

This chapter reviews the determinants of the real effective exchange rate and of the current account, with particular emphasis on factors that play an important role for lower-income countries. Toward the end of the chapter, the more limited literature on the determinants of net foreign assets (which generally follows similar intuitions as for the current account) is discussed. The main emphasis of this review is on the theoretical arguments that guide the empirical analysis, but it also highlights the empirical contributions related to each conceptual argument to ease comparison with the results of this analysis. Potential determinants are classified into four main groups: (1) main determinants identified in the literature; (2) structural policies, distortions, and institutions; (3) shocks; and (4) external financing.

In principle, the same factors should affect the real exchange rate and the current account simultaneously (Blanchard, 2007; Edwards, 1989; Obstfeld and Rogoff, 1999; Hinkle and Montiel, 1999; and Vegh, forthcoming). However, foundations for the empirical analysis of the real exchange rate have usually been derived from long-run steady-state analyses of models with tradable and nontradable goods in the presence of balanced trade. At the same time, empirical analysis of the current account has been underpinned by the intertemporal approach to the current account, often in single-good models, that is, without a meaningful exchange rate. Of course, a comprehensive model for external assessment would need to encompass both approaches. But to convey the intuition behind the main effect of each factor on the current account or the real exchange rate, it would be convenient to refer to the respective approach traditionally used.

Macroeconomic Policies, Predetermined Characteristics, and Economic Development

Fiscal Policy

In the absence of Ricardian equivalence, fiscal policy affects aggregate demand and national saving, and therefore, the current account balance and the

real exchange rate.¹ Empirically, Chinn and Prasad (2003) and Lee and others (2008) find that the fiscal balance is significantly and positively associated with the current account in pooled ordinary least squares (OLS) regressions.² Fiscal policy also affects the real exchange rate through a composition effect in a multi-good economy even in the presence of Ricardian equivalence (Obstfeld and Rogoff, 1999). If government spending falls relatively more on nontraded goods than private consumption does (which is often the case for government consumption), the real exchange rate will appreciate because the relative price of nontraded goods must increase to maintain internal and external balance (Ostry, 1994; Hinkle and Montiel, 1999; and Vegh, forthcoming). Consistent with this prediction, the empirical literature tends to find a positive coefficient (see De Gregorio, Giovannini, and Wolf, 1994; and Ricci, Milesi-Ferretti, and Lee, 2008).

Net Foreign Assets

Countries with initially higher net foreign assets can afford higher spending (above income flow)—and therefore a lower current account—and remain solvent even while reducing their net foreign assets positions (Obstfeld and Rogoff, 1999). However, in steady state, growing economies with a constant positive net-foreign-assets-to-GDP ratio would experience a positive current account.³ Moreover, in

¹Blanchard (1985) 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 raises the current generation's consumption and reduces the current account balance by shifting taxes to future generations.

²However, with country fixed effects, the fiscal balance tends to become insignificant in a sample of advanced countries (Chinn and Prasad, 2003; Chinn and Ito, 2007; and Gruber and Kamin, 2007).

³See Lane and Milesi-Ferretti (2002a); Chinn and Prasad (2003); and Lee and others (2008) for consistent empirical evidence in pooled OLS regressions. Blanchard (1985) and Weil (1989) present models with uncertain horizons or distinct

steady state, higher net foreign assets allow higher consumption of both tradable and nontradable goods while remaining solvent, implying a more appreciated real exchange rate (Lane and Milesi-Ferretti, 2002a, 2004; and Ricci, Milesi-Ferretti, and Lee, 2008). This relationship may not hold in LICs experiencing debt relief: if an increase in debt is expected to be associated with debt relief in the future, the decline in net foreign assets resulting from the increase in debt may not be associated either with lower consumption needed to service external liabilities through trade surplus, or with changes in the real exchange rate. The effect of such expectations cannot be disentangled in the data and could thus affect the coefficient of net foreign assets in current account and real exchange rate regressions.

Demographics

Under the life-cycle hypothesis, a higher share of inactive dependent population reduces national savings and the current account balance, thus resulting in a more appreciated real exchange rate. Population growth and fertility have a negative effect on the current account and a positive effect on the real exchange rate if they are correlated with the share of young inactive people in the population. These predictions are confirmed empirically in analyses of the current account (Lee and others, 2008), of the real exchange rate (Rose, Saktiandi, and Braude, 2009), and of net foreign assets (Lane and Milesi-Ferretti, 2002b).

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 incomes to finance their investment needs and smooth out consump-

tion, given high marginal utility of consumption (Obstfeld and Rogoff, 1999).⁴ Similarly, fast-growing countries with higher expected productivity gains should invest more, implying a deterioration of the current account.⁵ Finally, high productivity growth in the tradable sector relative to the nontradable sector 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, with respect to trading partners, will lead to higher wages in the tradable sector (whose price is given in world markets if the country is small) and subsequently put upward pressure on wages and prices in the nontraded sector.⁶ Ricci, Milesi-Ferretti, and Lee (2008) and Choudhri and Khan (2005) find that a 10 percent increase in the productivity of tradables relative to nontradables tends to appreciate the real exchange rate by about 1 to 2 percent on average. Moreover, higher income will result in upward pressure on prices of nontraded goods relative to traded goods because traded goods are priced on the international market, leading to a real exchange rate appreciation. However, a good measure of relative productivity is not readily available for LICs. Therefore, this paper uses real GDP per capita as a proxy variable, as in most of the literature. Given that this variable may not accurately capture the relative productivity effects—on the contrary, it averages out productivity in tradables and nontradables—the expected sign on this proxy is not clear.

⁴For a discussion of how the relationship between country saving and interest rates depends on the level of development, see Ogaki, Ostry, and Reinhart (1996).

⁵The effect of trend output growth on the current account can be ambiguous. In an overlapping generation model, an increase in trend output growth also raises aggregate saving by raising the wealth accumulated by the young relative to the wealth used up by the old (who had lower incomes when young). Hence, such a model predicts a positive effect of trend output growth on the current account (Modigliani, 1986).

⁶The effect is more complex in the presence of nonhomogeneous goods (MacDonald and Ricci, 2007; and Lee and Tang, 2007).

infinitely lived dynasties, in which the current account does not need to be zero in steady state even with infinitely lived agents: countries with positive (negative) steady-state net foreign assets will enjoy a current account surplus (deficit) in steady state. There could also be systematic differences between debtor and creditor countries in the relationship between the current account and net foreign assets (Kraay and Ventura, 2000).

Policy Distortions and Institutions

Domestic Financial Reforms

A more developed financial system facilitates investment and helps attract foreign capital, thereby lowering the current account balance and causing the real effective exchange rate to appreciate.⁷ A more developed financial system may also improve the current account balance and cause the real exchange rate to depreciate if it stimulates domestic saving (McKinnon, 1973; and Edwards, 1995).⁸ Gourinchas and Jeanne (2007) model an open economy in which both investment and saving decisions are distorted by “wedges” affecting the return to capital. Their model predicts that financial liberalization can have ambiguous effects on the external position of a developing country: a reduction of the saving distortion tends to *reduce* capital inflows by increasing domestic saving, but a reduction of the investment distortion tends to *increase* capital inflows by raising capital scarcity.⁹ Empirical analyses have usually relied on measures of financial development as a proxy for the degree of financial liberalization, and have found at best weak effects on the current account (Gruber and Kamin, 2007; and Chinn and Ito, 2007).

Capital Account Openness

Neoclassical theory predicts that, over the development process, capital account liberalization should be associated with deterioration of the current account (capital inflows) and real exchange

rate appreciation in developing countries, and with an improvement of the current account (capital outflows) and real exchange rate depreciation in advanced economies (Lucas, 1988; and Edwards, 1989).¹⁰ 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 (Vegh, forthcoming). However, Kraay and Ventura (2000) suggest that, if the marginal unit of wealth is invested in the same way as the average unit of wealth, transitory positive income shocks will lead to a current account deficit (surplus) in countries with negative (positive) net foreign assets.

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 and net foreign assets positions (Alfaro, Kalemli-Ozcan, and Volosovych, 2007; Gruber and Kamin, 2007). However, in countries with better institutions, the political process may be less likely to favor overvalued real exchange rates, and therefore result in higher current account and net foreign assets positions. The same outcome may arise if better institutions generate an environment more conducive to saving.

Trade Reforms

The effect of trade liberalization on the current account and the real exchange rate is theoretically ambiguous (Edwards, 1989). A common form of trade liberalization—a reduction in import tariffs—would generate income and substitution effects that could have offsetting effects on the real

⁷Greenwood and Jovanovic (1990) show that domestic financial reforms may increase investment by relaxing borrowing constraints. More broadly, a large literature has identified theoretically and empirically the channels through which financial development affects investment and economic growth (for example, Levine, 1997; and Fry, 1995).

⁸Empirical contributions found a weak link between domestic financial liberalization—measured by the real interest rate—and private saving rates in developing countries (Loayza, Schmidt-Hebbel, and Servén, 2000).

⁹An alternative model of the effect of financial globalization on the external position is that of Martin and Rey (2006), who show that financial liberalization can result in a crash and a reversal of the current account. To account for such effects, the empirical estimations in this analysis will include dummy variables for financial crisis.

¹⁰Empirical evidence has not confirmed the direction of capital flows predicted by basic neoclassical theory. See, for instance, Prasad, Rajan, and Subramanian (2007), and Gourinchas and Jeanne (2007).

exchange rate (Edwards and van Wijnbergen, 1987; Khan and Ostry, 1992). A reduction in import tariffs would lower the prices of imported goods and encourage consumers to substitute imports for domestic (i.e., nontraded) goods, which would reduce the prices of nontraded goods. There would also be an income effect: a reduction in tariffs would raise real income and tend to push up the prices on nontraded goods, provided they were normal goods.¹¹ Two studies—Edwards (1989) and Ricci, Milesi-Ferretti, and Lee (2008)—find empirical evidence to support the claim that a reduction in import tariffs leads to a real exchange rate depreciation.¹²

A reduction in import tariffs will affect the real exchange rate and the current account through intertemporal channels as well. A temporary reduction in import tariffs would induce consumers to shift consumption of imports from future periods to the present, worsening the current account in the present, but improving it in the period ahead. There would also be an income effect: the higher real income that results from a reduction in tariffs would tend to improve the current account to the extent that the tariff reduction encourages households to raise savings (Ostry 1990; Edwards and Ostry, 1990).¹³

¹¹Liberalization would also increase permanent income if trade restrictions reduce productivity. For example, firms may be able to produce output more efficiently if they have access to imported intermediate inputs. Barriers that restrict access to imported goods would therefore reduce productivity.

¹²Goldfajn and Valdes (1999) include a measure of a country's openness, defined as the ratio of exports plus imports to GDP, as a "fundamental" in their equilibrium real exchange rate regressions. Although they did not include tariffs on imports explicitly, the authors claim that the openness variable is a proxy for trade liberalization. They find that for a large majority of the 93 countries studied, greater openness is associated with a more depreciated real exchange rate.

¹³Permanent liberalization may also affect the current account if perceived as temporary: if the reforms lack credibility and agents anticipate a policy reversal, agents will consume more today and the current account would deteriorate because of intertemporal substitution effects (Calvo, 1987).

Price Controls and Black Market Premiums

Administered prices keep prices below the market level and are, therefore, associated with a more depreciated real exchange rate (Ricci, Milesi-Ferretti, and Lee, 2008). However, price controls may also take the form of a marketing board pushing domestic prices up, which would therefore be associated with a more appreciated real exchange rate. Finally, a black market rate that is more depreciated than the official exchange rate (i.e., a positive black market premium indicating expectations of a devaluation of the official rate) is associated with a more appreciated official real exchange rate (i.e., based on the official rate, which is the prevalent basis for measuring real exchange rates) for given fundamentals.

Shocks

Terms of Trade

The impact of a change in a country's terms of trade on its real exchange rate is uncertain, as it depends on the magnitude of income and substitution effects (Edwards and van Wijnbergen, 1987; Mendoza, 1995). In the case of a rise in the price of a country's exports, both the income and substitution effects work in the direction of pushing up the prices of domestically produced (nontraded) goods, but it is uncertain whether the magnitude of the increase in the prices of those goods exceeds the rise in export prices. In the case of a terms-of-trade improvement that arises from a decline in the price of imports, the impact on the price of nontraded goods is ambiguous, as the positive income effect would tend to push up the prices of those goods (Ostry, 1988; Edwards and Ostry, 1992), but the substitution effect would tend to reduce prices of those goods. This same sort of reasoning would apply if one adopted a definition of the real exchange rate based on relative consumer price indices. Depending on how the real exchange rate responds to the terms-of-trade change, the trade balance and current account will adjust in a manner that depends on the sensitivity of trade flows to changes in the real exchange rate. Although empirical work seems to support the view that a terms-

of-trade improvement leads to a real exchange rate appreciation (Ostry and Reinhart, 1992; Chen and Rogoff, 2003; Cashin, Céspedes, and Sahay, 2004; and Ricci, Milesi-Ferretti, and Lee, 2008), recent work by Christiansen and others (2011) calls this conclusion into question.¹⁴

There are also intertemporal considerations at work. An improvement in the terms of trade—whether through a rise in the price of exports or a decline in the price of imports—raises income, which could have implications for the current account through changes in household saving behavior. For example, if consumers respond to a terms-of-trade improvement by increasing savings so as to smooth consumption over time, the current account would improve. Also, if consumers perceive a decline in import prices to be temporary, they could shift consumption of imports from the future to the present (Obstfeld and Rogoff, 1999; Vegh, forthcoming), which would worsen the current account in the present period, but improve it in the period ahead.

Natural Disasters

A negative income shock positively affects the current account balance if national saving increases, or if investment falls relative to saving, as a consequence of the shock. However, the current account could worsen if the country can smooth consumption by borrowing on international financial markets (Obstfeld and Rogoff, 1999). Thus, it is expected that the effect of natural disasters depends on the degree of capital account openness.¹⁵ When considering the long-run relationship between the real exchange rate and its fundamentals, shocks may not play any role because it is likely that they have only temporary effects.

¹⁴Christiansen and others (2011) also provide an analysis of the separate effects of import and export prices.

¹⁵It may also depend on the initial net foreign assets position (Kraay and Ventura, 2000; Guo and Jin, 2009).

External Financing through Official Aid

In the short run, a surge in aid could push up domestic prices and induce the real exchange rate to appreciate because supply has limited ability to respond to an increase in aggregate demand financed by aid. In the long run, however, the effect of aid on the real exchange rate is theoretically ambiguous—aid flows may cause an increase (decrease) in the productivity of the nontraded goods sector *relative to* the productivity of the traded sector, thereby causing the real exchange rate to depreciate (appreciate).¹⁶

To empirically estimate the impact of aid on the current account, aid must be broken down into its two main components (grants and concessional loans), given that the two components are accounted for in different parts of the balance of payments (the former enters the current account and the latter the financial account). Also, to the extent that aid flows are usually redistributed to private agents through government expenditures and are not intermediated by the domestic financial system, their effect on the external position is independent of the impact of domestic financial liberalization. Conceptually, and as a first-order approximation, aid flows can be modeled as exogenous transfers.

Grants

Countries receiving steady flows of grants are able to sustain a lower trade balance in the medium term. Given that grants are accounted for in the current account section of the balance of payments, the current account should remain unchanged if a grant fully finances a deterioration of the trade balance. If, on the contrary, part of the grant is saved

¹⁶Torvik (2001) shows how such ambiguity results from a model with traded and nontraded sectors, learning by doing, and spillover effects. If aid tends to expand the size of the nontraded sector, productivity will grow faster in the nontraded sector than in the traded sector as a result of stronger learning by doing in the nontraded sector. Hence, the real exchange rate would depreciate in the long run as a result of a permanent aid inflow.

in the form of international reserves, the current account will improve.¹⁷

Concessional Loans

Concessional loans allow the financing of a lower current account in the medium term. Moreover, debt issued at concessional terms poses a measurement issue because it is associated with a gap between the nominal and the present market value of net foreign assets.¹⁸ This paper examines the effect of net foreign assets when accounting for the present value of public and publicly guaranteed debt.¹⁹ Of course, this valuable correction has limitations—the additional effect from expected

future debt relief cannot be accounted for as a result of lack of data.

The literature on net foreign assets is more limited, in part because until recently empirical analysis has been impaired by the lack of good data. Lane and Milesi-Ferretti (2002b) offer a theoretical and empirical discussion of the main determinants of net foreign assets for advanced economies and developing countries.²⁰ First, public debt tends to reduce net foreign assets, similar to the effect of budget deficits on the current account. Second, a higher share of dependent population implies the need to run down savings (and thus reduce net foreign assets) to consume more. Third, the relationship between income and net foreign assets is more uncertain. A positive relationship is suggested by the standard development model in which poor countries borrow and rich countries lend, but can also be derived in models with habit formation, or nonlinearities in the utility function. However, a negative relationship with income may arise from a higher desire for precautionary saving in developing countries. Finally, richer countries tend to invest more in equity (Faria and others, 2007), which is more likely to offer a higher long-term return and result in a higher level of net foreign assets.

¹⁷See Prati and Tressel (2006) and Berg and others (2007) 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.

¹⁸Extensive borrowing on concessional terms implies that net present value calculations are crucial for deriving realistic indicators of the net external position of LICs. New measures of net foreign assets encompassing the net present value of external debt have been constructed, which for some countries can be substantially different from the standard net foreign assets measure.

¹⁹The authors are grateful to Ibrahim Levent and his team at the World Bank for sharing with us the net present value calculations.

²⁰See Lane and Milesi-Ferretti (2007) for a second edition of their data set.