Exchange Rates and Global Rebalancing*

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1 Introduction

Everyone agrees that global rebalancing is needed. They just don't agree on what it entails. American commentators talk about the need for increases in consumption spending in Asia without equal emphasis on the need for more saving in the United States. Asian commentators emphasize the need to raise saving in the U.S. without acknowledging that it needs to be accompanied by an increase in spending in other regions in order to avoid a shortfall in global demand. Some point to the need for the United States to produce additional traded goods without acknowledging that this implies the need for other regions to produce less of the same, absent a significant change in relative prices. Some commentators insist that exchange rate changes are central to the adjustment process, while others insist that they are peripheral. This inability to agree does not exactly enhance the regard with which practitioners of the dismal science are held in the policy community.

Confusion and disagreement frequently stem from the fact that the problem is inadequately specified. In some cases the question is posed as: what would be the impact on global imbalances of an increase in China's exchange rate without at the same specifying what other variables are to be taken as endogenous if the exchange rate is treated as exogenously set. In other cases the question posed is: how would the exchange rate have to adjust to accommodate a change in the level of spending? In some cases the formulation distinguishes inadequately between spending on Chinese- and U.S.-produced goods. In others it distinguishes inadequately between changes in spending on traded and nontraded goods. The substitutability of U.S.- and foreign-produced traded goods and of traded and nontraded goods produced within the U.S. is not specified. With the question underspecified, the answer is underspecified: it fails to distinguish between equilibrating changes in the real exchange rate (relative overall price levels in the two economies) and the single factoral terms of trade (the relative price, exchange rate adjusted, of traded goods produced in the two countries).

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Then there is disagreement stemming from confusion over which countries and regions are involved in this rebalancing process. Are we talking about the United States and China, where the Chinese economy is only 30 per cent the size of the U.S. economy – a fact that may have important implications for the changes in relative prices that would have to accompany, say, an exogenously-specified increase in U.S. savings rates?[1] Are we talking about a process of rebalancing where the U.S. is on one side and all of Asia is on the other – in which case the size imbalance is considerably less? Or are we talking about rebalancing between the U.S. and the rest of the world, in which case the U.S. is the smaller economy by a considerable margin?

Finally, there is confusion over the circumstances in which different categories of countries can contribute to the process of global rebalancing. The empirical literature has focused on adjustment by deficit countries. It asks: under what circumstances have such countries been able to eliminate large and persistent current account deficits? This literature has identified a useful set of stylized facts about the circumstances under which adjustment has occurred. But this emphasis fails to acknowledge that the coin has two sides. It is equally important to ask: under what circumstances have countries with large and persistent current account surpluses been able to eliminate these successfully? What with large surpluses heavily concentrated in emerging markets and petroleum-producing countries, it is further important to ask: are the circumstances in which these countries have succeeded in eliminating large current account surpluses different from those of advanced countries and non-oil exporters finding themselves in this position? It may be unwarranted to assume that findings about the characteristics of countries that have succeeded in eliminating large deficits carry over, up to a sign change, to countries that have eliminated large surpluses. It may be similarly reckless to simply assume that findings that apply to advanced countries and non-oil exporters mechanically carry over to emerging markets and oil exporters.

In this paper we seek to clarify these questions. In its first part we use the simplest model capable of shedding light on the exchange-rate and terms-of-trade implications of various rebalancing scenarios, the Obstfeld-Rogoff two-country endowment model (Obstfeld and Rogoff 2007). In this model each country possesses an endowment (produces a fixed quantity) of traded and notraded goods that are imperfect substitutes in consumption.[2] Given an assumption about the level of spending in both countries, it is possible to solve for the relative prices (the real exchange rate and terms of trade) that clear markets. And this makes it possible, in turn, to solve for the changes in relative prices (the exchange rate and terms of trade changes) needed to clear markets when levels of spending change.

[1] The comparison is at market exchange rates, which is presumably what is relevant for an experiment in which relative prices adjustments eliminate initial imbalances in markets for traded goods.

[2] We add more precision to this statement below.

This is the question, in our view, that is most central to global rebalancing and to the role of the exchange rate in that process. Starting from a situation where the U.S. is in current account deficit and the rest of the world is in surplus, what is the effect on the real exchange rate and other relative prices of, inter alia, an increase in U.S. savings owing to a financial crisis that vaporizes households' retirement accounts ? What is the effect of an increase in Chinese spending owing to financial reforms that eliminate households' credit constraints and to the development of a social safety net that reduces the need for precautionary saving?

This initial analysis simply replicates the findings of the Obstfeld-Rogoff study. But we then apply the same model to further questions. How dramatically do relative price effects differ when it is only China, or all of Asia, or the entire rest of the world minus China on the other side of the U.S. rebalancing process? What difference does it make when the increase in spending in China falls mainly on traded or nontraded goods? How is the relative-price and adjustment impact affected when the increase in spending in China takes the form of investment in infrastructure and capacity that can then be used to produce traded or nontraded goods?

In the second part of the paper we turn to the circumstances under which countries have eliminated persistent current account surpluses. We start with a review of the literature on the elimination of large deficits. We then apply similar methods to constructing a sample of cases where large surpluses were eliminated. We compare the results with those in the mirror-image (large deficit) cases. And we contrast the findings for advanced countries with those for emerging markets and oil exporters.

We argue that this is an important extension of the earlier literature focusing on circumstances under which large deficits are eliminated. When the deficit country is small, the circumstances under which its external imbalance is eliminated can reasonably be considered in isolation. But when that country is large, there also has to be significant adjustment on the surplus side. In this case analyzing the circumstances in which large deficits are eliminated makes little sense without also analyzing the circumstances under which large surpluses are eliminated. The previous literature having addressed the first question, we add evidence on the second. Putting the pieces together, we are then able to say something about the likelihood that we will now see a sustained reduction in global imbalances.

2 Overview of global imbalances

The debate over global imbalances is of long standing, reflecting the persistence of those imbalances themselves. Figure 1, following Blanchard and Milesi-Ferretti (2009), summarizes their evolution, expressing the imbalances of different regions as shares of global GDP. The figure highlights two facts. First, the United States accounts for the largest share of global current

account deficits; any explanation for imbalances and their evolution will have to account for its behavior. 2009 was the first time in years when the U.S. did not account for the majority of the world's deficits, the question of course being whether its deficit share is likely to expand again as the U.S. and global economies recover.

Second, while China is prominent on the surplus side, it is not alone. In most years the contribution of oil exporters and Surplus-Europe countries like Germany is even greater, and in some years (early in the period) China's contribution is matched by those of Other Emerging Asia and Japan. Only in 2009 was the global surplus heavily a Chinese surplus. While any explanation for global imbalances clearly will have to reckon with the behavior of China, an analysis limited to the bilateral U.S.-China imbalance will not adequately capture the problem.

Some years ago one of us (Eichengreen 2006) published an article distinguishing several classes of explanations for global imbalances. The first of these was the "new economy" or "relative profitability" interpretation emphasizing the contrast between the rapid productivity growth associated with the rollout of new information and communications technologies in the United States and slower growth and lower profitability in crisis-ridden Other East Asia and Japan. This plausibly accounts for some widening of global imbalances in the late 1990s but less so after the Tech Bubble burst and Other East Asia recovered from its crisis.

The second explanation, the "standard analysis," focused on declining U.S. saving and corresponding increases in saving in Asia (Governor Bernanke's global savings glut).[3] The initial decline in U.S. savings was ascribed mainly to growing government dissaving following the Bush tax cut of 2001 (Figure 2). After 2004 the focus shifted to household dissaving associated with the boom in asset prices, home prices in particular (Figure 3). On the surplus side, different explanations applied to different economies. The oil exporters ran large net surpluses in the period of strong global growth and high energy prices around mid-decade. High internal and external savings in Surplus Europe reflected policies of restraint (restraint of wages and of the impulse to consume).[4] In Other Emerging Asia, net external savings reflected stagnant investment more than surging saving.[5] High saving in China was a function of high growth.[6] It was a function of the strong demand for precautionary saving in the presence of capital market imperfections and absence of a well-developed social-safety net. It was a function of lack of pressure on profitable state-owned enterprises to pay out dividends.

[3] Bernanke (2005).

[4] This can be understood as reflecting the absence of a housing boom in countries like Germany and that only a small fraction of the population holds a significant share of their savings in the form of stocks; hence the effects of the asset boom were less.

[5] A thorough analysis is Asian Development Bank (2009).

[6] This is understood in terms of the predictions of the life-cycle model: with younger generations saving out of higher current incomes and older generations dissaving out of lower former incomes, national saving will be high in fast growing economies. See Modigliani and Cao (2004).

The third class of explanation focused on the characteristics of international assets and liabilities. The "dark matter" or "exorbitant privilege" views emphasized the tendency for the United States to earn a higher return on its external assets than it paid on its liabilities, enabling it to run current account deficits without increasing its net indebtedness to the rest of the world. One interpretation of this differential was that U.S. investors were savvier. A more plausible variant was that they had greater risk tolerance: they were willing to hold relatively risky foreign direct investments, while foreigners preferred relatively safe U.S. debt securities. Gourinchas and Rey (2007) documented the existence of this rate-of-return differential and established the linkage with the composition of external assets and liabilities. Caballero (2010) is an influential statement of the view that the demand in emerging markets for relatively safe debt securities, which the U.S. has a comparative advantage in producing, could rationalize the existence not just of rate-of-return differentials but also of growing imbalances, as larger and more rapidly growing emerging markets sought to import additional safe assets from the United States.

While these three interpretations are different, there is no necessary incompatibility among them, in general and insofar as they apply to different periods and economies in particular.

Each class of explanation can shed some light on what is likely to happen next. The "new economy" view does not predict the rapid reemergence of global imbalances insofar as the post-crisis U.S. economy is unlikely to be characterized by high levels of investment.[7] The "standard analysis" points to the importance of higher U.S. savings rates which, recent research suggests, will continue to run in the mid single digits.[8] It points similarly to the likelihood that Chinese household savings will begin to decline with better public provision of health care and a more effective social safety net generally.[9] But it also suggests that adjustment in China will remain slow insofar as household savings are inertial and there is still little pressure on Chinese enterprises to reduce their retained earnings.[10] Finally, to the extent that the United States is no longer viewed as a reliable supplier of safe assets, emerging markets wishing to accumulate them may now turn to other sources, which will mean less foreign finance for U.S. current account deficits.

[7]Rapid productivity growth there has of course been in recent quarters, but there is reason to think this was a one-off event, as firms laid off their least productive workers and closed down their least efficient plant. The difficulty of structural change, the likelihood of a credit-less recovery, and the growing debt overhang are all reasons to worry that U.S. investment rates will lag (Goldman Sachs 2010).

[8]This according to Carroll and Slacalek (2009), Lee, Rabanal, and Sandri (2010) and Mody and Ohnsorge (2010).

[9]Barnett and Brooks (2010) find that one additional yuan of government spending on health care produces a two yuan increase in consumption spending; in contrast, they find little impact on consumption of increases in education spending.

[10]It is on these grounds that the IMF projects the reemergence of large surpluses in China by 2012 (Blanchard and Milesi-Ferretti 2009). The decline in household savings rates in China will presumably accelerate after 2015 with the rapid rise in old-age dependency ratios, but this is still far in the future from the perspective of policy analysis.

Note that this analysis has been presented entirely without reference to the exchange rate. Indeed, how exchange rates (shown in Figure 4) fit into this story is not entirely clear. It is to this issue that we now turn.

3 Implications of various rebalancing scenarios

3.1 Obstfeld-Rogoff model

In this subsection we describe Obstfeld-Rogoff model. We describe first the structure of preferences, then the equilibrium conditions, and finally the parameter values used for simulation. We then show the impact on exchange rates (real exchange rates and the terms of trade) of eliminating the imbalance between the U.S. and the rest of the world.

The model here is Obstfeld-Rogoff's two-country model with exogenous endowments. It assumes that prices are flexible and the law of one price holds for individual tradable goods. There is home consumption bias within tradable goods which may be different between countries. This is captured by the parameters α and α^*. Countries may also assign different preference weights to tradable goods relative to nontradable goods. This is captured by the two parameters γ and γ^*. The values of θ and η correspond to (constant) elasticities of substitution between tradable and nontradable goods and domestically-produced and imported tradables, respectively.
The Home consumption index is expressed in the nested form

$$C = \left[\gamma^{\frac{1}{\theta}} C_T^{\frac{\theta-1}{\theta}} + (1-\gamma)^{\frac{1}{\theta}} C_N^{\frac{\theta-1}{\theta}}\right]^{\frac{\theta}{\theta-1}} \tag{1}$$

and the Home consumer price index (CPI) corresponding to the preceding Home consumption index C is

$$P = \left[\gamma P_T^{1-\theta} + (1-\gamma) P_N^{1-\theta}\right]^{\frac{1}{1-\theta}} \tag{2}$$

with tradables and nontradables consumption given by

$$C_T = \left(\frac{P}{P_T}\right)^{\theta} \gamma\, C \tag{3}$$

$$C_N = \left(\frac{P}{P_N}\right)^{\theta} (1-\gamma)\, C \tag{4}$$

Similarly, tradables consumption index C_T is expressed as

$$C_T = \left[\alpha^{\frac{1}{\eta}} C_H^{\frac{\eta-1}{\eta}} + (1-\alpha)^{\frac{1}{\eta}} C_F^{\frac{\eta-1}{\eta}}\right]^{\frac{\eta}{\eta-1}} \tag{5}$$

and the price index for tradables given by

$$P_T = \left[\alpha P_H^{1-\eta} + (1-\alpha) P_F^{1-\eta}\right]^{\frac{1}{1-\eta}} \tag{6}$$

with Home and Foreign tradables consumption

$$C_H = \left(\frac{P_T}{P_H}\right)^{\eta} \alpha \; C_T \tag{7}$$

$$C_F = \left(\frac{P_T}{P_F}\right)^{\eta} (1-\alpha) \; C_T \tag{8}$$

In Foreign there are isomorphic indices but with the parameters α^* and γ^*.

The terms of trade, τ, and the real exchange rate, q, are[11]

$$\tau = \frac{P_F}{P_H} = \frac{P_F^*}{P_H^*} \qquad q = \frac{\varepsilon P^*}{P}$$

Even though the law of one price holds for individual tradable goods, purchasing power parity does not hold for the differing preferred baskets of tradable goods in each country. This means that $P_T \neq \varepsilon P_T^*$, where ε is the nominal exchange rate.

Given this structure, market-clearing conditions for the Home produced good H, the Foreign tradable good F, Home nontradables N and Foreign nontradables N^* are

$$Y_H = C_H + C_H^* \quad \Leftrightarrow$$

$$Y_H = \alpha \left(\frac{P_H}{P_T}\right)^{-\eta} \underbrace{\gamma \left(\frac{P_T}{P}\right)^{-\theta} C}_{C_T} + (1-\alpha^*) \left(\frac{P_H/\varepsilon}{P_T^*}\right)^{-\eta} \underbrace{\gamma^* \left(\frac{P_T^*}{P^*}\right)^{-\theta} C^*}_{C_T^*} \tag{9}$$

$$Y_F = C_F + C_F^* \quad \Leftrightarrow$$

$$Y_F = (1-\alpha)\gamma \left(\frac{P_F}{P_T}\right)^{-\eta} \left(\frac{P_T}{P}\right)^{-\theta} C + \alpha^* \gamma^* \left(\frac{P_F/\varepsilon}{P_T^*}\right)^{-\eta} \left(\frac{P_T^*}{P^*}\right)^{-\theta} C^* \tag{10}$$

$$Y_N = C_N \quad \Leftrightarrow \quad Y_N = (1-\gamma) \left(\frac{P_N}{P}\right)^{-\theta} C \tag{11}$$

$$Y_N^* = C_N^* \quad \Leftrightarrow \quad Y_N^* = (1-\gamma^*) \left(\frac{P_N^*}{P^*}\right)^{-\theta} C^* \tag{12}$$

[11] Discussion here is in terms of the real exchange rate, this being a real rather than a monetary model. Readers preferring to think in terms of the nominal rate can assume that central banks in each country target a stable price level.

Finally, the current account is

$$\text{Home:} \qquad CA = P_H Y_H + iF - P_T C_T \tag{13}$$

$$\text{Foreign:} \qquad \varepsilon CA^* = P_F Y_F - iF - P_T C_T^* = -CA \tag{14}$$

where F is Home net foreign assets and i is the interest rate, in Home-currency units, and the real exchange rate is

$$q = \underbrace{\frac{\left[\alpha^* \tau^{1-\eta} + (1-\alpha^*)\right]^{\frac{1}{1-\eta}}}{\left[\alpha + (1-\alpha)\tau^{1-\eta}\right]^{\frac{1}{1-\eta}}}}_{\frac{\varepsilon P_T^*}{P_T}} \times \frac{\left[\gamma^* + (1-\gamma^*)(P_N^*/P_T^*)^{1-\theta}\right]^{\frac{1}{1-\theta}}}{\left[\gamma + (1-\gamma)(P_N/P_T)^{1-\theta}\right]^{\frac{1}{1-\theta}}} \tag{15}$$

In our calibration we initially adopted Obstfeld and Rogoff's (2007) parameter values. We set the dollar value of tradable goods output to GDP at $\frac{P_H Y_H}{P_H Y_H + P_N Y_N} \approx 0.25$. Assuming that U.S. current external deficit is about 5% of GDP, this implies a current account deficit-to-tradables ratio of $ca = \frac{CA}{P_H Y_H} = -0.05/0.25 = -0.2$. We set net U.S. foreign assets over the dollar value of traded goods output at $f = \frac{F}{P_H Y_H} = 0.8$, and the nominal interest rate at $i = 0.05$ per year. We also set $Y_N/Y_H = Y_{N^*}/Y_F = 1$, $\eta = 2, \theta = 1, \gamma = \gamma^* = 0.25, \alpha = 0.7$ and $\alpha^* = 0.925$. Under the assumption that $\sigma_T = Y_H/Y_F = 0.22$, the U.S. accounts for 21% of the world economy.

We assume a decline in U.S. spending and an increase abroad sufficient to eliminate the U.S. deficit. Suppose, for example, that a financial crisis depresses the value of U.S. households' retirement accounts and that financial reforms eliminate credit constraints in China. Eliminating the imbalance would cause the dollar to depreciate by 32.3%. On the one hand, there will be a shift in global demand away from the U.S. which causes a relative drop in demand for U.S.-produced tradable goods. This is because U.S. citizens are assumed to have a relatively strong preference for U.S.-produced tradables. The U.S. terms of trade will fall by 15.76%. On the other hand, because eliminating the U.S. current account deficit implies a 20% fall in demand for traded goods, there needs to be a fall in the relative price of nontraded goods in the United States. In parallel with the effect in the U.S. there will also be a rise in the price of nontraded goods abroad. Given the large share of nontradables in the CPI, this magnifies the overall real exchange rate response beyond terms of trade changes.

Changing the two elasticity parameters θ and η has important effects in the adjustment. Higher elasticities of substitution between tradable and nontradable goods and domestically-produced and imported tradables lead to a smaller impact on the terms of trade and the real exchange rate.

3.2 Participation in global rebalancing

In this second subsection we explore alternative assumptions about what countries participate, along with the United States, in the process of global rebalancing. Our benchmark assumption was that all countries participate, both the U.S., which is 21 percent of the world economy, and the rest of the world. Here we ask how much difference it makes if China does not participate – if it prevents its imports and exports from moving. Removing China from the picture, the rest of the world is now smaller relative to the United States. The U.S. is 21% of the world, while we take China as 7% of the world. Hence the relative economic size of the U.S. is now approximately 23%. Accordingly, we assume that $\sigma_T = Y_H/Y_F = 0.2579$ instead of 0.22.[12] For different combinations of the two elasticity parameters, Table 1 shows how the impact on exchange rates (the terms of trade and the real exchange rate) of eliminating the imbalance between the U.S. and the rest of the world varies with different U.S. sizes. Since U.S. citizens have a relatively strong preference for Home goods, the fall in the terms of trade increases with the size of the U.S relative to the world economy. Furthermore, the larger the relative size of the U.S. the larger the initial current account surplus in the rest of the world. For example, a U.S. current account deficit of 5% of GDP corresponds to a current account surplus in the rest of the world of $\frac{CA^*}{GDP^*} = -\frac{CA}{GDP} \times \frac{P_H Y_H}{P_F Y_F} = -(-0.05 * 0.2579/0.8843) = 1.46\%$ when the U.S. is 23% of the world economy and of $\frac{CA^*}{GDP^*} = -(-0.05 * 6.71/2.2357) = 15\%$ when the U.S. is 75%. Adjustment abroad causes the rise in the relative price of foreign nontraded goods, in parallel to the fall in the relative price of domestic nontraded goods, which magnifies the effect on the real exchange rate. Therefore, if China does not participate in eliminating the imbalances, there will have to be a larger dollar depreciation.

Alternatively, we explore the cases where the U.S. is on one side of the rebalancing process and either all of Asia or only China is on the other. In the first case all non-Asian countries prevent any movement in their imports and exports from occurring, while in the second all of Asia except China joins the non-Asian group by excluding itself from the process of rebalancing. Since the U.S. is one and a half times the economic size of Asia and three times the economic size of China on its own, its share in the collective output is 0.5 and 0.75, respectively.

It follows that the impact on the terms of trade and the real exchange rate would be much bigger. For example, when only the U.S. and China participate in the rebalancing, the dollar depreciation is above 69% for any reasonable combination of the two elasticity parameters.

The conclusion is that it matters greatly how many countries are on the other side of the U.S. current account adjustment. If there is only one, China, the real exchange effects are extremely large. All of Asia and they are smaller. The rest of the world minus China and they are even smaller. The entire rest of the world including China and they are smaller still.

[12] See Appendix A for details.

Table 1: Rebalancing with different participants

Countries involved	**Size of the U.S.**	θ	η	**Fall in TOT** $\Delta\tau$	**Real depreciation** Δq
U.S. and the rest of the world	0.21	1	2	15.76	32.30
		1	3	9.44	26.37
		2	2	15.76	19.09
		2	3	9.44	14.37
		0.5	2	15.76	64.36
U.S. plus the rest of the world minus China	0.23	1	2	16.65	33.58
		1	3	10.09	27.47
		2	2	16.65	20.06
		2	3	10.09	15.14
		0.5	2	16.65	66.41
U.S. and all Asia	0.5	1	2	30.87	57.83
		1	3	20.91	52.26
		2	2	30.87	36.69
		2	3	20.91	30.45
		0.5	2	30.87	108.97
U.S. and China	0.75	1	2	51.34	115.66
		1	3	37.57	143.47
		2	2	51.34	69.96
		2	3	37.57	78.27
		0.5	2	51.34	225.18

3.3 Sectoral productivity shocks

In this third subsection we return to our benchmark model where the U.S. accounts for 21% of the world economy and explore the effects of productivity shocks in the rest of the world. First, we look at an increase in foreign production of tradable goods (think of this as the additional infrastructure investment undertaken by China in 2008-9 as increasing the supply of exportable goods). We also explore the effect of assuming an increase in foreign capacity to produce non-tradable goods. The real exchange rate changes needed to accommodate these different patterns of increased output are, not surprisingly, very different.

The real exchange rate response is determined by changes in both the terms of trade and in the relative prices of domestic and foreign nontradable goods (see equation 15). Given the large share of nontradable goods in the CPI, changes in the relative prices of nontradable goods have a higher weight in the determination of the overall exchange rate response than do changes in the terms of trade.

An increase in foreign production of tradable goods causes the relative prices of both domestic tradable goods and foreign nontradable goods to rise. The former relative price change corresponds to an improvement in the U.S. terms of trade, and the combination of both causes the dollar to depreciate. When the increase in foreign production is concentrated in the nontradable goods sector there is no change in the terms of trade. Nevertheless, the drop in the relative price of foreign nontradable goods causes the dollar to appreciate. Table 2 reports parameter values and exchange rate changes (the terms of trade and the real exchange rate) for 20 percent variations in foreign production.

Table 2: Exchange rate responses to productivity shocks

	20% increase in foreign production of tradables	**20% increase in foreign production of nontradables**
σ_T	0.2	0.22
σ_N	1	1
σ_N^*	5/6	1.2
ca	-0.2	-0.2
f	-0.8	-0.8
Fall in TOT: $\Delta\%\tau$	-3.22	0
Real dep.: $\Delta\%q$	10.97	-13.68

It thus matters tremendously whether surplus countries like China as they continue to grow concentrate their investment in productive capacity in traded or nontraded goods. In the first case, the U.S. terms of trade would have to increase and the dollar would depreciate in real terms. In the second case, in contrast, there would be no change in the terms of trade and the dollar would appreciate in real terms.

3.4 Preference shocks

In this final subsection we imagine structural reforms (a social safety net, financial market reforms, etc.) that change spending patterns. First, we assume an increase in the foreign preference for U.S. exports. This is, in effect, an increase in the foreign preference weight on U.S. tradable goods, $1-\alpha^*$, or, equivalently, a reduction in foreign home bias in tradables. As can be seen from the second row of Table 3, raising $1-\alpha^*$ from 0.075 to 0.2 causes the U.S. terms of trade to rise by about 35 percent and the dollar exchange rate to appreciate by 31 percent.[13] This reflects the shift in global demand towards U.S. exports. If foreign home bias were to increase to the level of the U.S., $\alpha = \alpha^* = 0.7$, the rise in the terms of trade would be larger than 50 percent and the dollar real exchange rate would appreciate by 45 percent.

[13] We assume the size of the U.S. to be 21% of the world economy and the elasticity parameters θ and η to equal 1 and 2, respectively.

Next we assume a reduction in U.S. home bias in tradables from 0.7 to 0.4. In the fourth row of the table we can see that this causes the terms of trade to fall by 37 percent and the dollar to depreciate 33 percent in real terms. This happens because lower U.S. home bias causes global demand for U.S. tradable goods to fall.

Finally we look at changes in foreign preferences for tradables. This corresponds to the foreign preference weight on tradable goods, γ^*. Because this parameter affects only relative consumption of tradable and nontradable goods – see equations (1) to (4) – it has no effect on the terms of trade. However, because it has an impact in the price of foreign nontradable goods (relative to tradable goods) the real exchange rate changes. We can see this from equation (15) above – the dollar depreciates in real terms when γ^* falls and appreciates when it increases. Lowering γ^* from 0.25 to 0.19 causes the dollar real exchange rate to depreciate by about 35 percent. A real appreciation of the same magnitude can be generated by raising γ^* from 0.25 to 0.33, as can be seen from the fifth and sixth rows of the table. The effect of raising the U.S. preference for tradables, γ, is similar to that of lowering the foreign preference for tradables, γ^*. An increase in γ from 0.25 to 0.32 causes the real exchange rate to depreciate by 33 percent – see the seventh row of the table.

Table 3: Exchange rate responses to changes in preference parameters

#	**U.S. (Home) preference weight on**		**Foreign preference weight on**		**Adjustment**	
	U.S. tradables	tradables	U.S. tradables	tradables	Fall in TOT	Real depreciation
	α	γ	$1-\alpha^*$	γ^*	$\Delta\%\tau$	$\Delta\%q$
1	0.7	0.25	0.075	0.25		
2	0.7	0.25	**0.2**	0.25	-34.71	-30.99
3	0.7	0.25	**0.3**	0.25	-51.43	-44.82
4	**0.4**	0.25	0.075	0.25	37.10	33.19
5	0.7	0.25	0.075	**0.19**	0.00	34.72
6	0.7	0.25	0.075	**0.33**	0.00	-34.52
7	0.7	**0.32**	0.075	0.25	0.00	32.56

This shows that changes in spending patterns can result in significant changes in the real exchange rate and terms of trade. Stronger foreign taste for U.S. exports or for tradable goods cause the dollar to appreciate, while declines in U.S. home bias in tradables, declines in foreign preference for tradable goods or increases in U.S. preference for tradable goods cause the dollar to depreciate. As expected, changes in domestic or foreign preferences for tradable goods have no effect in the terms of trade, while changes in home bias in tradables do. A decline in U.S. home bias causes U.S. terms of trade to fall, while a decline in foreign home bias (or, equivalently, an increase in foreign preference for U.S. tradable goods) causes U.S. terms of trade to rise.

4 Current Account Surplus Reductions

While there is little literature on how large current account surpluses end, especially in emerging markets, there is a large literature on the elimination of large current account deficits ("current account reversals"). Table C summarizes this literature. Most studies identify "reversals" following the criteria proposed by Milesi-Ferretti and Razin (1998).[14] These criteria identify, inter alia, the initial current account ratio, the size of the adjustment (in percent of GDP and as a fraction of the initial deficit) and its duration. Algieri and Bracke (2007) relax earlier criteria using sensitivity analysis in order to maximize the number of episodes. IMF (2007) shift the emphasis of previous studies toward both deficit and surplus reversals and propose a set of criteria applicable to both. Additionally, they estimate the duration of episodes instead of setting a fixed adjustment period.

Most papers focus on industrial/OECD countries, namely Freund (2005), Croke, Kamin, and Leduc (2005), Freund and Warnock (2007), Debelle and Galati (2007) and de Haan, Schokker, and Tcherneva (2008).[15] A few papers consider current account reversals in low- and middle-income economies (Milesi-Ferretti and Razin (1998)), or in both industrial and emerging economies (Adalet and Eichengreen (2007), Algieri and Bracke (2007) and IMF (2007)).

While there is dispute about the main determinants of reversals, there is nonetheless some agreement regarding what variables to consider. Most studies include the current account ratio, macroeconomic variables such as domestic growth, GDP per capita and the fiscal balance, external sector variables such as the trade balance, trade openness, the real exchange rate, the terms of trade and the exchange regime, and world variables such as world growth, OECD growth or U.S. real interest rates. The last column of the table reports the effect of the variables used in each study.

Although these papers focus on current account deficit reversals[16], which may differ beyond a sign change from reductions in current account surpluses, they are nonetheless a logical starting point in our study.

[14] With the exceptions of Algieri and Bracke (2007) and IMF (2007): see below.

[15] This is evidence of the recent interest in the U.S. situation as a few of them use the analysis of the OECD's experience to draw inferences for the U.S. case.

[16] Except IMF (2007).

4.1 Data and variable definitions

Our analysis uses data for 46 emerging countries[17] and 26 advanced countries[18] over the period 1980-2008. The main sources are the IMF World Economic Outlook Database (October 2009) and the World Bank's World Development Indicators (2009). We start by identifying persistent reductions in current account surpluses. Because the defining criteria have important implications in episode selection and thereby for the results, we consider three different sets of criteria inspired by the above-mentioned literature on deficit reversals.

Our first definition, EP1, is a variant of the measure proposed by Algieri and Bracke (2007). In order for a country to have an episode that qualifies as a persistent reduction in the current account surplus, it must meet the following five criteria:

i. The current account is in surplus before the reduction;

ii. Adjustment takes place within 4 years;

iii. Within 4 years the current account decreases by at least one standard deviation of the country's current account ratio;

iv. The current account reduction is sustained over 5 years, that is, the maximum current account ratio in the 5 years after the adjustment should remain below the minimum current account ratio in the 3 years before the adjustment;

v. There is not another reduction in the following 4 years.

Alternatively, we construct EP2 following, with necessary modifications, Milesi-Ferretti and Razin (1998) and the subsequent studies that adopted their criteria:[19]

i. The current account surplus exceeded 2 percent of GDP before the reduction;

ii. The average surplus was reduced by at least 2 percent of GDP over 3 years (from the maximum to the 3 year average);

iii. The maximum current account ratio in the 5 years after the reduction was not larger than the minimum current account ratio in the 3 years before the reduction;

[17] Argentina, Bahrain, Bangladesh, Botswana, Brazil, Bulgaria, Chile, China, Colombia, Côte d'Ivoire, Croatia, Cyprus, Czech Republic, Egypt, Estonia, Hungary, India, Indonesia, Jordan, Kenya, Lithuania, Macedonia, Malaysia, Mauritius, Mexico, Morocco, Nigeria, Oman, Pakistan, Peru, Philippines, Poland, Qatar, Romania, Russia, Serbia, Slovak Republic, Slovenia, South Africa, Sri Lanka, Taiwan, Thailand, Tunisia, Turkey, United Arab Emirates, and Vietnam.

[18] Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Israel, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Singapore, Korea, Spain, Sweden, Switzerland, the United Kingdom, and the United States.

[19] Freund (2005), Croke, Kamin, and Leduc (2005), Freund and Warnock (2007), Adalet and Eichengreen (2007), Debelle and Galati (2007), and de Haan, Schokker, and Tcherneva (2008).

iv. The current account ratio decreased by at least 1/3 of the initial surplus value;

v. There is not another reduction in the following 3 years.

Finally, we construct EP3 using the four criteria adopted by IMF (2007), to which we add a fifth:

i. *Beginning of the reduction (year 0)*: the average reduction in the imbalance over the next 3 years must be at least 1/2 percentage point of GDP;

ii. *End of the reduction (year T)*: the episode finishes when a local minimum is reached, that is, when the current account ratio ca_t remains above ca_T for 3 consecutive years, and 1/2 percent or more of the reduction is overturned: $|ca_T - ca_{T-1}|/|ca_0 - ca_{T-1}| \geq 0.005$;

iii. Compared with the initial year, the current account ratio in T must fall by at least 2.5 percentage points of GDP, and by at least one-half of the initial level;

iv. In each of the 5 years after the beginning of the episode, the current account ratio must be smaller than the initial level;

v. There is not another reduction while one is still ongoing, where the duration of each reduction is determined in criterion ii.

Unlike the first two measures, which look at adjustments over a fixed period of 3 to 4 years, EP3 allows for longer-lived reductions in current account surpluses and estimates the duration of each episode. It is less restrictive than EP1 and EP2 as it requires only a 1/2 percent of GDP reduction as opposed to one standard deviation for EP1 and 2 percent of GDP for EP2. We therefore refer to EP1 and EP2 as capturing "substantial surplus reductions" and EP3 as identifying both "substantial" and "moderate" surplus reductions. EP3 generates many more episodes (69 in emerging countries and 26 in advanced countries) than EP1 (28 episodes in emerging countries and 13 in advanced countries) and EP2 (34 episodes in emerging countries and 13 in advanced countries).[20]

Table D1 lists all episodes identified by each set of criteria, and tables D2 and D3 report the current account ratio at the beginning of the episode, its change during the adjustment and the duration of the reduction.

If we compare episodes picked up by EP1 and EP2 we notice some cases where the same episode is captured by both but with a divergence of several years, and others where episodes are captured by only one definition. One way of choosing between these definitions would be to select the one

[20] After this paper was drafted, IMF (2010) published a study of the consequences (as opposed to the causes, our concern here) of ending sustained current account surpluses. Their methodology is similar to our definition EP2, and of the 20 episodes they list after 1980, 7 are also included in our measure EP1, 9 in our measure EP2, and 14 in our measure EP3, which provides something of an independent check on our methodology.

that has the highest fraction of episodes also picked up by the other two, allowing for 3 years of divergence with regards to the starting year. Table D4 reports this information. Of the 47 episodes identified by EP1, 28 were also picked up by EP2 and 39 by EP3. On average, 71.3% of its episodes were also identified by the other two definitions. Since this fraction equals 70.7% for EP2, EP1 does the best job in identifying a consistent set of episodes in this sense.

4.2 Univariate Patterns

We now turn to the choice of explanatory variables, guided by the literature on current account deficit reversals. We list and describe these variables and their sources in Table D5, and in Table D6 we show their means, differences in means and significance in a two-tailed t-test. We divide the sample in emerging and advanced countries to allow for different determinants of reductions between these countries.[21]

For emerging markets, the univariate comparisons suggest that reductions occur in countries with higher initial current account surpluses and with slower domestic growth. Reductions in surpluses appear also to be associated with earlier decreases in trade balances, higher real appreciation, and higher public savings. "Substantial reductions" happen when oil prices are higher, while "substantial and moderate reductions" happen when they are lower. In advanced countries, similarly, reductions seem to occur in economies with higher current account ratios and higher public savings. They are also associated with faster growth, higher openness to trade, earlier decreases in trade balances, and higher world growth.

Figures 5, 6 and 7 provide a graphical depiction of the behavior of the current account ratio and various correlates during episodes of surplus reductions in emerging and advanced countries, where year zero is when the reduction starts. The first graph reports the median and average current account ratio over all countries 5 years before and after reductions, and the other seven graphs compare averages for domestic growth, trade openness, trade balance, the real exchange rate, fiscal balance, world growth and the real oil price between countries that experienced reductions and those that did not in the 5 years before and after they occur.

These variables behave very differently in emerging and advanced economies. In emerging countries, reductions happen after increases in the current account ratio. In advanced countries, in contrast, this ratio does not show much variation before reductions. Domestic growth accelerates in the years preceding reductions in emerging countries, perhaps reflecting demand-driven growth that translates into increased domestic absorption, while it decelerates slightly in advanced countries. In both emerging and advanced countries, reductions seem to occur after a deceleration in a previously growing trade balance. Openness to trade moves in tandem with the

[21] We exclude Germany from the advanced country subsample since the current account reduction identified after the reunification in 1989 has its own historical reasons.

trade balance in its improving phase but does not follow its deceleration in the following years. This behavior may possibly be caused by the rise in imports due to exchange rate appreciation.

The real exchange rate is defined such that an increase represents an appreciation. In line with the earlier theoretical model, reductions seem to be preceded by 2 years of significant real appreciation in emerging countries, and by 1 year of mild appreciation in advanced countries. The fiscal balance is very volatile before reductions in emerging countries, whereas in advanced countries it is more stable. In advanced countries, public savings fall in the year immediately preceding reductions following 2 to 3 years of growth. In both emerging and advanced economies fiscal savings deteriorate markedly in the year of the reduction.

Reductions occur after 1 to 3 years of decelerating world growth, in both emerging and advanced countries. "Substantial reductions" tend to be preceded by 2 to 3 years of improving oil prices, whose subsequent fall seems to trigger these reductions. This may reflect the impact of falling oil prices on oil producers' export receipts. "Substantial and moderate reductions" in advanced countries occur after smaller increases in oil prices without a subsequent fall, while in emerging countries they seem to be preceded by 2 years of falling oil prices. The distinct behavior exhibited by several variables before "substantial reductions" and before "substantial and moderate reductions" shows that it matters greatly how we define current account reductions.[22]

The one clear conclusion from this univariate analysis is that the behavior of macroeconomic variables around the time of reductions in large current account surpluses is very different in emerging and advanced countries. We therefore disaggregate them in the multivariate analysis to which we now turn.

4.3 Multivariate Analysis

We use logit analysis to determine which variables help to predict whether a country experiences a substantial, or substantial and moderate, reduction in its current account surplus. Our dependent variable takes a value of 1 if there is a current account reduction and 0 otherwise. Given the similarities between logit and probit models with binary dependent variables, both models would deliver qualitatively similar conclusions. However, fixed effects probit analysis introduces what Wooldridge (2002) calls an "incidental parameters problem." Because the fixed effects logit maximum likelihood estimator does not treat the fixed effects as parameters to be estimated along with the betas, it produces consistent estimators.

To avoid problems of endogeneity and for consistency with prior studies, we used three-year-

[22] For the case of current account deficit reversals, Algieri and Bracke (2007) show, similarly, that small modifications to the criteria used in the literature can considerably change the selection of reversals and significantly affect the results.

lagged averages for the current account ratio, domestic growth, and the change in the trade balance.[23] Since observations for the same country in different years are not independent, we cluster standard errors by country. However, this does not control for unobserved country-specific characteristics, for which we use country fixed effects. We also add year fixed effects to control for unobserved factors that affect all countries in each given year. When we include year fixed effects, we can compare the effects of various factors across countries. When we instead include country fixed effects, effectively dummying out cross-country differences, we are focusing on the effects of changes in an explanatory variable within a country over time on the probability of a surplus reduction.

Results are in tables D7 and D8. While we would have liked to have a consistent set of explanatory variables in the two subsamples, we had to exclude the fiscal balance from the emerging country subsample and the dummy for oil exporters from the advanced country subsample. Fiscal balance data is available for most advanced countries but not for many emerging countries, especially in earlier years, causing a large number of missing observations in the regressions that use the emerging country subsample. We dropped the dummy for oil exporters from the advanced country subsample because there is only one country that is classified as an oil exporter, Norway.

The first regression in each group considers several domestic determinants of reductions and two external variables.[24] The second regression controls for unobservable country-specific characteristics and the third for year-specific factors. A schematic summary of the signs of the significant coefficient estimates is presented in Table D9. In discussing the results, we focus on "substantial surplus reductions" identified by EP1, which for the reasons presented above dominates EP2, and on "substantial and moderate surplus reductions" identified by EP3.

Not surprisingly, both groups of reductions are more likely to occur in countries with higher current account surpluses (columns 3, 6, and 9). "Substantial and moderate reductions" are also more likely after periods of increase in the current account ratio (column 8). Fast-growing emerging economies are less likely to experience both groups of reductions than slow-growing emerging economies, but differences in growth among advanced economies have no significant effects on the likelihood of reductions.

Reductions are less likely in more open emerging economies. More open economies have larger exportables-producing sectors, making policies designed to shift resources toward the production of nontradeables more difficult politically. Comparable evidence for advanced economies is weaker, even though there is some evidence that increasing trade openness reduces the prob-

[23] Other explanatory variables are trade openness, real appreciation, fiscal balance, world growth, the real oil price, and a dummy for oil exporters. World growth and the real oil price are meant to capture the effect of external (and exogenous) factors on the probability of a current account reduction.

[24] This corresponds to columns 1, 4, and 7 in tables D7 and D8.

ability of current account reductions. In both emerging and advanced countries "substantial reductions" are more likely after a deceleration in the growth of the trade balance, which may be associated with slower export growth or an acceleration in import growth. There is similar evidence for "substantial and moderate reductions" in advanced countries, but not for emerging countries.

In section 3, Obstfeld and Rogoff's theoretical model shows that real appreciations accompany reductions in the current account surplus, and figures 5, 6 and 7 show that this is mostly the case in emerging countries. In the multivariate regression analysis we verify this evidence for emerging countries, finding positive coefficient estimates for one-period lagged real appreciations.[25]

"Substantial reductions" are more likely to occur in advanced countries with smaller fiscal surpluses. Because current account surpluses may be fed by increases in fiscal savings, these reductions are more likely after increases in the fiscal balance. This is a variant of the "twin deficits hypothesis," if you will. We do not find any effect of the fiscal balance on "substantial and moderate reductions."[26]

In sum, we find that large current account surpluses do not last forever: the larger the surplus, the more likely it is to eventually be wound down. This adjustment is more likely in less open economies, where political resistance is likely to be less. It is more likely in emerging market economies whose period of exceptionally high growth comes to an end, when the supply of exportables presumably begins to expand more slowly and demand is rebalanced toward domestic goods, and in these economies it is also associated with real appreciation. Finally, in advanced economies, it is more likely after reductions in budget surpluses.

We checked the robustness of our results against outliers by removing current account reductions that may have a significant impact on the results. We reestimated all regressions twice: (1) after removing reductions with very low initial current account ratio (smaller than 0.5% of GDP) from our list of episodes,[27] and (2) after removing reductions with very large initial current account ratio (two standard deviations higher than the period average for each country).[28] All coefficient estimates keep their sign and magnitude. However, some coefficients that

[25] IMF (2010) also finds that the ending of sustained current account surpluses tends to be associated with real exchange rate appreciation, although they provide no explicit hypothesis tests.

[26] Additionally, we find no significant effect of the two external variables, world growth and real oil prices, even after controlling for the potentially different effect of oil prices on oil exporters, which does not validate our previous univariate analysis.

[27] This corresponds to 3 episodes picked up by EP1 (1 from the emerging country subsample and 2 from the advanced country subsample) and 12 episodes picked up by EP3 (4 from the emerging country subsample and 8 from the advanced country subsample).

[28] This corresponds to 4 episodes picked up by EP1 (all from the emerging country subsample), 7 episodes picked up by EP2 (all from the emerging country subsample), and 7 episodes picked up by EP3 (6 from the emerging country subsample and 1 from the advanced country subsample).

were previously significant at 10% become insignificant. This occurs because there are more countries and years in the sample with only zeros (i.e., no reductions), and these observations will therefore be dropped from the estimates with fixed effects.

Given the nonlinearity of the empirical model, it is difficult to interpret the coefficient estimates in terms of discrete changes. We calculate the marginal effect of each regressor using all observations in the sample and present their average values in table D10.[29] As we have seen before, countries with larger surpluses have a higher likelihood of experiencing a reduction. The second, forth and sixth columns show that, for each additional percentage point increase in the current account ratio, the likelihood of a reduction increases by between 1.46 and 1.84 percentage points in emerging countries and between 1.1 and 1.2 percentage points in advanced countries. For example, the current account ratio in China in 2007 was 10.9% of GDP. The likelihood of China experiencing a reduction was, on average, 7 to 12 percentage points higher than that of Chile, the Philippines, Russia or Japan in the same year.[30]

We can see from the fifth row of the table the magnitude of the real appreciations that accompany reductions. Each percentage point increase in the rate of real appreciation raises the likelihood of a reduction by 0.2 to 0.7 percentage points, on average. For example, the rates of appreciation of the Malaysian ringgit, the Philippine peso, and the Chinese yuan in 2006 increased between 3 and 4 percentage points. This corresponds to a 1 to 3 percentage point higher likelihood of a significant reduction in their current account surpluses.

Because the marginal effect of a specific regressor depends on the values of other regressors, we ask, in figure 8, how this response varies with the level of other regressors. We focus on the emerging country subsample. We can see from the first four graphs that faster currency appreciation increases the marginal effect of changes in the current account ratio and of accelerations in appreciation itself. For "substantial reductions," the marginal effect of changes in the current account is significantly different from zero when real appreciation is strong (between 10 and 28 percent) and for "substantial and moderate reductions" even when appreciation is weak. For both groups of reductions, the marginal effect of accelerations in real appreciation is significantly different from zero for levels of currency appreciation below 15 percent.

The remaining four graphs show that output growth has a different impact on the marginal effect of these variables on the likelihood of "substantial reductions" and the likelihood of "substantial and moderate reductions." For the former, the response to changes in the current account ratio is significantly different from zero when countries grow between 5 and 10 percent and remains

[29] Notice that this is different than looking at the marginal effects at the average of all regressors or at some other point in the space of regressors.

[30] In 2007, the current account ratio in Chile was 4.4%, in the Philippines 4.9%, in Russia 6%, and in Japan 4.8%.

stable at around 0.05 in this interval. The response to faster real appreciation increases with the rate of growth and is significantly different from zero when growth is between zero and 5 percent. By contrast, the response to changes in the current account ratio and to accelerations in real appreciation increases with reductions in domestic growth. It is significantly different than zero when growth is between -5 and 7 percent.

In sum, higher rates of currency appreciation increase the impact of other determinants, such as the current account ratio and real appreciation itself, on the likelihood of reductions. Slower growth increases the impact of these determinants on the likelihood of "substantial and moderate reductions" but not on the likelihood of "substantial reductions."

5 Conclusion

Economists disagree about the role of the exchange rate in the process of global rebalancing. Some argue that the imbalances problem is fundamentally an imbalance between saving and investment in the U.S. and a mirror-image imbalance in China, and that since there is no reason to think that a change in the exchange rate should have a first-order impact on saving or investment there is no reason to advocate a Chinese revaluation/dollar devaluation as part of the rebalancing process.[31] Others insist, to the contrary, that exchange rate adjustments are indispensable to rebalancing. The resulting controversy has been a source of confusion. That confusion has not aided the adoption of policies conducive to rebalancing. Looking forward, there is the danger that it may continue to disrupt efforts to put in place the policies needed for a sustainable resolution of imbalances.

In this paper we have attempted to reduce the confusion by making some simple points and drawing out their implications. First, the exchange rate is not a primitive. The exchange rate is an endogenously-determined relative price that adjusts to clear markets in response to shocks. In thinking about global rebalancing, it is more productive to think in terms of primitives: what is the shock in response to which rebalancing must occur (an increase in Chinese spending, a reduction in U.S. spending, something else)? What are the behavioral parameters that shape the impact of the shock on prices and quantities? Given assumptions about these primitives, it is then possible to ask whether and by how much the exchange rate must adjust. Where the debate over global imbalances has gone wrong is by focusing on the exchange rate, which is better thought of as one of a number of endogenous relative prices that must adjust in response to policy initiatives or other events precipitating the rebalancing process. The simulation exercises undertaken in this paper underscore this point.

The empirical literature, for its part, tends to forget that it takes two to tango. The literature

[31] Examples of this point of view include Laurenceson and Qin (2005) and McKinnon and Schnabl (2006).

on large current account deficits has been used to ask: are circumstances in the U.S. such that we can now expect a persistent fall in the deficit? But for a large economy like the U.S., this question makes sense only if one also asks: are circumstances in other countries now such that we can expect a persistent fall in the surplus? Is this the case in a sufficient number of other countries to match the adjustment in the United States? In this paper we have added an analysis of the second set of dance partners in an effort to gain a better sense of the overall choreography.

We find that large current account surpluses tend to come to an end when they have been allowed to rise previously to exceptionally high levels, when the economy doing the reducing is less open (reducing political resistance to resource reallocation), when an earlier period of rapid growth comes to an end (presumably both moderating the rate of growth of the capacity to produce tradeables and some rebalancing toward domestic goods), and in the case of oil-exporting emerging markets when the price of oil is unusually low. While our data on government budgets are more limited, what we have suggest that smaller budget surpluses can also help to bring large current account surpluses to an end.

Potentially, some of these patterns bode well for reductions in China's large current account surplus. That surplus has risen to extraordinary high levels, something that the cross-country evidence suggests is unlikely to continue forever. Both domestic and foreign pressures make some reduction of the country's extraordinarily large surpluses likely. That Chinese economic growth will decelerate with more spending on social programs and with the country's demographic transition similarly augers the likelihood of some reduction in its current account surplus. Similarly, that China has been ramping up social spending, and government spending in general, points in a helpful direction. On the other hand, the fact that the Chinese economy is so open, making output and employment growth dependent on exports, is likely to create political resistance to adjustment.

All this underscores the fact that the requisite adjustments are not guaranteed. They are unlikely to occur automatically. Appropriate policy action would greatly increase the likelihood that countries on the surplus side of global imbalances contribute constructively to global rebalancing.

Appendix

A Derivation of σ_T for different U.S. sizes

Assuming that the share of tradable goods output to GDP is approximately 0.25 in the U.S. and in the rest of the world, the share of tradables to nontradables is approximately 1/3.

$$\frac{P_H Y_H}{P_H Y_H + P_N Y_N} \approx 0.25 \qquad \Rightarrow \qquad \frac{P_H Y_H}{P_N Y_N} \approx \frac{1}{3}$$

and

$$\frac{P_F^* Y_F}{P_F^* Y_F + P_N^* Y_{N^*}} \approx 0.25 \qquad \Rightarrow \qquad \frac{P_F^* Y_F}{P_N^* Y_{N^*}} = \frac{P_F Y_F}{\varepsilon P_N^* Y_{N^*}} \approx \frac{1}{3}$$

With the relative size of the U.S. is given by

$$\frac{\text{U.S. GDP}}{\text{World GDP}} = \frac{P_H Y_H + P_N Y_N}{P_H Y_H + P_N Y_N + P_F Y_F + \varepsilon P_N^* Y_N^*} \approx \frac{4 P_H Y_H}{4 P_H Y_H + 4 P_F Y_F} = \frac{P_H Y_H}{P_H Y_H + P_F Y_F}$$

the value of $\sigma_T = \frac{Y_H}{Y_F}$ such that the U.S. is ω% of the world solves the following nonlinear equation:

$$\frac{\sigma_T / \tau(\sigma_T)}{1 + \sigma_T / \tau(\sigma_T)} = \omega$$

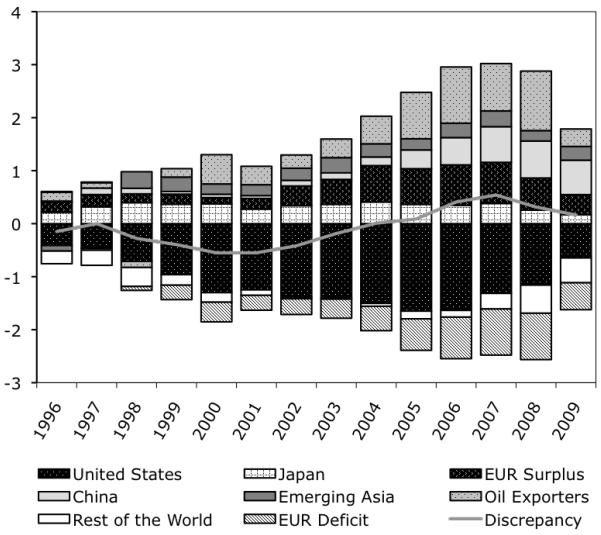
where $\tau(\sigma_T)$ is given by the equilibrium condition

$$1 = \alpha \frac{1}{[\alpha + (1-\alpha)\tau^{1-\eta}]}(1 + if - ca) + (1-\alpha^*)\frac{1}{[\alpha^* \tau^{1-\eta} + (1-\alpha^*)]}\left(\frac{\tau}{\sigma_T} - if + ca\right)$$

In the benchmark model, the U.S. is approximately 21% of the world and σ_T equals 0.22. The initial value of the terms of trade is 0.8439. When China does not participate in the rebalancing, the relative size of the U.S. is approximately 23%. In this case, $\sigma_T = 0.2579$ and the initial value of τ is 0.8843. In the case where the U.S. and Asia do the rebalancing, the relative size of the U.S. is 50% and both σ_T and τ are equal to 1.5361. If only the U.S. and China participate, the relative size of the U.S. is 75%, $\sigma_T = 6.7068$ and $\tau = 2.2357$.

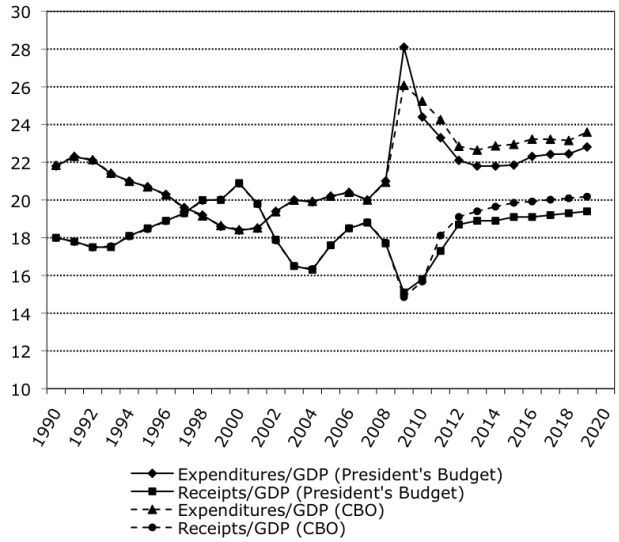
B Figures

Figure 1: Global Imbalances
(percent of global GDP)



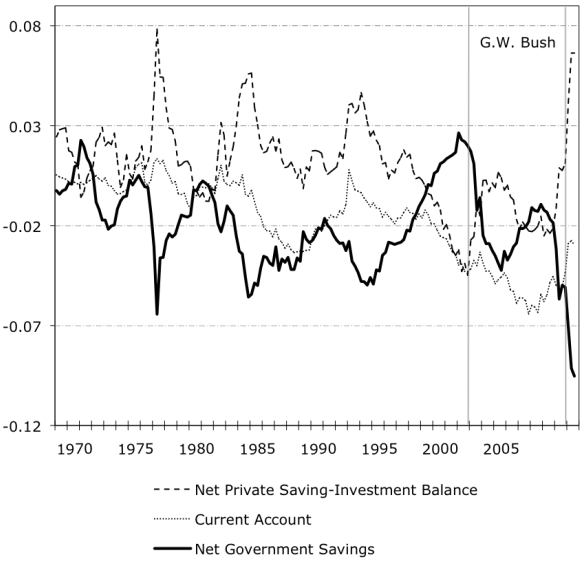
Source: World Economic Outlook, October 2009

Figure 2: Federal Expenditures and Revenues
(percent of GDP)



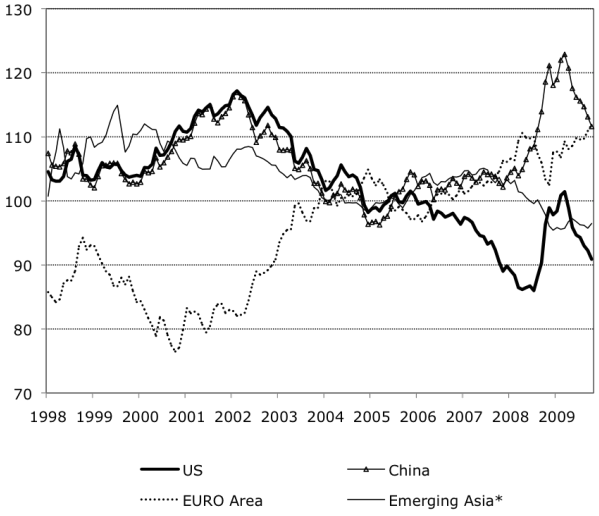
Sources: Office of Management and Budget (White House) and Congressional Budget Office

Figure 3: U.S. Savings and Investment
(normalized by nominal GDP)



Source: Bureau of Economic Analysis

Figure 4: Effective Exchange Rate, 2005=100
(Broad Index, Monthly averages)



Source: Bank of International Settlements
* Hong Kong, Indonesia, Korea, Malaysia, Philippines, Singapore, Taiwan and Thailand

Figure 5: (a) Dynamics of key variables before and after substantial reductions in current account surpluses (EP1)

Emerging countries

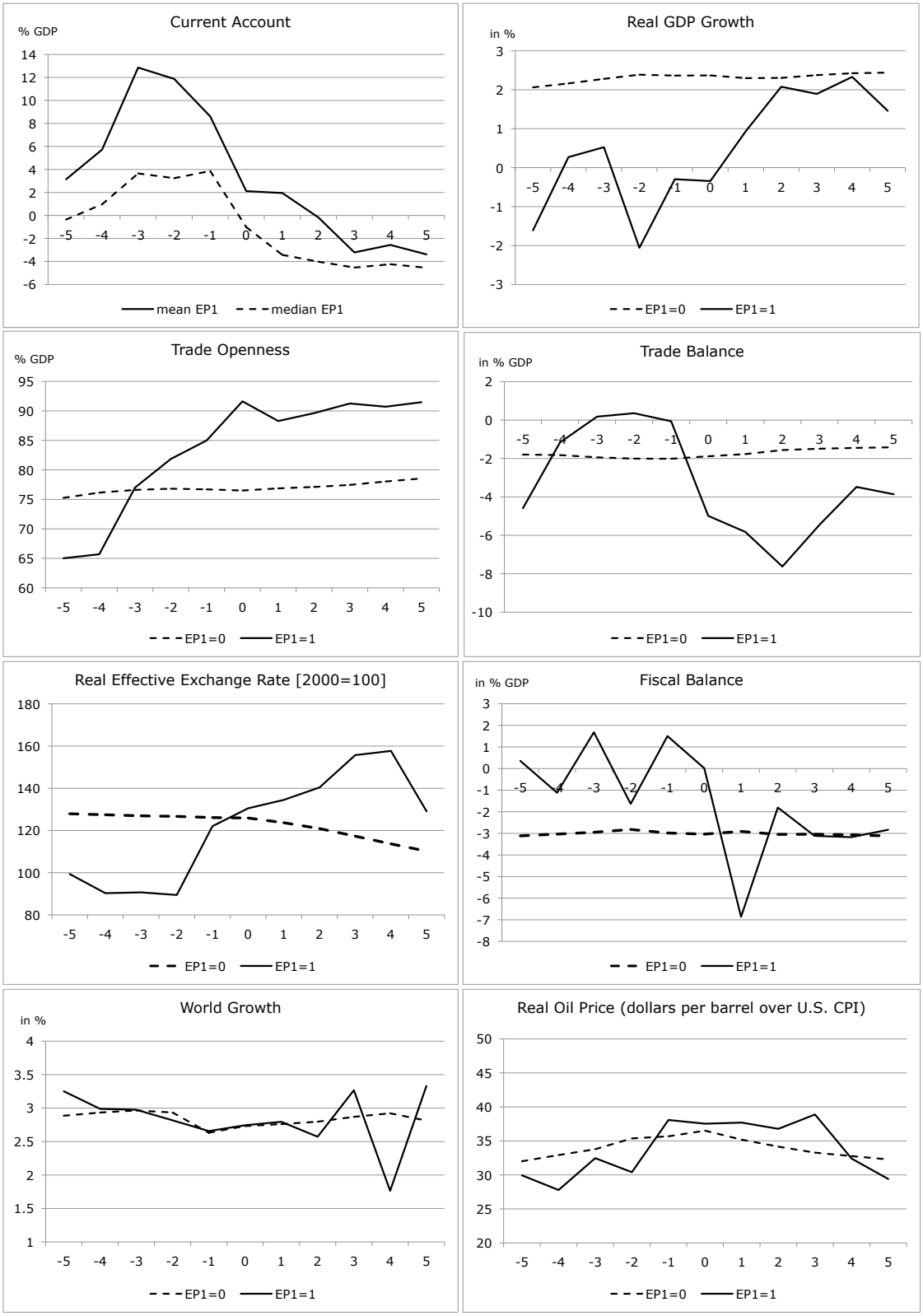


Figure 5: (b) Dynamics of key variables before and after substantial reductions in current account surpluses (EP1)

Advanced countries

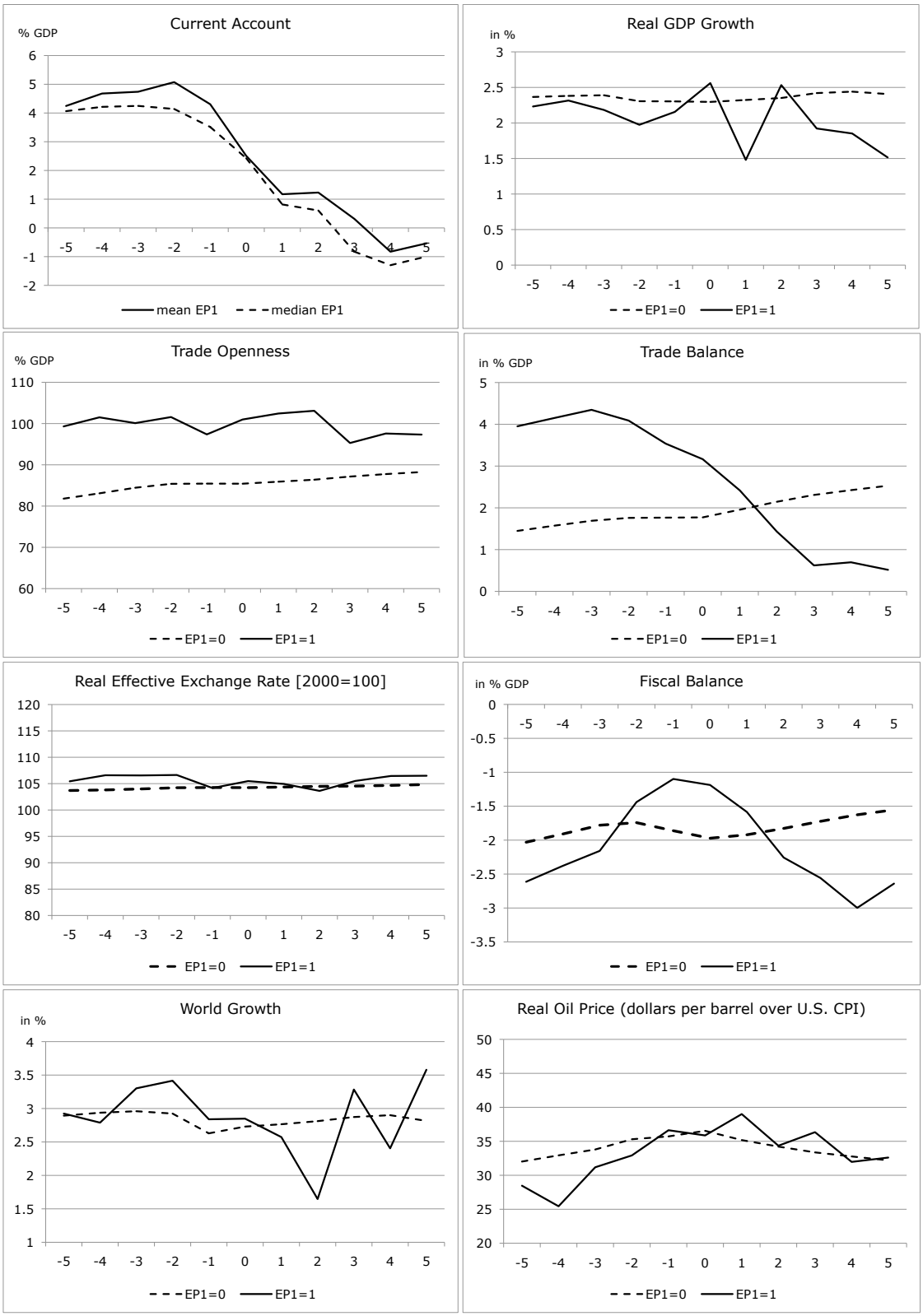


Figure 6: (a) Dynamics of key variables before and after substantial reductions in current account surpluses (EP2)

Emerging countries

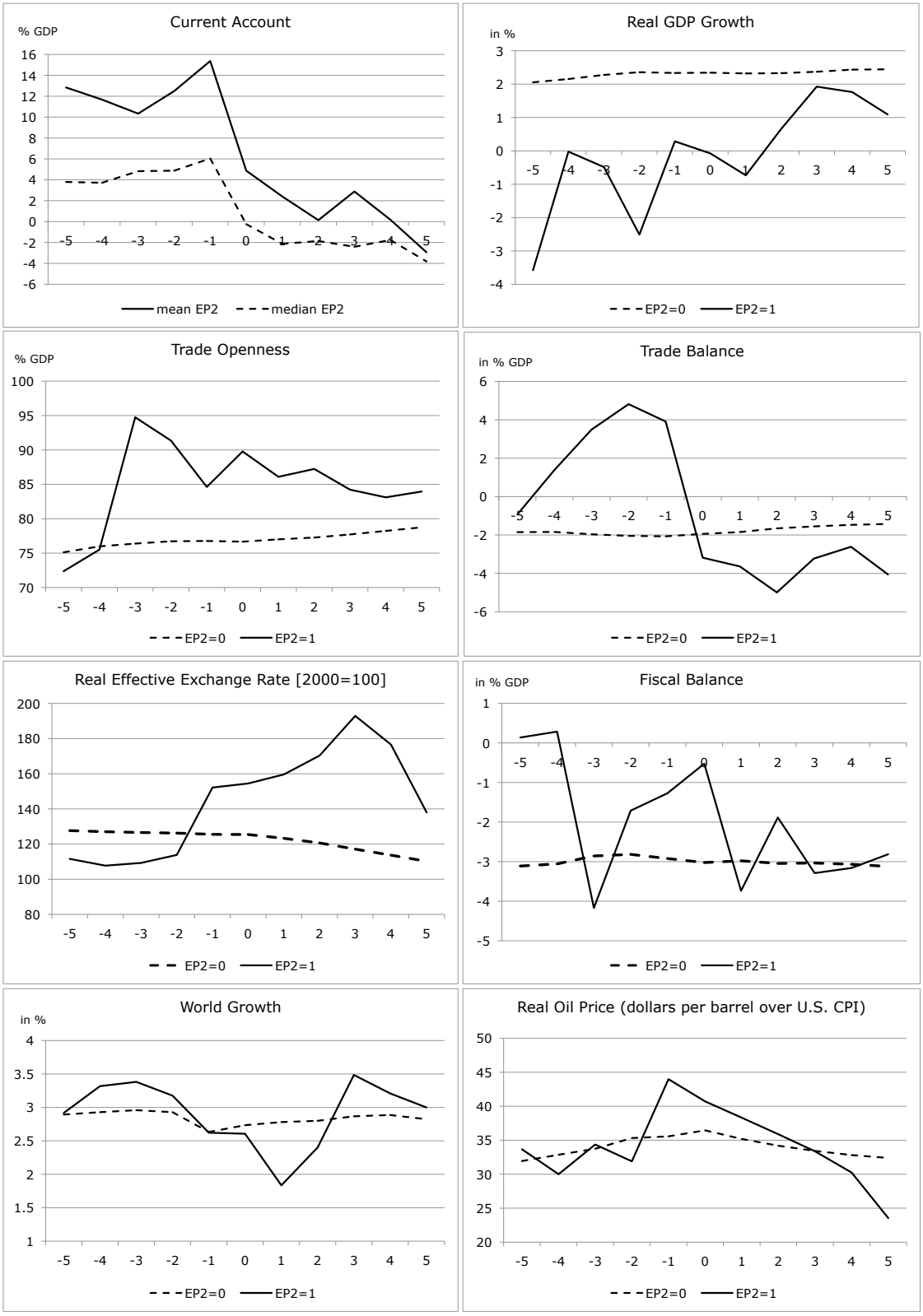


Figure 6: (b) Dynamics of key variables before and after substantial reductions in current account surpluses (EP2)

Advanced countries

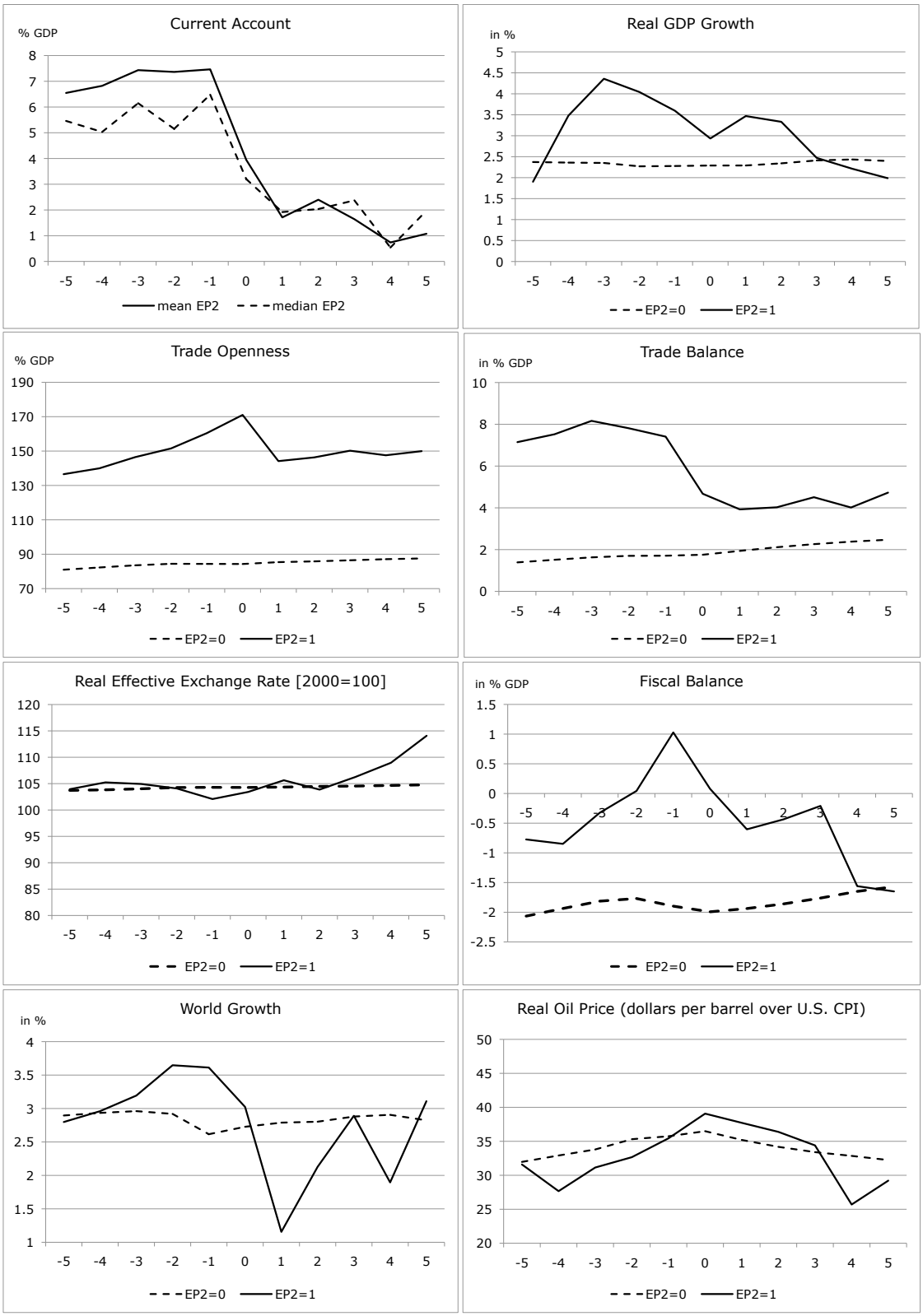


Figure 7: (a) Dynamics of key variables before and after substantial and moderate reductions in current account surpluses (EP3)

Emerging countries

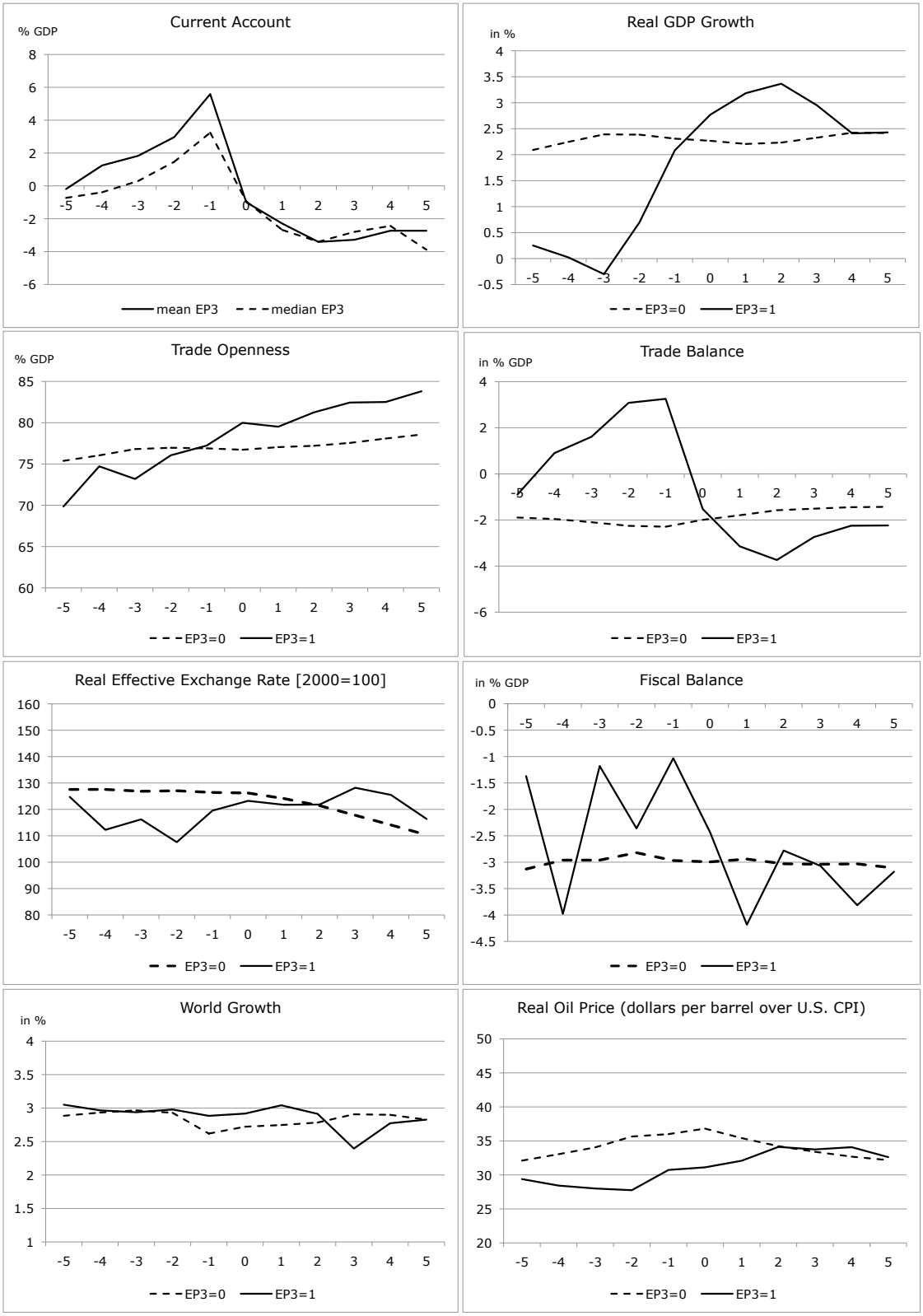


Figure 7: (b) Dynamics of key variables before and after substantial and moderate reductions in current account surpluses (EP3)

Advanced countries

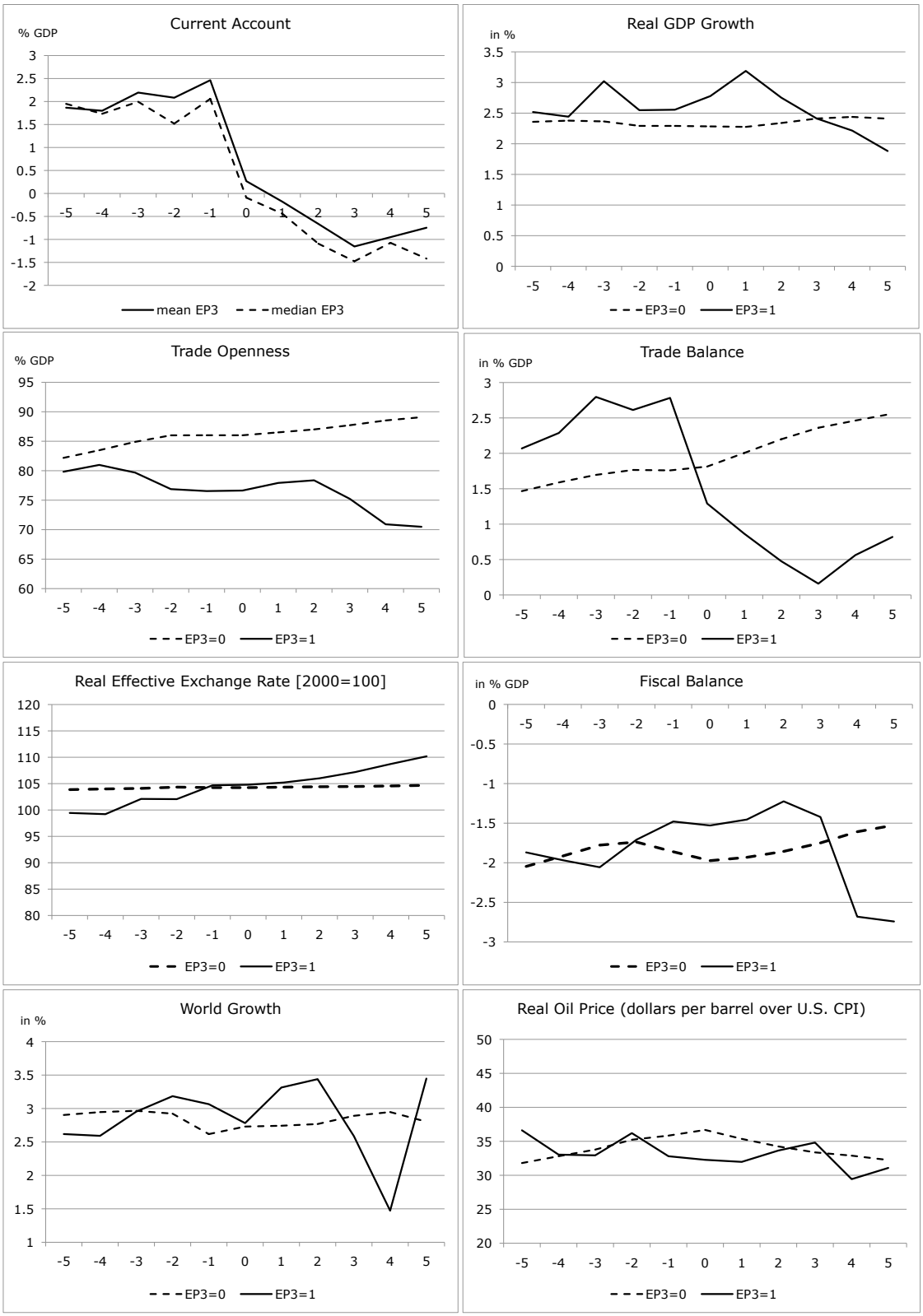
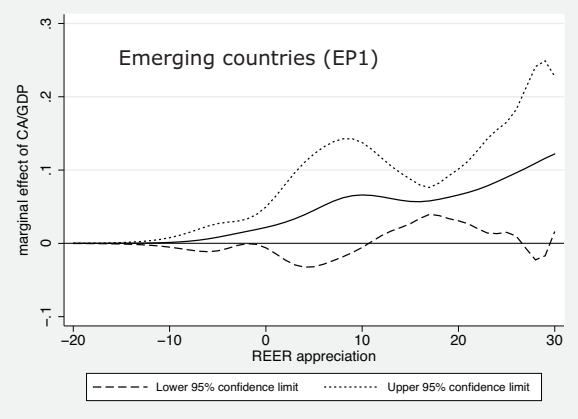
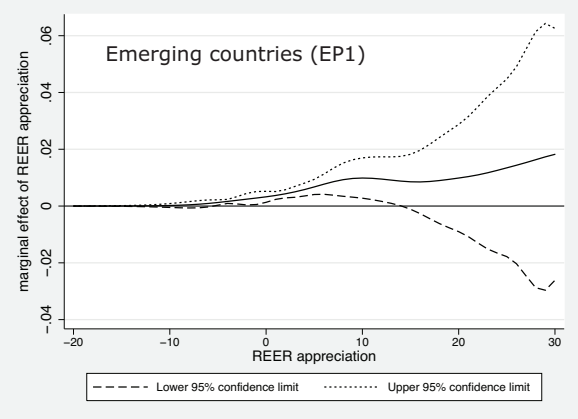
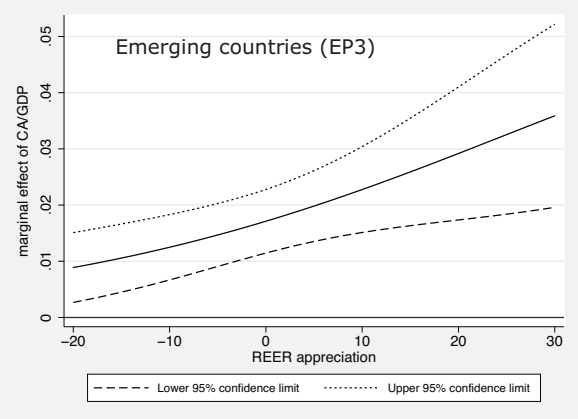
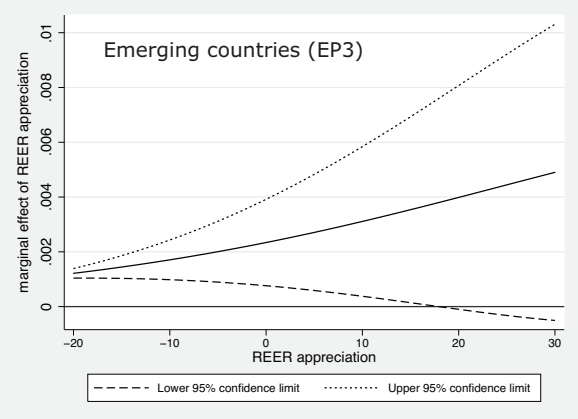


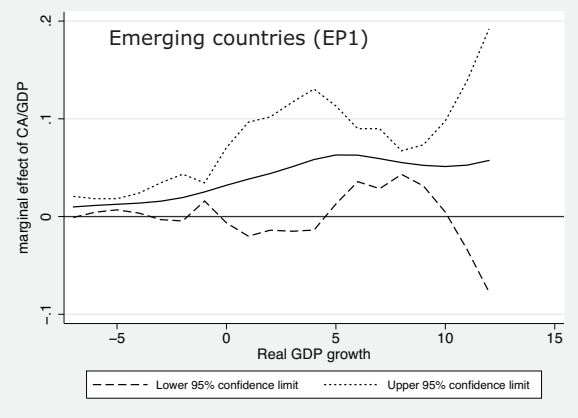
Figure 8: Evaluating marginal effects over the response surface

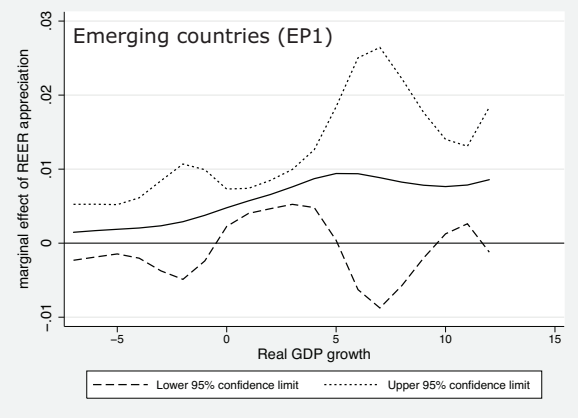


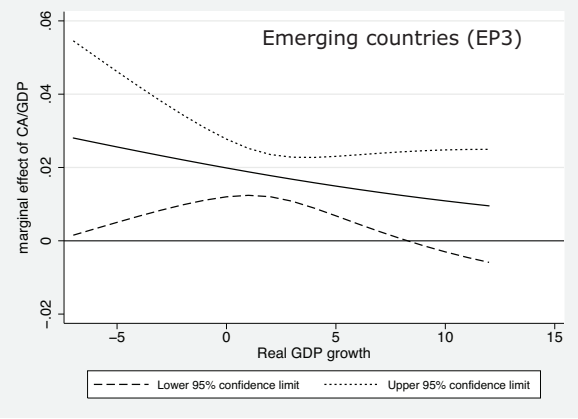


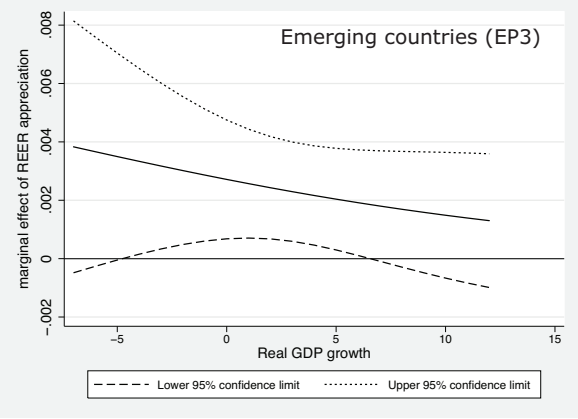












C Literature Review

			Definiton of current account reversals						Main	
			Initial	Size of Adjustment		Years of	Sustainability	Nr.	Determinants	Sign
Article	Period	Countries	CA to GDP	GDP	Share of initial deficit	Adjustment	of Adjustment	Episodes	of reversals	
Milesi-Ferretti and Razin (1998)	1974-1990	86 low and middle income	-	3% or 5%	1/3	3	-	72 or 48	CA/GDP Trade openness Reserves/Imports GDP per capita Fiscal Balance Terms of trade Ch. ToT U.S. real interest rates OECD growth Official transfers	- - - + + - + + + -
Freund (2005)	1980-1997	25 industrial	-2%	2%	1/3	3	5	25	CA/GDP Reserve growth Real GDP growth REER appreciation Government Balance Real interest rates	- - -
Croke et al (2005)	1980-1999	21 industrial	-2%	2%	1/3	3	5	23	N/A	
Freund and Warnock (2007)*	1980-2003	25 OECD	-2%	2%	1/3	3	5	26	N/A	
Algieri and Bracke (2007) **	1973-2006	45 industrial and emerging	<0%	1 std. dev.	-	4	5	71	CA/GDP Import expansion variable Exch. Rate overvaluation Output gap Credit expansion Real oil price***	
IMF (2007)	1960-2006	47 advanced, emerging and oil exporters	-	2.5	1/2	estimated	5	119	N/A	
Adalet and Eichengreen (2007)	1880-1998	56 all	<0%	2% or 3%	1/3	3	3	194	CA deficit Trade Balance/GDP Government Balance U.S. interest rates GDP per capita U.S. real GDP growth Openness	+ - - - + +
Debelle and Galati (2007)	1974-2003	21 industrial	-2%	2%	1/3	3	5	28	Global Growth U.S. interest rate CA REER Real GDP growth Terms of trade	- + -
de Haan et al (2008)	1960-2004	29 OECD	-2% plus larger than at t-1	2%	1/3	3	5	41	CA Output gap REER appreciation Government Balance Exch. regime Financial Openness	- + - -

*They also define persistent deficits, which satisfy: (1) CA/GDP below 2 percent for 5 consecutive years, (2) no reversal, and (3) CA/GDP below 2/3 of its initial level in each of the 5 years; **They classify episodes into 3 groups based on the characteristics of the adjustment and find different determinants depending on the type of adjustment. The first is characterized by a slowdown of real GDP and little exchange rate movements, the second by large depreciations without significant changes in the GDP growth, and the third by slower growth and exchange rate depreciation; ***Multiplied by 1 for net oil importers and zero for net oil exporters.

D Tables

Table D1: Episodes of current account surplus reductions

EP1		EP2		EP3			
Bahrain	1981	Bahrain	1983	Argentina	1991	Macedonia	1992
Brazil	2007	Bulgaria	1981	Argentina	2004	Malaysia	1990
Bulgaria	1998	Bulgaria	1998	Bahrain	1984	Mauritius	1988
Colombia	1993	Chile	2008	Bahrain	1989	Mauritius	2005
Cote d'Ivoire	1987	Cote d'Ivoire	1987	Botswana	1988	Mexico	1988
Croatia	1993	Croatia	1995	Botswana	2000	Morocco	1989
Czech Republic	1994	Indonesia	1981	Brazil	1993	Morocco	2003
Egypt	2007	Indonesia	2003	Brazil	2006	Nigeria	1981
Estonia	1994	Jordan	1981	Bulgaria	1985	Nigeria	1991
Hungary	1993	Jordan	1990	Bulgaria	1998	Nigeria	2001
India	2005	Lithuania	1993	China	1983	Oman	1982
Indonesia	1981	Macedonia	1992	China	1992	Oman	1991
Jordan	1981	Mexico	1988	China	1998	Oman	2006
Jordan	1990	Morocco	2007	Colombia	1993	Pakistan	2005
Jordan	2005	Nigeria	1981	Colombia	2001	Peru	1986
Lithuania	1993	Oman	1981	Cote d'Ivoire	1987	Philippines	1989
Macedonia	1992	Qatar	1981	Cote d'Ivoire	1996	Philippines	1999
Mauritius	2005	Qatar	1986	Cote d'Ivoire	2003	Poland	1996
Mexico	1988	Qatar	1990	Croatia	1995	Qatar	1990
Morocco	2005	Romania	1990	Cyprus	1999	Qatar	2006
Nigeria	1981	Russia	2007	Czech Republic	1994	Romania	1990
Oman	1981	Slovenia	1993	Egypt	1996	Russia	2006
Pakistan	2005	South Africa	1981	Egypt	2006	Slovakia	1996
Poland	1996	South Africa	1994	Estonia	1994	Slovenia	1995
Qatar	1983	Taiwan	1988	Hungary	1993	Slovenia	2003
Qatar	1987	Taiwan	1992	India	2004	South Africa	1981
Romania	1990	UAE	1981	Indonesia	1981	South Africa	1994
Slovenia	1993	UAE	1991	Indonesia	2003	South Africa	2003
South Africa	1981			Jordan	1981	Taiwan	1993
South Africa	2003			Jordan	1990	Thailand	1987
Taiwan	1988			Jordan	2005	Thailand	2002
Thailand	2002			Kenya	1994	Tunisia	1989
UAE	1983			Kenya	2005	Turkey	2002
UAE	1991			Lithuania	1993	UAE	1991
						Vietnam	2002
34		**28**			**69**		
Austria	1992	Belgium	2000	Austria	1992	Italy	1999
Belgium	2000	Belgium	2007	Belgium	2005	Japan	1987
Belgium	2005	Finland	2005	Canada	1983	Korea	1990
Canada	2007	Germany	1990	Canada	2001	Korea	2005
France	2002	Hong Kong SAR	1990	Denmark	2006	Netherlands	1986
Germany	1990	Hong Kong SAR	1994	Finland	1985	Netherlands	1998
Hong Kong SAR	1991	Ireland	1998	Finland	2005	Norway	1986
Italy	1999	Japan	2008	France	2005	Portugal	1994
Netherlands	1986	Korea	1990	Germany	1991	Spain	1987
Netherlands	1998	Netherlands	1986	Hong Kong SAR	1994	Sweden	1987
Switzerland	2007	Netherlands	1998	Ireland	1998	UK	1982
UK	1983	Singapore	2008	Israel	1991	USA	1982
USA	1981	Switzerland	2007	Italy	1987	USA	1992
13		**13**			**26**		

Table D2: (a) Description of episodes in emerging countries

Identified by	country	year	Initial CA ratio	Δ CA ratio			Nr. Years		
				EP1	EP2	EP3	EP1	EP2	EP3
EP3	Argentina	1991	3.30			-7.57			4
EP3	Argentina	2004	6.32			-4.96			5
EP1	Bahrain	1981	16.78	-14.36			4		
EP2	Bahrain	1983	21.53		-23.77			3	
EP3	Bahrain	1984	10.07			-16.55			4
EP3	Bahrain	1989	5.00			-22.40			4
EP3	Botswana	1988	25.64			-20.87			5
EP3	Botswana	2000	10.54			-7.06			5
EP3	Brazil	1993	1.44			-5.76			7
EP3	Brazil	2006	1.59			-3.52			5
EP1	Brazil	2007	1.25	-3.18			4		
EP2	Bulgaria	1981	3.66		-3.54			3	
EP3	Bulgaria	1985	1.67			-26.36			9
EP1 EP2 EP3	Bulgaria	1998	4.12	-9.75	-9.7	-29.58	4	3	11
EP2	Chile	2008	4.39		-4.83			3	
EP3	China	1983	1.99			-4.42			4
EP3	China	1992	3.24			-3.02			4
EP3	China	1998	3.88			-2.57			4
EP1 EP3	Colombia	1993	1.36	-5.61		-6.16	4		5
EP3	Colombia	2001	0.81			-3.94			10
EP1 EP2 EP3	Cote d'Ivoire	1987	8.93	-25.56	-26.27	-25.56	4	3	4
EP3	Cote d'Ivoire	1996	0.20			-3.00			5
EP3	Cote d'Ivoire	2003	6.69			-7.37			5
EP1	Croatia	1993	2.62	-6.84			4		
EP2 EP3	Croatia	1995	4.07		-14.77	-11.34		3	8
EP3	Cyprus	1999	2.70			-21.02			10
EP1 EP3	Czech Republic	1994	1.24	-7.58		-7.58	4		4
EP3	Egypt	1996	0.64			-2.56			4
EP3	Egypt	2006	3.24			-6.08			5
EP1	Egypt	2007	1.63	-4.47			4		
EP1 EP3	Estonia	1994	1.22	-12.36		-12.36	4		4
EP1 EP3	Hungary	1993	0.95	-4.85		-9.32	4		8
EP3	India	2004	1.53			-4.04			7
EP1	India	2005	0.12	-2.32			4		
EP1 EP2 EP3	Indonesia	1981	3.04	-5.31	-9.8	-7.68	4	3	6
EP2 EP3	Indonesia	2003	4.00		-3.9	-3.95		3	6
EP1 EP2 EP3	Jordan	1981	9.58	-15.03	-17.49	-15.03	4	3	4
EP1 EP2 EP3	Jordan	1990	3.65	-15.29	-18.06	-15.29	4	3	4
EP1 EP3	Jordan	2005	0.78	-12.06		-12.06	4		4
EP3	Kenya	1994	2.10			-6.09			5
EP3	Kenya	2005	0.15			-8.25			5
EP1 EP2 EP3	Lithuania	1993	5.33	-10.25	-15.91	-16.95	4	3	6
EP1 EP2 EP3	Macedonia	1992	6.29	-12.62	-15.3	-14.96	4	3	7
EP3	Malaysia	1990	0.66			-10.25			6
EP3	Mauritius	1988	7.09			-12.13			8

Table D2: (b) Description of episodes in emerging countries

Identified by	country	year	Initial CA ratio	Δ CA ratio EP1	Δ CA ratio EP2	Δ CA ratio EP3	Nr. Years EP1	Nr. Years EP2	Nr. Years EP3
EP1 EP3	Mauritius	2005	0.83	-9.54		-11.41	4		6
EP1 EP2 EP3	Mexico	1988	2.86	-7.51	-5.69	-9.58	4	3	5
EP3	Morocco	1989	0.42			-3.64			7
EP3	Morocco	2003	3.65			-8.39			8
EP1	Morocco	2005	1.69	-7.12			4		
EP2	Morocco	2007	2.15		-7.62			3	
EP1 EP2 EP3	Nigeria	1981	8.85	-13.25	-22.91	-27.59	4	3	6
EP3	Nigeria	1991	7.62			-15.74			4
EP3	Nigeria	2001	12.57			-6.73			4
EP1 EP2	Oman	1981	17.60	-14.19	-11.64		4	3	
EP3	Oman	1982	17.84			-30.32			5
EP3	Oman	1991	9.41			-31.94			8
EP3	Oman	2006	16.75			-17.21			4
EP1 EP3	Pakistan	2005	1.85	-10.19		-10.19	4		4
EP3	Peru	1986	0.29			-8.01			10
EP3	Philippines	1989	0.84			-6.36			5
EP3	Philippines	1999	2.27			-2.63			4
EP1 EP3	Poland	1996	0.61	-8.06		-8.06	4		4
EP2	Qatar	1981	106.84		-49.57			3	
EP1	Qatar	1983	74.12	-40.62			4		
EP2	Qatar	1986	62.31		-29.49			3	
EP1	Qatar	1987	33.50	-42.43			4		
EP2 EP3	Qatar	1990	44.68		-58.73	-75.71		3	6
EP3	Qatar	2006	33.21			-22.41			4
EP1 EP2 EP3	Romania	1990	4.68	-9.38	-12.44	-11.78	4	3	9
EP3	Russia	2006	11.05			-7.43			4
EP2	Russia	2007	9.54		-5.92			3	
EP3	Slovakia	1996	1.95			-10.24			6
EP1 EP2	Slovenia	1993	5.79	-5.51	-7.27		4	3	
EP3	Slovenia	1995	4.26			-8.21			5
EP3	Slovenia	2003	1.07			-6.60			6
EP1 EP2 EP3	South Africa	1981	4.08	-6.58	-4.56	-6.58	4	3	4
EP2 EP3	South Africa	1994	2.13		-3.28	-3.89		3	5
EP1 EP3	South Africa	2003	0.83	-7.14		-8.24	4		6
EP1 EP2	Taiwan	1988	17.38	-10.61	-10.75		4	3	
EP2	Taiwan	1992	6.77		-4.19			3	
EP3	Taiwan	1993	3.91			-2.67			6
EP3	Thailand	1987	0.57			-8.91			4
EP1 EP3	Thailand	2002	4.43	-8.76		-8.76	4		4
EP3	Tunisia	1989	0.96			-9.74			5
EP3	Turkey	2002	1.92			-7.95			5
EP2	UAE	1981	34.06		-15.35			3	
EP1	UAE	1983	22.82	-11.85			4		
EP1 EP2 EP3	UAE	1991	22.07	-22	-13.78	-22.00	4	3	4
EP3	Vietnam	2002	2.10			-14.02			7

Table D3: Description of episodes in advanced countries

Identified by	country	year	Initial CA ratio	Δ CA ratio EP1	Δ CA ratio EP2	Δ CA ratio EP3	Nr. Years EP1	Nr. Years EP2	Nr. Years EP3
EP1 EP3	Austria	1992	0.04	-2.89		-2.89	4		4
EP1 EP2	Belgium	2000	7.90	-3.77	-3.26		4	3	
EP1 EP3	Belgium	2005	3.51	-6.06		-6.06	4		4
EP2	Belgium	2007	2.65		-3.61			3	
EP3	Canada	1983	0.61			-4.53			7
EP3	Canada	2001	2.72			-5.32			9
EP1	Canada	2007	1.40	-3.24			4		
EP3	Denmark	2006	4.35			-3.25			4
EP3	Finland	1985	0.07			-5.40			7
EP2 EP3	Finland	2005	6.55		-2.4	-6.01		3	5
EP1	France	2002	1.83	-2.26			4		
EP3	France	2005	0.61			-2.87			4
EP1 EP2	Germany	1990	4.56	-5.51	-5.66		4	3	
EP3	Germany	1991	2.93			-4.35			4
EP2	Hong Kong	1990	9.16		-6.15			3	
EP1	Hong Kong	1991	6.20	-7.02			4		
EP2 EP3	Hong Kong	1994	4.76		-7.28	-9.15		3	4
EP2 EP3	Ireland	1998	2.90		-3.26	-8.23		3	10
EP3	Israel	1991	0.31			-5.30			5
EP3	Italy	1987	0.45			-3.13			6
EP1 EP3	Italy	1999	1.62	-2.4		-5.03	4		10
EP3	Japan	1987	4.26			-2.82			4
EP2	Japan	2008	4.82		-2.78			3	
EP2 EP3	Korea	1990	2.22		-3.42	-6.20		3	7
EP3	Korea	2005	3.90			-4.59			4
EP1 EP2 EP3	Netherlands	1986	7.15	-3.21	-4.23	-5.09	4	3	7
EP1 EP2 EP3	Netherlands	1998	6.48	-4.04	-4.6	-4.04	4	3	4
EP3	Norway	1986	4.73			-4.82			4
EP3	Portugal	1994	0.26			-10.50			7
EP2	Singapore	2008	23.49		-10.95			3	
EP3	Spain	1987	1.50			-5.08			5
EP3	Sweden	1987	0.03			-2.79			6
EP1 EP2	Switzerland	2007	14.40	-7.28	-8.25		4	3	
EP3	UK	1982	1.89			-6.75			8
EP1	UK	1983	0.80	-1.72			4		
EP1	USA	1981	0.08	-2.48			4		
EP3	USA	1982	0.16			-3.55			6
EP3	USA	1992	0.05			-6.05			15

Table D4: Cross-checking of episodes

	EP1	EP2	EP3	Fraction
EP1	**47**	28	39	**71.3%**
EP2	28	**41**	30	**70.7%**
EP3	39	30	**95**	**36.3%**

Table D5: Data description and sources

Variables	**Description of variables**	**Sources**
CA/GDP	Current account in percent of GDP	World Economic Outlook Database (WEO), Oct. 2009
Real Growth	Growth in real GDP per capita	World Bank's World Development Indicators (WDI)
Openness	Trade openness = (Imports + Exports)/GDP	WDI
Trade Balance	Trade balance to GDP	WDI
REER Appreciation	Growth in the real effective exchange rate index [2000=100] – an increase means appreciation	WDI and IMF's International Financial Statistics (IFS)
Government Deficit	Government deficit to GDP	WEO
World Growth	World GDP growth	WDI
Oil Exporter	Dummy variable that equals 1 if the share of oil exports on total exports is higher than 20 percent	WDI
Real Oil Price	Nominal oil price adjusted by U.S. CPI	WEO
Emerging/Advanced	FTSE Global Equity Index Series Country Classification	FTSE

Table D6: Summary Statistics - means and difference in means

		EP1			**EP2**			**EP3**		
EMERGING	**Obs.**	**0**	**1**	**Diff.**	**0**	**1**	**Diff.**	**0**	**1**	**Diff.**
$CA/GDP_{t-1,t-3}$	1183	-1.20	11.31	12.51***	-1.15	12.03	13.17***	-1.19	3.32	4.51***
Real $growth_{t-1,t-3}$	1160	2.40	0.63	-1.77**	2.39	0.90	-1.49	2.43	1.17	-1.26***
$Openness_{t-1}$	1174	76.25	84.99	8.74	76.32	84.62	8.3	76.43	77.23	0.8
Δ Trade $Bal_{t-1,t-3}$	999	0.12	-1.81	-1.92***	0.10	-1.30	-1.4**	0.13	-0.81	-0.95***
REER $app._{t-1,t}$	550	0.11	7.96	7.85**	0.29	1.63	1.34	0.15	2.96	2.81
Fiscal $Balance_{t-1}$	138	-2.98	1.50	4.48**	-2.92	-1.27	1.65	-2.97	-1.03	1.94
World $growth_t$	1380	2.63	2.66	0.02	2.63	2.62	-0.01	2.62	2.88	0.27
Real oil $price_t$	1380	35.68	38.08	2.4	35.57	43.98	8.42**	36.00	30.73	-5.27**
Oil exporter	977	0.17	0.19	0.02	0.16	0.33	0.17*	0.16	0.22	0.05
ADVANCED										
$CA/GDP_{t-1,t-3}$	710	0.69	4.82	4.13***	0.64	7.42	6.78***	0.71	2.33	1.63
Real $growth_{t-1,t-3}$	780	2.41	2.17	-0.25	2.38	4.00	1.62***	2.40	2.69	0.29
$Openness_{t-1}$	731	84.90	97.37	12.47	83.87	160.42	76.56***	85.44	76.55	-8.89
Δ Trade $Bal_{t-1,t-3}$	710	0.24	-0.24	-0.47	0.24	-0.49	-0.73**	0.25	-0.42	-0.67***
REER $app._{t-1,t}$	695	0.34	1.23	0.89	0.34	1.62	1.29	0.35	0.36	0
Fiscal $Balance_{t-1}$	777	-1.86	-1.10	0.76	-1.90	1.03	2.93**	-1.86	-1.48	0.38
World $growth_t$	780	2.63	2.84	0.21	2.62	3.61	1*	2.62	3.06	0.45
Real oil $price_t$	780	35.72	36.63	0.91	35.74	35.44	-0.3	35.84	32.80	-3.04
Oil exporter	707	0.04	0.00	-0.04	0.04	0.00	-0.04	0.04	0.00	-0.04

Two-tailed t-test p-value *< 0.1, **< 0.05, ***< 0.01.

Table D7: Determinants of current account reductions in emerging countries

	Substantial Reductions						Substantial and moderate reductions		
	EP1			**EP2**			**EP3**		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
CA/GDP$_{t-1,t-3}$	**0.485**	3.013	**0.431**	**0.304**	**0.898**	**0.304**	**0.204**	**0.314**	**0.248**
	[0.16]***	[2.07]	[0.24]*	[0.06]***	[0.45]**	[0.16]*	[0.06]***	[0.06]***	[0.06]***
Real growth$_{t-1,t-3}$	-0.127	0.753	**-0.280**	**-0.174**	**-0.654**	**-0.457**	**-0.109**	-0.0791	**-0.127**
	[0.10]	[0.82]	[0.13]**	[0.05]***	[0.23]***	[0.22]**	[0.04]***	[0.10]	[0.05]**
Openness$_{t-1}$	**-0.0402**	0.166	**-0.0644**	**-0.0228**	-0.0593	**-0.0217**	**-0.00625**	-0.0209	**-0.00798**
	[0.01]***	[0.11]	[0.03]**	[0.01]**	[0.14]	[0.01]**	[0.00]*	[0.02]	[0.00]*
Δ Trade Bal$_{t-1,t-3}$	**-0.516**	**-0.998**	**-0.505**	**-0.464**	**-1.258**	-0.341	-0.0647	0.0171	0.0383
	[0.16]***	[0.48]**	[0.28]*	[0.18]***	[0.56]**	[0.30]	[0.12]	[0.15]	[0.16]
REER app.$_{t-1,t}$	**0.116**	**0.450**	**0.133**	**0.0644**	0.0690	0.0337	**0.0316**	**0.0429**	**0.0359**
	[0.04]***	[0.19]**	[0.06]**	[0.03]**	[0.09]	[0.03]	[0.01]***	[0.02]***	[0.01]***
World growth$_{t-1}$	0.289	0.918		0.535	0.191		0.359	0.317	
	[0.52]	[2.65]		[0.68]	[0.83]		[0.26]	[0.29]	
Real oil price$_{t-1}$	-0.0584	-0.110		0.0654	**0.163**		**-0.0886**	**-0.103**	
	[0.05]	[0.10]		[0.04]	[0.07]**		[0.03]***	[0.04]**	
ROP$_{t-1}$*oil exporter	-0.153			-0.0437			0.0154		
	[0.14]			[0.03]			[0.01]		
Constant	-1.410	-27.10	-0.893	-6.841	-13.10	0.933	-0.964	2.265	-3.078
	[1.95]	[11.15]**	[1.49]	[3.24]**	[13.69]	[1.94]	[1.21]	[3.11]	[1.35]**
Observations	448	182	113	448	130	84	448	369	262
Fixed effects	No	Country	Year	No	Country	Year	No	Country	Year
Log-likelihood	-22.68	-9.473	-14.96	-21.67	-11.57	-13.46	-81.81	-74.79	-66.87
McFadden pseudo-R^2	0.435	0.711	0.482	0.319	0.524	0.377	0.176	0.205	0.211
Nr.Clusters	22	8	22	22	6	22	22	17	22

Robust standard errors in brackets, clustered by country. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
The current account ratio, domestic growth, and the change in trade balance are defined as averages over the 3 years preceding the event. REER appreciation is the lagged annual percentage change in the real effective exchange rate index.

Table D8: Determinants of current account reductions in advanced countries

	Substantial Reductions						Substantial and moderate reductions		
	EP1			**EP2**			**EP3**		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
CA/GDP$_{t-1,t-3}$	**0.263**	**1.490**	**0.334**	**0.336**	**1.576**	**0.442**	**0.148**	**0.208**	**0.181**
	[0.07]***	[0.33]***	[0.09]***	[0.16]**	[0.53]***	[0.26]*	[0.05]***	[0.10]**	[0.06]***
Real growth$_{t-1,t-3}$	-0.0499	0.626	-0.337	0.440	**2.316**	0.707	0.119	0.0346	0.120
	[0.26]	[1.01]	[0.22]	[0.51]	[0.73]***	[0.63]	[0.21]	[0.27]	[0.27]
Openness$_{t-1}$	-0.00141	**-0.133**	-0.00107	-0.00638	**-0.153**	-0.00680	-0.00425	-0.0203	-0.00453
	[0.01]	[0.05]**	[0.01]	[0.01]	[0.08]**	[0.02]	[0.00]	[0.02]	[0.00]
Δ Trade Bal$_{t-1,t-3}$	**-0.974**	**-2.488**	**-1.532**	-0.612	**-3.819**	**-1.298**	**-0.750**	**-0.806**	**-0.778**
	[0.26]***	[1.36]*	[0.35]***	[0.53]	[1.63]**	[0.62]**	[0.32]**	[0.42]*	[0.34]**
REER app.$_{t-1,t}$	-0.0129	0.0346	0.0332	-0.0661	0.0372	0.0329	0.0151	0.00570	0.0311
	[0.06]	[0.10]	[0.06]	[0.09]	[0.24]	[0.09]	[0.03]	[0.04]	[0.03]
Fiscal Balance$_{t-1}$	**-0.127**	**0.659**	**-0.189**	-0.140	**0.748**	**-0.371**	-0.0664	0.0169	-0.0474
	[0.07]*	[0.30]**	[0.10]*	[0.10]	[0.43]*	[0.17]**	[0.05]	[0.06]	[0.05]
World growth$_{t-1}$	-0.413	-1.214		**0.899**	**2.757**		-0.0281	-0.0479	
	[0.39]	[0.91]		[0.27]***	[1.37]**		[0.26]	[0.30]	
Real oil price$_{t-1}$	0.0269	0.0763		0.00686	0.0701		0.00602	0.00591	
	[0.03]	[0.07]		[0.02]	[0.10]		[0.02]	[0.02]	
Constant	-4.316	2.530	-3.005	-9.542	-25.88	-6.153	-3.683	-2.542	-2.907
	[1.33]***	[2.92]	[1.25]**	[1.81]***	[9.99]***	[1.70]***	[0.99]***	[1.07]**	[1.17]**
Observations	549	201	196	549	126	110	549	408	256
Fixed effects	No	Country	Country	No	Country	Year	No	Country	Year
Log-likelihood	-42.06	-20.81	-30.64	-27.65	-11.78	-18.66	-79.19	-72.09	-60.25
McFadden pseudo-R^2	0.158	0.476	0.224	0.262	0.564	0.284	0.0779	0.0968	0.142
Nr.Clusters	23	8	23	23	5	23	23	16	23

Robust standard errors in brackets, clustered by country. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
The current account ratio, domestic growth, and the change in trade balance are defined as averages over the 3 years preceding the event. REER appreciation is the lagged annual percentage change in the real effective exchange rate index.

Table D9: Sign of significant coefficient estimates

	Substantial Reductions						Substantial and moderate reductions		
	EP1			**EP2**			**EP3**		
Emerging	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$CA/GDP_{t-1,t-3}$	+		+	+	+	+	+	+	+
Real $growth_{t-1,t-3}$			−	−	−	−	−		−
$Openness_{t-1}$	−		−	−		−	−		−
Δ Trade $Bal_{t-1,t-3}$	−	−	−	−	−				
REER $app._{t-1,t}$	+	+	+	+			+	+	+
World $growth_{t-1}$			N/A			N/A			N/A
Real oil $price_{t-1}$			N/A		+	N/A	−	−	N/A
ROP_{t-1}*oil exporter		N/A	N/A		N/A	N/A		N/A	N/A
	EP1			**EP2**			**EP3**		
Advanced	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$CA/GDP_{t-1,t-3}$	+	+	+	+	+	+	+	+	+
Real $growth_{t-1,t-3}$					+				
$Openness_{t-1}$		−			−				
Δ Trade $Bal_{t-1,t-3}$	−	−	−		−	−	−	−	−
REER $app._{t-1,t}$									
Fiscal $Balance_{t-1}$	−	+	−		+	−			
World $growth_{t-1}$			N/A	+	+	N/A			N/A
Real oil $price_{t-1}$			N/A			N/A			N/A

Table D10: Average Marginal Effects

	EP1		**EP2**		**EP3**	
Emerging	reg.(2)	reg.(3)	reg.(5)	reg.(6)	reg.(8)	reg.(9)
$CA/GDP_{t-1,t-3}$	0.0486	0.0172	0.0244	0.0146	0.0178	0.0184
Real $growth_{t-1,t-3}$	0.0121	-0.0109	-0.0178	-0.0219	-0.0047	-0.0095
$Openness_{t-1}$	0.0027	-0.0026	-0.0016	-0.0010	-0.0012	-0.0006
Δ Trade $Bal_{t-1,t-3}$	-0.0162	-0.0206	-0.0342	-0.0163	0.0008	0.0028
REER $app._{t-1,t}$	0.0072	0.0053	0.0019	0.0016	0.0024	0.0026
World $growth_{t-1}$	0.0147		0.0052		0.0181	
Real oil $price_{t-1}$	-0.0018		0.0044		-0.0058	
Advanced	reg.(2)	reg.(3)	reg.(5)	reg.(6)	reg.(8)	reg.(9)
$CA/GDP_{t-1,t-3}$	0.0532	0.0109	0.0472	0.0122	0.0098	0.0109
Real $growth_{t-1,t-3}$	0.0086	-0.0205	0.0618	0.0078	0.0036	0.0051
$Openness_{t-1}$	-0.0047	0.0000	-0.0052	-0.0002	-0.0011	-0.0003
Δ Trade $Bal_{t-1,t-3}$	-0.0712	-0.0504	-0.1132	-0.0294	-0.0397	-0.0476
REER $app._{t-1,t}$	0.0048	0.0015	0.0057	0.0001	-0.0014	-0.0008
Fiscal $Balance_{t-1}$	0.0261		0.0273		0.0012	
World $growth_{t-1}$	-0.0306		0.0891		-0.0042	
Real oil $price_{t-1}$	0.0017		0.0017		0.0004	

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