Why Do Emerging Economies Import Direct Investment and Export Savings? A Story of Financial Underdevelopment*

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Abstract

The net foreign asset positions (NFAP) of developing countries and emerging markets tend to be short equity and either short or long debt, while most industrial nations are long equity and short debt. This paper proposes that financial system inefficiencies associated with underdeveloped financial markets can explain this difference in the NFAPs. Financial system imperfections typically found in emerging markets and developing countries raise the cost of debt financing for domestic firms. This in turn leads to three distinct effects; a greater need for firms to precautionary save, increased vulnerability to foreign multinationals buy-outs, and a drastic limitation on the purchase of foreign firms. We extend a small open economy framework to study the financing decisions of firms operating under financial frictions. In equilibrium, we can obtain a large negative net equity position and a smaller negative net debt position as a result of incremental financing decisions of the firms, rationalizing the observed NFAP in most non-industrial economies.

JEL Codes:

Key Words: Global Imbalances, Financial Underdevelopment, Foreign Direct Investment, Reserves

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1 Introduction

The net foreign asset positions (NFAP) of emerging markets and developing countries differs starkly from that of most industrial countries. According to Lane and Milesi-Ferretti (2006), in 2004 no emerging market or developing economy was concurrently long equity and short debt, a common characteristic shared by most major industrial countries. Developing and emerging markets show a strong desire to import FDI and portfolio equity, evident in the fact that 93% of all these countries are short equity. Of the countries that are short equity, 70% are short debt and 13% are long debt. While emerging markets and developing countries need capital, these data suggests that there is a pattern in the choice of financing which is evident in the composition of capital flows. In particular, emerging markets and developing countries are using equity financing rather than debt financing for capital accumulation.

This pattern of equity financing in emerging markets is also observed at a regional level. Looking at Table 1, between 1980 and 2004, Emerging Asia reduced it net debt and increased its international equity issuance. For Emerging Asia, including China, the net debt position improved from -10.3% of GDP in 1980 to 1.1% of GDP in 2004. Reserves, much of it held in debt securities, improved from 4.9% of GDP to 37% of GDP. Emerging Asia is a net recipient of foreign direct investment (FDI) and has *increasingly* depended on FDI as a source of financing. In Emerging Asia, including China, the net FDI position went from -1.8% of GDP in 1980 to -15.7% of GDP in 2004. As it is clear from the table, this pattern is not exclusive to China.

Indeed, many regions of the world have experienced an improvement in the holding of debt securities (mainly in the form of official reserves) and an increasing dependence on FDI, both in gross and in net terms. In Emerging Europe, reserves grew from 0.2% of GDP in 1980 to 20.2% of GDP in 2004. During the same period, FDI went from being close to nil in 1980 to -21.5% of GDP in 2004. In Latin America, reserves grew from 4.5% of GDP in 1980 to 11.0% of GDP in 2004. FDI grew from -3.1% of GDP in 1980 to -33.0% of GDP in 2004.

This paper argues that capital market imperfections can explain the differences in NFAP composition between industrial and non-industrial countries. Transactions costs, monitoring costs, and moral hazard all generate inefficiencies/imperfections in developing countries' financial markets. While others have looked at weak "domestic institutions" more generally (including property rights

issues and corporate governance concerns) the focus here is to isolate the impact of financial market inefficiencies on the NFAP composition.[1] The key assumption in the model is that financial frictions are much greater in emerging markets and developing economies than in major industrial countries. [⋈Isn't the key assumption that it is costlier for EM firms to borrow internationally than it is for industrialized country firms.] If financial systems are significantly in developing markets more inefficient, then debt financing should be more costly in the emerging markets and developing countries than industrial countries.[2] Zervos (2004) documents that international debt primary issuance direct costs in the United States for Brazil, Chile, and Mexico are in the order of 2% of the issue size for a $100 issue, falling to 1% for a $400 million issue. These costs appear to be larger on average than those paid by issuers in more advanced economies; Melnik and Nissim (2003) document that the average issue costs in the Eurobond market is about 0.37 percent of the issue size. While these numbers are not directly comparable, they fit with the commonly held belief that firms in emerging markets pay higher costs to issue debt.

We present a model to theoretically and quantitatively rationalize the existing NFAP composition in emerging market economies. In our framework, firms in a small open economy (SOE) make financing decisions to finance productive investment. [Need to explain more explicitly what the financial frictions means in the model.] Given the financial frictions faced by the firm, the financing decision is not trivial, domestic firms decide whether to use internal resources and reduce dividend payments to households or to use international bonds to finance investment. Foreign equity, foreign debt, and domestic financing are imperfect substitutes for one another due to capital market imperfections. As firms decide to use more external resources to finance investment, they become more constrained, depressing the value of the firm.

Foreign multinationals can purchase domestic firms by engaging in costly search.[3] Thus, the incentive for a multinational to purchase domestic firms will depend on the price paid for the domestic firm relative to the value of the same firm to the multinational. We assume that once a purchase occurs, control of the firm is transferred to the multinational, which in turn relaxes the

[1] More specifically, we do not explicitly consider any default, expropriation, or corporate governance issues. To weave a more complex story one must add at least one other weak institution to distinguish between portfolio equity and FDI.

[2] Miller and Puthenpurackal (2002) examine costs of public debt issues made by non-U.S. firms in the U.S. bond market. They find that investors demand premium on bonds issued by firms that are located in countries that do not protect investor's rights and do not have a prior history of on-going disclosure.

[3] The market for domestic firms is not Walrasian.

financial constraints of that firm. This is consistent with the notion of foreign direct investment (FDI) as a result of a merger and acquisition (M&A) transaction that changes corporate control presented in Head and Ries (2008).[4] Thus, the value of the firm to the multinational is simply the unconstrained value of the firm. In our model, as domestic firms become more constrained, the wedge between the value of the firm and the unconstrained value of the firm grows, and more FDI occurs.

The financial frictions faced by domestic firms and the probability of domestic firms being bought by foreign multinationals increases the volatility of payoffs from domestic firms to risk-averse domestic residents. In our framework, domestic agents are unable to diversify this risks as international markets are incomplete. Thus, the increased risk faced by domestic residents encourages a powerful precautionary savings motive.

In equilibrium, we obtain an endogenous capital structure for the small open economy. The endogenous capital structure partly represents the cumulation of financing decisions by the domestic firm, which chooses the cheapest form of financing at each point in time. This is similar to the idea of the endogenous capital structure explored by Baker and Wurgler (2002) applied to an open economy setting. The type of financing that the firm chooses determines, one the one hand, the amount of FDI done by multinationals. On the other hand, it also determines the amount of precautionary savings done by households. In our model economy, it is possible for countries hold a positive savings position in which the SOE buys bonds from the rest of the world while FDI flows into the SOE at the same time. Similar to Baker and Wurgler (2002), the model predicts persistence in countries NFAP and no clear target debt/equity ratio either in across countries or within a country.

In terms of our model, non-trivial external financing costs have four major impacts on capital flows which work to explain the observed emerging market NFAPs. First, the direct effect of higher debt costs is to lower debt inflows. Second, these costs raise debt outflows as countries tend to use pre-cautionary saving to self finance future investment prospects rather than going to costly debt markets. Third, equity assets in emerging markets and developing countries appear relatively cheap to industrial countries encouraging the inflow of foreign direct investment (FDI). Finally, foreign

[4] Nocke and Yeaple (2007) document that in 1999 the ratio of the value of cross-border M&A to the value of global FDI was about 80%. Head and Ries (2008) state that from 1987 to 2001 about 2/3 of FDI activity was M&A and the rest was greenfield investment.

equity becomes prohibitively expensive to emerging markets and developing countries, generating virtually no equity outflows.[⋈I do not follow this last argument. We rule out equity purchases by the SOE by assumption. Also, I do not want to explicitly say this as it contradicts the data, particularly towards the latter part of the sample.]

We obtain two important results: First, a dramatic increase in the efficiency of the financial markets will not change the net position rapidly. Second, the building up/stock piling of reserves is not an attempt to generate a "war chest" to protect against future "Sudden Stops" but rather it is an optimal outcome given that debt is costly.

Our paper is related to the rapidly growing literature on global imbalances.[5][6] Perhaps the paper closest in spirit is Ju and Wei (2007) which develops a two-country two-period model where two-way capital flows (savings flowing out and FDI flowing in) as a consequence of weak domestic financial institutions. Significantly, our paper differs from Ju and Wei because we provide a quantitative evaluation of our study in addition to providing a theoretical explanation for global imbalances. Our model is also different in three important ways: First, Ju and Wei get the stylistic result that domestic markets are completely bypassed as the result of financial integration while our model still allows a domestic capital market to emerge. Indeed, in our framework, the domestic capital market is perfect at insuring domestic idiosyncratic shocks for domestic residents. Second, they explore domestic institutions more generally rather than simply focusing on the financial market inefficiencies. In our paper, we focus on [need to state what is the particular friction that we can address⋈]. Thirdly, in their model, agents are risk neutral. Thus, their model cannot asses the importance of risk on saving and financing decisions. In our model, agents are risk averse, and risk plays an important role in generating the observed NFAP.

Caballero, Farhi, and Gourinchas (2008) use a two-country model to explain the net accumulation of liabilities by the United States concurrently with a decrease in interest rates. In their model, two elements are critical. The first is that the United States is assumed to be a superior producer of financial assets. The second is that the developing economy has a higher growth rate. Both

[5] A partial list of papers on global imbalances is Caballero, Farhi, and Gourinchas (2008), Choi, Mark, and Sul (2007), Devereux and Sutherland (2007), Durdu, Mendoza, and Terrones (2007), Fogli and Perri (2006), Ju and Wei (2007), Mendoza, Quadrini, and Ríos-Rull (2007), Tille and van Wincoop (2007).

[6] In addition to the theoretical work there has been substantial empirical work tries to isolate the impact of domestic institutions on capital flows. See, for example, Wei (2000a), Wei (2000b), Alfaro, Sebnem Kalemli-Özcan, and Volosovych (2005), Prasad, Rajan, and Subramanian (2006) [⋈What Prasad article is this?]

assumptions lead to a decrease in world interest rates and a permanent current account deficit by the United States. Caballero, Farhi, and Gourinchas employ a perfect-foresight model where risk does not play a role. We share with their paper the assumption that the advanced world has a more developed financial market. Unlike their model, we do not assume that the developing country's growth prospects are any different. Indeed, we calibrate our SOE to shocks that do not deviate significantly from those of developed economies. Also, we consider the effect of risk on agents.

Durdu, Mendoza, and Terrones (2007) study the accumulation of reserves in a small open economy in response to "sudden stops" and financial globalization. Relative to that paper, we share a similar feature that risk faced by domestic agents can encourage the domestic accumulation of reserves. In contrast to that paper, we develop a model where we can study the joint determination of the bond position and the FDI position for an emerging market economy. Moreover, in our model, we do not have any "sudden stops" and the domestic and international interest rates would equilibrate in the absence of uncertainty.

More recent papers on the global imbalances literature focus on the composition of the capital flows. Devereux and Sutherland (2007) use two-country model to study the joint determination of net inflows of FDI into emerging market economies from developed countries and the net outflows of savings from emerging market economies into developed countries. In their framework, an emerging market needs FDI to grow, and the advanced economy produces risk free bonds. The emerging market chooses an optimal portfolio which consists of a short position in FDI equity and long position in the risk-free bond. Relative to their model, we study the degree that FDI is determined as a result of financial imperfections and not due to the transfer of technology. Indeed, the evidence of Chari, Ouimet, and Tesar (2004) suggests that once FDI occurs, the purchased firm receives a one-time boost to its value, but then the returns from that firm are similar to other ones in the economy. Consistent with that view, purchased firms in a SOE will receive a one-time boost to their value as corporate control changes, but will behave similarly to other firms in the SOE as they have access to the same technology.

Mendoza, Quadrini, and Ríos-Rull (2007) use a two-country model, where one country has more developed internal financial markets than the other, to study the impact of globalization on net foreign asset positions. In their framework, when financial globalization happens, country with more imperfect capital market lends safe assets to country with a more complete asset markets.

The country with more complete asset market also invests more in riskier assets. In equilibrium, the more developed country borrows from the less financially developed country and invests in the less developed country's more volatile capital stock. Mendoza, Quadrini, and Ríos-Rull (2007) focus on the precautionary savings at the individual's level. In their model there is no aggregate uncertainty. In our model, we do allow for aggregate uncertainty and focus on the financing decisions of firms in determining gross positions.

2 An equilibrium model of global imbalances

We start with a canonical model of firm financing decisions and we augment it to fit in an international framework appropriate for emerging markets. The model can be summarized as an SOE model with financial frictions and two sets of agents: foreign and domestic. The domestic SOE consists of a representative firm and a household. The domestic firm is subject to non-diversifiable productivity shocks and makes decisions to finance investment. The firm invests in profitable projects and has the power to trade bonds and equity with the rest of the world. Domestic firms face debt costs and the potential to be bought out by a multinational firm. The representative household is risk averse. The household receives income from wages, from dividends paid by domestic firms, and from sales of domestic firms to foreign multinationals. Domestic agents take the international interest rate as given. There are two kinds of foreign agents: the aforementioned multinational firms who search to purchase firms and the global credit market of one-period bonds that determines the international interest rate. Unlike the domestic firms that are limited by financial frictions, the multinational firms are unconstrained. However, they face search costs in finding a firm to purchase in the domestic economy.

2.1 Domestic households

A large number of identical, infinitely lived households inhabit the SOE. Households choose consumption and purchase shares in domestic companies to maximize the present value of lifetime utility $\mathcal{U}$:

$$\mathcal{U}_t = \mathbf{E}_t \sum_t \left[\exp\left(-\sum_{\tau=0}^{t-1} V(c_t) \right) U(c_t) \right], \tag{2.1}$$

where U is a concave, continuously differentiable, instantaneous utility function and the term in parenthesis represents an endogenous discount factor (Epstein, 1983; Mendoza, 1991). Epstein (1983) established technical assumptions on the endogenous discount factor, which generalizes the standard constant discount factor case, that allows the problem of the households to be stated recursively. Households receive utility from consumption of perishable goods, c_t. Labor supply,l_t is inelastic. Households face the following period-t budget constraint:

$$s_t \left(\text{div}_t + \Theta_t V_t^{\text{NASH}} + (1 - \Theta_t) p_t \right) + b_t^d + w_t l = c_t + s_{t+1} p_t + \frac{1}{(1 + r_t^d)} b_{t+1}^d. \tag{2.2}$$

The households receive income from labor, $w_t l$, and receipts on domestic discount bonds, b_t^d. In addition, households receive a payoff from owning shares. The payoff on equity consists of three components. First, households who hold shares s_t are paid dividends div_t. Second, while households cannot sell domestic shares abroad directly, a multinational may buy-out the firm with a probability of Θ_t. If a buy-out occurs, the domestic shareholders receive V_t^{NASH} per share. Third, households can sell the share s_t with price p_t to another domestic agent. While households always have the option to sell shares, the likelihood that the price is non-zero (a buy-out did not occur) is $(1 - \Theta_t)$. Households make expenditures on consumption c_t, new shares $p_t s_{t+1}$, and discount bonds b_{t+1}^d with price $\frac{1}{(1+r_t^d)}$. The net domestic real interest rate is r^d. Given that labor is inelastically supplied, we normalize the labor supply to be equal to unity.

The use of the discount factor allows the model to determine endogenously the non-stochastic net foreign asset position of the SOE. An endogenous stochastic distribution of net foreign assets also emerges. Because of the SOE assumption of incomplete markets, the model features precautionary savings. Precautionary savings will lead to the mean of the net foreign asset position being greater than the non-stochastic steady state net foreign assets position. Thus, when domestic agents face greater risk, they will tend to hold a larger amount of foreign assets. In our model, agents not only face risk due to productivity shocks but also by their ability to self-insure by using efficient financial markets. In our model, the financial frictions increase risk to domestic agents resulting in a larger net foreign asset position and potentially explaining the positive reserve accumulation observed in emerging market economies, particularly in Asia.

In our model, as is shown below, there is a stochastic wedge between the international interest

rate, r_t^*, and the domestic interest rate, r_t^d. This wedge will also impact the households desire to hold a larger share of net foreign assets.[⋈Finish this, change the time recursive characterization put the parametrization of the V function in the appropriate place.]

Domestic household's optimality conditions

The optimality conditions of the domestic household problem in equation (2.1) are

$$\mathcal{U}_{c_t} = \mathbf{E}_t \left[\exp\left(-V(c_t)\right) \mathcal{U}_{c_{t+1}} \left(1 + r_t^d\right) \right] \tag{2.3}$$

$$p_t = \mathbf{E}_t \left[\exp\left(-V(c_t)\right) \frac{\mathcal{U}_{c_{t+1}}}{\mathcal{U}_{c_t}} \left(\mathrm{div}_{t+1} + \Theta_{t+1} V_{t+1}^{\mathrm{NASH}} + (1 - \Theta_{t+1}) p_{t+1} \right) \right], \tag{2.4}$$

where $\mathcal{U}_{c_t}$ represents the marginal utility of period-t consumption and includes the marginal effect on the time-varying discount factor. The first condition is the standard Euler equation that determines the dynamics of domestic bond demand. The second condition equates the marginal cost of buying a share of equity and the marginal benefit that share provides.

Iterating equation (2.4) forward we can determine the price of a share as follows:

$$p_t = \mathbf{E}_t \left[\sum_{i=1}^{\infty} \exp\left(- \sum_{\tau=t}^{t+i-1} V(c_\tau) \right) \frac{\mathcal{U}_{c_{t+i+1}}}{\mathcal{U}_{c_{t+i}}} (1 - \Theta_{t+i-1}) \left(\mathrm{div}_{t+i} + \Theta_{t+i} V_{t+i}^{\mathrm{NASH}} \right) \right]. \tag{2.5}$$

The price of a share in a particular firm is the discounted stream of dividends adjusted for the time varying probability the firm may be purchased by a multinational.

2.2 Domestic firms

The value of the domestic firm is derived from the discounted value of returns on labor and capital. In addition, the value reflects the chance that the firm may be sold abroad. Every period the firms in the SOE face a time-varying probability, Θ_t, of being bought by a foreigner. Firms take that probability as given. If each firm faces a probability Θ_t of being purchased, for the economy as a whole we assume Θ_t sales are executed. The price of the sold firm, V_t^{NASH}, is determined by the Nash bargain between the emerging market firm and the foreign firm, which we will discuss later. Firms pay domestic households dividends and any proceeds from the sale of the firm to foreigners.

Thus, the domestic value of the firm at any point in time, V_t^D, is given by

$$V_t^D = \text{div}_t + \Theta_t V_t^{\text{NASH}} + (1 - \Theta_t)\mathbf{E}_t \left[M_{t+1} V_{t+1}^D \right], \tag{2.6}$$

where M_{t+1} is the stochastic discount factor and div_t are dividends paid to households.

There are a large number of identical firms in the SOE producing a single tradable good using a fixed labor input, l, and variable capital, k_t. Firms produce the single tradeable good using a constant-returns-to-scale (CRS) technology $y_t = \exp(\varepsilon_t) f(k_t)$, where ε_t is a Markov productivity shock and y_t is net output. Given a sequence of adjusted discount factors, M_{t+j}, and purchase probabilities, Θ_t, in a competitive equilibrium, domestic firms choose sequences of dividends, div_t, desired capital stock, k_{t+1}, and foreign borrowing, b_{t+1}, to maximize the present value of dividends:

$$V^D(k_t, b_t; \varepsilon_t, \zeta_t) = \max_{k_{t+1}, b_{t+1}} \text{div}_t + \Theta_t V_t^{\text{NASH}} + (1 - \Theta_t)\, \mathbf{E}_t [M_{t+1} V^D(k_{t+1}, b_{t+1}; \varepsilon_{t+1}, \zeta_{t+1})] \tag{2.7}$$

where

$$\text{div}_t = \exp(\varepsilon_t) f(k_t) - w_t + (1 - \delta) k_t - k_{t+1} - b_t (1 + r_t^*) + b_{t+1} \left(1 - \eta_b \left(\frac{b_{t+1}}{k_t} \right) \right). \tag{2.8}$$

We assume that only domestic firms and not domestic households have access to foreign capital markets. Domestic firms issue debt abroad to finance domestic projects. International bonds pay an interest rate $r_t^* = r^* \exp(\zeta_t)$. The mean world interest rate is denoted by r^*, and ζ_t is a Markov world interest rate shock. The world interest rate is only contingent on the shock ζ_t and not on any domestic state variable.

Domestic firms face frictions in financing domestic investment projects; therefore, the value of the firm will be lower than if there were no constraints. Firms face adjustment costs when they want to access international capital markets to issue debt, $\eta_b \left(\frac{b_{t+1}}{k_t} \right)$. We assume that the bond issuance cost function is increasing and strictly positive for $b_{t+1} > 0$. The motivation for the cost function is the notion that external financing is more costly than self financing. While the form of this function may differ depending on the source of market imperfection, Gomes, Yaron, and Zhang (2002) find that most models exhibit increasing marginal costs after controlling for the existing firm size as proxied by capital stock.[7] The relevant proxy for firm size is today's capital stock rather

[7] The current size of the firm is known at the time that the new debt is issued.

than the future capital stock; therefore, k_t is used in the financing cost function.

Domestic firms' optimality conditions

When firms want to invest, they can either use internal resources (which reduces dividends) or borrow from the world credit market. The firms choose the optimal capital stock and source of financing to minimize costs and maximize returns. Both the marginal cost of financing and the type of funds used will fluctuate over the business cycle.

The optimality conditions for the domestic firm's solution to its maximization problem in equation (2.7) are given by

$$1 = (1-\Theta_t)\,\mathbf{E}_t\left[M_{t+1}\left(\exp(\varepsilon_{t+1})\frac{\partial}{\partial k}f\left(k_{t+1}\right) + (1-\delta) + b_{t+2}\frac{\partial}{\partial k}\eta_b\left(\frac{b_{t+2}}{k_{t+1}}\right)\right)\right] \tag{2.9}$$

$$1 - \eta_b\left(\frac{b_{t+1}}{k_t}\right) - b_{t+1}\frac{\partial}{\partial b}\eta_b\left(\frac{b_{t+1}}{k_t}\right) = (1-\Theta_t)\,\mathbf{E}_t\left[M_{t+1}\left(1+r_t^*\right)\right]. \tag{2.10}$$

The first condition in equation (2.9) equates the cost of postponing dividend payments today with the marginal return to investing those dividends and producing more in the next period. The marginal return to investing in the firm is driven by the discounted return to capital tomorrow. This is is given by the marginal product of capital in the next period net of depreciation and conditional on the firm remaining a domestic firm. One additional benefit reflected in the marginal return to investing is that next period's issuance cost falls which is captured in the $b_{t+2}\frac{\partial}{\partial k}\eta_b\left(\frac{b_{t+2}}{k_{t+1}}\right)$ term. The discount factor applied to the marginal return of investment is driven by the households' marginal rate of substitution, M_{t+1} and the search frictions $1-\Theta_t$. The search frictions alter the probability the domestic firm will be purchased, Θ_t, and make investment more volatile. Firms have to make investment decisions, unsure whether or not they may be bought out. As the probability of being purchased increases, the marginal benefit of investing falls. The financial frictions also impact the discount rate indirectly through the marginal rate of substitution. Costly external financing lowers consumption via the resource constraint, raising the intertemporal price of consumption.

The second condition in equation (2.10) equates the marginal benefit of borrowing, net of the cost of issuance, and the marginal cost of borrowing in terms of interest payments in the next period. These costs are discounted by the stochastic discount factor and are conditional on the firm not being sold to a foreigner through FDI. In this way, the search friction reduces the effective

cost of borrowing for firms. Firms would like to borrow more if they are more likely to be purchased.

Return to investment

The financial frictions affect the returns to investing in the domestic economy in several ways. We can combine the domestic firms' optimality conditions for bonds in equation (2.10) and capital in equation (2.9) to obtain the following expression:

$$\mathbf{E}_t\left[\widetilde{\mathrm{MPK}}_{t+1}\right] = \frac{\mathbf{E}_t\left[1+r^*_{t+1}\right] + \frac{\mathbf{COV}_t\left(M_{t+1},1+r^*_{t+1}\right)}{\mathbf{E}_t[M_{t+1}]}}{1-\eta_b\left(\frac{b_{t+1}}{k_t}\right) - b_{t+1}\frac{\partial}{\partial b}\eta_b\left(\frac{b_{t+1}}{k_t}\right)} - \frac{\mathbf{COV}_t\left(M_{t+1},\widetilde{\mathrm{MPK}}_{t+1}\right)}{\mathbf{E}_t\left[M_{t+1}\right]}, \tag{2.11}$$

where the marginal product of capital, accounting for depreciation and decreased future bond issuance costs, is given by $\widetilde{\mathrm{MPK}}_{t+1} \equiv \exp(\varepsilon_{t+1})\frac{\partial}{\partial k}f\left(k_{t+1}\right) + (1-\delta) + b_{t+2}\frac{\partial}{\partial k}\eta_b\left(\frac{b_{t+2}}{k_{t+1}}\right)$. Examining the first term in the returns for investment, costly debt finance directly raises the effective world interest rate, $\frac{E\left(1+r^*_{t+1}\right)}{1-\eta_b\left(\frac{b_{t+1}}{k_t}\right)-b_{t+1}\frac{\partial}{\partial b}\eta_b\left(\frac{b_{t+1}}{k_t}\right)}$. Risk induced by the foreign interest rate shocks $\mathbf{COV}_t\left(M_{t+1},1+r^*_{t+1}\right)$ also increases the effective borrowing rate. Both of these terms raise the expected marginal product of capital in the next period and depress desired investment. Costly finance, costly search, and the probability of being bought also affect the path of consumption through the resource constraint and through the impact on domestic interest rates. By rewriting equation (2.11), we can see how this first-order condition relates to the standard frictionless model;

$$\begin{aligned}\mathbf{E}_t\left[\widetilde{\mathrm{MPK}}_{t+1}\right] = \mathbf{E}_t\left[1+r^*_{t+1}\right] - \mathbf{COV}_t\left(M_{t+1},\widetilde{\mathrm{MPK}}_{t+1}\right)& \\ + \frac{\left[1+r^*_{t+1}\right]\left(\eta_b\left(\cdot\right)+b_{t+1}\frac{\partial}{\partial b}\eta_b\left(\cdot\right)\right) + \frac{\mathbf{COV}_t(M,r)}{\mathbf{E}_t[M_{t+1}]}}{1-\eta_b\left(\cdot\right)-b_{t+1}\frac{\partial}{\partial b}\eta_b\left(\cdot\right)}.&\end{aligned} \tag{2.12}$$

The first two terms of (2.12) are the usual terms that determine the returns to investing. Due to the frictions, the third term shows that an increase in the magnitude of the financial friction will drive the investment return above the world interest rate. Because the returns to investing are driven by the domestic firms' financing decisions, investment and consumption are correlated and the Fisherian separation of savings and investment does not result. Thus, frictions increase the correlation between savings and investment, helping to explain the Feldstein and Horioka (1980) puzzle.

The domestic interest rate

Putting together the households' optimality condition for domestic bonds in equation (2.3) and the firms' optimality condition for international debt (2.10), we can express the domestic economies' return on bonds r_t^d as a function of the world's return on bonds r_t^* and the financial frictions:

$$1 + r_t^d = \frac{(1 + r_t^*)(1 - \Theta_t)}{1 - \eta_b\left(\frac{b_{t+1}}{k_t}\right) - b_{t+1}\frac{\partial}{\partial b}\eta_b\left(\frac{b_{t+1}}{k_t}\right) - \mathbf{COV}_t\left(M_{t+1}, 1 + r_{t+1}^*\right)(1 - \Theta_t)} \tag{2.13}$$

If there were zero cost of issuance, $\eta_b = 0$, and no FDI, $\Theta = 0$, equation (2.13) reduces to:

$$1 + r_t^d = \mathbf{E}_t\left[1 + r_t^*\right] + \left(1 + r_t^d\right)\mathbf{COV}_t\left(M_{t+1}, 1 + r_{t+1}^*\right). \tag{2.14}$$

Any difference between the domestic interest rate and the world interest rate would be due to the covariance between the international interest rate and the stochastic discount factor. Given that in equilibrium the firms' stochastic discount factor will be equal to the households' intertemporal marginal rate of substitution, deviations from interest rate parity would be generated by any additional risk to domestic consumption from world interest rate movements. This risk leads to domestic households engaging in precautionary savings. This is a standard result of small open economy models.

With financial frictions (positive cost of issuance and search), the relationship between the domestic interest rate and the world interest rate is determined by the direct impact of the frictions on equation (2.13) and by their indirect impact on the stochastic discount factor. The financing frictions generate a wedge between the interest rate determined on world credit markets and the domestic interest rate. As discussed earlier, there are two components of the wedge: one is driven by the probability the domestic firm will be bought out by a multinational and the other is driven by costly external financing. A high probability of a firm being bought by a foreigner decreases the domestic interest rate relative to the world interest rate. The marginal cost of investing using debt falls because firms face a higher probability that they will not have to pay the debt back in the future.

This wedge varies with the business cycle. For example, if the domestic economy is in a recession and receives a positive productivity shock, domestic firms would like to invest. However, since their

capital stock is relatively low at that point in the business cycle, the cost of borrowing abroad, $\frac{\partial \eta_b}{\partial b_{t+1}}$, is high and this drives the domestic interest rate up. Foreigners who do not face costs and constraints are more likely to want to invest. Therefore, multinationals are willing to exert more effort to increase their probability of matching, which raises Θ. As the domestic firms invest and the economy expands, the financing premium falls and the domestic interest rate approaches the world interest rate.

2.3 Foreign multinationals

We assume that there is a search friction when foreign multinationals purchase domestic firms. We further assume that the foreign multinationals are unconstrained and have a zero outside opportunity. Finally, we assume that, once a domestic firm is found, the multinational and the domestic firm engage in bargaining to set the sale price of the domestic firm.

Let V_t^F be the unconstrained value of domestic firms and V_t be the constrained value of domestic firms. Given our assumption that multinationals are unconstrained (i.e., $\eta_b = 0$), the unconstrained value of the firm is given by the following expression:

$$V_t^F = \mathbf{E}_t \left[\frac{1}{1 + r_t^*} \left(\text{div} \left(k_{t+1}^f \right) + V_{t+1}^F \right) \right]. \tag{2.15}$$

Implicit in this expression is the timing assumption that firms are taken over after dividends to domestic households are paid. We can iterate this expression of the value of the firm to obtain the usual result that the value of the firm to the foreigner is the discounted value of dividends. In the equation below, k^f represents the optimal capital stock for the unconstrained multinational:

$$V_t^F = \mathbf{E}_t \left[\sum_{i=0}^{\infty} \prod_{j=0}^{i} \left(\frac{1}{1 + r_{t+1+j}^*} \right) \text{div} \left(k_{t+1+i}^f \right) \right]. \tag{2.16}$$

The after-dividend value of the firm to the domestic agent, V_t, is simply given by its domestic share price. We iterate on the domestic households' optimality condition for holding shares as in equation (2.4) to obtain the following expression:

$$V_t \equiv p_t = \mathbf{E}_t \left[\sum_{i=1}^{\infty} \exp \left(\sum_{\tau=t}^{t+i-1} V\left(c_\tau\right) \right) \frac{\mathcal{U}'\left(c_{t+i}\right)}{\mathcal{U}'\left(c_t\right)} (1 - \Theta_{t+i-1}) (\text{div} \left(k_{t+i}^d \right) + \Theta_{t+i} V_{t+i}^{\text{NASH}}) \right]. \tag{2.17}$$

The multinationals' valuation of the domestic firm and the domestic firms' own valuation differ for two reasons. First, the stochastic discount factors differ because the households in the emerging market do not have access to foreign capital. Second, because the foreign multinationals are not constrained they will make different choices concerning the optimal capital stock, so $k^f \neq k^d$, which is reflected in the dividend policy.

The surplus of a sale of a constrained firm, $\mathcal{S}$, is the difference between the constrained and unconstrained value of the firm:

$$\mathcal{S}_t = \left[V_t^F - V_t\right] \geq 0. \tag{2.18}$$

The inequality comes from the fact that the domestic value of firm is the constrained value of the firm, while the value of the firm to foreigners is unconstrained.

The Nash-bargaining price, V_t^{NASH}, divides the surplus from equation (2.18) between the domestic firm and the multinational based on the domestic firm's bargaining power, ψ;

$$V_t^{\text{NASH}} = \psi \left[V_t^F - V_t\right] + V_t. \tag{2.19}$$

The foreign multinational knows that it will pay V_t^{NASH} if it finds a domestic firm.

We assume that the probability that a foreign multinational matches with a domestic firm is a function of search effort, e_t. That is, $\Theta_t\left(e_t\right)$ is a function of effort. Effort costs $\chi(e_t)$ in terms of tradeable units (we assume that this cost is increasing in effort). Foreign firms will choose search effort, e, to maximize the expected value of the surplus they will receive minus their effort costs:

$$\max_{e_t} \Theta(e_t) \left[V_t^F - V_t^{\text{NASH}}\right] - \chi(e_t), \tag{2.20}$$

where $\Theta(e_t)$ is the probability of a match, which depends on the effort spent on searching.

Working with the first-order conditions for the multinationals, we can see that the amount of FDI is driven by the difference between the domestic and multinational firm values:

$$\frac{\partial}{\partial e}\Theta(e_t)(V_t^F - V_t) = \frac{\partial}{\partial e}\chi(e_t). \tag{2.21}$$

As the domestic value of the firm $V_t = p_t$ increases, the valuation wedge, $(V_t^F - V_t)$, falls forcing

less FDI to occur and the share of domestic ownership to increase.

Other models have also attributed a wedge between the valuation of domestic firms by foreign multinationals and by domestic residents as the impetus behind FDI flows. However, the reason for the wedge in valuation can stem from a variety of factors. For instance, Chari, Ouimet, and Tesar (2004) argue multinationals bring better institutions (e.g., better governance) and Alfaro and Charlton (2007) suggest multinationals offer knowledge transfers. Indeed, those "static" factors may be important in the long run in determining the degree of foreign ownership in an emerging market economy. In addition to these other alternative factors, we suggest here that access to financing plays a role in generating a wedge between the valuation of a firm to domestic residents and to foreign buyers. Unlike other theories, the benefit of this access to financing theory is that it can explain why changes in foreign ownership, FDI, tends to vary over the business cycle.

2.4 Market clearing conditions

For the domestic economy, it must be the case that domestic bonds are in net zero supply across all individuals i: $\sum_i b_t^d = \sum_i b_{t+1}^d = 0, \quad \forall i$. We normalize the sum of domestic shares in domestic firms, $\sum_i s_t^i = 1$. Given the large number of identical domestic firms, following Pissarides (1985) the probability a firm is taken over is equal to the portion of domestic firms taken over.[8] Therefore, Θ_t, the probability of a firm buyout is equal to ϕ_t, the portion of domestic assets taken over by multinationals. We define the number of firms owned by foreign multinationals as γ_t. Given Θ_t=ϕ_t the law of motion for the stock of FDI, $(1-\gamma_t)$, follows below:

$$\gamma_{t+1} = \gamma_t (1-\phi_t) + (1-\gamma_t)\kappa, \tag{2.22}$$

where κ is an exogenous separation rate. Domestic ownership for the entire economy falls as the portion of domestic firms that match increases. Gross FDI inflows may be zero or even negative due to the exogenous separation. When a merger falls apart, and the multinational separates from the domestic firm, the foreign ownership is assumed back into the domestic capital stock. Considering that some firms are owned by domestic agents and some by foreigners, the sum of all dividends paid out to domestic agents must be equal to $\gamma_t div_t$. Likewise the payout to the households by the

[8] Pissarides (1985) shows in a labor market search and matching model that the probability of finding a job match determines the economy wide employment rate.

multinationals is $\gamma_t V_t^{\text{NASH}} \phi_t$.

Using these market clearing conditions and the household budget constraint, equation (2.2), we can define the resource constraint for the economy:

$$c_t = \left(\gamma_t \text{div}_t + \gamma_t \phi_t V_t^{\text{NASH}} - V_t(1-\gamma_t)\kappa\right) + w_t. \tag{2.23}$$

Thus, aggregate consumption equals the sum of the share of dividends paid to domestic residents, net proceeds from buyouts by foreigners, and wage income.

We define gross investment as $i_t \equiv k_{t+1} - k_t(1-\delta)$. Substituting into the aggregate household budget constraint in equation (2.23) the definition of investment and dividends in equation (2.8) and ignoring issuance costs, we derive the following expression:

$$0 = \underbrace{\underbrace{y_t - c_t - i_t}_{\text{net exports}} + \underbrace{-(1-\gamma_t)\text{div}_t - r_t^* b_t}_{\text{net factor payments}}}_{\text{current account}} + \underbrace{\overbrace{b_{t+1} - b_t}^{\text{bonds}} + \overbrace{\left(\gamma_t \phi_t V_t^{\text{NASH}}\right) - V_t(1-\gamma_t)\kappa}^{\text{FDI}}}_{\text{capital flows}}. \tag{2.24}$$

$$\text{financial account}$$

This equation is simply the balance of payments for the model economy, which allows us to match the model to the data.

In the decentralized equilibrium, since the households own the firms, the discount rate of the firm reflects the households' marginal rate of substitution:

$$M_{t+i} \equiv \frac{1}{1 + r_{t+i}^d} = \beta^i \frac{U'(c_{t+i})}{U'(c_t)}. \tag{2.25}$$

2.5 Stochastic processes and competitive equilibrium

To complete the model, we specify the stochastic process for the productivity shocks, e_t, and the world interest rate shocks, z_t. We assume that both of these shocks follow a first-order autoregressive process and they are possibly correlated. We discretize the process for the two shocks using a simple persistence rule.

Given a stochastic process of productivity shocks, interest rate shocks, and initial conditions, a competitive equilibrium is defined by stochastic sequences of allocations $[c_t, l, b_{t+1}, k_{t+1}, e_t]$, prices $[w_t, r_t^d]$, and value functions, $[V_t^{\text{NASH}}, V_t^D, V_t^F]$, such that: (a) domestic firms maximize dividends

subject to the constant returns-to-scale technology, taking factor and goods prices as given, (b) households maximize utility subject to the budget constraint taking as given factor prices, goods prices, and asset prices, (c) foreign multinationals maximize their surplus, and (d) the market-clearing conditions for equity, labor, and goods markets hold.

3 Recursive equilibrium and numerical solution technique

The model's competitive equilibrium is solved by reformulating it in recursive form and applying a numerical solution method in a similar manner to Smith and Valderrama (2008). The challenge of the numerical solution is to keep track of optimizations for all four agents: domestic households, domestic firms, foreign investors (debt and equity holders), and foreign multinational firms. To facilitate computation of the equilibrium, we represent the domestic economy's problem (household and domestic firm) as a domestic social planner's problem. The domestic social planner makes investment, international borrowing, and secondary offering allocations. The advantage to solving the problem in this manner is that one can use the concavity of the utility function to get a unique solution on a coarser grid, which is more efficient given the multiple endogenous state variables.

In a similar manner to Mendoza and Oviedo (2006) and Kehoe (1987), the equilibrium between the domestic social planner and the multinationals is solved as a Nash Equilibrium of a two player dynamic game under uncertainty where both players move simultaneously. To solve for the equilibrium, the domestic social planner and the multinationals formulate there optimal plans taken as given a conjecture of the optimal plans' of the other agent. Given the multinational's conjectured effort level in searching for a domestic firm to buy, the domestic social planner infers a probability of a match and the selling price of the firm, which are used to determine the optimal investment, international borrowing, and secondary offering allocations. Likewise, given a conjecture of the domestic social planners capital and debt decisions, the multinational infers the buyout price and solves for the optimal effort level in procuring a match.

The domestic social planner faces the following state variables: capital, k, and international borrowing, b, as the endogenous state variables and ϵ and ζ as the exogenous states. The domestic social planner takes as given $\widetilde{V^{\text{NASH}}}$and $\widetilde{\phi}$, which are the price that the agents receive if part of the capital stock is sold to multinationals and the portion of domestic assets sold, respectively. The

optimal allocation for the domestic social planner is characterized by the value function, $\mathbb{V}^S$, that solves the following recursive problem:

$$\mathbb{V}^S(k,b;\epsilon,\zeta) = \max_{k',b'} \frac{c^{1-\sigma}-1}{1-\sigma} + E\beta\mathbb{V}^S(k',b';\epsilon',\zeta'), \tag{3.1}$$

subject to

$$\begin{aligned} c \leq & \gamma\left[\exp(\epsilon)f(k) - w + (1-\delta)k - k' - b(1+r^*\exp(\zeta)) + b'\left(1-\eta_b\left(\frac{b'}{k}\right)\right)\right] \\ & + w + \gamma\widetilde{\phi}(k,b;\epsilon,\zeta)\widetilde{V^{\text{NASH}}}(k,b;\epsilon,\zeta) \\ & \gamma' = \gamma\left(1-\widetilde{\phi}(k,b;\epsilon,\zeta)\right) + (1-\gamma)\kappa \end{aligned}$$

The solutions of this problem are represented by the optimal decision rules for capital $\hat{k}'(k,b,\epsilon,\zeta)$ and bonds $\hat{b}'(k,b,\epsilon,\zeta)$. Using the decision rules, the value of the firm to domestic agents is determined by equation (2.17), giving us $\hat{V}(k,b,\epsilon,\zeta)$.

The multinationals use their conjecture of $\widetilde{V}(k,b;\epsilon,\zeta)$ to determine $\widehat{V^{\text{NASH}}}$ and then choose their effort level in matching, $\hat{e}(k,b;\epsilon,\zeta)$, to satisfy (2.21). Knowing how much effort the multinational is willing to exert directly determines the probability of a match $\hat{\Theta}(k,b;\epsilon,\zeta)$.

This equilibrium, if it exists, is a competitive equilibrium for the small open economy. From the Bellman equation (3.1) for the domestic firm, we can see the first order conditions that result from the standard Benveniste-Sheinkman equation equal the Euler equations associated with the domestic firms' first order conditions with respect to capital and debt in equations (2.9) and (2.10).[9] On the multinationals side we use the first order conditions to determine the decision rule for search effort, e_t, guaranteeing the competitive equilibrium outcome.

The general outline of the solution algorithm is to solve the social planner's problem, given the conjecture of the portion of the domestic assets sold to the foreigners, $\widetilde{\phi}(k,b,\epsilon,\zeta)$ and the price at which the domestic firms are sold, $\widetilde{V^{\text{NASH}}}(k,b,\epsilon,\zeta)$, using standard dynamic programming techniques. Given the optimal allocations of consumption, investment, and financing, the value of the financially constrained firm is determined. This is then used to determine $\widehat{V^{\text{NASH}}}$. $\widehat{V^{\text{NASH}}}$

[9] The first order conditions to the social planner's problem differ slightly from the competitive equilibrium in that the social planner takes into account the exogenous separation rate. As long as the separation rate and FDI stocks are small the difference is trivial.

is plugged into the foreign multinationals' first-order conditions to determine the multinationals' effort levels, e_t, which in turn determines $\widehat{\Theta}(k, b, \epsilon, \zeta)$. In equilibrium $\hat{\Theta} = \hat{\phi}$, so $\hat{\Theta}(k, b, \epsilon, \zeta)$ and $\widehat{V^{\text{NASH}}}$ become the new conjectures for the domestic social planner. The process continues until $\widehat{V^{\text{NASH}}}(k, b, \epsilon, \zeta) = \widetilde{V^{\text{NASH}}}(k, b, \epsilon, \zeta)$ and $\hat{\Theta}(k, b, \epsilon, \zeta) = \widetilde{\phi}(k, b, \epsilon, \zeta)$.

The domestic social planner's problem, as given by the recursive equation (3.1), is solved by value function iteration. The value function is iterated, alternating between a full optimization and a recursion of the decision rules, until the value function does not change over successive iterations. The state space for capital stock includes NK discrete nodes and the state space of bond positions includes NB discrete nodes. The state space of endogenous states is thus given by 90×40 elements.

3.1 Functional forms and baseline calibration

To evaluate the model numerically, we make assumptions regarding the functional forms of the production function, the instantaneous utility function, the financial frictions, and the search intensity process. For the production function, we use the usual constant-returns-to-scale Cobb-Douglas form:

$$f(k, l) = l^{\alpha} k^{1-\alpha} = k^{1-\alpha} \tag{3.2}$$

where labor share of income is given by α.

We assume that the instantaneous utility function is of the constant relative risk aversion (CRRA) form:

$$U(C) = \frac{c^{1-\sigma} - 1}{1 - \sigma}. \tag{3.3}$$

The CRRA parameter is equal to σ.

The functional forms for the adjustment costs of bonds are quadratic:

$$\eta_b = \frac{\eta_b}{2} \left(\frac{b' - b}{k} \right)^2 \tag{3.4}$$

Finally, we assume that the probability of a match for the foreign firms is given as a logistic function of effort, e:

$$\Theta\left(e\right) = \frac{\pi e}{1 + \pi e}, \tag{3.5}$$

where π determines the elasticity of the match probability with respect to effort. A low level of

π means that the probability of a match is not very sensitive to search effort. In our model for a given cost of effort, if the elasticity π is low, then domestic firms' value has to fall far below the unconstrained value of the firm to induce much search effort and a large number of FDI transactions. If, alternatively, the elasticity is high, then a small deviation of the firms' domestic value from the unconstrained value induce more search effort and more FDI transactions.

In terms of the calibration, we follow standard practice in the real business cycle (RBC) literature and set our model's parameters to match standard features of Mexican data and international data. We first determine the values for technology and preference parameters (α, σ, β). We find that Mexican data from the Mexican Statistical Institute (INEGI) suggests an average labor income share for the period 1988-96 of 0.341. Compared to evidence from other countries, this share seems quite low.[10] Hence, we adopt instead a labor share α equal to 0.65, which is in line with international evidence. In terms of preference parameters, we choose the coefficient of relative risk aversion σ equal to 2.0, roughly in line with other international RBC studies. The gross annual real interest rate is set to 6%. We set the rate of time preference, β equal to 0.984, which is the inverse of the real interest rate.[11] The calibration yields a deterministic stationary state that replicates Mexico's 1970-95 average GDP shares of private consumption and investment at current prices. Using data from the World Bank's Development Indicators, the consumption share is equal to 0.684 and the investment share is equal to 0.217. Our model yields a steady state consumption share equal to 0.687 and an investment share equal to 0.307.

We now discuss the calibration of the financial frictions parameters $(\eta_b, \gamma, \pi, \psi, \kappa)$. We set the debt issuance cost parameter η_b equal to 0.075 so that, in steady state, debt is roughly 13% of GDP, which is consistent with the Mexican data if only private flows are examined. To set the equity issuance cost parameter, we appeal to the empirical evidence on transaction costs for public offerings. To launch an equity or debt offering, domestic firms pay direct and indirect transaction costs based on the firm size and the size of the offering. For the costs of equity issuance, the direct costs consist of administrative fees and underwriting costs. Data for the U.S. show that while administrative fees are minimal, the underwriting discount can be substantial. According to Lee, Lockhead, Ritter, and Zhao (1996) direct costs are 7% on average of the proceeds of seasoned

[10] See Mendoza (2006) for more discussion on the controversy surrounding measures of labor income shares for Mexico.

[11] The functional form assumed for the debt issuance costs pins down the steady state debt level.

equity offerings, 11% for IPOs, and $2-3\%$ for bonds issuances. International offerings tend to be significantly higher. Issuing American Depository Receipts on the New York Stock Exchange, for instance, requires costly conversion to U.S. accounting standards and many additional fees. In steady state, the domestic share of the capital stock γ is 0.92, which is consistent with the findings of Mendoza and Smith (2006). In terms of the search parameters, the bargaining power of the domestic household is $\psi = 0.1$, the elasticity of the matching probability is $\pi = 0.5$, and the rate of separation κ is set to 0.0788.

Given the Markov process of productivity shocks, the standard deviation and first-order autocorrelation of GDP match the standard deviation and first-order autocorrelation of the HP-filtered quarterly cyclical component of Mexico's GDP reported in Mendoza (2006). In terms of the simple persistence rule, this requires $\epsilon_H = 0.0178$ and the autocorrelation of the shock equal to 0.683.

4 Quantitative results

[To be completed]

5 Conclusions

[To be completed]

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A Tables

Table 1: Net asset positions

			1980		
	NFA	FDI	Debt	Other	Reserves
G7	1.87	2.61	-2.48	-0.73	2.46
US	3.69	5.76	-0.65	-1.97	0.56
G6	0.54	0.32	-3.81	0.18	3.85
Emerging Asia	-9.09	-2.75	-11.16	0.10	4.91
Not including China	-14.74	-4.24	-18.09	0.16	7.43
Emerging Europe	-2.77	0.01	-2.79	0.00	0.00
Latin America	-24.88	-5.41	-23.65	-0.33	4.52
			2004		
	NFA	FDI	Debt	Other	Reserves
G7	-4.85	7.97	-18.17	1.12	4.23
US	-22.64	5.12	-32.23	3.83	0.65
G6	9.79	10.32	-6.61	-1.10	7.18
Emerging Asia	9.30	-18.50	-1.62	-4.64	34.06
Not including China	10.23	-11.83	-4.01	-5.73	31.79
Emerging Europe	-28.09	-21.48	-19.14	-7.69	20.22
Latin America	-41.54	-22.79	-23.59	-6.16	11.00

Source: Lane and Milesi-Ferretti (2006)
Notes: Figures are for net stock as a percentage of the GDP of the respective country group. **Debt** includes portfolio debt and other investment. **Other** includes portfolio equity and financial derivatives. **NFA** is the net external position, composed of FDI, Debt, Reserves, and Other.
Country groups: **G7**: US, UK, France, Germany, Italy, Japan, Canada. **G6**: G7 without the US. **Emerging Asia**: China, Hong Kong SAR, India, Indonesia, Korea, Malaysia, Pakistan, Philippines, Singapore, Thailand, Vietnam. **Emerging Europe**: Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, Slovak Republic, Slovenia, Ukraine. **Latin America**: Argentina, Brazil, Chile, Colombia, Costa Rica, Mexico, Paraguay, Peru, Uruguay, Venezuela.

B Issues Raised to be Resolved

- How to interpret the model in the cross section? Countries with smaller financial restrictions should see less inward FDI?
- How to interpret the model in the time series? As countries liberalize capital markets, they would see less inward FDI?
- Greenfield versus M&A.