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Estimates of Fundamental Equilibrium Exchange Rates, May 2010

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This policy brief updates our estimates of fundamental equilibrium exchange rates (FEERs) to the latest issue of the *World Economic Outlook* (WEO) published by the International Monetary Fund in April 2010 (IMF 2010a). It is part of what has now become an annual cycle drawing out what we believe to be the implications of the IMF's forecasts for the pattern that exchange rates need to take if the world is to approach a reasonably satisfactory medium-run equilibrium position. This year we also published an interim report (Cline and Williamson 2010), partly drawing on the October 2009 WEO but essentially examining the implications of the pattern of market exchange rates as of January 1, 2010 for how misaligned currencies were at that time, assuming that the FEERs estimated in June 2009 were correct. In this publication we have estimated the FEERs anew on the basis of revisions in the methods employed and new data presented in the April 2010 WEO, after incorporating adjustments to the IMF forecast needed to take account of recent changes in exchange rates and especially the euro.

The big development in the world economy in the months following March 2009 (the basis of last year's forecasts) was the recovery from the global recession. This included commodity prices, most importantly the oil price, and the dollar exchange rates of most other countries, at least where these exchange rates were free to move. These changes largely reversed, or in a few cases more than reversed, the earlier declines in exchange rates against the dollar caused by investors' belief that the US dollar and US Treasury obligations were less unsafe assets in a crisis than most others. However, in recent months there has been a new flight from some other currencies, notably European currencies (especially the euro), as a result of the Greek crisis.

As in Cline and Williamson (2008, 2009), we take as our point of departure the projections published in the spring issue of the IMF's WEO. It contains projections of current account positions and assumptions about commodity prices, notably the oil price, which on this occasion the Fund assumed would average $80 per barrel in 2010 and $83 per barrel in 2011 (and constant in real terms thereafter). In the IMF projections most other variables (except interest rates) are assumed to remain constant at their average levels on February 23 to March 23, 2010. The euro stood at about $1.35 then. The projections of this study are instead based on the average level of the euro during May, at $1.25. Appendix A sets forth the adjustments to the IMF's medium-term current account projections that result from this updating of exchange rates.[1]

For the United States, in updated versions of two balance of payments models, Cline (2010) projects the baseline US current account deficit for 2015 at either 3.6 or 4.2 percent of GDP, based on exchange rates as of the first quarter of 2010. This range was sufficiently close to the IMF (2010a) projec-

1. In contrast, we make no change to the oil price projections, on grounds that the recent weakening is only a temporary response of increased risk aversion reflecting the Greek debt crisis and fears of its wider contagion.

tion of 3.5 percent for 2015 (especially after assuming a higher oil price in the out-years) that, unlike in the 2009 round, the additional step of applying a special change to the projection for the United States and the corresponding projections for its trading partners is unnecessary. However, the US forecast is changed from the WEO projection as part of the general adjustment for recent exchange rate changes (see appendix A).

This policy brief starts, as did that of a year ago, by reviewing the concept of the FEER. This section can be largely omitted by those who recall similar earlier discussions, although the fourth paragraph is new. We then discuss the main assumptions made in deriving estimates of FEERs, which again overlap with last year's discussion (Cline and Williamson 2009). The third section reviews the nature of the model employed, with the main emphasis on Cline's symmetric matrix inversion method (SMIM). Many readers will also feel able to skip this discussion, which is again a repetition, but some may wish for full details of the model, which are available in Cline (2008). The final section contains our new results and explains why in some instances they differ significantly from the earlier ones.

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 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 build-ups). 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.

ASSUMPTIONS

We make two main types of assumptions in estimating FEERs, in addition to those embodied in the models that we use (notably Cline's SMIM). First, there are projections of what would occur if there were no changes in exchange rates. Second, there are assumptions about the policy objectives that macroeconomic policy should pursue. As noted, the projections are based on the IMF's latest WEO (April 2010), as updated to take account of exchange rate changes from March to May (see appendix A).

We do not believe that it would be fruitful to attempt to estimate the equilibrium exchange rates of the currencies of the oil-exporting countries, represented in our set of major economies by Saudi Arabia, Norway, Russia, and Venezuela. These rates depend negatively upon the countries' saving strategies and positively on the oil price. Saving strategies vary enormously from one country to another: Norway saves virtually all of an increment in the oil price, while Ecuador spends virtually everything and would face difficulties in the event of a protracted oil price decline. The world has to find a way to accommodate countries like Norway, since such a saving strategy reflects the transformation of natural, exhaustible resource wealth into wealth in the form of foreign assets. If exchange rate targeting came to be viewed as a way to cajole countries like Norway into acting contrary to their enlightened long-run interest and to force them into excessive adjustment, they would naturally be reluctant to participate. Sophisticated estimates of equilibrium exchange rates that avoided this danger would require knowledge and appraisal of the saving strategies of each oil exporter identified in the study. That would, at the least, require detailed knowledge of each country that we do not claim to possess.

So far as the policy objectives that macroeconomic policy should seek are concerned, we have already stated that we assume that all countries pursue internal balance. (Some countries—like Greece today—may, however, be constrained by creditworthiness concerns.) The assumption is that they do this by manipulating fiscal-monetary policy appropriately, thus offsetting changes in internal demand that result from the pursuit of the external objective. This is not the same thing as ignoring internal balance and assuming the authorities are only interested in external balance, as is sometimes (wrongly) inferred. We also assume that countries should be pursuing some concept of external balance, but it is much more difficult to interpret what this means. We interpret it as implying a current account target: This target need not be zero; neither should it be so large as to lead a country into trouble in the long run. A customary interpretation of this view—which enjoys some modest statistical support[2]—is that countries should not run a current account deficit in excess of 3 percent of GDP on a sustained basis. A desire to have symmetrical rules on the surplus and deficit sides would then suggest extending this rule to surplus countries.

In the past we allowed some countries greater latitude to run imbalances than 3 percent of GDP. We argued that some countries have shown themselves capable of managing bigger debts or had already accumulated larger assets than were consistent with this limit. In 2008 we therefore raised the allowable imbalance to 6 percent of GDP for certain countries. In 2009 we argued that this was unacceptably arbitrary and that it would be preferable to give all countries the right to a larger imbalance if (but only if) this would not increase the net foreign assets to GDP ratio (NFA/GDP). (This has the merit of precluding Ponzi strategies.) But the latest meeting of the G-20 committed the international community to the goal of rebalancing (G-20 2010). We agree with giving higher policy priority to eliminating imbalances. The recent experiences in Eastern and now Southern Europe underscore the risks of large deficits. The current and prospectively protracted state of excess capacity in the global economy means that countries that run extremely large current account surpluses are exporting their unemployment and imposing a negative externality on the international economy. Therefore in this round of FEERs estimates we are eliminating exceptions to the ±3 percent of GDP limit on imbalances.

Removal of exceptions affects eight of our 30 non-oil regions: Australia, New Zealand, China, Hong Kong, Singapore, Taiwan, Hungary, and Switzerland. Australia and New Zealand have handled large debts successfully in the past, but

2. For emerging-market economies, Reinhart, Rogoff, and Savastano (2003) identify 40 percent as a critical threshold for external debt relative to GDP, beyond which countries have tended to be vulnerable to default. External debt stabilizes at a debt-to-GDP ratio that equals the ratio of the current account deficit as a percent of GDP to the nominal growth rate of GDP in foreign currency. With emerging-market growth rates typically in the range of 4 to 5 percent and world inflation at 2½ percent in dollars or euros, nominal GDP growth in foreign currency is typically on the order of 7 percent. Forty percent of this growth rate is about 3 percent, so the critical debt-to-GDP ratio translates into a current account deficit of about 3 percent of GDP. For industrial countries, Freund (2000) found that reversals of deficits tend to begin at a threshold of 5 percent of GDP and involve a slowdown in growth in the adjustment period. Mann (1999, 156) has identified 17 episodes in the 1980s and 1990s when a widening of the current account deficit of industrial countries was reversed; the average ratio of the current account deficit to GDP was 4.5 percent when the reversal began (although she emphasized that the turning points were not necessarily the threshold of unsustainability). For the important case of the United States, Cline (2005, 172–74) argued that 3 percent of GDP is a prudent long-term ceiling for the current account deficit despite the national advantage in the past of earning a higher return on foreign assets than it paid on liabilities, plus favorable valuation effects from exchange rate changes. Williamson (2004, 30) and Mussa (2005, 189) set the ceiling at 2 to 2.5 percent of GDP.

so did Greece until the disaster of 2010: Perhaps it behooves them to rein in demand in good time to avoid a similar fate.[3] On the surplus side, there is a perverse incentive structure if countries that successively violate surplus limits rapidly build up their NFA levels and as a result gain ever more lenient limits. By way of illustration, for China the elimination of the NFA exception would have no effect at all if an end-2006 NFA benchmark is applied (as in Lee et al. 2008), but it reduces the permitted surplus from 4.3 percent of GDP to 3 percent if the end-2009 level is used (correspondingly strengthening the FEER by 4 percent).[4] The best illustration of the unviability of the NFA-based exceptions, however, is the case of Hong Kong. With an end-2009 ratio of NFA/GDP at 307 percent, Hong Kong would have had the right to a current account surplus of close to 20 percent of GDP under the old rules, which would surely violate the spirit of the G-20 decision.

We have the impression that the IMF estimate of Singapore's 2015 current account surplus (21.3 percent of GDP) may be somewhat exaggerated, but it is in any event very large and hence the Singapore dollar is slated for a large revaluation under our approach.[5] The same is true, but on a smaller scale, for Taiwan. Hungary has already realized the danger of a Greek-style situation developing. With Switzerland we have adjusted the current account projection down by an additional 4 percent to allow for misleading accounting conventions. Switzerland has many multinational enterprises, the retained earnings of which are all recorded as accruing to Switzerland even though foreigners own a large portion of Swiss multinational enterprises (MNEs), and that portion of the retained earnings of Swiss MNEs therefore does not increase the conceptually relevant measure of the current account.[6]

Table 1 (page 11) calculates the current account targets. The first column (shown purely for reference) shows the IMF's (2010a) estimate of this year's current account balance. Column 2 shows the Fund's forecast of 2015 GDP in dollars at market exchange rates. Column 3 shows the IMF projection of the 2015 current account balance as a percentage of that year's GDP. Column 4 shows our adjusted projection of the 2015 current account balance after taking account of changes in exchange rates from the IMF's March base to our May base (see appendix A) and the overstatement of the Swiss current account. Column 5 then 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 it is less in absolute value than 3 percent of GDP. Seventeen of our 30 non-oil economies have projected 2015 imbalances under 3 percent of GDP and are therefore not called on to adjust their effective exchange rates.

In previous issues, we have carried out an initial adjustment to the set of desired current account changes to seek consistency from the standpoint of a zero sum across the changes of all individual countries' current accounts. Thus, in Cline and Williamson (2009, 5) an initial adding-up discrepancy of –$92 billion in current account changes was distributed across each non-oil economy as a uniform percent of their combined GDP. The initial targets for reducing surpluses were narrowed by approximately 0.2 percent of GDP; the initial targets for increasing balances of excess-deficit countries were made more ambitious by 0.2 percent of GDP; and countries initially indicated as needing no change at all were assigned a targeted increase of 0.2 percent of GDP.

In this round of FEERs calculations, the initial adding-up discrepancy for target current account changes is considerably larger, at –$326 billion or approximately 0.4 percent of world GDP. In this round, however, the inherent adding-up consistency imposed by the SMIM model itself is instead relied upon to arrive at broadly consistent current account changes. Because the model does not allow any individual country to dominate the result by obtaining precisely the target prescribed for that country (hence, "symmetric," whereas an early version focused on the United States did require precise targeting for the United States), solving the model automatically generates modest deviations from the raw target changes.[7]

Our methodology is most similar to the first of the three methods employed 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, it uses an econometric rather than a judgmental approach to determine current account targets. It is doubtless

3. Greece ran current account deficits averaging 12.9 percent of GDP in 2006–09 (IMF 2010a).

4. China's NFA was 24.6 percent of GDP at end-2006 and 36.7 percent at end-2009 (IMF 2010b). With 2010–15 real growth projected at nearly 10 percent (IMF 2010a) and world dollar inflation at 2 percent, the current account stabilizing the NFA/GDP ratio would be 2.9 percent for the former benchmark and 4.3 percent for the latter.

5. Cumulative current account surpluses reported by Singapore exceed the change in reported NFA from end-2001 to end-2008 by 37 percent (calculated from IMF 2010b), suggesting the possibility of overstatement. Verification by partner trade statistics is difficult because of the large influence of re-exports reported in varying ways by partners (Singapore Department of Statistics 2005).

6. Overstatement of capital services income to Swiss residents amounts to 4¼ to 7 percent of GDP. Corresponding understatement of residents' share of retained earnings in MNEs abroad is estimated at 1½ percent of GDP (OECD 2007, IMF 2007). A central estimate of the net overstatement is thus 4.1 percent of GDP.

7. Note that in the solution, the remaining global discrepancy in current account changes is relatively small at $25 billion, or 0.03 percent of world product.

inevitable that the staff of an international organization will seek to use a formula rather than judgment when seeking to postulate national objectives, but that does not make it right. The objectives thus postulated seem to make little normative sense (in that study, average current account targets of –1.9 percent of GDP for advanced countries outside Europe versus +1.3 percent of GDP for emerging Asia), as opposed to reflecting what actually happened (which the exercise is supposed to be aimed at preventing in future). Second, it uses estimated 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 may not in practice give this method 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 NFA/GDP at an appropriate level, which it interpreted as the level in 2006. This is not particularly appealing since there is no reason to think that NFA/GDP was in general at an optimal level in 2006, but the method has the virtue of ruling out Ponzi strategies. Last year we made use of this insight in our work, but as noted above we decided not to allow countries greater scope to run imbalances if they had higher NFA/GDP.

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 (as in Cline 2007) 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.[8] 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.[9]

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.[10] 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.

8. 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.

9. For the impact parameter (γ) for each country, see appendix table A.1. Note that for the United States, the estimates use an impact parameter derived from a much more complete model and include capital income effects from cumulative changes in net foreign liabilities.

10. To calculate the effective exchange rate, the importance of each of the 34 trading partners in the trade turnover (exports plus imports) of a country is calculated from a matrix of bilateral trade flows.

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

The most important change in 2010 FEERs is the reduction in the estimate of the undervaluation of the renminbi relative to its equilibrium rate.

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.[11] 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 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.[12]

RESULTS

The results of our calculations are shown in table 2 (page 12). The first column shows the target change in the current account balance as a percentage of GDP and is simply the difference between column 5 and column 4 in table 1. The adjacent column shows how close the simulations of the model came to achieving the targets laid out. It can be seen that in most cases the simulated change in the current account balance was somewhat smaller than the target for excessive-surplus countries, or somewhat larger for all other countries, by an average amount of approximately 0.4 percent of GDP, reflecting the size of the initial global discrepancy discussed above.

Column 3 shows our estimates of the target changes in effective exchange rates in May 2010, derived from the target changes in the current account in 2015 (column 1) and the impact parameters (table A.1). Column 4 shows the corresponding model estimates of changes in the effective exchange rates, which approximates each country's target as closely as possible while ensuring consistency across countries. A positive number indicates that the currency of the area in question needed to appreciate because it was undervalued, and conversely. The fact that countries that were not named as needing to adjust nevertheless have negative numbers, indicating a need for depreciation, reflects the fact that the model is seeking to impose larger improvements than those called for in column 1 of table 2 in order to obtain adding-up consistency.

Column 5 shows the actual average dollar exchange rates over May. Column 6 presents the results of applying Cline's SMIM model to estimate the percentage changes needed in the dollar exchange rates (these changes in the bilateral rate against the dollar also yield the changes in effective exchange rates shown in column 4). Unlike last year, the figures do not display a universal need for appreciation against the dollar, because the dollar is considerably weaker than at its safe haven peak in March 2009 at the height of the global financial

11. 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.

12. There is a single exception, for each currency. 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 35 economies' exchange rate change 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.

crisis.[13] Even so, only four currencies turn out to be overvalued bilaterally against the dollar: the Australian and New Zealand dollars, the South African rand, and the Turkish lira. Finally, column 7 reports the result of combining columns 5 and 6, to get our estimates of what we term the "FEER-consistent dollar exchange rates." These are usually expressed as units of local currency per dollar, although where it has been traditional to express them the other way round (Australia, New Zealand, the euro area, and the United Kingdom) we follow suit.

Table 3 (page 13) presents a comparison of this year's results and last year's estimates of FEER-consistent exchange rates. Column 1 simply states the results of last year's analysis. Column 2 adjusts that column for differential inflation over the intervening year. (In most cases these differences are small, reflecting the fact that we live in a non-inflationary age.) Column 3 reproduces the figures from column 7 of table 2, which stated the bottom line of the preceding analysis. Column 4 shows the result of comparing columns 2 and 3 to indicate whether our estimate of the FEER-consistent dollar exchange rate has appreciated, depreciated, or remained roughly constant. Countries are listed in order of the size of the discrepancy between last year's and this year's figures.

Another important change…is that of the euro, which is now estimated to have a FEER-consistent dollar rate of $1.31 instead of $1.52 last year.

While large changes are a little smaller and less frequent than the results of last year compared with those a year earlier, they are still large. There are 3 year-to-year changes exceeding 20 percent, 10 of over 15 percent, and no fewer than 13 (of 29) over 10 percent.

Table 4 (page 14) compares the results of our calculations over the three years we have been making them. In a number of cases (Indonesia, Brazil, Mexico, Canada, India, Korea, Australia, Chile, and Singapore) it seems that the depreciation in dollar exchange rates last year resulting from the "flight to safety" did not lead the IMF to make an appropriate adjustment in the projection of the current account, inducing us to project a need for an unnecessarily weak exchange rate in order to achieve the specified objectives. There are also several examples where the converse phenomenon seems to have been at work: in Japan, China, and also the euro area. These currencies strengthened (the euro was strong on an effective though not bilateral basis), but the IMF did not allow much for that in its forecasts (perhaps because of an ingrained elasticity-pessimism in the institution), so we estimated that they would have to be unrealistically strong in order to achieve satisfactory payments outcomes. Calculations in fact show that on average the changes between 2008 and 2009 are larger than those between 2008 and 2010 (an absolute average difference of 10.0 percent versus 8.1 percent).

The most important change in 2010 FEERs is the reduction in the estimate of the undervaluation of the renminbi relative to its equilibrium rate. Table 2 shows a need for a renminbi appreciation in effective terms of only 14 percent, as against last year's estimate of 21 percent, and in bilateral terms against the dollar of only 24 percent, as against 40 percent last year. Two factors are behind these developments: First, and overwhelmingly the most important, is a reduction in the surplus that the IMF is forecasting for China. Last year the Fund was projecting a medium-term (2012) current account surplus of 10.6 percent of GDP (which we adjusted downwards, but only to 10.5 percent of GDP), whereas this year its forecast (this time for 2015) is only 8.0 percent of GDP. Adjustment to take account of the real effective appreciation of the renminbi by 1.7 percent from the IMF's March base to our May base slightly reduces our medium-term projection of the surplus (from 8 percent of GDP to 7.5 percent; see appendix A). Partially offsetting this is a second effect. Last year China was allowed a surplus as large as 4.0 percent of GDP (i.e., an extra 1 percent) to keep its NFA/GDP ratio constant, whereas this year we have abolished any allowance for NFA. Hence last year China was expected to adjust by 6.5 percent of GDP, whereas this year the target adjustment is only 4.5 percent of GDP. (After the model arrives at its best approximation of consistent changes, however, the realized adjustment shrinks to just 4 percent of GDP; see table 2.)

The main reason for the reduction in the IMF's projected current account surplus for China appears to be that pipeline effects of appreciation in the renminbi have now taken place. The Fund may have given this effect insufficient consideration in its April 2009 WEO but more weight in the April 2010 WEO. Figure 1 (page 15) reports an index of the real effective exchange rate of the renminbi in the first quarter for 2008 through 2010 (left axis) and the corresponding 5-year forward current account projection in the relevant WEO (2013 forecast for the April 2008 WEO, 2014 in the April 2009 WEO, and 2015 in the April 2010 WEO).[14] The two paths go broadly in opposite directions: As the REER rises, the medium-term current account surplus as a percent of GDP declines.

13. On a trade-weighted basis, for May, the dollar's REER stood 8.9 percent below its average level in March 2009, using the trade weights of the SMIM model.

14. The REER for the renminbi used here is the average of the series maintained by JP Morgan, Citigroup, and the Bank for International Settlements.

However, the figure also suggests that the 2009 WEO failed to give much weight to a sizable appreciation that had already occurred in the renminbi, whereas the most recent WEO is more consistent with a substantial exchange rate effect on the future current account. Thus, from the first quarter of 2008 to the first quarter of 2010 the REER has appreciated by 5.5 percent. Applying the SMIM impact parameter for China (0.3), the medium-term current account surplus should have fallen by 1.65 percent of GDP.

A second factor is the increase in the expected price of oil. In its April 2009 WEO, the IMF projected oil prices at $62.50 in 2010 and constant in real terms at this level thereafter. In the April 2010 WEO, the expected price is $80 in 2010, $83 in 2011, and at that level in constant prices thereafter. The $20.50 difference for 2012, combined with China's oil imports of 3.9 million barrels per day (EIA 2009), amounts to 0.4 percent of GDP projected for 2012. A third influence is that in its most recent WEO the IMF has modestly increased the long-term growth differential between China and the industrial economies.[15] In short, there are reasonable grounds for the IMF's reduction in its medium-term surplus forecast for China, although there may also be grounds for judging that this downscaling should have received more attention already in last year's IMF projections than it did.

By May 2010, the dollar's exchange rate was too strong only vis-à-vis a limited number of currencies, most of which were in East Asia and by far the most important of which is the renminbi.

Another important change in our estimated equilibrium exchange rates is that of the euro, which is now estimated to have a FEER-consistent dollar rate of $1.31 instead of $1.52 last year. The principal source of this change is that because of the latitude of the current account target, the recent low level of the euro remains compatible with a medium-term balance that falls within the allowed range. Thus, our baseline 2015 current account balance for the eurozone is 0.6 percent of GDP, stronger than in the IMF baseline of –0.1 percent but well within the permitted range.[16]

The other major currency in the world is the US dollar. Because it constitutes the numeraire, it can be judged only on its average or effective rate. One therefore has to examine column 3 (or, arguably better, column 4) in table 2. In May 2010 the dollar remained overvalued by about 5 to 8 percent. This extent of overvaluation is greater than in the March 2010 base used by the IMF. The real effective exchange rate of the dollar has risen by 2.1 percent from the February 23 to March 23, 2010 base to the May average.

One disadvantage of our approach that has been highlighted by the depreciation of the euro is a potential inconsistency. We emphasized earlier that the depreciation of the euro promised to expand the prospective European surplus by 0.7 percent of GDP, some $100 billion, but that the new current account still lay within the range of ±3 percent of GDP, which is the range of indeterminacy that we accept as consistent with an equilibrium exchange rate. But there may be other currencies, such as the US dollar, that are already outside their acceptable ranges, which are therefore shown as more overvalued than they were before. We therefore have an increase in net overvaluations in the system. In the present instance we have left this phenomenon to be resolved by Cline's SMIM model. It turns out that because the aggregate target surplus reductions for excess-surplus countries substantially exceed aggregate deficit reductions of the United States and other excess-deficit countries, under present global conditions the weaker euro does not cause an adding up problem in the sense of a lack of candidate surplus reductions to cover the US and other deficit reductions. Of course, if China and other high-surplus economies refuse to adjust exchange rates and cut their surpluses, then the task of meeting deficit-reduction targets for the United States and other relevant countries would indeed become more difficult as a consequence of the weaker euro.

Let us now go systematically down the list of countries in table 4. Australia and New Zealand both appear overvalued (the market rates of their dollars in the May base period were 87 and 70 cents, respectively), but the estimates of FEERs have not coalesced to give one a good estimate of how much, and indeed the 2008 estimates do not support the diagnosis.[17] China has already been discussed. The strong appreciation in

15. For 2009 through 2014, last year's WEO placed cumulative growth in China at 69.5 percent and in advanced economies at 7.5 percent. This year's WEO places the two respective estimates at 73.6 and 9 percent, boosting the 2014 ratio of Chinese to advanced-economy GDPs by 1 percent.

16. In absolute terms, for 2015 the revised baseline places the eurozone's current account in surplus at $91 billion, in contrast with a deficit of $7 billion in the IMF baseline. For all 34 economies considered, the sum of current accounts changes from a combined surplus of $229 billion to a surplus of $105 billion. By implication, the recalculation using the later base period moderates rather than aggravates any global discrepancy.

17. In 2008 we allowed Australia and New Zealand current account deficit targets of –6 percent of GDP, or twice the normal limit, on grounds of demonstrated past ability to sustain such levels. In 2009 we instead adopted the NFA test. This year they have the usual 3 percent target, and on this basis the acceptable deficit targets are considerably smaller and hence target adjustments for exchange rates and current accounts are larger.

the bilateral dollar FEER-consistent rates of the rest of Greater China (i.e., Hong Kong and Taiwan) is primarily a reflection of the appreciation of the renminbi's FEER-consistent rate, although both economies also have significant needed multilateral appreciations as well. The Indian rupee appears moderately undervalued. The Indonesian rupiah (at 9,167 in May) appears somewhat undervalued. Note that Indonesia is one of those countries whose rate was last year estimated excessively weakly for the reasons explained earlier (reaction to the flight to safety allied with the Fund's elasticity pessimism).

The Japanese yen (at 92 in May) is still too weak, but the disequilibrium is nowhere near the size that was customary. Korea is another case where we estimated an excessively weak FEER last year, for reasons explained at length in Cline and Williamson (2010); the Korean won now appears to be bilaterally too weak (1,167 in May) but multilaterally a little on the strong side. (In other words, as shown in table 2, Korea does not need a change in its multilateral exchange rate, but if China and other major trading partners carry out their needed appreciations, the won would need to appreciate against the dollar to avoid becoming undervalued on a trade-weighted basis.) Malaysia and Singapore are two cases in which it seems that the FEER calculations are relatively determinate (Singapore also exhibits a bump in 2009 due to the flight to safety), and in both cases the currencies are seriously undervalued (market rates of 3.25 and 1.39, respectively). Both the Philippines and Thailand (with market rates of 45.6 and 32.4, respectively) appear somewhat undervalued with respect to the dollar.

The Israeli shekel appears to be relatively close to its fundamental value. The same cannot be said for the South African rand, which at 7.66 to the dollar in May is about 9 percent overvalued even though this year's estimate of the FEER-consistent rate is by far the strongest we have estimated. So it is safe to conclude that the rand is overvalued, but unfortunately our analysis has shown relatively large variation in the estimate of how much. The Czech koruna at 20.5 appears relatively close to appropriate valuation. Arguably, Hungary and Poland both had excessively weak estimates in 2009, but now that the FEER for the euro has fallen significantly the new equilibrium level for the two currencies turn out to be relatively close to what was estimated last year. Against the new FEER-consistent rates the two currencies are moderately undervalued at present (market rates of 221 forints and 3.24 zloties). The Swedish krona (market value of 7.72) and Swiss franc (market value of 1.13) are both significantly undervalued, in both multilateral and bilateral terms. The Turkish lira at 1.55 is overvalued in effective and bilateral terms. The pound sterling is slightly undervalued on both an effective and a market basis.

The Argentine peso appears near equilibrium on a multilateral basis and mildly undervalued on a bilateral basis. The Brazilian real is shown as approximately at its target rate (at a market rate of 1.81), but this is one case in which our skepticism of the Fund's forecasting leads us to doubt the figures, and we would judge instead that the real is mildly overvalued at present exchange rates. This depends upon the belief that the industrial component of the balance of payments will deteriorate more in response to the stronger real than the Fund has forecast and that this will not be offset by stronger commodity prices than are being forecast by the Fund. The Canadian dollar is also shown as near equilibrium, though again it is possible that the Fund has underestimated the long-run impact of the recent appreciation. The Chilean, Colombian, and Mexican pesos all appear to be in the vicinity of equilibrium.

CONCLUSION

One can begin to appreciate the value of regular estimates of FEERs. In a number of cases, the figures in table 4 are sufficiently similar as to give confidence that we have hit on roughly the right measure. In a number of other cases, the figures changed a lot from one year to another but we have a reasonably coherent understanding of why they changed. In yet other cases, we feel that we are able with reasonable confidence to offer some judgments, although they are not as refined as we would wish. Our principal conclusions are as follows:

By May 2010, the dollar's exchange rate was too strong only vis-à-vis a limited number of currencies, most of which were in East Asia and by far the most important of which is the renminbi. Of course, for currency appreciation to have desirable effects it is necessary that it be accompanied by fiscal-monetary expansion (and conversely for countries that need to devalue).

There would be obvious advantages in a Chinese policy aimed at correcting this disequilibrium quickly. Such a policy would permit a liberalization of capital flows without being swamped by excessive inflows, increase the availability of goods to the Chinese public, and permit a relatively rapid end of the global imbalances. But if a rapid correction is resisted by Chinese policymakers, they could resume an upward crawl relative to the dollar, and preferably they could also shift to a basket peg as and when the dollar exhausts its current appreciation.

It is highly desirable that several East Asian economies that trade heavily with mainland China—notably Hong Kong, Malaysia, Singapore, and Taiwan—should revalue in parallel. Indeed, both Malaysia and Singapore require considerably more appreciation than China in our new estimates.

The recent dash for safety by investors has already increased the dollar overvaluation by almost 2 percent and could if continued lead to a renewed serious and general overvaluation of the dollar.

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Table 1 Target current accounts for 2015

Country	IMF projection of 2010 current account (percent of GDP)	IMF 2015 GDP forecast (billions of US dollars)	IMF 2015 current account forecast (percent of GDP)	Adjusted 2015 current account (percent of GDP)	Target current acount (percent of GDP)
Pacific					
Australia	–3.5	1,418	–5.8	–5.3	–3.0
New Zealand	–4.6	157	–8.2	–8.7	–3.0
Asia					
China	6.2	9,437	8.0	7.5	3.0
Hong Kong	12.1	288	7.6	7.0	3.0
India	–2.2	2,185	–2.0	–2.4	–2.4
Indonesia	1.4	1,172	–1.1	–1.6	–1.6
Japan	2.8	6,192	1.8	2.0	2.0
Korea	1.6	1,386	1.9	2.0	2.0
Malaysia	15.4	312	12.2	10.2	3.0
Philippines	3.5	252	0.4	–0.4	–0.4
Singapore	22.0	251	21.3	20.2	3.0
Taiwan	8.5	639	8.0	7.1	3.0
Thailand	2.5	428	0.2	–1.1	–1.1
Middle East/Africa					
Israel	3.9	258	–1.1	–2.1	–2.1
Saudi Arabia	9.1	645	10.2	9.1	9.1
South Africa	–5.0	430	–7.4	–8.0	–3.0
Europe					
Czech Republic	–1.7	303	–2.5	–2.0	–2.0
Euro area	–0.0	14,125	–0.1	0.6	0.6
Hungary	–0.4	189	–3.5	–1.1	–1.1
Norway	16.8	493	15.1	15.4	15.4
Poland	–2.8	635	–2.9	–1.2	–1.2
Russia	5.1	3,061	–0.4	–1.5	–1.5
Sweden	5.4	575	5.7	6.5	3.0
Switzerland	9.5	542	11.9	7.5[a]	3.0
Turkey	–4.0	852	–4.7	–5.8	–3.0
United Kingdom	–1.7	2,837	–1.4	–2.1	–2.1
Western Hemisphere					
Argentina	2.8	404	1.4	0.8	0.8
Brazil	–2.9	2,593	–3.2	–3.5	–3.0
Canada	–2.6	1,971	–1.9	–1.8	–1.8
Chile	–0.8	282	–2.8	–3.1	–3.0
Colombia	–3.1	375	–1.1	–0.6	–0.6
Mexico	–1.1	1,398	–1.5	–1.5	–1.5
United States	–3.3	18,250	–3.5	–3.8	–3.0
Venezuela	10.5	366	8.2	5.4	5.4

NFA = net foreign assets

a. Includes special adjustment; see text

Sources: IMF (2010a); authors' calculations.

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 May 2010	Percent change	
Pacific							
Australia[a]	2.3	2.8	–13.4	–16.1	0.87	–5.5	0.82
New Zealand[a]	5.7	6.2	–22.7	–24.7	0.70	–18.3	0.57
Asia							
China	–4.5	–4.0	15.3	13.5	6.83	24.2	5.50
Hong Kong	–4.0	–3.4	8.0	6.8	7.79	23.5	6.30
India	0.0	0.3	0.0	–1.8	45.9	7.7	42.6
Indonesia	0.0	0.5	0.0	–2.0	9,167	14.6	7,997
Japan	0.0	0.2	0.0	–2.0	92	8.8	84
Korea	0.0	0.6	0.0	–1.8	1,167	9.5	1,066
Malaysia	–7.2	–6.3	14.5	12.5	3.25	29.0	2.52
Philippines	0.0	0.6	0.0	–1.7	45.6	11.8	40.8
Singapore	–17.2	–16.0	34.4	32.0	1.39	44.9	0.96
Taiwan	–4.1	–3.4	9.6	8.0	31.8	21.4	26.2
Thailand	0.0	0.9	0.0	–2.0	32.4	10.8	29.2
Middle East/Africa							
Israel	0.0	0.5	0.0	–1.4	3.78	3.9	3.65
Saudi Arabia	0.0	0.6	0.0	–1.5	3.75	7.2	3.50
South Africa	5.0	5.6	–14.1	–15.7	7.64	–8.5	8.37
Europe							
Czech Republic	0.0	0.5	0.0	–1.1	20.3	4.3	19.6
Euro area[a]	0.0	0.4	0.0	–2.5	1.26	4.6	1.31
Hungary	0.0	0.5	0.0	–1.1	220	4.7	211
Norway	0.0	0.4	0.0	–1.2	6.24	5.0	6.00
Poland	0.0	0.4	0.0	–1.3	3.21	4.2	3.11
Russia	0.0	0.4	0.0	–1.3	30.4	5.0	29.1
Sweden	–3.5	–3.0	9.7	8.3	7.66	13.5	6.80
Switzerland	–4.5	–4.1	12.6	11.5	1.12	16.6	0.97
Turkey	2.8	3.1	–10.5	–11.7	1.55	–5.8	1.65
United Kingdom[a]	0.0	0.3	0.0	–1.4	1.47	4.5	1.53
Western Hemisphere							
Argentina	0.0	0.7	0.0	–2.9	3.90	1.8	3.83
Brazil	0.5	1.0	–2.9	–5.9	1.81	–0.0	1.81
Canada	0.0	0.2	0.0	–0.6	1.04	1.6	1.03
Chile	0.1	0.8	–0.3	–2.6	535	3.3	518
Colombia	0.0	0.5	0.0	–2.3	1,985	1.5	1,956
Mexico	0.0	0.2	0.0	–0.8	12.8	1.3	12.6
United States	0.8	1.2	–5.2	–7.8	0.00	0.0	1.00
Venezuela	0.0	0.6	0.0	–1.8	4.29	1.7	4.22

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.

Table 3 Changes in estimated FEER-consistent dollar exchange rate

Country	FEER-consistent dollar exchange rate			Appreciation of FEER-consistent dollar rate
	2009	2009, inflation adjusted	2010	
0–5 percent change				
Sweden	6.62	6.78	6.80	–0.4
Thailand	29.5	29.8	29.2	2.0
Hungary	198	207	211	–2.1
Philippines	40.0	41.7	40.8	2.1
Poland	3.10	3.19	3.11	2.6
Hong Kong	6.06	6.14	6.30	–2.6
Taiwan	25.2	25.2	26.2	–3.7
Israel	3.69	3.79	3.65	3.7
Japan	82	81	84	–4.2
Turkey	1.46	1.58	1.65	–4.3
United Kingdom[a]	1.65	1.61	1.53	–4.8
5–10 percent change				
Malaysia	2.63	2.66	2.52	5.6
New Zealand[a]	0.62	0.61	0.57	–6.2
Switzerland	0.90	0.90	0.97	–7.5
Czech Republic	17.9	18.1	19.6	–7.8
Chile	549	559	518	8.1
10–15 percent change				
China	4.88	4.94	5.50	–10.2
Argentina	3.17	3.40	3.83	–11.2
Euro area[a]	1.53	1.52	1.31	–13.6
15–20 percent change				
Australia[a]	0.73	0.71	0.82	15.2
Korea	1,197	1,231	1,066	15.5
Canada	1.18	1.19	1.03	15.9
Brazil	2.02	2.12	1.81	16.8
Mexico	14.0	14.7	12.6	17.0
India	44.8	50.2	42.6	17.7
Colombia	2,255	2,342	1,956	19.7
20–25 percent change				
Singapore	1.15	1.16	0.96	20.3
South Africa	9.48	10.09	8.37	20.6
25 percent+ change				
Indonesia	9,707	10,170	7,997	27.2

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

Source: Authors' calculations.

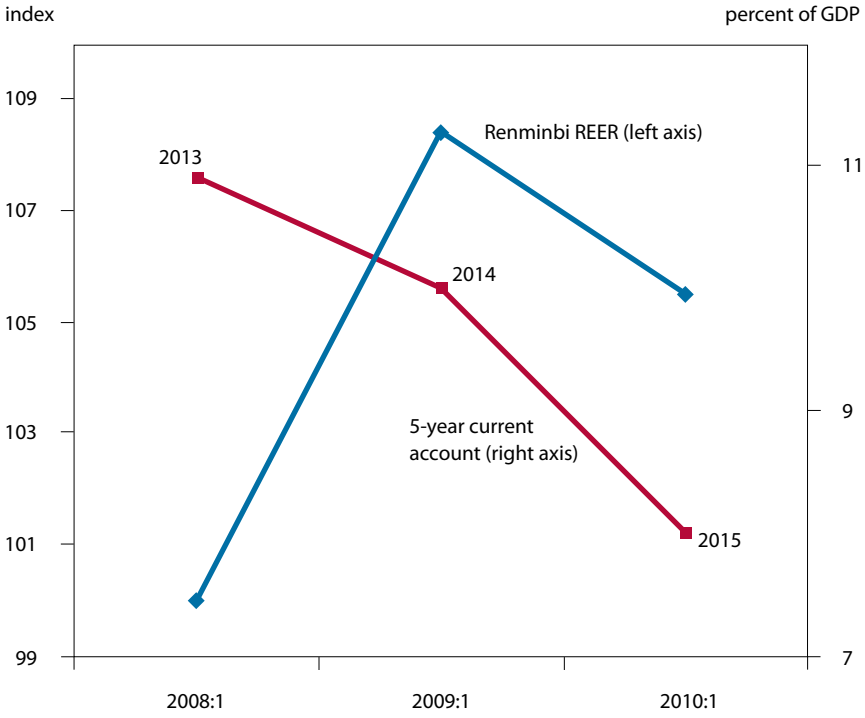
Table 4 FEER-consistent dollar rates estimated over the last three years

Country	2008, inflation adjusted	2009, inflation adjusted	2010	Market rate, May 2010
Pacific				
Australia[a]	0.97	0.71	0.82	0.87
New Zealand[a]	0.81	0.61	0.57	0.70
Asia				
China	5.66	4.94	5.50	6.83
Hong Kong	6.27	6.14	6.30	7.79
India	45.6	50.2	42.6	45.9
Indonesia	8,420	10,170	7997	9167
Japan	89	81	84	92
Korea	907	1,231	1066	1167
Malaysia	2.58	2.66	2.52	3.25
Philippines	38.1	41.7	40.8	45.6
Singapore	1.05	1.16	0.96	1.39
Taiwan	25.5	25.2	26.2	31.8
Thailand	28.7	29.8	29.2	32.4
Middle East/Africa				
Israel	3.53	3.79	3.65	3.80
South Africa	9.55	10.09	8.37	7.66
Europe				
Czech Republic	17.9	18.1	19.6	20.5
Euro area[a]	1.43	1.52	1.31	1.25
Hungary	198	207	211	221
Poland	2.77	3.19	3.11	3.24
Sweden	6.04	6.78	6.80	7.72
Switzerland	0.89	0.90	0.97	1.13
Turkey	1.54	1.58	1.65	1.55
United Kingdom[a]	1.81	1.61	1.53	1.46
Western Hemisphere				
Argentina	3.47	3.40	3.83	3.90
Brazil	1.82	2.12	1.81	1.81
Canada	1.04	1.19	1.03	1.04
Chile	472	559	518	535
Colombia	2,168	2,342	1956	1985
Mexico	11.7	14.7	12.6	12.8

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

Source: Authors' calculations.

Figure 1 Renminbi real effective exchange rate (REER) and WEO five-year forward current account forecast



Note: The REER for the renminbi used here is the average of the series maintained by JP Morgan, Citigroup, and the Bank for International Settlements. Current accounts projected in IMF's April *World Economic Outlook* (WEO) of 2008 (for 2013), 2009 (for 2014), and 2010 (for 2015).

APPENDIX A RECALCULATING THE BASELINE CURRENT ACCOUNT PROJECTIONS

In its spring 2010 issue of the *World Economic Outlook*, the IMF (2010a) used exchange rates for the base period February 23 to March 23. Subsequently there was a major decline in the value of the euro, precipitated by the Greek sovereign debt crisis and fears about contagion. The present study uses May as the base period. The lower value of the euro implies a larger future current account surplus for the eurozone. Table 1 reports both the IMF projection for the 2015 current accounts (percent of GDP) and a corresponding set of projections used in this study after taking account of changes in exchange rates from the earlier to the later base period.

For this purpose, the revised estimate for each economy is $CA'_i = CA_i[1 + \gamma_i(\frac{R'_i}{R'_i} - 1)]$ where i designates the country in question, CA is the 2015 current account balance as a percent of GDP, the prime denotes use of the exchange rate of the May base period, absence of the prime indicates use of the March base period, g is the current account impact parameter (see Cline 2008, reproduced in the Appendix table), and R is the level of the real effective exchange rate.

In the important case of the eurozone, for example, the impact parameter is $g = -0.143$. With the March base REER for the euro at 100, the May base index stands at [95.31]. With the original IMF projection for 2015 at $CA = -0.05$ percent of GDP, the adjusted projection becomes $CA' = +[0.62]$ percent of GDP (impact coefficient of about 0.14 times effective depreciation of about 5 percent, for approximately 0.7 percent of GDP upswing in the current account balance).

Table A.1 reports dollar exchange rates as of the earlier base (column 1), the later base (column 2), the percent change in the bilateral rate from the earlier to later base (column 3), and the percent change in the real effective exchange rate from the earlier to later period (column 4). These changes are then applied to the current account impact parameter (Gamma, column 5, or percent of GDP changes in current account for 1 percent change in real effective exchange rate) as just described in order to obtain the adjustments in the current account projections (column 6).

Table A.1 Changes in exchange rates, March[a] to May 2010, and in medium-term current account outlook

Country	Dollar exchange rate		Percent change in exchange rate, March to May		Gamma	Change in current account forecast for 2015
	February 23 to March 23	May	Dollar bilateral	Real effective exchange rate		
Pacific						
Australia[b]	0.91	0.87	–4.5	–2.61	–0.17	0.45
New Zealand[b]	0.70	0.70	–0.6	2.04	–0.25	–0.51
Asia						
China	6.83	6.83	–0.0	1.71	–0.30	–0.51
Hong Kong	7.76	7.79	–0.3	1.11	–0.50	–0.55
India	45.7	45.9	–0.3	2.97	–0.14	–0.42
Indonesia	9,209	9167	0.5	1.85	–0.27	–0.51
Japan	90	92	–2.2	–1.47	–0.12	0.17
Korea	1,141	1167	–2.2	–0.24	–0.32	0.08
Malaysia	3.35	3.25	2.9	3.84	–0.50	–1.92
Philippines	45.9	45.6	0.5	2.02	–0.38	–0.77
Singapore	1.40	1.39	0.4	2.24	–0.50	–1.12
Taiwan	31.9	31.8	0.2	2.09	–0.43	–0.89
Thailand	32.7	32.4	0.9	2.81	–0.45	–1.27
Middle East/Africa						
Israel	3.75	3.80	–1.1	2.93	–0.32	–0.95
Saudi Arabia	3.75	3.75	–0.0	2.95	–0.37	–1.10
South Africa	7.48	7.66	–2.3	1.85	–0.36	–0.66
Europe						
Czech Republic	18.8	20.5	–8.1	–1.01	–0.48	0.48
Euro area[b]	1.36	1.25	–8.0	–4.86	–0.14	0.70
Hungary	196	221	–11.6	–4.88	–0.48	2.35
Norway	5.90	6.31	–6.4	–0.85	–0.37	0.31
Poland	2.87	3.24	–11.5	–5.10	–0.34	1.71
Russia	29.6	30.5	–2.9	3.61	–0.30	–1.09
Sweden	7.15	7.72	–7.4	–2.07	–0.36	0.74
Switzerland	1.07	1.13	–5.5	0.48	–0.35	–0.17
Turkey	1.54	1.55	–1.0	4.25	–0.27	–1.14
United Kingdom[b]	1.51	1.46	–3.2	3.05	–0.23	–0.70
Western Hemisphere						
Argentina	3.86	3.90	–1.0	2.62	–0.23	–0.60
Brazil	1.79	1.81	–1.4	1.78	–0.16	–0.29
Canada	1.03	1.04	–1.1	–0.31	–0.32	0.10
Chile	522	535	–2.3	0.80	–0.31	–0.25
Colombia	1,907	1985	–3.9	–2.48	–0.20	0.50
Mexico	12.7	12.8	–0.8	–0.17	–0.25	0.04
United States	1.00	1.00	0.0	2.08	–0.16	–0.33
Venezuela	4.29	4.29	0.0	9.10	–0.31	–2.86

a. March = February 23 to March 23.
b. The currencies of these countries are expressed as dollars per currency. All other currencies are expressed as currency per dollar.

Source: Authors' calculations.