# Current Account Imbalances:
# Is the US Pulling Global Saving?

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I would like to thank foremost Professor Woglom for his help on this project throughout the year. Without his advice many of my ideas would have remained unworkable and without his suggestions many approaches would have been overlooked. Secondly, I would also like to thank my friends, especially the non-economists among them – Elizabeth, Suma and Michael, who put up with many, many hours of talk about current account imbalances. Last but not least, I would like to thank John for listening and arguing with me about this topic but most of all for being there for me.

# Table of Contents

## I. Introduction

In recent years we have witnessed current accounts around the world go rapidly out of balance, spearheaded by a ballooning US current account deficit and reciprocal current account surpluses in developing Asia and among the oil exporters. A growing literature has tried to shed light on the causes of these developments and to analyze their place of origin. In this paper I contribute to this debate by identifying some of the driving forces behind the current account positions of a wide range of countries in the last sixteen years. In particular, I try to answer the question whether the factors which explain such global imbalances originate in the US or in the rest of the world, namely whether the US is pulling global saving to finance its deficit.

The topic of current account imbalances merits considerable interest because their recent pattern defies traditional open-economy macroeconomic models. By definition, the current account balance represents a country's net exports of goods and services to the rest of the world. Thus, according to intertemporal models of the current account (Obstfeld and Rogoff, 1996) a capital-rich country is expected to lend abroad by running current account surpluses, whereas a developing capital-poor country is expected to accumulate foreign debt by running deficits. Yet, in 2000 the world's largest and richest economy – the US – had a current account deficit amounting to 66% out of total world current account deficits, whereas developing countries – predominantly the ones in Asia – run current account surpluses representing 58% out of total world surpluses. Since then the US has increased its share of world deficits to over 90% and the developing economies – to 76% of total surpluses.

Such challenges to international macroeconomic theory have engendered a range of hypotheses which can be broadly categorized into two groups. The first group

espouses the view that the US economy experiences a "push" phenomenon as saving from the developing world is "pushed" in the US. According to Bernanke (2005) this is due to a saving glut in the developing world, whereas Dooley, Folkerts-Landau and Garber (2003) argue that Asia is putting its saving in the US as collateral for its development. Another variant of the hypothesis of external causal factors is that the US current account deficit is a result of expanding global financial intermediation (Greeenspan, 2003). Conversely, the second major strand in the literature emphasizes "pull" factors: developments within the US economy that have triggered the current situation. One such factor is the large fiscal deficit (Chinn, 2005) which puts a drag on gross domestic saving. Another is increased US productivity growth (Ferguson, 2005) which raises expectations of high returns on US assets and thus encourages capital inflow.

The most striking limitation of the existing literature is the relative dearth of empirical testing of the above hypotheses. Given that the evolving current accounts' divergence does not conform to established theoretical models, empirical analysis is crucial in identifying the factors that can account for this. Most of the empirical accounts that exist provide an overview of the widely accepted determinants of the current account such as openness to trade, per capita income, and demographics (Chinn and Prasad, 2000). More recently, Gruber and Kamin (2005) have tried to go beyond the traditional determinants by focusing on factors such as financial crises and institutional environment. Nevertheless, these additional factors also fail to explain the current pattern of global imbalances.

My choice of conceptual framework is a simple, medium- to long-run theoretical model to avoid cyclical effects and reflect the reality of widespread exchange rate management. It is a reduced-form model of the current account embedded in the market

for loanable funds and the market for foreign exchange. Thus, the determinants of the current account position can be established through their influence on gross domestic saving, domestic investment and net capital outflow. They are divided into push factors – public saving, Tobin's q, private credit availability, price of oil and pull factors – US long-term interest rates, US fiscal balance, and US oil imports. Unlike traditional models in which only interest rate differentials and price effects matter, this framework includes the last two pull factors to capture quantity effects. I argue that this is the key to understanding the present pattern of global imbalances due to the dollar's unique position as a currency in which reserves are held and oil is denominated.

The countries included in the analysis are 15 developed and 43 developing economies from North America, Europe, Asia, Africa and Latin America. The panel nature of my data allows me to examine the cross-country and time-series variation of the current account determinants around the world. The data covers the sixteen-year period from 1990 until 2005. After identifying the main forces explaining the current account balances, I run an experiment which simulates changes in the US pull variables and shows the expected impact on the latest current account positions in the rest of the world.

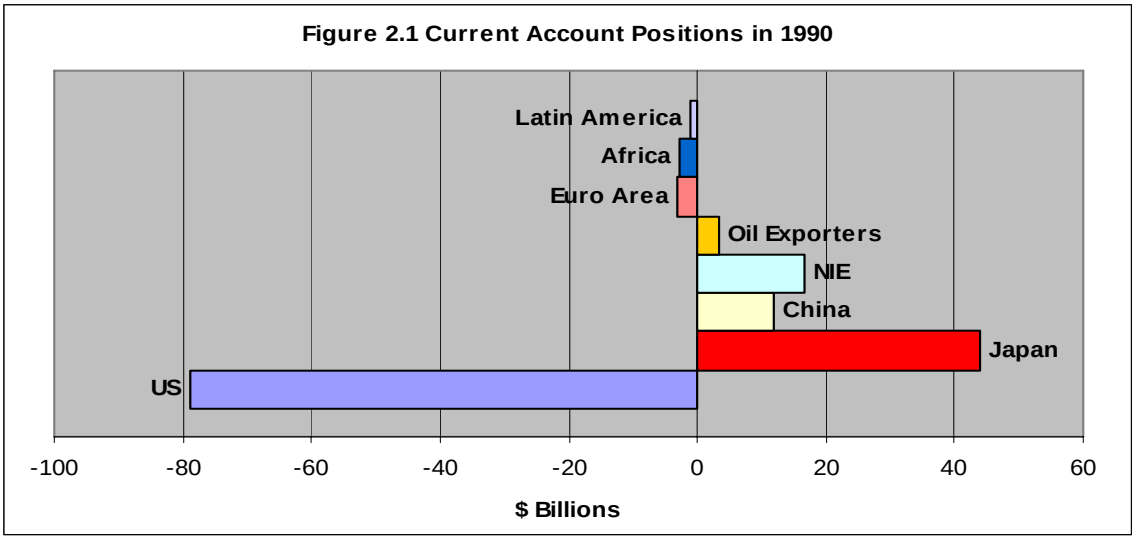
My broader purpose in researching the causes of the recent global imbalances from an empirical perspective is twofold. Such research can stimulate the creation of new theoretical models that better account for the present pattern of current accounts. It can also contribute to the debate on the sustainability of the recent external positions and identify those targets that would lead to the most effective policy action in addressing the global imbalances.

The rest of the paper is organized as follows. The next section provides a description of current account positions in the different world regions. Section III

introduces the theoretical model which has guided the empirical set-up. Section IV presents the econometric model and discusses estimation issues. Section V gives the results and their analysis and, lastly, Section VI concludes.

## II. Global Developments

This section gives a broad overview of current account developments around the world from 1990 onwards. The regional groups examined are the following: the United States, the Euro Area, Japan, the Newly Industrialized Asian Economies (NIE), China, the Oil Exporters, Latin America, and Africa. The countries included in each grouping are given in the Data Appendix. The aim of the sample is not a comprehensive account of the world but instead a selection focusing on those regions that exhibit the most intriguing characteristics. First, I present a general overview of the world's pattern of current accounts and then, I look into the specific developments in each region.

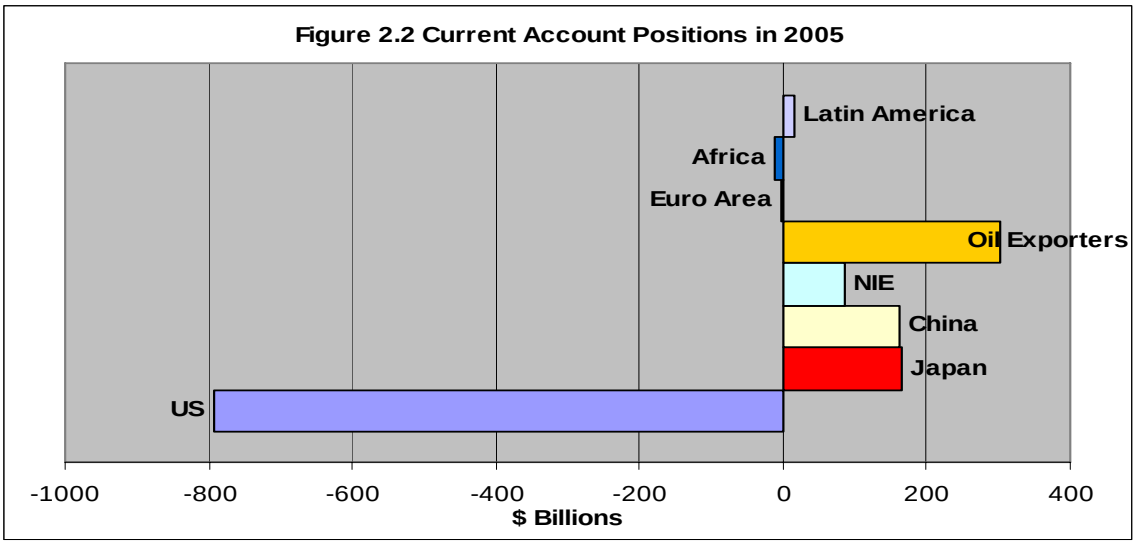



Source: IMF World Economic Outlook Database for September 2006.

### *The Global Pattern of Current Account Positions*

At the beginning of the 1990s the United States accounted for over 90% of the current account deficits in the world, whereas the group of regions in surplus was

somewhat more evenly comprised of Japan, China, NIE and the Oil Exporters. Thus, the only developing regions running deficits were Africa and Latin America; Japan was the only developed country in the sample with a surplus.

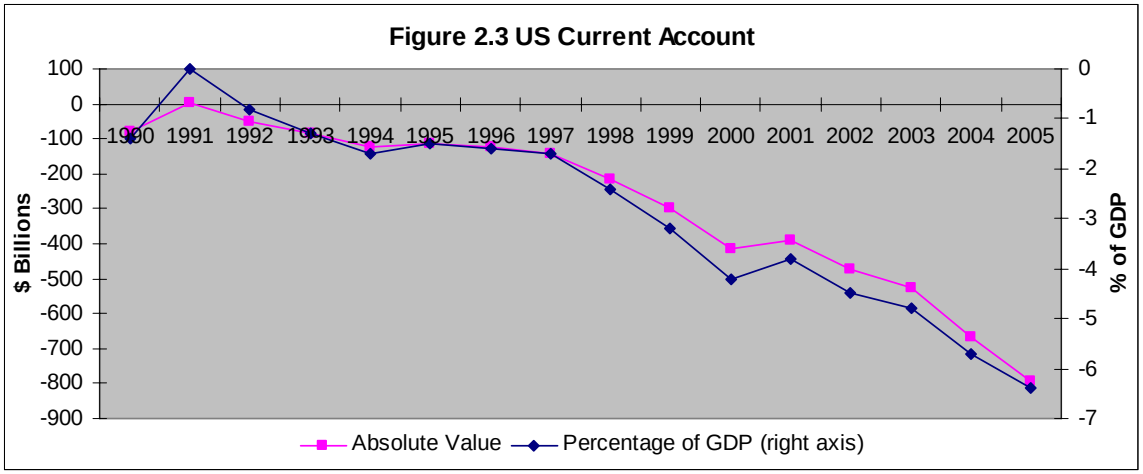



Source: IMF World Economic Outlook Database for September 2006.

By 2005 Latin America joined the group of developing regions running surpluses, whereas Japan – still the only developed country in a surplus – lost its frontrunner position. The oil exporters emerged as the region running the biggest surpluses at a regional surplus of over $300 billion and China emerged as the developing country with the largest surplus of about $160 billion. The US increased even further its share of world deficits: the absolute value of its deficit rose tenfold compared to 1990.

***United States***

The United States is treated separately from other regional groupings given the research question of whether US behavior is driving the global current account pattern.




Source: IMF World Economic Outlook Database for September 2006.

*Country Specifics*

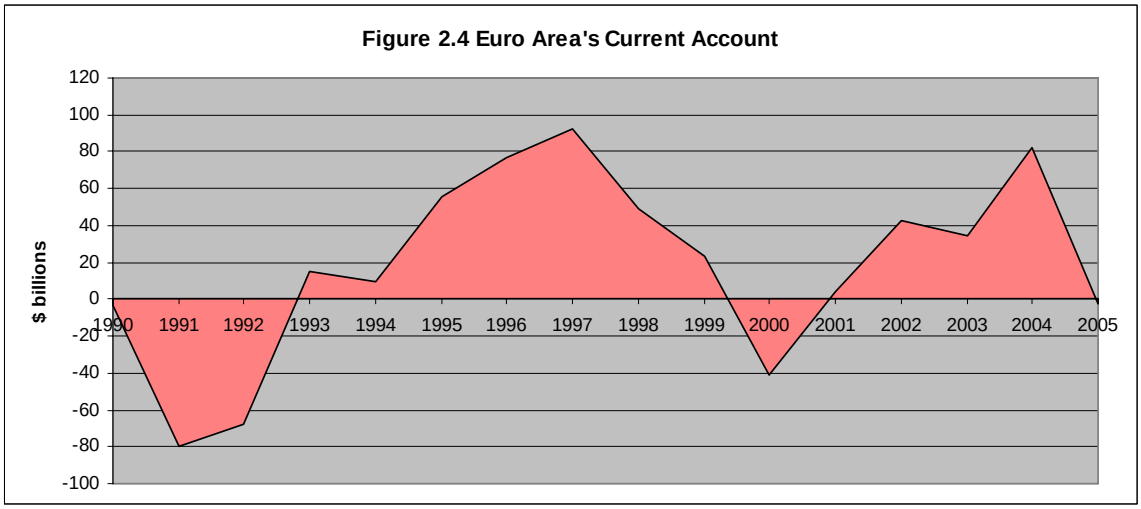
The US current account has been on a steep downward path in absolute value and as a percentage of GDP ever since the mid 1990s. That the current account position did not start its deterioration earlier was partially due to improving public saving in the 1990s. However, this ameliorating effect stopped in 2000. Since then the government started running ever increasing budget deficits. On the investment side, Tobin's q was noticeably increasing during the 1990s but its behavior was at best mixed since 2000. At the same time the availability of private credit has been on an almost uninterrupted rise throughout the entire period. The monetary stance, measured by real long-term government bond yields, has also been increasingly expansionary throughout the period, but especially so after 2000. Rising oil prices and oil imports also have contributed to the declining current account position. Their importance has been crucial given the US position as the world's top oil importer, outstripping the second placed Japan more than two times.

***The Euro Area***

The countries examined in this grouping are the twelve[1] European countries which participate in a currency union with the euro as their common currency.

*Regional specifics*

The current account balances in the Euro Area varied greatly from one member to another throughout the period 1990–2006, but the divergence has increased considerably since 2001. The majority of countries ran surpluses in the second half of the 1990s which kept the overall balance in surplus. Since then some accounts (Germany and France) began an increasingly rapid improvement, while the rest, led by the Mediterranean countries, took a path of an equally rapid deterioration. This brought the overall European balance back in deficit by 2005.




Source: IMF World Economic Outlook Database for September 2006.

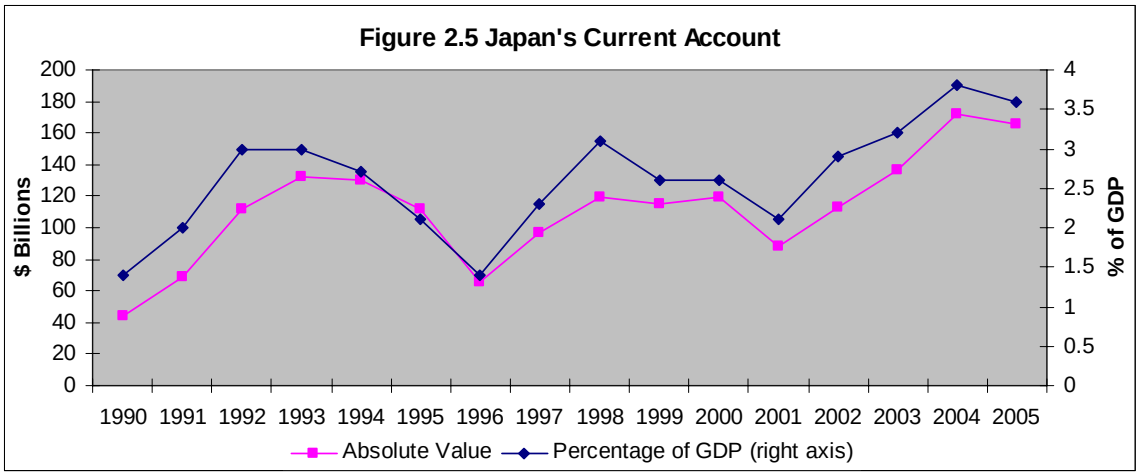
At the beginning of the 1990s government balances were in large deficits in all Euro Area countries and only since the last several years has the Maastricht criterion of a maximum three percent deficit been met in the majority of economies in the region. Despite the deepening of financial integration in the Eurosystem, the measures of

[1] This excludes Slovenia which joined the currency union on January 1st 2007.

domestic investment – private credit availability and Tobin's q – continue to differ significantly across the member economies and have not markedly improved since 1990. Rising oil prices are also highly relevant to the Euro Area as the members are all net oil importers with the biggest four economies ranking among the world's top ten net importers. Finally, from a European perspective external factors are approximated well by considering only US fiscal and monetary policy changes. This is due to the dominant position of the US as partner for capital flows to and from Europe.

***Japan***

Japan, just like the US, is analyzed in a group of its own because its characteristics differ considerably from the other economies in the region.




Source: IMF World Economic Outlook Database for September 2006.

*Country specifics*

Japan's current account surplus has been rising ever since 1990 both in absolute terms and as percentage of GDP. However, the upward trend over time has been interrupted by steep declines during the Asian financial crisis and subsequently around 2001-2002. Since the early 1990s, Japan has sustained a large government deficit, which has not put a strain on national saving due to consistently high levels of private saving.

The investment indicators – Tobin's q and private credit's availability – have also been largely flat throughout the period 1990-2005. As the world's second largest oil importer, Japan's current account is greatly influenced by the behavior of oil prices. Lastly, given that the largest share of Japanese exports goes to the US, Japan is affected considerably by US fiscal and monetary stance. Moreover, Japan is the largest single country recipient for recycled petrodollars by the oil exporters (Ruiz and Vilarubia, 2007).

***Newly Industrialized Asian Economies***

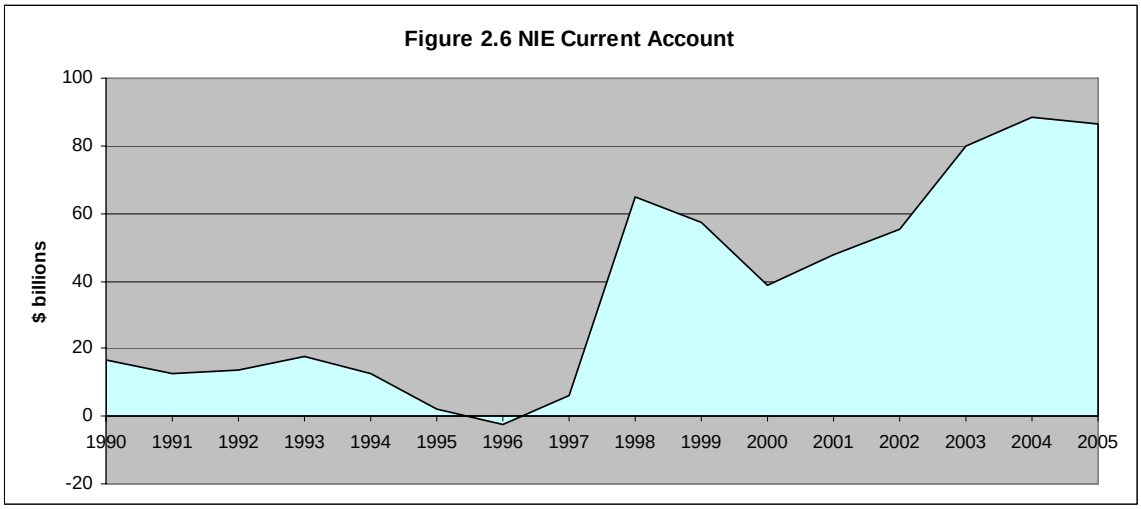
This subsection examines the current account developments and relevant factors in the four Asian Tigers: Hong Kong, South Korea, Singapore and Taiwan.

*Regional specifics*

The region's overall current account has been consistently in surplus since 1990 with the exception of 1996-1997 during the Asian financial crisis. Throughout the period there has been considerable co-movement in the individual current accounts. However, its extent has decreased after the crisis with Korea's current account taking a downward path, out of sync with the improvements in positions of the smaller economies.

On the saving side, the fiscal balance has been in a very large surplus in Singapore and somewhat smaller in Hong Kong and Korea with Taiwan the only one running moderate deficits throughout the period. On the investment side, while private credit availability has kept almost the same levels as in 1990, Tobin's q has increased considerably throughout the region. Yet, unlike the saving rate, the growth in the overall investment rate has still not recovered from the financial crisis which is reflected in a rising saving-investment surplus in the region. Turning to foreign factors, the price of oil, US budget deficits and US government bond yields are all relevant for this regional grouping. First, the countries are major oil importers: Korea and Taiwan rank in the top

10 net oil importers in the world. Second, the US being a top three trading partner for the region makes the US variables especially influential for the Asian Tigers' current account balances.




Source: IMF World Economic Outlook Database for September 2006.

***China***

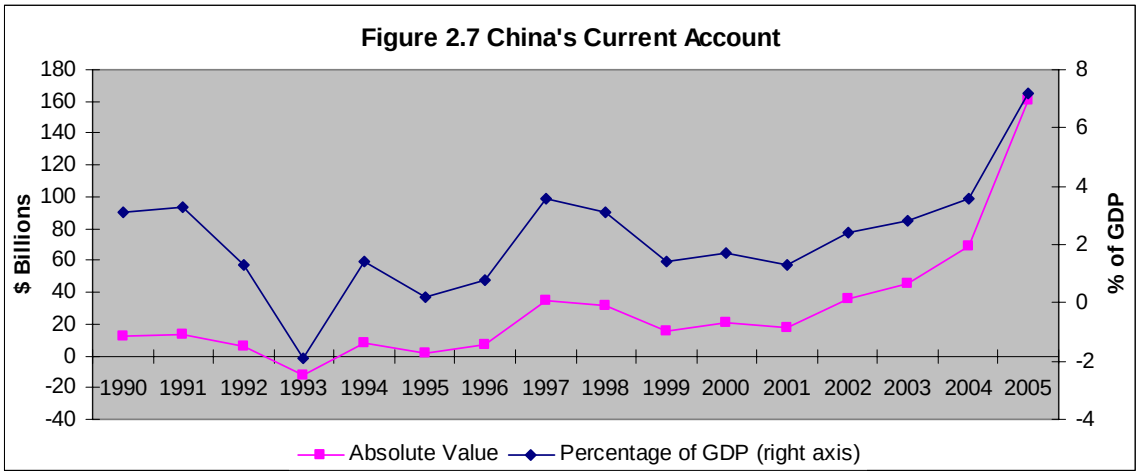
China, like US and Japan, is analyzed by itself without being included in any regional country grouping due to the very specific development of China's current account and its determinants.

*Country specifics*

The path of China's current account since 1990 has been one of very rapid increase when scaled by GDP and an even more rapid one when examined in absolute value. Although the trend was upward throughout the last seventeen years it speeded up very dramatically since the early 2000s.

At the background of this rapidly improving current account balance has been negative public saving and improving investment opportunities: the government budget has been in a small deficit throughout the period 1990-2005 whereas the measure of Tobin's q shows a consistent increase. Nevertheless, the overall national saving rate is

increasingly outpacing investment due to very high private saving, driven predominantly by corporate saving (Kuijs, 2005). As a foreign factor, the price of oil is highly influential given that China surpassed Japan in 2003 to become the second largest oil consumer and is currently the third largest oil importer. Other foreign factors at play are US policy developments because the US is China's biggest export destination and the third largest source for imports into China. What makes developments in the US especially relevant for China's current account position is the intervention by Chinese authorities to keep the yuan exchange rate with the dollar fixed.




Source: IMF World Economic Outlook Database for September 2006.

### *Oil Exporters*

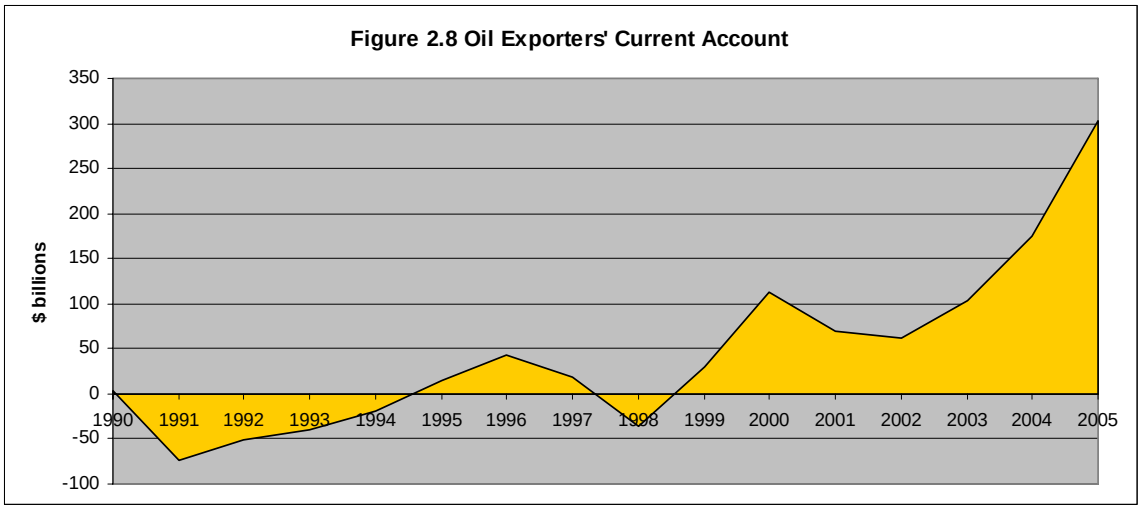
This subsection describes the specifics of the current accounts of the world's top eight largest oil exporters and the relevant determinants of their current account positions.

*Regional specifics*

The overall current account position in the region was in considerable deficit at the beginning of the 1990s during the first Gulf War, after which it embarked on an almost uninterrupted upward trend. Throughout the 1990s the current accounts in the region moved together with the exception of Mexico which is an outlier for the whole

period with a sustained small deficit, reflecting specific internal developments such as the peso crisis in the mid 1990s. Since 2000 the overall regional balance has improved drastically spurred by surpluses in Russia and Saudi Arabia that outstripped the more moderate positions of the rest.

Among the underlying domestic factors, the investment measures have been similarly flat among all the oil exporters while public saving has been consistently in positive territory everywhere except for the two Latin American exporters: Mexico and Venezuela. Given the position of the US as the world's predominant oil importer, monetary and fiscal developments in the US as well as US demand for oil are all highly relevant external factors for the current account positions of the oil exporters.




Source: IMF World Economic Outlook Database for September 2006.

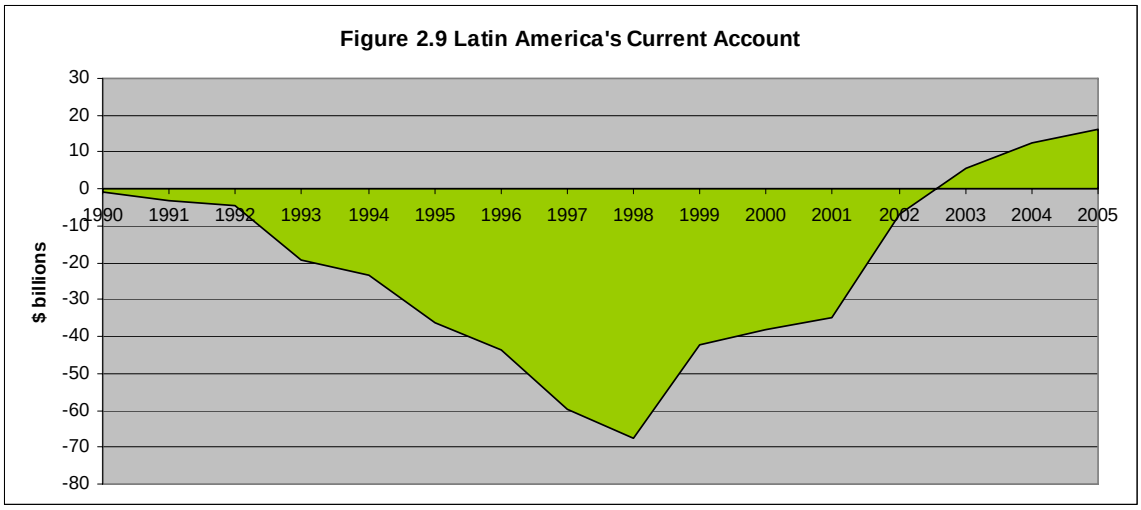
***Latin America***

This regional grouping comprises of seventeen countries in South America and the Caribbean. Below are examined the current account characteristics of the region.

*Regional specifics*

After running a sizeable overall current account deficit throughout the 1990s, Latin America changed its position to a small and increasing surplus in the last several

years. Within the group there has been considerable co-movement in current account positions with the bigger economies Brazil and Argentina running correspondingly bigger in absolute value deficits and recently surpluses than the smaller economies. The greater fluctuations in these two economies' current account positions are explained by the currency crises they underwent at the end of the 1990s and their subsequent recoveries.




Source: IMF World Economic Outlook Database for September 2006.

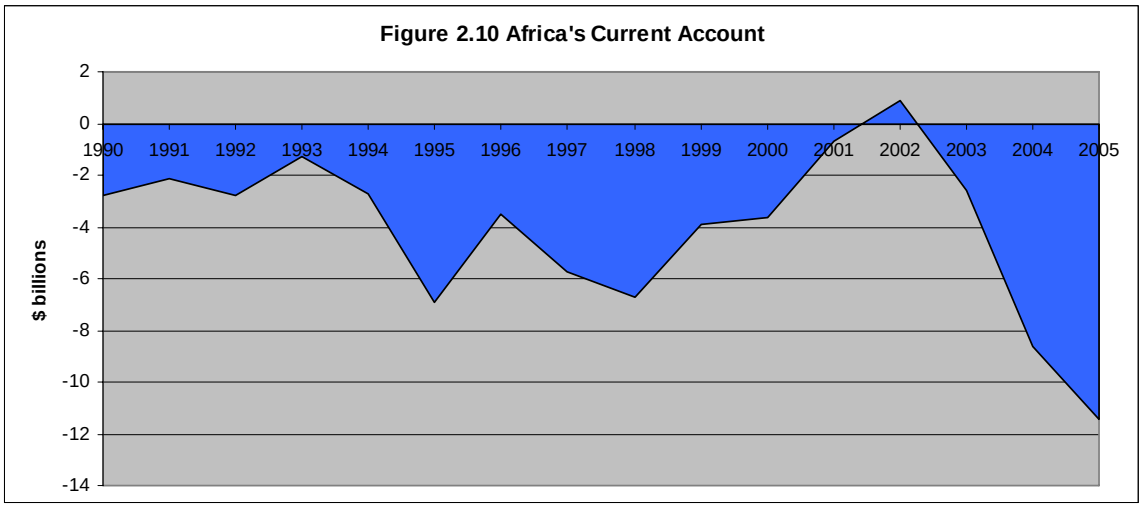
Looking at the underlying factors of these current account positions, all the seventeen economies have been running sizeable government budget deficits throughout the time period with only in the past three of four years have most countries decreased the size of their deficits or started running small budget surpluses. Investment measures have been mixed – significantly improving when measured by Tobin's q or mostly unchanged as measured by private credit availability. Given the traditional extensive trade and investment links between the region and the US, foreign factors such as the US budget balance and US interest rates are relevant determinants for the region's current accounts. The price of oil is also important, though to a lesser extent than it is for the developed economies. Nevertheless, oil comprises a significant portion (around 18%) of total imports for the majority of countries in the region.

### *Africa*

This regional grouping consists of fourteen African economies whose current account specifics are described below.

*Regional specifics*

The aggregate current account balance of this regional group has been negative throughout the period from 1990 onwards. Nevertheless, only since 2002 has the current account embarked on a rapid decrease, fueled predominantly by South Africa's rising deficit. All the rest of the economies are also running deficits, albeit smaller in absolute value, with Botswana being the only one consistently running small surpluses.




Source: IMF World Economic Outlook Database for September 2006.

Among the underlying investment indicators, private credit availability and Tobin's q have both been rising in all countries in the region though with varying speeds. Cross-country comparisons reveal big differences with countries such as South Africa far outstripping the others in terms of investment opportunities. More uniformity is present in terms of public saving. The fiscal balances of all the African countries are in deficit for most of years in the time period from 1990 onwards. Although some economies such as South Africa have managed to bring their budget deficits closer to balance in recent years,

the majority continue to run deficits of around 4-5% of their GDP. Among the foreign determinants of the current account, the price of oil is somewhat relevant for the economies in this regional grouping. The countries are all net importers of oil with oil imports comprising about 15% of total imports for the majority of the countries. US economic developments are also influential given that the US is among the top three sources (together with the UK and France) of capital inflow into Africa.

## III. The Theoretical Model

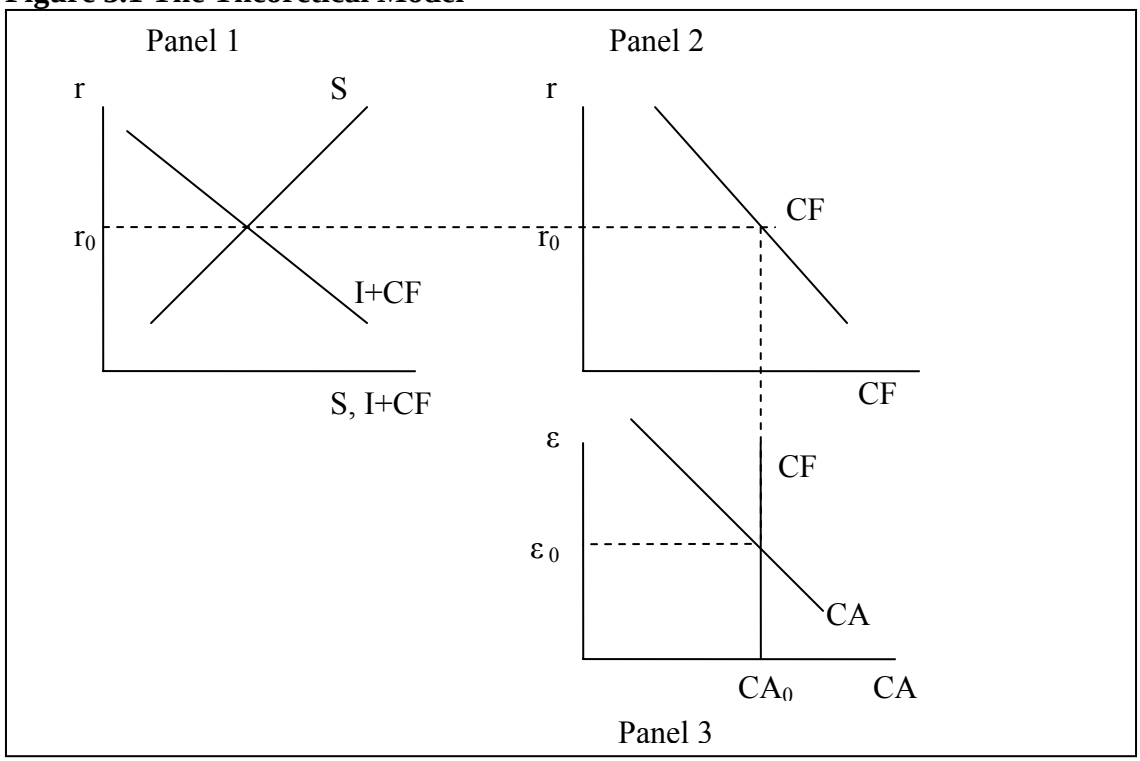
The theoretical framework is a simple medium- to long-run large open economy model with a managed float exchange rate regime. Below I give a brief description of the model and then examine seven determinants of the current account: home government budget balance, Tobin's q, private credit, price of oil, US government budget balance, US interest rates, US oil imports. Their effect on the home current account position is the following. Increase in home government budget balance or US interest rates improves the current account; increase in Tobin's q, private credit or US government budget balance worsens the current account. Increase in the price of oil improves the current account of an oil exporter and worsens it for an oil importer. Lastly, increase in US oil imports improves current accounts in the rest of the world and worsens US current account.

### *Description of the Model*

The model used is a simple, reduced-form model which is derived from the markets for loanable funds and for foreign exchange and in its basic form it is similar to other long-run open-economy models (e.g. Mankiw, 2002, pp. 147-8). The current account is endogenous to this model and its determinants are the exogenous shifters that

cause changes in the endogenous variables: saving, investment, net capital outflow and net exports.

**Figure 3.1 The Theoretical Model**




First, Panel 1 of Figure 3.1 shows the equilibrium in the market for loanable funds in an open economy. It is attained at a domestic interest rate $r_0$ which equalizes national saving S and the sum of domestic investment I and net foreign investment or net capital outflow CF. Next, Panel 2 shows that for a large open economy with imperfect capital mobility the schedule of net capital outflow is a function of the domestic interest rate. The equilibrium rate of $r_0$ determines the equilibrium net capital outflow $CF_0$. Finally, Panel 3 shows the equilibrium in the balance of payment for a flexible exchange rate

regime. It is attained at a real exchange rate $\varepsilon_0$ which equalizes net exports or the current account balance[1] CA with net capital outflow CF.

*Exogenous shifts in saving, investment, capital flow and net exports*

Here I examine how the model's equilibrium changes as a result of an exogenous shift in each of the main variables: saving, investment, capital flow and net exports.

**Figure 3.2 Exogenous Shift in Saving**

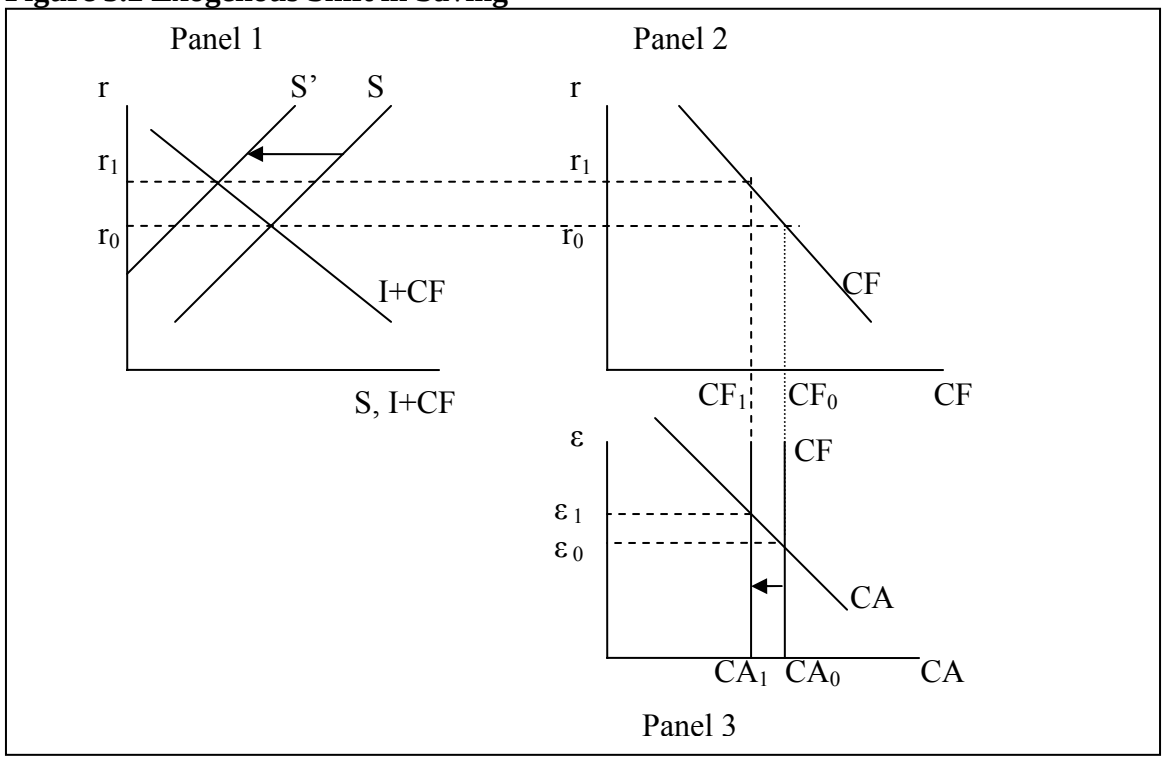



Figure 3.2 shows the effect of a shift in the saving schedule to the left. This leads to an increase in the equilibrium long-run domestic interest rate from $r_0$ to $r_1$ in Panel 1 which reduces both domestic investment and net capital outflow. The change in the capital outflow is demonstrated on the second panel as an upward movement along the CF schedule: the new equilibrium is now at $CF_1$. To keep the balance of payments in

[1] The complete definition of the current account is the sum of net exports, net factor income and net transfer of payments. In this theoretical model I ignore net factor income and net transfer of payments and let the current account equal net exports.

equilibrium the real exchange rate adjusts upwards (appreciates) in the third panel and the current account deteriorates from $CA_0$ to $CA_1$.

Figure 3.3 shows the effects of an exogenous shift in investment. In Panel 1 the rightward shift of the I+CF schedule leads to a higher equilibrium real interest rate $r_1$. The increase in the interest rate reduces net capital outflow to $CF_1$ in Panel 2. Finally, the real exchange rate appreciates to $\varepsilon_1$ and balance of payment equilibrium is restored at a lower current account balance equal to $CA_1$.

**Figure 3.3 Exogenous Shift in Investment**

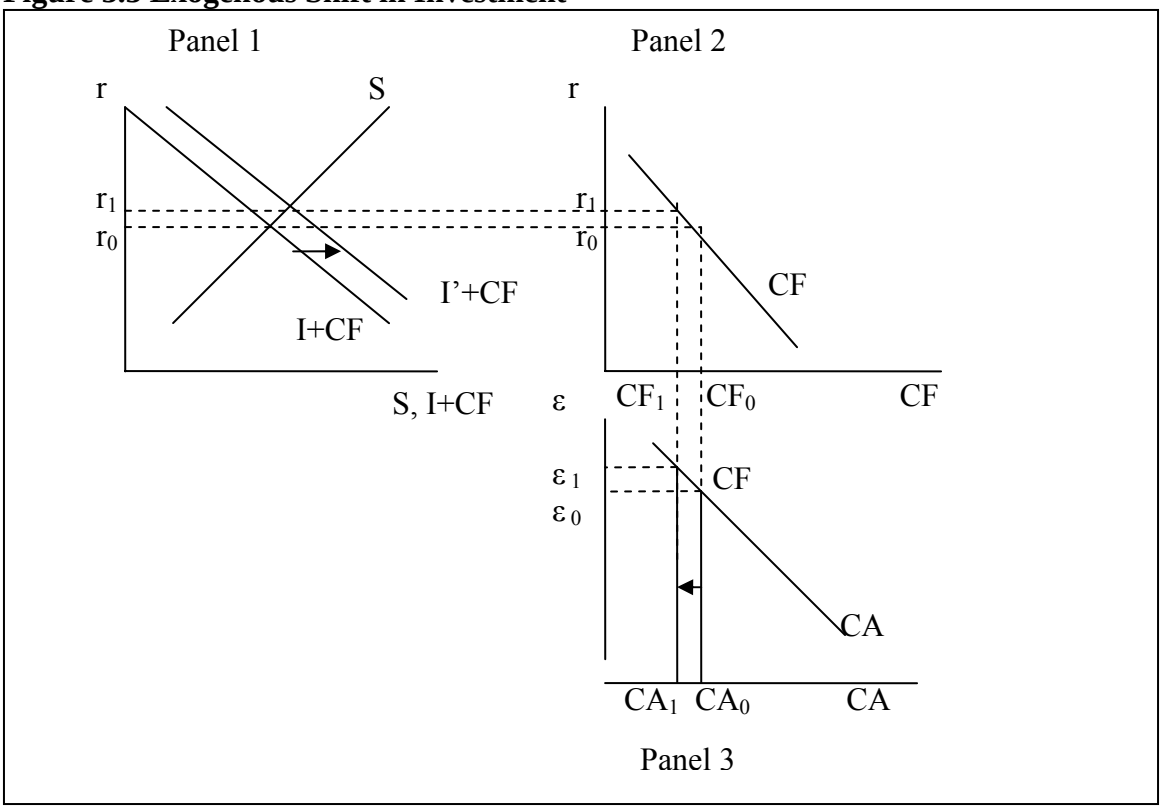



Figure 3.4 shows the effect of an exogenous shift in the net capital outflow schedule. First, the capital outflow schedule shifts rightward in panel 2. This leads to an equal upward shift of the I+CF schedule in panel 1. However, the net capital outflow does not increase in equilibrium by the full horizontal shift. Under the pressure of rising capital outflows the domestic interest rate increases. The new equilibrium is at $r_1$ which

restores equilibrium in the market for loanable funds by reducing both domestic investment and capital outflow. This determines the final level of capital outflow as $CF_1$ (Panel 2) which is still higher than the original $CF_0$. This is translated in panel 3 into a corresponding improvement in the current account balance to $CA_1$.

**Figure 3.4 Exogenous Shift in Net Capital Outflow**

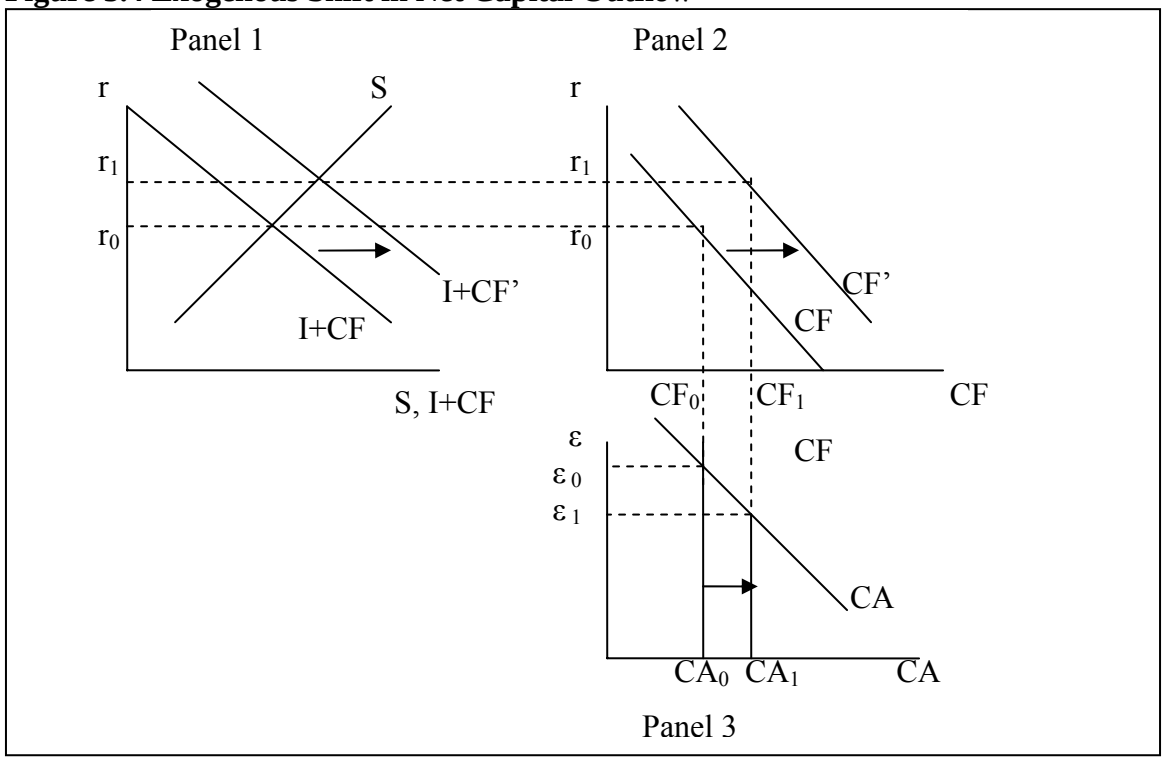
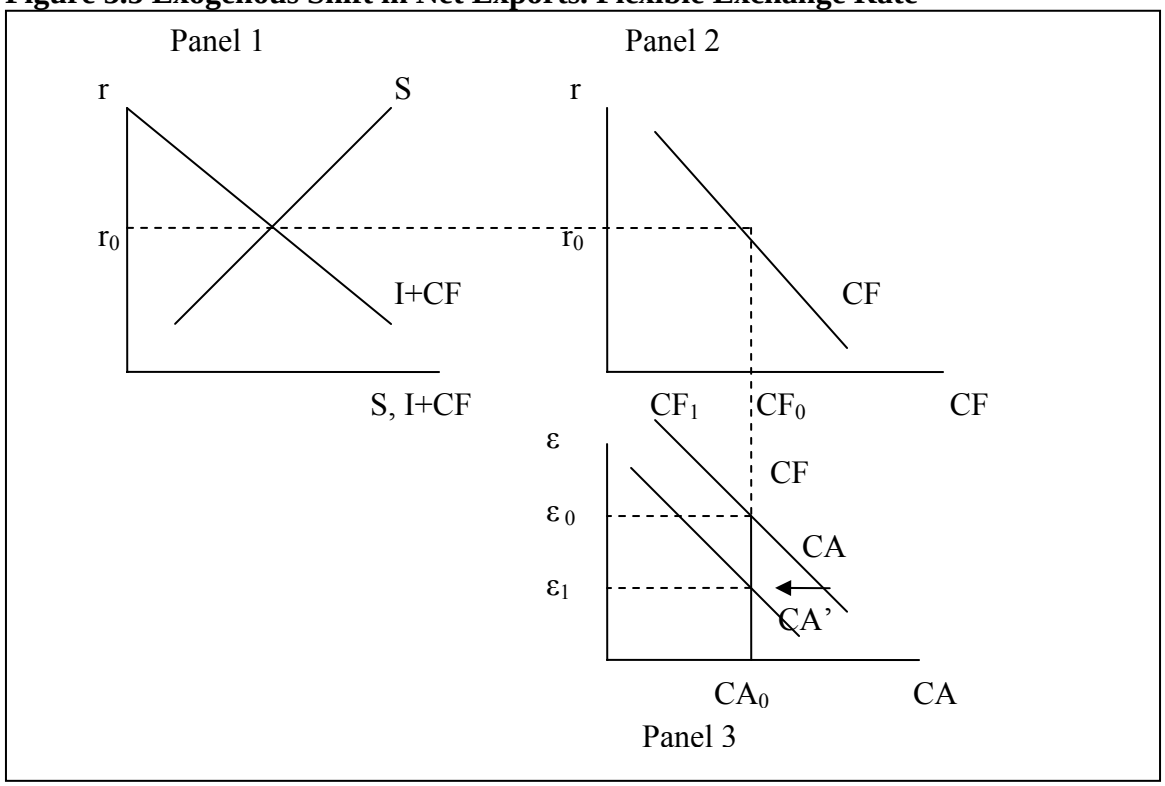



Figure 3.5 shows the effect of an exogenous shift in net exports in the case of a fully flexible exchange rate regime. When the CA schedule shifts to the left, the exchange rate depreciates from $\varepsilon_0$ to $\varepsilon_1$ as illustrated in Panel 3. The depreciation is needed in order to preserve equilibrium in the balance of payments: as the net capital outflow has not changed, the current account balance needs to return back to its original level – $CA_0$. Thus, under a fully flexible exchange rate regime, an exogenous shift in net exports leaves the current account position unchanged.

**Figure 3.5 Exogenous Shift in Net Exports. Flexible Exchange Rate**

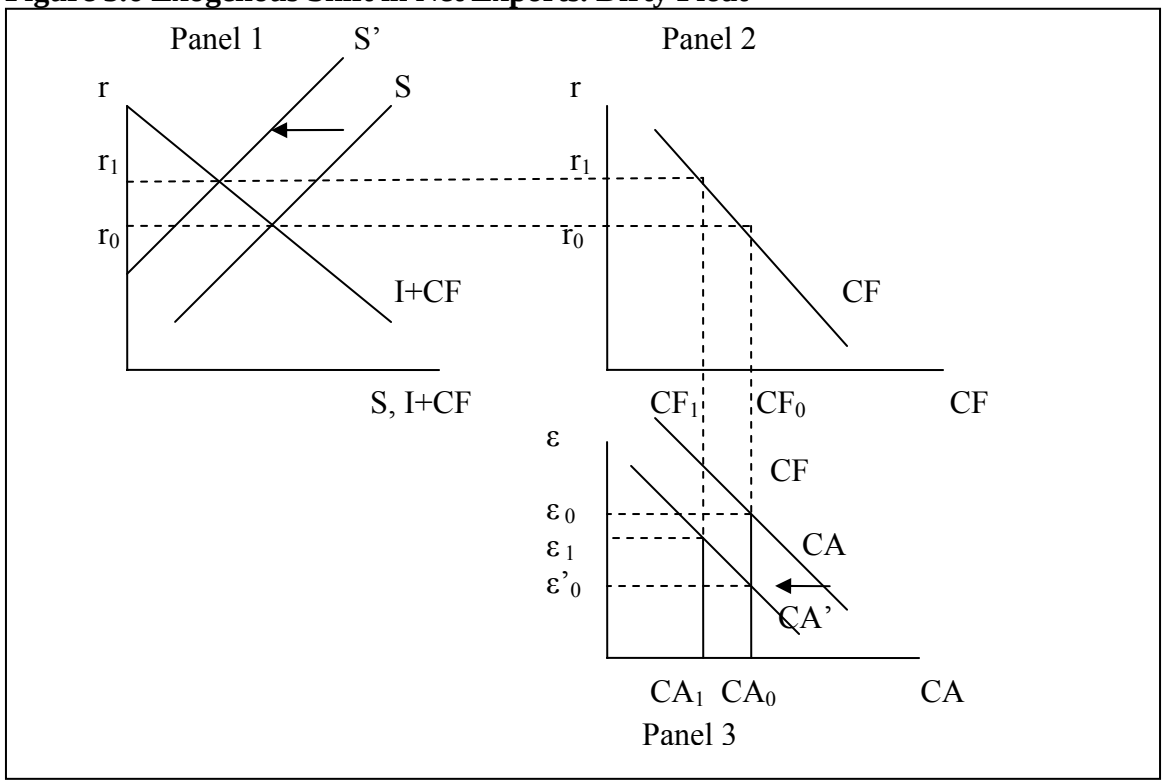



So far, the model has been specified purely as a long-run model. However, such a specification does not conform completely to the reality of exchange rate management performed in varying degrees by all economies out of concern for inflationary pressures or for their trade balance. The research purpose of this paper is to find a model that fits better the observed current account positions around the world. For this reason I introduce in the model exchange rate management as a medium-run characteristic.

Figure 3.6 shows the effect of an exogenous shift in net exports under a dirty float exchange rate regime. First in Panel 3 the CA schedule shifts to the left. If the exchange rate were fully flexible it would depreciate all the way to $\varepsilon'_0$ as was shown in Figure 3.5. However, in a dirty float the authorities intervene to prevent too big a depreciation of the currency because of fears of inflation. Tightening of the monetary stance leads to a leftward shift of the saving schedule in Panel 1 as a result of reduction in aggregate

demand. Equilibrium in the market for loanable funds is restored when the domestic interest increases to $r_1$ which determines the new lower equilibrium level of $CF_1$ as shown on Panel 2. Balance of payment equilibrium is finally achieved at an exchange rate $\varepsilon_1$, lower than the original equilibrium but higher than under a fully flexible exchange rate regime. The result is a worsening of the current account to a level of $CA_1$.

**Figure 3.6 Exogenous Shift in Net Exports. Dirty Float**




***Determinants of the Current Account***

In this section I examine seven determinants of the current account that are exogenous to the model: domestic fiscal policy, private credit availability, Tobin's q, US long-term interest rates, US government budget balance, price of oil and US oil imports. A change in any one of them can be viewed as a cause for one of the shifts of the endogenous variables of the model described above.

*Domestic fiscal policy*

The government budget balance affects the current account through its influence on national saving. Deterioration in the government budget balance constitutes a decrease in public saving which leads to a decrease in national saving. Thus, a worsening of the government budget is an exogenous shifter of the saving schedule in the model to the left. As discussed above, the result of such a shift is deterioration in the current account balance.

*Private credit's availability*

Private credit availability affects the current account through its influence on domestic investment. Increase in credit availability increases private investment and thus it constitutes an exogenous shifter of the I+CF schedule. As discussed above, the result of such a rightward shift is deterioration of the current account.

*Tobin's q*

Tobin's q, a measure of profitable investment opportunities, is another exogenous variable that affects the current account through its influence on domestic investment. An increase in the Tobin's q ratio increases investment analogously to an increase in private credit's availability. Therefore, as another exogenous shifter of the I+CF schedule it worsens the current account balance in the same way.

*US long-term interest rates*

Monetary policy abroad affects the current account through its influence on net capital outflow. A contractionary monetary policy abroad such as increase in US long-term interest rates increases net capital outflow from the home economy. Higher US interest rates make foreign investors less willing to invest in the domestic economy and

make domestic investors more willing to invest in the US. Thus, increase in the US long-term interest rate constitutes an exogenous rightward shift of the CF schedule. As discussed above, this causes an improvement in the current account at home. This effect, however, is smaller the more actively the home authorities manage their exchange rate with the dollar. In such economies, the CF schedule is partially brought back by official intervention in the foreign exchange market and the improvement of the current account is much smaller.

*US government budget balance*

In general, foreign government budget balances affect the current account at home only through their impact on foreign interest rates consequently exerting the same change as just described above. Nevertheless, there may be a separate quantity effect that is present in the case when it is US public saving that is the exogenous shifter. Due to the position of the dollar as the world's predominant reserve currency, the quantity of dollar-denominated US treasury bonds available influences the net capital outflow positions in the rest of the world. An increase in US budget deficits increases the quantity of available US treasury bonds. These bonds are bought not only by American investors but also by foreign investors who want to hold assets denominated in the world's reserve currency. The result is an increase in net capital outflow. Therefore, an increase in US budget deficits is an exogenous rightward shifter of the CF schedule. The result as we saw in the previous subsection is improvement in the home current account. Quantity effects are even stronger when the home country is actively managing its exchange rate with the dollar. Such management artificially raises US demand for goods from the home country as the home currency is undervalued. The exogenous increase in net exports raises the

current account balance by the full horizontal shift of the CA schedule due to authorities' purchases of US bonds which shift the CF schedule by the same horizontal distance.

*Price of oil*

The price of oil affects the current account balance of a country that is a major oil net importer or exporter. For a net oil importer an increase in the price of oil raises the value of its oil imports and thus the value of its overall imports. This worsens the current account of a net oil importer. Conversely, for a net oil exporter an increase in the price of oil raises the value of its exports and thus improves the current account of an exporter. Therefore, a change in the price of oil is an exogenous shifter of the CA schedule. As we saw in the previous subsection, an increase in the price of oil which shifts the CA schedule to the left for a net importer leads to a worsening in the current account balance. Conversely, an increase in the price of oil for a net exporter leads to improvement of the current account balance.

*Oil imports*

In general, only price effects should impact the current account, not quantity effects. Nevertheless, if the quantity effect is a change in the quantity of US oil imports, it will have an impact on the current accounts in the rest of the world. This is due to the dominant position of the US as the world's biggest oil consumer and importer and to the fact that oil is priced in dollars. Thus, the quantity of US oil imports affects directly the current account balance of an economy that is a major oil exporter. A quantity increase in US oil imports increases the value of US imports and therefore constitutes an exogenous rightward shifter of the CA schedule of an oil exporter. As we saw in the model, this leads to improvement in the home current account balance for an oil exporter.

What is more, there is also an effect on the rest of the world through the recycling of petrodollars by oil exporters. An oil exporter wishing to diversify its revenues from US oil imports either buys goods or accumulates assets from the rest of the world. However, because the dollar is the main reserve currency and the currency in which oil is denominated, oil exporters have a bias for dollar assets and thus they do not use the petrodollars to buy assets from the rest of the world. This is confirmed by studies which show that since the 1970s oil exporters have relied more on the trade channel than the financial channel for diversification of their oil revenues (Ruiz and Vilarubia, 2007). Such increase in the demand for goods from the rest of the world causes an exogenous rightward shift of the CA schedule for the rest of the world which improves their current accounts[2].

## IV. Empirical Framework

In this section I discuss the empirical treatment of the seven determinants of the current account: government budget balance, Tobin's q, private credit availability, US government budget balance, US long term interest rate, US oil imports, price of oil. This is done according to a pull-push formulation which divides up the above determinants into factors that pull and factors that push foreign saving into the US. Finally, I discuss empirical issues such as simultaneity bias, measurement error and multicollinearity that might be present in the chosen econometric model.

[2] There is also a secondary, reinforcing quantity effect from the recycling of petrodollars. When the oil producers diversify by buying goods from the rest of the world, the petrodollars don't necessarily just get accumulated by the third countries but are reinvested in US government bonds. This constitutes a rightward shift of the CF schedule in the rest of the world which improves their current accounts further.

***Pull-Push Formulation***

The empirical analysis is driven by the question to what extent the recent pattern of the global current accounts can be explained by developments in the US as opposed to developments in the rest of the world. The former are termed pull factors – factors that pull foreign saving to finance the US current account deficits. The latter are termed push factors – factors originating in the rest of the world that push foreign saving into the US. Table 4.1 below presents how the seven determinants of the current account are divided into push and pull factors according to this formulation. The table also gives the expected effect (increase or decrease) on the home country current account from an increase in each one of the variables. The data sources and exact definition of each variable are provided in the Data Appendix.

**Table 4.1. Pull and Push Factors. Effect on the Current Account**

| | **Explanatory Variable** | **Expected Effect on the Current Account** |
|---|---|---|
| **Push Factors** | GOVBUDJ (government budget balance) | + |
| | PRIVCRED (private credit) | – |
| | TOBINQ (measure of Tobin's q) | – |
| | POIL (oil price) | +/– |
| **Pull Factors** | USBUDJ (US government budget) | – |
| | USRATE (US long-term interest rate) | + |
| | USOIL (US oil imports) | +/– |

***Econometric Model and Estimation Issues***

The general econometric model based on the current account determinants discussed above is the following:

$CA_{it} = \beta_{0it} + \beta_{1it}*GOVBUDJ_{it} + \beta_{2it}*PRIVCRED_{it} + \beta_{3it}*TOBINQ_{it} + \beta_{4it}*\ln(POIL)_{it} + \beta_{5it}*USBUDJ_{it} + \beta_{6it}*USRATE_{it} + \beta_{7it}*\ln(USOIL)_{it} + \varepsilon_{it}$.

The subscript i indicates country i and subscript t indicates time period t. The time period in the regressions with annual observations is one of the years from 1990 until 2005 and in the regressions with four-year averages is one of the four-year periods 1990-1993, 1994-1997, 1998-2001, 2002-2005. The price of oil and the US interest rate are given in real terms because the current account, the government budgets, Tobin's q and private credit availability are all scaled by GDP and are thus in real terms as well. Also, the price of oil and the quantity of US imports are introduced in the econometric model in a logarithmic form in order to measure the effect of percentage rather than absolute value changes in these two variables. The measurement of the quantity effect of US government budget balances is given as a percentage of regional GDP. This specification allows me to scale the amount of US government bonds outstanding by the size of the regional group and examine how much each country within the group is responsible for the absorption of the available US assets.

Panel data regressions are run on each of the regional groupings: Euro Area, NIE, Africa, Latin America, The Oil Exporters as well as ordinary OLS regressions on individual countries: US, China and Japan. Given that the theoretical model described in the previous section is a medium- to long-run model, the main regressions are run with four-year averages of the underlying annual observations. There is still some concern that

a period of four years is not long enough to test adequately the medium- to long-run predictions of the model. However, given that the total span of the data is only sixteen years, the four-year average specification is a compromise between capturing medium-run determinants and ensuring enough observations in order to present estimates that can be tested statistically. For the case of the individual countries US, China and Japan only annual results are available because there are not enough data points for estimation based on 4-year averages. In addition, to test the robustness of the results annual regressions are also presented. In such a short-run specification there is some concern for simultaneity bias from the domestic variables – the home government budget balance, Tobin's q and private credit availability. For instance, in the short run an expansionary fiscal policy that reduces public saving increases national income and therefore shifts the saving schedule back towards its initial position. In an effort to correct for possible endogeneity, I also present results from the annual regressions with the domestic variables lagged one period.

Apart from the general pooled OLS model, I test fixed effects models – both cross-section fixed effects and time fixed effects in order to control for omitted variables that differ respectively between the countries and between time periods. The F-tests conducted show that the cross-section fixed effects model is better than the pooled OLS model for each regional grouping and thus the main results presented in the next section are all for a fixed effects specification. However, the time dummies in the annual specifications did not prove to be significant for any of the regional groupings or the entire sample (see Table A.1) except for the Euro Area for which the time dummy model's results are presented in Table A.2 of Appendix A. For the 4-year averages no testing of time fixed effects model was possible due to the lack of enough degrees of

freedom. This occurred because there are only four time observations for the given 16-year period and the list of regressors include three variables invariant across the cross sections – the external pull factors.

Given that the main specification reported in the results section is cross-section fixed effects, the only variation in the model is over time. Such time series data might have autocorrelated error structures which would bias upward the significance of the point estimates, i.e. the estimated t-statistics. This issue was addressed by a Durbin-Watson test which showed that no autocorrelation is present in either the whole sample or the separate regions.

There is also a concern for measurement error in the coefficient estimates of Tobin's q because the measure used for Tobin's q is stock market capitalization, i.e. only the numerator of the Tobin's q ratio. Thus, what is omitted from the equations is a measure of the denominator of Tobin's q ratio – the replacement cost. Because this variable is likely to undergo changes in time and across cross sections that are independent of such changes in the market value, its omission introduces a measurement error in the coefficient estimates for Tobin's q.

Another possible concern is multicollinearity. Given the dominant US position as the world's largest oil consumer and importer, the price of oil is influenced to a great degree by the quantity of US oil imports. Indeed, when regressions were ran with both the price of oil and the US oil imports neither coefficient appeared significant. Thus, I have chosen to include only one of these two variables. In the main regression results reported in the next section I preferred US oil imports over the price of oil. I chose the former variable as it allows me to measure the effect of another pull factor which is

separate from the effects of the pull factors US government budget balance and US long-term interest rate. This is important in my specification because in some regressions I test the effects of the US budget and interest rate separately and thus in some equations I would have only one pull factor if I did not use US oil imports. Moreover, by itself the variable US oil imports provides an interesting measure of how petrodollars are recycled by the oil exporters as described above in section III. Nevertheless, in Table A.3 of Appendix A I report the results of the regressions involving the price of oil. Interestingly enough, the oil price effect does not appear significant in the medium run for the oil exporting economies. On the other hand, the quantity effect of US oil imports is found to be highly significant for this region as well as for all the other regional groups.

Similar concerns have motivated the testing of the US budget balance and the US interest rate separately in some of the regional groups. In the short and medium run interest rates are determined not only by structural factors but also by the fiscal stance. Thus, it is difficult to estimate their separate effects when included jointly in an equation. For instance, an increase in US borrowing might cause an increase in the yield of US long-term government securities in order to make these securities more attractive for buyers or as a result of a higher default premium.

## V. Results

In this section I present the results of the panel regressions and then I run a simulation exercise to predict how the latest current account positions would change under the effects of the pull factors. In brief, it appears that among the push factors the home government budget deficit is the one that is significant among almost all regional groups and robust to the different specifications. Out of the pull factors, it is the two

factors reflecting quantity effects – US budget balance and US oil imports – that have significant influence on almost all current account positions around the world.

***Regression Results***

This subsection presents the main regression results. First results are reported for the whole sample and then a more in depth look is provided for the findings particular for the separate regional groupings.

*Entire sample*

Before analyzing the results of this model, an important qualification needs to be made. The entire sample specification is provided in order to give a general picture of the factors influencing current accounts in the world as a whole, apart from the US. This specification however is not too revealing given that there are important differences between the different regional groups. Evidence for the existence of such differences is the result from the F-test reported in Table A.4 in Appendix A. The test examines whether the restrictions placed by considering each region separately in the subsequent regressions are needed. The high F-statistics achieved show that indeed the models with separate regressions for each region are a better fit for the data.

Nevertheless, the whole sample specification fits well the theoretical model: all factors have the expected coefficient sign and only Tobin's q is not significant (Table 5.1). The home government budget balance is the most significant and robust among the push factors. Although the exerted effect is smaller when we attempt to control for simultaneity in the short run, it is nevertheless still highly significant. Among the pull factors, it is the quantity effects US budget balance, US oil imports and not US interest rates that are very significant and robust. This suggests that the US is able to pull global saving because of the dollar's unique position which creates a bias for US assets.

Moreover, among all the statistically significant factors it is the policy-driven variable – US budget balance – that was found to have the largest variance over time and thus the greatest influence on the variation in the global current accounts. Every percentage point increase in the US budget balance scaled by world GDP increases by .655 percentage points the current account to GDP ratio in the world.

**Table 5.1 Whole Sample Panel Regressions. Cross-Section Fixed Effects**
(Dependent Variable: Current Account as Percentage of GDP)

| | 4 year-averages | Annual | Annual (Lagged domestic variables) |
|---|---|---|---|
| Govt. budget balance ( % of GDP)<br>Exp. sign + | 0.402***<br>(4.637) | 0.421***<br>(9.753) | 0.114***<br>(2.345) |
| Tobin's Q (% of GDP)<br>Exp. sign – | -0.003<br>(-0.254) | 0.001<br>(0.034) | 0.001<br>(0.150) |
| Private credit (% of GDP)<br>Exp. sign – | -0.041***<br>(-2.492) | -0.032***<br>(-3.558) | -0.029**<br>(-2.210) |
| US budget balance (% of world GDP)<br>Exp. sign – | -0.655**<br>(-2.214) | -0.270**<br>(-1.988) | -0.157*<br>(-1.304) |
| US long-term interest rate<br>Exp. sign + | 1.065*<br>(1.387) | -0.168<br>(-0.574) | -0.420<br>(-1.297) |
| US oil imports (in natural log) [a]<br>Exp. sign + | 0.101***<br>(2.784) | 0.045***<br>(2.696) | 0.045***<br>(2.355) |
| F-test statistic | 4.62<br>[0.000] | 11.967<br>[0.000] | 14.326<br>[0.000] |
| Adjusted R-squared | 0.73 | 0.67 | 0.65 |
| Number of observations | 196 | 706 | 665 |

Notes: The t-test is a one-sided t test, with the reported expected sign. In parenthesis are given the t-statistics. Coefficients significant at the 10% level are marked with *, those at the 5% level – with **, and those at the 1% level – with ***. The F-statistic tests whether the fixed effects model is better than the pooled OLS. P-values in brackets indicate the level at which we can reject that the pooled OLS is better.
[a] The coefficient for the oil imports reports the percentage points change in the current account/GDP ratio from a 1 percent increase in US oil imports.

**Table 5.2 Oil Exporters Panel Regressions. Cross-Section Fixed Effects**
(Dependent Variable: Current Account as Percentage of GDP)

| | 4 year-averages | 4 year-averages | Annual | Annual (Lagged domestic variables) |
|---|---|---|---|---|
| Govt. budget balance ( % of GDP) Exp. sign + | 0.904*** (2.594) | 0.926*** (2.749) | 0.685*** (9.236) | 0.218** (2.181) |
| Tobin's Q (% of GDP) Exp. sign – | 0.033 (0.279) | 0.031 (0.293) | 0.027 (0.742) | 0.201 (1.208) |
| Private credit (% of GDP) Exp. sign – | 0.025 (0.307) | 0.020 (0.280) | -0.173*** (-2.919) | -0.207** (-2.057) |
| US budget balance (% of regional GDP) Exp. sign – | -0.010 (-0.330) | … | … | … |
| US long-term interest rate Exp. sign + | 6.268 (1.065) | 5.747** (2.025) | 1.284** (2.381) | 2.713*** (3.231) |
| US oil imports (in log) [a] Exp. sign + | 0.423* (1.503) | 0.398** (2.131) | 0.059** (2.558) | 0.074** (2.346) |
| F-test statistic | 4.219 [0.009] | 4.270 [0.007] | 13.766 [0.000] | 12.814 [0.000] |
| Adjusted R-squared | 0.82 | 0.82 | 0.78 | 0.67 |
| Number of observations | 29 | 29 | 113 | 107 |

Notes: The t-test is a one-sided t test, with the reported expected sign. In parenthesis are given the t-statistics. Coefficients significant at the 10% level are marked with *, those at the 5% level – with **, and those at the 1% level – with ***. The F-statistic tests whether the fixed effects model is better than the pooled OLS. P-values in brackets indicate the level at which we can reject that the pooled OLS is better.
[a] The coefficient for the oil imports reports the percentage points change in the current account/GDP ratio from a 1 percent increase in US oil imports.

*Oil Exporters*

For the oil exporters, the most significant of the push factors is the home government budget balance (Table 5.2). Home public saving matter increasingly as we widen the time horizon: in the medium run the relationship is almost one-to-one, much higher than the estimated effect of public saving for the aggregated sample. This suggests that for the oil exporters the oil revenues accruing to the state are not able to boost domestic investment and thus lead to ever larger trade surpluses. The other interesting finding is which pull factors are the most influential. Whereas the quantity of US government bonds outstanding does not appear significant, the yield of US long-term

treasury bills has a very strong impact: for every percentage point increase the current account to GDP ratio of an oil exporter increases by about 6 percentage points. This is somewhat puzzling as it implies that the oil exporters invest in US assets based on their returns and not based on a general bias towards US assets due to the dollar's reserve currency status. On the other hand, an alternative interpretation could be that because the oil exporters are already such a major holder of US treasury bills, there is not much change over time of the quantity of their holdings, but changes in the bond yields exert a large effect on the value of their capital account[1].

**Table 5.3 Euro Area Panel Regressions. Cross-Section Fixed Effects**
(Dependent Variable: Current Account as Percentage of GDP)

| | 4 year-averages | Annual | Annual (Lagged domestic variables) |
|---|---|---|---|
| Govt. budget balance ( % of GDP) Exp. sign + | 0.045 (0.174) | -0.124 (-1.189) | -0.291 (-2.887) |
| Tobin's Q (% of GDP) Exp. sign – | 0.031 (1.431) | 0.025 (2.711) | 0.023 (2.660) |
| Private credit (% of GDP) Exp. sign – | -0.032** (-1.983) | -0.024*** (-3.334) | -0.024*** (-3.442) |
| US budget balance (% of regional GDP) Exp. sign – | -0.588** (-2.366) | -0.228** (-2.110) | -0.164** (-1.730) |
| US long-term interest rate Exp. sign + | 3.197*** (2.764) | 1.313*** (3.389) | 1.210*** (3.024) |
| US oil imports (in log) [a] Exp. sign + | 0.114** (2.110) | 0.063*** (2.910) | 0.072*** (3.146) |
| F-test statistic | 4.270 [0.001] | 14.425 [0.000] | 19.314 [0.000] |
| Adjusted R-squared | 0.75 | 0.67 | 0.69 |
| Number of observations | 46 | 174 | 162 |

Notes: The t-test is a one-sided t test, with the reported expected sign. In parenthesis are given the t-statistics. Coefficients significant at the 10% level are marked with *, those at the 5% level – with **, and those at the 1% level – with ***. The F-statistic tests whether the fixed effects model is better than the pooled OLS. P-values in brackets indicate the level at which we can reject that the pooled OLS is better.
[a] The coefficient for the oil imports reports the percentage points change in the current account/GDP ratio from a 1 percent increase in US oil imports.

[1] Since 1999 this capital account – the reverse side of the current account in the balance of payment – has been renamed financial account in US national accounting.

*Euro Area*

For the Euro Area it is the pull factors that are determining the European current account positions and not the push factors (Table 5.3). It is especially remarkable that European public saving has no statistically significant influence. A possible explanation for this finding is increased capital mobility across the Euro Area as a result of the adoption of the common currency and other preceding single market policy initiatives. Yet, the cross-section specification cannot conclusively show this because it does not give the pooled effect on the overall European current account balance. However, the time fixed effects model for the Euro Area (Table A.2) provides such a specification and gives stronger support to the hypothesis of high capital mobility that makes home government saving not very relevant. This is consistent with other studies (Hericourt and Maurel, 2005) which find increasing financial integration within the Euro area (but not within the broader European Union).

When examining the pull factors, which are all three very significant and robust, it is worth noting that US long-term interest rates have a very significant and robust impact: for every percentage point increase in the 10-year US treasury bill yield, the current accounts in Europe as a ratio of GDP rise by more than 3 percentage points. Unlike the oil exporters who are a group of developing countries with the exception of Norway, the Euro Area is one of the most developed regional groups. Thus, for this region it is more understandable that asset returns are a very significant determinant of capital flows towards the US and not only a bias towards dollar-denominated assets.

*Newly Industrialized Asian Economies*

For the NIE the specification containing all determinants does not fit the data well and none of the factors are significant (Table 5.4). However, when the US interest rate is removed from the equation, the two pull factors – the US budget balance and the quantity of US oil imports are very significant and robust to the different time horizons. A possible explanation for these results is the existence of linkages that are difficult to separate between the 'price' effect of US interest rates and the two quantity effects for this region. The finding that what matters is the quantity of US government bonds available and not their yields suggests that the US is able to pull saving out of this developing region due to the dollar's position as a reserve currency. This result is also in line with the theoretical claim from the previous section that in regions with active management of the dollar exchange rates the quantity effect should be stronger. The other pull factor – US oil imports – could be interpreted to indicate that oil exporters recycle their petrodollars by buying goods from Asia and boosting the current accounts in the region. The finding that this coefficient is markedly larger compared to the Euro Area is supported by studies (e.g. Ruiz and Vilarubia, 2007) which show that in the past twenty years Asia is replacing Europe as the destination for recycled petrodollars.

What remains statistically insignificant in all the different specifications is the home government budget balance. This suggests that capital mobility within the region, similar to the case of Europe, is high and makes the level of domestic saving not an important determinant of current account positions. This finding is even more remarkable given the very different institutional environment in the two regions. While the European Union has institutional measures put in place to boost capital mobility among its members, no such formal arrangements exist among the Asian tigers.

**Table 5.4 NIE Panel Regressions. Cross-Section Fixed Effects**
(Dependent Variable: Current Account as Percentage of GDP)

| | 4 year-averages | 4 year-averages | Annual | Annual (Lagged domestic variables) |
|---|---|---|---|---|
| Govt. budget balance ( % of GDP) Exp. sign + | -0.452 (-0.932) | -0.549 (-1.111) | -0.377 (-2.120) | -0.161 (-0.857) |
| Tobin's Q (% of GDP) Exp. sign – | 0.001 (0.064) | 0.001 (0.054) | 0.018 (1.454) | 0.006 (0.572) |
| Private credit (% of GDP) Exp. sign – | 0.063 (1.544) | 0.059 (1.615) | 0.049 (2.835) | 0.048 (2.455) |
| US budget balance (% of regional GDP) Exp. sign – | 0.010 (0.019) | -0.538** (-1.798) | -0.350** (-1.677) | -0.347** (-1.860) |
| US long-term interest rate Exp. sign + | -3.321 (-1.240) | … | … | … |
| US oil imports (in log) [a] Exp. sign + | -0.023 (-0.193) | 0.105** (1.788) | 0.122*** (4.599) | 0.130*** (4.308) |
| F-test statistic | 6.616 [0.018] | 6.740 [0.014] | 32.849 [0.000] | 24.946 [0.000] |
| Adjusted R-squared | 0.49 | 0.80 | 0.79 | 0.79 |
| Number of observations | 16 | 16 | 63 | 59 |

Notes: The t-test is a one-sided t test, with the reported expected sign. In parenthesis are given the t-statistics. Coefficients significant at the 10% level are marked with *, those at the 5% level – with **, and those at the 1% level – with ***. The F-statistic tests whether the fixed effects model is better than the pooled OLS. P-values in brackets indicate the level at which we can reject that the pooled OLS is better.
[a] The coefficient for the oil imports reports the percentage points change in the current account/GDP ratio from a 1 percent increase in US oil imports.

*Africa*

Africa is another developing region similar to the oil exporters for which public saving is an important determinant of the current account, though in this case we have budget deficits contributing to current account deficits (Table 5.5). This finding suggests that, compared to the relatively more developed Asian Tigers and the advanced economies in Europe, capital mobility in Africa is not very high and investment relies only on domestic sources of finance. Though the ability of the US to pull saving from this region is low, it is worth noting that once again the 'pull' is achieved only through quantity effects whereas returns on US assets are not statistically significant in the

medium run. In other words, it is the reserve currency position of the dollar that is able to exert this pull effect. That the other robust pull factor is US oil imports is perhaps evidence that some of the recycling of petrodollars is in the form of foreign aid to Africa.

**Table 5.5 Africa Panel Regressions. Cross-Section Fixed Effects**
(Dependent Variable: Current Account as Percentage of GDP)

| | 4 year-averages | Annual | Annual (Lagged domestic variables) |
|---|---|---|---|
| Govt. budget balance ( % of GDP) Exp. sign + | 0.358** (1.793) | 0.255*** (2.929) | 0.107 (1.233) |
| Tobin's Q (% of GDP) Exp. sign – | 0.013 (0.136) | -0.024 (-0.882) | -0.022 (-0.697) |
| Private credit (% of GDP) Exp. sign – | -0.101 (-1.157) | -0.079*** (-2.451) | 0.075** (-2.263) |
| US budget balance (% of GDP) Exp. sign – | -0.022** (-1.965) | -0.011*** (-2.508) | -0.010** (-1.737) |
| US long-term interest rate Exp. sign + | 2.263 (1.293) | 0.701* (1.483) | 0.645* (1.347) |
| US oil imports (in log) [a] Exp. sign + | 0.145** (1.852) | 0.110*** (3.919) | 0.114*** (3.950) |
| F-test statistic | 4.487 [0.001] | 17.658 [0.000] | 20.483 |
| Adjusted R-squared | 0.67 | 0.67 | 0.69 |
| Number of observations | 46 | 171 | 161 |

Notes: The t-test is a one-sided t test, with the reported expected sign. In parenthesis are given the t-statistics. Coefficients significant at the 10% level are marked with *, those at the 5% level – with **, and those at the 1% level – with ***. The F-statistic tests whether the fixed effects model is better than the pooled OLS. P-values in brackets indicate the level at which we can reject that the pooled OLS is better.
[a] The coefficient for the oil imports reports the percentage points change in the current account/GDP ratio from a 1 percent increase in US oil imports.

*Latin America*

Latin America is another developing region that demonstrates the strong impact of public saving on the current account balance (Table 5.6). A percentage point increase in the government budget balance improves the current account by over half a percentage point – an even greater impact than the one in the African region. What is different for Latin America is that it is the only region for which both investment indicators are

statistically significant determinants. Thus, it appears that Latin America is the only region in the sample for which current account developments have been mostly driven by domestic push factors. A possible explanation why Latin America is an outlier in this respect is the series of debt-driven currency crises that this region experienced. Large government deficits and accumulating debt have made the region an unlikely place for saving to be pulled towards the US. Nevertheless, what little saving is being pulled, it is done once again through quantity effects, resulting from a bias towards dollar-denominated assets.

**Table 5.6 Latin America Panel Regressions. Cross-Section Fixed Effects**
(Dependent Variable: Current Account as Percentage of GDP)

| | 4 year-averages | 4 year-averages | Annual | Annual (Lagged domestic variables) |
|---|---|---|---|---|
| Govt. budget balance ( % of GDP) Exp. sign + | 0.579*** (2.649) | 0.573*** (2.653) | 0.015 (0.308) | 0.043 (0.876) |
| Tobin's Q (% of GDP) Exp. sign – | -0.076*** (-3.160) | -0.076*** (-3.237) | -0.040*** (-2.609) | -0.022 (-1.189) |
| Private credit (% of GDP) Exp. sign – | -0.160*** (-2.725) | -0.160*** (-2.738) | -0.099*** (-2.548) | -0.006 (-0.920) |
| US budget balance (% of regional GDP) Exp. sign – | -0.027 (-0.504) | -0.038** (-1.951) | -0.042*** (-2.832) | -0.038*** (-3.054) |
| US long-term interest rate Exp. sign + | -0.595 (-0.524) | … | … | … |
| US oil imports (in log) [a] Exp. sign + | 0.090* (1.533) | 0.109*** (3.803) | 0.067*** (2.856) | 0.041** (1.691) |
| F-test statistic | 2.651 [0.008] | 2.735 [0.006] | 2.876 [0.000] | 2.993 [0.000] |
| Adjusted R-squared | 0.41 | 0.42 | 0.24 | 0.20 |
| Number of observations | 59 | 59 | 190 | 181 |

Notes: The t-test is a one-sided t test, with the reported expected sign. In parenthesis are given the t-statistics. Coefficients significant at the 10% level are marked with *, those at the 5% level – with **, and those at the 1% level – with ***. The F-statistic tests whether the fixed effects model is better than the pooled OLS. P-values in brackets indicate the level at which we can reject that the pooled OLS is better.
[a] The coefficient for the oil imports reports the percentage points change in the current account/GDP ratio from a 1 percent increase in US oil imports.

*Unites States, China and Japan*

The first general point to note about the results from the OLS regressions ran on each of the three countries is that the lagged domestic variables specification produces more statistically significant results in line with the theoretical model, which suggests that perhaps simultaneity is indeed an issue. Turning now to the individual countries, we see that the model fits especially well the case of the US with all variables having the expected coefficient and only the quantity of US oil imports is not statistically significant. Moreover, from the three statistically significant pull factors[2] it is the US government budget balance that is markedly the most significant. This variable not only has the largest in absolute value coefficient in the regression, but also varies the most over the given time period[3] and thus causes most of the changes in the current account position. This provides some refutation of the hypothesis that productivity surges resulting in higher domestic investment are a more important current account determinant than fiscal policy (Erceg et al., 2005). Nevertheless, this is not yet a confirmation of the twin-deficit hypothesis since the effect is substantially less than one-to-one.

Like the US, Japan fits the theoretical model better when domestic variables are lagged to avoid endogeneity. What is somewhat surprising about the results is that with the exception of US oil imports, no pull factors are significant determinants. A possible explanation is that during the given time period – from 1990 onwards, Japan's contribution to the US trade balance has been declining in relative terms. Thus, the only

[2] All the regressors – government budget balance, Tobin's q, private credit, oil imports – in the equation for the US are pull factors because they are domestic variables from a US perspective and thus are considered to "pull" saving from the rest of the world.

[3] The standard deviation of the US government budget balance is 2.351, whereas the standard deviations of US Tobin's Q and US private credit are respectively 0.371 and 0.365.

remaining pull factor is US oil imports triggering a recycling of petrodollars in the form of purchases of Japanese goods.

**Table 5.7 United States, China and Japan OLS Annual Regressions**
(Dependent Variable: Current Account as Percentage of GDP)

| | US | US (Lagged domestic factors) | China[a] | China (Lagged domestic factors) | Japan | Japan (Lagged domestic factors) |
|---|---|---|---|---|---|---|
| Govt. balance ( % of GDP) Exp. sign + | 0.091 (0.546) | 0.430*** (4.882) | 1.397 (1.048) | 1.542** (1.914) | 0.129 (1.062) | 0.309*** (3.862) |
| Tobin's Q (% of GDP) Exp. sign – | 0.019 (0.731) | -0.023* (-1.548) | 2.400 (0.137) | -0.029 (-0.369) | -0.019 (-1.330) | -0.020** (-1.949) |
| Private credit (% of GDP) Exp. sign – | -0.046 (-1.170) | -0.036* (-1.737) | … | … | -0.007 (-0.846) | -0.008 (-1.263) |
| US budget balance (% of country GDP) Exp. sign – | … | … | -0.036* (-1.426) | -0.038** (-2.102) | -0.112 (-1.184) | -0.042 (-0.668) |
| US long-term interest rate Exp. sign + | … | … | 1.302* (1.674) | 0.865* (1.524) | 0.188 (0.539) | 0.144 (0.621) |
| US oil imports[b] (in natural log) Exp. sign + (– for the US) | -0.048 (-1.209) | -0.016 (-0.794) | 0.186** (1.915) | 0.245*** (3.707) | 0.033 (1.301) | 0.050** (2.429) |
| Adj. R-squared | 0.94 | 0.99 | 0.58 | 0.81 | 0.36 | 0.70 |
| Observations | 16 | 15 | 16 | 15 | 16 | 15 |

Notes: The t-test is a one-sided t test, with the reported expected sign. In parenthesis are given the t-statistics. Coefficients significant at the 10% level are marked with *, those at the 5% level – with **, and those at the 1% level – with ***.

[a] For China no data was available on private credit.

[b] The coefficient for the oil imports reports the percentage points change in the current account/GDP ratio from a 1 percent increase in US oil imports.

It is the emerging Asian economy China that has been increasingly replacing Japan as the country with which the US has the largest bilateral trade deficit. This is reflected in all three pull factors being statistically significant and the most robust among all the variables. It is also worth noting that among all regional groups shown, US oil

imports have the largest influence for China's current account thus indicating that the majority of recycled petrodollars end up in China. However, what seems to make China really stand apart from the rest of the world is the strength exerted by public saving: a one percentage point increase in the government budget balance to GDP ratio improves the current account to GDP ratio by more than 1.5 percentage points. A way to interpret this finding is that there is correlation between public and corporate saving so that increases in public saving lead to more than one-to-one increase in the current account due to omitted variables bias. Indeed, Kujis (2005) argues that the high rate of retained earnings by enterprises is due largely to government policies of capital transfers. Thus, corporate saving is closely connected to the external financing of enterprises through public saving.

***Simulation Exercise***

In this subsection I conduct a simulation exercise of how the latest (from 2005) current account positions around the world would be affected by changes in the factors that pull global saving. The simulation is an increase of each pull factor by one standard deviation[4], where the standard deviation is computed over the time period 1990-2005. This specification is chosen in order to take account not only of the size of the point estimates of the regressions from the previous subsection, but also of the amount of variation of each factor over time. The latter is important as it shows us which factors fluctuate the most and in practice cause the most changes in the current accounts.

Table 5.8 shows that it is the quantity effect of the size of the US government budget balance that has the greatest potential to change the current pattern of global imbalances. It is interesting to note that this strongest pull factor is also the only variable

[4] Although the pull factor is US budget balance scaled by regional GDP the standard deviation is of the US balance scaled by US GDP in order to capture the deviation resulting only from US fiscal policy changes.

that is purely policy-driven. This suggests that the global imbalances are mostly driven by policy choices rather than structural factors. Moreover, the quantity effect is relatively stronger in all the developing regions NIE, Latin America and Africa, except for China, than it is in the advanced economies of the Euro Area. The other quantity effect – US oil imports – similarly appear to decrease with the development level of the region. Conversely, the 'price' effect of US long-term interest rates is stronger in the more developed groupings. These findings are consistent with the explanation that the developing world's saving is pulled toward the US because of the dollar's position as a reserve currency and not because of the better investment opportunities in the US.

**Table 5.8 Simulated Change in the Latest Global Current Account Positions**

| Rise of 1 standard deviation in: | Euro Area | NIE | Africa | Latin America | Oil Exporters | China | Japan |
|---|---|---|---|---|---|---|---|
| US govt. deficit | 2.456 | 6.647 | 2.812 | 3.042 | Not significant | 1.825 | Not significant |
| US interest rate | 1.181 | Not significant | 0.630 | Not significant | 1.155 | 0.778 | Not significant |
| US oil imports | 0.121 | 0.233 | 0.210 | 0.128 | 0.114 | 0.469 | 0.097 |

Notes: The current account effect is measured in percentage points' change of the current account to GDP ratio in 2005.

## VI. Conclusions

This paper has tried to investigate the factors that have been responsible for the pattern of current account balances around the world since the 1990s. Given the dominant position of the US as the world's largest economy and having the largest current account deficit in absolute terms, I have tried to answer the question whether factors in the US have pulled the savings of the rest of the world towards the US or factors abroad have pushed world's savings into the US.

The first general finding of this paper is that global current account developments cannot be explained by factors that are global in scope: the regions of Europe, Africa, Latin America, the Oil Exporters and the Asian Tigers are driven in a different degree and by different combinations of pull and push factors. Nevertheless, these divergent characteristics follow a clear pattern: the cleavages are along the lines of level of development: the current account determinants across the developing regions are closer in resemblance than the determinants between developed and developing regions. These findings suggest that the failure of existing theoretical models to explain the global pattern of imbalances has been due to their construction as encompassing theories. Instead what are needed are models with a scope that is regional rather than global or at least ones that aggregate only countries with similar level of development.

Turning now to the main question of push versus pull factors, it was discovered that there is a greater number of pull factors than push factors that are significant determinants. The only push factor that is significant and robust is public saving. This implies that the correction of the current account imbalances is to a large extent dependent on policy action around the world. A related finding is that such action will be especially effective in developing countries in which capital mobility is low and government budget deficits translate more fully into current account deficits.

Yet, the fiscal policy action that will be the most effective and indeed crucial for the rebalancing of the global current account positions is policy action in the US. It is US budget deficits that are pulling most of the global saving. The asymmetry in this pull effect's power and the push power of fiscal policy abroad accrues from the privileged position of the dollar as reserve currency and currency in which oil is transacted. This is a finding, however, which gives no clear prediction as to how easy it will be to correct the

global imbalances. It is optimistic to the extent that the imbalances are driven by policy decisions as opposed to by more fundamental and less malleable differentials in global returns to investment. Yet, what is pessimistic about the finding is that the existing policy choices will continue to appear the most attractive while the dollar keeps its dominance. Given that reserve currencies lose their position only very slowly and that serious challengers to the dollar have yet to emerge, the further exacerbation of the imbalances is likely to continue for some time. Therefore, the question of whether the US is pulling global saving has been the easier to answer. What remains unsolved is finding a way to correct the imbalances before they reach unsustainability and precipitously unravel.

## Data Appendix

This appendix gives the individual countries that make up the five regional groupings included in the sample. At the end, a table is provided with the exact definition and data sources for all the variables used in the regressions.

***Euro Area:*** Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, Netherlands, Portugal, Spain.

***NIE (Newly Industrialized Economies):*** Hong Kong, Korea, Singapore, Taiwan.

***Latin America*:** Argentina, Barbados, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Panama, Paraguay, Peru, Trinidad and Tobago, Uruguay.

***Africa*:** Botswana, Cote d'Ivoire, Ghana, Kenya, Morocco, Malawi, Mauritius, South Africa, Swaziland, Tanzania, Tunisia, Uganda, Zambia, Zimbabwe.

***Oil Exporters*:** Iran, Kuwait, Mexico, Nigeria, Norway, Russia, Saudi Arabia, Venezuela.

| Variable Definition | Source |
|---|---|
| CA: current account balance as a percentage of the country's GDP | International Monetary Fund (IMF) World Economic Outlook Database for September 2006 |
| GOVTBUDJ: general government balance as a percentage of the country's GDP | IMF World Economic Outlook Database for September 2006; African Development Bank dataset: 'Selected Statistics on African Countries 2006'; Asian Development Bank (ADB) dataset: 'Key Indicators 2006: Measuring Policy Effectiveness in Health and Education' |
| TOBQ: stock market capitalization as a percentage of the country's GDP | World Bank (WB) dataset: 'A New Database on Financial Development and Structure.' |
| PRIVCRED: private credit by deposit money banks and other financial institutions as a percentage of the country's GDP | WB dataset: 'A New Database on Financial Development and Structure.' |
| USBUDJ: US general government balance as a percentage of the given region or the country's GDP | IMF World Economic Outlook Database for September 2006 |
| USRATE: real US 10-year govt. bond yield | IMF International Financial Statistics database |
| USOIL: annual quantity of barrels of crude oil imported by the US | Online Database of the Energy Information Administration, Statistical Agency of the US Department of Energy |
| POIL: real annual price of crude oil (in $) | Online Database of the Energy Information Administration, Statistical Agency of the US Department of Energy |

## Appendix A

**Table A.1 Testing for Significant Time Periods. Annual Observations.**
(Dependent Variable: Current Account as Percentage of GDP)

| | NIE | Africa | Oil Exporters | Latin America | US | China | Japan |
|---|---|---|---|---|---|---|---|
| F-test statistic | 2.519 | 0.53 | 1.345 | 0.212 | 1.076 | 0.204 | 0.847 |
| P-value | 0.068 | 0.656 | 0.263 | 0.888 | 0.413 | 0.889 | 0.517 |

Notes: The F-statistic tests whether the time fixed effects model is better than the pooled OLS. P-values indicate the significance level at which we can reject the hypothesis that the pooled OLS is better.

**Table A.2 Time Fixed Effects Model for the Euro Area. Annual Observations**
(Dependent Variable: Current Account as Percentage of GDP)

| **Euro Area** | |
|---|---|
| Govt. budget balance (% of GDP)<br>Exp. sign + | -0.024<br>(-0.241) |
| Tobin's Q (% of GDP)<br>Exp. sign – | 5.928<br>(7.601) |
| Private credit (% of GDP)<br>Exp. sign – | -0.028***<br>(-3.404) |
| US budget balance (% of EU GDP)<br>Exp. sign – | -0.374***<br>(-2.314) |
| US long-term interest rate<br>Exp. sign + | 0.347<br>(0.480) |
| US oil imports (in natural log) [a]<br>Exp. sign + | 0.019<br>(0.245) |
| Significant time dummies | '94-'97** |
| F-test statistic | 6.855<br>[0.000] |
| Adjusted R-squared | 0.43 |
| Number of observations | 174 |

Notes: The t-test is a one-sided t test (except for the dummies), with the reported expected sign. In parenthesis are given the t-statistics. Coefficients significant at the 10% level are marked with *, those at the 5% level – with **, and those at the 1% level – with ***. The F-statistic tests whether the time fixed effects model is better than the pooled OLS. P-values in brackets indicate the significance level at which we can reject the hypothesis that the pooled OLS is better.

[a] The coefficient for the oil price reports the percentage points change in the current account/GDP ratio from a 1 percent increase in the price of oil.

**Table A.3 Price of Oil in the Medium Run. Cross-Section Fixed Effects**

(Dependent Variable: Current Account as Percentage of GDP)

| | Euro Area | NIE | Africa | Oil Exporters | Latin America |
|---|---|---|---|---|---|
| Govt. budget balance ( % of GDP) Exp. sign + | 0.045 (0.174) | -0.450 (-0.857) | 0.358** (1.793) | 0.562** (2.059) | 0.579*** (2.649) |
| Tobin's Q (% of GDP) Exp. sign – | 0.031 (1.431) | 0.001 (0.064) | 0.013 (0.136) | 3.038 (0.279) | -0.076*** (-3.160) |
| Private credit (% of GDP) Exp. sign – | -0.032** (-1.983) | 0.063 (1.544) | -0.101 (-1.157) | -0.172 (-1.058) | -0.160*** (-2.725) |
| US budget balance (% of regional GDP) Exp. sign – | -0.299** (-2.199) | 0.541 (0.188) | -0.195** (-1.857) | -0.379 (-0.846) | -0.976* (-1.529) |
| US long-term interest rate Exp. sign + | -1.065 (-1.675) | 0.625 (0.181) | -2.240 (-1.859) | 0.777 (0.855) | -2.372 (-1.546) |
| Real oil price [a] (in natural log) Exp. sign: importers + exporters – | -0.069** (-2.109) | 0.215 (0.203) | -0.123** (-1.852) | 0.048 (0.730) | -0.176* (-1.533) |
| F-test statistic | 4.270 [0.001] | 5.674 [0.034] | 4.487 [0.001] | 4.219 [0.009] | 2.651 [0.008] |
| Adj. R-squared | 0.75 | 0.78 | 0.67 | 0.82 | 0.41 |
| Observations | 46 | 16 | 46 | 29 | 59 |

Notes: The t-test is a one-sided t test, with the reported expected sign. In parenthesis are given the t-statistics. Coefficients significant at the 10% level are marked with *, those at the 5% level – with **, and those at the 1% level – with ***. The F-statistic tests whether the cross-section fixed effects model is better than the pooled OLS. P-values in brackets indicate the significance level at which we can reject the hypothesis that the pooled OLS is better.

[a] The coefficient for the oil price reports the percentage points change in the current account/GDP ratio from a 1 percent increase in the price of oil.

**Table A.4. Whole Sample Model Versus Separate Regional Models**

| | 4-year averages | Annual | Annual (lagged domestic factors) |
|---|---|---|---|
| F-test statistic | 6.9618 | 19.380 | 21.824 |
| P-value | 0.000 | 0.000 | 0.000 |

Notes: The F-statistic tests whether the separate regional models are a better fit for the data than the whole sample model. P-values indicate the significance level at which we can reject the hypothesis that the whole sample model is better.

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