The US Current Account Deficit: Smoothly Along the Adjustment Path*

Deficyt obrotów bieżących w USA: bezproblemowy proces korekty

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Abstract

Current global imbalances are a source of concern for most economic policy leaders and scholars. As important as explaining how the present situation arose, it is relevant to have a prospective view of what is to follow.

The aim of this work is to discuss adjustment and sustainability of the US Current Acount deficit and prospective impacts for the world. US Current Account deficit has reached new all time highs, so it seems interesting to assess its adjustment.

Based on recent literature and data, an argument for smooth adjustment is put forward. Firstly, theoretical foundations behind a potential smooth adjustment are presented; secondly, soft landing scenarios are tested using Cavallo and Tille (2006) model.

The main conclusion is that a soft landing of the dollar is possible. Most importantly, some factors normally unaccounted for might facilitate this smoother resolution.

Keywords: US Current Account imbalance, exchange rate adjustment, sustainable Net Investment Position

JEL: F31, F32, F41

Streszczenie

Obecne stany nierównowagi globalnej są źródłem zaniepokojenia większości przywódców gospodarczych i ekonomistów. Równie ważne jak wytłumaczenie przyczyn tej sytuacji staje się przedstawienie poglądu na temat tego, co nastąpi w przyszłości.

Celem artykułu jest omówienie procesu korekty i trwałości amerykańskiego deficytu obrotów bieżących oraz jego znaczenia dla świata. Deficyt ten osiągnął najwyższy poziom w historii, a więc wydaje się, że ocena tej korekty będzie interesująca.

Opierając się na literaturze tematu oraz danych, formułuje się tezę płynnym przebiegu korekty. Przedstawione zostały teoretyczne podstawy potencjalnej korekty o płynnym przebiegu. Za pomocą modelu Cavallo i Tille (2006) zbadano scenariusze miękkiego lądowania.

Najważniejszy wniosek brzmi: możliwe jest miękkie lądowanie dolara. Co ważniejsze, niektóre normalnie nieuwzględniane czynniki mogą ułatwić to łagodniejsze rozwiązanie.

Słowa kluczowe: nierównowaga obrotów bieżących w USA, korekta kursowa, trwała pozycja inwestycyjna netto

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1. Introduction

The US Current Account (CA) has been worsening since 1991, when it stood at a surplus of 0.7% of US GDP. CA deficit has now reached a forecasted 6.5% of GDP in 2006 and seems to be growing unstoppably. This surely would constitute a source of concern for policy makers in the US, but the question is what this implies for the rest of the world? Due to the fact that the US economy is one of the driving forces behind the world economic performance, surely the importance of the issue cannot be underestimated.

If the US is undergoing record deficits, then other countries must be doing just the opposite. Asian countries, namely China and Japan, and oil-exporting countries have been running growing surpluses. This particular fact has been called "The Problem of Global Imbalances" due to its unprecedented magnitude and reach. If the US CA deficit is to change then virtually all CAs in the World are to be impacted.

Classical Economics predicts a reversal of this CA deficit by means of adjusting several key variables in both the US and the rest of the World, most notably Exchange Rate adjustment. This is pivotal for world trade flows' development and its impact is swift and sometimes harsh, as many crises have shown. Some believe that the reversal of such pronounced imbalances will lead to severe financial crisis.

However, contradicting literature and recent empirical data seem to point to a soft landing of the world economy. The purpose of this work is to discuss adjustment and sustainability of CA imbalances in this context, rather than explain the forces behind their recent growth. A major question is whether there are factors that can facilitate this resolution.

The above mentioned topic is one of the most referred to in recent international Economics literature, particularly international monetary Economics. Its relevance and potential problems are addressed in Section 2. Afterwards, both sustainability and adjustment are discussed in light of the most recent contributions to literature on this subject and developments in empirical economic variables (Section 3). In Section 4, an argument for a potential adjustment path is put forward using a 3-region model based on the works of Cavallo, Tille (2006) and Ostfeld, Rogoff (2005). Finally, Section 5 presents some concluding remarks.

2. Why Does the US Current Account Matter?

We can look at the above mentioned American imbalance through three equivalent lenses. The most obvious is the one arising from the difference between Savings and Investment. The truth is that savings in the US have decreased considerably reaching 13% of GDP in 2005. This is the lowest value since 1929, except for the Great Depression years of 1931-1934. Some argue that the government's budget deficit is responsible for this situation (eg. Summers 2004). This twin deficit view has been growingly dismissed by reality: some countries that have widening CA surpluses are running greater budget deficits as a percentage of GDP than the US. And even recent US history has shown that in the late 90's, when there were budget surpluses, the CA deficit was widening rapidly. Thus, the Twin Deficit Theory explains only partially (at best) the growing US CA deficit (Erceg et al. 2005 estimate that a 1 US dollar reduction in US Federal Budget deficit would cause CA deficit to decline less than 0.20 US dollar).

On the other hand, investment is growing, both private and governmental. Notably, private investment is supported by a massive upsurge of residential investment (36% increase from 2000 to 2005), giving rise to a speculative bubble. This savings gap shows why the US has been running consistent CA deficits. Shows rather than explains, one might add.

Another way of looking at the CA is examining the trade balance. In fact we see that a large part of the CA deficit is due to large trade deficits (these accounted for more than 91% of CA deficit in 2001-2005). This fact has been referred to by many economists as being a main rationale explaining why in a situation where a reversal in the CA deficit is to occur, it should be led by a reversal in the trade balance (eg. Obstfeld, Rogoff 2005).

A third approach is to look at international cross holdings of financial assets and liabilities. By running increasing deficits, the US has accumulated sizeable liabilities and foreign investors have increased their claims on US property these require debt payment or dividend reimbursement, respectively.

According to the traditional intertemporal approach to the problem of running a CA deficit, the US would have to run surpluses in the future equal to the net liabilities now contracted (time discounted, of course). Most importantly, it should run trade surpluses, due to the importance of the trade balance for the CA. This is usually called the "Trade Adjustment Channel".

Based on this last view, some economists have predicted gloomy outcomes both for the US and the World (eg. Wolf's 2004 "Comfortable path to ruin"). Looking at the deficit figures, these economists argue that a rising debt will require even greater payments which in turn will add up to the principal amount. This vicious circle would lead to an even greater US dependence on foreigners. Roubini and Setser (2004) predicted a net debt of 50% of GDP or 500% of export revenues in 2008. Some claim that eventually it could even become desirable to impose a withholding tax on foreign earnings on US held assets to provide a disincentive to these inflows (Cline 2005).

The question is until which point foreign investors would be willing to accumulate claims on US assets

and debt. Certainly, they will, at the very least, require greater returns above a given threshold.

Moreover, interest rates might also rise due to a possible FED overshooting (to avoid inflationary pressures) or to increased lending restrictions tightening by domestic banks. The latter could be caused either by the fact that households are deemed insolvent or by the burst of the housing market bubble, which would lead to a steep reduction in collateral value.

An interest rate's hike would trigger a recession, or at least a strong slowdown in the US economy. Consequently, foreign investors would lower their expectations of returns on their asset (and debt) holdings denominated in dollars, making them less valuable and thus less appealing. The dollar would have a strong downward pressure, triggering a chained-self-fulfilling reaction that would further lead to a strong depreciation of the US currency. Stock exchanges and other asset trading markets would crash, first in the US, spreading fast across the world. A deep recession would be the aftermath, especially in countries that have accumulated large CA surpluses and, thus, large US dollar holdings (as Mann (2005) reminds us).

Along the way, the US would loose both its international credit and the dollar would cease to play the role of global reserve of value, as Wolf 2004 argues. This is indeed gloomy enough.

How could this be prevented? These economists generally answer this question by emphasizing the Trade Adjustment Channel, following Krugman's (1985; 1991) views in the 80's. If US trade deficit is reversed (through massive US dollar depreciation), the CA could come to balance. Even if this could be done, it would imply major disruptions in the US dollar value, and consequently in financial markets. The world appears to be facing a dead-end.

If this is so, why aren't investors worried, why do they keep on accumulating US assets? Are they short sighted or irrational?

There may be a more obvious explanation behind what is happening.

3. A Review of Sustainability and Adjustment

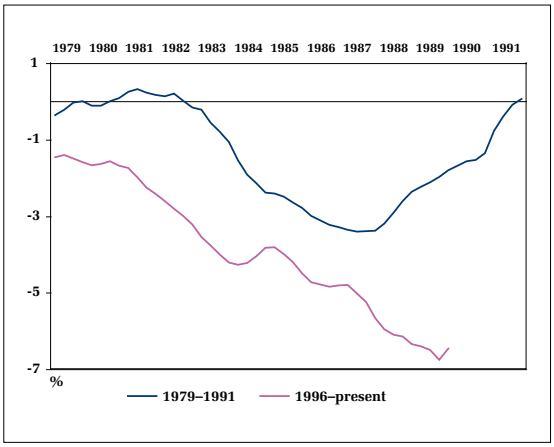
Advocates of the presented "Armageddon-like" view base themselves on the last consistent period when US CA was in deficit, i.e. in the 80's. Starting from 1979, CA deficit rose until it reached around 3.5% of GDP in 1987. Then it started a reversal process that led to the already mentioned surplus in 1991. This adjustment was based on a significant dollar depreciation (approximately 40%) and a resulting rebalancing of the trade balance (trade deficit in 1991 was a fifth of the 1987 deficit).

In Figure 1, quarterly CA data from this period is plotted against the one we observe nowadays and Figure 2 presents trade-weighted US dollar exchange rate in both periods. These graphs are displayed such that the US dollar peak in 1985:1 is aligned with its peak in 2002:1.

As can be seen, there are several differences between both periods. First and foremost, CA deficit is considerably higher nowadays. Secondly, the volatility of the US dollar in the 80s is apparently higher than currently. Thirdly, reversal on the US dollar appreciation in both periods has had very different effects. In 1985, it paved the way for CA reversal, whereas nowadays we haven't seen a consistent beginning to CA reversal even though the trade-weighted US dollar has been falling since 2002 (almost 27% until 2007:1). According to economic theory (and practice), this reversal, although lagged, should occur approximately 2 years after the dollar started depreciating (see Baily, Lawrence (2006) for deeper analysis). There is something fundamentally different now from what was true in the 80s.

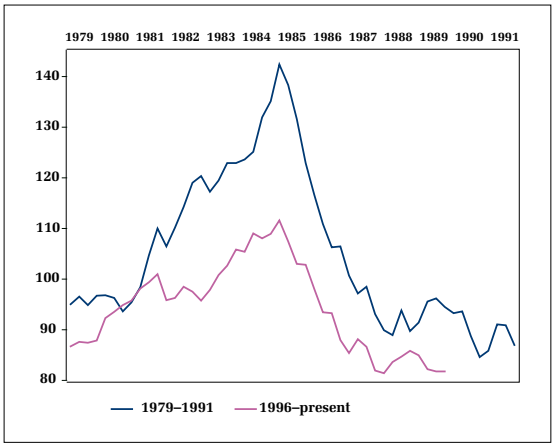
This significant difference is "Global Financial Integration" as Greenspan has stressed in many of his

Figure 1. *US Current Account in % of GDP*



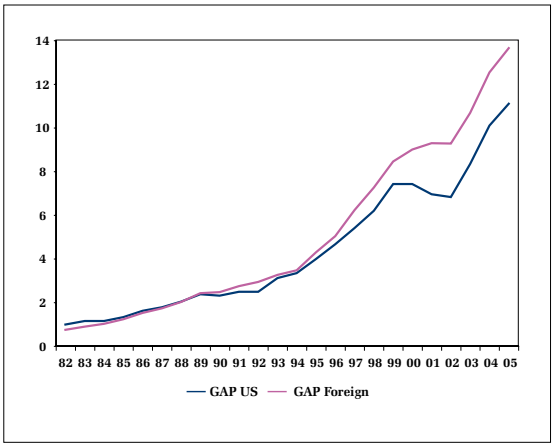
Source: BEA.

Figure 2. *Trade-weighted US dollar exchange rate against major currencies*



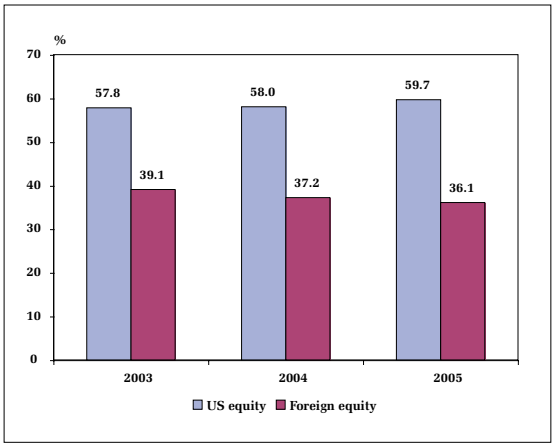
Source: Board of Governors of the Federal Reserve System.

Figure 3. *Gross Cross Asset Positions (US residents and foreigners in the US, in trillions of US dollar)*



Source: BEA.

Figure 4. *Equity and FDI weight in US residents' GAP abroad and foreign residents' American GAP*



Source: BEA.

speeches since 2004 (eg. Greenspan 2005). Fig. 3 shows the spectacular increase in gross assets held by the US abroad and gross assets held by foreigners in the US.

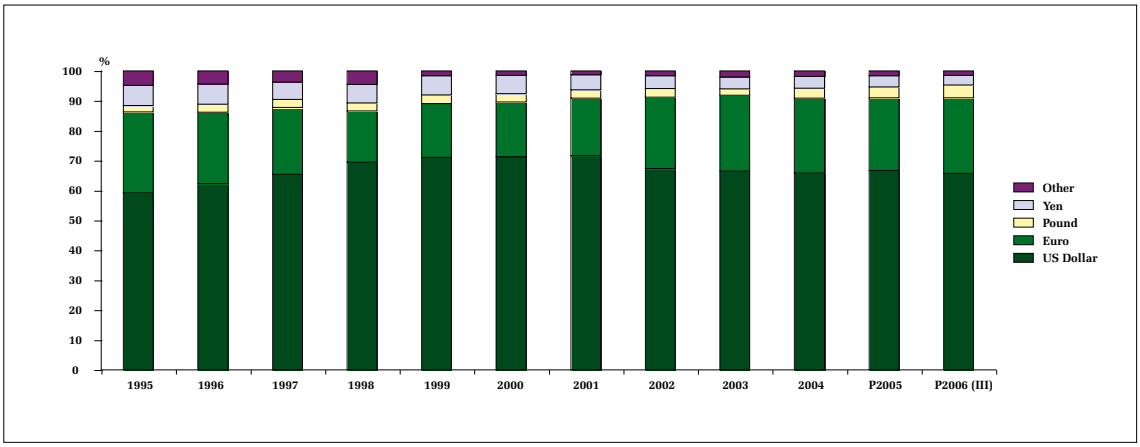
In turn, a new, faster pathway for adjustment has been created. An adjustment through financial markets, whereby investors' preferences on the composition of international portfolio holdings are extremely relevant for CA determination. Investors have shown a clear preference for US assets. Caballero 2006 (p. 7) states that US could attract funds since it has "an unmatched ability to generate sound and liquid financial assets appealing to global investors and savers". This theory is further elaborated in Caballero et al. (2006) where current global imbalances are primarily explained through the fundamentals of asset creation.

Most emerging countries have been increasing their savings, what was addressed by Bernanke (2005) as a "global saving glut". These countries have liquidity but lack financial market developments for domestic investment since the Asian and Latin American crisis of the 90s. Therefore, according to this view, American financial markets are safe havens, deep and reliable, "to whom" foreigners can entrust their hard earned savings (following views expressed by former US Treasury Secretary Paul O'Neill). Backus et al. (2005), and Engel, Rogers (2006) agree and argue that Americans are simply borrowing foreigners' savings because they believe that the US will account for a greater share of world output and consumption.

Interestingly enough, the majority of what these foreign investors have been buying is not high return assets, but rather bonds and currency (Figure 4). Why?

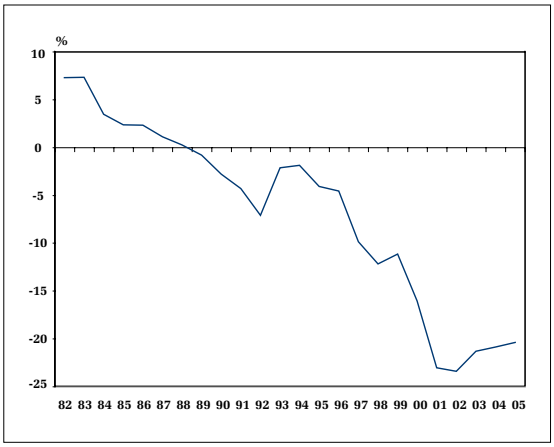
The US dollar maintains its status as the global reserve currency as shown in Figure 5. Moreover, some countries that run large surpluses have pegged or semi-pegged their currencies to the dollar. To prevent

Figure 5. *Currency composition of central banks' reserves (world)*



Source: FMI.

Figure 6. *Net International Investment Position of the US*



Source: BEA.

currency appreciation, central banks have to buy dollar assets, either currency or T-bills. This is the reason why the share of low return dollar assets in foreign portfolios has been increasing (Figure 5). This dependency path is the basis for Dooley et al. (2004)' Bretton Woods II Theory.

On the other hand, most of US foreign investment is either in equity or FDI (Figure 4). These are riskier than bonds or other securities. Ergo, the US is receiving a risk premium on its investments. Gourinchas and Rey (2005) estimate the differential between returns on American held assets and its liabilities at an astonishing 3.4%. They sustain that the US is the "Venture Capitalist of the World, issuing short term and fixed income liabilities and investing primarily in equity and direct investment abroad". Ventura (2001) agrees that CA deficit can be sustainable as a means of leveraging American investment with cheap foreign debt.

Even if one believes that this premium will end (as some do), there is another underlying factor that might help reverting the CA deficit, another privilege of sorts. The US borrows almost entirely in its own currency. However, its foreign assets are mostly denominated in foreign currency (around 2/3). When the US dollar depreciates, there is a transfer of wealth to the US as its payments on liabilities remain constant whereas returns on US held assets are higher in US dollar terms. This is the so called "Financial Adjustment Channel" or "Valuation Effect". US foreign assets are more valuable any time the US dollar depreciates, unlike other nations which have a strong dependency on US dollar assets in their investment portfolios.

Therefore, this second effect may attenuate the need for a strong US dollar depreciation (Gourinchas and Rey (2005) estimate that 31% of US adjustment could be achieved through valuation effects). Moreover, this adjustment is quicker than classical Trade Channel and has been amplified over time with the increase of gross asset and liability positions (Lane, Milesi-Ferretti 2006).

Thus, increased financial integration creates a lower need for adjustment. In fact, looking at US Net Investment Position in Figure 6, we see that it has been roughly stable since 2001 (even improving slightly as a percentage of GDP), indicating that valuation effects have been sufficient to counter for the growing CA deficit in a context of mild dollar depreciation and deeper trade deficits.

Combining all this together, and following IMF's view that the "issue is not whether but how and when they (global imbalances) adjust" (IMF 2006, p. 28), an argument for smooth adjustment is presented in Section 3.

4. An Argument for Smooth Adjustment

In this Section, three alternative scenarios of adjustment are presented. These have been calculated based on a model proposed by Cavallo and Tille (2006) of a 3-Region World: US (U), Europe (E) and Asia (A), which is in turn based on Ostfeld and Rogoff (2005). Each region has a currency, US dollar for the US, euro for Europe and yen for Asia. Regions are interlinked by trade and financial flows and produce a traded and a non traded good. Traded goods of different regions do not respect the law of one price between each other because they are imperfect substitutes; however, the same traded good has the same price independently of its location. Most calibrations and building blocks are well explained in both papers so the reader should resort to them for details not covered here.

There are clearly two major blocks. Firstly, all regional markets need to be in equilibrium in each year, so that trade flows, CAs and exchange rates are all interlinked. The Current Account of each region is defined by,

$$CA^i = NI^i + P_i Y_T^i - P_T^i C_T^i, \quad i = U, E, A$$

which is nothing less than payments on Net Investment Position (NI^i) and the Trade Balance ($P_i Y_T^i - P_T^i C_T^i$, where $P_i Y_T^i$ is tradable output and $P_T^i C_T^i$ is tradable consumption in region i). We also know that $-CA^U - CA^E = CA^A$ and $-NI^U - NI^E = NI^A$. In this model, output is exogenous and is divided between tradable (Y_T^i) and non tradable (Y_N^i). Cavallo and Tille derive a set of market equilibrium conditions to find 5 basic variables. All equations are normalized to US tradable output, so lower case n^i and c^i are just payments on Net Investment Position (NI^i) and Current Account (CA^i) divided by $P_U Y_T^U$. NI^i are calculated based on asset and liabilities' positions at the end of the previous period. CA^i are calculated so that Net Investment Positions in absolute terms are unchanged.

This will be further explained later. Equations 1–8 are presented and thoroughly explained in Cavallo, Tille (2006, Appendix).

First, the tradable good's market in US (1), Europe (2) and Asia (3) have to be in equilibrium:

$$1=\frac{\alpha(1+n^U-c^U)}{\alpha+(\beta-\alpha)\pi_U^{E1-\eta}+(1-\beta)\pi_U^{A1-\eta}}+\frac{(\beta-\alpha)(\frac{\tau_U^E}{\sigma_E^U}+n^E-c^E)}{\beta-\alpha+\alpha\tau_U^{E1-\eta}+(1-\beta)\pi_U^{A1-\eta}}+(...) \quad (1)$$

$$(...)+\frac{(1-\delta)(\frac{\tau_U^A}{\sigma_A^U}-n^U-n^E+c^U+c^E)}{1-\delta+(1-\delta)\pi_U^{E1-\eta}+2\delta\tau_U^{A1-\eta}}$$

$$1=\frac{\sigma_E^U}{\tau_U^E}[\frac{(\beta-\alpha)\pi_U^{E1-\eta}(1+n^U-c^U)}{\alpha+(\beta-\alpha)\pi_U^{E1-\eta}+(1-\beta)\pi_U^{A1-\eta}}+\frac{(1-\delta)\pi_U^{E1-\eta}(\frac{\tau_U^A}{\sigma_A^U}-n^U-n^E+c^U+c^E)}{1-\delta+(1-\delta)\pi_U^{E1-\eta}+2\delta\tau_U^{A1-\eta}}+(...) \quad (2)$$

$$(...)+\frac{\alpha\tau_U^{E1-\eta}(\frac{\tau_U^E}{\sigma_E^U}+n^E-c^E)}{\beta-\alpha+\alpha\tau_U^{E1-\eta}+(1-\beta)\pi_U^{A1-\eta}}]$$

$$1=\frac{\sigma_A^U}{\tau_U^A}[\frac{(1-\beta)\pi_U^{A1-\eta}(1+n^U-c^U)}{\alpha+(\beta-\alpha)\pi_U^{E1-\eta}+(1-\beta)\pi_U^{A1-\eta}}+\frac{(1-\beta)\pi_U^{A1-\eta}(\frac{\tau_U^E}{\sigma_E^U}+n^E-c^E)}{\beta-\alpha+\alpha\tau_U^{E1-\eta}+(1-\beta)\pi_U^{A1-\eta}}+(...) \quad (3)$$

$$(...)+\frac{2\delta\tau_U^{A1-\eta}(\frac{\tau_U^A}{\sigma_A^U}-n^U-n^E+c^U+c^E)}{1-\delta+(1-\delta)\pi_U^{E1-\eta}+2\delta\tau_U^{A1-\eta}}]$$

where τ_U^E is the price of European relative to US tradables, τ_U^A is the price of Asian relative to US tradables and, finally, τ_E^A is the price of Asian relative to European tradables, such that $\tau_U^E=\frac{P_E}{P_U}, \tau_U^A=\frac{P_A}{P_U}, \tau_E^A=\frac{P_A}{P_E}=\frac{\tau_U^A}{\tau_U^E}$. These two terms of trade (because the third can be written in terms of the previous two) are key variables in the determination of exchange rates in each period. $\sigma_E^U=\frac{Y_T^U}{Y_T^E}$, $\sigma_A^U=\frac{Y_T^U}{Y_T^A}$, $\sigma_E^A=\frac{Y_T^A}{Y_T^E}$ are simply the ratios of tradable output between regions. α, β and δ represent relative shares of consumption. By assumption, US and Europe are symmetric, having a domestic share of consumption of α, a share (1- β) of consumption of Asian tradable good and, finally, a share of (β – α) of each other's consumption so that it all adds to unity. As for Asia, it has a domestic share of consumption of δ, and the remaining is divided evenly between US and Europe. Home biasness in preferences for traded goods is assumed, and thus α = 0.7, β = 0.8 and δ = 0.7 (all ≥ 0.5). η is the elasticity of substitution of consumption between traded goods produced in the 3 regions. Therefore, it basically measures the degree of substitution imperfectness between them. The higher the η, the more perfectly substitutable the traded goods.

After calculating the terms of trade (τ_j^i), for which one of the above equations is redundant, we can compute relative non traded goods' prices through the equilibrium of each non tradable good's market:

$$\sigma_N^U = \frac{1-\gamma}{\gamma}(N^U)^{-\theta}[\alpha+(\beta-\alpha)\pi_U^{E1-\eta}+(1-\beta)\pi_U^{A1-\eta}]^{\frac{1}{1-\eta}}(1+n^U-c^U) \quad (4)$$

$$\sigma_N^E = \frac{1-\gamma}{\gamma}(N^E)^{-\theta}[\alpha+(\beta-\alpha)\pi_U^{E-(1-\eta)}+ \\ +(1-\beta)\pi_U^{A1-\eta}\tau_U^{E-(1-\eta)}]^{\frac{1}{1-\eta}}[1+\frac{\sigma_E^U}{\tau_U^E}(n^E-c^E)] \quad (5)$$

$$\sigma_N^A = \frac{1-\gamma}{\gamma}(N^A)^{-\theta}[\delta+\frac{1-\delta}{2}\tau_U^{A-(1-\eta)}(1+\tau_U^{E1-\eta})]^{\frac{1}{1-\eta}} \\ [1+\frac{\sigma_A^U}{\tau_U^A}(-n^U-n^E+c^U+c^E)] \quad (6)$$

such that relative prices of non traded goods vs. tradable goods in each country are given by:

$$N^U=\frac{P_N^U}{P_T^U},\ N^E=\frac{P_N^E}{P_T^E},\ N^A=\frac{P_N^A}{P_T^A}.$$

γ is the share of consumption of traded goods and θ is the elasticity of substitution between traded and non traded goods. The relationship between domestic tradable and non tradable output is:

$$\sigma_N^U=\frac{Y_N^U}{Y_T^U},\quad \sigma_N^E=\frac{Y_N^E}{Y_T^E},\quad \sigma_N^A=\frac{Y_N^A}{Y_T^A}.$$

Both papers that build on this model assume that central banks stabilize each domestic overall price index in domestic currency (CPI targeting). This makes real and nominal exchange rate movements equivalent. Throughout this discussion, exchange rate movements are nominal if not stated otherwise.

Therefore, nominal exchange rates are defined as a function of the five variables estimated before.

$$E_U^E = [\frac{\gamma+(1-\gamma)(N^U)^{1-\theta}[\alpha+(\beta-\alpha)(\tau_U^E)^{1-\eta}+(1-\beta)(\tau_U^A)^{1-\eta}]^{\frac{1-\theta}{1-\eta}}}{\gamma(\tau_U^E)^{1-\theta}+(1-\gamma)(N^E)^{1-\theta}[(\beta-\alpha)+\alpha(\tau_U^E)^{1-\eta}+(1-\beta)(\tau_U^A)^{1-\eta}]^{\frac{1-\theta}{1-\eta}}}]^{\frac{1}{1-\theta}} \quad (7)$$

$$E_U^A = [\frac{\gamma+(1-\gamma)(N^U)^{1-\theta}[\alpha+(\beta-\alpha)(\tau_U^E)^{1-\eta}+(1-\beta)(\tau_U^A)^{1-\eta}]^{\frac{1-\theta}{1-\eta}}}{\gamma(\tau_U^A)^{1-\theta}+(1-\gamma)(N^A)^{1-\theta}[\frac{(1-\delta)}{2}+\frac{(1-\delta)}{2}(\tau_U^E)^{1-\eta}+\delta(\tau_U^A)^{1-\eta}]^{\frac{1-\theta}{1-\eta}}}]^{\frac{1}{1-\theta}} \quad (8)$$

Cavallo and Tille introduce a fundamental innovation to the work of Ostfeld and Rogoff by allowing a dynamic adjustment along several periods, which constitutes a second building block. This is done by calculating each country's portfolio of assets and liabilities at the end of each period. Afterwards, it is possible to recalculate interest received/paid on the Net Investment Position (NI^i) which in turn serves as input for the following year's equilibrium. In addition, valuation effects depend not only on exchange rate movements but also on the change of cross financial holdings. Most of the aspects discussed in the previous sections are included in this model:

1) Calculating regional financial balance sheets at the end of each period allows the estimation of valuation effects and returns on assets and liabilities (NI^i);

2) US pays a lower interest for its liabilities compared to its returns on asset holdings ($r^W > r^U$);

3) Initial positions are set so that US CA is in deficit and Europe and Asia have positive CAs (1/4 of US CA for Europe and 3/4 for Asia);

4) US dollar will have to fall relative to both European and Asian currencies so that its CA approaches 0.

Table 1. *Parameter values as in Cavallo and Tille and under growth differential scenario*

Definition	Symbol	Benchmark	Growth differential
Elasticity of substitution			
– between tradable and non tradable	θ	1	
– among tradable goods	η	2	
Weights in consumption baskets (tradable vs. total)	α	0.7	
	β	0.8	
	δ	0.7	
	γ	0.25	
Ratio of US to Asian tradable output	σ_A^U	1	
Ratio of US to European tradable output	σ_E^U	1	growing at 0.98% p.y.
Ratio of non tradable vs. tradable endowments	σ_N^i	3	
Interest rate on high return bonds	r^W	0.05	
Interest rate on low return bonds	r^U	0.0375	
Initial CA relative to US tradable output	c^U	-0.2	
	c^E	0.05	

Source: Cavallo, Tille (2006) and own calculations

I use Cavallo and Tille's base scenario as my own benchmark, keeping Net Investment Positions in absolute terms constant in each period. A new scenario is created by changing the definition of sustainability. Finally, in the third scenario, it is assumed that output growth is uneven with US and Asia growing more than Europe.

Cavallo and Tille also create two alternative scenarios for their (and now mine) benchmark. Firstly, they net out gross financial flows so that there is no asset and liabilities balance sheet update throughout the adjustment period (and consequently asset and liabilities positions are unchanged from their initial level). This fixes returns on initial positions. In a second extension of their baseline, they eliminate US privilege of paying less for its own liabilities. Both scenarios go in the same direction, so as to increase the need for dollar adjustment, especially in this latter case.

It would be interesting to assess the opposite direction. My hypothesis is that by relaxing the sustainability requirement and introducing growth differentials, the need for dollar adjustment might be attenuated and, thus, a smoother resolution of global imbalances is possible. The three scenarios are presented in the following subsections. In order to attain best comparability, all assumptions made by Cavallo and Tille are kept. Only in the alternative scenarios are different assumptions made and thus only these will be thoroughly explained here. Table 1 summarizes assumptions used to perform the necessary calculations.

4.1. Benchmark

In this scenario (referred to as "Benchmark" in Figures 7–15), Net Investment Positions in absolute terms are held constant in each period. This allows for a delay of CA balancing (contrary to the one-off scenario of Ostfeld and Rogoff). In the steady state, all CAs are balanced and no further change of key variables (mainly exchange rate) occurs. In Figures 7–9, each region's CA is plotted. One can observe that only in 3 periods, US CA deficit is undercut by more than a half from its starting point. Both European and Asian CAs are reduced accordingly. The fact that Asia has a greater initial CA than Europe makes the Asian currency bear the greatest rise against the dollar (bilateral exchange rate movements are presented in Figures 10–12). Trade-weighted US dollar depreciation in the first period is 8.6% and 6.3% in the second; these constitute the largest single year US dollar depreciations. Stemming from the construction of the model, and because exchange rate adjustment follows CA adjustment, initial periods' exchange rate movements are greater when US CA deficit has to be reduced by a greater amount. Consequently, valuation effects are decreasing with time, by definition. These allow for slower adjustment in trade flows. Trade-weighted exchange rate adjustment is presented in Figures 13–15. These values might differ slightly from Cavallo and Tille's results due to approximations.

As this benchmark scenario is well explained in Cavallo and Tille, it will not be explained further, and we should proceed directly to the extension scenarios.

4.2. Sustainability revisited

In the baseline scenario created by Cavallo and Tille and recreated here, US Net Investment Position (NIP) decreases to -90% of US tradable output at period 10 from

its initial value of -100%. This is due to the rise in US tradable output price, P_U. One cannot avoid considering that it is more sustainable to have a lower relative NIP, so that -90% is more manageable than -100% of a country's exports. Therefore, fixing absolute NIP is possibly too strict to allow for a sustainable position. Furthermore, a country might run a CA deficit but have a stable relative Net Investment Position if its economy is growing (as Roubini and Setser (2004) or Blanchard et al. (2005) point out). This last effect is not considered because output endowments are fixed (whereas prices are not!).

Therefore, one might ask what the result would be if the relative Net Position is constant rather than the Net Position being expressed in absolute terms. It is possible to make a back-of-the-envelope demonstration to illustrate the impact of changing the definition of sustainability.

The absolute Net Investment Position at the end of year t is:

$$NP_t = TB_t + A_{t-1}(1+\delta+\Delta V) - L_{t-1}(1+r) \qquad (9)$$

where TB_t is current year's Trade Balance A_{t-1} and L_{t-1} are Asset and Liabilities' positions at the beginning of t. Assets yield a yearly dividend δ and a capital valuation ΔV, both in % of asset base. This ΔV is a combination of revaluation in the same currency of denomination (v) and revaluation of assets in foreign currency translated into US dollars due to a nominal US dollar depreciation (if $\Delta E > 0$ then the US dollar has lost nominal value). Only a share α of US assets is denominated in foreign currency, thus total % valuation is $\Delta V = v + \alpha\,\Delta E$. Liabilities pay an interest of r %.

We also know that (t–1)'s absolute Net Investment Position is simply $NP_{t-1} = A_{t-1} - L_{t-1}$ Current Account in t is $TB_t + A_{t-1}\,\delta - L_{t-1}\,r$ (since valuation gains/losses are not financial flows, they do not enter the CA).

Output endowments are not growing (as in Cavallo and Tille, $Y_t = Y_{t-1}$). It is irrelevant for this discussion if normalizing output is merely tradable or total. General prices are rising (π is positive). Thus, $P_t = (1+\pi)\,P_{t-1}$.

Normalizing all variables (expressed in small caps) by output:

$$np_t = \frac{NP_t}{P_t Y_t},\ np_{t-1} = \frac{NP_{t-1}}{P_{t-1}Y_{t-1}},\ a_{t-1} = \frac{A_{t-1}}{P_{t-1}Y_{t-1}},\ ca_t = \frac{CA_t}{P_t Y_t} \qquad (10)$$

Thus, substituting (10) into (9), we get:

$$(1+\pi)np_t - np_{t-1} = (1+\pi)ca_t + a_{t-1}(v+\alpha\Delta E) \qquad (11)$$

If we assume that relative NIP is unchanged, $np_t = np_{t-1} = -0.2$. Then for

$\pi = 3\%,\ a_{t-1} = 89\%, v = 3\%,\ \alpha = 0.6,\ ca_t = -6.5\%$, we get

$\Delta E = 6.4\%$

Therefore, in order to maintain (t–1)'s Net Investment Position in (t), and to counter for a CA deficit of 6.5% in t, the dollar would need to depreciate 6.4% throughout t. Also, it is assumed that ca_t doesn't depend on the depreciation of the US dollar in t (ΔE), an implicit lagged effect, which might be acceptable.

Comparing this result with the one using Cavallo and Tille's assumption that NIP is unchanged in absolute terms ($NP_t - NP_{t-1} = 0$), equation (11) is modified to:

$$0 = (1+\pi)ca_t + a_{t-1}(v+\alpha\Delta E^*)$$

Now, CA (in absolute terms) is equal to valuation effects, whereas in (11) (assuming constant relative Net Position), CA equals the valuation effects plus a constant (in % of GDP). Therefore the implied depreciation should be higher under Cavallo and Tille's assumption (or $\Delta E^* > \Delta E$). Using the same values as before,

$\Delta E^* = 7.5\%$.

Values used are irrelevant for this demonstration as long as one keeps them for both hypotheses (although used values are approximations for the US in $t = 2006$). The important conclusion is that under the second case ΔE is higher.

Returning to the model, the benchmark scenario needs to be adjusted to allow for this new assumption. Now, US CA deficit does not equal valuation effects in each period. Benchmark values for the US CA relative to US tradable output are taken as given. In order for the initial relative NIP to stay unchanged at -100% of US tradable output throughout the whole timeframe, relative valuation effects must be equal to $-ca_t^U - \frac{\pi^U}{1+\pi^U}$ which is smaller than just $-ca_t^U$ (since $-ca_t^U$ and π_U are both positive). Note that π^U is determined by the market clearing equations because these define P_U in each period and π^U is the growth of P_U in each year. After computing the new valuation effects, exchange rate movements can be re-estimated, keeping the same weight each currency had for the total initial valuation effect in the benchmark scenario. These should be less pronounced compared to the initial benchmark, since valuation effects are proportional to exchange rate movements. As for Europe, one can observe that relative NIP were already unchanged from one period to the following in the benchmark (since it is equivalent to say $NP_t = NP_{t-1} = 0$ or $np_t - np_{t-1} = 0$). Therefore, in Europe's case Cavallo and Tille's hypothesis is held $-ca_t^E = valuation\ effects_t$. This should result in lower relative European CA, due to the fact that exchange rate movements will not be as large as before. In turn, Asia should have a higher relative CA, since US CA is the same but Europe's CA is lower. This is just the opposite argument for the US since Asia has a positive relative NIP of 100% US tradable output.

4.2.1. Results

This scenario is presented graphically under the name "Fixed relative NP". The largest single year depreciation is 7.3%, from the previous 8.6%. Trade-weighted US dollar depreciation after 10 periods is now much smaller at 29.1% vs. 35.4% in the benchmark (trade-weighted

exchange rate movements are plotted in Figures 13-15). This really indicates that, despite the unchanged weight of US NIP on its tradable output, the US dollar depreciates by 17.8% less. Logically, both the euro and especially the yen, appreciate less under this scenario.

As was to be expected, Asian CA relative to US tradable output is somewhat higher than in the benchmark (relative US CA is taken as given from the benchmark scenario by assumption). In Europe's case, CA is now considerably lower than in the benchmark, as a direct consequence of the fact that exchange rate movements are less pronounced within this framework. As the differential of exchange rate movements between this scenario and the benchmark decreases, the difference between European CA in both scenarios will be narrower. Thus, in the initial periods Europe is running a lower CA, but this will later converge to the benchmark's CA (in period 10 they are already virtually the same).

Trade patterns are somewhat shifted since now the euro, on one hand, is not depreciating as much against the yen as it was before and, on the other hand, it is appreciating less against the dollar. Therefore, European trade position with Asia is somewhat deteriorated counterbalancing the amelioration relative to the US.

4.3. Growth differential

This third scenario is an attempt to test the impact of different output growth rates across regions. The pivotal assumption is that there is a region that is growing less than the others, and that this region is not the US. Intuition would indicate that lower regional growth would attenuate US dollar depreciation against the currency of that region. Europe is chosen to be this lower growth region because it better suits the facts, but the same could be done for Asia.

Here, a problem arose: if output endowments in each region are growing (while Europe is growing at a slower pace), how could one distinguish the numerator effect (CA^i change) from a denominator effect (simple Y_T^U growth)? We know, however, that output ratios $\sigma_E^U = \frac{Y_T^U}{Y_T^E}$ and $\sigma_E^A = \frac{Y_T^A}{Y_T^E}$ must be larger than unity (an assumption made by Cavallo and Tille). But this can be achieved by making both Y_T^U and Y_T^A grow more than Y_T^E or simply keeping the first two unchanged and making European output decrease.

This is assumed to avoid result distortion due to an increase in the common normalizing denominator Y_T^U. A different question follows: the level at which σ_E^U and σ_E^A should be set (σ_A^U is unchanged since both economies are growing at same pace). To compute these, one can do a simple exercise: if both US and Asia were growing at 3% p.a. and Europe was growing 1 p.p. less, what would σ_E^U and σ_E^A be? One easily gets $\sigma_E^U = \sigma_E^A = 1.098$ for period 1. After fixing US and Asian output and making Europe diverge, this results in a yearly negative European growth of 0.97%. This is then taken as given throughout the considered period. As a consequence of assuming a steady European divergence, σ_E^U and σ_E^A will grow over time. These start off in period 1 at 1.098 (as explained) and rise to 1.1024 in period 10. Thus, in each period the new σ_E^U and σ_E^A are plugged in the market equilibrium conditions (1)–(6), allowing computation of new CA relative to US tradable output and implied exchange rate movements.

4.3.1. Results

As expected, this new extension "Growth differential" also creates a lower need for exchange rate movements, although not as significant as in "Fixed relative NP". The total trade-weighted dollar depreciation (over 10 periods) is only 2% lower than in the benchmark. Trade-weighted European currency starts off by appreciating (thus having a negative sign) as was the case in the benchmark, but after period 5 it looses value (the U-curve in Figure 14). This happens because, although the euro appreciates against the US dollar, it depreciates vs. the yen. This second effect dominates at later periods. Consequently, the yen is appreciating fractionally more under this new scenario (19.3% for the 10 periods against 19% in the benchmark).

In the US, CA relative to tradable US output is closing to 0 slightly more rapidly. Despite the fact that Asia is now in a less favorable position relative to Europe (total euro depreciation against yen is 8.4% vs. 7.5%), the yen does not appreciate as much against the dollar. Due to the fact that US is a more important trade partner of Asia, Asian CA is virtually the same as in the benchmark case. European CA is consistently lower than in the benchmark, converging more swiftly to 0. This is partially explained by the decrease of European output, which also creates lesser CA values in absolute terms (an effect exacerbated by the consistent US tradable output increase relative to European output).

4.4. A Feasible smoother adjustment

The construction of the described scenarios is only a demonstration of possible contexts for a smoother (than sometimes expected) adjustment. Table 2 summarizes the findings under each set of hypotheses and figures 7–15, referred to above are presented below.

The largest single year trade-weighted dollar depreciation is between 8.6% (Benchmark scenario) and 7.3% (Fixed relative NP). This is relatively smooth and feasible compared to recent values. From 2002 to 2006, the total trade-weighted dollar depreciation (against major currencies) was 26.1% which represents an average yearly depreciation of 7.3%. The largest single year depreciation was 15% in 2003. This was not disruptive for financial markets and is clearly above the estimated values given by the model in the 3 settings.

Table 2. *Results for the 3 Scenarios explained in Section 4 (%)*

Variable	Benchmark	Fixed relative NP	Growth differential
US dollar depreciation vs. euro	29.3	24.2	28.1
US dollar depreciation vs. yen	39.0	32.1	38.9
euro depreciation vs. yen	7.5	6.3	8.4
Trade weighted US dollar	35.4	29.1	34.7
Trade weighted euro	-3.7	-3.1	-2.8
Trade weighted yen	-19.0	-16.2	-19.3
NP as % of US tradable output ($P_U Y_T^U$)	-90.0	-100.0	-90.0

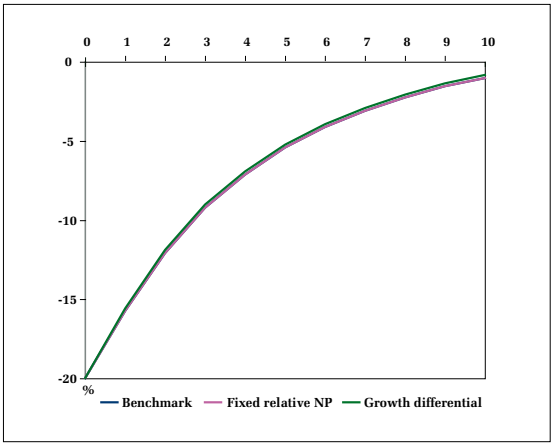
Presented values are for period 10.

Source: own calculations

These results point to a smoother adjustment of global imbalances comparing to other approaches taken in the literature. However, comparisons can be misleading since assumptions and constructed models vary significantly. Thus, these results can be best compared to the ones obtained by Cavallo and Tille (2006) (since the exact same build-up is used) and Ostfeld and Rogoff's (2005), and more remotely to Blanchard et al. (2005). These three indicate greater US dollar movements. Cavallo and Tille's results range from the lower bound presented here under the benchmark scenario and a maximum of 41.4% trade-weighted US dollar depreciation (a variation of around 17% over the benchmark and 42% over the smoothest presented scenario, "Fixed relative Net Investment Position"). Cavallo and Tille introduce minor changes to Obstefeld and Rogoff's model and re-estimate a trade-weighted US dollar depreciation of 38.4% under the assumptions used by the latter authors (this is inside the upper bound result of Cavallo and Tille). Blanchard et al. (2005) use quite a different setting and mention bounds (p. 30 and p. 23) for the needed trade-weighted US dollar depreciation of 34-56%. These indicate that Blanchard et al. tend to support the "harder landing" side of the argument, despite mentioning that the upper bound assumes an abrupt adjustment (dismissed promptly by these authors).

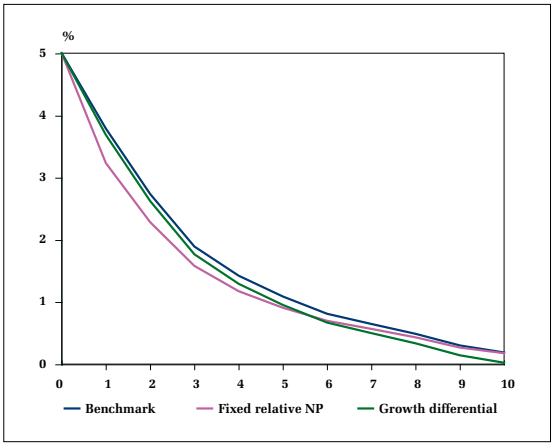
The main set back that is present in the model is the assumption that currencies are fully flexible. While this is certainly the case for the euro, major Asian currencies have been rather inflexible against the US dollar. Moreover, in this model (as well as in other settings like Blanchard et al. (2005)) the adjustment path depends on strong Asian currency appreciation since it is this region that runs the highest CA surpluses. By pegging to the dollar, Asian central banks assume a greater role of maintaining output growth and promoting employment. This might be an important issue, because the euro (and other flexible

Figure 7. *US Current Account relative to US tradable output*



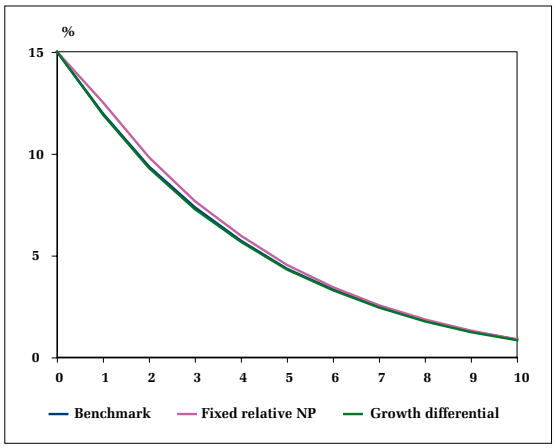
Source: own calculations

Figure 8. *European CA relative to US tradable output*



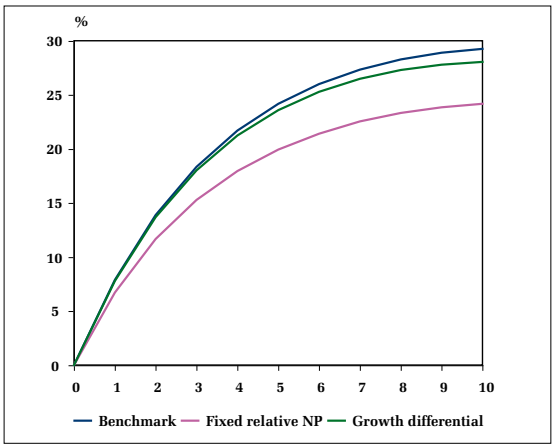
Source: own calculations

Figure 9. *Asian CA relative to US tradable output*



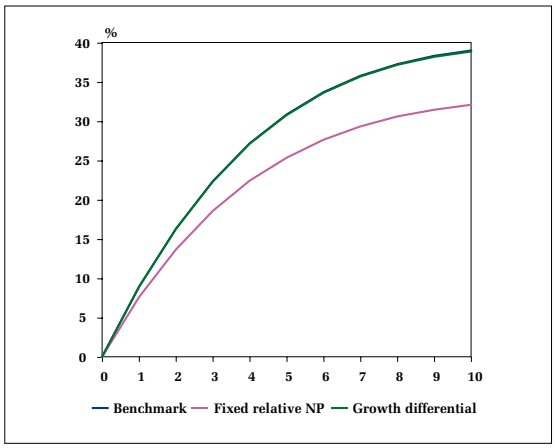
Source: own calculations

Figure 10. *Depreciation of the US dollar vs. euro*



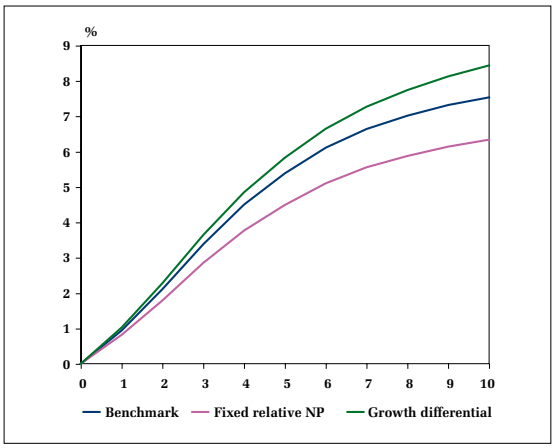
Source: own calculations

Figure 11. *Depreciation of the US dollar vs. yen*



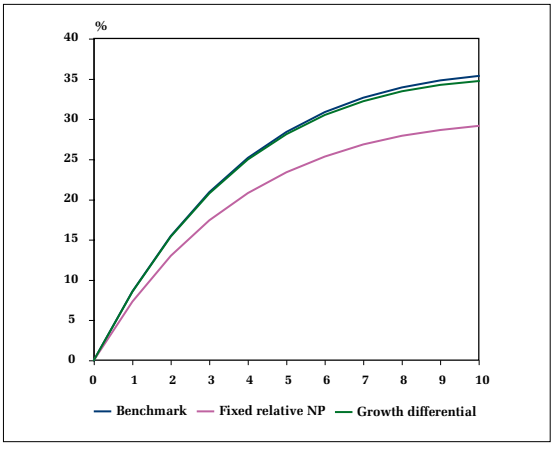
Source: own calculations

Figure 12. *Depreciation of the euro vs. yen*



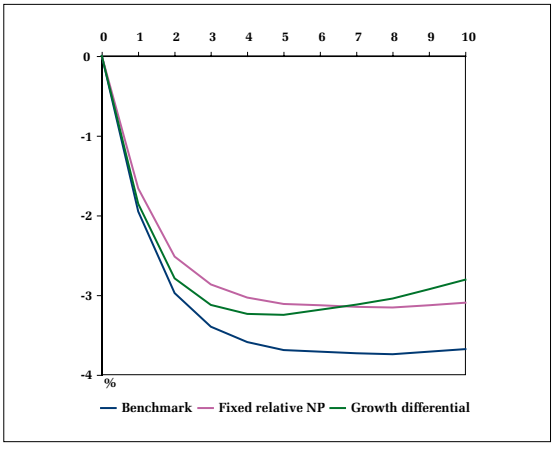
Source: own calculations

Figure 13. *Trade-weighted depreciation of the US dollar*



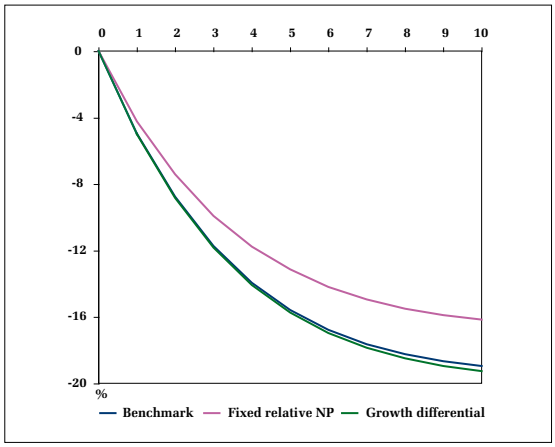
Source: own calculations

Figure 14. *Trade-weighted depreciation of the euro*



Source: own calculations

Figure 15. *Trade-weighted depreciation of the yen*



Source: own calculations

currencies like the sterling pound) might be forced to absorb the majority of the adjustment. If this is to happen, while still maintaining trade-weighted US dollar depreciation as a whole, European and other developed country's currencies will rise dramatically placing huge strains on their exporting sectors.

Therefore, another important liberalization debate can be anticipated. If developed countries do not enhance competitive conditions in their economies or convince developing countries to share the burden of adjustment, a new wave of protectionism is likely to arise, one that may have harmful effects for the world economy, as some gloomier views presented in Section 2 would indicate.

Finally, saying that the dollar will not adjust strongly doesn't necessarily imply that all countries will experience a soft landing. It may well be that the US, starting from a privileged point, will manage the adjustment easily whereas some emerging countries may experience sudden stops (as Calvo and Talvi (2006) conjecture).

5. Concluding Remarks

Paramount for this article is the discussion of possible smoother avenues for adjustment. Empirically, we can observe that the "soft landing side" of the argument has been right. The US dollar is indeed gradually loosing value, in spite of rising US CA deficit (though recently at a much lower pace). One reassurance is that the Financial Adjustment Channel will continue to increase its importance through further accumulation of cross country asset and liabilities. It will continue to take the spotlight away from the trade adjustment channel and progressively decrease exchange rate adjustment requirement.

The modest contribution that is put forward here indicates that some important factors (mentioned in the literature but not quantified) might support a smoother landing of the US dollar in the context of US CA Deficit adjustment. Namely, the consequences of nominal output growth (pivotal for the stressed emphasis on relative Net Investment Position vs. absolute Net Investment Position) and possible output growth differential paths. These two factors have been assessed and it has been shown that they can further contribute (especially the first one) to a smooth resolution of US CA imbalance.

One key factor, that has not been discussed, is policy intervention. It was mentioned above that most Asian, oil exporting and other developing countries' central banks (or other public institutions) have considerable US dollar or T-bill holdings. These actors can play a pivotal role in providing a soft landing for the imbalances by diversifying very gradually away from the US dollar, increasing domestic currency adjustment flexibility and progressively lifting capital movement restrictions.

The scenarios presented in Section 3 assume that exchange rates are flexible, which is certainly not true for major Asian currencies (eg. renminbi and yen). If central banks insist on pegging mechanisms, Europe and other countries with more flexible regimes will bear the burden (as Ostfeld and Rogoff (2005) show). This could sparkle a "tsunami" of protectionist measures that would bring severe hardships for the global economy. On the one hand, European politicians might be tempted to cap euro appreciation *vis à vis* the dollar to protect exporting firms, on the other, Japan and China, whose currencies are undervalued, will not be too keen on seeing their currencies appreciate given that their current growth is very much export-led. This is the sort of conundrum the world might face.

Gradual adjustment demands responsible action. Greater (exchange rate) flexibility in developing countries, increased savings in the US (both private and public), reforming lagging economies in the world (mainly Europe and Japan) and creating investment options outside the US (following Caballero's views) are only some of the challenges that lie ahead. Discussion of these issues would require additional insight, clearly outside the purpose of this work.

One thing is certain, future landing can be soft, but requires careful navigation.

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