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Tanzania's Equilibrium Real Exchange Rate

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Abstract

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Tanzania's real effective exchange rate (REER) has depreciated sharply since end-2000, reversing the appreciation that took place in the second half of the 1990s. Single-country and panel data estimates, and the external sustainability approach, suggest that Tanzania's REER is currently modestly undervalued relative to its estimated equilibrium level. Looking forward, a modest trend appreciation of the equilibrium REER is expected, consistent with continued high GDP growth and an expected recovery in terms of trade. In addition, capital inflows to Tanzania could be significantly higher than currently expected, to take advantage of Tanzania's natural resources and strong policy framework. If so, these inflows would contribute to an additional appreciation by as much as 20 percent of the equilibrium REER.

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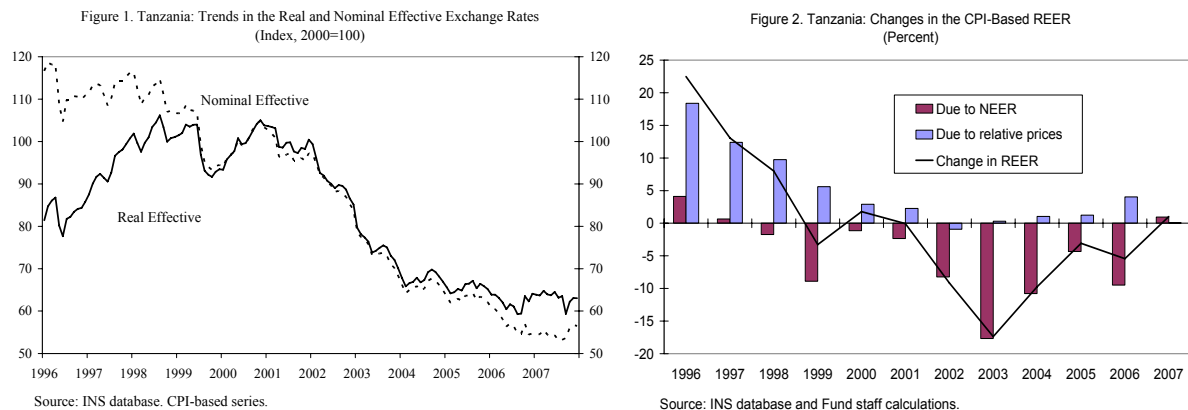
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I. INTRODUCTION

Tanzania's real effective exchange rate (REER) has appreciated modestly over the last 12 months, after a significant depreciation between end-2000 and mid-2006 (Figure 1).

Through end-2001, the REER movements were largely due to Tanzania's higher inflation relative to its trading partners but, with inflation falling to single digits, they have since reflected mainly trends in the nominal effective exchange rate (NEER) (Figure 2).



This change seems to have reflected the authorities' concerns of Dutch disease effects. Following the sharp real appreciation of the shilling in the second half of the 1990s, the Bank of Tanzania (BOT) reduced aid absorption in 2001, while the government continued to fully spend increasing levels of aid. This contributed to a rapid increase in international reserves, and also encouraged depreciation of the nominal exchange rate, particularly during 2002/03 (Berg et. al., 2007).

Since 2003/04, however, aid has been fully absorbed, and the coverage of reserves has gradually declined (text Table 1). The current account deficit (net of official transfers) has widened, rising to 14 percent of GDP in 2006/07, but remains largely financed by highly-concessional donor assistance (8½ percent of GDP) and FDI (4½ percent of GDP).

During April-July 2007, Tanzania experienced significant portfolio inflows, estimated at about US\$200-250 million (equivalent to about 1½ percent of GDP). The BOT responded by purchasing most of these additional inflows, resisting nominal appreciation pressures, and sold T-bills to mop up liquidity (Figure 3).

Starting from September 2007 the BOT has relied more on sales of foreign exchange by BOT, as opposed to the sale of T-bills, to mop up aid-related liquidity injections. As a result, the TSH/US\$ rate and the NEER, appreciated markedly during the period September-December 2007, but have recently returned to their August 2007 levels (Figures 1 and 3).

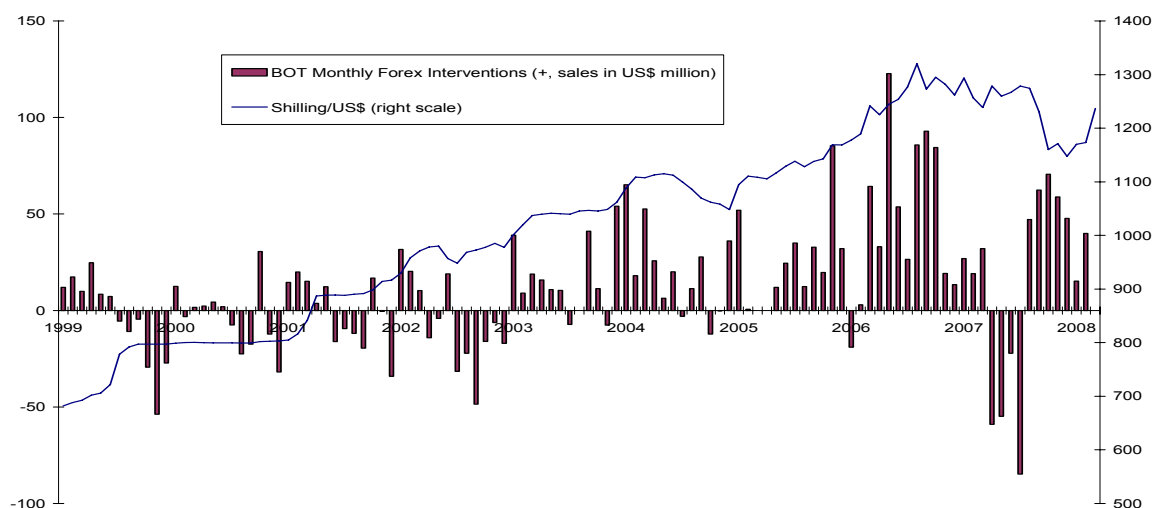
Table 1. Tanzania: Aid Absorption and International Reserves
(in percent of GDP, unless otherwise indicated)

	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07
Current Account Balance (excluding official grants) 1/	-8.4	-5.9	-9.9	-9.6	-11.3	-13.8
Official aid flows (including grants)	6.6	7.3	9.1	9.8	9.0	8.6
Capital and financial account (excluding aid flows)	3.5	3.0	2.6	1.5	2.5	7.2
<i>of which: FDI</i>	3.6	4.0	4.1	3.4	3.8	4.4
Change in reserves (-, increase)	-1.7	-4.3	-1.7	-1.7	-0.2	-2.0
International reserves						
- in US\$ million	1,184	1,670	1,878	1,969	1,995	2,285
- in months of imports	5.9	6.7	5.9	5.0	4.2	4.2

Source: Tanzanian authorities and IMF staff calculations.

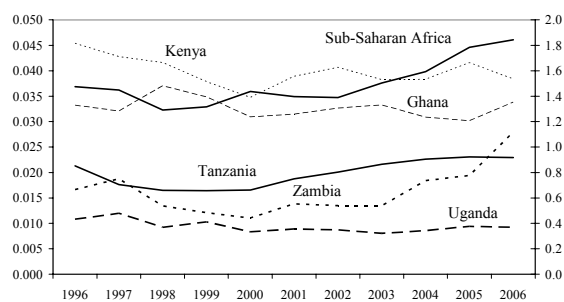
1/ Includes errors and omissions.

Figure 3. Tanzania: BOT Forex Interventions and Evolution of Shilling/US\$ Exchange Rate, 1999-2007



Tanzania's share of goods and nonfactor services (GNFS) relative to global GNFS exports has increased in recent years, more than recovering the significant decline of the late-1990s (Figure 4). Over the last five years, Tanzania's GNFS exports have grown by an average of about 20 percent per year (text Table 2), and the growth rate has accelerated sharply in the second half of 2007, notably manufacturing.

Figure 4. Share of GNFS Exports in Selected SSA Countries
(in percent of world GNFS exports)



Source: WEO database.

Table 2. Tanzania: Export Growth, 1996-2006 1/
(in percent)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Total GNFS	26.3	-13.9	-8.0	3.4	12.2	9.5	12.2	25.4	26.8	15.9	14.1
Total goods	12.4	-3.2	-20.9	-7.7	22.1	17.1	19.1	24.8	25.3	15.3	13.4
Gold exports only	24.5	-8.6	-48.6	179.0	143.1	69.7	28.2	36.4	26.6	8.7	10.4
Goods exports (excl. commodities) 2/	8.4	-6.1	-20.5	-18.0	13.9	26.5	29.9	27.7	24.6	18.2	13.2

Source: Bank of Tanzania.

1/ Calendar year basis. For the period 2002-2006, simple averages of fiscal year data provided by the BOT.

2/ Excludes gold and traditional commodity exports.

Traditional exports—including cotton, coffee, tea, tobacco, and cashew nuts—have remained virtually flat in nominal US dollar terms in recent years, despite the significant REER depreciation since end-2000 and higher commodity export prices (about 30 percent in nominal US dollar terms since 2001/02). This poor performance seems to reflect mainly weak supporting financial and transport infrastructure for the sector, although the sharp rise in oil prices in recent years is also likely to have played an important role.

Against this background, this paper seeks to address two main questions: (1) How well is the shilling aligned with the economy’s fundamentals? and (2) Where is Tanzania real exchange rate headed over the medium term?

II. IS THE SHILLING ALIGNED WITH ITS FUNDAMENTALS?

As defined in Edwards (1991), the equilibrium REER is considered to be the “relative price of tradables to nontradables that, for given sustainable values of relevant variables—such as taxes, international prices, and technology—results in simultaneous attainment of *internal* and *external equilibrium*. *Internal equilibrium* means that the nontradable goods market clears in the current period and is expected to be in equilibrium in future periods. *External equilibrium* means that the current account balances (current and future) are compatible with long-run sustainable capital flows.”

There are three main methodologies that are used to assess whether the actual REER is in line with the underlying equilibrium REER: an “equilibrium REER” (EREER) approach, a “macroeconomic balance” (MB) approach, and an “external sustainability” (ES) approach.² These three methodologies provide complementary perspectives on exchange rate assessments. Taken together, and combined with additional country-specific information, they help reach informed judgments about medium-term real exchange rates and current account balances.

It should be kept in mind, however, that the assessments obtained from the above three methodologies are subject to large margins of uncertainty. For the first two methods (EREER and MB), the uncertainty stems from the potential instability of the underlying macroeconomic links, significant measurements problems for some variables, and the imperfect “fit” of the models. These problems are more severe for LICs, where data limitations are more acute, and structural breaks more frequent. For the third approach (ES), the uncertainty is due to the “arbitrariness” when setting the benchmark NFA position.

² See Appendix I for a summary description of these three methodologies.

In summary, the result of the three methodologies is as follows. The EREER approach suggests that Tanzania's REER has been fluctuating around its equilibrium value since the early 1990s, and that currently the REER is undervalued relative to its estimated equilibrium level. These results are supported by those of the *ES approach*, which suggest that, on balance, there is room for a further increase in Tanzania's medium-term current account deficit without unduly increasing Tanzania's external exposure and associated risks. On the other hand, using coefficient estimates of three different papers employing similar panel *MB approaches* yields ambiguous results. However, it should be noted that no strong conclusions can be drawn from estimated CA "norms" on the basis of imported coefficient estimates from studies in which Tanzania or any other SSA country is not part of the sample.

A. Macroeconomic Balance Approach

In this sub-section the averages of the projected value of fundamentals for the period 2008-12 are used to generate a range of CA "norms" for Tanzania on the basis of coefficient estimates of five specifications in three different MB studies.³ Comparing such CA "norms" with the projected medium-term current account deficit under the baseline scenario yields ambiguous results (text Table 5). More specifically, the projected current account deficit under the baseline is:

- Below the "current account norm" based on the two IMF estimates (by 0.9 percentage points of GDP for the pooled specification, and 0.3 percentage points of GDP for the fixed effects specification), suggesting an undervaluation of the REER;
- Above the "current account norm" based on three specifications in papers from Chinn & Itto (2005) and Chinn & Prasad (2003) (between 1¼ and 2¼ percentage points of GDP), suggesting an overvaluation of the REER.

As noted above, importing coefficient estimates from studies that do not include SSA countries is problematic, and the results should be treated with caution. For example, the elasticity of current account deficits to external assistance is likely to be significantly higher in SSA countries than the range of 0.16-0.32 in the five studies summarized in text Table 5. In addition, SSA countries, including Tanzania, also rely on large amounts of concessional donor assistance which are not among the fundamentals in MB studies from which coefficients for this note are imported.

³ The three papers used for estimating CA "norms" in this section are IMF (2006a), Chinn and Itto (2005), and Chinn and Prasad (2003).

B. Equilibrium REER Approach

To assess whether Tanzania REER is in line with its underlying equilibrium value, this subsection compares the actual REER with the “equilibrium” REER derived from the coefficient estimates of the *EREER approach* in two recent papers—Chudik and Mongardini (2007), and Li and Rowe (2007).

In the Chudik and Mongardini (2007) paper, a reduced-form relationship between the actual REER and a set of four fundamentals was estimated for an unbalanced panel of 39 sub-Saharan African (SSA) countries (including Tanzania), with annual data spanning the period 1980-2005.

The fundamentals in the paper’s preferred specification for non-oil exporting SSA countries are: (i) terms of trade (TOT), (ii) trade openness (Trade); (iii) GDP growth per capita relative to trading partners (Prod); and (iv) government spending as share of GDP relative to trading partners (Gov). The calculations below are based on coefficient estimates in the paper’s Pooled Mean Group (PMG) specification, without heterogeneous country-specific trends as follows (with t-statistics in parenthesis).⁴

$$EREER = 0.186 * TOT - 0.473 * Trade + 1.047 * Pr od + 0.277 * Gov \quad (1)$$

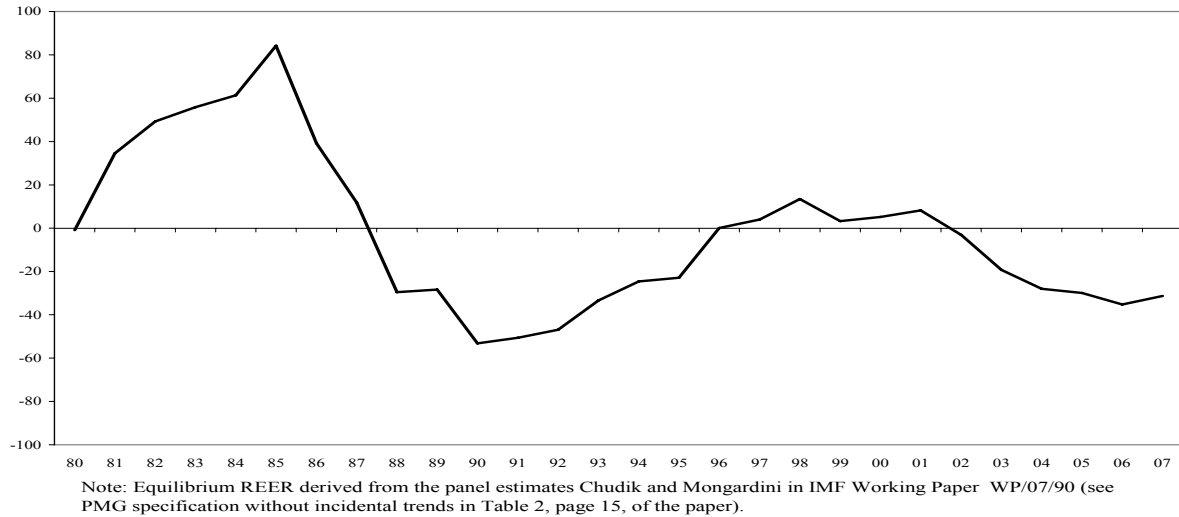
(6.2) (-11.4) (18.3) (5.4)

Since the paper was based on data through 2005, the actual value of fundamentals for 2006 and that projected for 2007 was updated for both Tanzania and its trading partners. Using the paper’s coefficient estimates, the equilibrium REER was calculated through 2007, and the results were compared with the latest actual REER for Tanzania (through March 2008).

As can be seen from Figure 5, this comparison suggests that Tanzania’s REER has been fluctuating around its equilibrium value since the early 1990s, and that currently the REER is undervalued relative to its estimated equilibrium level by a significant margin (about 30 percent), subject to the caveats discussed above.

⁴ The paper also estimates a specification with heterogeneous country specific trends, but for Tanzania none of these trends were found to be statistically significant.

Figure 5. Tanzania: Difference Between Actual REER and Estimated Equilibrium REER (+, overvaluation) (in percent)



Chudik and Mongardini's result that Tanzania's REER has been close to equilibrium since the early-1990s is supported by the findings in Li and Rowe (2007). The latter paper estimates a long-run equilibrium REER model for Tanzania for the period 1970-2005. The explanatory variables that were found to be significant in that study include the terms of trade (TOT), openness of the economy (Trade), and net aid inflows (Aid), as follows (with standard errors in parenthesis).

$$EREER = 4.69 + 0.84 * TOT - 0.95 * Trade - 0.31 * Aid \quad (2)$$

(1.23) (0.15) (0.15) (0.15)

Results in Li and Rowe, however, suggest a much smaller undervaluation relative to that in Chudik and Mongardini. As can be seen from Figure 6, updated results of the former through 2007 suggest an REER undervaluation of about 5 percent in 2007, compared to about 30 percent in the latter.⁵

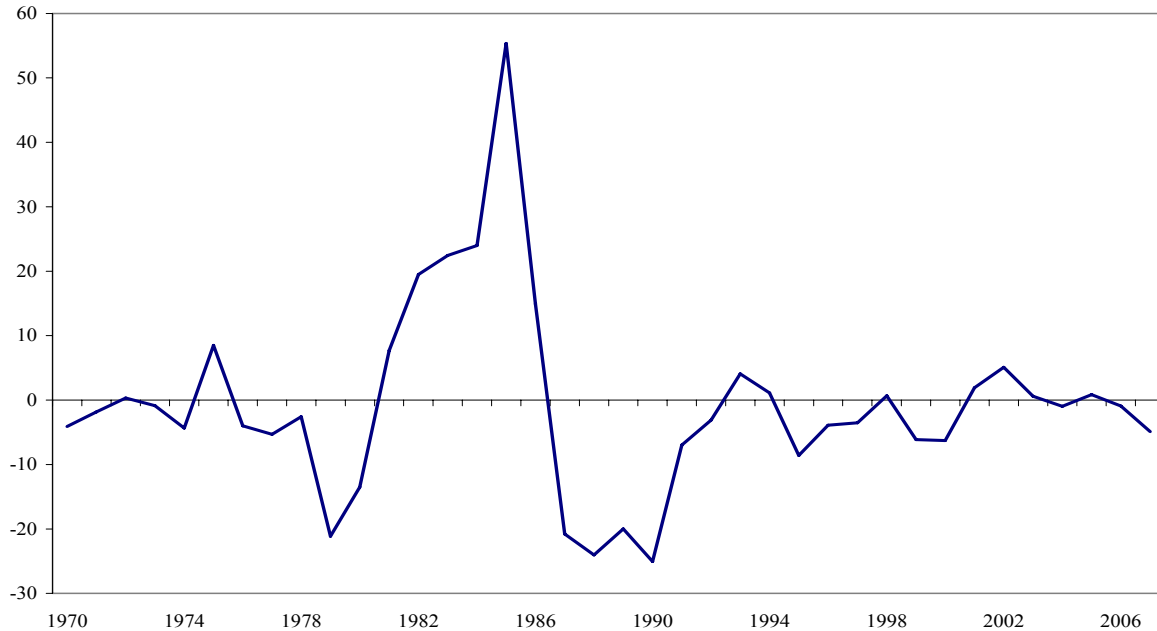
C. External Sustainability Approach

The ES approach looks at the exchange rate from the points of view of maintaining a sustainable balance of payments over the medium term. IMF (2007) assumes the following medium-term baseline projections for Tanzania through 2012: (i) real GDP growth of 8

⁵ Panel estimates used in Chudik and Mongardini can circumvent the limitations of single-country estimates used in Li and Rowe, particularly those related to the short-span of the data sample, and thus tend to be more robust. At the same time, however, country-specific idiosyncrasies may be lost in panel estimates.

percent; (ii) inflation rate of 5 percent; (iii) program and projects grants of 6.9 percent of GDP; and (iv) program and project loans of about 4 percent of GDP (with a grant element of about 50 percent). One can argue that the actual amounts of grants for the purposes of the ES approach is 8.9 percent of GDP—6.9 percent of GDP in direct grants plus 2 percent of GDP equivalent to the grant element of public sector borrowing.

Figure 6. Tanzania: REER Misalignment Index



Source: Li and Rowe, 2007.

Substituting these average medium-term projections for real GDP growth, inflation, and external grants for Tanzania in equation (1) of Appendix I, the level of the current account that stabilizes NFA at the June 2007 level (-43 percent of GDP)⁶ is about 14 percent of GDP, as follows.

$$\frac{0.08 + 0.05}{(1 + 0.08) * (1 + 0.05)} * (-43) - 8.9 = -13.9 \quad (3)$$

Thus the “stabilizing” current account deficit is higher by about 1 percentage points of GDP relative to the projected current account deficit for 2012 under the baseline scenario (13 percent of GDP). This suggests an undervaluation of the REER relative to its equilibrium which, on the basis of trade elasticities discussed in Appendix III, would require an REER

⁶ Tanzania’s NFA of -43 percent of GDP, comprises total NFA of BOT and commercial banks of 22 percent of GDP, external debt of 26 percent of GDP, and net FDI position of -39 percent of GDP.

appreciation of about 2¼ -5 percent. The usefulness of equation (1) in Appendix I is somewhat limited, however, given that it is based on a “steady state” concept. In this context, the result in equation (3) above is due to the objective of keeping the net foreign assets unchanged at their end-June 2007 level. In fact, as will be discussed below, in light of the significant increase in Tanzania’s creditworthiness in recent years, following continued progress in economic reforms and material debt relief under the MDRI, there may be significant scope for higher current account deficits in the medium term, without unduly increasing Tanzania’s external exposure and associated risks.

Where does this all leave us? The analysis in this section suggests that, as of mid-2007, the REER was undervalued relative to its equilibrium, although the range of estimated undervaluation is fairly wide (Table 4).⁷

Table 4: Estimated REER Misalignment

Approach/Study ⁸	Magnitude of Undervaluation
Equilibrium REER/Chudik and Mongardini	30 percent
Equilibrium REER/Li and Rowe	5 percent
External sustainability	2¼ -5 percent

Having argued that the REER is undervalued, a conclusion that seems to be supported by the continued rapid export growth in recent years, the magnitude of undervaluation is likely to be closer to the lower end of the spectrum of Table 4—i.e., to the 5 percent range suggested by the ES approach as well as by the Li and Rowe study, than the 30 percent suggested by Chudik and Mongardini. The large undervaluation suggested by the latter, if it were indeed the case, should have, among other things, contributed to significantly higher reserve accumulation than we have seen to date.

III. WHERE IS THE REER HEADED OVER THE MEDIUM TERM?

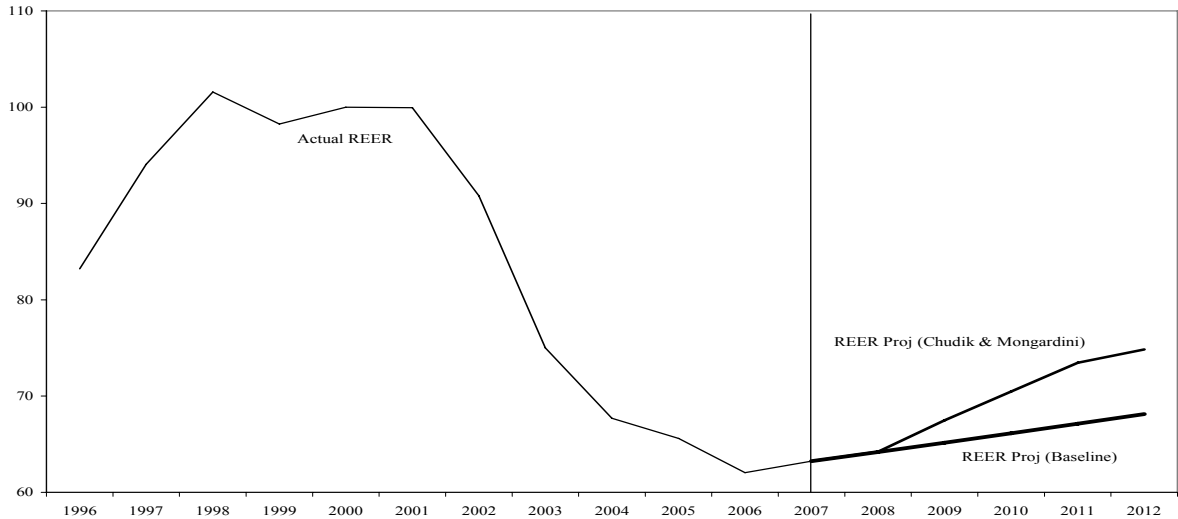
The baseline scenario (through 2012) projects a trend appreciation of Tanzania’s equilibrium REER of about 1½ percent per year, reflecting continued rapid productivity growth over the medium term (Figure 7). This is broadly in line with the projected equilibrium REER on the

⁷ As can be seen from Figure 1, while the REER appreciated briefly during last few months of 2007, as of end-March 2008 (the latest data available) the REER was broadly unchanged from its mid-2007 level.

⁸ The ambiguous results of the macroeconomic balance approach are not listed here, given that such results are based on imported coefficients from studies in which neither Tanzania nor any other SSA country is included.

basis of Chudik and Mongardini. Using the PMG coefficients of that paper without coincidental trends (equation 1 above), suggests that the equilibrium REER will appreciate by about 15 percent by 2012 relative to the 2007 level. This reflects mainly higher GDP growth in Tanzania relative to its trading partners, but also the expected improvements in Tanzania terms of trade, which have deteriorated considerably over the last several years.

Figure 7. Tanzania: Estimated REER Trends, 2008-12



The appreciation of the equilibrium REER could be even higher, to the extent that BOP inflows are higher than projected under the baseline. The medium-term current account deficits under the baseline scenario of about 13 percent of GDP, which keep the NPV of external debt broadly unchanged (Figure 8), are based on recent trends and do not assume any significant increase in FDI and/or external assistance. More specifically, the baseline projections are based on: (i) an unchanged level of donor assistance of about 11 percent of GDP (about 6¾ percent of GDP in grants, and the remainder in concessional loans from multilateral and bilateral donors); (ii) FDI inflows of about 4 percent of GDP; and (iii) zero non-concessional borrowing from the general government. However, there are at least three reasons to believe that Tanzania's current account deficit will be higher than projected in the baseline.⁹

- First, there is a reasonable possibility that medium-term FDI can be much higher than currently assumed. At 4 percent of GDP, projected medium-term FDI flows to Tanzania are in line with regional levels, but much lower than, for example, in fast-

⁹ The difference between capital inflows of about 15 percent of GDP and a current account deficit of about 13 of GDP projected over the medium term represents the accumulation of BOT's reserves to maintain their coverage relative to the projected level of imports.

growing transition economies. As can be seen from Table 5 below, there has been a secular trend increase in FDI to emerging market economies and SSA countries in recent years. In view of Tanzania's continued progress in economic reforms and increasing worldwide investment in natural resources, with which Tanzania is well-endowed, an increase in FDI by about 1½-2½ percentage points of GDP over the medium term relative to the baseline may well be possible. Growing participation by foreign investors in syndicated loan financing of Tanzanian companies organized by local banks in recent months seems to support such a view.

Figure 8. Tanzania: Indicators of Public and Publicly Guaranteed External Debt Under High Borrowing Scenario, 2006-2026
(In percent)

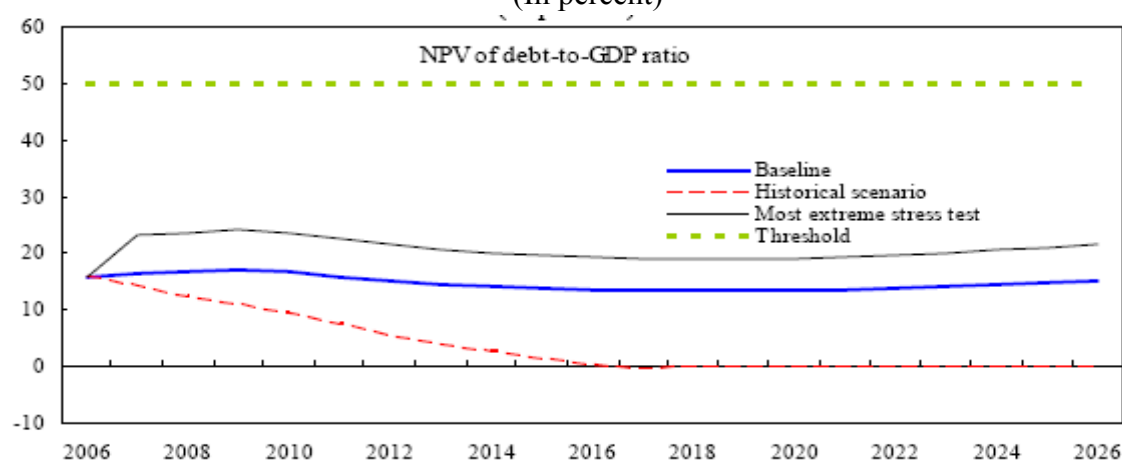


Table 5. FDI Inflows in Selected EMEs and SSA Countries
(in percent of GDP)

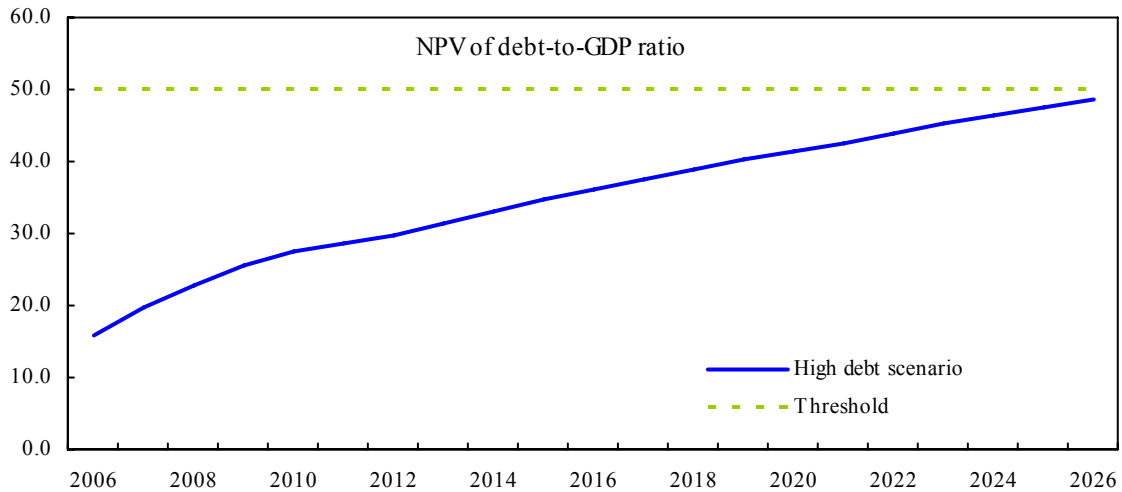
Countries	2000	2001	2002	2003	2004	2005	2006	Avg 1991-2006	Avg 2001-06
Botswana	0.9	0.4	6.8	5.0	4.0	2.6	4.6	1.5	3.9
Brazil	5.1	4.1	3.3	1.8	2.7	1.7	1.8	2.2	2.6
Bulgaria	7.9	5.9	5.8	10.5	10.8	15.6	16.4	6.0	10.8
China, P.R.: Mainland	3.2	3.3	3.4	2.9	2.8	3.5	3.0	3.6	3.2
Ecuador	-0.1	2.5	3.1	3.0	2.6	1.3	0.7	2.3	2.2
Georgia	4.3	3.4	4.7	8.4	9.6	7.1	13.6	6.8	7.8
Hungary	5.8	7.4	4.5	2.6	4.4	6.8	9.2	6.2	5.8
India	0.8	1.2	1.1	0.8	0.9	0.9	2.0	0.7	1.1
Indonesia	-2.7	-1.9	0.1	-0.3	0.7	2.9	1.5	0.6	0.5
Mozambique	3.7	6.9	8.5	7.0	4.1	1.6	2.0	3.8	5.0
Philippines	3.0	0.3	2.0	0.6	0.8	1.9	2.0	1.7	1.3
Poland	5.5	3.0	2.1	2.1	5.2	3.4	5.6	3.0	3.6
Romania	2.8	2.9	2.5	3.1	8.5	6.6	9.3	3.2	5.5
Senegal	1.3	0.7	1.5	0.8	1.0	1.1	1.0
Slovak Republic	10.1	...	16.7	1.7	4.0	9.2
South Africa	0.7	6.1	1.3	0.5	0.3	2.7	0.0	1.1	1.8
Tanzania	5.1	4.1	4.0	3.0	2.9	3.6	3.7	2.7	3.5
Uganda	2.7	2.7	3.2	3.2	4.3	4.3	4.1	2.6	3.7
Ukraine	1.9	2.1	1.6	2.8	2.6	9.1	5.3	2.5	3.9
All countries									
Mean 1/								2.9	4.0
Median 1/								2.5	3.6
Transition Economies									
Mean								4.5	6.7
Median								4.0	5.8

Source: IFS database.

1/ Excluding Tanzania.

- Second, there may also be scope for higher external borrowing over the medium term than assumed in the baseline. For example, if Tanzania were to borrow 3¼ percent of GDP on commercial terms every year, its debt would rise but remain below the critical threshold of 50 percent of GDP by 2026 (Figure 9).¹⁰
- Third, a significant scaling up of aid may take place over the medium term to help reach MDGs (see for example the scaling up scenario in Table 10 of IMF 2007). Under such a scenario, a higher current account of about 1-1½ percent of GDP relative to the baseline could be supported over the medium term.

Figure 9. Tanzania: Indicators of Public and Publicly Guaranteed External Debt Under High Borrowing Scenario, 2006-2026
(In percent)



Before continuing, it should be stressed that this “high-debt” scenario is not meant to make a case for higher commercial borrowing by the government, but only to demonstrate the implications it would have for Tanzania’s balance of payments and its medium-term equilibrium REER if such a strategy were to be adopted.

The discussion above suggests that while the projected baseline medium-term current account deficit is broadly consistent with fundamentals, there is scope for higher deficits over the medium term without unduly increasing Tanzania’s external exposure and associated

¹⁰ External borrowing of such magnitude would keep the NPV of public external debt just under the indicative 50 percent threshold applicable to Tanzania by 2026—the end of the forecast period in the latest Debt Sustainability Analysis for Tanzania (IMF 2007).

risks. These higher deficits would be consistent, over the medium term, with an appreciation of the equilibrium REER.

IV. MAGNITUDE OF REER ADJUSTMENT

Having argued that Tanzania's medium-term current account deficit could well be several percentage points of GDP higher than projected under the baseline scenario, this section discusses the magnitude of REER appreciation that would be required to bring about such an adjustment in the balance of payments.

Pinpointing the REER appreciation that would result from a certain level of additional inflows is not possible, as there are no studies on the relationship between external trade and exchange rate movements in Tanzania. However, it is clear that a smaller appreciation would result from higher FDI in the mining sector (which tends to have a large direct import component), as opposed to a scenario with higher external assistance or government borrowing that would finance public spending in education or health (which tend to have a significantly smaller direct import component). This section therefore provides a possible range of exchange rate adjustments in response to higher inflows, using trade elasticities from studies involving developing countries.

Existing studies on the impact of changes in the exchange rate on external trade in developing countries suggest long-term trade elasticities of between 0.4-1.¹¹ Using this range of trade elasticities, plausible assumptions on the import content of various BOP inflows, and projected shares of GNFS exports and imports for Tanzania for the period 2007-12 (respectively, 15 percent of GDP, and 37 percent of GDP)¹² would suggest that a higher current account deficit of 1 percentage points of GDP could bring about an appreciation of 1¼-2¾ percent in the equilibrium REER.¹³

These elasticities are used to generate the estimated equilibrium REER under three alternative scenarios that assume higher inflows relative to the baseline:

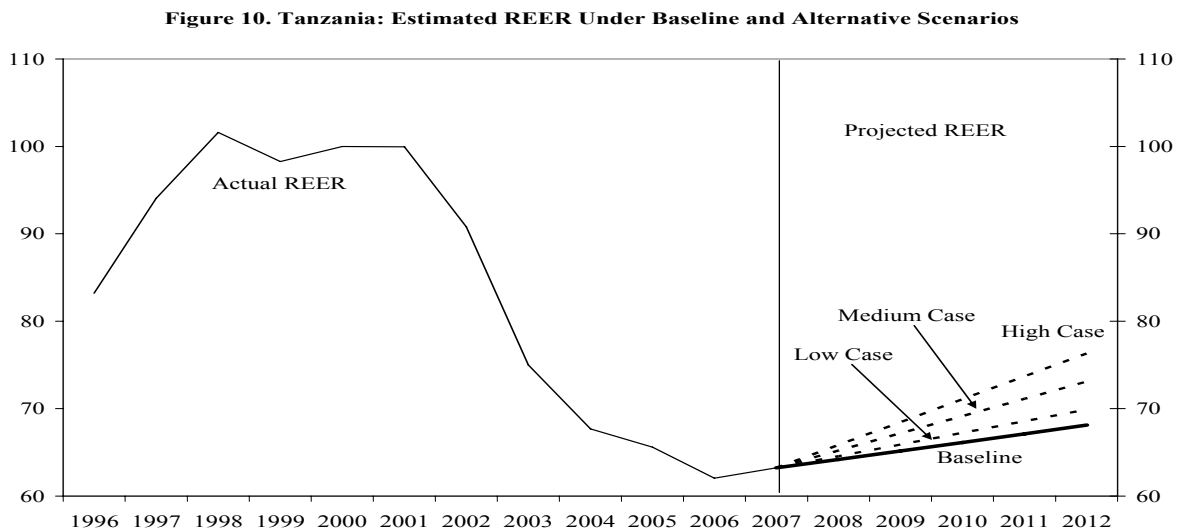
¹¹ The IMF's CGER methodology, for example uses elasticities of -0.71 for exports and 0.92 for imports. See IMF 2006b for a summary of studies on this subject.

¹² The above share of GNFS exports excludes exports of gold and traditional commodities, which are not considered to be very sensitive to exchange rate movements.

¹³ See Appendix III for the assumptions on trade elasticities and the direct import content of BOP inflows used in these calculations.

- ***A low case scenario***, with additional inflows of 1½ percentage points of GDP relative to the baseline (additional ½ percentage points of GDP for each of the three main sources—i.e., external assistance, FDI, and commercial borrowing by the general government sector).
- ***A high case scenario***, with additional inflows of 7¼ percentage points of GDP relative to the baseline (1½ percentage points in external assistance, 2½ percentage points in FDI, and 3¼ percentage points in commercial borrowing by the general government).
- ***A medium case scenario***, with additional inflows of 4½ percentage points of GDP relative to the baseline (basically the average of the low and high scenarios for each of the three main sources of inflows discussed above).

As can be seen in Figure 10, such higher inflows could contribute to an appreciation of the equilibrium REER by an estimated 2-20 percent relative to the baseline.



V. CONCLUSIONS

The analysis in this note suggests that the real effective exchange rate (REER) is moderately undervalued, on the basis of results of both the EREER and ES methodologies.¹⁴

¹⁴ Whereas the results of the MB approach are ambiguous, these results are based on imported coefficient estimates from studies that do not include SSA countries, and should thus be treated with caution.

Looking forward, to the extent that trends in key fundamental variables move as forecast, the equilibrium REER is likely to appreciate over the medium term. This reflects rapid GDP growth and improvements in terms of trade projected over the forecast period. In addition, there is significant potential for higher inflows given Tanzania's improved creditworthiness, following substantial debt relief under HIPC and MDRI. If so, these inflows would contribute to an additional appreciation by as much as 20 percent of the equilibrium REER relative to the baseline.

An appreciation of the REER may raise competitiveness concerns for particular sectors in the near term, notably the traditional commodity export sector whose performance has remained poor over the last decade. However, such concerns should not be allowed to undermine the commitment to flexible exchange rate policy. As documented in Berg et. al, 2007, resistance in the past to market-driven nominal exchange rate appreciation pressures has contributed to either faster money growth, and ultimately higher inflation, or to a significant increase in interest rates when the BOT intervened to sterilize the liquidity impact of its foreign exchange purchases, and proved too costly to maintain on a sustained basis.

Efforts to address competitiveness concerns should instead focus on improving the business climate, infrastructure bottlenecks, and other structural aspects of competitiveness. The key objective in the short to medium term should be to enhance the economy's absorptive capacity, particularly through public investments in transport and energy infrastructure, so as to minimize any potential Dutch disease problems.

While the equilibrium REER is, on balance, expected to appreciate over the medium term, there are also risks. The ongoing uncertainty in international financial markets could well reduce FDI and other inflows to Tanzania from current levels. Therefore maintaining exchange rate flexibility is also important to respond to potential adverse external shocks.

Areas for future analysis include estimating directly trade elasticities for Tanzania, exploring the reasons why traditional goods exports do not seem to respond to the significant fluctuations in the REER over the last decade, and getting a better understanding on the particular sectors that are contributing the rapid increase in manufacturing exports, as well as the main markets these exports are going to.

Appendix I: Summary of Three REER Methodologies

This appendix summarizes the three popular methodologies that are used to assess where the REER stands with respect to its fundamental determinants.

Equilibrium REER Approach

This approach is the most commonly used in the case of low-income countries (LICs).¹⁵ The steps involved in this approach include:

- Estimating a reduced-form equilibrium relationship between the actual REER and a set of fundamentals. These include the net foreign asset (NFA) position of the country, productivity growth in the tradables and nontradables sectors relative to its trading partners, evolution of terms of trade, government consumption as share of GDP relative to its trading partners, and extent of trade restrictions. This can be done in a single country context, or a panel of countries.
- Calculating the REER adjustment needed to restore equilibrium as a difference between the actual REER and the “equilibrium REER” estimated on the basis of the above set of REER medium-term fundamentals.

Macroeconomic Balance Approach

This method is rarely used in LICs given more severe data limitations relative to the EREER approach. The steps involved in this approach include:

- Estimating an equilibrium relationship between the current account (CA) balance and a set of fundamentals. These include the fiscal balance relative to trading partners, old and young age dependence, population growth, NFA position of the country, oil balance, relative growth, and relative income. This is usually done in a panel context.
- Deriving the “CA norm” of the country, using its medium-term fundamentals and the parameters obtained from the above step.
- Calculating the needed REER adjustment to close the gap between the underlying CA and the “CA norm”, using the elasticity of the current account balance to the REER.

¹⁵ Chudik and Mongardini, 2007.

External Sustainability Approach

This method is based on the idea that, in order to satisfy the intertemporal budget constraint, the present value of current account surpluses must be sufficient to pay for its external liabilities. One simple way to achieve this objective is to stabilize the ratio of country's NFA relative to the size of the economy. Assuming that there are no capital gains and no errors and omissions in the BOP, it can be shown that:

$$ca^s = \frac{g_t + \pi_t}{(1 + g_t) * (1 + \pi_t)} * nfa^s - gr_t \quad (1)$$

where: ca^s is the current account level net of grants (as ratio to GDP) that stabilizes the nfa^s (the ratio of NFA to GDP) at a certain benchmark, and g_t , π_t , and gr_t are, respectively, the real growth rate of GDP, inflation rate, and grants as a ratio to GDP, with $(1 + g_t) * (1 + \pi_t)$ being the nominal growth of GDP.¹⁶

The above relationship implies that faster-growing economies, and those that benefit from external grants can afford to run larger current account deficits without increasing their level of external liabilities relative to GDP.

The method involves the following steps:

- Calculating from equation (1) the size of the CA balance that will stabilize the NFA at a given “benchmark” position.
- Comparing the “stabilizing” CA balance obtained from the above step with that expected to prevail in the medium term at unchanged policies.
- Calculating the needed REER adjustment to close the gap between the “stabilizing” CA balance and the projected CA at unchanged policies, using the elasticity of the current account balance to the REER.

¹⁶ See Appendix II for details on how equation (1) is derived.

Appendix II: Derivation of NFA Stabilizing Current Account Level

The evolution of net foreign assets (NFA) between period t-1 and t is determined by the following formula:

$$NFA_t - NFA_{t-1} = CA_t + GR_t + KG_t + E_t \quad (1)$$

Where CA_t is the current account balance excluding foreign grants, GR_t is the amount of foreign grants, KG_t are capital gains arising from valuation changes, and E_t includes factors such as capital account transfers and errors and omissions that can drive a wedge between the current account balance and net financial flows.

Assuming that $KG_t = E_t = 0$, and dividing both sides of (1) by the nominal GDP in period t, and manipulating equation (1) we have:

$$\frac{NFA_t}{GDP_t} - \frac{NFA_{t-1}}{GDP_{t-1}} * \frac{GDP_{t-1}}{GDP_t} = \frac{CA_t}{GDP_t} + \frac{GR_t}{GDP_t} \quad (2)$$

Denoting ratios to GDP with lower case letters equation (2) becomes:

$$nfa_t - nfa_{t-1} * \frac{1}{(1 + g_t) * (1 + \pi_t)} = ca_t - gr_t \quad (3)$$

Where g_t and π_t are, respectively, the real growth rate of GDP and the inflation rate, with $(1 + g_t) * (1 + \pi_t)$ being the nominal growth of GDP.

Equation (3) can be further manipulated to the following:

$$nfa_t - nfa_{t-1} = ca_t + gr_t - \frac{g_t + \pi_t}{(1 + g_t) * (1 + \pi_t)} * nfa_{t-1} \quad (4)$$

Denoting by nfa^s the benchmark level of NFA, the current account that stabilizes the NFA at nfa^s is:

$$ca^s = \frac{g_t + \pi_t}{(1 + g_t) * (1 + \pi_t)} * nfa^s - gr_t \quad (5)$$

Appendix III: Main Assumptions on Trade Elasticities

Current account elasticity to REER

It can be shown that the elasticity of the current account to the real effective exchange is as follows:

$$\eta_{CA} = \left(\eta_X * \frac{X}{GDP} \right) - \left(\eta_M * \frac{M}{GDP} \right), \quad (1)$$

where η_{CA} is the current account elasticity to the REER, η_X is the export elasticity to the REER, η_M is the import elasticity to the REER, and X, M, and GDP represent, respectively, nominal exports, imports, and GDP. Equation (1) implies that a higher ratio of exports and imports to GDP will require a lower change in the REER to close any particular BOP gap, as the adjustment in exports or imports will be larger for a certain change in the REER.

Existing studies suggest a wide range of long-term trade elasticities to the REER—between 0.4 and 1. The elasticities used for most countries in the CGER exercise are on the high side of that range—0.71 for exports, and 0.92 for imports. The table below uses a range of trade elasticities and the results suggest that, given the average trade shares for Tanzania projected for the period 2008-2012, the REER change needed to close a 1 percent BOP gap ranges between 2¼-5 percent.

Table 1. Tanzania: Current Account Elasticities to REER Change

	CGER	Low bound	Medium Range
Elasticities to REER appreciation			
Export	-0.71	-0.4	-0.55
Import	0.92	0.4	0.65
Shares to GDP for Tanzania			
GNFS exports (minus gold & nontraditional goods) to GDP	0.14	0.14	0.14
GNFS Imports to GDP	0.37	0.37	0.37
CA elasticity to REER change			
X share*X elasticity	-0.44	-0.21	-0.32
X share*X elasticity	-0.10	-0.06	-0.08
M share*M elasticity	-0.34	-0.15	-0.24
REER appreciation to close a BOP gap of 1 percent of GDP (in percent)	2.3	4.9	3.1

Impact on REER of higher BOP inflows

The needed REER appreciation to accommodate higher BOP inflows relative to baseline projections depends not only the current account elasticity discussed above, but also the direct import content of these inflows. The calculations in this paper assume a different share of import content for the various BOP inflows. More specifically, it is assumed that the share of direct import content is 60 percent for FDI inflows, 45 percent for infrastructure investments, and 30 percent for aid inflows. On the basis of these assumptions on the direct

import content of additional BOP inflows, together with the current elasticities summarized in Table 1, and the three scenarios on higher BOP inflows discussed in section V above, Table 2 below summarizes the range of REER appreciation needed to accommodate the additional BOP inflows. REER projections in Figure 9 reflect the medium range elasticities, i.e., medium-term REER appreciation of between 2½ and 12 percent.

Table 2. Range of REER Appreciation under Various Scenarios of BOP Inflows and Trade Elasticities

	Various scenarios of higher BOP inflows		
	Low	Medium	High
CGER elasticities	1.9	5.3	8.7
Medium range elasticities	2.6	7.3	12.0
Low range elasticities	4.0	11.3	18.7

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