



Estimates of Fundamental Equilibrium Exchange Rates, May 2012

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This Policy Brief updates our estimates of fundamental equilibrium exchange rates (FEERs) to the latest available data. For exchange rates, we apply the average rates of April 2012, while for the International Monetary Fund's balance of payments forecasts, we use the April 2012 issue of the *World Economic Outlook* (henceforth WEO; see IMF 2012a). This study is the fifth in an annual series, begun in 2008, in which we have used the spring WEO as the basis for drawing out implications for exchange rate changes needed if the world is to approach a reasonably satisfactory medium-run position. In addition, in semiannual updates (most recently in November 2011), we have tracked interim changes in exchange rates but not reestimated the underlying FEERs for the year in question.

The world economy is still bifurcated between advanced and emerging-market economies, with the former continuing to experience substantial output gaps and the latter producing

at near-capacity rates. Superimposed on this contrast is now the European crisis, which is dragging most European countries below the performance of other advanced economies. We analyzed these developments in the November 2011 Policy Brief and concluded that Greece, Portugal, and possibly Italy were quite likely significantly overvalued, although even these countries would have no external problem if the IMF's balance of payments forecasts were correct. The world is now trifurcated into most of Europe, other advanced economies, and emerging-market and developing countries, which are continuing to grow and are operating at close to their productive potential despite the slowdown in Asia in the second half of 2011.

As in previous years (Cline and Williamson 2008, 2009, 2010, 2011a), we take as our point of departure recent figures for exchange rates and projections published by the IMF in the latest WEO. The statistical appendix to that publication contains projections of individual country current account positions on the technical assumption of no further changes in real exchange rates. The IMF also makes projections about the future of commodity prices, including that for oil. We checked the oil price assumption against that of the US Energy Information Administration, but since they were not greatly different we stuck with the assumptions of the IMF (as we did with commodity prices).

By far the biggest difference from 2011's IMF projections is the forecast for the Chinese current account surplus, which is now put at 4.3 percent of GDP in 2017 instead of the 7.8 percent projected for 2016 in the spring 2011 WEO (IMF 2011a). The sizable reduction in China's expected surplus reflects the unexpectedly low surplus in 2011, at 2.8 percent of GDP instead of the Fund's projection of 5.2 percent even in its fall WEO (IMF 2011b), as well as a reassessment within the IMF following a sequence of earlier overestimates of the surplus only partly explained by the fact that the IMF predicts on the assumption of no changes in real exchange rates while China has been on an appreciating trend (Ahuja et al. 2012). The new projection for 2017 is also based on the standard WEO assumption of no further changes in real exchange rates,

whereas China has been gradually appreciating in recent years. It is likely that a modest further appreciation of the renminbi would bring the Chinese current account surplus within our 3 percent of GDP limit.¹ Since this change in the forecast was made deliberately, as the result of the deliberations of a working group, it is likely that considerable thought went into it. We shall learn in due course whether it is excessively optimistic to postulate that enough action has been taken to adequately reduce the Chinese current account surplus, but in the interim we propose to continue using the IMF's figures.

One of us has recently used his model of the US balance of payments to project the US current account deficit in the year 2017 (Cline 2012b). This turns out to be 3.9 percent of GDP, which is rather close to the IMF's equivalent estimate of 3.5 percent. We have therefore decided that this year the only change we need to make to the IMF's estimates of 2017 current accounts is that which takes account of the changes in exchange rates between the IMF's base period (February 13 to March 12) and ours (the first four weeks of April). We therefore have modified the IMF's figures only by adding or subtracting the product of the exchange rate change times Cline's impact parameter. The changes are the difference between columns 4 and 3 in table 1.²

In this Policy Brief, we discuss the main assumptions made in deriving estimates of FEERs and give a guide to the calculations. We then present and discuss our new results and explain why in some instances they differ significantly from earlier ones. Those who are unfamiliar with the concepts or are seeking a more detailed explanation can find discussions of the concept of the FEER and of the nature of the model employed (with emphasis on Cline's symmetric matrix inversion method, or SMIM) in appendix A.

THE ASSUMPTIONS

The main assumptions used in estimating the FEERs (apart from those embodied in models, notably Cline's SMIM, which we use) are as follows. First, the projections refer to what would occur if there are no changes in (real) exchange rates. Second, we assume the objectives that macroeconomic policy is pursuing in each of the countries. We continue to decline to estimate FEERs for the oil exporters, on the ground that at

1. Cline (2012a) presents new statistical results explaining China's current account. His baseline projections for 2017 indicate a moderate rebound of the surplus to 4 to 5 percent of GDP by 2017, similar to the WEO estimate in the absence of further exchange rate changes. He also finds that if China continues the same 3 percent annual rate of appreciation in the real effective exchange rate achieved since June 2010, by 2017 the range of expected outcomes would be centered at a zero balance.

2. As discussed below, there is a further adjustment for Switzerland.

least some of them conceive of themselves as exchanging oil in the ground for paper assets and that it would be contrary to the international interest to limit the size of their current account surpluses since the presumption is that they would satisfy such a constraint by curtailing oil output.

The projections of what would occur without further changes in real exchange rates are based on the IMF's WEO (April 2012a). As noted, however, we update the IMF forecasts of 2017 current account balances to take account of the exchange rate changes between the IMF's base period of mid-February to mid-March and our base period of April. Also as noted, this year we do not have to make a further modification to account for Cline's differing estimates of the US deficit in the year 2017, since the IMF estimate is close to that of Cline (2012b).

As far as the objectives of macroeconomic policy are concerned, we believe that countries should and do pursue internal balance. It is true that some countries (such as those in Southern Europe and Ireland) are presently constrained from pursuing this objective due to creditworthiness concerns, but we do not believe that their predicament is sufficiently general to negate the value of assuming that this is a general objective. The assumption is that they pursue internal balance by manipulating fiscal-monetary policy appropriately, thus offsetting changes in internal demand that result from pursuit of the external objective. This is not the same thing as ignoring internal balance and assuming that the authorities are only interested in external balance, as is sometimes (wrongly) inferred, but to understand our results it is important to remember that we assume that the authorities manage internally generated demand so as to maintain internal balance.

Many countries have taken to proclaiming that they pursue no external objective in the era of floating exchange rates. We doubt that this is either descriptively accurate or normatively sensible. What may well be true is that within some wide margins countries are content with the outcomes given by market forces, and we think it is sensible for the international community to go along with such acquiescence. But beyond some point countries do indeed become concerned, and recent experiences in Southern Europe suggest that they should have been more concerned than they typically have been. We suggest a tolerance limit of 3 percent of GDP. Admittedly the figure of 3 percent is arguable and should also be expected to depend on a country's stock position; it could be 4 percent, but there is a need to pick a specific number and it is clearly in the right ballpark for the level at which a current account deficit should spark concern.³ And if one has

3. For industrial countries, Freund (2000) found that reversals of deficits tend to begin around 5 percent of GDP and involve a slowdown of growth during

Table 1 Target current accounts for 2017

Country	IMF projection of 2012 current account (percent of GDP)	IMF 2017 GDP forecast (billions of US dollars)	IMF 2017 current account forecast (percent of GDP)	Adjusted 2017 current account (percent of GDP)	Target current account (percent of GDP)
Pacific					
Australia	-4.6	1,932	-6.1	-6.5	-3.0
New Zealand	-5.4	213	-7.1	-6.9	-3.0
Asia					
China	2.3	12,714	4.3	4.1	3.0
Hong Kong	3.2	372	6.4	6.2	3.0
India	-3.2	2,906	-2.4	-1.6	-1.6
Indonesia	-0.4	1,812	-1.2	-1.1	-1.1
Japan	2.2	6,696	1.9	2.1	2.1
Korea	1.9	1,645	0.7	1.0	1.0
Malaysia	10.8	451	8.6	9.2	3.0
Philippines	0.9	322	1.9	1.8	1.8
Singapore	21.8	336	18.6	17.8	3.0
Taiwan	8.0	717	8.9	8.7	3.0
Thailand	1.0	523	1.0	1.0	1.0
Middle East/Africa					
Israel	-0.9	315	1.0	0.7	0.7
Saudi Arabia	27.9	763	14.0	13.5	13.5
South Africa	-4.8	549	-6.0	-5.6	-3.0
Europe					
Czech Republic	-2.1	245	-1.8	-2.0	-2.0
Euro area	0.7	14,358	1.1	1.2	1.2
Hungary	3.3	172	-3.3	-2.7	-2.7
Norway	14.8	556	9.5	10.1	10.1
Poland	-4.5	679	-3.9	-3.7	-3.0
Russia	4.8	3,106	-1.9	-2.2	-2.2
Sweden	3.0	692	7.1	7.2	3.0
Switzerland	12.1	663	9.8	5.7 ^a	3.0
Turkey	-8.8	1,259	-7.9	-7.9	-3.0
United Kingdom	-1.7	3,168	-0.5	-1.1	-1.1
Western Hemisphere					
Argentina	-0.7	582	-1.9	-2.3	-2.3
Brazil	-3.2	3,268	-3.4	-2.6	-2.6
Canada	-2.7	2,141	-2.0	-2.0	-2.0
Chile	-2.4	379	-2.1	-2.3	-2.3
Colombia	-2.7	489	-2.0	-2.1	-2.1
Mexico	-0.8	1,568	-1.3	-0.9	-0.9
United States	-3.3	19,705	-3.5	-3.7	-3.0
Venezuela	7.4	365	2.0	1.5	1.5

a. Special adjustment. See page 4.

Sources: IMF (2012a); authors' calculations.

some constraints on deficits, then one also wants to constrain surpluses, or the sum of global surpluses may uncomfortably exceed the sum of global deficits. In the present context of high unemployment in most advanced economies, the presence of current account surpluses in several major emerging-market economies has the effect of exporting unemployment in a beggar-thy-neighbor fashion, emphasizing the need to place some upper bound on surpluses.

We, therefore, follow the practice of limiting all countries to imbalances of at most 3 percent of GDP.⁴ We have not adopted the proposal, advanced *inter alia* by Edwin Truman (2010), of basing adjustment obligations on the prospective size of the current account imbalance as a percentage of “world GDP.” The countries included in our group of 34 are in any event fairly large ones, accounting for a combined 91 percent of world GDP at market exchange rates in 2017. We seek parity of treatment among them, rather than imposing an additional penalty on the largest among them by making targets in part a function of the size of the country.

Our method is most similar to the first of the three methods employed in the past by the IMF’s Consultative Group on Exchange Rate Issues to assess equilibrium exchange rates (Lee et al. 2008). Their macroeconomic balance approach differs in two important ways from our approach as described above. First, they use an econometric rather than a judgmental approach to determine current account targets. It is presumably inevitable that the staff of an international organization will seek to use a formula rather than judgment when seeking to postulate national objectives, but in this case, where we are seeking to establish general rules that might be internationally acceptable, there are strong advantages in postulating universal rules. We in fact see strong disadvantages in their approach, in that some of the targets postulated seem to make little normative sense: For example, average current account targets were -1.9 percent of GDP for the advanced countries outside Europe versus $+1.3$ percent of GDP for emerging Asia

the adjustment period. Mann (1999, 156) identified 17 episodes in the 1980s and 1990s when a widening of the current account deficit was reversed, and the average current account deficit was 4.5 percent of GDP. Cline (2005, 172–74) argued that a prudent current account deficit for the United States was 3 percent of GDP, despite the past national advantage in earning more on assets than it paid on liabilities (reinforced on average by favorable valuation effects). For emerging-market economies, Reinhart, Rogoff, and Savastano (2003) identify 40 percent as a critical external debt/GDP ratio, beyond which countries may be liable to default. With emerging-market growth typically in the range of 4 to 5 percent and world inflation around 2 percent in dollars, nominal GDP growth would be around 7 percent. Forty percent of this is about 3 percent, so their criterion translates into a current account deficit of about 3 percent of GDP.

4. For a discussion of the greater latitude we allowed in some cases in our 2008 and 2009 estimates, see Cline and Williamson (2011a, 4).

(Lee et al. 2008, 7).⁵ Second, the IMF used country-specific responses of the trade balance to the real exchange rate rather than using a formula for the response as the SMIM model does. This is undoubtedly preferable in principle, although the uncertainties in estimating elasticities suggest that this method is unlikely in practice to have a big advantage.

The second of the IMF’s approaches amounts to estimating a behavioral equilibrium exchange rate (BEER). We regard this as appropriate only if it is plausible that on average the exchange rate was in equilibrium over the period of estimation.

The third of the IMF’s approaches aimed at stabilizing the ratio of net foreign assets (NFA) to GDP at an appropriate level, which it interpreted as the level of 2006. This is not particularly appealing since there is no reason to think that the NFA/GDP ratio was in general at an optimal level in 2006 (or any other year), but the method has the virtue of ruling out Ponzi strategies (which imply ever-escalating ratios of net foreign liabilities, or net foreign assets, to GDP).

THE CALCULATIONS

Table 1 calculates the current account targets. The first column (shown purely for reference) shows the IMF’s (2012a) estimates of this year’s current account balance. Column 2 shows the Fund’s forecast of 2017 GDP in dollars at market exchange rates. Column 3 shows the IMF’s projections of the 2017 current account balance as a percentage of that year’s GDP. Column 4 shows our adjusted projection of the 2017 current account balance after taking account of changes in exchange rates between the IMF’s February/March base and our April base and also deducting 4.1 percent from the estimated Swiss current account surplus to allow for the distortive effect of international accounting conventions when applied to the case of Switzerland with its unusually high presence of multinational firms.⁶ Column 5 shows the target current account imbalance. It is equal to a surplus or deficit of 3 percent of GDP or the actual projected imbalance where this

5. Moreover this method appears to be relatively unstable, considering that in an earlier version of the same study the norm identified for Asian emerging markets was -0.7 percent of GDP rather than the subsequent $+1.3$ percent (Lee et al. 2006, 12).

6. By international accounting conventions, earnings retained abroad are attributed to the country in which the multinational firm in question is domiciled; only distributed earnings are attributed to the country of residence of the shareholder. Because many large MNCs are domiciled in Switzerland, and Swiss residents own only a portion of their shares, the treatment of retained earnings substantially overstates current account income of Swiss residents. The corresponding overstatement in the other direction is much smaller (OECD 2007, 27).

is less in absolute value than 3 percent of GDP. Seventeen of the 30 economies (excluding the oil exporters Norway, Russia, Saudi Arabia, and Venezuela) showed projected imbalances of less than 3 percent of GDP and are therefore not called on to change their effective exchange rates.

Table 2 contains the essence of the calculations. Column 1 is derived from table 1, being the difference between columns 4 and 5 (with appropriate sign). Column 3 is column 1 divided by the impact parameter γ , which is Cline's estimate of the impact of a 1 percent change in the (effective) exchange rate on the trade balance, holding total demand constant. This is an important results column, since it shows our estimate of how misaligned a currency was in April 2012. Column 5 shows the actual dollar exchange rates in that month (generally to three significant figures). Column 6 shows what change in the dollar exchange rate would have been needed, according to the SMIM model, to achieve equilibrium, assuming that all other currencies also move to equilibrium rates. (Comparison of columns 2 and 4 to columns 1 and 3, respectively, shows the degree to which the SMIM model achieves the objectives of the exercise.) Column 7 is a direct product of columns 5 and 6.

The adding-up discrepancy caused by the world current account not summing to zero is automatically resolved by the SMIM model, obviating any need for us to make ad hoc adjustments.

THE RESULTS

Some of the results bear a little comment.

Australia and **New Zealand** are both judged seriously overvalued. Guy Debelle, assistant governor of the Reserve Bank of Australia, told a conference in Sydney that the Australian dollar is at levels consistent with the country's strong terms of trade.⁷ However, if the terms of trade were the sole explanation of the currency's strength, one would expect Australia to be running a current account surplus, not a large deficit; the explanation obviously needs supplementing by the strength of capital inflows. The thing to ask about capital inflows is what happens when they stop, as sooner or later they will (ask Greece). Both Australia and New Zealand already have high ratios of net external liabilities/GDP (66 percent of GDP in Australia and 88 percent in New Zealand in 2010; IMF 2011c). If Australia and New Zealand lack the will to at least slow capital inflows, one hopes that they are preparing for the day they will have to face adjustment.

7. "Australian Dollar Up Late but Weighed by New Worries," Reuters, March 27, 2012.

China is still judged undervalued by about 3 percent, even after the IMF has revised down its figures for future current account surpluses. However, the surplus is now much lower than it was, and so is the extent of appreciation needed to reach the FEER for the renminbi. Thus, whereas a year ago we estimated that the renminbi needed to rise 16 percent in real effective terms and 28.5 percent bilaterally against the dollar (in a general realignment to FEERs), the corresponding estimates now are 2.8 and 7.7 percent, respectively. It is entirely possible that

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future appreciation will bring the surplus down to less than 3 percent of GDP. But China still has fast productivity growth in the tradable goods industries, which implies that a process of continuing appreciation is essential to maintain its current account balance at a reasonable level.⁸ Some will doubtless continue to feel that its ample reserve stock plus the prospect of large capital inflows as the renminbi becomes a reserve currency give China scope to pursue far more adjustment than is implied by a 3 percent of GDP surplus. Further appreciation could in due course be permitted by the adoption of a floating exchange rate, though the Chinese might prefer to be able to control their rate through a perpetuation of upward crawling (preferably against a basket rather than the US dollar).

Several other East Asian currencies are also judged greatly undervalued: **Hong Kong**, **Malaysia**, **Singapore**, and **Taiwan**. Singapore's projected current account surplus of 17.8 percent of GDP in 2017 is the largest of all the reported imbalances. The existence of a negative balance reported on capital services despite large NFA suggests that, if anything, the current account surplus may be understated. Hong Kong also has a large surplus, which its present exchange rate system—a currency board with the US dollar—precludes it from adjusting except by the patently inferior mechanism of inflation. It is also important to the world that Malaysia and Taiwan adjust promptly.

The extent of undervaluation for Malaysia and Taiwan is almost unchanged from our May 2011 round of estimates in terms of real effective exchange rates, because the IMF is projecting approximately the same large current account

8. Cline (2012a) estimates that the renminbi needs to appreciate by 1.3 percent per year in real effective terms to avoid a rise in the current account surplus as a percent of GDP.

Table 2 Results of the simulation

Country	Changes in current account as percent of GDP		Change in REER (percent)		Dollar exchange rate		FEER-consistent dollar rate
	Target change	Change in simulation	Target change	Change in simulation	Actual, April 2012	Percent change	
Pacific							
Australia ^a	3.5	3.7	-17.1	-18.0	1.03	-12.0	0.91
New Zealand ^a	3.9	4.1	-14.5	-15.2	0.82	-12.8	0.71
Asia							
China	-1.1	-0.8	3.6	2.8	6.31	7.7	5.86
Hong Kong	-3.2	-2.9	6.3	5.8	7.76	13.5	6.84
India	0.0	0.2	0.0	-0.8	51.7	4.1	49.7
Indonesia	0.0	0.2	0.0	-0.8	9,162	8.0	8,481
Japan	0.0	0.1	0.0	-0.8	81	4.7	78
Korea	0.0	0.3	0.0	-0.8	1,136	4.7	1,085
Malaysia	-6.2	-5.8	12.4	11.5	3.06	20.1	2.55
Philippines	0.0	0.2	0.0	-0.8	42.7	8.8	39.2
Singapore	-14.8	-14.3	29.5	28.6	1.25	35.4	0.92
Taiwan	-5.7	-5.4	12.8	12.1	29.5	18.4	24.9
Thailand	0.0	0.4	0.0	-0.8	30.9	5.6	29.3
Middle East/Africa							
Israel	0.0	0.2	0.0	-0.6	3.75	2.7	3.65
Saudi Arabia	0.0	0.3	0.0	-0.6	3.75	4.5	3.59
South Africa	2.6	2.8	-10.5	-11.1	7.84	-6.9	8.42
Europe							
Czech Republic	0.0	0.2	0.0	-0.4	18.9	2.6	18.4
Euro area ^a	0.0	0.2	0.0	-1.1	1.32	2.7	1.35
Hungary	0.0	0.2	0.0	-0.5	224	2.6	219
Norway	0.0	0.2	0.0	-0.6	5.76	3.6	5.56
Poland	0.7	0.9	-2.2	-2.7	3.17	0.4	3.16
Russia	0.0	0.1	0.0	-0.5	29.5	2.5	28.7
Sweden	-4.2	-3.9	10.9	10.2	6.74	13.1	5.96
Switzerland	-2.7	-2.5	5.9	5.5	0.91	8.8	0.84
Turkey	4.9	5.0	-25.1	-25.6	1.79	-22.1	2.29
United Kingdom ^a	0.0	0.2	0.0	-0.6	1.60	2.7	1.64
Western Hemisphere							
Argentina	0.0	0.2	0.0	-1.0	4.39	2.5	4.29
Brazil	0.0	0.1	0.0	-1.1	1.85	2.8	1.80
Canada	0.0	0.1	0.0	-0.4	0.99	1.3	0.98
Chile	0.0	0.3	0.0	-0.9	486	3.2	471
Colombia	0.0	0.1	0.0	-0.7	1,774	2.0	1,739
Mexico	0.0	0.1	0.0	-0.4	13.0	1.5	12.9
United States	0.7	0.9	-3.2	-4.3	1.00	0.0	1.00
Venezuela	0.0	0.1	0.0	-0.6	4.29	3.1	4.17

FEER = fundamental equilibrium exchange rate; REER = real effective exchange rate

a. The currencies of these countries are expressed as dollars per currency. All other currencies are expressed as currency per dollar.

Source: Authors' calculations.

surpluses in the most distant year that it forecast in 2011, despite its substantial reduction in the corresponding projection for China.⁹ Nonetheless, the needed amount of change bilaterally against the dollar has declined substantially. Thus, for Malaysia and Taiwan the average needed appreciation in the REER to reach FEERs was 12.6 percent in May 2011 and is still 11.8 percent now (Cline and Williamson 2011a, and table 2 above). In contrast, the corresponding average appreciation bilaterally against the dollar (in the context of a general realignment to FEERs) was 28.1 percent for these two economies a year ago but is “only” 19.2 percent now. The reason for the narrowing in the needed appreciation against the dollar is that with a much smaller needed appreciation of the renminbi (in both effective terms and bilaterally against the dollar) than before, the exchange rates of these two regional trading partners no longer need to move as much against the dollar in order to accomplish the same real effective appreciation as before.¹⁰

Japan should no longer be considered a chronic surplus country, although it is forecast to remain solidly, but no longer exorbitantly, in surplus. Given its difficulties in igniting rapid growth in domestic demand, this seems appropriate.

South Africa is projected to be a major deficit country by 2017, although in 2011 its current account deficit lay just above the 3 percent limit, at 3.3 percent of GDP (IMF 2012b). Given an unemployment rate of around 24 percent, and a ratio of net external liabilities to GDP of a mere 14 percent in 2009 (the latest figure available), it would be quite inappropriate to call on South Africa to embrace austerity. Rather, the policy change that might be considered is a more competitive exchange rate designed to lift growth beyond the level of under 4 percent envisaged in the latest WEO. The disadvantage is the boost that this might give to inflation, which is already projected at close to 5 percent per year. Nevertheless, it would seem unwise to resist depreciation strongly.

As shown in table 2, the **euro area** is fine overall. Its problems are internal: Germany runs a large current account surplus

9. If trade of these partners with China were highly concentrated in exports destined for further processing and export from China to the United States and other advanced economies, one might have expected a downscaling in the Chinese surplus to have implied some reduction in the surpluses of these economies. Conversely, if their trade with China were primarily in competing goods for each other's home markets, the downscaling of the Chinese surplus would have been expected to translate to a *rise* in the regional partners' surpluses. The new IMF projections imply that the two effects roughly offset each other.

10. For Singapore, this side-effect from the new estimates for China explains why the needed bilateral rise against the dollar has moderated (from 38.5 to 35.4 percent) even though the needed real effective appreciation has risen (from 24.1 to 28.6 percent).

(estimated by the IMF at 5.7 percent of GDP last year), matching the current account deficit of the periphery. This imbalance will have to be narrowed to a sustainable level if the euro is to survive. To the extent that the periphery reduces inflation, Germany will have to be prepared to let it rise, if the European Central Bank's agreed objective of an overall inflation rate close to 2 percent is to be achieved.

Poland (though not Hungary) is projected to have a deficit of 3.7 percent of GDP in 2017 and hence to need a moderate real depreciation (2.7 percent). With a high ratio of net external liabilities to GDP of 64 percent in 2010, Poland is skating on thin ice in expecting to continue financing current account deficits of 4.5 percent of GDP in 2012 and an average of 4.1 percent in 2013–16 (IMF 2012a). Even so, with the dollar needing to ease somewhat against the euro to reach its FEER, the effective depreciation of the zloty could be accomplished with no depreciation (actually a slight appreciation) against the dollar in the context of a general move to FEERs.

Sweden is again projected to have a large current account surplus in 2017, as it did in 2011 (although IMF projections show it temporarily declining to around 3 percent in 2012–13), leading to our estimate that the Swedish krona would need to appreciate about 10 percent to reach its FEER.¹¹

Switzerland has created the impression that the Swiss franc is overvalued by the market. Given that Switzerland had a current account surplus of 9.9 percent of GDP in 2011 (14 percent before statistical adjustment), and that its surplus is still projected to be 5.7 percent of GDP in 2017 (9.8 percent before statistical adjustment), only those who seek to measure overvaluation by purchasing power parity, and ignore balance of payments considerations, can hold this view. Our view is that Switzerland is *undervalued* and therefore needs a further *appreciation* of about 6 percent. We do not dispute the view that the most important need is for a big expansion of domestic demand and that appreciation might happen as a consequence of such expansion rather than that it has to be the prime mover. But the rest of the world would be mistaken to view Swiss policy with complacency, let alone to join Switzerland in asking for a weaker Swiss franc.

Turkey had a high ratio of net external liabilities to GDP, in the mid-60s, in 2009. It also had a large current account

11. Considering that Sweden is still a net international debtor in terms of its net international investment position (NIIP), with net international liabilities of about 8 percent of GDP (IMF 2012b), it could be argued that the case for appreciation is less compelling than for other excess-surplus economies such as Singapore and Switzerland, where a failure to adjust will further add to already extremely high ratios of net foreign assets to GDP.

deficit in 2011 (9.9 percent of GDP) and is projected to have a deficit that declines only slowly to reach 7.9 percent of GDP in 2017. While it has been making good use of its capital imports to grow rapidly up to now, it is doubtful whether the world will continue to accommodate it. S&P's downgrade, while this Policy Brief was in preparation, is a warning that Turkey should heed.¹²

The **United Kingdom** appears to have found a satisfactory exchange rate at the new rate that fell so much against the euro in 2009.

It is rather surprising to see that none of the Latin American countries covered—**Argentina**, **Brazil**, **Chile**, **Colombia**, and **Mexico**—is called on to adjust its exchange rate. We remain suspicious that the Brazilian real may be overvalued (although it has weakened considerably recently) and that this is concealed by excessively optimistic forecasting by the IMF, but we have no proof.

The **United States** remains somewhat above the 3 percent of GDP limit in 2017 according to the IMF projection. We now estimate the dollar to be 3.2 percent overvalued (i.e., too strong to keep the deficit down to 3 percent of GDP; there are those who wish to see a more ambitious target for the United States¹³). In 2011 it was estimated as 6.2 percent overvalued.¹⁴

Countries that are listed in the tables but have not been named individually, such as Canada, India, and Korea, give no present signs of needing adjustment. However, most of these countries would have to accept an appreciation in their dollar rates in the event of a general move to FEERs (column 6 of table 2).

CONCLUSION

An appropriately weighted sum of estimated misalignments in 2012 is the smallest since we started the exercise of estimating FEERs in 2008 (figure 1). Weighting by GDP, the average absolute value of divergence from FEERs has fallen from 8.4 percentage points in 2009 to 2.6 percentage points now. In contrast, the simple unweighted average has remained virtually unchanged at about 5 percentage points. The difference

12. "S&P Pours Cold Water on Turkey," *Financial Times*, May 1, 2012.

13. It is doubtful that a lower current account deficit could be posited as part of a multilateral exercise that seeks to treat countries equally, although it would be possible for US negotiators to demand a more ambitious target for the United States in a negotiation.

14. Note that in terms of the SMIM solution, which approximates the target changes but does not meet them exactly (in order to achieve consistency across countries), the needed real effective depreciation of the dollar is now estimated at 4.3 percent, down from 8.5 percent last year.

reflects the predominant roles of China and the United States in the global imbalances. Large imbalances have persisted in a number of smaller economies, including Australia, New Zealand, South Africa, and Turkey on the deficit side and Hong Kong, Malaysia, Singapore, Sweden, Switzerland, and Taiwan on the surplus side.

While the world has probably made genuine progress in groping its way to more realistic exchange rate relationships, in particular through the 30 percent odd real revaluation of the renminbi since 2005 (40 percent real bilaterally against the dollar), the measurement of this progress is also influenced by the fact that in 2012 the IMF has revised downward its estimate of the size of the Chinese surplus in the out-years.

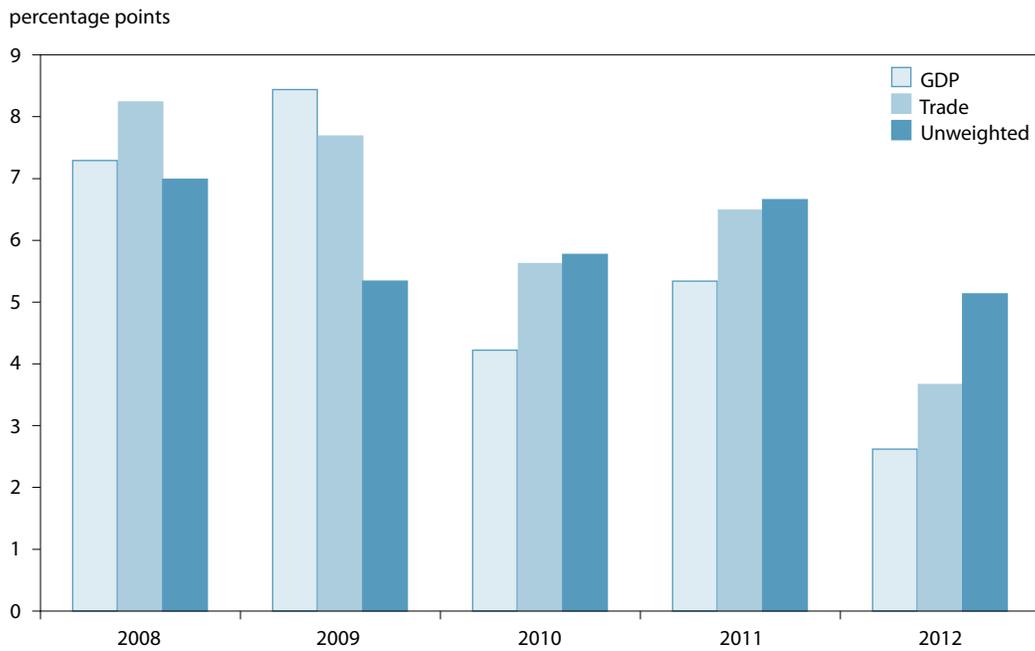
An appropriately weighted sum of estimated misalignments in 2012 is the smallest since we started the exercise of estimating FEERs in 2008.

This revision should not be allowed to obscure the continuing need for China to maintain appreciation in the future to counter its rapid productivity growth and the consequential Balassa-Samuelson effect, plus any desire the Chinese authorities may feel to curb the increase in (or reduce) their already high stock of net foreign assets relative to GDP.¹⁵ Moreover, while we continue to estimate FEERs on the assumption that the IMF forecasts accurately, it is conceivable that the IMF has overadjusted for its past errors on China and that the needed exchange rate changes are in fact larger than our estimates. Time may help to clarify.

Apart from the imbalance centered on the United States and China that has so troubled the world in the past, there is a second major problem with real exchange rates today. This is the overvaluation of the European periphery in terms of German costs, a problem that is aggravated by the single currency since this prevents the use of exchange rate changes to help adjust such disequilibria. We examined this issue last fall (Cline and Williamson 2011b). As shown in figure 2, the 2012 spring WEO projections (IMF 2012a) of current accounts for the debt-stressed peripheral European economies suggest that progress is under way in carrying out external adjustment through fiscal adjustment as well as "internal devaluation" in these economies.

15. Thus, in 2010 China's NFA/GDP ratio stood at 30 percent, in contrast to a range of -10 to -15 percent for Korea and Thailand (for example). The ratio was almost as high as that in Germany (38 percent), although still below that of Japan (56 percent) and far below the ratios in Switzerland (152 percent) and Singapore (233 percent) (IMF 2012a, 2012b).

Figure 1 Average absolute divergence from FEERs for 30 economies, 2008–12



Source: Authors' calculations.

Figure 2 Current account balance in Greece, Ireland, Italy, Portugal, and Spain, 2010–13



Source: IMF (2012a).

Moreover, in Spain and Portugal and to a lesser degree Italy, the adjustment is taking place more on the side of exports than imports, a sign that adjustment is not being obtained solely by the compression of domestic demand.¹⁶ In contrast, in Greece the prospective deficit remains large at about 7 percent of GDP in 2013, and the role of import compression is exceeding that of export expansion (with real volume of exports of goods and services growing at 3.3 percent annually in 2011–13 but the volume of imports falling at 6 percent annually). Similarly, whereas the real effective exchange rate based on unit labor costs has fallen by about 2.5 percent from March 2010 to February 2012 in Portugal, Spain, and Italy, it has remained unchanged in Greece (IMF 2012b). Among the debt-stressed peripheral European economies, then, the single currency seems to be imposing the greatest constraint to external adjustment on Greece.

APPENDIX A METHODOLOGICAL NOTES

The Concept of the FEER

A fundamental equilibrium exchange rate is defined as an exchange rate that is expected to be indefinitely sustainable on the basis of existing policies. It should therefore be one that is expected to generate a current account surplus or deficit that matches the country's underlying capital flow over the cycle, assuming that the country is pursuing internal balance as well as it can and that it is not restricting trade for balance-of-payments reasons. In a growing world where the demand to hold reserves is therefore increasing over time, one needs to deduct the desired secular growth of reserve holdings in determining either the amount of capital outflow available from a current account surplus or the amount of foreign capital available to finance a current account deficit.

Few countries now restrict trade for balance-of-payments reasons. Similarly, the dominant view that the pressure of demand drives the *acceleration*, rather than the *level*, of inflation pretty much settles what is meant by internal balance. In contrast, the widespread advent of high capital mobility has made it far more difficult to pin down in any definitive way what is meant by a country's "underlying capital flow." An extreme view would be that an endogenous capital flow can finance *any* level of current account imbalance, making it impossible to define a FEER. We believe that this view goes altogether too far and that one can

still identify dangerously large capital inflows (i.e., borrowing) and economically unproductive capital outflows (i.e., lending, including reserve buildups). There is nevertheless a range of indeterminacy: Within some limits, capital flows and therefore current accounts may vary without inducing forces that tend to curtail the flows. In this Policy Brief we adopt the position that limits lie at the edges of this range of indeterminacy and that it is desirable to work toward a situation in which these limits are respected. Naturally a FEER is defined in *real* (i.e., inflation-adjusted) terms. If a country suffers 10 percent higher inflation than its peers, then its currency will have to depreciate by 10 percent in order to restore the same real position as before. Only then will its producers have their competitive position restored and will its consumers face the same choices as before.

Similarly, the relevant exchange rate concept is an *effective* rate, i.e., one in which foreign currencies are taken into account and weighted by their importance in the foreign trade of the country in question to form a single estimate of the exchange rate. The practice of measuring a currency's value in terms of the currency of a single trading partner and calling this "*the* exchange rate" is quite wrong for any country with reasonably diversified trade. This is a bilateral rate, in contrast to the effective rate, which gives a measure of a country's overall competitive position. None of this is to deny that competitiveness is also influenced by many other factors, like productivity, which are implicitly being held constant in the analysis of exchange rates. While productivity may be enhanced by a "strong" currency policy, as advocates of such a policy assert (though with little empirical evidence to substantiate their case), we do not believe that productivity is stimulated so much that a country pursuing this policy can hope to emerge with a balance-of-payments position that is strengthened as a result of its policy.

The above discussion assumes that one is seeking the medium-run exchange rate that is in a country's best interest. This seems to us to be one of the requirements for an exchange rate that the international community can reasonably require its constituent elements to accept. Another obvious requirement is that the set of exchange rates be mutually consistent. But the indeterminacy in defining a FEER suggests that there is an element of ambiguity in a FEER, which may be exploited to enable the international community to allow its members a degree of autonomy in selecting their objectives and thus their FEERs. In what follows we have tried to ask ourselves what the international community could reasonably ask of its constituent nations and to avoid asking for changes where they could not be justified as necessary in order to achieve mutual consistency.

16. For 2011–13, annual average real growth in trade volume for goods and services will have been 5.3 percent, 5.0 percent, and 2.6 percent for Portugal, Spain, and Italy, respectively. The corresponding rates on the import side will have been –2.4 percent, –0.5 percent, and –1.8 percent, respectively.

Nature of the Model Employed

Cline (2008) developed a symmetric matrix inversion method model to calculate FEERs for 34 economies. This method is symmetric in that it gives equal weight to each country in arriving at the realignment to FEERs, rather than requiring exact achievement of the adjustment target for the United States and then solving for partner exchange rate changes that would be both broadly consistent with this requirement and roughly consistent with the other current account targets.

The model is based on two sets of relationships. The first is economic: The current account depends on the real effective exchange rate.¹⁷ The second is essentially algebraic: Any set of effective exchange rates has a direct mapping to a corresponding set of bilateral exchange rates against the dollar, and there must be consistency not only between all of the desired changes in effective exchange rates but also between the resulting changes in all bilateral rates in a realignment to FEERs.

The economic relationship states that the change in the current account as a percent of GDP will be equal to the percentage change in the effective exchange rate, multiplied by a country-specific impact parameter. The impact parameter (γ) equals the export price elasticity multiplied by the share of exports in GDP. As noted above, export elasticities in Lee et al. (2008) are specially tailored to each economy, thus being able in principle to reflect such factors as idiosyncrasies of greater or lesser exchange rate responsiveness (including, for example, influences of product composition as well as exchange rate pass through) of the economy's principal trading partners. In our work, however, the export price elasticity is assumed to follow a standard formula set at unity for a relatively closed economy with exports amounting to 10 percent of GDP, and falling to 0.5 (because of increasing supply constraints) for a highly open economy, with exports equal to 100 percent of GDP or more. Estimates of the impact parameters based on 2010 data are reported in Cline and Williamson (2011a, 18).

The overall effect is that the impact parameter varies from about a 0.15 percent of GDP change in the current account for each percentage point change in the effective exchange rate for a relatively closed economy to a maximum of a 0.5 percent of GDP change per percentage point change in the effective exchange rate for a highly open economy. In the case

of China, for example, we estimate an impact parameter of a 0.3 percent of GDP reduction in the current account surplus for a 1 percentage point appreciation in the real effective exchange rate. If the target external adjustment is a reduction in the current account surplus by 6 percent of GDP, the target effective exchange rate appreciation will need to be $6/(0.3) = 20$ percent.

The identification of the target change in each country's real effective exchange rate (REER) is thus simple. For each country, the change equals the desired change in the current account as a percent of GDP divided by the elasticity-based impact parameter. The problem then becomes more complicated, however, when consistency is imposed on all of the resulting changes in REERs. Changing the REER for any given country necessarily changes those of its trading partners.

This, then, involves a set of algebraic relationships among individual economies' effective exchange rates and between bilateral and multilateral effective exchange rate changes. If a currency appreciates by, say, 10 percent against the dollar in isolation, its effective appreciation against all trading partners also equals the bilateral appreciation, or 10 percent. But if other trading partners also appreciate, the home country's appreciation in effective terms will be diminished by an amount that depends on the importance of the other appreciating countries as trading partners. This influence turns out to be particularly important when considering possible corrective changes in exchange rates in East Asia. Bilaterally against the dollar, some of the indicated changes may be quite large, but because several regional trading partners also show sizable bilateral appreciations against the dollar in order to reach adjustment targets, the corresponding effective exchange rate changes are considerably smaller.

The SMIM model solves for a set of bilateral exchange rate changes against the dollar (z_i , for country i) that is consistent with a target set of changes in effective exchange rates (r_i). It turns out that this solution is the answer to a matrix algebra problem, in which the bilateral exchange rate changes (in percent), the effective exchange rate changes (in percent), and a matrix of trade weights enter in the equation.¹⁸ It also turns out that there is not one single solution to this problem. With 35 economies, the number considered in this study (counting the rest of the world as an economy), there are 35 possible alternative solutions. The reason is that there are 35 equations for target effective exchange rate changes (one for each country, in light of its target current account change

17. This relationship focuses on the relative price or "elasticity" effect in determination of trade. There is a parallel shadow "absorption" effect that must also be consistent, involving the national accounts identity whereby net imports equal investment minus saving (including public). Implicitly the focus on the effective exchange rate in external-sector adjustment assumes that parallel influences on domestic demand, such as a fiscal adjustment, take place to facilitate external adjustment and maintain the economy at full capacity.

18. Namely: $Z = B^{-1}R$, where Z is a vector of bilateral exchange rate changes against the dollar (percentages), R is a vector of effective exchange rate changes (percentages), and $B = I - A$, where B is the matrix obtained by subtracting the trade-weights matrix A from the identity matrix I .

and impact parameter) but only 34 unknown exchange rate changes against the dollar, because the dollar cannot change against itself (in the jargon of the exchange rate literature, it is the numeraire). Our approach to dealing with this problem of “overdetermination” is simply to average the alternative possible sets of exchange rate changes.¹⁹

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19. There is a single exception, for each country. Of the 35 solutions, the average for the currency in question is that of the 34 equations in which the country has been included. The remaining equation omits the direct effective rate equation for the country and only obtains the country’s bilateral exchange rate change indirectly as needed to generate the set of effective exchange rate changes sought for the other countries. The average of the 34 results with Own Country Included, or 34OCI, is used as the estimate of the bilateral exchange rate change for the country in question, because the one Own Country Excluded (OCE) result systematically turns out to be unrepresentative. The OCE estimate is always lower than the 34OCI average, in some cases absurdly so. With the 34OCI estimates in hand for each of the 35 economies’ exchange rate changes against the dollar (except for the dollar itself, which is zero), the corresponding set of effective exchange rate changes is then calculated. Because of the overdetermination problem, this estimated consistent set shows divergences from the target set of effective exchange rate changes. These divergences are generally small, however.

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