possible for an economy to borrow money from abroad to finance current consumption in excess of current production. This will occur at the cost of debts against the rest of the world, which have to be repaid in the future including interest payments. The change of this overall financial position against the rest of the world in a given year is called the current account. Following common notation, as used for example in Obstfeld and Rogoff (1996), it can be defined as

$$CA_t = B_{t+1} - B_t$$

where  $CA_t$  is a country's CA in year  $t$ , and  $B_t$  is that country's endowment of foreign assets or liabilities in that year. The CA can also be written as

$$CA_t = Y_t + r_t B_t - C_t - G_t - I_t$$

where  $Y_t$  is output in year  $t$ ,  $r$  is the interest rate,  $C$  is private consumption,  $G$  is government consumption, and  $I$  is investment. The equation thus states that the CA consists of production minus consumption (both private and public) and investment plus net interest rate payments received on foreign assets (or on foreign liabilities if that term is negative). Finally, in many cases it is convenient to define national savings  $S$  as

$$S_t = Y_t + r_t B_t - C_t - G_t$$

The equation states that everything that is produced and earned on foreign assets but neither consumed by either the government or private households is necessarily saved instead. With the help of this definition, it is possible to define the CA in a simpler way as savings minus investment.

$$CA_t = S_t - I_t$$

This definition is sometimes convenient to test empirically, for example in papers that try to determine whether the emergence of large CA imbalances has been driven mainly by changes in the investment rate or in the savings rate (e.g. Blanchard & (2002), Chinn & Ito (2007) or Jaumotte & Sodsriwiboon (2010). Moreover, the selection of determinants for CA positions in empirical papers, that will be discussed in section 4, has often been motivated by variables that had previously been found to be important driving forces of saving and investment decisions.

## **2.2 Theories for Current Account Imbalances**

CA imbalances are subject to many economic models both explicitly and implicitly. These models can give a rationale for the choice of the variables that are included in empirical estimations of CA positions. It appears that the most heavily discussed variables in the theoretical literature on CA determination are development measures (relative GDP and growth) and fiscal surplus (where the theoretical argument revolves around the presence or absence of Ricardian equivalence in many models) while there is also a theoretical justification for including a variable capturing the demographic structure. I will focus on the development strand of literature first and briefly discuss two of the most prominent theoretical explanations there, the intertemporal consumption model and neoclassical growth.

A very common approach to the modelling of CA imbalances have been intertemporal consumption models (see, for example, Sachs (1981 & 1982) and especially Obstfeld & Rogoff (1996) chapter 4 for a detailed description). In these models representative consumers (basically the whole economy) allocate consumption over time trying to realize the highest attainable utility level. Depending on the extent of time preference, this will be associated with more or less constant consumption paths. CA deficits or surpluses thus follow from this optimization

procedure and are used to enable the optimal intertemporal consumption allocation. Consequently, these models generally predict countries with low GDP and high growth rates to run CA deficits while those that have higher output initially (and thus can be expected to see slower growth in the future) would run CA surpluses in order smooth consumption.

The basic model can be and has been extended in many directions. Two of them are particularly relevant to the specific case of the EMU. First, Giavazzi & Spaventa (2010) develop a model with tradable and non-tradable goods and show that the intertemporal budget constraint (demanding that all debts have to be repaid in the future with interests) can be violated more easily as consumption of non-traded-goods grows. In their model this occurs because debts have to be repaid in the future with traded goods. Consequently, if the traded sector is relatively small, debt levels also have to be small in order to be sustainable. Empirically, the authors report construction booms in the years before the European debt crisis in 2 of the countries that would later experience financial distress, Spain and Ireland. Therefore, it can be argued that these countries did see a substantial part of international capital flow into their non-traded goods sectors. Consequently, even CA deficits that appear to be in line with the idea of intertemporal consumption choices might be a reason for concern depending on the sector that attracts the imported capital.

Second, Blanchard & Giavazzi's (2002) paper about the European Union and the EMU especially presents a model with widening CA imbalances in the presence of two effects: higher substitutability of goods and better access to international capital markets. Countries with higher expected growth find it optimal to run larger deficits under these conditions in their model. Both higher substitutability of goods and improved access to international capital markets are likely to be present in a currency union. This model therefore provides a theoretical rationale not only for the inclusion of a variable measuring relative GDP but also for the suspicion that CA positions might react to changes in it in a stronger way inside a currency union such as the EMU.

A slightly different way of motivating capital flows between countries relies on neoclassical growth. One of the most prominent growth models has been developed by Solow (1956). In this model capital experiences decreasing returns as the capital stock rises. Everything else equal, countries with lower capital stocks should thus yield higher returns to capital and be more attractive to invest in. Therefore, according to the model, capital flows from developed countries with high capital stocks to developing ones with low capital stocks should be observed. Consequently, the capital stock should have a positive effect on the CA. Therefore, capital inflows into countries with low GDP from countries with high GDP are predicted both by intertemporal consumption models and by neoclassical growth models (as long as they also have higher capital stocks).

The discussion on the theoretical importance of fiscal surplus goes back till the days of David Ricardo, who even gave it its name. Under Ricardian equivalence fiscal surplus does not affect CA positions significantly. The rationale is that households incorporate government net borrowing or lending into their consumption decisions because any tax cut has to be refinanced in the future (and vice versa). If this equivalence does in fact hold, changes in private and public consumption will net each other out leaving the CA unaffected by fiscal surplus. Intertemporal utility maximization over both finite and infinite periods, as implied by the basic intertemporal consumption model, would in fact lead to this result since the whole country is treated as one representative consumer (see Obstfeld & Rogoff (1996), chapter 3).

Modifications of the model that give up on the utility optimization process happening over all periods make Ricardian equivalence break down however. Overlapping generation models featuring mortal individuals that live for a finite number of periods and consider only their lifetime utility do imply effects of fiscal policy (see, for example, Obstfeld & Rogoff (1996) chapter 3). The reason is that individuals that receive tax cuts immediately will only partially (or not at all) suffer from the contractionary fiscal effects these cuts will necessitate in the future. Also, changes in the fiscal position can affect old and young individuals differently. A different modification that induces the breakdown of Ricardian equivalence was

made in Bussière et al. (2004). Their model assumes that only a fraction of the whole population has the possibility of making optimal intertemporal consumption allocation decisions while the rest of the population is liquidity constrained and can only consume what it earns in the same period. Consequently, fiscal policy would have an effect in this scenario with the extent of it depending on the relative sizes of the two different population groups. Models like these provide a theoretical rationale for the inclusion of government surplus into empirical CA specifications.

Theoretical arguments for the inclusion of a variable measuring the demographic structure of countries can be based upon consumption theories, especially the permanent income hypothesis by Friedman (1957) and the life-cycle hypothesis by Modigliani & Brumberg (1954). These models feature consumption smoothing behavior of individuals, who make their consumption decisions based on permanent income over their whole life-cycle instead of current income. Consequently, people who are either too young or too old to be part of the labor force will consume substantially more than they earn. In the context of CAs this would imply deficits for countries that have a large fraction of their population in a non-working age. Countries with large fractions of their population being in the labor force are predicted to run CA surpluses however, as these individuals have a strong saving motive for the time after retirement.

Consequently, theoretical explanations can be used to motivate the inclusion of variables measuring the relative stage of development (captured by GDP or capital stock), (expected) growth, fiscal surplus, and demographic structure. As will be shown in section 4, these variables are indeed the ones that have been used in almost every empirical paper covering CA positions. They will therefore also be used as a rationale for the variable choice in this paper in the sections 5 and 6.

### **2.3 Relevance of Current Account Imbalances**

Before turning to empirical values of CA positions and their potential empirical determinants, it seems reasonable to address the question why high and persistent

CA surpluses or deficits might raise concerns classifying them as a meaningful subject to research interest. As Obstfeld (2012), in an article devoted to this question, mentions, it could be claimed that as long as CAs just represent intertemporal consumption allocation decisions, they are no reason for concern. Or, as Blanchard (2007) puts it, “assume that a current account deficit reflects private saving and investment decisions. Assume rational expectations. Is there any reason for the government to intervene and what is the optimal form of that intervention” (p. 193). In fact, Blanchard’s (2007) verdict is that countries should rather deal with underlying distortions (such as for example wage rigidities) than aim at a reduction of CA deficits directly.

A further argument presented by Obstfeld (2012) is that CA positions are relatively small in comparison to total financial wealth abroad (due to the substantial rise in gross international capital flows in recent years) and may thus be negligible as the international investment position can be affected much more by changes in the value of internationally held assets. In fact, Obstfeld’s (2012) calculations reveal that the correlation between net international investment positions and the CA has become significantly weaker recently. Furthermore, as discussed by Johnson (2009), the CA merely adds up all demands and liabilities against the rest of the world even though debts might occur against completely different countries, people, or firms than demands. Therefore, the latter may not always equalize the former. Consequently, pure CA data is not necessarily telling in answering the question whether a country is able to meet its foreign liabilities.

Fortunately, there are indeed good reasons to analyze CA positions. Large CA deficits have been found to be connected to subsequent crises empirically (e.g. Jordà et al. (2011) or Gourinchas & Obstfeld (2012)). Furthermore, CA imbalances imply externalities as they have to add up to zero by construction. Therefore, if some countries run large surpluses, there have to be others with deficits. It has been argued that these countries will then experience, among other effects, lower real interest rates and higher housing prices. Bernanke’s (2005) famous speech about the “saving glut” (high saving rates and substantial positive CAs, especially in Asian countries) e.g. emphasizes the relationship between CA surpluses in

Asian economies and low real interest rates, appreciation of the dollar, and higher real estate prices in the US.

Furthermore, countries with CA deficits depend on finance by international capital markets (e.g. Rogoff (2012)). If these markets stop financing the deficits (for example due to a decrease in faith in the country's potential to repay debts), consumption may have to be reduced dramatically. In fact, financing of EMU periphery countries such as Portugal, Spain or Greece by international capital markets arguably did end to some extent in the aftermath of the sovereign debt crisis given the massive capital flights observed in these countries (see, e.g. Sinn & Wollmershäuser (2012)). Edwards (2004) examines sudden stops of financing via international capital markets empirically and reaches the following two results. First, large CA changes from negative to positive are connected to sudden stops of international finance. Second, these sudden CA turnarounds have negative effects on growth rates. Furthermore, Lane & Milesi-Ferretti (2012) find that, after the beginning of the financial crisis in 2008, those countries faced the largest contractions in CA positions that had run CA deficits that were farthest away from what could be explained by economic fundamentals previously. Consequently, CA deficits may be a reason for concern as the dependence on international capital can lead to the aforementioned detrimental consequences if that financing ends, which seems to have played a role in the EMU.

### **3 Current Accounts in the European Monetary Union**

Even though the CA of the EMU as a whole has been fairly balanced in most years after the introduction of the Euro (the numbers can be found in Table 7 of the Appendix I), most countries experienced substantial CA imbalances in the period of time considered. Germany, the Netherlands, Finland, Austria and especially Luxembourg were running substantial CA surpluses as can be seen in Figure 1. Greece, Spain, Portugal and Ireland on the other hand had very negative CA balances, even below -10% percent in several years as shown in Figure 2.

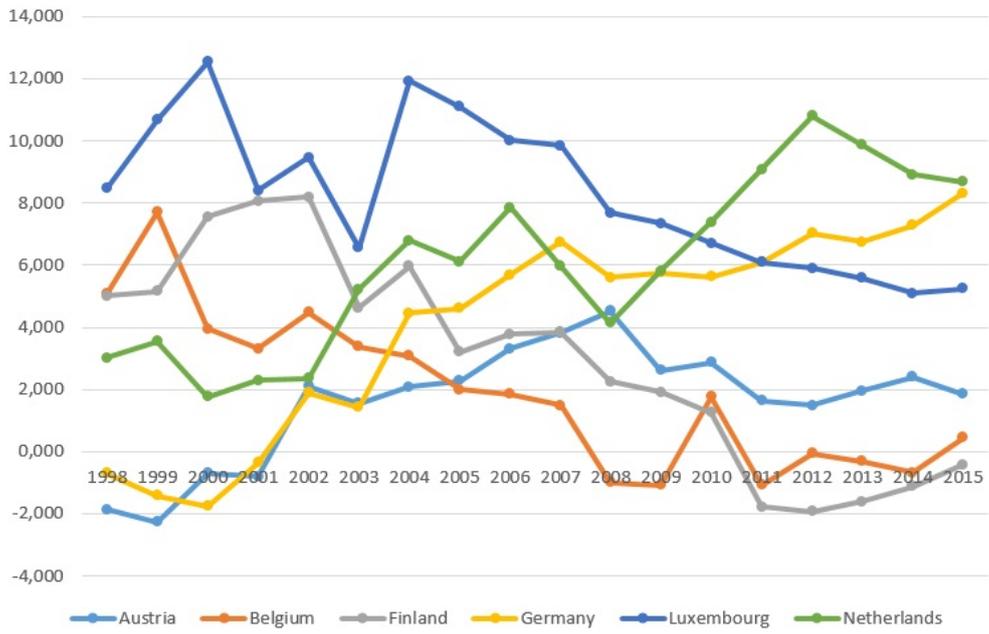


Figure 1: CA/GDP Ratios in the Central EMU

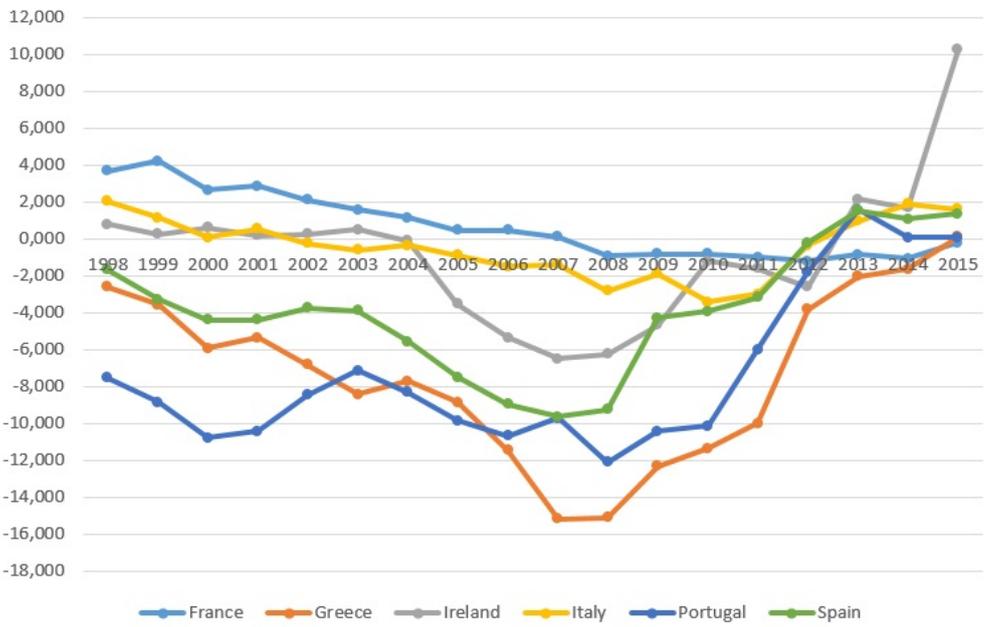


Figure 2: CA/GDP Ratios in the Southern EMU

However, as can be seen in Figure 2, substantial CA turnarounds occurred after the beginning of the crisis in 2009 in deficit countries, which is the reason why these years will not be included in the analysis. The values for the post-crisis years might not be as telling because of structural reforms and support through EU institutions, most notably the European Financial Stability Facility (EFSF) and European Stability Mechanism (ESM) lending money to Greece, Portugal, Ireland, and Spain. The divergence of CA positions until 2009 is certainly remarkable however and raises the question whether it was in line with current account determination for other countries during that time or represents increased responsiveness to fundamentals inside the EMU instead. These empirical questions are the subject of the remaining sections.

## **4 Empirical Determinants of Current Accounts**

In this section I address empirical investigations of CA positions concerning 3 topics. First, I cover empirical literature that has sought to determine the driving forces of CA positions in general. As explained previously, the choice of variables in the empirical literature is close to the ones discussed under 2.2 and/or motivated by variables that are assumed to affect saving or investment decisions. Second, I reference papers that deal with the question whether countries inside the EMU have reacted more sensitively to changes in those fundamental variables. And third, I include a short discussion concerning the question whether the divergence of CA positions in the EMU itself represents an anomaly.

### **4.1 Empirical Literature on Current Accounts Worldwide**

One of the first examinations of empirical determinants of CA positions in a worldwide setting that I could find was conducted by Faruquee & Debelle (1996) featuring data of 21 industrial countries. Cross-section analysis finds the coefficient on age dependency ratio (ADR) (ratio of people in non-working-age relative to people of working-age) to be significantly negative (in line with the argument under 2.2). No clear pattern is established for the government budget surplus (implying Ricardian equivalence). Relative income is found to be positively

connected to the CA (again in line with the theoretical prediction). The capital stock has a significant positive effect in most specifications (which is in line with growth models), which is also the case for initial Net Foreign Assets (NFA) (as expected since payments received on NFA are part of the CA). Extending this analysis to a total of 54 developing and developed countries and a subsample of developing countries only sees relative income and Terms of Trade still tend to be positive (or U-shaped) and significant. Budget surplus however is insignificant for both samples. Furthermore, ADR has a significant negative effect in the developing countries samples but no significant effect in the full sample. Error-correction-specifications and partial-adjustments-specifications for the industrial country panel lead to similar results for these variables. Furthermore, measures of enhanced competitiveness (real exchange rate and Terms of Trade) are found to lead to higher CA positions in the short-run.

Chinn & Prasad (2003) extend this analysis and find the variables with the highest explanatory power to be fiscal balance (positive effect) and NFA to GDP (positive but less important for developing countries than for developed ones). Indicators of financial openness and Terms of Trade variability are however found to be important drivers in the sample of developing countries. Relative GDP has a positive significant effect in some of the specifications but overall seems to have higher explanatory power for industrial countries. Chinn & Ito (2007) is similar to Chinn & Prasad (2003) in the variable choice and the results for economic fundamentals. Furthermore, this paper introduces institutional quality (e.g. corruption index, law and order, or quality of bureaucracy) and finds some of these variables to improve the fit of the models significantly. Barnes et al. (2010) also find similar variables to be important determinants of CA positions in OECD countries (GDP per capita, government net lending, ADR, initial NFA trade openness, and structural rigidities appear to be their most significant variables).

Gruber & Kamin (2007) find GDP per capita, fiscal balance, openness, and NFA to be the most important macroeconomic determinants in a country sample consisting of 61 developing and developed nations. Furthermore, their paper introduces dummies measuring the incidence of financial crises and finds a significant neg-

ative effect on CA positions but a positive significant one if it is interacted with openness (therefore, financial crises are predicted to have a positive effect on CAs if trade openness is sufficiently large). Gossé & Serranito (2014) find the most important explaining variables of CA imbalances in the short run to be competitiveness (measured either by real exchange rates or by Terms of Trade), oil price, and productivity gaps for 21 OECD countries. In the medium run their most important variables are fiscal balance, real exchange rate, private credit to GDP ratio, GDP per capita, and oil price fluctuations.

Further papers dealing with determinants of CA positions worldwide are Gagnon (2011) (introducing financial policies such as exchange rate policies as determinants) and Abbas et al. (2011) (mainly focusing of the extent of the “twin deficit”, namely to which degree the fiscal budget affects CA positions) while Bracke et al. (2010) includes a more qualitative discussion of potential determinants of CA imbalances. Other papers have demonstrated that structural policies affecting products, financial, and labor markets have considerable scope to affect CA imbalances (Kerdrain et al. (2010), Kennedy & Sløk (2005) or Zemanek et al. (2010) (the last one being specifically about the Euro countries arguing that structural reforms are a suitable way to increase CA positions in deficit countries of the EMU)).

Summing up these papers on determinants of CA positions, a few points can be made. First, it appears that there is widespread agreement on the fundamental variables that should be included in any specification. Terms of Trade variability, relative GDP, fiscal surplus, ADR, and a variable capturing competitiveness (e.g. Terms of Trade or real exchange rate) can be found in almost any paper mentioned here. Additional variables (e.g. concerning institutional quality or the incidence of crises) appear to depend on the specific research interests of the authors. Second, in some cases the explanatory power of the variables depends on the country sample under consideration (e.g. Terms of Trade variability in Chinn & Prasad (2003)). Third, variables affecting CA positions in the short run may differ from those that are significant in the determination of long-run values.

## **4.2 Empirical Literature on Current Accounts in the Eurozone**

In the context of the EMU two papers are of particular interest since they suggest that CAs do react more sensitively to relative income and/or growth inside the EMU. First, Blanchard & Giavazzi (2002) focus on the marginal effect of relative income on CA positions and estimate it over time for 3 different subsets: the majority of OECD countries, EU countries, and EMU countries from 1975 to 2001. While for the majority of OECD countries the coefficient is positive most of the time, it is often insignificant and shows at best a mild upward trend in recent years. For the EU and the EMU there is a clear upward movement in the estimated coefficient starting in the late 1980s and becoming statistically significant in the mid-1990s. Consequently, this result suggests that the sensitivity of CA positions with respect to relative income has increased over time in the European Union and the EMU (no significant differences were found between the 2 however) and that this sensitivity is higher than in the sample with most of the OECD countries. Second, Lane & Pels (2012) extend this analysis until 2007 and find that this effect continues to hold for those years. Furthermore, they show a significant negative effect of growth expectations on CA positions inside the EMU that is growing over time (and that is especially meaningful for 2002-2007). Consequently, this 2 papers make up a rationale for assuming a stronger effect of relative GDP and growth for the Euro countries.

Schmitz & von Hagen (2011) compare trade balances of the EU-15 countries (the 15 countries that were members of the EU in 2001 (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the UK)) against the Eurozone and against the whole world (trade balances were used as a proxy for the CA due to unavailability of CA data against individual countries). They find that trade balances against the Euro area already depended on GDP per capita for the countries inside the EMU before the introduction of the Euro in a positive and significant way. This effect is found to have increased further after the introduction of the common currency. The trade balance against the EMU does not significantly depend on GDP per capita however for the EU members that had not introduced the Euro: Denmark, Sweden,

and the United Kingdom. When trade balances between EU-15 countries and the whole sample are examined, the effect of GDP per capita is still positive but there is no additional effect depending on whether or not the country is a member of the EMU. Therefore, this paper also suggests that the responsiveness of CAs to differences in GDP/income is higher inside the EMU even though the effect seems to operate only for capital flows inside the Euro area.

Belke & Dreger (2011) model the divergence of CAs in the EMU as the outcome of both a catching-up process and a competitiveness effect (measured as the real exchange rate) in an error-correction-setting. Their sample of 11 Euro area members shows competitiveness effects to be the more significant ones leading to current account deficits in the Southern EMU countries. The empirical relevance of changes in the real exchange rate for member countries of the EMU has also been found by Arghyrou & Chortareas (2008) and Estrada & López-Salido (2013). The latter paper also finds that competitiveness had a significant negative effect on CA positions most of the time in the EMU between 1985 and 2012 while this effect was insignificant for the control group of other developed countries. Kang & Shambough (2013) examine the causes for the building up of large CA deficits in the EU periphery states Greece, Portugal, Spain, Ireland and the Baltics prior to the crisis. They find that different factors were responsible for them in the different countries but that rising Unit Labor Costs (and thus a decrease in competitiveness) and strong increases in imports following demand booms (that were not matched by increases in exports of equivalent magnitude) were a common feature to most of them.

Other papers have shown that CAs for some Euro countries exceeded the values that would be obtained by using the coefficients for a larger set of countries. Jaumotte & Sodsriwiboon (2010) find additional negative significant effects of being a Southern European member of the Eurozone after controlling for the usual macroeconomic variables as it was connected empirically to higher investment rates. Barnes et al. (2010) also find an additional negative (positive) effect on the CA position of being a Southern (Central) EMU member after controlling for all fundamental variables in their sample. These papers suggest that estimations for

the coefficients of fundamentals derived from larger country samples do not fully explain CA imbalances in the EMU. They do not determine however whether the coefficients differ (which is implied by the previously mentioned papers) or whether the divergence is caused by unobserved variables.

A controversial question is whether the diverging paths of CA positions in the EMU themselves in this period represent an anomaly. As mentioned previously, the common currency removes exchange rate risks and improves access to international capital markets. In fact, there is some evidence that financial integration has increased substantially overall recently but especially in EMU countries after the introduction of the Euro, largely due to the abolishment of exchange rate risks (e.g. Lane (2010) or Fratzscher (2002) see also Baele et al. (2004)). A higher degree of financial integration is also implied by Blanchard & Giavazzi's (2002) paper, which finds that a positive relationship between investment and saving rates (the famous Feldstein-Horioka-puzzle from Feldstein & Horioka (1980)) has been lower and even ceased to exist in the late 1990s in the Euro area.

In the light of this finding, together with increased responsiveness to macroeconomic fundamentals as implied by papers previously mentioned, larger differentials would appear logical for the Eurozone. In fact, Berger & Nitsch (2010) find that an increase in trade imbalances has been connected to the introduction of the Euro in a data set following European countries from 1948 to 2008. On the other hand, Decressin & Stavrev (2009) argue that in their sample, starting in the early 1990s, CA position divergence can be observed for advanced economies as a whole and that divergence has not been significantly higher in the EMU.

Summing up the results for empirical papers that focus on the EMU, there seems to be some indication (however derived from different sources) that at least 3 variables might have stronger effects in the Euro area. As mentioned throughout the last paragraphs, previous analysis has found this effect for relative GDP, growth rates and competitiveness. Despite the potential higher sensitivity of CAs and the indication of increased financial integration for countries inside the Euro area, it is not obvious however that the actual size of CA imbalances observed in the

Euro area in the period under consideration has been abnormal compared to other country samples.

## 5 Data and Methodology

Subsequently, the question whether CA positions tend to react more sensitively in the EMU is addressed empirically. The observation period starts in 1998 because this was the year when the first 11 participating countries were selected and conversion rates for the currencies were set. Consequently, it can be argued that in this year the advantages of the EMU (most notably eradication of currency risk) began to operate and started having an effect on CAs at least potentially. It might therefore be assumed that different effects of fundamentals on CA positions inside the Eurozone compared to other country samples occurred from this year onwards. The last observations included are from 2009 since it can be considered the last year before the outbreak of the sovereign debt crisis.

The dependent variable is the CA relative to GDP (*relCA*). Based on the discussion under 2.2 and the empirical findings summarized in 4, I choose the following explanatory variables: real GDP per capita divided by US GDP per capita (*relGDP*), real exchange rate (*REERCPI*), government surplus relative to GDP (*fiscsurplus*), ADR (*ADR*), initial NFA relative to GDP (*initalNFAGDP*), growth rate (*growth*), Terms of Trade variability (*ToTvar*) (which may induce a precautionary savings motive and has been included in previous empirical analysis, e.g. Faruqee & Debelle (1996)), and a dummy for oil exporting countries (*oilproduce*) (which has also been included in previous research (e.g. Chinn & Ito (2007)) since oil exporting countries may have substantially larger CA positions). Variables like openness or financial liberalization are deliberately not used as regressors because these might be the kind of variables through which membership in a currency union affects the sensitivity of CA positions to economic fundamentals. Overall, the variable choice follows quite closely the discussions in Faruqee & Debelle (1996), Chinn & Prasad (2003), Chinn & Ito (2007), or Gruber & Kamin (2007).

The variables are obtained from the following sources: data on relative CA positions and fiscal surplus come from the IMF World Economic Outlook (WEO) (22 missing individual observations on fiscal surplus are replaced by World Development Indicators (WDI) data). Data on GDP, growth, real exchange rates based on Unit Labor Costs (ULC), ADR, Terms of Trade, and oil production come from the WDI by the World Bank. Real exchange rates based on Consumer Price Indices (CPI) are obtained from Darvas (2012). Data on NFA to GDP relations are obtained from the updated and extended version of the dataset constructed by Lane and Milesi-Ferretti (2007), that has also been applied for this purpose previously (e.g. Chinn & Prasad (2003) or Chinn & Ito (2007)). Theoretically, the change in NFA equals the CA as discussed in the introduction. Therefore, instead of current NFA positions I use the NFA position at the beginning of the observation period which is also common in the literature (e.g. Chinn & Prasad (2003)). A list of the variables included together with their sources can be found in Table 6 of Appendix I while summary statistics can be found in the Tables 8-10.

Two issues with the data set deserve mentioning here. First, differences in NFA do not equal absolute CA in my actual data. Aside from possible different computational approaches concerning the estimation of these variables by different institutions, there are a lot of reasons why the NFA position can change without affecting the CA. An interesting coverage of these possible reasons is given in Lane & Milesi-Ferretti (2001). One example given there are exchange rate changes. According to the authors, Indonesia was indebted in Japanese yen and suffered a decline in NFA when the yen appreciated, which was not fully reflected in the CA. Also, recall from the earlier discussion of Johnson's paper (2009) that gross financial flows have been a lot larger than net flows recently. Therefore, valuation effects can have a substantial impact on NFA. For reasons like these, CA positions may differ substantially from the change in NFA in actual data sets.

And second, I will use the database by Darvas (2012) as the source for data on real exchange rates primarily because it appears to be the largest available one (using the numbers from the WDI for example would result in the loss of many countries (also countries that should be considered at least emerging nations like

Argentina or Hong Kong)). Darvas' (2012) database, like many real effective interest rate indices, is based on CPI instead of ULC, which is a slight weakness for the use as a measure for competitiveness. Specifically, a recent paper (Ahn et al. (2017)) shows that CA positions are significantly negatively correlated with real exchange rates based on ULC measurement in a sample of 35 developed and emerging economies from 1995 to 2014. This correlation is found to be absent however for the relationship between CA positions and real exchange rates based on CPI. I am fully aware of this potential problem but due to data availability and the common use of indices based on CPI in the literature (e.g. Arghyrou & Chortareas (2008)), I shall apply this index for the measurement of competitiveness. Data from the WDI based on ULC however (*REERULC*) can and will be used as a robustness test.

In determining whether CA positions react more sensitively to changes in macroeconomic fundamentals, it has to be clarified which kind of countries should be chosen as the control group. Therefore, I shall proceed in two steps. First, I will estimate the model for various country subsamples (including the EMU) to determine whether different variables are important regressors for CA positions of different countries. Varying coefficient estimates for different country samples have been found empirically (as discussed previously) and are of particular interest for this paper since it seeks to determine whether those estimations appear to be larger in absolute size inside the EMU. Comparing these estimates against various subsamples will yield insights whether the effects of fundamentals on CA positions inside the EMU are unique or can be observed as well for other country sets that share certain characteristics.

The sample will therefore be divided following a development and a financial integration argument. For the selection according to development the countries that are labeled "advanced economies" by the IMF (see IMF (2017) for further information) are considered separately from those that are not and can thus be considered developing countries. For the second division I use Chinn & Ito's (2006) index for financial integration and take the average of their normalized index (between 0 and 1) over the whole period. This database is based on the

IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (details on its construction can be found in Chinn & Ito (2006)) and is available for a large sample of countries (In my sample it is not available for Luxembourg and Brunei Darussalam, so these countries will be considered to have high financial integration). CA positions of countries that have an average value below 0.5 in the financial integration index are considered separately from those that have a value above 0.5. The rationale for this segmentation is that CAs in countries with little financial integration might react more insensitively to changes in macroeconomic fundamentals.

In a second step, the countries forming the EMU will then be interacted with those that are considered advanced economies. I choose to make the comparison that way because other advanced economies are arguably most similar with respect to their political, financial, and economic structure to EMU countries. In fact, all 12 member states of the Eurozone are also classified as advanced economies. Therefore, when trying to measure the additional effects on CA positions inside the EMU, it appears reasonable to measure them as the effects that occur on top of those that are present for advanced economies anyway. These results will indicate whether observed differences in estimations between EMU countries and other advanced economies are in fact significant.

In principal, the estimation should take into account that CA positions need not adjust immediately to changes in fundamental variables. As discussed in 2.1, the CA can be written as the difference between savings and investment. It seems to be a plausible assumption that savings and investment decisions do not react immediately and fully but take some time to adjust. Techniques that have been used by other empirical papers include taking averages over the whole period (e.g. Faruqee & Debelle (1996)) or a specified number of years (e.g. Chinn & Ito (2007)), partial adjustment models (e.g. Bussière et al. (2004)), and error-correction models (e.g. Belke & Dreger (2011)).

In order to determine an appropriate estimation approach, stationarity of the data has to be analyzed. For this purpose, I apply the test for unit roots in panels pro-

posed by Harris and Tzavalis (1999). Monte Carlo simulations ran by the authors indicate that the test yields results reasonably close to the normal distribution and has high power for situations with many observations and few years. It is therefore very suitable for this dataset with a relatively short time dimension of 12 years and a cross-section dimension of 139 countries. The null hypothesis of unit roots in the dependent variable CA to GDP ratio is rejected at any conventional level while it could clearly not be rejected for the relative GDP (the outcome of the Harris-Tzavalis test for all regressors that vary over time can be found in Table 11 of Appendix I). This problem can hardly be solved by taking differences because the resulting variable would measure growth relative to the United States. However, in order to test for the presence of a development effect, relative GDP has to be included apart from growth, which might actually have the opposite effect as explained previously.

Due to these problems, a cross-sectional approach taking averages over the whole time period will be applied in this paper. A panel set that takes averages over 4 years (and thus will give 3 observations per country) will serve as a further robustness test. As mentioned previously, both approaches are common in the empirical literature. Consequently, this paper measures medium-term determinants of the CA. The initially preferred partial-adjustment-model on the other hand is difficult to implement since it requires the assumption of stationary data. It is therefore not part of the next chapter. Since the problems in its estimation are quite interesting however, I include this model along with a discussion of its limitations in the Appendix II.

Data availability restricts the full data set to 139 countries. The subsamples consist of 111 countries classified as non-advanced economies, 72 countries with low financial integration, 28 advanced economies, 67 countries with relatively high financial integration, and 12 EMU countries (a list of all countries together with symbols indicating in which subsample they are included can be found in Table 5 in the Appendix I). The countries that joined the EMU later (Slovakia, Slovenia, Malta, Cyprus, Estonia, Latvia and Lithuania) have to be dropped from the dataset. This is necessary because these countries have been inside the EMU for

only a certain period of the observation time. Due to the missing time structure in the cross-section there is no way to introduce differences in the responsiveness to fundamental variables depending on membership in the EMU for these countries. Therefore, if there is indeed a Euro effect driving up coefficients for fundamental variables, inclusion of these countries as EMU countries may introduce downward bias into the interaction variables. In this connection, a slight weakness may be the inclusion of Greece that joined the EMU in 2001. Since Greece has been a member in 9 out of the 12 years observed and since it has run particularly large CA deficits however, estimating the regressions without this country would be particularly unfortunate. Therefore, its inclusion may be considered a minor and negligible problem.

## 6 Results and Discussion

### 6.1 Cross-Sectional Sample

	(1) Full sample	(2) Non advanced economies	(3) Low financial integration	(4) Advanced economies	(5) High financial integration	(6) Euro countries	(7) Euro countries
avrelGDP	0.0206* (0.0112)	-0.0366 (0.0392)	-0.0300 (0.106)	-0.000638 (0.0241)	0.0343** (0.0140)	0.205** (0.0616)	0.463** (0.105)
avADR	-0.0290 (0.0258)	-0.0340 (0.0268)	-0.0947** (0.0404)	-0.0861 (0.177)	0.0279 (0.0357)	0.439 (0.315)	0.269 (0.144)
avREERCPI	0.0124 (0.0219)	0.0160 (0.0227)	0.0492* (0.0264)	0.0966 (0.0779)	-0.0424 (0.0265)	-0.309 (0.210)	-0.412** (0.108)
avfiscsurplus	0.554*** (0.147)	0.548*** (0.176)	0.330* (0.194)	1.160*** (0.194)	0.572*** (0.144)	0.350 (0.412)	0.672* (0.293)
avgrowth	-0.363* (0.203)	-0.378* (0.207)	-0.458** (0.217)	-1.176* (0.661)	0.184 (0.523)	-1.925 (0.967)	-2.333** (0.663)
initialNFA GDP	0.0309*** (0.00408)	0.0321*** (0.00561)	0.0160 (0.0150)	0.0545*** (0.0164)	0.0344*** (0.00377)	-0.0644 (0.0400)	0.0125 (0.0283)
ToTvar	0.0344 (0.0412)	0.0567 (0.0437)	0.0724 (0.0648)	-0.103 (0.0962)	0.000728 (0.0500)	-2.107* (0.885)	1.602 (1.133)
oilproduce	3.882** (1.503)	4.528*** (1.574)	2.864 (2.342)		5.078** (2.072)		
avrelGDP2							-0.00155** (0.000506)
Observations	139	111	72	28	67	12	12
R-squared	0.629	0.636	0.446	0.811	0.801	0.938	0.970
adj. R2	0.606	0.608	0.377	0.748	0.774	0.852	0.911

Robust standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 1: Cross-Section Results for Different Country Sets

Looking at the full sample, I find relative GDP, fiscal surplus, growth, and the initial NFA position to be the most significant variables, that also have the expected sign. A GDP per capita that is higher by one percentage point relative to the US is predicted to lead to an increase in the CA relative to GDP by approximately 0.02 percentage points, which is line with the theory that relatively poor countries can attract capital as part of their catching-up process. The negative, albeit insignificant, coefficient on the ADR implies that a country that has an increase in the share of the population that is in non-working age relative to the rest by one percentage point will see its CA decrease by roughly 0.03 percentage points. As the relative exchange rate is an index that is normalized to 100, the interpretation of the coefficient is that a country that has an average of 101 points there is predicted to have a CA position increase by roughly 0.01 percentage points.

This is in opposition to the idea that lower price levels are connected to enhanced competitiveness encouraging consumption switching to domestic goods and thus leading to surpluses. The estimation is far away from any conventional level of significance however.

The initial NFA to GDP ratio enters significantly positively as the payments gained on assets that are held abroad are part of the CA. An NFA to GDP ratio increase by 1 percentage point is connected to an increase in the CA position by roughly 0.03 percentage points. Terms of Trade variability has the expected positive but insignificant sign. The interpretation is that a standard deviation of the Terms of Trade index (which is normalized at 100) that is higher by 1 point increases the CA by roughly 0.03 percentage points. The negative coefficient of the average growth rate is in line with the idea that countries with higher growth rates are more attractive to investors and implies an estimated reduction of the CA by roughly 0.35 percentage points for a growth rate that is higher by 1 percentage point. The fact that the coefficient on fiscal surplus is significantly positive indicates the absence of full Ricardian equivalence; the estimation of roughly 0.5 implies however that only half of an increase in government spending is reflected in a deterioration of the CA position. Finally, oil exporting countries seem to have higher CA positions.

The next two columns show the results for developing countries (2) and countries with low financial integration (3). Compared to the full sample, the positive impact of relative GDP vanishes. Consequently, lower GDP per capita is unable to attract foreign investment in developing or financially unintegrated countries. However, the negative effect of ADR becomes more pronounced, especially for countries with low financial integration. Growth rate, initial NFA to GDP ratio, fiscal surplus, and Terms of Trade variability have the expected sign even though they are not always significant. The real exchange rate has the wrong sign but is not very significant.

The results for the developed and integrated economies differ slightly. I find evidence for capital flows following low GDP per capita for financially integrated

countries (even though not for the developed countries sample) while the ADR loses its negative significance. It seems that a higher number of people of non-working age in a more developed or financially integrated country does not necessitate foreign indebtedness. The result is similar to Chinn & Ito's (2007) investigation, that also found ADR to be a more significant negative regressor of CA positions for developing and emerging countries than for industrial ones.

Furthermore, Terms of Trade variability is less of a concern in developed and integrated countries which is in line with Chinn & Prasad's (2003) finding of Terms of Trade variability increasing CA positions in developing countries but not in developed ones. The different relevance of both Terms of Trade variability and ADR with respect to different country samples might indicate better institutions in more developed countries. NFA and fiscal surplus point into the right direction and are highly significant while the role of the real exchange rate remains elusive. Estimations of the effects of fiscal surplus are in line (albeit slightly higher) with the values obtained by Chinn & Prasad (2003) and Chinn & Ito (2007) with the exception of the unrealistically high value in (4). The growth channel is found to operate into the expected direction for the advanced economies but not for the financially integrated ones. In all samples, oil exporting countries tend to run large CA surpluses (the dummy was excluded in (4) since Norway would have been the only country to which it applies).

Looking at the EMU finally, the coefficients for relative GDP, average growth and competitiveness are estimated to be particularly large. Based on the empirical literature on the EMU specifically (e.g. Blanchard & Giavazzi (2002), Lane & Pels (2012), or Schmitz & Von Hagen (2011)), these are the variables for which an additional effect of EMU membership is expected the most. Not all of them are significant but a quadratic specification is found to improve the fit considerably in (7) (which was not the case for the other subsamples). Previous studies have also experimented with the inclusion of relative income squared to reflect stage of development effects. The idea is that initially poor countries cannot attract foreign capital but start doing so once they reach a certain degree of development. Consequently, a U-shape pattern for the effect of relative GDP on the CA would

be expected (see, e.g. Faruqee & DeBelle (1996) or Chinn & Prasad (2003)). Following this logic, the coefficients on relative GDP in this sample have the wrong signs and instead of a stage of development hypothesis rather suggest a limit for the effect of relative GDP on CA positions. This however has also been found for industrial countries previously by Chinn & Prasad (2003).

Comparing the estimated coefficients for the EMU with the other country samples, it seems that capital is much more predicted to flow to countries with low relative GDP but high growth rates and high competitiveness in the Eurozone. In fact, the coefficient estimates for these variables exceed those of all other subsamples suggesting that CAs of Euro countries are especially susceptible to changes in them. Specifically, CA reactions to changes in these variables appear to be much stronger than in the sample consisting of 28 advanced economies, which can be considered to resemble the EMU countries politically and economically (in fact, the direction of the coefficients resembles most the sample of financially integrated countries even though the magnitudes are very different). These observations are definitely in line with the hypothesis of this paper.

However, two caveats deserve mentioning in this connection. The other coefficients in the EMU sample are all insignificant at the 5% level, which is a bit concerning, especially with respect to fiscal surplus and NFA positions. This, together with the fact that the coefficient on Terms of Trade variability changes its sign upon the introduction of relative income squared, might indicate that too many variables for the 12 observations have been included. Next, the question whether the differences in the coefficients for EMU countries and advanced economies are significant is addressed by introducing interaction terms for the countries inside the Euro area.

	(1)	(2)	(3)	(4)	(5)
avrelGDP	-0.0681 (0.0758)	-0.0615 (0.0472)	-0.0658* (0.0374)	-0.0890 (0.0867)	0.105 (0.136)
avADR	0.0546 (0.310)				
avREERCPI	0.104 (0.117)	0.122* (0.0629)	0.127** (0.0493)	0.122** (0.0575)	
avfiscsurplus	1.333*** (0.428)	1.299*** (0.386)	1.344*** (0.285)	1.175*** (0.334)	0.748* (0.417)
avgrowth	-2.045 (1.581)	-1.940* (0.956)	-2.018** (0.780)	-1.683* (0.897)	-0.773 (1.448)
initialNFA/GDP	0.0622* (0.0297)	0.0585*** (0.0110)	0.0577*** (0.0106)	0.0573*** (0.0106)	0.0694*** (0.0120)
ToTvar	-0.0155 (0.138)				
EUROtimesavrelGDP	0.103 (0.0864)	0.0906 (0.0566)	0.0985** (0.0368)	0.314** (0.139)	0.146 (0.184)
EUROtimesavADR	-0.146 (0.613)				
EUROtimesavREERCPI	-0.00178 (0.301)	-0.0691 (0.0745)	-0.0800* (0.0444)	-0.189** (0.0797)	
EUROtimesavfiscsurplus	0.0463 (0.775)	0.116 (0.607)			0.377 (0.776)
EUROtimesavgrowth	-0.553 (1.707)	-0.594 (1.167)	-0.510 (0.960)	-0.909 (1.165)	-1.917 (1.711)
EUROtimesToTvar	-0.249 (1.260)				
avrelGDP2				0.000190 (0.000414)	-0.000423 (0.000618)
EUROtimesavrelGDP2				-0.000885 (0.000569)	-0.000380 (0.000730)
avREERULC					-0.0246 (0.0872)
EUROtimesavREERULC					-0.0525 (0.123)
Observations	28	28	28	28	26
R-squared	0.859	0.858	0.858	0.875	0.842
adj. R2	0.738	0.791	0.801	0.806	0.726

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 2: Cross-Section Results with Interaction Effects

From Table 1 I conclude that the most important variables for advanced economies and the EMU appear to be relative GDP, growth, competitiveness, fiscal surplus, and the initial NFA to GDP ratio. Terms of Trade variability and ADR seem to play a minor role for advanced economies. This is also confirmed by the first sample including all variables plus the interaction terms (except for the one with initial NFA to GDP ratio because it seems hard to imagine why the payments gained on NFA should depend on being a member of a currency union). The 4 coefficients are among the least significant ones and are therefore excluded in (2). Signifi-

cance of the interaction terms rises a little bit, relative GDP and competitiveness however have the wrong sign (even though they are not very significant). The other 3 variables are well behaved however. The EMU interaction terms are all insignificant and also jointly insignificant but at least all enter with the expected sign. In (3) I exclude the interaction term that is least significant, the one with fiscal surplus. The interaction terms gain in significance but so do relative GDP and competitiveness, which have the wrong sign. Therefore, in large parts, the interaction terms have the effect of bringing the coefficients back to 0. For growth there is an additional negative EMU effect that is not significant however.

The final two specifications try to address the variables for competitiveness and relative GDP, which do not behave in the hypothesized way. In (4) I apply a quadratic specification of relative income as before but without much success (the 4 variables all work in opposite directions while only one of them is significant) and in (5) I try to address the problem of CPI-based indices by replacing this variable by the WDI index based on ULC due to the possible superiority of the latter as explained previously (this leads to the loss of South Korea and Hong Kong because of data unavailability but these countries did not drive up the coefficient for the CPI-index before). This improves the overall fit slightly in the sense that relative GDP and relative GDP squared do not point into different directions for EMU countries and the remaining ones any longer. Instead, relative GDP is found to have a positive effect on CAs only up to a certain point, and this relationship is estimated to be more pronounced for EMU countries. The signs of the coefficients for competitiveness and its interaction are more intuitive now but insignificant. Consequently, I find rather limited evidence that CA positions are significantly more sensitive to changes in macroeconomic fundamentals (especially relative GDP, growth, and competitiveness) in the EMU compared to other advanced economies.

The intercept was excluded in all of these regressions because it has little meaning. In the full sample CA positions should add up to zero in the absence of measurement errors. In the restricted samples an intercept may indicate a fixed effect, that is shared by all of the countries in the sample. Therefore, I did check for sig-

nificance before excluding it. However, I found intercepts to be quite substantial in size but never significant in any of the specifications above. In the sample of EMU countries I obtained an intercept of roughly -80 percentage points, which was insignificant however. There is no plausible qualitative reasoning for this result (that, however, drives up the other coefficients) except for the small number of degrees of freedom left.

## **6.2 Cross-Sectional Sample with Time Structure**

In order to test the robustness of the previously obtained results, the estimations are now repeated for a cross-section in which each observation is the average over 4 years. Thus, a panel dataset with 3 observations per country is obtained. This specification has 2 advantages over the previous one. First, it can capture adjustments that happen within shorter periods, which are invisible in a pure cross-sectional case. And second, degree of freedoms are less of a concern due to the higher number of observations. Therefore, inclusion of an intercept is no longer as costly and will be done subsequently. The exogenous variables will be the same except for Terms of Trade variability for two reasons. Calculating it over periods of 4 years will lead to huge variation in this variable and data before 2000 is unavailable for many countries.

VARIABLES	(1) Full sample	(2) Non advanced economies	(3) Low financial integration	(4) Advanced economies	(5) High financial integration	(6) Euro countries	(7) Euro countries
relGDP	0.0205* (0.0124)	0.00434 (0.0473)	-0.0590 (0.0768)	0.00723 (0.0112)	0.0407*** (0.0132)	0.0363 (0.0275)	0.271*** (0.0795)
REERCPI	-0.00552 (0.0135)	-0.0120 (0.0149)	-0.00500 (0.0154)	0.0283 (0.0430)	-0.0168 (0.0299)	-0.0576 (0.227)	-0.171 (0.200)
ADR	-0.0220 (0.0234)	-0.0264 (0.0261)	-0.0551 (0.0355)	0.172** (0.0790)	0.0360 (0.0274)	0.534** (0.211)	0.532** (0.203)
fiscsurplus	0.623*** (0.0953)	0.634*** (0.110)	0.532*** (0.147)	0.638*** (0.107)	0.662*** (0.106)	1.099*** (0.235)	0.768*** (0.277)
growth	-0.482* (0.274)	-0.562* (0.292)	-0.625** (0.292)	0.00803 (0.261)	-0.0907 (0.216)	-0.479 (0.679)	-0.554 (0.729)
initialNFA/GDP	0.0311*** (0.00990)	0.0286** (0.0115)	0.0460*** (0.0134)	0.0637*** (0.00851)	0.0272** (0.0111)	0.0232 (0.0240)	0.0151 (0.0221)
oilproduce	4.124*** (0.891)	4.712*** (0.888)	3.834*** (1.156)		5.552*** (1.527)		
relGDP2							-0.000796*** (0.000243)
Constant	1.775 (2.498)	2.853 (3.103)	6.180* (3.568)	-10.41** (4.788)	-2.802 (3.760)	-21.00 (18.40)	-24.23 (19.48)
Observations	417	333	216	84	201	36	36
R-squared	0.512	0.481	0.318	0.778	0.692	0.766	0.832
adj. R2	0.504	0.470	0.295	0.761	0.681	0.718	0.791

Robust standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 3: Panel Results for Different Country Sets

Table 3 shows that the results are partially similar to those obtained in the pure cross-sectional case. Relative income has a positive effect in all subsamples except for the one with financially unintegrated countries, but the effect is largest for integrated countries and EMU countries where, again, a quadratic specification improves the fit considerably (I tried this for the other subsamples as well but the changes were negligible). A negative effect of decreased competitiveness is visible for most samples but is estimated with the largest coefficient for the EMU countries (despite missing significance). Again, higher ADRs are connected to decreases in CAs for developing countries (even though insignificantly), which is not observed for more advanced and integrated economies. In fact, this coefficient is positive there and even significant for advanced economies and EMU countries. Higher growth rates induce capital inflows in all samples with similar coefficients except for the one consisting of advanced economies. Fiscal surplus is strongly positively significant in all samples (as expected) but the effect is highest in the EMU, in (5) even exceeding 1, which is a bit illogical since it implies that an increase in government spending leads to a deficit even higher than that spending.

Again, the slightly surprising result that NFA to GDP ratios matter everywhere except for the EMU occurs.

Overall, the results are similar to the pure cross-sectional case. This is true especially for the estimations of the variables capturing relative GDP, initial NFA to GDP ratio, and fiscal surplus. Furthermore, the coefficient estimations of the EMU countries resemble most those for integrated countries in direction. As in the pure cross-sectional case, the behavior of some variables is hard to rationalize however. Specifically, it is hard to come up with an explanation for the significant positive coefficient on ADR for advanced economies or the absence of significance for initial NFA to GDP in the Euro area. Furthermore, the behavior of the variable measuring competitiveness appears to be erratic. However, as in the cross-sectional case, the magnitude of the coefficients indicates that relative GDP, competitiveness, and growth are important drivers of CAs inside the EMU, especially when compared with the advanced economies sample. Therefore, magnitude and significance of these additional effects is estimated with the help of interaction dummies again subsequently.

	(1)	(2)	(3)	(4)	(5)	(6)
relGDP	0.0118 (0.0170)	0.0139 (0.0167)	0.0257* (0.0143)	-0.0237 (0.0517)	0.0204 (0.0578)	0.0603 (0.0504)
REERCPI	0.000450 (0.0484)	0.0154 (0.0468)	0.0278 (0.0433)	0.0301 (0.0443)		
ADR	0.181* (0.102)	0.142 (0.101)				
fiscsurplus	0.505*** (0.117)	0.526*** (0.119)	0.491*** (0.115)	0.446*** (0.126)	0.375*** (0.119)	0.366*** (0.115)
growth	0.162 (0.440)	0.192 (0.436)	0.223 (0.433)	0.208 (0.441)	-0.00353 (0.382)	0.140 (0.390)
initialNFA GDP	0.0696*** (0.0104)	0.0647*** (0.00944)	0.0592*** (0.00742)	0.0585*** (0.00748)	0.0724*** (0.00618)	0.0715*** (0.00622)
EUROtimesrelGDP	0.0245 (0.0320)	-0.0225 (0.0224)	-0.0285 (0.0228)	0.240** (0.0979)	0.148 (0.105)	0.129 (0.103)
EUROtimesREERCPI	-0.0581 (0.228)	0.196 (0.228)	0.206 (0.215)	0.134 (0.224)		
EUROtimesADR	0.353 (0.231)	0.181 (0.220)				
EUROtimesfiscsurplus	0.594** (0.259)	0.511** (0.233)	0.546** (0.233)	0.263 (0.287)	0.303 (0.287)	0.499 (0.334)
EUROtimesgrowth	-0.641 (0.800)	0.00129 (0.780)	-0.0839 (0.798)	-0.0279 (0.879)	0.315 (0.707)	-0.732 (0.565)
EUROtimesinitialNFA GDP	-0.0463* (0.0257)					
EURO	-11.82 (18.89)	-24.03 (21.21)	-15.48 (21.06)	-23.85 (20.79)	-34.06* (17.98)	
relGDP2				0.000249 (0.000238)	2.52e-05 (0.000261)	-0.000123 (0.000233)
EUROtimesrelGDP2				-0.00102*** (0.000359)	-0.000676* (0.000385)	-0.000599 (0.000371)
REERULC					-0.0546 (0.0380)	-0.0358 (0.0295)
EUROtimesREERULC					0.280 (0.188)	-0.0367 (0.0652)
Constant	-9.181* (5.428)	-8.964* (5.317)	-4.372 (4.720)	-2.452 (4.792)	4.448 (4.104)	
Observations	84	84	84	84	78	78
R-squared	0.803	0.796	0.785	0.806	0.830	0.825
adj. R2	0.766	0.761	0.755	0.773	0.798	0.796

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 4: Panel Results with Interaction Effects

Specification (1) includes all variables and their interaction terms and thus yields results that follow from Table 3. Most of the coefficients are in line with the hypothesized effects, especially the interaction terms have the expected signs (except for NFA). Unfortunately, this result does not hold upon removal of the interaction term with NFA to GDP, which, as argued before, has little justification to be included a priori. After its exclusion in (2), most of the interaction terms are insignificant and have the wrong sign. I again suggest that ADR is not a main driver of CA positions in this sample and exclude it in (3) with little change. In (4) I try a quadratic specification again which slightly improves the fit but has the

very unintuitive result of a U-shape for relative GDP for the whole sample and a mountain-shape for EMU countries. Also, the competitiveness coefficients point into the wrong direction. Therefore, I replace the CPI-based index by the ULC-based one again in (5) which changes the sign for the competitiveness measure but not for its interaction term.

I find negative intercepts for advanced economies and, on top of that, a negative impact of being a member of the EMU in 5 out of 6 specifications here (in (5) the intercept is positive but, on the other hand, the additional intercept from the Euro is strongly negative). These intercepts are substantial in size but not very significant which is unsatisfactory in at least two ways. First, the magnitude of these estimations makes it difficult to ignore them. And second, it seems that countries see net capital outflows or inflows for reasons not controlled for in the estimation. In (6) I leave out the intercepts because their inclusion severely influences other estimates, and overall, they do not seem to be very significant. This definitely yields the most appealing results with respect to signs since, except for growth, all variables and interaction terms have the expected sign now. Significance remains low for most of them however. Therefore, as in the cross-sectional case, the initial observance that relative GDP, competitiveness, and growth rates have larger effects inside the EMU based on comparing different samples does not hold in a specification that tries to measure these effects on top of those occurring for advanced economies.

Overall, these results do not appear to be particularly satisfactory, and, naturally, poor data quality, especially concerning the observations of developing countries, could, in parts, be responsible for this. Especially data on ADR and the real exchange rate require well-functioning administrations. A further obvious reason for the results is the quite static approach taking averages over the whole period or periods of 4 years, that was applied throughout this paper. This approach is most suitable for the detection of medium-term determinants. Any variability happening during this period of time however will be invisible in the results by construction. It might thus be that variable coefficients could be measured in a more meaningful way using dynamic models. Furthermore, inclusion of addi-

tional variables could influence the results. I have focused here on those that are used by practically all empirical papers on the issue, but of course, many authors have extended this variable choice (most notably by variables capturing institutional quality). As long as those variables are not independent of the actually included ones, the latter will be biased. A final potential issue is that the CA might not reflect consumption and savings decisions well (any longer) in the presence of gross financial flows that by far exceed CA positions as discussed in 2.3.

## **7 Concluding Remarks**

This paper has explored empirically the determinants of CA positions worldwide with a focus on the EMU during the period from its creation until the beginning of the sovereign debt crisis. I find that CA positions are determined by different macroeconomic fundamentals and that different variables are more suitable in explaining patterns for different country subsamples. For developing and financially unintegrated countries ADR and Terms of Trade variability are important drivers of the CA balance while relative income differentials play a more important role for financially open countries. Government lending/borrowing appears to be more or less equally important for all country samples.

The question whether countries inside the EMU are particularly sensitive to these macroeconomic differentials has been analyzed both in a pure cross-sectional case and for a panel taking averages over 4 years for the time from 1998 to 2009. Comparing the estimations for the EMU with those obtained for other country samples, it appears that countries in the EMU have reacted more sensitively by lower CA balances to lower relative income, decreased competitiveness, and higher growth in the period of time considered. The coefficients are estimated to be much larger for these 3 variables compared to the sample of advanced economies, which can be considered to be most similar to EMU countries with respect to political, financial, and economic structure. Significance is weak however for the estimated coefficients on growth and competitiveness in the panel case.

Attempts to calculate additional effects that occur for EMU members compared

to other advanced economies are not successful however. Interaction terms are often insignificant or point into the wrong direction. Furthermore, a lot of changes in signs occur upon the inclusion or removal of other variables. Therefore, even though running different regressions for the different country samples suggests that the creation of large CA differences in the EMU has been facilitated by the common currency in the observed period, I do not find this result to be robust or statistically significant when measured as interaction effects with respect to other advanced economies. Evidence in favor of such incremental effects is therefore weak.

The results are not convincing enough to derive clear policy recommendations. Furthermore, the issue is not very urgent in the light of CA turnarounds after the beginning of the sovereign debt crisis. However, in my opinion, CA positions in the EMU should continue to be monitored. I cannot ascertain here that they can occur more easily within the EMU, but even if they do not, policy makers should strive to identify their origins. CA differentials in the EMU might be due to a healthy and welcome catching-up process accompanied by higher growth rates but might also be caused by deteriorating competitiveness in some countries. In case the large CA imbalances seen in the past return in the Eurozone, the appropriate political reaction will depend on the origin of those imbalances.

## References

- [1] Abbas, S. A., Bouhga-Hagbe, J., Fatás, A., Mauro, P., & Velloso, R. C. (2011). Fiscal policy and the current account. *IMF Economic Review*, 59(4), 603-629.
- [2] Achen, C. H. (2000). Why lagged dependent variables can suppress the explanatory power of other independent variables. *Ann Arbor*, 1001(2000), 48106-1248.
- [3] Ahn, M. J., Mano, R., & Zhou, J. (2017). Real Exchange Rate and External Balance: How Important Are Price Deflators?. *International Monetary Fund*.
- [4] Arghyrou, M. G., & Chortareas, G. (2008). Current account imbalances and real exchange rates in the euro area. *Review of International Economics*, 16(4), 747-764.
- [5] Baele, L., Ferrando, A., Hördahl, P., Krylova, E., & Monnet, C. (2004). Measuring financial integration in the euro area (No. 14). *European Central Bank*.
- [6] Barnes, S., Lawson, J., & Radziwill, A. (2010). Current Account Imbalances in the Euro Area: A Comparative Perspective (No. 826). *OECD Publishing*.
- [7] Belke, A., & Dreger, C. (2011). Current Account Imbalances in the Euro Area: Catching up or Competitiveness? (No. 241). *RWI-Leibniz-Institut für Wirtschaftsforschung, Ruhr-University Bochum, TU Dortmund University, University of Duisburg-Essen*.
- [8] Berger, M. H., & Nitsch, V. (2010). The Euro's Effect on Trade Imbalances (No. 10-226). *International Monetary Fund*.
- [9] Bernanke, B. S. (2005). The global saving glut and the US current account deficit (No. 77).

- [10] Blanchard, O. (2007). Current account deficits in rich countries. *IMF staff papers*, 54(2), 191-219.
- [11] Blanchard, O., & Giavazzi, F. (2002). Current account deficits in the euro area: the end of the Feldstein-Horioka puzzle?. *Brookings papers on economic activity*, 2002(2), 147-209.
- [12] Bracke, T., Bussière, M., Fidora, M., & Straub, R. (2010). A framework for assessing global imbalances. *The World Economy*, 33(9), 1140-1174.
- [13] Bussière, M., Fratzscher, M., & Müller, G. J. (2004). Current account dynamics in OECD and EU acceding countries-an intertemporal approach.
- [14] Chinn, M. D., & Ito, H. (2006). What matters for financial development? Capital controls, institutions, and interactions. *Journal of development economics*, 81(1), 163-192.
- [15] Chinn, M. D., & Ito, H. (2007). Current account balances, financial development and institutions: Assaying the world “saving glut”. *Journal of international money and Finance*, 26(4), 546-569.
- [16] Chinn, M. D., & Prasad, E. S. (2003). Medium-term determinants of current accounts in industrial and developing countries: an empirical exploration. *Journal of International Economics*, 59(1), 47-76
- [17] Darvas, Z. (2012). Real effective exchange rates for 178 countries: A new database (No. 1210). Institute of Economics, Centre for Economic and Regional Studies, Hungarian Academy of Sciences.
- [18] Faruquee, H., & Debelle, G. (1996). What Determines the Current Account? a Cross-Sectional and Panel Approach (No. 96/58). International Monetary Fund.
- [19] Decressin, M. J., & Stavrev, E. (2009). Current accounts in a currency union (No. 9-127). International Monetary Fund.

- [20] Edwards, S. (2004). Thirty years of current account imbalances, current account reversals and sudden stops (No. w10276). National Bureau of Economic Research.
- [21] Estrada, Á., Galí, J., & López-Salido, D. (2013). Patterns of convergence and divergence in the euro area. *IMF Economic Review*, 61(4), 601-630.
- [22] Feldstein, M., & Horioka, C. (1980). Domestic Saving and International Capital Flows. *The Economic Journal*, 90(358), 314-329.
- [23] Fratzscher, M. (2002). Financial market integration in Europe: on the effects of EMU on stock markets. *International Journal of Finance & Economics*, 7(3), 165-193.
- [24] Friedman, M. (1957). The permanent income hypothesis. In *A theory of the consumption function* (pp. 20-37). Princeton University Press.
- [25] Gagnon, J. (2011). Current Account Imbalances Coming Back (No. WP11-1). Peterson Institute for International Economics.
- [26] Giavazzi, F., & Spaventa, L. (2010). Why the current account matters in a monetary union: lessons from the financial crisis in the euro area.
- [27] Gossé, J. B., & Serranito, F. (2014). Long-run determinants of current accounts in OECD countries: Lessons for intra-European imbalances. *Economic Modelling*, 38, 451-462.
- [28] Gourinchas, P. O., & Obstfeld, M. (2012). Stories of the twentieth century for the twenty-first. *American Economic Journal: Macroeconomics*, 4(1), 226-265.
- [29] Gruber, J. W., & Kamin, S. B. (2007). Explaining the global pattern of current account imbalances. *Journal of International Money and Finance*, 26(4), 500-522.
- [30] Harris, R. D., & Tzavalis, E. (1999). Inference for unit roots in dynamic panels where the time dimension is fixed. *Journal of econometrics*, 91(2), 201-226.

- [31] IMF (2017). WEO Groups and Aggregates Information. retrieved from <https://www.imf.org/external/pubs/ft/weo/2017/01/weodata/groups.htm#ae>
- [32] Jaumotte, M. F., & Sodsriwiboon, P. (2010). Current account imbalances in the southern euro area (No. 10-139). International Monetary Fund.
- [33] Johnson, K. H. (2009). Gross or Net International Financial Flows.
- [34] Jordà, Ò., Schularick, M., & Taylor, A. M. (2011). Financial crises, credit booms, and external imbalances: 140 years of lessons. *IMF Economic Review*, 59(2), 340-378.
- [35] Keele, L., & Kelly, N. J. (2005). Dynamic models for dynamic theories: The ins and outs of lagged dependent variables. *Political analysis*, 14(2), 186-205.
- [36] Kennedy, M., & Slok, T. (2005). Structural Policy Reforms and External Imbalances (No. 415). OECD Publishing.
- [37] Kerdrain, C., Koske, I., & Wanner, I. (2010). The Impact of Structural Policies on Saving, Investment and Current Accounts (No. 815). OECD Publishing.
- [38] Lane, P. (2010). International Financial Integration and the External Positions of Euro Area Countries (No. 830). OECD Publishing.
- [39] Lane, P. R., & Milesi-Ferretti, G. M. (2001). The external wealth of nations: measures of foreign assets and liabilities for industrial and developing countries. *Journal of international Economics*, 55(2), 263-294.
- [40] Lane, P. R., & Milesi-Ferretti, G. M. (2007). The external wealth of nations mark II: Revised and extended estimates of foreign assets and liabilities, 1970–2004. *Journal of international Economics*, 73(2), 223-250.
- [41] Lane, P. R., & Milesi-Ferretti, G. M. (2012). External adjustment and the global crisis. *Journal of International Economics*, 88(2), 252-265.

- [42] Lane, P., & Pels, B. (2012). Current Account Imbalances in Europe (No. 8958). CEPR Discussion Papers.
- [43] Modigliani, F., & Brumberg, R. (1954). Utility analysis and the consumption function: An interpretation of cross-section data. *Franco Modigliani*, 1.
- [44] Nickell, S. (1981). Biases in dynamic models with fixed effects. *Econometrica: Journal of the Econometric Society*, 1417-1426.
- [45] Obstfeld, M. (2012). Does the current account still matter? (No. w17877). National Bureau of Economic Research.
- [46] Obstfeld, M., & Rogoff, K. S. (1996). *Foundations of international macroeconomics* (Vol. 30). Cambridge, MA: MIT press.
- [47] Sachs, J. (1981). The Current Account in the Macroeconomic Adjustment Process (No. 0796). National Bureau of Economic Research, Inc.
- [48] Sachs, J. (1982). The current account in the macroeconomic adjustment process. *The Scandinavian Journal of Economics*, 147-159.
- [49] Schmitz, B., & Von Hagen, J. (2011). Current account imbalances and financial integration in the euro area. *Journal of International Money and Finance*, 30(8), 1676-1695.
- [50] Sinn, H. W., & Wollmershäuser, T. (2012). Target loans, current account balances and capital flows: the ECB's rescue facility. *International Tax and Public Finance*, 19(4), 468-508.
- [51] Solow, R. M. (1956). A contribution to the theory of economic growth. *The quarterly journal of economics*, 70(1), 65-94.
- [52] Zemanek, H., Belke, A., & Schnabl, G. (2010). Current account balances and structural adjustment in the euro area. *International Economics and Economic Policy*, 7(1), 83-127.

## Appendix I

Albania*	Algeria*	Angola*	Antigua & Barbuda	Argentina*	Australia#	Austria#€
Bahrain	Bangladesh*	Belarus*	Belgium#€	Belize*	Benin*	Bhutan*
Azerbaijan*	Bolivia	Brazil*	Brunei Darussalam	Bulgaria	Burkina Faso*	Burundi*
Cabo Verde*	Cambodia*	Canada#	Central African Republic*	Chad*	Chile	China*
Colombia*	Comoros*	Congo, Dem. Rep.*	Congo, Rep.*	Costa Rica	Cote d'Ivoire*	Croatia
Czech Republic#	Denmark#	Djibouti	Dominican Republic*	Ecuador	El Salvador	Equatorial Guinea*
Eritrea*	Fiji*	Finland#€	France#€	Gabon*	Georgia	Germany#€
Ghana*	Greece#€	Grenada*	Guatemala	Guinea*	Guinea-Bissau*	Guyana
Haiti	Honduras*	Hong Kong#	Hungary	Iceland#	India*	Indonesia
Iran*	Ireland#€	Israel#	Italy#€	Jamaica	Japan#	Jordan
Kazakhstan*	Kenya	Korea, Rep.*#	Kuwait	Kyrgyz Republic	Lebanon	Lesotho*
Luxembourg#€	Macedonia*	Madagascar*	Malaysia*	Mauritius	Mexico	Moldova*
Mongolia	Morocco*	Mozambique*	Namibia*	Netherlands#€	New Zealand#	Nicaragua
Niger*	Norway#	Oman	Pakistan*	Panama	Papua New Guinea*	Paraguay
Peru	Philippines*	Poland*	Portugal#€	Romania	Russian Federation*	Rwanda*
Samoa*	Saudi Arabia	Senegal*	Seychelles	Singapore#	Solomon Islands*	South Africa*
Spain#€	Sri Lanka*	St. Lucia*	St. Vincent & Grenad.*	Sudan*	Suriname*	Swaziland*
Sweden#	Switzerland#	Tajikistan*	Tanzania*	Thailand*	Togo*	Trinidad & Tobago
Tunisia*	Turkmenistan*	Uganda	Ukraine*	Un. Arab Emirates	United Kingdom#	United States#
Uzbekistan*	Vanuatu	Venezuela*	Vietnam*	Yemen	Zambia	.

Table 5: List of Countries Included

\* financial integration index <.5 on average

# advanced economy according to IMF

€ starting member of the EMU in 1998 (including Greece that joined in 2001)

Variable	Description:	Source
(av)relCA	Current account relative to GDP	IMF WEO
(av)fiscsurplus	Government net lending/borrowing relative to GDP	IMF WEO
(av)relGDP	(average) Real GDP per capita in constant 2010 US-Dollars relative to the US	WDI
(av)growth	(average) real growth rate based on real GDP in constant 2010 US-Dollars	WDI/own calculations
(av)ADR	(average) Age Dependency Ratio (ratio of dependents (people younger than 15 or older than 64) to the population of working age)	WDI
ToTvar	Standard deviation of WDI's Terms of Trade Index for the years 2000-2009 (base year:2000=100)	WDI/own calculations
(av)REERULC	(average) Real Effective Exchange Rate based on ULC (index with base year:2010=100)	WDI
(av)REERCPI	Real Effective Exchange Rate based on CPI (index with base year:2007=100)	Darvas (2012)
initialNFAGDP	Ratio of Net Foreign Assets to GDP at the beginning of the observation period	Lane & Milesi-Ferretti (2007)
oilproduce	Dummy variable that takes on the value 1 if oil revenues exceed 2% of GDP on average over period 1998-2009	WDI/own calculations
EUROtimesx	Interaction terms with independent variables above	see above

Table 6: List of Variables Included

	1998	1999	2000	2001	2002	2003
Austria	-1.857	-2.266	-.707	-.798	2.106	1.554
Belgium	5.079	7.703	3.937	3.317	4.47	3.376
Finland	5.014	5.148	7.544	8.056	8.194	4.636
Germany	-.709	-1.415	-1.75	-.363	1.885	1.412
Luxembourg	8.476	10.672	12.537	8.4	9.456	6.558
Netherlands	3.009	3.544	1.754	2.298	2.359	5.213
France	3.669	4.203	2.629	2.847	2.108	1.567
Greece	-2.624	-3.588	-5.927	-5.368	-6.832	-8.45
Ireland	.781	.244	.617	.176	.248	.494
Italy	2.049	1.126	.056	.525	-.27	-.609
Portugal	-7.542	-8.856	-10.802	-10.435	-8.485	-7.168
Spain	-1.665	-3.296	-4.401	-4.391	-3.738	-3.884
EU area	.323	-1.945	-2.6	-1.197	.483	.126

	2004	2005	2006	2007	2008	2009
Austria	2.083	2.268	3.311	3.824	4.518	2.613
Belgium	3.076	1.985	1.839	1.49	-.999	-1.076
Finland	5.955	3.209	3.782	3.837	2.246	1.914
Germany	4.457	4.595	5.681	6.75	5.595	5.741
Luxembourg	11.92	11.095	10.021	9.846	7.671	7.351
Netherlands	6.796	6.12	7.86	5.955	4.141	5.815
France	1.126	.477	.45	.093	-.941	-.832
Greece	-7.71	-8.87	-11.486	-15.188	-15.111	-12.345
Ireland	-.098	-3.548	-5.352	-6.512	-6.271	-4.675
Italy	-.347	-.9	-1.503	-1.39	-2.818	-1.889
Portugal	-8.329	-9.883	-10.673	-9.738	-12.126	-10.422
Spain	-5.586	-7.494	-8.99	-9.648	-9.251	-4.281
EU area	.767	-.282	-.22	.083	-1.22	.147

Table 7: CA/GDP Ratios in the EMU

	N	mean	sd	min	max
avrelCA	139	-1.869	8.110	-22.22	37.88
avrelGDP	139	27.21	39.53	0.490	210.3
avREERCPI	139	100.5	14.03	76.68	183.4
avREERULC	80	98.80	23.41	66.94	279.3
avADR	139	63.66	18.06	27.09	108.2
avfiscsurplus	139	-1.375	4.581	-23.67	25.10
Avgrowth	139	3.730	2.407	-0.340	18.78
initialNFAGDP	139	-38.58	110.9	-325.8	883.0
avka_open	137	0.537	0.353	0	1
ToTvar	139	14.58	14.82	1.137	57.04

Table 8: Summary Statistics for Full Sample

Note: No data on financial openness for Luxembourg and Brunei Darussalam

	N	mean	sd	min	max
avrelCA	28	1.330	6.746	-10.67	18.52
avrelGDP	28	91.08	38.87	36.20	210.3
avREERCPI	28	97.23	9.737	83.15	125.4
avREERULC	26	98.01	10.40	79.60	129.9
avADR	28	48.51	5.094	36.70	61.06
avfiscsurplus	28	-0.593	3.803	-7.411	11.93
avgrowth	28	2.306	1.161	0.396	4.836
initialNFAGDP	28	3.849	63.05	-98.27	191.7
avka_open	27	0.938	0.143	0.408	1
ToTvar	28	5.775	6.384	1.137	27.38

Table 9: Summary Statistics for Advanced Economies

	N	mean	sd	min	max
avrelCA	12	0.0977	5.683	-9.538	9.500
avrelGDP	12	91.93	41.12	46.72	210.3
avREERCPI	12	95.44	2.047	91.09	98.72
avREERULC	12	97.77	3.354	91.52	102.5
avADR	12	48.89	2.379	45.41	53.93
avfiscsurplus	12	-1.753	2.837	-7.411	3.046
avgrowth	12	1.952	1.001	0.553	4.000
initialNFAGDP	12	-2.365	39.48	-77.24	81.80
avka_open	11	0.989	0.0254	0.927	1
ToTvar	12	3.112	1.422	1.616	7.080

Table 10: Summary Statistics for Euro Countries

Note: Summary statistics for cross-section with 3 periods are similar

Variable	Statistic	z	p-value
relCA	0.5015	-13.8088	0.0000
relGDP	0.9376	8.6870	1.0000
ADR	0.9674	10.2242	1.0000
REERCPI	0.7250	-2.2818	0.0113
REERULC	0.5203	-9.7053	0.0000
growth	0.2685	-25.8283	0.0000
fiscsurplus	0.3529	-21.4749	0.0000

Table 11: Harris-Tzavalis Unit-Root Tests

Note: H0: Panels contain unit roots

## Appendix II

In this section I present the outcome of a partial-adjustment specification and the problems connected to it. According to the Harris-Tzavalis tests, the null hypothesis of unit roots can be rejected for the relative CA, fiscal surplus, growth, and competitiveness based on both CPI and ULC in my data. It can clearly not be rejected for relative GDP and ADR however (as can be seen in Table 11). In the

case of ADR this can be addressed by taking first differences (the included variable will thus be *diffADR*). The absence of stationarity for relative GDP is a greater problem, as explained previously, and I suggest the following rationale to ignore it. It has been hypothesized throughout the whole paper (and in fact arguably by any paper that includes relative GDP as an explanatory variable) that countries undergo a catching-up process that attracts capital for lower stages of development. If that rationale is applicable, then the relative GDP series should however at least be mean-reverting and not follow a random walk as the null hypothesis implies. Instead, it should converge to 100 in the long run. Failure of finding this result as in this case would then just be due to the brevity of the time period under consideration. Under these (strong) assumptions, a partial-adjustment model, which can take into account reactions that occur with a lag, can be estimated as

$$CA_{i,t} = \alpha + \rho CA_{i,t-1} + \beta X_{i,t} + \varepsilon_{i,t}$$

where CA for country *i* at time *t* depends on its own lag, an intercept  $\alpha$ , and the variables from above captured by *X* while  $\varepsilon$  is the usual error term.  $\beta$  will now measure the short-run effect of fundamentals on the CA. The long-run effect occurs because variables at time *t* continue to influence CA positions in the future through the lagged dependent variable and is thus obtained as  $\frac{\beta}{1-\rho}$ . The independent variables are in principle the same as before as long as they vary over time and thus represent a similar variable choice as in the partial-adjustment-estimations of Faruqee & Debelle (1996) or Bussière et al. (2004).

One more point that deserves to be mentioned is that a lagged dependent variable necessarily introduces bias into the estimation as has been pointed out by many (see for example Keele & Kelly (2005)). I will use Pooled OLS because, despite the bias, estimates can be shown to be consistent. Fixed effect estimations would be even more problematic as in a case like this with high *N* but small *T* they will not just be biased but also inconsistent as has been shown by Nickell (1981).

	(1) Full sample	(2) Non advanced economies	(3) Low financial integration	(4) Advanced economies	(5) High financial integration	(6) Euro countries
lastrelCA	0.732*** (0.0156)	0.707*** (0.0184)	0.691*** (0.0237)	0.915*** (0.0241)	0.802*** (0.0194)	0.996*** (0.0369)
relGDP	0.0135*** (0.00404)	0.0318*** (0.0117)	0.0279 (0.0300)	-0.00148 (0.00422)	0.00592 (0.00406)	0.00728 (0.00483)
REERCPI	-0.00410 (0.00610)	-0.00654 (0.00700)	-0.00736 (0.00799)	0.00709 (0.0115)	0.00696 (0.0112)	-0.00545 (0.0277)
fiscsurplus	0.258*** (0.0261)	0.277*** (0.0319)	0.310*** (0.0450)	0.0571 (0.0377)	0.194*** (0.0297)	-0.109* (0.0570)
diffADR	-0.374** (0.164)	-0.378* (0.195)	-0.583** (0.250)	-0.724** (0.347)	0.0736 (0.214)	0.285 (0.407)
growthrate	-0.121*** (0.0306)	-0.0924** (0.0361)	-0.0988** (0.0451)	-0.299*** (0.0436)	-0.185*** (0.0408)	-0.00229 (0.0635)
Constant	-0.0997 (0.664)	-0.154 (0.766)	-0.186 (0.922)	0.0709 (1.226)	-0.451 (1.158)	-0.594 (2.717)
Observations	1,764	1,356	888	408	876	144
R-squared	0.690	0.668	0.563	0.869	0.814	0.936

Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 12: Dynamic Model for Different Country Sets

	(1) Full sample	(2) Non advanced economies	(3) Low financial integration	(4) Advanced economies	(5) High financial integration	(6) Euro countries
relGDP	0.0625*** (0.00586)	0.155*** (0.0163)	0.152*** (0.0416)	0.0614*** (0.00832)	0.0597*** (0.00662)	0.0821*** (0.00989)
REERCPI	0.00418 (0.00916)	-0.00528 (0.0101)	0.000604 (0.0112)	0.109*** (0.0240)	0.0375* (0.0192)	0.0165 (0.0692)
fiscsurplus	0.752*** (0.0359)	0.684*** (0.0435)	0.643*** (0.0609)	0.529*** (0.0762)	0.819*** (0.0439)	0.649*** (0.124)
diffADR	-1.081*** (0.245)	-0.789*** (0.281)	-0.742** (0.350)	-1.155 (0.742)	-1.130*** (0.365)	2.184** (1.003)
growthrate	-0.280*** (0.0456)	-0.228*** (0.0519)	-0.211*** (0.0629)	-0.226** (0.0932)	-0.384*** (0.0697)	-0.0817 (0.159)
Constant	-3.249*** (0.991)	-3.014*** (1.101)	-3.456*** (1.281)	-14.50*** (2.494)	-6.331*** (1.977)	-7.932 (6.767)
Observations	1,764	1,356	888	408	876	144
R-squared	0.301	0.305	0.142	0.397	0.450	0.595

Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 13: Pooled OLS for Different Country Sets

I report results for all subsamples again in Table 12 and two issues are visible. First, the significance of the lagged dependent variable is extremely high. Ex-

cluding this variable leads to deteriorations of about 0.3 in R-squared on average in the 6 country samples as can be seen from comparing it to Table 13. While high significance is not a problem in itself, it might be here because inclusion of the lagged dependent variable severely affects the estimations of other variables, which can be seen in Table 13 again. Without the lagged dependent variable relative GDP is by far the best performing variable being significant at the 1% level in all subsamples while it is insignificant in the dynamic specification in 4 out of 6 subsamples.

This result might indicate that the lagged dependent variable takes away some of the explanatory power from the other variables, thereby biasing them downwards. Achen (2000) shows that this can happen with explanatory variables that follow a stationary autoregressive process (which is very likely for some of the explanatory variables) and serially correlated errors (which are also likely to occur in panel data sets in general). While OLS estimation without the lagged dependent variable will still yield unbiased estimation results absent other sources of bias (serial correlation will just make it inefficient), once the lag is introduced, the coefficients for the explanatory variables will be biased downwards. As demonstrated by Achen (2000), the bias will be the stronger, the higher persistence is in the error term and in the explanatory variables.

On the other hand, the serial correlation will drive the coefficient for the lagged dependent variable upwards even if this lagged variable does not even have an effect on the current one at all! The bias will be the stronger, the higher persistence is in the serially correlated errors. To quote Achen (2000), the newly included lagged dependent variable “is a kleptomaniac, picking up the effect, not only of excluded variables, but also of the included variables if they are sufficiently trended. As a result, the impact of the included substantive variables is reduced, sometimes to insignificance” (p. 7). Consequently, it is possible that the lagged CA does not play a role in the data generating process and is just estimated with high significance due to serially correlated errors and the autoregressive behavior of other explanatory variables. While it is impossible to prove that the results are in fact inconsistent for this reason, the requirements for this inconsistency are probably

met, and a quick glance at the estimations (especially the jump in R-squared and the lacking significance of relative GDP after the inclusion of the lagged dependent variable) suggests that it is at least a serious possibility.

And second, the coefficient for the lagged dependent variable for the EU sample is close to unity, which makes all estimated long-run effects go to infinity. This problem persists even after exclusion of the “problem variable” relative GDP. Hence, a partial adjustment model is impossible to estimate. The Pooled OLS estimation in Table 13 is unable to capture any long-run effects and will therefore not be discussed at length. It appears remarkable however that most effects are estimated with the same sign for the different samples (the exceptions being competitiveness for developing countries and diffADR in the Eurozone) and point into the expected directions with satisfactory significance (except for competitiveness). Higher absolute coefficients of fundamental variables for the EMU however are not obtained.