Explaining the Composition of Capital Flows to the Developing World in the 1990s: An Asymmetric Information Story and its Efficiency and Policy Implications*

by

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Abstract

This paper identifies a regular pattern in the composition of capital flowing into the developing world in the 1990s with foreign direct investment dominating foreign portfolio debt flows, which in turn dominate equity flows. An explanation for this pecking order is given in terms of an asymmetric information structure that has been suggested to tackle the home bias puzzle in international finance. We also derive the implications of this information asymmetry for the efficiency of resource allocations as well as for the design of corrective tax policies in the capital-importing countries.

JEL Classification: D82; F21; H21

Keywords: composition of capital flows; foreign direct and portfolio (debt and equity) investment; home bias; asymmetric information; developing countries

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Abstract

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1. Introduction

As is well-understood by both academics and policy-makers, international capital flows may take on many different forms and these flows may be less than perfectly free in reality. However, most economics textbooks and research papers continue to abstract from the distinction among the various types of capital movement and to assume the existence of a perfect world capital market. These two aspects of cross-border capital flows are indeed interrelated. Equivalence among the different forms of capital movement (in terms of their implications for resource allocations and for national as well as global welfare)) ) hence the redundancy in sorting them into different categories) ) is implied by the assumption of perfect capital mobility. Although it may be innocuous to make these conventional assumptions when our object of analysis is the rich, developed countries (DCs), they do not apply as well to most less wealthy, less developed countries (LDCs).

The objective of this paper is to provide an overview of and a consistent explanation for the time series behavior of different kinds of capital flows from the developed world to the developing world in the recent decade. Section 2 first uses the World Bank data to uncover a regular pattern in the composition of capital flowing to the developing countries in the 1990s. There, we find a clear rank order) ) with foreign direct investment dominating foreign portfolio debt flows, which in turn dominate equity flows. Section 3 then provides an explanation for this pecking order in terms of an asymmetric information structure that has been suggested to tackle the home bias puzzle in international finance. Section 4 derives the implications of this information asymmetry for the efficiency of resource allocations as well as for the design of corrective tax policies in the capital-importing countries. Concluding remarks are contained in Section 5.
2. The Composition of Capital Flows to Developing Countries: A Pecking Order

In a closed economy with perfect capital markets, it is well-known that investment and financing decisions can be separated (Fisher’s separation theorem) and the two common modes of external finance (debt and equity) are equivalent and equally efficient (Modigliani-Miller theorem). The latter implies the non-existence of a unique optimal capital structure for any single firm in particular and the economy as a whole in general. In the presence of capital market imperfections (such as asymmetric information, transactions costs, and tax distortions), however, these irrelevance results will no longer hold. According to the “pecking order of capital structure” in corporate finance, firms in financing their investment projects would prefer internal finance to external finance. If the latter is required (due to, say, insufficient internal funds), then they would first issue debt (the safest security) and will issue new equity only as a last resort since the choice of equity finance may send the potential signal that the firm thinks its shares are overvalued. (See, e.g., Myers and Majluf (1984).)

In an open economy with free capital mobility, firms can raise investment funds from both domestic and foreign sources. In particular, they can either borrow from (i.e., issue debt) or sell shares of firm ownership (i.e., issue equity) to both domestic and foreign savers. Raising capital from foreign sources in these manners will involve inflow of capital in the form of portfolio investment by the foreigners, viz., foreign portfolio debt investment (FPDI) and foreign portfolio equity investment (FPEI). Alternatively, foreigners can undertake investment in the economy in a more direct manner, viz., foreign direct investment (FDI). By “the composition of capital flows” in this paper, we mean the breakdown of foreign investment into these three broad categories, i.e.,

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1The focus of our analysis of debt and equity finance differs, however, from that in the corporate finance literature. While the latter is based on analysis of a single firm’s investment and financing decisions focusing on issues of corporate governance, we abstract from the governance issues in order to focus on the macroeconomic and international finance issues.
FPDI, FPEI, and FDI. These three forms of capital inflows are commonly found in the LDCs where their relatively low levels of domestic savings (due to their relatively low levels of income) are normally insufficient to finance their relatively high levels of desired investment (due to their relatively high levels of marginal productivity of capital, given their relatively low levels of capital stocks).

[insert Figure 1 about here]

Similar to the pecking order in corporate finance, an examination of the World Bank’s data on the size of aggregate net long-term resource flows to developing countries in the 1990s shows clearly a rank order of international capital flows. This pecking order of capital inflows can be stated in terms of their magnitudes in, say, the year 1996. According to the Global Development Finance 1998, FDI ($119 billion) dominates private debt flows ($89.2 billion), which in turn dominate portfolio equity flows ($45.8 billion). In terms of percentages of aggregate net private flows, the numbers for FDI, FPDI, and FPEI are 46.9%, 35.1%, and 18.0% respectively. This same ordering is consistently found year after year in the 1990s. As Figure 1 reveals, although the three types of capital flows co-move and are all trending upward, equity flows (FPEI: analogue of external, equity finance) occupy a much smaller fraction of the total portfolio flows to developing countries than do such debt instruments as commercial loans and bonds (FPDI: analogue of external, debt finance). More importantly, FDI (analogue of internal finance)\(^2\) occupies a dominant position, making up about half of the private capital flows. In the next two sections, we shall try to provide an explanation for this alternative pecking order and to draw efficiency and policy implications from it.

\(^2\)The reason why FDI can be regarded as an analogue of “internal” rather than “external” finance is that, as explained in section 3.1 below, the foreigners can gain internal control and management of their establishments abroad through FDI.
3. “Home Bias” as an Explanation of the Pecking Order of Capital Flows?

As a direct consequence of the trend towards globalization, financial markets around the world are rapidly integrating into a single global marketplace with large amounts of capital flowing across international borders to take advantage of rates of return and risk diversification benefits. Among others, the creation of the Economic and Monetary Union (EMU) in Europe is an outstanding example of such financial integration. There is nonetheless clear evidence that the world capital market is still far from the Utopia of perfect capital mobility. In particular, when exposed to opportunities to invest in both domestic and foreign assets, people still have a strong tendency to invest more heavily in assets originating from their own countries rather than from other countries) a phenomenon known as the “home bias” in international investment. Among others, Tesar and Werner (1995) find that despite the recent increase in US equity investment abroad (including investment in emerging stock markets), the US portfolio remains strongly biased toward domestic equity. Even among states that are fully integrated into one federal system such as the United States, there may also exist substantial home bias. As reported by Huberman (1997), investors prefer to invest in companies with headquarters stationed in their own states or in companies where they work.

In some cases, the limited degree of capital mobility can be explained by the presence of capital controls, foreign exchange controls, and other forms of government regulations. But in most other places where such interventionist measures are absent, an information asymmetry which confers a “home court” advantage to the domestic residents over the foreign residents about the local investment environment (say, local economic situation and policies affecting the

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3 They report that equity portfolio flows to Western Europe, as a fraction of the capitalized value of the US equity markets, rose only from 0.3% in 1976 to about 2.2% in 1990. The share invested in Canada remained fairly constant, at less than 1%. The home bias phenomenon was even more pronounced before the prevalence of emerging markets: French and Poterba (1991) find that about 94% of US investors’ wealth was held in domestic (i.e., US) equity.
productivity of local firms) has been alluded to as one major explanation for the home bias.

In Razin, Sadka, and Yuen (1998a), we make a first attempt to provide an explanation for the pecking order of capital flows (as depicted in Figure 1 above) in terms of this kind of information asymmetry in relation to the home bias phenomenon. The formal analysis is carried out in the context of an information-based model adapted from Gordon and Bovenberg (1996). Here, I shall provide only the intuitive arguments behind our asymmetric information story.

3.1 The dominance of FDI over FPDI and FPEI

Officially, foreign acquisition of shares issued by domestic firms is classified as FDI when the shares acquired exceed a certain fraction (say, 20%) of ownership. From an economic point of view, however, we should think of FDI not merely as a purchase of a sizable share in a company but, more importantly (especially in contrast to FPEI), as an actual exercise of control and management as well as a channel for technology transfer. We thus view FDI as a tie-in activity, involving an inflow of both capital and other managerial/technological inputs. (In other words, we view FDI more in the form of wholly-owned subsidiaries than joint ventures.) Viewed this way, the superiority of FDI (relative to FPDI and FPEI) can be easily explained by the informational and technological advantages it offers. By stationing managers and skilled workers from their headquarters at their FDI establishments in the destination countries, multinationals can alter their roles from “outsiders” to “insiders”, thus circumventing some of the informational problems associated with the operations of these local establishments while providing assistance in transferring new and advanced technical knowhow to the LDCs. In fact, we show in Razin, Sadka, and Yuen (1999a) that, even in the absence of technology transfers, the informational advantage conferred by FDI alone is sufficient to render it as a more efficient form of investment over both FPDI and FPEI flows.
3.2 The dominance of FPDI over FPEI

In the context of our theory (Razin, Sadka, and Yuen, 1998a and 1999a), the dominance of FPDI over FPEI is nonetheless less clear. All we can show is that, in the presence of asymmetric information, the equilibrium amounts of both kinds of portfolio capital flows will be inefficient. More specifically, while two kinds of economic inefficiencies) an aggregate production inefficiency (leading to foreign under-investment) and a production-consumption inefficiency (leading to domestic over-saving) exist under FPEI, inefficiency of the first kind may or may not exist under FPDI. In the social welfare sense, therefore, debt flows only weakly dominate equity flows. To understand the logic behind this efficiency comparison, let me elaborate by briefly describing some of the features of our theoretical framework and verbally deriving their efficiency implications.

3.2.1 The theoretical framework

Consider a two-period small open economy with a very large number of business firms. Each firm makes its investment and financing decisions in the first period and collects its returns on investment in the second period. The investment decision involves a choice of the amount of new capital stock to acquire in order to produce goods and services and to generate profits in the second period; whereas the financing decision involves selecting the mode of raising funds to finance the chosen investment project. Suppose for simplicity that the firm does not have any retained earnings and will have to raise investment funds from either the debt market or the equity market (both assumed to be perfectly competitive). The return on investment is measured in terms of the second-period level of production and is determined by two factors: the amount of capital input chosen in the first period and a random factor that dictates the productivity of the capital input when utilized to produce goods in the second period. For simplicity, we label the
latter as a “supply shock” and assume it to be idiosyncratic and identically and independently distributed across all firms, implying that there is no aggregate risk in the economy at large.\footnote{In the small open economy context, there may exist another kind of risk due to the difference in the currency denominations of debt and equity: while dividend payments on equity are normally denominated in terms of domestic currency, interest payments on debt may be denominated in terms of foreign currency. So the existence of exchange rate risk may introduce a non-trivial difference between equity and debt in the international context. But this kind of risk is symmetric to both insiders and outsiders of firms and is thus abstracted from in our asymmetric information framework.} In other words, firms are \textit{ex ante} identical, so we can simplify our analysis by considering just one single representative firm when analyzing their \textit{ex ante} decision problems.

The firm is assumed to make its investment decision and precommit to its chosen level of investment at a stage \textit{before}, and its financing decision at a stage \textit{after}, the true value of the supply shock is realized and revealed to it.\footnote{A possible rationale behind this sequence of firm decisions whereby the investment choice is made \textit{ex ante} while the financing of the pre-committed investment is decided \textit{ex post} has to do with a potential agency problem between the board of directors (representing the owners) and the managers (responsible for making such decisions). Loosely speaking, the latter are less interested in the net worth of the firm than the former. In the absence of full information about the firm’s productivity, the owners will have to set investment guidelines for the managers so as to protect their own interests. This agency problem is not modeled explicitly in Razin, Sadka, and Yuen (1998a, 1999a). What is captured in our theoretical framework is the spirit of these investment guidelines in terms of the sequencing of information and the firm’s investment and financing decisions.} At the financing stage, two important asymmetries between the domestic and foreign fund-suppliers (or consumer-savers) creep in. First, the foreigners from the more developed world are able to provide the firm in the less developed world with funds) ) in the form of either debt or equity) ) to finance its investment at a given risk-free world rate of interest that is lower than its cost of capital in an otherwise autarkic situation. This is one major reason why the firm has an incentive to resort to foreign sources of financing despite the possibility of relying solely on domestic sources. Second, being “close to where the action is”, domestic savers (like the domestic firm) possess better information about the firm’s realized value of supply shock than their foreign counterparts, who are “farther away from the action”. In other words, the home-bias-type information asymmetry comes into play at this stage of project implementation. This completes the description of the salient features of our model.
Let us turn next to examine the equilibrium in the small open economy under FPDI and FPEI flows. In either case, we have three groups of players: the domestic firms (who have to make their investment choices by solving their expected net present value maximization problems) on the one hand and the domestic fund-providers (or consumer-savers, who have to make their saving choices by solving their intertemporal utility maximization problems) and the foreign fund-providers (who will supply perfectly elastically capital funds at the prevailing world interest rate) on the other. In equilibrium, the profit-maximizing and utility-maximizing conditions for the domestic firms and the domestic consumer-savers, the rate-of-return arbitrage condition for the foreign fund-providers, a cutoff condition that governs which firms will raise funds from domestic sources and which from foreign sources, and the two economy-wide resource constraints (one for each time period) will together determine the amounts of domestic consumption, output, saving, investment, and (debt or equity) capital inflows as well as the domestic rate of interest.

3.2.2 Pure debt finance

Under pure debt finance, the firm will borrow from both domestic and foreign savers at a (common) competitive domestic rate of interest to finance its investment in period one. Given the stochastic nature of its return on investment, the firm may or may not be able to retire its debt in period two depending on the final realized level of its productivity. Under “good” realizations, the firm’s second-period cash flow will exceed the principal and interest on its debt; the investment will be profitable; and its commitment to the debt-holders will be honored. Under “bad” realizations, however, the reverse is true and its debt will be defaulted. Although nobody knows at the investment stage whether the firm in question will ultimately default, both the firm and the domestic lenders know at the financing stage the true realization of the firm’s supply
One may wonder why, under our assumption that the firm already knows before issuing debt whether it will ultimately default, the “bad” firms will only be able to borrow from the uninformed foreigners while the “good” firms are able to debt-finance their investment from both the informed local lenders as well as the uninformed foreign lenders.

With rational expectations, both the investors/borrowers (i.e., the firm) and the foreign savers/lenders will take this *ex post* default possibility into account when making their *ex ante* investment/borrowing and lending decisions. (The well-informed domestic saver/lenders need not care about this possibility as they will never buy debt issued by “bad” firms.) In anticipation of the default possibility, foreign lenders will charge an *ex ante* interest rate higher than the world interest rate (i.e., the alternative rate they can earn elsewhere), the difference being a reflection of the risk premium.\(^7\) Knowing that it need not fully repay its loan in “bad” states, the firm will invest beyond the socially efficient level where the expected net marginal productivity of capital is equated to the domestic rate of interest, which is in turn equated to the net marginal rate of intertemporal substitution in consumption) i.e., domestic over-saving leading to a production-consumption inefficiency.

### 3.2.3 Pure equity finance

Under pure equity finance, the firm will issue shares to both domestic and foreign savers.\(^8\)

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\(^6\)One may wonder why, under our assumption that the firm already knows before issuing debt whether it will ultimately default, the “bad” firms will still go ahead to borrow, only to default and to have all their residual assets seized by the debt-holders in the end. This paradox is a consequence of our other assumption that the investment decision made and committed to in period one cannot be reneged upon in period two) due to the investment guidelines set by the firm owner for the manager to resolve the agency problem (see footnote 4 above).

\(^7\)Together with the arbitrage condition facing the foreign lenders, this implies that it is *likely* (but not absolutely necessary) for the firm to invest only up to a level where the net marginal productivity still exceeds the world rate of interest, resulting in foreign under-investment or an aggregate production inefficiency.

\(^8\)In a formal sense, FPEI is defined as buying less than a certain small fraction (say, 10-20%) of shares of a firm. From an economic point of view, however, the critical feature of FPEI is the lack of control by the foreign investor over the management of the domestic firm, because of the absence of foreign managerial inputs.
Being unable to observe the realized levels of the firms’ productivity, the foreigners will offer the same price for all firms reflecting their average productivity. On the other hand, the group of firms experiencing high productivity shocks do know about their own true productivity levels at the financing stage and will thus refuse to sell their shares at the lower average price. Instead, they will be sold to the domestic savers, who have access to the same information as the firms about their shock realizations and are thus able to offer a fair price (reflecting their true productivity levels) to these high-productivity firms. As a result, the foreigners will end up supplying equity funds only to firms with relatively low levels of productivity.

Within the group of low-productivity firms, the better (though still “bad”) firms will find the average price (averaged over the group of “bad” firms as a whole) offered by the foreigners acceptable because the discount rates they use to compute their demand and supply prices respectively are different. In particular, having access to the world capital market, the foreigners will face a lower interest rate (the world rate) than these firms. In other words, the domestic rate of interest will exceed the world rate in equilibrium to make this financing arrangement viable. In this sense, the foreigners are overcharged for their purchase of these low-productivity firms. Knowing this, the foreigners will only supply a less-than-efficient amount of equity funds) only up to a level where the net marginal productivity of capital still exceeds the world rate of interest) i.e., foreign under-investment leading to an aggregate production inefficiency.

Although the firm does not know at the investment stage whether it will be hit by good or bad shocks, it knows for sure that it will be able to sell its shares to the foreigners at a “premium” in low-productivity events. As a result, it will tend to over-invest relative to its

For our purposes, we simply assume that, unlike the case of FDI, foreign equity-investors buy shares in the domestic firms without exercising any form of control or applying their own managerial inputs.
domestic rate of return) up to a level where the net marginal productivity of capital falls short of
the domestic rate of interest, which is in turn equated to the net marginal rate of intertemporal
consumption substitution in equilibrium) i.e., domestic over-saving leading to a production-
consumption inefficiency.

3.3 Summarizing the lessons from the asymmetric information story

To summarize the main conclusions from this long story, the foreigners can get around
the home-bias-type information asymmetry by gaining insider control of the domestic firms (thus
assimilating themselves with the locals) through FDI, but not through FPDI and FPEI as well.
Consequently, FDI dominates both types of portfolio flows. On the other hand, although the
informational problems make both FPDI and FPEI less than socially efficient, the degree of
distortions (as proxied by the number of choice margins affected) is more serious for the latter
than for the former, implying a weak dominance, i.e., FPDI may be less inefficient than FPEI.9

While the pecking order of capital flows we alluded to in Figure 1 is based on their actual
magnitudes (i.e., sizes of flows), the pecking order we generated in our asymmetric information
story above is based on efficiency arguments alone. Our presumption (which we believe to be
pretty innocuous) is that, in the absence of coordination failures in the economy, rational decision-
makers will always act in such a way as to induce the most efficient outcome as the equilibrium.
In fact, we (Razin, Sadka, and Yuen, 1999a) have also simulated our model numerically and
produced a pecking order in terms of relative sizes of capital flows consistent with that in Figure
1, i.e., FDI flows > FPDI flows > FPEI flows.

Even so, two puzzles remain. First, if both FPDI and FPEI flows are less efficient than

9We use the less certain word “may” here because, as is well-known from the theory of second best, adding
one more distortion to an already distortion-ridden equilibrium does not necessarily make it more inefficient.
FDI flows, why do they still exist in reality? In other words, why don’t we see FDI flows crowd out all other types of portfolio flows? Second, we have only managed to establish that FPDI may (but need not always) be less inefficient than FPEI. Besides, our simulation result that the equilibrium size of FPDI flows exceeds that of FPEI flows is merely a confirmation (rather than a proof) of the pecking order. In other words, there are some loose ends associated with the second layer of the pecking order that have to be fixed.

4. Efficiency and Policy Implications of the Pecking Order of Capital Flows

Let us first address the first puzzle. Although the laissez faire amounts of FPDI and FPEI flows may be less than efficient, some kind of government intervention can be introduced to restore efficiency. In fact, we (Razin, Sadka, and Yuen, 1998a, 1999a) have shown how this can be done through corrective taxes/subsidies. In particular, the domestic over-saving (or production-consumption inefficiency) under FPDI can be eliminated through a tax on capital income with a higher (positive) rate levied on the residents and a lower (possibly negative, i.e., subsidy) rate on the non-residents. Under FPEI, this kind of distortion can be corrected through a corporate income tax while the foreign under-investment (or aggregate production inefficiency) can be eradicated through a capital income subsidy to the foreigners. Under these corrective schemes, full Pareto efficiency can be achieved under both

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10 This first puzzle may have been even deeper than is stated here. In two related papers (Razin, Sadka, and Yuen, 1999b and 2000b), we explore two other aspects of FDI which may make it even more superior to portfolio investment. The technological aspect we consider focuses on the effects of FDI in facilitating technology transfer through the importation of new varieties of factor inputs and in promoting competition in the input market. The financial aspect we examine zeros in on the possibility of perverse interactions between FDI and the domestic capital market in the presence of asymmetric information between the managing owners of firms and the other portfolio stakeholders and the adverse selection problems involved in investment-financing. In particular, we show how, in the absence of domestic credit, the introduction of FDI flows may help a small developing country get around such informational problems and resurrect its equity market as a source of investment finance.

11 These are first best (Pigouvian) corrective measures. In Razin, Sadka, and Yuen (1999a), we have also carried out some second best tax experiments, where there are some restrictions in using certain tax instruments (e.g., lump-sum taxes) for corrective purposes. In those other cases, “full” Pareto efficiency cannot be restored.
FPDI and FPEI, so that they will be as efficient as FDI.\footnote{On the other hand, if, as insiders, foreign direct investors possess an informational advantage not only over foreign portfolio investors but also over domestic savers (the outsiders), they may even be able to “over-charge” the domestic savers when shares of multinational subsidiaries are being traded in the domestic stock market. We (Razin, Sadka, and Yuen, 2000c) have shown how, anticipating these future domestic stock market trade opportunities in advance, foreign investment can become excessive, hence inefficient as well.} We do see governments in LDCs use tax incentives to attract foreign capital, though more so for direct investment than for portfolio investment. Of course, one can argue that relative to these Pigouvian rates, the taxes may not have been set at the right rates by these LDC governments in practice to make their portfolio flows fully efficient. It is nonetheless hard to believe that incorporating these corrective taxes into the analysis can fully resolve the first puzzle.

Another possible answer to it lies in the following assumption we have made for the sake of simplicity, i.e., that the foreign direct investors can get around the asymmetric information problem by gaining insider control of the local firms while the portfolio investors cannot. In making this assumption, we have ignored the monitoring costs (costs of internal control and management) that have to be incurred in order to bring about the informational advantage. In reality, these monitoring costs can be prohibitive and some informational problems may remain under FDI, rendering it still less than efficient. In addition, FDI is simply not feasible for “small” foreign investors with limited amounts of capital to invest abroad. For sure, these two partial answers will give portfolio investment some edge over direct investment. But how important they really are in accounting for the coexistence of the three types of foreign investment in line with the pecking order is an empirical question to which we do not have an answer yet.

Turning to the second puzzle, we have analyzed FPDI and FPEI separately as if they were available only one at a time. (That is why we used the terms \textit{pure} debt finance and \textit{pure} equity finance in section 3.2 above.) In practice, firms can use different mixes of debt and equity to finance their investment. In Razin, Sadka, and Yuen (2000a), we examine the more realistic case
where these two forms of finance are blended together. What we find in that case is a strong dominance of FPDI over FPEI, i.e., debt flows will crowd out equity flows completely. An intuitive explanation is provided in what follows.

Recall from section 3.2.2 above that, under asymmetric information, *pure* equity finance will lead to foreign under-investment and domestic over-saving. Take that as the initial situation and consider the introduction of domestic and foreign debt securities or bank loans. One may think that, like under *pure* debt finance, the possibility of default cannot be ruled out in low-productivity events under *mixed* debt-equity finance. But a little reflection will suggest that, under the assumptions of our story, bad debt will not occur. The logic is the following. Since the firm can observe at the financing stage the realized value of its supply shock before proceeding with the actual implementation of its predetermined level of investment and the *foreign* borrowing needed for its finance, it will never pay her to borrow from the foreigners if she knows that the firm will not be able to repay its loans at the end. This is because in the case of default, all its post-investment output will be seized by the debt-holders, leaving the firm pennyless. Instead, it now has the option of not borrowing but rather issuing equity to finance its new investment, which will generate some positive cash flow even in low-productivity events in the second period, to be discounted back to the first period and be sold to the equity-investors. Evidently, the firm cannot cheat the *domestic* savers, who are as well-informed as the firm itself, by borrowing from them and defaulting later. As a result, the firm will never borrow from anyone (domestic or foreign) and default later in these “bad” events.

Whenever the firm finds it worthwhile to debt-finance its investment, therefore, it will borrow from both the domestic and foreign savers. A simple no-arbitrage argument from the firm’s perspective implies that domestic and foreign rates of interest must be equal. Recall from section 3.2 that the coexistence of domestic and foreign equity finance depends crucially on the
rate-of-interest differential between domestic and foreign savers. The interest rate equalization here will bring up the familiar “lemons” problem \textit{a la} Akerlof (1970) in the domestic equity market, whereby the uninformed foreign equity-buyers will be driven out of the market. This is because, at the price offered by these buyers, which reflects the average productivity of all firms in the market, firms experiencing a high-than-average shock value will not be willing to sell their shares. By repeated applications of this adverse selection argument, we can deduce that foreign equity flows will vanish in equilibrium.\footnote{If there exist firms whose values are lower than this average price offered by the uninformed equity-buyers when they choose not to make new investment (so that no financing is required), then they will still resort to FPEI flows to finance their investment. As a result, there will be two subgroups of firms within the group of “bad” firms \textit{i.e.}, those (the better ones) that will not make any new investment and those (the worst ones) that will equity-finance their investment from foreign sources.}

What about domestic equity? The informed domestic savers will be able to distinguish the firms (which are different \textit{ex post}) and offer them fair prices (truly reflecting their \textit{ex post} values) for the equity shares they issue. But in such low-productivity events (when default could have occurred), the firm’s investment is unprofitable implying that these share prices should be negative. As a result, these “bad” firms would not have issued and sold their shares in the domestic equity market in the first place. In other words, even domestic equity will disappear in such cases.

The new equilibrium is characterized as follows. The group of high-productivity firms will debt-finance their investment from either domestic or foreign savers or equity-finance it from domestic savers alone. The group of low-productivity firms will not make any new investment at all.\footnote{Under the presumption specified in the preceding footnote, some of the firms within this group will still choose to equity-finance their new investment from foreign sources.} So we have a separating equilibrium under which “good” firms are able to finance their investment at a relatively high level while “bad” firms will not invest. This is certainly a more efficient outcome than the pure debt or pure equity solution. We can thus view the inefficient
outcomes under the “pure” cases as arising from a missing market. Although those inefficiencies can be corrected by a Pigouvian tax package, this market solution) ) introduction of a debt market blended with equity financing from domestic sources) ) may be more incentive compatible and more manageable than the tax solution. This is because the former relies on the self interests of the private agents and the natural forces of the markets whereas the latter depends on the discretion of a well-intentioned government.

Consequently, mixing debt and equity finance will give us a much more definite dominance of FPDI over FPEI. This strong crowding out result immediately brings back the first puzzle in another dimension) ) i.e., why do portfolio equity flows still exist in reality? On the one hand, we have noted in passing (see footnotes 13 and 14) the possibility that the crowding out will be incomplete) i.e., some foreign equity flows will still remain) ) when the firm has the option of not making any new investment at all. (In practice, this option is similar to the option of internal finance) ) i.e., financing investment by retained earnings). On the other hand, while our analysis of equity finance has taken full account of its potential “lemons”-type problems, our analysis of debt finance has abstracted from all kinds of bad consequences that may arise from problems of asymmetric information. In particular, as we have seen, the assumption that the firm knows so much more about its random productivity at the financing stage than at the investment stage simply rules out default on debt as a possibility. As long as the firm’s uncertainty about its productivity level is not fully resolved at the financing stage, default will still be possible. If, in addition, there also exist costs of default or bankruptcy, then debt may no longer be superior to equity as a mode of finance. In fact, in Razin, Sadka, and Yuen (2000a), we examine a case

15Besides, we have neglected problems of moral hazard, which are believed to be common, especially in the case of sovereign debt. On the other hand, we have also ignored the possibility of the firm using signalling devices to alleviate its “lemons” problems under equity finance. Incorporating these considerations will make the balance between debt and equity finance more even, thus ruling out the extreme case of complete crowding out.
where investment and financing decisions are made simultaneously at a point before the true values of the supply shock are revealed to the firms and where bankruptcy costs have to be incurred in case of default and show that, in that case, equity flows can crowd out debt flows instead.

In sum, whether FPDI will crowd out FPEI or the other way round depends, inter alia, on the information structure (say, in terms of the degree and type of information asymmetry\textsuperscript{16} and the timing of information arrival) as well as the magnitudes of the costs of bankruptcy, both of which are closely related to the governance structure within the firms. While the case we have analyzed in this paper (i.e., FPDI crowding out FPEI) is more consistent with the pecking order of capital flowing to developing countries, the alternative case (FPEI crowding out FPDI) can also be very real in industrialized countries. The sharp contrast in the relative superiority of debt and equity flows between the two cases points to the importance of understanding how the structure of corporate governance is determined and how it affects the sequencing of investment and financing decisions as well as information-gathering at different stages. These important issues are nonetheless outside the scope of this paper and are left for future research.

\footnote{So far, we have assumed the home-bias-type information asymmetry, whereby domestic firms and domestic savers are both better informed than their foreign counterparts. In corporate finance, however, it is common to assume that owner-managers (“insiders”) of the firms possess an information advantage about their own productivity levels over and above the other stakeholders (fund-providers or “outsiders”). In Razin, Sadka, and Yuen (1998b), we have shown how this alternative kind of information asymmetry will generate a well-defined capital structure for the economy as a whole with the following features: low-productivity firms will rely on the equity market to finance investment at a relatively low level; medium-productivity firms will not invest at all; and high-productivity firms will rely on the debt market to finance investment at a relatively high level. So instead of complete crowding out in one way or the other, we have a mixed debt-equity finance equilibrium under which debt still dominates equity. The efficiency and policy implications of this alternative information structure are also very different. The debt market is efficient, with respect to both its scope and the amount of investment it helps financing. The equity market, however, fails: its scope is too narrow and the investment it helps financing is too little. A corrective policy requires simply one policy instrument, which is rather unconventional: lump-sum subsidies to those firms that choose to equity-finance their investment (i.e., equity-market-contingent grants). In addition to considering this alternative information structure, it will be interesting to examine as well the more realistic case with two levels of information asymmetry whereby the domestic firms are better informed than the domestic savers, who are in turn better informed than the foreign savers. We plan to pursue it in future research.}
5. Conclusion and Possible Extensions

In this paper, we have identified a pecking order in international finance (somewhat analogous to that in corporate finance)) a rank order of capital flows to the developing countries in the 1990s that places FDI on the top, followed by FPDI and FPEI in that sequence. A consistent story is told, based on a home-bias-type information asymmetry (i.e., between locals and foreigners), to explain this rank order. In addition, we have explored its efficiency and policy implications for capital-importing countries in the developing world.

In particular, we find that the information asymmetry will lead to inefficient allocations of resources under both debt and equity finance: domestic over-saving (production-consumption inefficiency) in both cases and, in addition, foreign under-investment (aggregate production inefficiency) in the latter case as well. We have considered both a tax solution (Pigouvian style) and a market solution (blending debt and equity finance). As the inefficiencies are caused by information imperfections, they may better be tackled at the source by policies that facilitate information dissemination. In fact, OECD countries do have laws that require disclosure of new material information to non-voting shareholders. We should thus expect these informational problems to diminish during the process of capital market development, as rules of disclosure and prudential regulations get increasingly incorporated into the workings of both debt and equity markets. This is especially true for the “lemons” problem in the equity case (e.g., through the increase in the transparency of equities that have American depository receipts). We can therefore predict that the economy-wide debt-equity ratio will fall as an economy develops. Indeed, as revealed by Figure 2 (taken from Chen and Khan, 1997), we do find relatively larger inflows of equity capital in middle-income countries than in low-income countries.

[insert Figure 2 about here]

In trying to provide a consistent story for the overall pattern of capital flows to the
developing world in the 1990s, we have focused on an asymmetric information framework and ignored the institutional constraints and government regulations that may also have been an important determinant of such pattern. For instance, a large component of the equity offerings from LDCs in the 1990s has been the result of government privatization of state-owned enterprises to attract foreign capital; whereas the increase in bond financing has been a result of the expansion of existing corporations. The incorporation of these institutional developments into the analysis would be useful in explaining why debt flows have not been increasing as much in the developing countries relative to equity offerings. Future research should look more closely at how the scope of government regulations (e.g., capital controls of various kinds) and the quality of public institutions (e.g., the level and extent of corruption activities) will affect the composition of capital flows. Having said that, let me reiterate the main contribution of this paper: Despite the omission of such important elements as institutional and public policy factors, our asymmetric information story still goes a long way towards explaining the pecking order of capital flows. This can be viewed as the main success of that story.

On the other hand, however, what we have presented in this paper is just a broad picture about aggregate capital flows into the developing world. Naturally, the composition of FDI, debt, and equity flows vary quite a bit from time to time and from country to country. A more disaggregative analysis of this composition at the country or regional level (say, comparing East Asia with other emerging markets) over a longer period of time (say, comparing different sub-periods) could be very interesting and enlightening.
References


World Bank, Global development finance, various issues.

__________, Private capital flows to developing countries: the road to financial integration, Oxford University Press, 1997.