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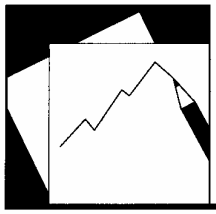

IMF Working Paper

Assessing External Equilibrium in Low Income Countries

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Assessing External Equilibrium in Low Income Countries

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Abstract

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This paper investigates empirically the external performance of low income countries, as measured by the real exchange rate, the current account, and the net foreign assets. The paper focuses on indicators which are specific to low income countries, such as the quality of policies and institutions, the special financing access, and the role of shocks. It also offers a metric for linking the external indicators via a calibration of trade elasticities.

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I. INTRODUCTION

This paper aims at developing a methodology for assessing whether the real exchange rate and the external position (current account, net foreign assets) of low income countries are in line with fundamentals in the medium-to-long run. The rise and persistence of large external imbalances in recent years have renewed interest in this area from the empirical and theoretical perspective, and have also highlighted the need for a multi-pronged approach to the assessment of external imbalances based on multiple indicators. In this paper, the simultaneous analysis of the three aforementioned indicators of external performance allows us to check the consistency of the results across indicators, an effort which is generally absent in the literature. The focus on low income countries aims at filling a gap in the literature. Although the literature on the determinants of the real exchange and of the current account is very vast (and the one on net foreign asset very limited), very few contributions focus specifically on low income countries, or account for features that are quite specific to—or more important for—this set of countries, such as policy distortion, access to special financing, larger sensitivity to exogenous shocks, and price taking behavior. It is important to note that the exercise undertaken in this paper required extensive efforts in the creation of a wide database, which is unique in terms of the set of indicators and of countries encompassed. Finally, the paper suggests a metric to convert a current account gap into a real exchange rate gap.

A large literature has analyzed medium term determinants of current accounts on the basis of factors affecting saving and investment (see for instance Chinn and Prasad (2003), and Lee et al. (2008)).[2] A more recent empirical literature has aimed at explaining the patterns of global imbalances that have widened over the past decade as function of financial crisis, financial development and distortions, and institutional variables (Gruber and Kamin (2007, 2008); Chinn and Ito (2007); Mendoza, Quadrini, and Rios-Rull (2008); Caballero, Fahri & Gourinchas (2008)). Others have illustrated the role of labor market policies and exchange rate regimes in the persistence and dynamic of current accounts (Ju and Wei (2007), Chinn and Wei (2008)) and the relationship between labor market, financial frictions and fiscal policies in shaping the optimal current account responses to shocks (Blanchard (2006)).

The literature on real exchange rates (RER) is vast and we cannot make justice to all contributions. Broad surveys are offered by Froot and Rogoff (1995), Rogoff (1996) and, for developing countries, by Edwards (1989), Hinkle and Montiel (1999), and Edwards and Savastano (2000).[3] The traditional findings of Meese and Rogoff (1983) on the unpredictability of exchange rates at short horizons are still undisputed, and the literature has

[2] This literature has been drawing from an earlier literature on the determinants of saving in advanced countries and emerging markets (Schmidt-Hebbel et al., 1992; Edwards, 1995; Masson et al., 1998) and of capital flows (e.g. Bosworth et al, 1999).

[3] For a recent application to Central and Eastern European countries see Maeso-Fernandez, Osbat, and Schnatz (2004).

converged towards explaining the behavior of real exchange rates at medium to long horizons as a function of fundamentals (see for example Engel and West, 2005; Engel, Mark, and West, 2007). Long-run real exchange rates are typically explained via a steady-state relationships that influence the intertemporal and intratemporal allocation of resources between tradable and nontradable sectors in an economy (Obstfeld and Rogoff (1996), Vegh (2009), Montiel (2003), and Ricci et al. (2008)).

A growing literature has uncovered the medium-term determinants of gross and net external positions, after the creation of the Lane&Milesi-Ferretti database of external positions (for the latest version, see Lane and Milesi-Ferretti (2006)). Lane and Milesi-Ferretti (2001) offer a theoretical and empirical discussion of long-term determinants of the net foreign asset position. Faria et al. (2007) show that more open economies with better institutions have a greater equity share in external liabilities.

Few studies have focused on low-income countries (LICs) with the notable exceptions of Edwards (1989) and Hinkle and Montiel (1999).[4] LICs differ from other countries in a number of ways. First, these countries face greater distortions—some of which are policy-induced—than other countries. Capital account controls may reduce the ability of LICs to borrow in order to bring consumption and investment forward, as required by a lower level of development or the occurrence of negative shocks, and therefore affect the current account, domestic demand and the real exchange rate. Price controls can directly affect the RER by artificially setting specific tradable or nontradeable prices. Trade restrictions were at least until the 1990s more prevalent in LICs than in other countries, with implications for the RER and the current account. Financial repression, by dampening domestic savings, may lead to larger current account deficits. Finally, broader institutional characteristics—such as the degree of protection of property rights—may have first order effects on domestic and foreign investment.

Second, low-income countries are in general more exposed to shocks than other countries, and may—as a result of the lack of diversification of their production structure—experience larger macroeconomic consequences associated with given shocks. For example, LICs are exposed to frequent terms of trade fluctuations often associated with their main crop or natural resource exports, but also, on the import side, to oil price fluctuations. Such terms of trade fluctuations affect the RER and the current account through income and intra- and inter-temporal substitution effects. Moreover LICs, in contrast to high and middle income countries, frequently experience significant natural shocks, such as droughts, floods as well as windstorms and earthquakes, with potential effects on current account balances. Finally, wars and violent political transitions between regimes have often occurred in the historical sample. Such events, by disrupting investment, consumption, and capital flows, can have a bearing on the current account and the RER at a relatively short horizon.

[4] The impact of fiscal and monetary policies on the real exchange rate and the current account in presence of large distortions has been explored by Edwards (1988) and Prati and Tressel (2006). Prati and Tressel (2006) and Berg et al. (2007) show in particular that aid recipient countries' absorption of foreign aid inflows is affected by policy responses, often resulting in the accumulation of foreign exchange reserves.

Finally, capital flows are typically of a different nature in low income countries than in other countries. A large part of their foreign borrowing is in the form of official development assistance (grants or concessional loans). Such capital flows do not respond to market incentives, and often do not need to be repaid contributing to financing larger current account deficits over the medium-term. Moreover, extensive borrowing on concessional terms imply that net present value (NPV) calculations are crucial in order to derive realistic indicators of the net external position of LICs. New measures of net foreign assets (NFA) encompassing the NPV value of external debt have been constructed, which for some countries can be substantially different from the standard NFA measure. Aid flows have often been associated with the risk of Dutch disease as resource transfers are expected to be lead to a more appreciated real exchange rates by increasing aggregate demand.

The paper is organized as follows. Section II reviews the theoretical literature on the determinants of current accounts and real exchange rates. Section III presents the results of the empirical analysis. Section IV suggests how to gauge the elasticity of the trade balance to the real exchange rate. Section V concludes.

II. THEORETICAL BACKGROUND

This section reviews the determinants of the RER and of the CA in particular factors that are important fundamentals for LICs. Potential determinants of the RER and the CA are grouped into 4 main groups: (i) macroeconomic policies, pre-determined characteristics, and stage of economic development; (ii) policy distortions and institutions, (iii) shocks, and (iv) external financing.

Economic theory underpins the relationship between the real exchange rate, the current account and a number of macroeconomic variables. In principle, factors that affect the real exchange rate should also affect the current account.[5] However, theoretical foundations for the RER analysis has usually been derived from long-run steady state analysis of economies with tradable and nontradable goods, while the CA analysis has been underpinned by the intertemporal approach to the current account (Edwards, 1989, Obstfeld and Rogoff, 1996, Hinkle and Montiel, 1999, and Vegh, 2009). [6]

[5] For example, in the IS-LM model, output is given by: $Y = A(Y, r, X) + NX(\varepsilon, Y, Y^*)$, and the exchange rate is given by: $\varepsilon = \varepsilon(r, r^*, Z)$ where Y is domestic output, A is domestic demand, r the real interest rate, X is a set of exogenous fundamentals, ε is the real exchange rate, and Z reflects a set of factors affecting the allocation of capital across countries such as portfolio preferences and the degree of capital account openness. Assuming a monetary policy rule, a reduced form equation of the trade balance and the real exchange rate would therefore be a function of the same fundamentals: $NX = NX(\overline{Y}, Y^*, X, Z)$ and $\varepsilon = \varepsilon(\overline{Y}, Y^*, X, Z)$.

[6] For a theoretical and empirical extention of the RER analysis to a setup with imperfect substitutability, see Mac Donald and Ricci (2007).

Macroeconomic policies, pre-determined characteristics, and economic development

Fiscal policy. In absence of Ricardian equivalence, the fiscal balance affects national savings and therefore the current account balance (Obstfeld and Rogoff, 1999, and Chinn and Prasad, 2003).[7] Fiscal policy also affects the RER in a multigood economy even with Ricardian equivalence. If government spending falls relatively more (less) on non-traded goods than on private consumption, government consumption leads to an appreciation (depreciation) of the REER, as the relative price of nontraded goods must increase (decrease) in order to maintain internal (external) balance (Vegh (2009), Hinkle and Montiel (1999)).

Net foreign assets. Countries with initially higher NFA can afford higher spending (above income flow)—and therefore a lower CA—while remaining solvent.[8] However, in economies with uncertain horizon, non-zero steady state CAs are positively associated with steady-state NFA.[9] Moreover, in a steady-state, higher NFAs allow higher consumption of both tradeable and non-tradable goods while remaining solvent, implying a more appreciated real exchange rate. This relationship may not hold in low-income countries experiencing debt relief. If debt relief is fully anticipated, lower NFAs may not be associated neither with lower consumption needed to service external liabilities through trade surplus nor with changes in the real exchange rate.

Demographics. Under the life-cycle hypothesis, a higher share of inactive dependent population reduces national savings and the current account balance, and therefore results in a more appreciated real exchange rate. In an OLG model, a higher share of working-age agents raises national savings, thus increases the current account. Population growth has a negative effect on the current account if it is correlated with the share of young inactive in the population (see also Rose et al., 2008).

Stage of development and economic growth. Neoclassical theory predicts that countries at an early stage of development should import capital and borrow against their future income to finance their investment needs and smooth out consumption given high marginal utility of consumption (Obstfeld and Rogoff, 1999). Similarly, fast growing countries with higher expected productivity gains should invest more implying a deterioration of the current

[7] Blanchard (1984) and Weil (1989) present models breaking Ricardian equivalence in infinitely lived agent models by respectively introducing a positive probability of death and successive cohorts of infinitely lived agents. In such models, a fiscal deficit (surplus) raises (reduces) the current generation's consumption and reduces (increases) the current account balance by shifting taxes to future (unborn) generations.

[8] Obstfeld and Rogoff, 1999, Chapter 2. In an infinite horizon model and no uncertainty, the steady-state current account should be zero, implying no relationship between the current account and the NFA. In a growing economy, a positive steady-state relationship between the current account and the NFA would be observed.

[9] In Blanchard (1984) or Weil (1989) models with uncertain horizon/distinct infinitely lived dynasties, the current account need not be zero in the steady state even with infinitely lived agents: countries with positive (negative) steady-state NFA will enjoy current account surplus (deficit) in steady-state. There could also be systematic differences between debtor and creditor countries in the relationship between current account and NFA (Kraay and Ventura, 2000).

account.[10] Finally, high productivity growth in the tradable sector relative to the non-tradable should be associated with a more appreciated real exchange rate (Balassa-Samuelson effect). An increase in productivity in the tradable relative to the nontradable sector, relative to trading partners, will lead to higher wages in the tradable sector and subsequently put upward pressure on wages in the nontraded sector. This will result in an upward pressure on prices of nontraded goods relative to traded goods, as traded goods are priced on the international market, leading to a real exchange rate appreciation.[11] However, a good measure of relative productivity is not easily available in low-income countries. Therefore, this paper uses real GDP per capita as a proxy variable, as in most of the literature. As this variable may not accurately capture the relative productivity effects—on the contrary, it averages productivity in tradables and nontradables—the expected sign on this variable is not clear.

Policy distortions and institutions

Domestic financial reforms. On the one hand, a more developed financial system facilitates investment and help attract foreign capital, thereby lowering the current account balance and appreciating the real effective exchange rate. On the other hand, a more developed financial system may improve the current account balance and depreciate the real exchange rate if it stimulates domestic savings (Mac Kinnon, 1973, Edwards, 1995).

Trade reforms. Trade reforms that are temporary (or perceived as temporary) may worsen the current account by reducing the price of imported goods relative to domestically produced goods (intra-temporal substitution effect). Moreover consumption of non-traded goods increases as a result of the wealth effect. This tends to draw resources out of the export sector, further deteriorating the current account. The inter-temporal effect is ambiguous: the current account should improve as a result of the income effect, but a lower price for today's consumption relative to future consumption negatively impacts the current account balance (Ostry, 1990).[12] The effect of trade liberalization on the real exchange rate is theoretically ambiguous, depending on whether income or substitution effects dominate. As trade is liberalized, the increase in real income resulting from lower import prices tends (under the presumption that trade restrictions lower real income by imposing distortions**)**. However, trade liberalization may also shift demand away from nontraded to traded goods, resulting in a depreciation.

[10] The effect of trend output growth on the current account can be ambiguous. Indeed, in an overlapping generation model, an increase in trend output growth also raises aggregate savings by raising the wealth accumulated by the young relative to the wealth decumulated by the old (who had lower income when young). Hence such a model predicts a positive effect of trend output growth on the current account.

[11] The effect is more complex in the presence of non-homogeneous goods (see Mac Donald and Ricci, 2007).

[12] Permanent liberalization may also affect the current account if they are perceived as temporary by private agents: if reforms lack credibility and agents anticipate a policy reversal, agents will consume more today following a permanent liberalization, and the current account would deteriorate because of intertemporal substitution effects (Calvo, 1987).

Capital account openness. Neoclassical theory predicts that, over the development process, capital account liberalization should be associated with a deterioration of the current account (capital inflows) and a real exchange rate appreciation in developing countries, and an improvement of the current account (capital outflows) and a real exchange rate depreciation in advanced countries (Lucas, 1988, Edwards, 1989).[13] Moreover, a more open capital account allows countries to borrow against future income and therefore to run a lower current account balance when hit by a temporary negative income shock.

Institutions. Broad institutional characteristics such as the quality of property rights and contract enforcement can have first order effects on the current account balance and capital flows. Countries with better institutions may be more able to attract a steady flow of foreign capital as a result of lower expropriation risks, and therefore can sustain lower current account balances (Alfaro et al., 2007). However, in countries with better institutions, the political process may produce exchange rate policies less likely to favor overvalued real exchange rates, and therefore result in higher current account balances.

Price controls and black market premium. Administered prices keep prices below the market level and are therefore associated with a more depreciated REER. However, price controls may also take the form of a marketing board, pushing domestic prices up and therefore be associated with a more appreciated REER. Finally, a black market rate that is more depreciated than the official exchange rate (a positive black market premium, indicating expectations of a devaluation) is likely associated with a more appreciated real exchange rate (based on the official rate, which is the prevalent basis for measuring real exchange rates, as widely available).

Shocks

Terms of trade. An improvement in the terms of trade arising from an increase in the price of tradables raises the current account as part of the positive income shock is saved to smooth out consumption over time, and appreciates the real exchange rate as the increase in domestic demand (associated with the income effect) bids nontraded goods prices up. However, an improvement in the terms of trade arising from a decrease in the price of imports may also result in a worsening of the current account and a real depreciation if agents substitute imported goods for domestically produced goods or for future imported goods (Obstfeld and Rogoff (1999) and Vegh (2009)), or if imports are used as intermediate inputs. Overall, the effect of an improvement in the terms of trade depends on whether the substitution or the income effect dominate.

Natural disasters. A negative income shock positively affects the current account balance if national savings increase or investment falls as a consequence of the shock. However, the current account could worsen if the country can smooth consumption out by borrowing on

[13] Empirical evidence has not confirmed the direction of capital flows predicted by the basic neoclassical theory. See for instance Prasad, Rajan and Subramanian (2007) for a recent empirical analysis.

international financial markets (Obstfeld and Rogoff, 1999). When considering the long-run relationship between the REER and its fundamentals, we may expect shocks not to play any role, as it is likely that they have only temporary effects.

External financing

Grants. Countries receiving a steady flow of grants are able to sustain a lower trade balance. Given that grants are accounted for in the current account of the balance of payment, the current account should remain unchanged if a grant fully finances a deterioration of the trade balance. If, on contrary, part of the grant is saved in the form of international reserves, the current account will improve.[14] In the short-run, as supply has alimited ability to respond, a surge in aid could push up domestic prices and induce a real exchange rate appreciation. In the long-run, however, the result is unclear, as aid flows may cause an increase (decrease) in the productivity of the nontraded goods sector relative to the traded sector, hence leading to a real exchange rate depreciation (appreciation).

Concessional loans. Concessional loans do not respond to market incentives either, but, in contrast to grants, are accounted for in the financial account of the balance of payments. Concessional loans allow to finance a lower current account in the medium-term, and, eventually must lead to an improvement of the current account when the loan is repaid. Moreover, debt on concessional terms poses a measurement issue as it creates a gap between the nominal and the present market value of NFA. This paper examines the effect of net foreign assets when accounting for the present value of public and publicly guaranteed debt. However, given data availability, the additional effect from expected future debt relief cannot be not accounted for.[15]

III. EMPIRICAL RESULTS

A. Data

The exercise required an extensive data gathering and cleanup exercise. We constructed a dataset containing 134 countries over the period 1980-2006 for the various indicators. Countries used in the analysis were selected based on their income group: low or lower middle income, according to the World Bank classification, and excluding emerging markets (see appendix table A1). A summary statistic of the main data is provided in Appendix table A2. A description of all variables is provided in the Appendix.

[14] See Berg et al. (2007) and Prati and Tressel (2006) for evidence on the relationship between aid flows, policies and current account balances in aid receiving countries, and Mongardini and Rayner (2009) for evidence on the relationship between aid flows, policies and the real exchange rate.

[15] We are grateful to Ibrahim Levent and his team at the World Bank for sharing with us the net present value calculations.

B. Analysis of Medium-Term Current Accounts

Following Lee et al. (2008), the estimations consists of non-overlapping four-year averages over the period 1981-2005 with 6 observations for most countries. The focus is mainly on low income countries.

Baseline results

Current account regressions on various country samples using the same set of explanatory variables as in Lee and al. (2008) or Chinn and Prasad (2003) are presented in **Table 1**. The first three columns report respectively: (1) the regression coefficients of the fixed effects (FE) estimation of Lee et al. (2008); (2) the same specification with country FE including also initial NFA and relative income per capita estimated on our sample of low-income countries; (3) the same specification without country FE; (4) the same specification as in column (2), but on the sample of high income countries, and (5) the same specification as in column (4) without country FE.

These regressions show that typical medium-term determinants of the current account such as the fiscal balance or the old age dependency ratio are not always significantly associated with the current account balance in low-income countries. Per capita GDP growth is not significant whether FE are included in the regression or not. Finally, the coefficient on relative income per capita has the expected positive sign in the pooled OLS regression. The pooled OLS specification (column 3) has a relatively low R^2 (0.26), which may reduce its usefulness in predicting medium-term equilibrium current account.

Regressions on a sample of high-income countries show a stable coefficient for the fiscal balance compared with the coefficients estimated by Lee et al. (2008). However, the coefficients of the two demographic variables appear significantly higher than those estimated in the literature. The coefficient of the old-age dependency ratio is 3 to 6 times higher (in absolute terms), and the coefficient of the population growth variable about twice as large as in the one estimated in Lee et al. (2008).[16]

Table 2a reports our preferred current account regressions.[17] A careful search among potential factors has identified 3 main robust determinants of the medium-term current account in our sample of countries: (i) foreign aid; (ii) domestic financial reforms; (iii) the terms of trade; and (iv) and capital account openness interacted with exogenous income shock.

[16] Additional regressions suggest that this difference in the magnitude of the effect of the demographic variables is caused by the difference in the period considered (the regressions of Lee et al. (2008) include the 1970s, whereas our database does not).

[17] Note that the results our robust to restricting the sample to be the same in all regressions.

The regression baseline 1 includes an aggregate measure of foreign aid excluding debt relief in percent of GDP (Roodman, 2005), and the IMF World Economic Outlook measure of the terms of trade. It has a high R^2 of 0.73, which is significantly better than the 0.56 R^2 of the regression of Lee et al. (2008) reported in Table 1. For comparison, column 2 reports an OLS regression with the foreign aid variable only.

Estimated coefficients can be read as follows. The coefficient on the aid variable implies that, for any 1$ of aid (scaled by GDP) the current account (also scaled by GDP) will deteriorate by 11.3 cents. This coefficient suggests that, on average, a large share of aid is not spent through a lower trade balance, and may therefore be indirectly saved as foreign exchange reserves. Berg et al, (2007) and Prati and Tressel (2006) provide evidence on fiscal and monetary policies contributing in the absorption of aid inflows in aid receiving countries. The coefficient on the terms of trade implies that a 10 percent improvement in the terms of trade (relative to its historical average) is associated with a 0.23 percent of GDP improvement of the current account. Among standard variables considered in Lee et al. (2008) and Chinn and Prasad (2003), the fiscal balance has a significant impact on the current account with a coefficient of the same order of magnitude as in the typical estimate of Lee et al. (2008). The coefficient on population growth is significant, and implies a much larger effect on the current account than the one usually estimated: the estimated coefficient of -1.6 implies that a one standard deviation increase (0.8 percent relative to trading partners) in population growth is associated with a 1.3 percent of GDP deterioration of the current account.

The regression baseline 2 is almost identical to baseline 1, but breaks-down foreign aid in its two components: grants and concessional loans. It shows that grants and concessional loans have a different impact on the trade balance on average. The coefficient on *concessional loans* implies that a 1$ (scaled by GDP) of concessional loans is associated with a 31 cents (scaled by GDP) deterioration of the current account balance over a 4 year period. In other words, only about 1/3 of concessional loans are absorbed through an increase in net imports over a four year horizon. On the contrary, *grants* have no significant effects on the current account. This is consistent with the hypothesis that, on average, grants are fully spent on net imports over a four year horizon: a 1$ grant (scaled by GDP) results in a 1$ (scaled by GDP) deterioration of the trade balance, and, as a result the current account is unaffected.

The regression baseline 3 is almost identical to baseline 2, but also add the measure of domestic financial liberalization from Abiad, Detragiache and Tressel (2008) in the set of fundamentals. Given the lower country coverage of this variable, the sample drops somewhat. Moreover, dropping insignificant explanatory variables does not affect results significantly (column 6). The impact of *concessional loans* on the current account (coefficient of -0.54) is now larger than in the baseline 2. This larger coefficient, however, reflects mainly the smaller country sample. *Domestic financial liberalization* is associated with a higher current account balance in low-income countries, supporting the Mac Kinnon hypothesis that financial liberalization, by raising the return on financial savings, results in higher saving rates in developing countries. The estimated effect is noticeable: the coefficient implies that a country moving from complete financial repression to the sample average level of liberalization would experience a 1.5 percent of GDP increase in the current account balance on average.

The regression baseline 4 introduces a measure of exogenous shocks (natural disasters), an index of capital account liberalization, and an interaction term between these two variables as additional control variables. The rationale for the interaction term is that the macroeconomic response to an exogenous negative income shock will depend on the borrowing capacity of the country considered: countries with a more open capital account will be able to smooth temporary negative income shocks out by borrowing internationally. The measure of natural disaster is defined as the frequency of floods, droughts, earthquakes and windstorms over the 4 years period considered.[18] The index of capital account liberalization is from Abiad, Detragiache and Tressel (2008). The impact of *capital account openness* on the current account is negative when countries experience natural disasters, as predicted by theory, but it is positive in absence of such shocks. The average coefficient on capital account openness estimated at the sample frequency of natural disasters is -0.003. However, with a probability 1 of a natural disaster, the total effect of capital account liberalization is higher in absolute value with a coefficient of -0.025. This implies that, when natural disasters are extremely frequent, removing capital account restrictions fully would lead to a deterioration of the capital account by -2.5 percent of GDP. The response of the current account to *natural disasters* is consistent with basic neoclassical theory only in countries with sufficiently opened capital account. In these countries (about half of our sample), the current account deteriorates when a natural disaster occurs. In contrast, in countries with a closed capital account, natural disasters – which are as frequent in this subgroup as in the complete sample - are associated with an improvement of the current account.

Quantifying the effects of new determinants of the CA

In **Table 2b**, we compare medium-term current accounts estimated using the specification of column 2 in Table 1 with the same set of explanatory variables as in Lee et al. (2008), and the baseline 3 of Table 2 which includes the additional explanatory variables that we have uncovered for LICs (aid, the terms of trade, and the index of domestic financial reforms). The first column reports the change in the estimated medium-term current account resulting from the addition of the new variables. The following columns report the contribution of each new variable to the change in the medium-term current account.[19] [20]

[18] Such exogenous negative income shocks are very frequent in our sample (frequency of 0.6 over the sample period)

[19] For regressions with country fixed effects, the medium-term CA is decomposed based on the formula: $CA_{MT} = \hat{CA}_{it+5} = CA_{i\bullet} + \hat{\beta}_{within} \cdot \left(X_{it+5} - X_{i\bullet}\right)$ where $\hat{CA}_{it+5}$ is the predicted current account consistent with medium-term fundamentals, $CA_{i\bullet}$ are country fixed effects, $\hat{\beta}_{within}$ is the vector of within-country estimated coefficients, and $X_{it+5} - X_{i\bullet}$ is a vector of the medium-term fundamentals deviations from their historical averages.

[20] There are also indirect effects through changes in the coefficients of other variables. The direct effects of new explanatory variables remain broadly unchanged when non significant variables are dropped from the regression.

On average, the estimated medium-term current account does not change significantly when using the baseline 1 instead of the specification of Lee et al. (2008). However, the cross-country standard deviation of the change in the estimated medium-term CA, and the absolute value of this change both suggest that this change in the medium-term CA can be positive or negative and be economically large for some countries. Moreover, the impact of specific variables is as follows.

Accounting for domestic financial liberalization leads to higher medium-term CA (0.7 percent of GDP) on average. This is explained by the fact that countries that have progressively liberalized their domestic financial systems have higher medium-term current accounts than historically, after controlling for other factors.

Accounting for concessional loans (or grants) results in higher medium-term CA by 0.1 percent of GDP (or -0.2 percent of GDP) on average. This average effect is small and is explained by the fact that, on average, developing countries receive somewhat smaller amount of aid (excluding debt relief) than in the historical sample. However, accounting for aid can have large effects on estimated medium-term CA for some countries as suggested by the maximum and minimum reported effect.

As a result of worsening terms of trade relative to historical average, the contribution to the medium-term CA is slightly negative on average (-0.1 percent of GDP), but the effects can be large for some countries.

Other results and tests of robustness

Table 3 presents regression results for additional potential determinants of the current account related to structural characteristics of the economy considered, exogenous shocks and external financing. Column 1 explores the *dynamic effect of aid flows* (both concessional loans, grants) on the current account to assess the extent to which aid flows are spent over time. We find no significant relationship between the current account and four year lags of concessional loans and grants on average. In principle, if part of concessional loans are saved in the form of international reserves and are spent later on, a negative relationship between the current account and lags of concessional loans should be observed if one controls for other key factors. The high standard errors suggests that there exists a significant degree of dispersion across countries and/or periods in this relationship. Note however that the time series are not long enough to assess how repayment of concessional loans – which typically spans over decades – affects the current account.

We find that domestic credit expansion – measured by the change in the ratio of private credit to GDP – is associated with a lower current account balance. A one standard deviation increase in this variable is associated with a 0.1 percent of GDP reduction in the current account balance. This suggests that credit growth is a proxy for aggregate demand pressures in LICs. Note that the coefficient of the concessional loans variable falls, suggesting that part of the aggregate demand effect of aid flows is captured by this financial variable. The specification also include a dummy variable for periods during which a violent change of

political regime occurs.[21] The coefficient on this variable is positive and strongly significant, which could be explained by capital outflows and/or a reduction of domestic investment relative to savings during periods of political unrest.

Next, the impact of trade reforms is not unambiguous, as it leads to a reduction in the current account balance when measured by the trade liberalization date of Wacziarg and Welch (2008) (column 3), but lower average tariffs have no significant impact on the current account (columns 4 and 5). The lack of a clear impact on the current account is consistent with the predictions of existing theories.

Theory suggests that terms of trade shocks caused by movements in export prices have a different impact on the current account than those caused by import prices (section II). Empirical evidence confirms the theoretical predictions. *Export prices* are positively correlated with the current account which can be explained by income effects associated with varying export prices. *Import prices* however are not significantly associated with the current account. This lack of a significant association is consistent with income effects and substitution effects of changes in import prices having opposite impacts on the current account.

Broad institutional characteristics – which are relatively stable over time - mainly explain the cross-sectional dispersion of current accounts. *Constraints on the executive power* (a standard proxy for limits on expropriation risks) are negatively associated with the current account in the cross section of countries, but not within countries.[22] [23] Moreover, a dummy for violent political transitions is positively associated with the current account both within and between countries.

Finally, our empirical analysis confirms that the standard predictions of neoclassical theory regarding capital flows holds within countries. Capital account liberalization tends to improve the current account in more developed countries, and worsens it in less developed countries, as shown by a positive coefficient on an interaction term between GDP per capita and the index of capital account liberalization in a regression including all countries. This result is consistent with the standard neoclassical theory: countries at an early stage of development, – resp. countries that are more developed – tend to experience capital inflows – resp. capital outflows – when they open up to international capital markets.

Various additional robustness tests are reported in **Table 4**, and are as follows: (i) when *using the lagged CA as a proxy for NFA* as in Lee et al. 92008), we find limited persistence of the current account beyond 4 years when controlling for medium-term determinants of the

[21] The dummy variable for a violent political regime change is equal to one whenever the Polity IV constraint on the executive index takes a negative value.

[22] Acemoglu and Johnson (2005) show that property rights have a first order impact on financial development and economic growth in a cross-section of countries.

[23] The pooled OLS regression (not reported) is available upon request.

current account, and results are broadly comparable (columns 1 & 2); (ii) *using a commodity terms of trade* instead of the World Economic Outlook terms of trade measure does not alter our main results (columns 3 & 4); (iii) *the non-linear effect of capital account liberalization* on the current account is robust to the use of a broader measure of capital account liberalization (updated version of Quinn, 1997), as shown in column 5; (iv) *Dropping countries with extremely low NFA (* countries that experienced debt relief) does not affect our main results (column 6);[24] (v) *Dropping transition countries* does not alter our main results (column 7), even though the impact of concessional loans on the current account is now somewhat larger than in the baseline; (v) *The degree of openness to international trade* – proxied by the ratio of exports plus imports to GDP – does not affect the relationship between the terms of trade and the current account: an interaction term between the terms of trade and the openness variable is not significant (column 8).

C. Empirical Analysis of the Real Exchange Rate

This section investigates the long-run relationship between the real effective exchange rate and a set of fundamentals. The estimation relies on an unbalanced panel of annual data covering 1980-2006. The number of countries varies across specifications based on data availability but the largest country set includes 66 low- and lower middle-income countries. Panel unit root test show the unit root nature of the variable involved in the estimation, apart from the natural shocks (see Table 5).[25] Panel cointegration test have been performed for the benchmark regressions of interest (columns 3 in Tables 6 and 7) and reject the null of no cointegration.[26] Under the assumption of I(1) cointegrated variables, dynamic ordinary least squares with fixed effect provide an estimate of a long-run cointegrating relationship between the real exchange rate and a set of fundamentals.

Benchmark REER regressions for low income countries[27]

Table 6 reports the preferred specifications for LICs, that include traditional variables such as the net foreign assets, government consumption, terms of trade, and productivity, but also LIC-specific variables such as aid flows and capital account liberalization. The first column includes a dummy for natural shocks defined as before as LIC are widely affected by such natural occurrences, and the results hint to a negative effect on the real exchange rate. However, given that the econometric nature of these [0,1] indicators is uncertain (a PUR test rejects a unit root), in column 2 (and subsequent regressions) we exclude this indicator.

[24] We drop observations with initial NFA below 119 percent of GDP.

[25] Panel unit root tests are based on Pesaran 2007 to control for cross-sectional dependence (Pesaran (2007)).

[26] Panel cointegration tests are based on Group mean ADF panel cointegration test (Pedroni (2004) and (1999)).

[27] The benchmark regressions are virtually unchanged if we include time dummies (available upon request), to account possible common movements in the REER of LICs associated, for example, with an exchange adjustment in the currencies of advanced economies.

Column 3 drops insignificant variables and derives a benchmark regression. Consistently with the previous literature, government consumption is associated with a real exchange rate appreciation, which is usually the case under the presumption that government consumption is spent on non-tradables in a higher proportion than private spending. An improvement in the terms of trade appreciates in the real exchange rate with an effect similar to those in other sample of countries (see Ricci, Milesi-Ferretti and Lee, 2008). Fertility is associated with an appreciation of the real exchange rate, as in Rose (2008).

Turning to variables specific to low income countries, aid inflows (from Roodman, 2006[28]) are in the long run associated with a more depreciated exchange rate, potentially indicating positive productivity effects in the nontradable sector relative to the tradable sector's productivity. Aid is generally considered to push up domestic prices (especially of nontradables), thus leading to a read exchange rate appreciation (Dutch disease), although this is more likely in the short run, where the supply side of the economy has not had a chance to adjust. In the long run, an increase in aid would be consistent with a real exchange rate depreciation if it would raise productivity of nontradables relative to the productivity of tradables.[29]

Capital account liberalization is associated with an appreciation of the real exchange rate, suggesting that in the long run such liberalization promotes persistent net capital inflows. Price distortions are also somewhat significant. In particular the presence of marketing boards is likely to keep prices high and thus appreciate the real exchange rates.

The last column of Table 6 includes the black market premium, which unfortunately halves the sample size. In the presence of a black market premium, the official exchange rate is likely overvalued, resulting in an appreciated real exchange rate, measured at the official rate. The actual rate is likely to be between the official and the black market rates, corresponding to a coefficient between zero and one. As expected, the size of the coefficient is in this interval. However, when we include the black market premium the sample size decreases substantially, which limits the usefulness of including the black market premium in the benchmark regressions. The point of this regression is mainly to show the importance of measuring correctly the exchange rate, an issue which should deserve wide attention in real exchange rate analysis, especially when focusing on low income countries which have traditionally been more prone to dual exchange rate systems and problems of measurements of price levels.

The regression coefficients are relatively stable across specifications. Although the sample size changes across the various specifications with different controls, the regression coefficients show the same overall results. For example, an improvement in the terms of

[28] This variable measures foreign aid net of debt relief.

[29] An alternative explanation for the negative coefficient is the presence of endogeneity. In particular, countries that are experiencing depreciating exchange rates while in economic difficulties may also be aid receivers. But such an interpretation would not be consistent with the long-run nature of the estimated cointegration relationship.

trade for goods of one percent is associated with approximately a 0.2 percent appreciation of the real exchange rate. Additionally, net foreign assets enter insignificantly in most specifications.

Table 7 presents the same regressions for the real effective exchange rate calculated on the basis of the Penn World Table (PWT) prices relative to the U.S. applying the same trade weights as for the real effective exchange rate from the INS (IMF). Results are virtually identical, with the main exception of the indicator of productivity (in this case, for dataset consistency, the productivity indicator is based on GDP per worker from the PWT dataset) The negative sign (also in Table 6 although not significant) could indicate that overall productivity in low income countries is mainly reflected in the tradable sector (consistently with the Balassa-Samuelson mechanism, but arising from the opposite shock) or could reflect endogeneity. Unfortunately, it was not possible to construct a better proxy for the Balassa-Samuelson effect (the productivity of tradables versus non-tradables), despite extensive efforts.

Are low income countries different?

Low income countries differ from high income ones mainly because of the specific factors (distortions, financing, and shocks), but traditional factors do not show great difference. However, neglecting the presence of the specific factors would lead to misspecifications and even coefficients on traditional factors would appear different. Table 8a columns 1 and 2 presents a typical specification for high income and middle-high income (see for example Ricci et al.., 2008), estimated with separate coefficients for low- and lower middle-income countries (LIC) and for high- and upper middle-income countries (HIC). All coefficient appears to be significantly different (see Table 8b column 1). The next two sets of columns in table 8a show the two benchmark regressions in Table 6, columns 2 and 3, again with different slopes for HIC and LIC. The difference on the traditional coefficients is now smaller, but the key LIC factor are generally quite different, especially for the main benchmark.

Robustness

The benchmark model for LICs is generally robust to alternative specifications. Tables 9 and 10 repeat in column 1 the benchmark derived in columns 3 of Tables 6 and 7 and then explore the robustness of alternative indicators. In particular, columns 2 and 3 allow for the terms of trade (respectively in goods only or goods and services) to be split in the two components (price of exports and imports), and show that the effect is mainly due to the price of exports. This is something we would expect, as an improvement in the terms of trade from a decline in import prices may generate not only a positive income effect (increasing demand for domestic goods), but also an additional substitution effect away from domestic goods, thus with offsetting effects on the real exchange rate (see Christiansen and Tokarick (2008) for a broad theoretical and empirical analysis of the effect of the components of the terms of trade).

D. Empirical Analysis of NFA

This Section investigates empirically the net foreign asset position of LICs. The estimation relies on an unbalanced panel of annual data covering 1980-2006. Again, panel unit root test confirm the unit root nature of the variable involved in the estimation and panel cointegration test have been performed for the benchmark regressions. The estimation is based on dynamic ordinary least squares with fixed effects. The number of countries varies heavily across specifications mainly depending on the availability of the debt variable. Similarly to the regressions of current account on fiscal deficit, the literature include public debt among the determinants (see Lane and Milesi-Ferretti (2006)). However, the availability of public debt data for LICs is limited. Other variables include demographics, income percapita relative to trading partners, and various measures of policy distortions and institutions.

Given the difficulty of proxying for debt, we employ three indicators for debt, matched by three corresponding indicators for NFA. The first debt indicator, and the only indicator of public debt, is the ratio of public debt to GDP from Jaimovich and Panizza (2006); this is matched with NFA to GDP as a left hand side variable. The second regression is based on the ratio of NFA to trade and the ratio of external debt to trade from the same database as the NFA (i.e. the Lane and Milesi-Ferretti (2006)). The last combination employs debt measured as the present value based on World Bank data (as in Section IV.B) and NFA reflects the present value calculation in its debt component, both divided by GDP.

The results are reported in Table 11.[30] Net foreign assets of LICs are highly correlated with public debt, demographic factors, income, and institutions. The first two factors are well established both theoretically and empirically and are consistent with the results in Section III.B. An increase in public debt tends to reduce NFA by about the same amount in the long run. The effect is rather large, but not too far off from the one estimated by Lane and Milesi-Ferretti (2006) for developing countries. The effect of public debt on NFA seems to be much larger than the one of fiscal balance on the current account presented in Section III.B. This result could be due to deficits being more monetized in LICs than HICs: deficits financed by money creation would be less likely to result in external debt, while deficits financed by public debt would be more likely to result in external debt. Hence, the lower effect of the fiscal balance on the current account may simply reflect the average of two effects, while the one of debt on NFA would capture only one of them. Note also that when we run the regression for the high income sample, we find a much lower effect than for LICs (similarly to what found by Lane and Milesi-Ferretti (2006).

Also in line with theoretical intuition and past evidence, a higher share of dependent population implies the need to run down savings in order to consume more. The positive association of income with NFA is in line with the standard development model where poor countries borrow and rich countries lend. Additional explanatory factors may relate to the

[30] Time dummies might be appropriate to absorb common movements in the NFA position of LICs arising from, for example, exchange rate fluctuations that may cause valuations effects. Results are virtually identical (available upon request).

presence of habit formation or other nonlinearities in the utility function (see Lane and Milesi-Ferretti (2006) for a theoretical discussion). Also, richer countries tend to invest more in equity (see Faria et al. 2007), which are more likely to offer a higher long term return and hence a higher NFA. However, limited access to international markets or a high desire for precautionary saving would tend to work in the opposite direction and may reduce or offset the positive effect.

It is interesting to notice that policy distortions and institutions all work in the same direction. Higher quality of policies and of institutions are associated with a higher NFA in the long run. Other indicators, such as the degree of financial development are often also positively associated with NFA. This may seem at odd with the standard intuition that countries with better policies and institutions can borrow more easily (in other words they face milder credit constraint). One possible explanation is that countries with better policies and institutions can better facilitate the saving process. An alternative explanation is related to the high correlations of these indicators with the level of development, which may affect savings as discussed above and may be only imperfectly captured by income percapita.

The relation between the analysis of NFA positions and of the other external indicators would need to be complemented by a dynamic picture, which is beyond the scope of this paper.[31] We would like to highlight, however, a few issues. First, in steady state, a country with positive nominal GDP growth, would normally experience a positive link between the current account ratio to GDP and the NFA ratio to GDP (the factor of proportionality is exactly the growth in nominal GDP, under the assumption of identical return on foreign assets and liabilities). Hence, any given a level of NFA to GDP in line with fundamentals (for given growth and interest rate assumptions) is associated with a unique current account to GDP ratio that would be consistent in steady state.

We can thus derive an assessment of external imbalances from three measures. The current account gap arising from the current account regressions (i.e. deviation of actual current accounts from the ones consistent with fundamentals); the real exchange rate gap (i.e. the deviation of the actual real exchange rate from the one consistent with fundamentals in the long run); and the current account gap arising from the NFA regressions (i.e. deviation of actual current accounts from the ones consistent in steady state with the NFA that is in line with fundamentals). The next section will discuss a metric to convert the three measures in the same units (either in terms of exchange rate gaps, or in terms of current account gap).

[31] Regarding projections of NFA and fundamentals in order to derive a medium term assessment, there are some issues to consider in low income countries. First, it is necessary to forecast the degree of concessionality of future debt and the extent of debt relief in order to obtain a proper measure of NFA and of public/external debt. In doing so, an assessment as to what is the sustainable level of debt is necessary, as this level is likely to be an upper bound of the target level of debt of the donor community. Finally, returns on assets and liabilities are likely to differ in general and LICs are no exception: they may indeed face the opposite pattern than the advanced economies, that is higher returns on the liabilities than on assets.

IV. TRADE ELASTICITIES WITH RESPECT TO THE EXCHANGE RATE

Previous sections discussed how to estimate the magnitude of a country's long-run or "equilibrium" current account, real exchange rate, and net foreign asset position. To compare the resulting gaps (i.e. deviations of actual , we need a metric to covert a current account gap (the difference between the actual current account and the "equilibrium one) into a exchange rate gap (the difference between the actual real exchange rate and the one that is consistent with long-run equilibrium) and vice versa. Under the assumption that an imbalance can be adjusted by a change in the real exchange rate that delivers a change in the trade balance, trade elasticities, i.e. import and export elasticities, can be used to derive such a metric.[32] Starting from existing estimates of these elasticities, we can derive the overall trade balance elasticities that can be used to convert a current account gap into a exchange rate gap.

A. Computing Elasticities of a Country's Trade Balance With Respect to a Change in the Exchange Rate

This section derives an analytical expression for how a change in a country's real exchange rate would affect its trade balance. A country's trade balance, in terms of foreign currency, can be written:

$$TB^* = P_E^* E - P_M^* M \tag{1}$$

where P_E^* is the price of exports in foreign currency, P_M^* is the price of imports in foreign currency, E is the volume of exports, M is the volume of imports, and TB^* is the trade balance. Note that E and M are functions of both the domestic and foreign prices of each good. Totally differentiating equation (1) gives:

$$dTB^* = P_E^* E(\hat{p}_E^* + \hat{E}) - P_M^* M(\hat{p}_M^* + \hat{M}) \tag{2}$$

where ^ denotes proportional change, i.e. $\hat{M} = \frac{dM}{M}$. The domestic prices of imports and exports are related to foreign prices and the nominal exchange rate, r:

$p_M r = p_M^*$, or $\hat{p}_M = \hat{p}_M^* - \hat{r}$

$p_E r = p_E^*$, or $\hat{p}_E = \hat{p}_E^* - \hat{r}$.

[32] Kohli (1991) employs a GDP function approach to estimate import demand and export supply elasticities. Kee et al. follow a similar approach, but covers a large number of countries. Tokarick (2009) uses the GDP function approach to calibrate elasticity values from trade and production data. Senhadji (1997) used a traditional approach, based on prices and income. Stern, Francis, and Schumacher (1976) and Goldstein and Khan (1985) present surveys of the literature.

To allow for the possibility that changes in foreign prices or the exchange rate are not fully passed through into domestic prices, the two equations above can be modified to include pass-through coefficients. For example:

$$\hat{p}_M = \phi_M (\hat{p}_M^* - \hat{r}) \tag{3}$$

$$\hat{p}_E = \phi_E (\hat{p}_E^* - \hat{r}) \tag{4}$$

where ϕ_M and ϕ_E are the pass-though coefficients for import and export prices respectively and lie between zero and one. If $\phi_M = \phi_E = 1$, then pass through is complete and changes in foreign prices are fully reflected in domestic prices. There is no consensus in the literature on values for these parameters. Frankel, Parsley, and Wei (2005) estimate that for developing countries and emerging markets, the pass-through coefficient is in the range of 0.66 to 0.77.

In equation (2), expressions for changes in foreign prices and quantities are needed. Define the following:

$\hat{E}^D = \eta_X \hat{p}_E^*$ (export demand equation, with export demand elasticity $\eta_X < 0$)

$\hat{E}^S = \varepsilon_X \hat{p}_E$ (export supply equation, with export supply elasticity $\varepsilon_X > 0$)

$\hat{M}^D = \eta_M \hat{p}_M$ (import demand equation, with import demand elasticity $\eta_M < 0$)

$\hat{M}^S = \varepsilon_M \hat{p}_M^*$ (import supply equation, with import supply elasticity $\varepsilon_M > 0$).

Solving the above system of equations gives:

$$\frac{dTB^*}{dr/r} = P_E^* E \left[\frac{-\varepsilon_X \phi_E (\eta_X + 1)}{\eta_X - \varepsilon_X \phi_E} \right] - P_M^* M \left[\frac{\eta_M \phi_M (1 + \varepsilon_M)}{\eta_M \phi_M - \varepsilon_M} \right] \tag{5}.$$

Dividing both sides of equation (5) by GDP (denominated in the foreign currency) gives:

$$\frac{dTB^*/GDP^*}{dr/r} = s_X \left[\frac{-\varepsilon_X \phi_E (\eta_X + 1)}{\eta_X - \varepsilon_X \phi_E} \right] - s_M \left[\frac{\eta_M \phi_M (1 + \varepsilon_M)}{\eta_M \phi_M - \varepsilon_M} \right] \tag{6}$$

where s_X and s_M are the shares of exports and imports in GDP respectively. To compute how the trade balance would change, *denominated in domestic currency*, use the relationship:

$$TBr = TB^* \tag{7}$$

where TB is the trade balance measured in *domestic* currency.

Differentiating equation (7) with respect to *r*, gives:

$$\frac{dTB}{dr}r = \frac{dTB^*}{dr} - TB \tag{8}$$

or,

$$\frac{dTB}{dr}r = \frac{1}{r}\frac{dTB^*}{dr/r} - TB \tag{9}$$

Substituting equation (6) into equation (9) and manipulating, gives:

$$\frac{dTB/GDP}{dr/r} = s_X\left[\frac{-\eta_X(1+\varepsilon_X\phi_E)}{\eta_X - \varepsilon_X\phi_E}\right] - s_M\left[\frac{\varepsilon_M(1+\eta_M\phi_M)}{\eta_M\phi_M - \varepsilon_M}\right] \tag{10}$$

It needs to be emphasized that a devaluation could cause the trade balance to improve measured in foreign currency terms, but deteriorate in domestic currency. Consider the small country case, where prices are fixed in foreign currency terms. Suppose a devaluation raises the domestic prices of imports and exports by the full amount of the exchange rate change—the case of full pass through. Then export volume will rise and import volume will fall. Measured at *foreign* prices, the trade balance must improve because foreign prices are fixed and export volume increased, while import volume decreases. So the change in the trade balance must be positive. Measured at *domestic* prices, however, the change in the trade balance could be positive or negative. On the export side, the domestic price of exports rises and so does volume, so export revenue must increase. On the import side, however, expenditure on imports could rise or fall. This is because the domestic price of imports rises with the devaluation, but the volume falls. So what happens to import expenditure depends on the elasticity of demand for imports, as shown in equation (10)—it will depend on whether η_M is greater or less than one. Using equation (8) it is easy to see that the only situation in which the trade balance *must* change in the same direction in both foreign and domestic currency is if the trade balance is initially zero.

Equations (6) and (10) demonstrate how changes in a country's real exchange rate affect its trade balance, for alternative values of trade elasticities—import and export demand and import and export supply.

Table 12 summarizes how a change in the real exchange rate affects the trade balance. For illustrative purposes, Table 13 reports the trade balance elasticities that result from applying equations (6) and (10). The column labeled "small country" lists the trade balance elasticities that result from assuming that import supply and export demand elasticities are infinite. In addition, these trade balance elasticities also use the import demand and export supply elasticities reported in Tokarick (2009) using a production function approach. The column

labeled "general" refers to the trade balance elasticities that result from applying a combination of the elasticities used by Lee et al. (2008) and Tokarick (2009). For illustrative purposes, this case assumes that the import supply elasticity is infinite; the import demand and export supply elasticities are taken from Tokarick (2009); and the export demand elasticities are Lee et al. (2008). The elasticities presented in Table 13 show how the overall trade balance elasticities would be affected as a result of using alternative assumptions regarding the underlying import and export elasticities. For all the trade balance elasticities reported in Table 13, it was assumed that $\phi_E = \phi_M = 1$, that is, the full pass-through case. In table 13, for most countries, the absolute value of the trade balance elasticity for the "general case" lies between the elasticities in Lee et al. (2008) and the small country case. An exception is the case of Bangladesh, where the trade balance elasticity for the general case exceeds the elasticity used in Lee et al (2008). Using the formulae for changes in the trade balance in domestic currency terms, this will occur when:

$s_X\left[\frac{-\eta_X(\varepsilon_X+1)}{\eta_X-\varepsilon_X}\right]+s_M(\eta_M+1)>s_X\eta_X^{CGER}+s_M(1-\eta_M^{CGER})$. Substituting in the relevant values, this condition can be expressed as:

$\eta_M > \frac{s_X}{s_M}\left[\frac{-.2059}{-.71-\varepsilon_X}\right]-0.92$. Since the import demand elasticity for Bangladesh is relatively high (-0.33), the above condition is satisfied. However, for most other countries, the import demand elasticity is more negative. Also, a low value for $\left(\frac{s_X}{s_M}\right)$ will increase the likelihood that the above condition is satisfied. In the case of Bangladesh, this ratio is 0.62. Since the bracketed term in the above condition is positive, a low value for $\left(\frac{s_X}{s_M}\right)$ means that a low weight will be attached to this term.

B. Price elasticities and the real exchange rate

In the analysis described above, the behavior of exports and imports depends on prices of these goods in domestic currency terms. What is of interest, however, is how changes in the *real* exchange rate affects a country's trade balance. It turns out that in the context of the model laid out in section II—the three-good model of exports, imports, and nontraded goods—the real exchange can be defined as the price of traded goods relative to the price of nontraded goods. Therefore a change in the nominal price of exports or imports IS a change in the real exchange rate, *holding the price of nontraded goods constant*. This is done in this model because there is no formal mechanism to determine the price of nontraded goods in response to a change in the nominal exchange rate, as P_N is endogenous.

In particular, the expression for the export supply elasticity, defined as the proportional change in export supply as a result of a proportional change in the price of exports, *holding the price of nontraded goods constant*. Likewise, the expression for the import demand

elasticity, holding the price of nontraded goods constant. Defined in these terms, these elasticities can be thought of as real exchange rate elasticities, since they both are defined holding the price of nontraded goods constant.

An alternative definition of the real exchange rate that is frequently used is based on relative CPIs of two countries—the CPI in the home country relative to the CPI in the foreign country. There are a number of issues that need to be confronted if this definition is used. First, this definition of the real exchange rate does not isolate the importance of the price of traded goods relative to nontraded goods—both types of these goods are aggregated in one price index, the consumer price index. Second, one would need to specify how the price of nontraded goods is determined. In general, a country's CPI can be thought of as a aggregation of the prices of imports, exports, and nontraded goods, along the following lines:

$$CPI = P_M^{\alpha} P_E^{\beta} P_N^{1-\alpha-\beta} \quad \text{or} \quad \hat{CPI} = \alpha \hat{P}_M + \beta \hat{P}_E + (1-\alpha-\beta)\hat{P}_N \qquad (11).$$

In equation (11), it would be straightforward to determine how the prices of imports and exports are affected by a depreciation of the home currency. However, determining how the price of nontraded goods responds is more complicated and requires a complete model because the price of nontraded goods is determined endogenously by both supply and demand. In particular, it would have to specify cross-price elasticities: how a change in the price of traded goods affects the demand for nontraded goods. In the absence of a complete model, this study does not take the approach of defining the real exchange rate as the ratio of domestic and foreign CPIs.

V. CONCLUSIONS

This paper offers a portfolio of methodologies for assessing external disequilibria in low income countries. In particular, it offers coherent results for the relation of real exchange rates, current account, and net foreign assets with respective fundamentals in the medium-to-long run. The focus on low income countries is mandated by the limited attention in the literature towards this set of countries and by the presence of specific features that characterize these countries, such as policy distortion, access to special financing, larger sensitivity to exogenous shocks, and price taking behavior. As one of the reason for the lack of attention to these countries is imposed by data limitations, we built a wide database, which is unique in terms of the set of indicators and of countries encompassed.

We find that external performance in LICs appears to be different. In addition to standard determinants of current accounts and real exchange rates, aid flows (grants and concessional loans), domestic financial liberalization, the removal of capital account controls, shocks (terms of trade, natural disasters), and demographic measures have a significant impact on external indicators of low-income countries.

The results are generally coherent across methodology, and are mainly in line with existing literature for standard economic indicators. Standard indicators encompass fiscal and demographic ones, and the level of development. First, an improvement of fiscal balance is

associated with an increase of the current account. Similarly, a reduction in debt is associated with an improvement in the NFA position. The effect seems to be much larger in the latter case than in the former (and larger than in advanced economies, similar to Lane and Milesi-Ferretti), which may be due to the fact that deficits tend to be more monetized in LICs than HICs (so that the lower effect of the fiscal balance on the current account with respect to the one of debt on NFA may be due to the averaging of the effects of deficits financed by money creation—which is less likely to result in external debt—and the effect of deficits financed by public debt—which is more likely to result in external debt). An increase in government consumption is associated with an appreciation of the real exchange rate (as typical in advanced economies), unless coupled with an increase in aid. This is consistent with the argument that government spending is more likely to fall on tradables if it is financed by aid. Second, a higher share of dependants in the economy is associated with a lower current account, as well as a more appreciated REER and lower net foreign asset position in the long run. This is due to the lower saving and higher spending (which would push up the prices of nontradables). Third, a higher income is associated with higher current account for countries with an open capital account, and with higher net foreign assets in the long run, in line with the intuition that rich countries lend to poor countries.

The additional indicators specific to low income countries can be classified in 3 categories: access to special financing, heavier policy distortions, and more sensitivity to shocks. Regarding financing, an increase in aid arising from concessional loans is associated with a deterioration of the current account—as it drives higher imports. In the long run, an increase in aid is associated with a deterioration of the real effective exchange rate. The latter result may be surprising in light of the usual Dutch disease argument. However, while aid can generate an appreciation of the real exchange rate in the short run (as expenditure on non tradables increase relative to supply), it may also be associated with a long run depreciation if it is channeled to improve productivity of nontradables more than productivity of tradables.

Regarding shocks, a positive terms of trade shock tends to improve the current account and appreciate the real exchange rate, but mainly if it arises from a change in the export price (which is consistent with the fact that import prices are associated with an additional substitution effect working in the opposite direction). Disasters tend to be associated with an improvement of the current account (due to the drastic reduction in absorption), unless the country has an open capital account which allows the country to borrow.

Regarding policy distortions, domestic financial reforms are associated with an improvement of the current account, suggesting either a larger positive effect on saving than on investment, or that financial repression was pervasive before the reforms. Capital account liberalization allows countries to borrow against disasters (lower current account), and allows low income countries in general to borrow from high income countries. Capital account liberalization is also associated with a more appreciated real exchange rate in the long run, possibly due to the effect of capital inflows on spending. It is interesting to notice that the quality of policies and institution are generally positively associated with NFA in the long run. This could be due to a better saving process in this countries, or these indicators may simply proxy for the level of development (thus complementing an imperfect proxy such as income).

We also generate trade balance elasticities that allow one to convert gaps resulting from one methodology (say current account) to the other (real exchange rates). Finally, this study, despite the extensive data collection efforts, laments the lack of wide coverage for many indicators, thus highlighting the need for further efforts in improving the data production and quality control.

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Table 1. Current Account regressions with standard medium-term determinants (Lee et al. 2008)

	(1) CGER FE	(2) LICs FE	(3) LICs OLS	(4) HI FE	(5) HI OLS
Fiscal balance	0.32***	0.2719**	0.1981	0.1937**	0.2646***
		[0.1128]	[0.1386]	[0.0892]	[0.0952]
Old age dependency ratio	-0.23**	-0.2208	-0.4194***	-0.6096***	-0.3118**
		[0.2360]	[0.1583]	[0.2093]	[0.1564]
Population growth	-0.47	-1.3559**	-0.6729	-2.1609***	-2.2073***
		[0.6302]	[0.6206]	[0.7632]	[0.6710]
Initial NFA	...	-0.0056	0.0260***	-0.0014	0.0280
		[0.0106]	[0.0086]	[0.0198]	[0.0173]
Oil balance	0.31***	0.2213**	0.1159**	0.7803***	0.3748***
		[0.0957]	[0.0524]	[0.1720]	[0.1302]
Relative income per capita	...	0.0731	0.2553***	-0.0892*	0.0015
		[0.2133]	[0.0774]	[0.0526]	[0.0271]
Per capita GDP growth	-0.27	0.1883	0.0448	0.3995*	0.3779**
Observations		249	249	124	124
R-squared	0.56	0.73	0.26	0.79	0.56

*** p<0.01, ** p<0.05, * p<0.1; robust standard errors in brackets.

Table 2a. Current Account regressions: Main Results

	Baseline 1		Baseline 2		Baseline 3		Baseline 4
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	FE	OLS	FE	FE	FE	FE	FE
CGER variables							
Fiscal balance	0.2432**	0.1802	0.2466**	0.2648*	0.2896*	0.3216**	0.3460***
	[0.1213]	[0.1398]	[0.1229]	[0.1497]	[0.1639]	[0.1354]	[0.1216]
Old age dependency ratio	-0.2673	-0.2708*	-0.2415	0.0062	0.0316		
	[0.3089]	[0.1519]	[0.3103]	[0.2732]	[0.2802]		
Population growth	-1.6275**	-0.5442	-1.4663**	-2.7725***	-2.3913***	-2.2373***	-2.0289***
	[0.6977]	[0.5740]	[0.7116]	[0.7551]	[0.7365]	[0.7612]	[0.7562]
Initial NFA	-0.0103	0.0160*	-0.0099	-0.0066	-0.0095		
	[0.0126]	[0.0084]	[0.0127]	[0.0118]	[0.0120]		
Oil balance	0.1820	0.0995*	0.1892	0.2209*	-0.0530		
	[0.1248]	[0.0542]	[0.1282]	[0.1142]	[0.1253]		
Relative Income per capita	0.1017	0.0700	0.0372	0.3085	0.2039		
	[0.2472]	[0.0816]	[0.2707]	[0.1964]	[0.2547]		
Per capita GDP growth	0.1446	0.1058	0.1263	0.0777	0.0312		
	[0.1413]	[0.1430]	[0.1449]	[0.1196]	[0.1411]		
New baseline variables							
Aid	-0.1130*	-0.2356***					
	[0.0605]	[0.0585]					
Concessional loans			-0.3122*		-0.5376**	-0.4694**	-0.4995**
			[0.1709]		[0.2115]	[0.1849]	[0.1907]
Net grants			-0.0282		0.1476	0.1337	0.1806*
			[0.0837]		[0.1259]	[0.1178]	[0.1036]
Domestic financial liberalization				0.0290**	0.0246*	0.0251**	0.0239*
				[0.0140]	[0.0141]	[0.0120]	[0.0141]
Terms of trade (WEO)	0.0228*		0.0236*		0.0317**	0.0326**	0.0324**
	[0.0136]		[0.0139]		[0.0149]	[0.0129]	[0.0129]
Capital account liberalization							0.0408*
							[0.0210]
Other variables							
Negative natural shock							0.0340**
							[0.0133]
Nat. Shock * Capital account							-0.0655**
							[0.0256]
Observations	223	249	219	161	139	139	139
R-squared	0.73	0.31	0.73	0.80	0.82	0.82	0.83

*** p<0.01, ** p<0.05, * p<0.1; Robust standard errors in brackets

Table 2b. Current Account: Quantifying the Effect of Variables on medium-term CA

		Impact of :				
	Δ Med-term CA	Fiscal balance	Domestic finance	Loans	Net grants	TOT
Average	0.8%	-0.01%	0.7%	0.1%	-0.2%	-0.1%
Std dev	2.7%	0.05%	0.3%	0.8%	0.3%	1.4%
Average(absolute value)	2.0%	0.04%	0.7%	0.6%	0.2%	1.0%
Minimum	-4.7%	-0.11%	0.1%	-2.2%	-1.4%	-2.3%
Maximum	9.1%	0.11%	1.2%	1.4%	0.3%	4.1%

Note: all figures are in percent of GDP

Table 3. Current Account regressions - Additional Results: credit, trade, institutions and capital account restrictions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
CGER variables									
Fiscal balance	0.2713*	0.3281***	0.3339**	0.2605**	0.2809***	0.3311***	0.3615***	0.2983**	0.3225**
	[0.1596]	[0.1100]	[0.1355]	[0.1272]	[0.1064]	[0.1142]	[0.1057]	[0.1480]	[0.1385]
Population growth	-1.9885**	-3.4174***	-2.3897***	-3.1551***	-2.9258***	-1.9051***	-1.7011**	-2.1700***	-2.2259***
	[0.9541]	[0.5677]	[0.7977]	[0.7437]	[0.6705]	[0.6694]	[0.6506]	[0.7966]	[0.8237]
New baseline variables									
Concessional loans	-0.3572	-0.2604	-0.5092**	-0.4647**	-0.4219**	-0.4901**	-0.5039**	-0.4520**	-0.5431***
	[0.2199]	[0.1811]	[0.1975]	[0.1872]	[0.1891]	[0.1952]	[0.1969]	[0.1795]	[0.2023]
Net grants	0.1068	0.1458	0.1237	0.0520	0.0613	0.1724	0.2141**	0.1254	0.1427
	[0.1337]	[0.1101]	[0.1144]	[0.1182]	[0.1160]	[0.1224]	[0.1063]	[0.1171]	[0.1275]
Domestic financial liberalization	0.0307**	0.0228*	0.0378***	0.0219	0.0245*	0.0300**	0.0260*	0.0204	0.0269*
	[0.0135]	[0.0119]	[0.0134]	[0.0143]	[0.0146]	[0.0123]	[0.0143]	[0.0139]	[0.0142]
Terms of trade (WEO)	0.0329**	0.0452***	0.0273**	0.0367***	0.0344***	0.0327***	0.0324***		0.0260*
	[0.0146]	[0.0123]	[0.0133]	[0.0133]	[0.0117]	[0.0117]	[0.0117]		[0.0134]
Other variables									
Concessional loans (lagged)	-0.1182								
	[0.2259]								
Net grants (lagged)	0.0547								
	[0.1275]								
Change in private credit to GDP		-0.0855***							
		[0.0321]							
Violent political transition		0.0268***			0.0247**	0.0236**	0.0245***		
		[0.0086]			[0.0100]	[0.0100]	[0.0087]		
Economic Liberalization			0.0116*						
			[0.0060]						
Average tariffs				-0.0106	-0.0122				
				[0.0127]	[0.0126]				
Constraints on executive						-0.0001	-0.0001		
						[0.0001]	[0.0001]		
Capital account liberalization							0.0437**		-0.0276*
							[0.0197]		[0.0147]
Negative natural shock							0.0352***		
							[0.0127]		
Nat. Shock * Capital account							-0.0651***		
							[0.0239]		
Exports price (WEO)								0.0400***	
								[0.0148]	
Imports price (WEO)								-0.0255	
								[0.0157]	
GDP percapita * Capital Account Lib									0.2102**
									[0.0871]
Observations	121	121	139	134	134	139	139	139	234
R-squared	0.84	0.84	0.82	0.82	0.83	0.83	0.85	0.82	0.80

*** p<0.01, ** p<0.05, * p<0.1; Robust standard errors in brackets

Note: regression 9 is run on all countries, with LICs' specific coefficients (with the exception of the interaction between GDP per capita and Capital Account lib)

Table 4. Current Account Regressions: Robustness Tests

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	FE	OLS	FE	FE	FE	FE	FE	FE
CGER variables						*A*	*B*	
Fiscal balance	0.2700*	0.1178	0.2790**	0.2782**	0.3393**	0.2157*	0.3463**	0.3220**
	[0.1559]	[0.1206]	[0.1153]	[0.1141]	[0.1430]	[0.1219]	[0.1386]	[0.1304]
Population growth	-1.6942*	0.3508	-2.2382***	-2.2412***	-2.5583***	-1.8165**	-2.1414***	-2.2411***
	[0.8917]	[0.4550]	[0.6929]	[0.6900]	[0.7942]	[0.7768]	[0.7303]	[0.7512]
New baseline variables								
Concessional loans	-0.3306	-0.2186	-0.5790***	-0.5986***	-0.6514***	-0.5292***	-0.4731**	-0.4629**
	[0.2119]	[0.2496]	[0.2015]	[0.2079]	[0.2250]	[0.1951]	[0.1842]	[0.1864]
Net grants	0.1051	-0.1852*	0.1430	0.1624	0.1459	0.1943	0.1211	0.1279
	[0.1259]	[0.1015]	[0.1166]	[0.1220]	[0.1362]	[0.1447]	[0.1167]	[0.1201]
Domestic financial liberalization	0.0323**	0.0174	0.0200*	0.0213*	0.0164	0.0221*	0.0256**	0.0212*
	[0.0135]	[0.0112]	[0.0118]	[0.0121]	[0.0153]	[0.0125]	[0.0119]	[0.0124]
Terms of trade (WEO)	0.0325**				0.0260*	0.0259**	0.0320**	0.0300**
	[0.0141]				[0.0134]	[0.0123]	[0.0128]	[0.0123]
Other variables								
Current Account (lagged)	0.0789	0.5419***						
	[0.0936]	[0.0897]						
Violent political transition			0.0244***	0.0237**				
			[0.0092]	[0.0092]				
Terms of trade (32 commodities)			0.0508**					
			[0.0221]					
Exports price (32 commodities)				0.0573**				
				[0.0266]				
Imports price (32 commodities)				-0.0275				
				[0.0288]				
GDP percapita * Capital Account Lib					0.2847*			
					[0.1479]			
Capital account liberalization					-0.0332*			
					[0.0200]			
Terms of Trade * openness								0.0000
								[0.0000]
Constant	-0.2178***	-0.0163*	-0.3665***	-0.2712*	-0.2794***	-0.1285**	-0.1630**	-0.2670***
	[0.0715]	[0.0083]	[0.1085]	[0.1534]	[0.1039]	[0.0623]	[0.0638]	[0.0594]
Observations	121	121	155	155	250	125	136	139
R-squared	0.84	0.65	0.82	0.82	0.77	0.72	0.82	0.82

*** p<0.01, ** p<0.05, * p<0.1; Robust standard errors in brackets

Notes: A: dropping periods with low initial NFA (below -199 percent of GDP); B: dropping transition countries.

Table 5. Panel Unit Root test statistic

REER (INS)	-1.59	-1.57
REER (PWT)	-1.82	-1.97
dependency ratio	-0.77	0.19
Productivity (log) #	-1.53	-1.22
Trade restrictions #	-2.04	-1.75
Constraint on executive	-0.85	-0.8
NFA to GDp	-2.02	-2.06
NFA to trade	-1.58	-1.39
NFA (w/PV) to GDP	-2.06	-2.03
NFA (w/PV) to trade	-1.83	-1.53
Terms of Trade G&S (log)	-1.45	-1.36
Government Consumption to GDP #	-1.99	-2.12*
Aid to GDP*	-2.19*	-2.07
Capital account liberalization #	-1.95	-1.85
Administered prices (str. Reform)	-0.79	-1.12
Max. Price intervention (str. Reform)	-1.26	-0.96
Fertility #	-0.54	-0.57
Natural disaster	-3.66*	-3.52*

1/ test based on Pesaran (2007)
* means reject null HO of unit root at 5% one-sided
# indicates that the variable is constructed relative to the weighted average of the trading partners

TABLE 6: REER (INS) regressions
Panel DOLS with FE (only long-run coefficients reported)

	(1)	(2)	(3)	(4)
NFA (w/PV) to trade	-0.0168	-0.0175		
	(0.2661)	(0.2511)		
Productivity (log) #	-0.1019	-0.0770		
	(0.3613)	(0.4869)		
Terms of Trade G (log)	0.3458***	0.3455***	0.3931***	0.4353***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Government Consumption to GDP #	1.2667*	1.1259*	2.0271***	1.9688***
	(0.0622)	(0.0910)	(0.0002)	(0.0074)
Aid to GDP #	-2.2405***	-2.1679***	-1.6187***	-1.3812***
	(0.0000)	(0.0000)	(0.0000)	(0.0016)
Capital account liberalization #	0.3152***	0.2916***	0.2978***	0.4910***
	(0.0025)	(0.0056)	(0.0011)	(0.0000)
Trade restrictions #	0.0975	0.1003		
	(0.2836)	(0.2630)		
Administered prices (str. Reform) #	-0.0004	-0.0223		
	(0.9954)	(0.7174)		
Max. Price intervention (str. Reform) #	0.0596	0.0691	0.0596	0.0129
	(0.2059)	(0.1368)	(0.1660)	(0.8473)
Fertility #	0.1239***	0.1221***	0.0979***	0.1512***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Natural disaster	-0.0951*			
	(0.0559)			
Black market premium (%)				0.2547***
				(0.0015)
Observations	522	522	609	338
R-squared	0.71	0.70	0.65	0.78

p-values in parentheses
*** p<0.01, ** p<0.05, * p<0.1

# indicates that the variable is constructed relative to the weighted average of the trading partners

TABLE 7: REER (PWT) regressions

Panel DOLS with FE (only long-run coefficients reported)

	(1)	(2)	(3)	(4)
NFA (w/PV) to trade	0.0094	0.0087		
	(0.4610)	(0.5053)		
GDP Chain per worker (log)	-0.4418***	-0.4266***		
	(0.0006)	(0.0010)		
Terms of Trade G (log)	0.1634**	0.1600**	0.1970***	0.2040**
	(0.0281)	(0.0326)	(0.0077)	(0.0318)
Government Consumption to GDP #	2.0186**	1.8770*	3.3371***	5.3549***
	(0.0350)	(0.0507)	(0.0000)	(0.0000)
Aid to GDP #	-3.2405***	-3.1855***	-2.0504***	-1.3181***
	(0.0000)	(0.0000)	(0.0000)	(0.0049)
Capital account liberalization #	0.1746**	0.1520*	0.1984**	0.3048**
	(0.0418)	(0.0850)	(0.0233)	(0.0265)
Trade restrictions #	-0.0434	-0.0258		
	(0.6543)	(0.7934)		
Administered prices (str. Reform) #	-0.0299	-0.0650		
	(0.6735)	(0.3607)		
Max. Price intervention (str. Reform) #	0.0343	0.0530	0.1842***	0.0574
	(0.4661)	(0.2462)	(0.0002)	(0.4864)
Fertility #	0.1464***	0.1484***	0.1247***	0.1072***
	(0.0001)	(0.0001)	(0.0001)	(0.0060)
Natural disaster	-0.1549***			
	(0.0057)			
Black market premium (%)				0.4344***
				(0.0000)
Observations	522	522	622	364
R-squared	0.75	0.74	0.69	0.81

p-values in parentheses

*** p<0.01, ** p<0.05, * p<0.1

# indicates that the variable is constructed relative to the weighted average of the trading partners

TABLE 8a: REER (INS) regressions with different slope for HIC and LIC
Panel DOLS with FE (only long-run coefficients reported)

	(1)		(2)		(3)	
	HIC	*LIC*	*HIC*	*LIC*	*HIC*	*LIC*
NFA (w/PV) to trade	0.0276***	0.0074	0.0847***	-0.0165		
	(0.0020)	(0.6476)	(0.0000)	(0.2699)		
Productivity (log) #	-0.1346**	0.2087***	-0.1235	-0.1157		
	(0.0350)	(0.0028)	(0.1336)	(0.2598)		
Terms of Trade G (log)	0.1023	0.3811***	0.1745**	0.3325***	0.1564**	0.3938***
	(0.1466)	(0.0000)	(0.0262)	(0.0000)	(0.0331)	(0.0000)
Government Consumption to GDP #	1.3367***	0.1634	1.5695***	1.2225**	1.7819***	2.0246***
	(0.0015)	(0.7362)	(0.0017)	(0.0489)	(0.0004)	(0.0002)
Trade restrictions #	0.3179***	0.0474	0.2767***	0.0833		
	(0.0004)	(0.5393)	(0.0048)	(0.2646)		
Administered prices, CGER	-0.1070***					
	(0.0000)					
Administered prices (str. Reform) #			-0.2448***	0.0283		
			(0.0011)	(0.5365)		
Max. Price intervention (str. Reform) #			-0.1081	0.0789*	-0.0417	0.0591
			(0.1006)	(0.0558)	(0.5501)	(0.1187)
Aid to GDP #			3.3650**	-2.4081***	0.7691	-1.6192***
			(0.0373)	(0.0000)	(0.5668)	(0.0000)
Fertility #			0.1054**	0.1213***	0.1939***	0.0970***
			(0.0392)	(0.0000)	(0.0000)	(0.0000)
Capital account liberalization #			0.0283	0.2823***	0.3209***	0.2999***
			(0.7224)	(0.0046)	(0.0001)	(0.0008)
Observations	1916		1361		1471	
R-squared	0.53		0.72		0.66	

p-values in parentheses
*** p<0.01, ** p<0.05, * p<0.1
# indicates that the variable is constructed relative to the weighted average of the trading partners

Table 8b: test of equality of coefficients of regressions in table 6 (p-values)

	(1)	(2)	(3)
NFA (w/PV) to trade	0.2710	0.0000	
Productivity (log) #	0.0003	0.9525	
Terms of Trade G&S (log)	0.0020	0.1165	0.0175
Government Consumption to GDP #	0.0678	0.6628	0.7432
Trade restrictions #	0.0221	0.1168	
Administered prices, CGER			
Administered prices (str. Reform) #		0.0019	
Max. Price intervention (str. Reform) #		0.0161	0.2043
Aid to GDP #		0.0006	0.0818
Fertility #		0.7801	0.0308
Capital account liberalization #		0.0465	0.8620

note: Ho: coeff HIC = coeff LIC

TABLE 9: REER (INS) regressions, robustness

Panel DOLS with FE (only long-run coefficients reported)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Terms of Trade G (log)	0.3931***			0.2578***	0.4281***	0.3766***	0.3930***	0.3871***
	(0.0000)			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Government Consumption to GDP #	2.0271***	1.8930***	1.6995**	1.2982*	2.6090***	1.7860***	2.3317***	2.0402***
	(0.0002)	(0.0003)	(0.0167)	(0.0871)	(0.0000)	(0.0009)	(0.0000)	(0.0004)
Aid to GDP #	-1.6187***	-1.4091***	-1.5832***	-4.6194***	-1.8067***	-1.4648***	-1.9358***	-1.6471***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Capital account liberalization #	0.2978***	0.2890***	0.2594**		0.3374***	0.2611***	0.2511***	0.2816***
	(0.0011)	(0.0011)	(0.0103)		(0.0001)	(0.0022)	(0.0057)	(0.0025)
Max. Price intervention (str. Reform) #	0.0596	0.0657	0.1616***	0.0886**	0.0501	-0.0295	0.0058	0.0528
	(0.1660)	(0.1223)	(0.0002)	(0.0238)	(0.2247)	(0.4794)	(0.8933)	(0.2153)
Fertility #	0.0979***	0.0821***	0.1100***	0.1490***			0.1156***	0.1013***
	(0.0000)	(0.0005)	(0.0003)	(0.0000)			(0.0000)	(0.0000)
Price of exports		0.3698***						
		(0.0000)						
Price of imports		-0.3754***						
		(0.0000)						
Price of exports (G&S)			0.1554*					
			(0.0921)					
Price of imports (G&S)			-0.0751					
			(0.3470)					
Capital account liberalization (other) #				0.0668				
				(0.3459)				
Infant mortality rate (UN) #					0.0052***			
					(0.0001)			
Old age dependency ratio #						5.2828***		
						(0.0000)		
GDP Chain per worker (log)							-0.2360**	
							(0.0255)	
Productivity (log) #								-0.0363
								(0.6816)
Observations	609	609	609	561	609	609	555	609
R-squared	0.65	0.66	0.61	0.64	0.64	0.68	0.68	0.66

p-values in parentheses

*** p<0.01, ** p<0.05, * p<0.1

# indicates that the variable is constructed relative to the weighted average of the trading partners

TABLE 10: REER (PWT) regressions robustness
Panel DOLS with FE (only long-run coefficients reported)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Terms of Trade G (log)	0.1970***			0.1098	0.3453***	0.2593***	0.1892***	0.2023***
	(0.0077)			(0.1327)	(0.0000)	(0.0000)	(0.0092)	(0.0045)
Government Consumption to GDP #	3.3371***	3.0899***	2.8125***	2.1511**	4.0085***	2.8295***	3.4689***	4.0020***
	(0.0000)	(0.0000)	(0.0002)	(0.0230)	(0.0000)	(0.0001)	(0.0000)	(0.0000)
Aid to GDP #	-2.0504***	-1.5720***	-1.5319***	-3.9983***	-2.4248***	-1.6520***	-2.1860***	-2.6034***
	(0.0000)	(0.0002)	(0.0006)	(0.0000)	(0.0000)	(0.0001)	(0.0000)	(0.0000)
Capital account liberalization #	0.1984**	0.1995**	0.2124**		0.3337***	0.1672**	0.1747*	0.1140
	(0.0233)	(0.0166)	(0.0167)		(0.0002)	(0.0314)	(0.0575)	(0.1836)
Max. Price intervention (str. Reform) #	0.1842***	0.2037***	0.1958***	0.2401***	0.1764***	0.0412	0.1770***	0.1095**
	(0.0002)	(0.0000)	(0.0000)	(0.0000)	(0.0009)	(0.3679)	(0.0003)	(0.0290)
Fertility #	0.1247***	0.1311***	0.1553***	0.1485***			0.1364***	0.1354***
	(0.0001)	(0.0000)	(0.0000)	(0.0000)			(0.0002)	(0.0001)
Price of exports		0.2490***						
		(0.0012)						
Price of imports		-0.0875						
		(0.3106)						
Price of exports (G&S)			0.2331***					
			(0.0060)					
Price of imports (G&S)			-0.0715					
			(0.3759)					
Capital account liberalization (other) #				0.1540*				
				(0.0883)				
Infant mortality rate (UN) #					0.0046***			
					(0.0077)			
Old age dependency ratio #						6.3982***		
						(0.0000)		
Productivity (log) #							-0.0889	
							(0.4985)	
GDP Chain per worker (log)								-0.3678***
								(0.0029)
Observations	622	622	622	571	622	622	622	587
R-squared	0.69	0.70	0.70	0.74	0.63	0.70	0.69	0.70

p-values in parentheses
*** p<0.01, ** p<0.05, * p<0.1

# indicates that the variable is constructed relative to the weighted average of the trading partners

Table 11: NFA regressions
Panel DOLS with FE (only long-run coefficients reported)

	(1)	(2)	(3)
	NFA to GDP	NFA to Trade	NFA (w/PV) to trade
Public Debt to GDP	-1.0565***		
	(0.0000)		
External Debt to Trade		-0.9287***	
		(0.0000)	
NPV External Debt to GDP			-0.9274***
			(0.0000)
dependency ratio	-4.8161***	-6.8193***	-14.1155***
	(0.0001)	(0.0000)	(0.0000)
Productivity (log) #	0.1193	0.8249***	1.5729***
	(0.5673)	(0.0023)	(0.0000)
Trade Restrictions (#)	-1.0584***	-0.5631***	-0.4755
	(0.0067)	(0.0018)	(0.1128)
Constraint on executive	0.1152***	0.0192	0.0735***
	(0.0037)	(0.3571)	(0.0012)
Observations	314	603	359
R-squared	0.83	0.97	0.99

p values in parentheses
*** p<0.01, ** p<0.05, * p<0.1

# indicates that the variable is constructed relative to the weighted average of the trading partners

Table 12. Summary of How Changes in the Exchange Rate Affect the Trade Balance

	Small Country	General Case
Elasticity	$\eta_X = -\infty$	$\eta_X < 0$
Values	$\varepsilon_X > 0$	$\varepsilon_X > 0$