EUROPEAN CENTRAL BANK

EUROSYSTEM

WORKING PAPER SERIES

NO 935 / SEPTEMBER 2008

FISCAL POLICIES, THE CURRENT ACCOUNT AND RICARDIAN EQUIVALENCE

by Christiane Nickel

and Isabel Vansteenkiste

EUROPEAN CENTRAL BANK

EUROSYSTEM

WORKING PAPER SERIES

NO 935 / SEPTEMBER 2008

FISCAL POLICIES, THE CURRENT ACCOUNT AND RICARDIAN EQUIVALENCE[1]

by Christiane Nickel[2]

and Isabel Vansteenkiste[3]

In 2008 all ECB publications feature a motif taken from the €10 banknote.

This paper can be downloaded without charge from http://www.ecb.europa.eu or from the Social Science Research Network electronic library at http://ssrn.com/abstract_id=1243262.

1 The authors would like to thank Jürgen von Hagen, Ad van Riet, ECB seminar participants and an anonymous referee. Any views expressed represent those of the authors and not necessarily those of the European Central Bank.

2 European Central Bank, Kaiserstraße 29, D-60311 Frankfurt am Main, Germany; e-mail: christiane.nickel@ecb.europa.eu and Center for European Studies, WHU - Otto Beisheim School of Management, Burgplatz 2, D-56179 Vallendar, Germany.

3 European Central Bank, Kaiserstraße 29, D-60311 Frankfurt am Main, Germany; e-mail: isabel.vansteenkiste@ecb.europa.eu

Address
Kaiserstrasse 29
60311 Frankfurt am Main, Germany

Postal address
Postfach 16 03 19
60066 Frankfurt am Main, Germany

Telephone
+49 69 1344 0

Website
http://www.ecb.europa.eu

Fax
+49 69 1344 6000

ISSN 1561-0810 (print)
ISSN 1725-2806 (online)

CONTENTS

Abstract

This paper analyses the empirical relationship between fiscal policy and the current account of the balance of payments and considers how Ricardian equivalence changes this relationship. To do so, we estimate a dynamic panel threshold model for 22 industrialised countries in which the relationship between the current account and the government balance is allowed to alter according to the government debt to GDP ratio. The results show that for countries with debt to GDP ratios up to 90% the relationship between the government balance and the current account is positive, i.e. an increase in the fiscal deficit leads to a higher current account deficit. For very high debt countries this relationship however turns negative but insignificant, suggesting that a rise in the fiscal deficit does not result in a rise in the current account deficit. Implicitly this result suggests that households in very hight debt countries tend to become Ricardian. Estimating the same model for the 11 largest euro area countries shows that the reationship between the govnerment balance and the current account turns statistically insignificant when the debt to GDP ratio exceeds 80%.

Keywords: *Fiscal policy, current account, panel threshold model.*

JEL Classification: *F32, E62, F41*

Non-technical summary

So far empirical work on the relationship between the current account of the balance of payments and fiscal policy has been rather inconclusive. This inconclusiveness could come as a surprise when one considers the twin-deficit hypothesis that suggests that wider fiscal deficits should usually be accompanied by wider current account deficits. However, this hypothesis rests on the assumption that the relationship between fiscal deficits and private consumption is positive, i.e. higher fiscal deficits lead to higher private consumption, in line with the Keynesian model. This assumption is not necessarily true as the literature on the expansionary effects of fiscal consolidation shows: If private agents perceive the current fiscal situation as unsustainable, the implementation of a drastic fiscal consolidation can acutally lead to higher private consumption and thus a negative relationship between fiscal deficits and private consumption. The latter would be in line with a Ricardian behaviour of consumers.

Against this backdrop this paper argues that the relationship between the current acount and fiscal policy changes depending on whether consumers react in a Ricardian on Keynesian manner. Ricardian or Keynesian behaviour is in itself at least in part explained by the government debt to GDP ratio. If the debt ratio is high and the fiscal situation becomes increasingly unsustainable, then the more likely tax increases become. Given this expectation of the private sector, consumers have an incentive to save more if the government dissaves to be able to repay likely future tax increases. In this case a fiscal stimulus is offset or even overcompensated by higher private savings. In this Ricardian case, a high debt level should therefore be associated with a stable or even negative relationship between the fiscal deficit and the current account deficit. If the debt ratio is however low and consumers react in a Keynesian manner the relationship between the current account deficit and the fiscal deficit should be positive.

This paper uses a dynamic panel threshold model to shed light on the relationship between the current account and the fiscal balance and investigate the role of Ricardian equivalence for 22 industrial countries during the period 1981-2005. In this model, the relationship between the current account and the government balance is allowed to alter according to the government debt level. At the same time we control for other factors influencing the current account. Our calculations find three thresholds for the government debt to GDP ratio: In low debt and medium debt countries (up to a debt level of 44% of GDP) the relationship is positive, i.e. an increase in the fiscal deficit leads to a higher current account deficit, in line with the Keynesian model. In medium-to-high debt countries with debt ratios between 44% and 90% of GDP the relationship is still positive but much less so. In the very high debt countries with debt ratios of above 90% of GDP the relationship is negative and insignificant, suggesting that a rise in the fiscal deficit does not result in a rise in the current account deficit. Implicitly this result suggests that private consumers have become Ricardian (i.e. they have offset the increase in the fiscal deficit by a fall in private consumption). The results are similar when estimating the same model for the 11 euro area countries included in the larger panel. In this case, two thresholds for the government debt to GDP ratio are found: at 56% and 80%. To put it differently, the relationship between the current account and the government balance is positive when the government debt to GDP ratio remains below 80%. Thereafter the relationship is negative and insignificant.

1 Introduction

So far empirical work on the causal relationship between the current account of the balance of payments and fiscal policy has been rather inconclusive. Some empirical studies find that higher budget deficits lead to higher current account deficits; others prove the opposite or show no significant impact at all.[1]

This inconclusiveness could come as a surprise when one considers the twin-deficit hypothesis. This hypothesis suggests that when a government increases its fiscal deficit–for instance by cutting taxes or increasing expenditure–domestic residents use some of the additional income to boost consumption, causing national (i.e. private and public) saving to decline. The decline in national saving requires the country to either borrow from abroad or reduce its foreign lending, unless domestic investment decreases enough to offset the saving shortfall. Thus, a wider fiscal deficit typically should be accompanied by a wider current account deficit.

However, the twin-deficit hypothesis rests on the assumption that the relationship between fiscal deficits and private consumption is a positive one, i.e. an increase in the deficit leads to higher private consumption, as suggested by the Keynesian model. This is not necessarily true. In theoretical models the relationship between fiscal policy and private consumption depends largely on whether Ricardian equivalence is assumed. This equivalence theorem states that for a given path of government expenditures, the timing of taxes should not affect the consumption decision made by individuals paying the taxes. The simple idea behind the theorem is that rational agents realise that substituting taxes today for taxes plus interest tomorrow via government debt financing is the same (Barro, 1974). Therefore, the financing of government spending via debt or taxes should not affect the current account either. However, Keynesian economic models assume that a shift from tax to debt financing increases private consumption. In many Keynesian models private consumption depends on disposable income (i.e. income minus taxes). Therefore, fiscal deficits (and lower taxes) increase private consumption and the current account deficit.

In empirical models, Ricardian equivalence is difficult to prove because in the real world many propositions underlying the theoretical model of the Ricardian type do not hold (perfect generational linkages, non-distortionary taxes, perfect rationality).[2] Empirical studies on the relationship between fiscal policy and private consumption have therefore also led to mixed results, as the growing body of literature on the expansionary effects of fiscal consolidations shows.[3]

Against this backdrop this paper argues that the relationship between the current account and fiscal policy changes depending on whether consumers react in a Ricardian or Keynesian manner. Ricardian or Keynesian behaviour is at least in part determined by the government debt to GDP ratio. The analyses of Blanchard (1990), Sutherland (1997), Perotti (1999) and recently Berben and Brosens (2007) identify the government debt to GDP ratio as the key variable affecting private sector expectations. Whenever the debt ratio is either near a critical value or growing at a rapid pace, a fiscal consolidation programme does not lead to a rise in national saving: the private sector reacts to improved long-term prospects by dissaving more than the government saves. In this Ricardian case, a high public debt level should therefore be associated with a stable or even negative relationship between the fiscal deficit and the current account deficit. If the public debt ratio is however low and consumers react in a

[1] For a literature review, see Bussiere, Fratzscher and Müller (2005) or Cavallo (2005).
[2] See for instance, Elmendorf and Mankiw (1999) or Ricciuti (2003).
[3] For a survey of the literature on the economic reactions to public finance consolidation see Briotti (2005).

Keynesian manner (i.e. use the fiscal stimulus to consume more) the relationship between the fiscal deficit and the current account deficit should be positive.

The contribution of this paper is twofold: First, this paper links insights from the literature on the expansionary effects of fiscal consolidations with the behaviour of the current account. The literature on the expansionary effects of fiscal consolidation showed that the government debt to GDP ratio can indeed explain observed differences in private consumer reactions to fiscal policy but did not draw conclusions on the implications that this would have on the behaviour of the current account. Therefore this paper looks directly at the effect of fiscal policy on the current account and does not concentrate solely on fiscal policy and private consumption. The second contribution lies in the determination of a concrete debt ratio that could be considered as either "high" or "low" or as a critical value. The existing literature so far does not answer the question what constitutes a high or a low debt ratio in certain circumstances (see Giammarioli et al., 2006). The use of a threshold model allows us to find concrete values.

This paper uses a dynamic panel threshold model to shed light on the relationship between the fiscal balance and the current account of the balance of payments and to investigate the role of Ricardian equivalence for 22 industrial countries during the period 1981-2005. In this model, the relationship between the government balance and the current account is allowed to alter according to the government debt level. At the same time we control for other factors influencing the current account. Our calculations find three thresholds for the government debt to GDP ratio: In low debt and medium debt countries (up to a debt level of 44% of GDP) the relationship is positive, i.e. an increase in the fiscal deficit leads to a higher current account deficit. In medium-to-high debt countries with debt ratios between 44% and 90% of GDP the relationship is still positive but much less so. In the very high debt countries with debt ratios of above 90% of GDP the relationship is negative and insignificant, suggesting that a rise in the fiscal deficit does not result in a rise in the current account deficit. Implicitly this result suggests that private consumers have become Ricardian (i.e. they have offset the increase in the fiscal deficit by a fall in private consumption). The results are similar when estimating the same model for the 11 euro area countries included in the larger panel. Here, two thresholds for the government debt to GDP ratio are found: at 56% and 80%. In this case, the relationship the current account and the government balance is positive when the government debt to GDP ratio remains below 80%. Thereafter the relationship is negative and insignificant.

The paper is structured as follows: In section 2 we review the related literature. Based on the findings, we describe the used data and the estimation methodology in section 3. In section 4 we present the regression results. Section 5 concludes.

2 Literature review

Our paper builds on two strands of literature: the literature on the expansionary effects of fiscal consolidations and the literature on the determinants of the current account. Unfortunately, with few exceptions (e.g. Kim and Roubini, 2004) both strands do not meet very often.[4]

The literature on the expansionary effects of fiscal consolidations goes back to 1974, the year when Robert Barro published its seminal article on Ricardian equivalence. The topic

[4] Funke and Nickel (2006) study the impact of fiscal variables on the trade account.

gained renewed interest in the mid-1980's when both Denmark (1983-86) and Ireland (1987-89) introduced drastic fiscal consolidation programmes yielding higher – not lower, as Keynesian theory would have suggested – economic growth. In the aftermath, a large body of literature developed to explain these "non-Keynesian" effects of fiscal consolidations.

One part of the literature on expansionary fiscal consolidations, to which this paper is strongly linked, investigates the relationship between national saving and fiscal policy. Based on Giavazzi and Pagano (1990, 1996) and Alesina and Perotti (1995, 1997), Giavazzi et al. (2000) conclude that the relationship between fiscal policy and national saving may be non-linear. Broadly speaking, these non-linearities arise from the influence of fiscal policy on private sector expectations. In a situation where private agents feel that the current fiscal situation is unsustainable and will sooner or later lead to economic disruptions, the implementation of a drastic fiscal consolidation programme signalling a regime shift can change the private sector's assessment of future economic developments. Building on earlier work by Blanchard (1990) and Sutherland (1997), Perotti (1999) shows that the debt to GDP ratio is a good predictor for a non-linear response of the private sector to a fiscal consolidation. Whenever the debt ratio is either high or growing at a rapid pace, a fiscal consolidation programme does not lead to a rise in national saving: the private sector reacts to improved long-term prospects by dissaving more than the government saves. The importance of government debt as a key variable affecting private sector expectations was confirmed by other more recent studies (e.g. Berben and Brosens, 2007).

The modern literature on current account determination rests on the intertemporal approach as first proposed by Buiter (1981) and Sachs (1981) and extended by Obstfeld and Rogoff (1995). In these models, the current account of a country is treated mainly as a reflection of consumption and investment decisions (Gandolfo, 2001). The current account acts as a shock absorber to temporary changes in national cash flow or net output (i.e. output less investment and government spending) in order to smooth consumption and maximize welfare (Obstfeld and Rogoff, 1995). In response to a temporary adverse terms of trade or productivity shock, an open economy would prefer to run a current account deficit and borrow from abroad rather than allow consumption to fall. Glick and Rogoff (1995) but also Bussière et al (2005) find that productivity shocks, in particular country-specific ones, act as main drivers of the current account.

Longer-term variations in current account balances can also be explained by the intertemporal model. A small open economy, which is initially capital (and income) poor, provided it has access to international capital markets, will run current account deficits for a sustained period of time in order to build its capital stock while maintaining its long-run rate of consumption. This argument underlines that the stage of development may play a significant role in explaining current account developments and the works of Ghosh and Ostry (1995); Debelle and Faruquee (1996) and later Chinn and Prasad (2003) – to name just a few – showed this empirically.

Extending the basic intertemporal approach beyond the representative agent model to an overlapping generations framework, one could introduce life-cycle considerations into the analysis. With some heterogeneity across age groups, demographic trends through their life-cycle implications become a relevant source of long-run variation in the current account. According to the life-cycle model, consumption and saving behaviour are directly tied to the stage in the life cycle. Hence, systematic changes in the age structure of population will affect national saving behaviour. To the extent that capital-labour ratios are also affected, changes in demographics may affect investment as well. Using cross-country panel data sets,

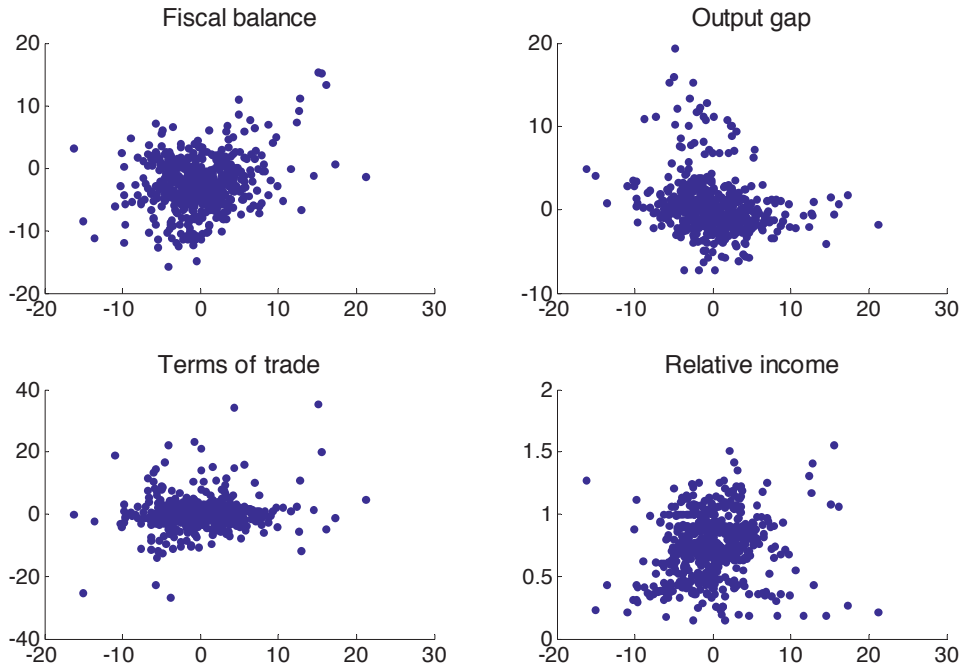


Figure 1: The relationship between the current account and its explanators

Chinn and Prasad (2003) and Luhrman (2003) show that demographic trends indeed are a significant factor in the determination of the current account. In a VAR model, Kim and Lee (2007) show that the increase in the dependency rate significantly lowers the savings rate and subsequently worsens current account balances.

Similarly, the life-cycle framework could also be used to examine the real effects of fiscal policy on the current account through its intergenerational consequences. As stated above, in the absence of Ricardian equivalence, tax policies will have implications (through net wealth effects) for national saving. In particular, changes in public saving and debt will not be fully offset by changes in private saving, leading to changes in the current account balance. Government spending or tax measures will have a further impact on the current account, even in the permanent income model, through its direct effect on absorption given income. Consequently, without Ricardian equivalence, fiscal policy has important long-run implications for net foreign assets and the current account, as for example shown in Debelle and Faruquee (1996) as well as Bussière at al. (2004).

3 Data and estimation methodology

The discussion above suggests a number of factors which might be important in determining the current account: fiscal policy, demographics, the stage of development, the real exchange rate, the terms of trade, productivity shocks, amongst others.

This section outlines the methodology adopted in estimating the determinants of the current account and discusses the data used.

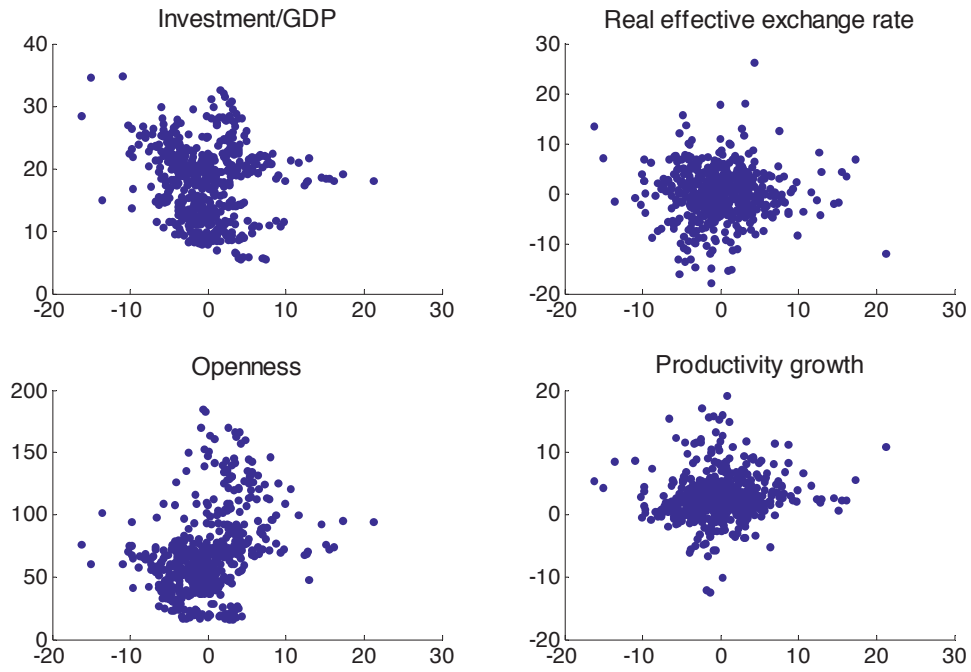


Figure 2: The relationship between the current account and its explanators

3.1 Data

The sample we use to examine the determinants of the current account covers the period 1981-2005 for 22 industrial countries, namely: Australia, Austria, Belgium, Germany, Canada, Denmark, Spain, Finland, France, UK, Greece, Ireland, Italy, Iceland, Japan, the Netherlands, Norway, New Zealand, Portugal, Sweden, US and Taiwan. Most of the data is drawn from the IMF's annual World Economic Outlook database. However, the real effective exchange rate is derived from the BIS while the dependency ratio series used originate from the UN World Development Indicators. For Germany the data refers to West Germany before 1990. In an extension to the estimations we also present the results only using the 11 euro area countries from the extended sample.

Scatter plots of the current account and the explanatory variables are shown in Chart 1-2 for the sample of industrial countries. The graphs are only suggestive of the relationship between the current account and its various explanatory variables that we will focus on in the next section, as they reflect only partial correlations.

The dependent variable in our regression analysis is the ratio of the current account of the balance of payments to GDP. Fiscal policy is captured by the general government budget surplus (including interest payments on government debt) as a ratio to GDP.

Stage-of-development effects were measured by the income per capita (in terms of purchasing power parity) calculated relative to the United States. Demographic effects were measured by the dependency ratio (i.e. the ratio of the non-working age population to the working age population). We also split the dependency ratio into its two components: the

ratio of the old (over 65) to the working age population, and the ratio of the young (under 19) to the working age population.

The annual change in the terms of trade was used to capture the effects of export and import price movements on the current account.

To capture the stage of the business cycle, we include a measure of the output gap in the analysis. To derive the output gap, we make use of the HP filter technique.

We further include the change in productivity in our regressions. Indeed, through its impact both on saving and investment, it has been shown that productivity can affect the current account (see for instance Valderrama, 1996 with a focus on the United States but also Bussière et al, 2005 and Rogoff and Glick, 1995). In general, we would expect an improvement in productivity to worsen the current account.

We also include the real effective exchange rate in our regressions. A priori, the impact of the real effective exchange rate on the current account is ambiguous. The real effective exchange rate generally tends to rise while the economic catching-up process is taking place. This is due to productivity gains in manufacturing (Balassa-Samuelson effect) as well as demand-side influences such as the use of capital inflow. To the extent that the real appreciation is anticipated to be an element of the economic catching-up process, the effects on the savings ratio are equivalent to those of real income developments: the initial undervaluation of the currency induces, in expectation of later gains in purchasing power, higher household debt, which is later reduced (see for instance Razin, 1984). Unforeseen, but permanent, appreciations affect the saving ratio in the opposite direction: as a result of the appreciation, the purchasing power of current and future income increases, as does that of monetary and property assets already accumulated. This positive wealth effect has a negative influence on the propensity to save.[5] Finally, a temporary real appreciation should result in an improvement of the current account according to the consumption smoothing hypothesis (see Obstfeld and Rogoff, 1995). In this paper, we focus on the short-term effects and hence would expect a priori the real effective exchange rate appreciation to result in an improvement of the current account. As, however, productivity increases could be correlated with a real effective exchange rate appreciation we also ran regressions excluding each variable in turn to avoid potential multicollinearity problems.

3.2 Estimation methodology

As mentioned above, in this paper, we want to pin down the impact of fiscal policy on the current account and investigate the role of Ricardian equivalence. We do this by allowing the relationship between the government balance and the current account balance to alter according to the government debt level. At the same time, we wish to control in this analysis for other factors. To do so, we make use of a dynamic panel threshold model.

In the panel regression, the choice of the model in part depends on an assumption about the stationarity of the current account to GDP ratio and the explanatory variables. Conceptually,

[5] See Davey (2001), Maki and Palumbo (2001) and Strauss (2000). However, if the real appreciation leads to an improvement in the terms of trade (the elasticity of the supply of imported and exported goods is high), an unexpected rise in the real exchange rate can have a positive effect on the current account. A positive valuation effect emerges alongside the negative wealth effect, resulting in a fall in the import value when trading volumes are unchanged. The overall effect is dependent on supply and demand elasticities as well as the time preference of economic agents. See Harberger (1950), Laursen and Metzler (1950), Svensson and Razin (1983), Backus, Kehoe and Kydland (1994) or Kent (1997).

this implies that whether the current account (as a share of GDP) is stationary (mean-reverting) depends on the long-run impact of shocks on the equilibrium net foreign asset position. If changes to the underlying determinants of saving and investment have only level effects on the stock of NFA, but not on the ratio of NFA to GDP, the effects of shocks on the current account to GDP ratio will tend to die out over time. If, however, certain shocks alter the entire path for NFA, the ratio of NFA and the current account to GDP would be permanently affected (absence of mean reversion).

Dickey Fuller tests country-by-country are generally unable to reject the null of difference stationarity for the ratio of net foreign assets to GDP and the current account to GDP ratio. For this reason, we estimate dynamic specifications that allow for the current account to be stationary.

There are a number of other specification issues that arise in panel data estimation. OLS estimates which ignore the potential for country-specific effects will provide biased estimates. Two estimation approaches that address this problem are the fixed effects and the random effects models.

The random effects estimates assumes that the country-specific effects are distributed randomly across countries. Thus, it makes the assumption, as in OLS, that the country random effects are uncorrelated with the included exogenous variables, in which case, both estimates will be consistent but OLS will be inefficient. However, this exogeneity assumption may not be an appropriate assumption in our model, especially when we include the lagged dependent variable.

As a result, we estimate below a fixed-effects threshold model. According to Hansen (1999), the fixed-effect threshold model splits the sample into various regimes and takes the general representation below (in case of a double threshold model):

$$\ln y_{it} = \pi_i + \beta_1 \ln x_{it} + \delta \ln y_{i,t-1} + \theta \ln z_{i,t} + \varepsilon_{it} \qquad q_{it} \leq \gamma_1 \tag{1}$$

$$\ln y_{it} = \pi_i + \beta_2 \ln x_{it} + \delta \ln y_{i,t-1} + \theta \ln z_{i,t} + \varepsilon_{it} \qquad \gamma_1 < q_{it} < \gamma_2 \tag{2}$$

$$\ln y_{it} = \pi_i + \beta_3 \ln x_{it} + \delta \ln y_{i,t-1} + \theta \ln z_{i,t} + \varepsilon_{it} \qquad q_{it} \geq \gamma_2 \tag{3}$$

In this model, the observed data are from a balanced panel where the subscript i indexes the individual and the subscript t indexes time. The dependent variable, in our case the ratio of the current account balance to GDP, y_{it} is scalar, the threshold variable (i.e. the government debt to GDP ratio) q_{it} is scalar, and the regressor x_{it} is a set of exogenous explanatory variables, which are threshold dependent and z_{it} a set of exogenous explanatory variables which are not dependent on the threshold variable. The observations are divided into three regimes depending on whether the threshold variable q_{it} is smaller, in between or larger than the thresholds γ_1/γ_2. The regimes are distinguished by differing regression slopes, β_1, β_2 and β_3. For the identification of the slopes, it is required that the elements of x_{it} are not time invariant. We also assume that the threshold variable q_{it} is not time invariant. The error ε_{it} is assumed to be independent and identically distributed (iid) with mean zero and finite variance σ^2. The iid assumption excludes lagged dependent variables from x_{it}.

For any non-dynamic panel model (so any panel model excluding $(\delta \ln y_{i,t-1})$ in the equations 1-3 above), the slope coefficient can be estimated by least squares, given the threshold value, as discussed in Hansen (1999). However in our case, equations 1-3 form a dynamic panel model, as we want to incorporate into our model partial adjustment effects (through a lagged current account). As a result, the conventional least squares estimator cannot be applied. In more detail, the estimation of a univariate dynamic regression model based on T

observations is not unbiased, but it is consistent in T. However, in conventional panel data, T is assumed to be small, and large-sample results are obtained with respect to N growing large, not T. Hence, least squares is not consistent in dynamic panel data. In addition, in the model set-up by Hansen (1999) it was assumed that all right-hand side variables are exogenous. Also in this case, the least squares estimator cannot be applied.

To overcome the first problem - i.e. that least squares cannot be applied in a *dynamic* panel model - we can use either instrumental variables or the generalised method of moments. In this paper, we follow Hsaio (2002) who suggests that the first-order difference is a valid instrumental variable in our fixed effects model.

To overcome the second problem - i.e. that the variables in the model are endogenous - we can use the solution proposed by Caner and Hansen (2004) which relies on a two-stage least squares estimator of the threshold parameter and a generalised method of moments estimator of the slope parameters. However, in this paper, we decide to include the right-hand side variables with one lag, which may also overcome the potential endogeneity problem.[6]

4 Regression results

In this section, we present the regression results derived from estimating the above-described equations 1-3 as a dynamic panel model. The model includes as a threshold variable the government debt to GDP ratio. Other explanatory variables included in the model are the change in the terms of trade, income relative to the United States, the output gap, the investment to GDP ratio, openness, the changes in the real effective exchange rate, the change in productivity and the dependency ratio.[7]

Before proceeding to the results from the model estimation, we need first to determine the number of thresholds. In our estimation, we allow for (sequentially) zero, one, two and three thresholds. The likelihood ratio test used to determine the number of thresholds suffers however from the traditional Davies problem (see Davies, 1977, 1987).[8] The issue has been inter alia investigated by Andrews and Ploberger (1994) and Hansen (1996). Our fixed effects equations 1-3 fall in the class of models considered by Hansen (1996) who suggested a bootstrap to simulate the asymptotic distribution of the likelihood ratio test.

The resultant likelihood ratio test statistics F1, F2 and F3, along with their bootstrap p-values[9], are shown in Table 1. We find that the tests for a single, a double and a triple threshold are strongly significant. On the basis of these results, we conclude that there is strong evidence that there are three thresholds in the regression relationship. For the remainder of the analysis we work for this reason with this triple threshold model.

In the next step, we then proceed with determining the point estimates of the three thresholds for the government debt to GDP ratio and their asymptotic 95% confidence intervals.

[6] It should be noted however, that the estimation methodology applied in this paper treats the threshold variable q_{it} as exogenous. The method applied here does not generalise to the case of an endogenous threshold variable. It could be argued however that the level of the government debt to GDP is endogenous. At the same token, however, the assumption that the government debt to GDP ratio is exogenous to the model may not be overly restrictive and hence we decide to maintain this assumption in this paper.

[7] It is possible that some of the variables are correlated and hence that the regression will exhibit a multicollinearity problem. To overcome this we also ran the regression excluding some of the explanatory variables.

[8] The Davies problem implies that testing is nonstandard since the threshold parameter is not identified under the null hypothesis. The inference problem when a nuisance parameter is not identified under the null hypothesis was first studied by Davies.

[9] 300 bootstrap replications were used for each of the three bootstrap tests.

Table 1: Tests for threshold effects

Test for single threshold	
P-value	0.0001
Test for double threshold	
P-value	0.004
Test for triple threshold	
P-value	0.005

Table 2: Threshold estimates

	Estimate	95% confidence interval
γ_1	35.8	$[35.2, 37.1]$
γ_2	44.0	$[42.0, 47.5]$
γ_3	90.2	$[88.8, 98.6]$

The results are reported in Table 2. The threshold estimates are 36%, 44% and 90%. The asymptotic confidence intervals for the threshold are very tight, indicating little uncertainty about the nature of this division. More information can be learned about the threshold estimates from plots of the concentrated likelihood ratio function (see Charts in Figure 3). The point estimates are the value of γ (presented on the Y-axis) at which the likelihood ratio hits the zero axis. The 95% confidence intervals for γ_1, γ_2 and γ_3 can be found from the charts by the values of γ for which the likelihood ratio lies beneath the dotted line. In more detail, for the first threshold the interval ranges between 35-37%, for the second between 42-48% and for the third threshold between 89-99%.

Table 3 reports the percentage of countries which fall into the three regimes. We see that on average over all the years, the percentage of countries that fall in the very low debt category equals 22%. The largest share of countries fall within the >44%,<90% category whereas on average slightly less than 15% of countries have a very high debt level (of above 90%). Considering the evolution over time, we can see that the share of high to very high debt countries has risen over time, whereas those of especially the very low debt countries has fallen.

In the regression slope estimates, the coefficients of our primary interest are those on the fiscal balance to GDP ratio.[10] These results are presented in Table 4. As can be seen, the coefficient estimates and their accompanying standard errors vary importantly across regimes. Indeed, in the low and medium debt regime, the impact of the fiscal balance is high and significant, suggesting that an increased fiscal deficit results in a rise in the current account deficit. This is still true for countries with a medium/high debt to GDP ratio however here the impact is less strong (indeed the estimated coefficient is less than half that of the estimate in the low debt regime). Moreover, in general, the impact of the fiscal position on the current account is less than one-for-one.

Finally, in the high debt regime, where the debt to GDP ratio exceeds 90%, the coefficient turns negative and insignificant, suggesting that a rise in the fiscal deficit does not

[10] The exercise was also run with the ratio of the fiscal primary balance to GDP. This left the conclusions broadly unchanged. The regression results can be obtained from the authors upon request.

Table 3: Percentage of countries in each regime each year

	low debt	medium debt	medium/high debt	high debt
	<=36	>36,<=44	>44,<=90	>90
1981	36.36	22.73	40.91	0.00
1982	31.82	27.27	36.36	4.55
1983	36.36	13.64	45.45	4.55
1984	31.82	13.64	45.45	9.09
1985	22.73	22.73	45.45	9.09
1986	22.73	18.18	50.00	9.09
1987	22.73	18.18	50.00	9.09
1988	31.82	9.09	45.45	13.64
1989	31.82	13.64	36.36	18.18
1990	27.27	18.18	40.91	13.64
1991	27.27	13.64	40.91	18.18
1992	22.73	9.09	50.00	18.18
1993	13.64	4.55	63.64	18.18
1994	9.09	9.09	68.18	13.64
1995	13.64	4.55	63.64	18.18
1996	13.64	4.55	63.64	18.18
1997	13.64	4.55	63.64	18.18
1998	13.64	4.55	63.64	18.18
1999	18.18	4.55	59.09	18.18
2000	18.18	13.64	45.45	22.73
2001	22.73	4.55	50.00	22.73
2002	22.73	13.64	50.00	13.64
2003	18.18	18.18	50.00	13.64
2004	18.18	18.18	50.00	13.64
2005	18.18	27.27	40.91	13.64
Average	22.36	13.27	50.36	14.00

Note: Debt is defined as general government debt as a % of GDP

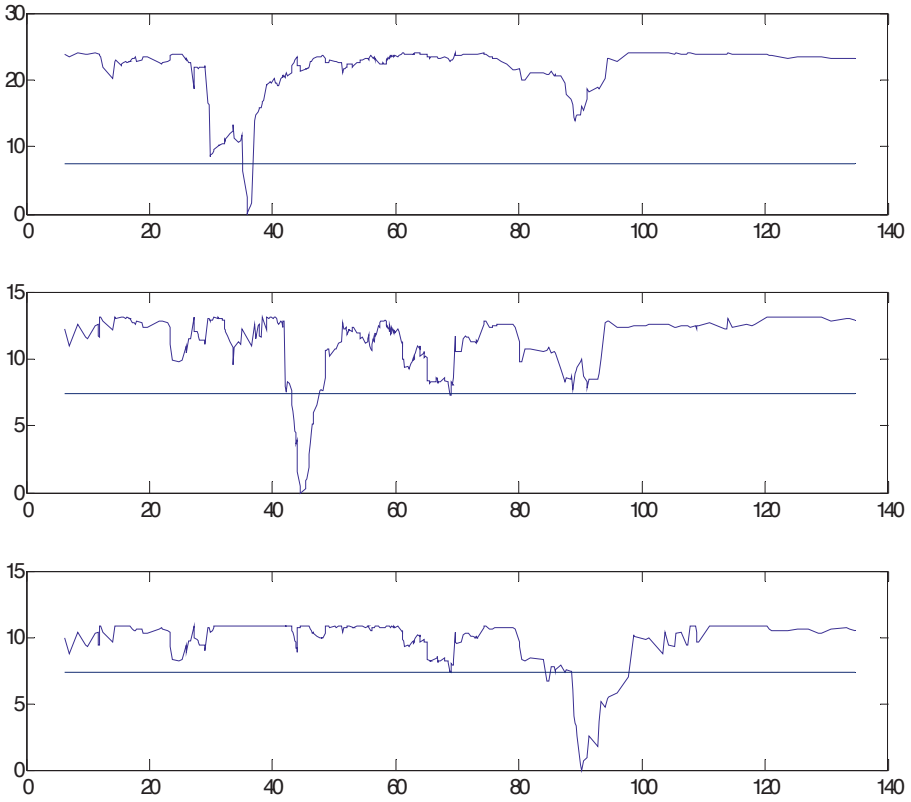


Figure 3: Confidence interval construction in single (top pane), double (middle pane) and triple threshold model (bottom pane)

result in a rise in the current account deficit. Implicitly this result suggests that private consumers have become Ricardian (i.e. they have offset the increase in fiscal deficit by a fall in private consumption expenditure, hence keeping the national savings unchanged). The results are consistent with a growing body of research on the composition and effects of fiscal consolidation, as described in the literature survey.

Beyond the fiscal balance, which is regime dependent, we also included a number of regime-independent explanatory variables in our panel model. The regression results for those can be seen in Table 5. All variables enter the model with one lag to avoid the endogeneity problem. In addition we included the lagged current account to GDP ratio. The coefficient estimate for the latter variable turns out to be high and strongly significant, showing the importance of the partial adjustment effect. Further, the regression results indicate that increases in the terms of trade have a positive effect on the current account. This is in line with the Harberger-Laursen-Metzler (HLM) effect which predicts a positive relationship between temporary exogenous changes in the terms of trade and national savings, through consumption-smoothing behaviour. For example, a deterioration in the terms of trade results

Table 4: Fiscal Balance/GDP Coefficient Estimates Full Sample Model

Coefficient	Standard error	T-statistic	Threshold (Debt/GDP ratio)
0.45**	0.08	5.39	<36%
0.31*	0.17	1.83	36%-44%
0.16**	0.04	4.27	44%-90%
-0.11	0.09	-1.26	>90%

Coefficients in this table show the estimates of γ as derived from 1-3. A ** indicates a significance at the 5% level, a * shows signficance at the 10% level.

in a decrease in a country's current real income that is larger than the fall in its permanent income. Using a single-good, Keynesian open-economy model and given that the marginal propensity to consume is less than unity, national consumption is also predicted to fall.[11]

The coefficient on the output gap has a negative sign, reflecting the dominance of the accelerator effect of the output gap on investment over the positive effect of the output gap on savings suggested by the permanent income model.

The results also show that the dependency ratio has the expected negative sign. This suggests that demographics matter for a country's current account balance. When we inserted the ratio of the old population (over 65) to the working age population and the ratio of the young (under 20) to the working age population separately we found broadly similar results hence we only report here the results for the overall dependency ratio.

Table 5: Regression Estimates Triple Threshold Model - Full Sample

	Coefficient	Standard error	T-statistic
Current account/GDP(-1)	0.68**	0.17	4.04
Change in terms of trade(-1)	0.08**	0.02	3.75
Relative income(-1)	0.11	0.78	0.13
Output gap(-1)	-0.36**	0.04	-9.76
Investment/GDP ratio(-1)	-0.23**	0.03	-6.68
Openness(-1)	0.05**	0.01	3.42
Change in real exchange rate(-1)	-0.03	0.02	-1.41
Productivity change(-1)	-0.01	0.04	-0.35
Dependency ratio(-1)	-13.39**	5.33	-2.51

Coefficients in this table show the estimates of θ and δ as derived from 1-3. A ** indicates a significance at the 5% level, a * shows signficance at the 10% level.

The relative income variable enters the equation with a positive sign. The positive coefficient on relative income indicates that a per capita income below the average, will be associated with a current account deficit. The rationale is that poorer countries are assumed

[11] In our regression, we estimate the effect of a change in the terms of trade during the previous period on the current account balance. As such, we are measuring mostly the short run impact. In the long run, however, several studies have indicated the importance of the impact of especially permanent changes in the terms of trade on the optimal capital stock and hence through this channel on the impact of investment (capital accumulation) on the current account balance. This effect works in the opposite direction to the consumption-smoothing effect (see for instance Murphy, 1992, Servén, 1999 and Kent and Cashin, 2003).

to grow faster than the average and are thus borrowing against future income. However the coefficient enters the regression not significantly, most likely as in fact most countries in our sample are rather close in terms of stage of development (i.e. our sample does not contain developing countries). This was the case even after dropping the investment/GDP ratio from the regression, which could also be linked to stage of development.

The capital output ratio is however significant and negative suggesting that capital deepening results in an increase in the current account deficit. At the same time, the impact of productivity changes on the current account is negative but insignificant. This result was unchanged when the regression did not include the investment/GDP ratio or the real effective exchange rate. This finding contrasts with Bussière et al. (2005) and Glick and Rogoff (1995) who find that their country specific productivity measure enters the current account panel equation they estimate systematically significant at the 1% level. It may however be the case that only "permanent " productivity changes will impact the current account. Our relationship is however mostly capturing only temporary changes and as such the results may not contrast with the literature.

As mentioned in section 3, the impact of the real effective exchange rate on the current account is ex ante not clear. In our regression, the coefficient turns out to be negative, suggesting that an exchange rate appreciation tends to result in a current account deficit. However, the impact is not significant, showing that the offsetting forces discussed in section 3 may in fact be at play.

Finally, openness appears to have a significant impact on the current account across the countries we investigated. Indeed, as the import+export to GDP ratio increases, the current account balance tends to increase.

When we repeat the above mentioned analysis, only including the 11 euro area countries from the sample into the regression, we find broadly similar results. In this case, we find evidence that there are two thresholds in the regression relationship, at 56 and 80% (see Table 6 for estimation results). As is the case for the more extended model we find in the low debt regime that the impact of the fiscal balance is high and significant, suggesting that an increased fiscal deficit results in a rise in the current account deficit This is still the case for medium debt levels although the impact of the fiscal deficit on the current account diminishes. However, when the debt to GDP ratio exceeds 80% the coefficient becomes negative and insignificant, suggesting that a rise in the fiscal deficit does not result in a rise in the current account deficit.

Table 6: Fiscal Balance/GDP Coefficient Estimates Full Sample Model

Coefficient	Standard error	T-statistic	Threshold (Debt/GDP ratio)
0.36**	0.15	2.44	<56%
0.14**	0.05	2.80	56%-80%
-0.61	0.50	-1.24	>80%

A ** indicates a significance at the 5% level, a * shows signficance at the 10% level.

As regards the other estimated coefficients, the results broadly concord with those shown for the extended sample (see Table 7).

Table 7: Regression Estimates Triple Threshold Model - Full Sample

	Coefficient	Standard error	T-statistic
Current account/GDP(-1)	0.71**	0.25	2.84
Change in terms of trade(-1)	0.05**	0.02	2.13
Relative income(-1)	1.09	1.02	1.07
Output gap(-1)	-0.43**	0.05	-9.45
Investment/GDP ratio(-1)	-0.20**	0.06	-3.62
Openness(-1)	0.04**	0.02	2.57
Change in real exchange rate(-1)	0.03	0.04	-0.68
Productivity change(-1)	-0.03	0.05	-0.58
Dependency ratio(-1)	-4.21**	2.09	-2.01

A ** indicates a significance at the 5% level, a * shows signficance at the 10% level.

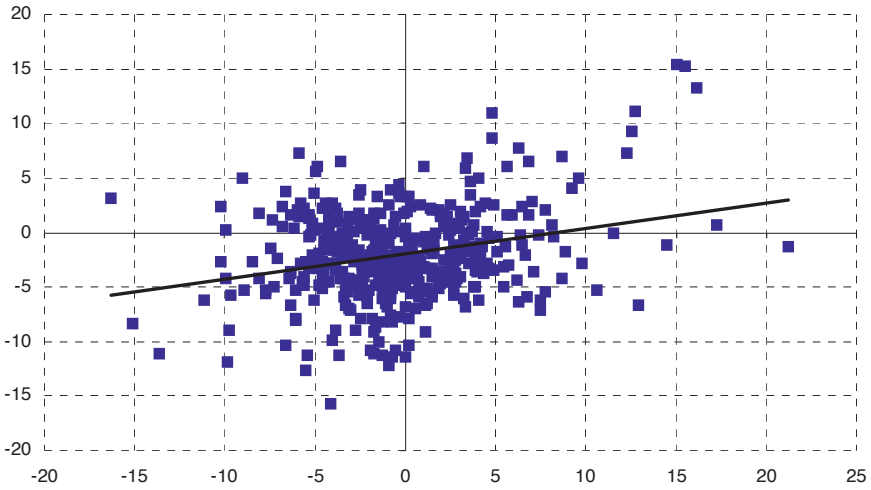


Figure 4: The current account balance (x-axis) and fiscal balance (y-axis) for countries where the debt/GDP ratio is below 90%

5 Conclusion

This paper argued that the relationship between fiscal policy and the current account changes depending on the government debt to GDP ratio because this variable affects private sector expectations. Indeed our regression results suggest that in low debt and medium debt countries (up to a debt level of 44% of GDP) the relationship is positive, i.e. an increase in the fiscal deficit leads to a higher current account deficit. In medium-to-high debt countries with debt ratios between 44% and 90% of GDP the relationship is still positive but much less so (see Figure 4). In the very high debt countries with debt ratios of above 90% of GDP the relationship is negative, suggesting that a rise in the fiscal deficit does not result in a rise in the current account deficit. Implicitly this result suggests that private consumers have become Ricardian (i.e. they have offset the increase in the fiscal deficit by a fall in private consumption) (see Figure 5). Given that this extreme case of debt ratios above 90% of GDP is

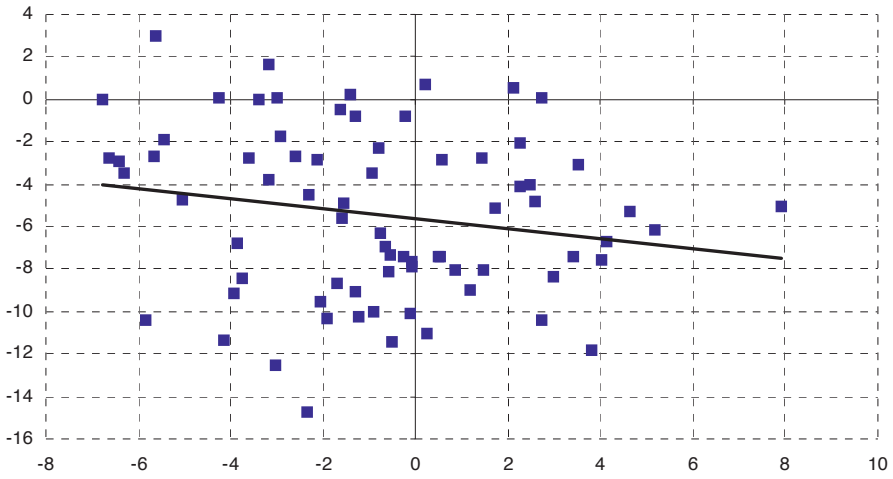
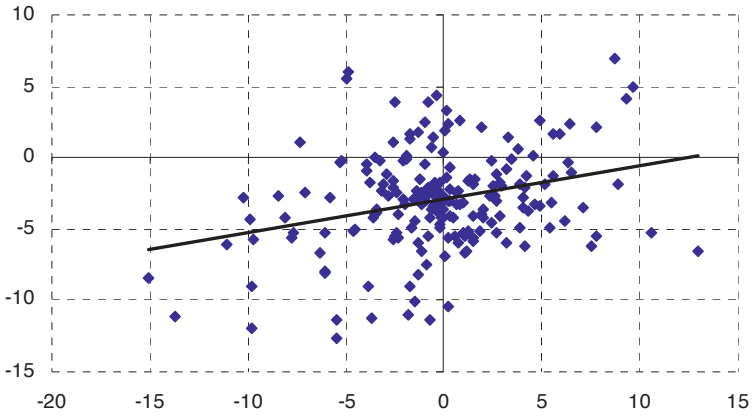


Figure 5: The current account balance (x-axis) and fiscal balance (y-axis) for countries where the debt/GDP ratio is above 90%

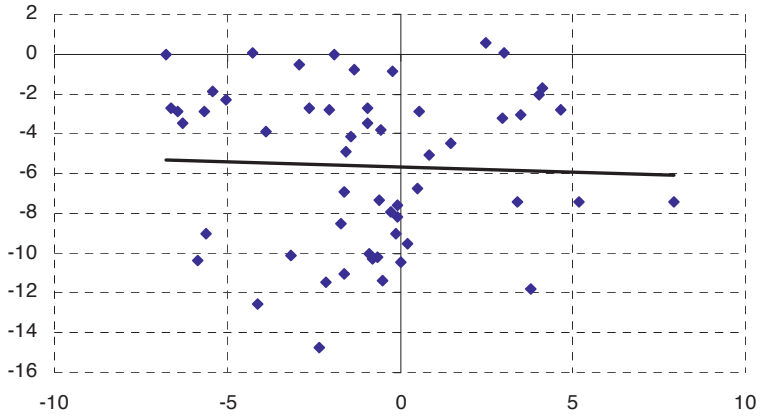
relatively rare (on average only 14% of the countries fall in this category for every single year), one can draw the conclusion that a more Keynesian reaction of the consumer and therefore a positive relationship between the fiscal and the current account deficit is more likely in most of the time. Repeating the estimation only for the 11 largest euro area countries, we find broadly similar results, although in this case the relationship between fiscal deficits and the current account becomes insignificant when the government debt to GDP ratio exceeds 80% (see Appendix for charts).

6 Appendices

A Current account and fiscal balance in the euro area



The current account balance (x-axis) and fiscal balance (y-axis) for countries where the debt/GDP ratio is below 80% in euro area countries.



The current account balance (x-axis) and fiscal balance (y-axis) for countries where the debt/GDP ratio is below 80% in euro area countries.

References

[1] Alesina, A. and R. Perotti (1995). Fiscal Expansions and Fiscal Adjustments in OECD countries, Economic Policy, XXI, pp. 205–248.

[2] Alesina, A.and R. Perotti (1996). Reducing Budget Deficits, Swedish Economic Policy Review, III, p. 13–34.

[3] Alesina, A. and R. Perotti (1997) Fiscal Adjustments in OECD Countries: Composition and Macroeconomic Effects, IMF Staff Papers, XLIV, pp. 210–248.

[4] Backus, D., Kehoe, P. and F. Kydland (1994). Dynamics of the Trade Balance and the Terms of Trade: The J-Curve?, The American Economic Review, Vol. 84.

[5] Barro, R.J. (1974). Are Government Bonds Net Wealth? Journal of Political Economy, Vol. 82, 1095-1117.

[6] Berben, R.-P. and T. Brosens (2007). The Impact of Government Debt on Private Consumption in OECD Countries, Economics Letters, Vol. 94, pp. 220-225.

[7] Blanchard, O.J. (1990). Comment on Francesco Giavazzi and Marco Pagani, Can Severe Fiscal Contractions Be Expansionary? in NBER Macroeconomics Annual, O. Blanchard and S. Fischer, eds. (Cambridge, MA: MIT Press).

[8] Blanchard, O.J. (2007). Current Account Deficits in Rich Countries. NBER Working Paper 12925.

[9] Briotti, G. (2005). Economic Reactions to Public Finance Consolidation: A Survey of the Literature. ECB Occasional Paper No. 38.

[10] Buiter, W. (1981). Time Preference and International Lending and Borrowing in an Overlapping Generations Model. The Journal of Political Economy, Vol. 89, 4, pp. 769-797.

[11] Bussière, M., Fratzscher, M. and G. Müller (2004). Current Account Dynamics in OECD and EU Acceding Countries – an Intertemporal Approach. ECB Working Paper Number 311.

[12] Bussière, M., Fratzscher, M. and G. Müller (2005). Productivity Shocks, Budget Deficits and the Current Account. ECB Working Paper Number 509.

[13] Caner, M. And B. Hansen (2004). Instrumental Variable Estimation of a Threshold Model. Econometric Theory, Vol. 20, pp. 813-843.

[14] Cavallo, M. (2005). Understanding the Twin Deficits - New Approaches, New Results. FSRBD Economic Letter, Number 2005-16, July 22.

[15] Chinn, M. and E. Prasad (2003). Medium-term Determinants of Current Accounts in Industrial and Developing Countries: An Empirical Exploration. Journal of International Economics, Vol. 59, pp. 47-76.

[16] Davies, R.B., 1977. Hypothesis testing when a nuisance parameter is present only under the alternative. Biometrika, Vol. 64, pp. 247-254.

[17] Davies, R.B., 1987. Hypothesis testing when a nuisance parameter is present only under the alternative. Biometrika, Vol. 74, pp. 33-43.

[18] Davey, M. (2001). Saving, Wealth and Consumption, Bank of England, Quarterly Bulletin, Vol. 41, pp. 91-109.

[19] Debelle G. and H. Faruquee (1996). What Determines the Current Account? A Cross-sectional and Panel Approach, IMF working paper number 96/58, pp. 42.

[20] Elmendorf, D.W. and N.G. Mankiw (1999), Government Debt. In: Taylor, J.B., Woodford, M. (Eds.), Handbook of Macroeconomics.

[21] Funke, K. and C. Nickel (2006). Does Fiscal Policy Matter for the Trade Account – A Panel Cointegration Study. ECB Working Paper Number 620.

[22] Edge, R.M., Laubach, T. and J.C. Williams (2004). Learning and Shifts in Long-Run Productivity Growth. FRBSF Working Paper 2004-04 (March).

[23] Gandolfo, G. (2001). International Finance and Open-Economy Macroeconomics. Springer-Verlag, Berlin.

[24] Ghosh, A. and J. Ostry (1995). The Current Account in Developing Countries: A Perspective from the Consumption-Smoothing Approach. World Bank Economic Review, Vol. 9, No. 2, pp. 305-333.

[25] Giammarioli, N., Nickel, C., Rother, P. and J.P. Vidal (2006), Assessing Fiscal Soundness. ECB Occasional Paper Number 56.

[26] Giavazzi, F. and M. Pagano (1990) Can Severe Fiscal Adjustments Be Expansionary? in NBER Macroeconomics Annual, O. Blanchard and S. Fischer, eds. (Cambridge, MA: MIT Press).

[27] Giavazzi F. and M. Pagano (1996). Non-Keynesian Effects of Fiscal Policy Changes: International Evidence and the Swedish Experience, Swedish Economic Policy Review, III, pp. 67–103.

[28] Giavazzi, F., T. Jappelli and M. Pagano (2000). Searching for non-linear effects of fiscal policy: evidence from industrial and developing countries, European Economic Review, Vol. 44, No 7, pp. 1259-1289.

[29] Glick, R. and K. Rogoff (1995). Global Versus Country-Specific Productivity Shocks and the Current Account. Journal of Monetary Economics, Vol. 35, pp. 159-192.

[30] Hansen, B.E. (1996). Inference When a Nuisance Parameter Is Not Identified Under the Null Hypothesis. Econometrica Vol. 64, pp. 413-430.

[31] Hansen, B. E. (1999). Threshold Effects in Non-Dynamic Panels: Estimation, Testing, and Inference. Journal of Econometrics, pp. 34-68.

[32] Harberger, A. (1950). Currency Depreciation, Income and the Balance of Trade, Journal of Political Economy, Vol. 58.

[33] Hsiao, C. (2002). Analysis of Panel Data, Cambridge, Cambridge University Press.

[34] Im, K. S., Pesaran, M. H. and Y. Shin. (2003). Testing for Unit Roots in Heterogeneous Panels, Journal of Econometrics, Vol. 115, No. 1, pp. 53–74.

[35] Kent, C. (1997). The Response of the Current Account to Terms of Trade Shocks: A Panel Data Study, Research Discussion Paper, Reserve Bank of Australia.

[36] Kent, C. and P. Cashin (2003). The Response of the Current Account to Trade Shocks: Persistence Matters. IMF Working Paper No. 03/143. pp. 49.

[37] Kim, S. and J.-W. Lee (2007). Demographic Change, Saving and Current Accounts in East Asia. Asian Economic Papers, Vol. 6, 2. pp. 22-53.

[38] Kim, S. and Roubini, N. (2004). Twin Deficits or Twin Divergence? Fiscal Policy, Current Account and Real Exchange Rate in the U.S. Mimeo, Korea University and New York University.

[39] Laursen, S. and L.A. Metzler. (1950). Flexible Exchange Rates and the Theory of Employment, Review of Economics and Statistics, Vol. 32.

[40] Luhrman, M. (2003). Demographic Change, Foresight and International Capital Flows. Mannheim Research Institute fo the Economics of Aging. MEA Discussion Paper Series No. 03038. University of Mannheim, Germany.

[41] Maki, D. and M. Palumbo (2001). Disentangling the Wealth Effect: A Cohort Analysis of Household Saving in the 1990s, Finance and Economics Discussion Series, 2001-21, Federal Reserve Board, Washington.

[42] Murphy R. (1992). The Terms of Trade, Investment and the Current Account. Journal of International Economic Integration Vol. 7, pp 58-79.

[43] Obstfeld, M. and K. Rogoff (1995). The Intertemporal Approach to the Current Account, in: Grossman G. and K. Rogoff Handbook of International Economics.

[44] Perotti, R. (1999). Fiscal Policy in Good Times and Bad, Quarterly Journal of Economics, 114(4), pp. 1399-1436..

[45] Razin, A. (1984). Capital Movements, Intersectoral Resource Shifts and the Trade Balance, European Economic Review, No. 26, pp. 135-152.

[46] Ricciutti, R. (2003). Assessing Ricardian Equivalence. Journal of Economic Surveys, 17, pp. 55-78.

[47] Sachs, J.D. (1981). The current account and macroeconomic adjustment in the 1970's. Brookings Papers on Economic Activity, Vol. 1, pp. 201-268.

[48] Sevrén, L. (1999). Terms of Trade Shocks and Optimal Investment: Another Look at the Laursen-Metzler Effect. Journal of International Money and Finance 18. pp. 337-365.

[49] Strauss, H. (2000). How Normal are the Stock Market Wealth, Private Saving, and the Current Account in the United States?, Konjunkturpolitik, Vol. 46, H. 1-2.

[50] Sutherland, A. (1997). Fiscal Crises and Aggregate Demand: Can High Public Debt Recers the Effect of Fiscal Policy? Journal of Public Economics Vol. 65. pp. 147-162.

[51] Svensson, L. and A. Razin (1983). The Terms of Trade and the Current Account: The Harberger-Laursen-Metzler Effect, Journal of political Economy, Vol. 91, No. 11.

[52] Valderrama, D. (2006). What Are the Risks to the United States of a Current Account Reversal?" FRBSF Economic Letter 2006-29 (October 27)

European Central Bank Working Paper Series

For a complete list of Working Papers published by the ECB, please visit the ECB's website (http://www.ecb.europa.eu).

904 "Does money matter in the IS curve? The case of the UK" by B. E. Jones and L. Stracca, June 2008.

905 "A persistence-weighted measure of core inflation in the euro area" by L. Bilke and L. Stracca, June 2008.

906 "The impact of the euro on equity markets: a country and sector decomposition" by L. Cappiello, A. Kadareja and S. Manganelli, June 2008.

907 "Globalisation and the euro area: simulation based analysis using the New Area Wide Model" by P. Jacquinot and R. Straub, June 2008.

908 "3-step analysis of public finances sustainability: the case of the European Union" by A. Afonso and C. Rault, June 2008.

909 "Repo markets, counterparty risk and the 2007/2008 liquidity crisis" by C. Ewerhart and J. Tapking, June 2008.

910 "How has CDO market pricing changed during the turmoil? Evidence from CDS index tranches" by M. Scheicher, June 2008.

911 "Global liquidity glut or global savings glut? A structural VAR approach" by T. Bracke and M. Fidora, June 2008.

912 "Labour cost and employment across euro area countries and sectors" by B. Pierluigi and M. Roma, June 2008.

913 "Country and industry equity risk premia in the euro area: an intertemporal approach" by L. Cappiello, M. Lo Duca and A. Maddaloni, June 2008.

914 "Evolution and sources of manufacturing productivity growth: evidence from a panel of European countries" by S. Giannangeli and R. Gómez-Salvador, June 2008.

915 "Medium run redux: technical change, factor shares and frictions in the euro area" by P. McAdam and A. Willman, June 2008.

916 "Optimal reserve composition in the presence of sudden stops: the euro and the dollar as safe haven currencies" by R. Beck and E. Rahbari, July 2008.

917 "Modelling and forecasting the yield curve under model uncertainty" by P. Donati and F. Donati, July 2008.

918 "Imports and profitability in the euro area manufacturing sector: the role of emerging market economies" by T. A. Peltonen, M. Skala, A. Santos Rivera and G. Pula, July 2008.

919 "Fiscal policy in real time" by J. Cimadomo, July 2008.

920 "An investigation on the effect of real exchange rate movements on OECD bilateral exports" by A. Berthou, July 2008.

921 "Foreign direct investment and environmental taxes" by R. A. De Santis and F. Stähler, July 2008.

922 "A review of nonfundamentalness and identification in structural VAR models" by L. Alessi, M. Barigozzi and M. Capasso, July 2008.

923 "Resuscitating the wage channel in models with unemployment fluctuations" by K. Christoffel and K. Kuester, August 2008.

924 "Government spending volatility and the size of nations" by D. Furceri and M. Poplawski Ribeiro, August 2008.

925 "Flow on conjunctural information and forecast of euro area economic activity" by K. Drechsel and L. Maurin, August 2008.

926 "Euro area money demand and international portfolio allocation: a contribution to assessing risks to price stability" by R. A. De Santis, C. A. Favero and B. Roffia, August 2008.

927 "Monetary stabilisation in a currency union of small open economies" by M. Sánchez, August 2008.

928 "Corporate tax competition and the decline of public investment" by P. Gomes and F. Pouget, August 2008.

929 "Real convergence in Central and Eastern European EU Member States: which role for exchange rate volatility?" by O. Arratibel, D. Furceri and R. Martin, September 2008.

930 "Sticky information Phillips curves: European evidence" by J. Döpke, J. Dovern, U. Fritsche and J. Slacalek, September 2008.

931 "International stock return comovements" by G. Bekaert, R. J. Hodrick and X. Zhang, September 2008.

932 "How does competition affect efficiency and soundness in banking? New empirical evidence" by K. Schaeck and M. Čihák, September 2008.

933 "Import price dynamics in major advanced economies and heterogeneity in exchange rate pass-through" by S. Dées, M. Burgert and N. Parent, September 2008.

934 "Bank mergers and lending relationships" by J. Montoriol-Garriga, September 2008.

935 "Fiscal policies, the current account and Ricardian equivalence" by C. Nickel and I. Vansteenkiste, September 2008.

ISSN 1561-0810