



# Financial development, international capital flows, and aggregate output <sup>☆</sup>



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## ABSTRACT

We develop a tractable two-country overlapping-generations model and show that cross-country differences in financial development can explain three recent empirical patterns of international capital flows: Financial capital flows from relatively poor to relatively rich countries, while foreign direct investment flows in the opposite direction; net capital flows go from poor to rich countries; despite its negative net international investment positions, the United States receives a positive net investment income.

International capital mobility affects output in each country directly through the size of domestic investment and indirectly through the aggregate saving rate. Under certain conditions, the indirect effect may dominate the direct effect so that international capital mobility raises output in the poor country and globally, although net capital flows are in the direction to the rich country. We also explore the welfare and distributional effects of international capital flows and show that the patterns of capital flows may reverse along the convergence process of a developing country. Our model adds to the understanding of the costs and the benefits of international capital mobility in the presence of domestic financial frictions.

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## 1. Introduction

Standard international macroeconomics predicts that capital flows from capital-rich countries, where the marginal product of capital (MPK, henceforth) is low, to capital-poor countries, where the MPK is high. Furthermore, there should be no difference between gross and net capital flows, as capital movements are unidirectional.

The patterns of international capital flows observed in the past 20 years, however, stand in stark contrast to these predictions (Lane and Milesi-Ferretti, 2001, 2007b,c). First, since 1998, the average per-capita income of countries running current account surpluses has been below that of the deficit countries, i.e., net capital flows have been “uphill” from poor to rich countries (Prasad et al., 2006, 2007). Second, many developing economies, including China, Malaysia, and South Africa, are net importers of foreign direct investment (hereafter, FDI)

and net exporters of financial capital at the same time, while developed countries such as France, the United Kingdom, and the United States exhibit the opposite pattern (Ju and Wei, 2010). Third, despite its negative net international investment position since 1986, the U.S. has been receiving a positive net investment income until 2005 (Gourinchas and Rey, 2007; Hausmann and Sturzenegger, 2007; Higgins et al., 2007).

Recent research offers two main explanations for these empirical facts. Devereux and Sutherland (2009) and Tille and van Wincoop (2010) focus on the cross-country risk-sharing that investors can achieve by diversifying their portfolios globally. International portfolio investment is determined by the cross-correlation patterns of aggregate shocks at the country level. These models do not distinguish between FDI and portfolio equity investment and, therefore, offer no explanation for the second pattern.

The other strand of literature focuses on domestic financial market imperfections (Aoki et al., 2009; Caballero et al., 2008). Matsuyama (2004) shows that, in the presence of credit market imperfections, financial market globalization may lead to a steady-state equilibrium in which fundamentally identical countries end up with different levels of per capita output, a result he calls “symmetry breaking”. Furthermore, financial capital flows from poor to rich countries in the steady state. However, Matsuyama (2004) does not address FDI flows. Mendoza et al. (2009) analyze the joint determination of financial capital flows and FDI in a heterogeneous-agent model with uninsurable idiosyncratic endowment and investment risks. The precautionary savings motive plays the crucial role. Ju and Wei (2010) show in a static model that,

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when both FDI and financial capital flows are allowed, all financial capital leaves the country where credit market imperfections are more severe, while FDI flows into this country. Thus, capital mobility allows investors to fully *bypass* the underdeveloped financial system. The models mentioned above explain only one or two of the three facts.

While the literature does not explicitly address the implications of international capital mobility for aggregate output, it seems intuitively plausible that, due to the declining MPK, “uphill” capital flows make the poor countries and the world poorer.<sup>1</sup> The policy implications seem to be clear: The world would be better off without international capital movements between rich and poor countries.

We extend the second strand of literature and explain all three empirical facts. Following Matsuyama (2004), we take the tightness of the borrowing constraints as a measure of a country's level of financial development. The two countries in our model differ fundamentally only in the level of financial development.

Under international financial autarky (hereafter, IFA), interest rates are affected by two factors. First, for a given level of financial development, a lower capital–labor ratio implies a higher MPK and higher interest rates. We call this the *neoclassical* effect, as it arises from the concavity of the neoclassical production function with respect to the capital–labor ratio. Second, for a given capital–labor ratio, a lower level of financial development means less efficient enforcement of credit contracts and monitoring of borrowers. In this case, agents face tighter borrowing constraints and the lower aggregate credit demand leads to a lower loan rate and a higher equity rate. We call this the *financial-underdevelopment* effect. In the less financially developed country, the steady-state loan rate is lower and the steady-state equity rate is higher. In the case of interest-elastic saving, domestic financial frictions also distort aggregate saving through the interest rates, leading to lower investment and output.

Suppose that the two countries are initially in the steady state under IFA. Upon allowing full capital mobility, the initial cross-country interest rate differentials drive financial capital flows from the poor to the rich country and FDI flows in the opposite direction. Due to its larger credit capacity, the more financially developed country receives net capital inflows. Thus, net capital flows are “uphill” from the poor to the rich country. Since the rich country receives a higher return on its FDI assets than it pays on its foreign debts, it gets a positive net investment income despite its negative net international investment position. Intuitively, by “exporting” its superior financial services through two-way capital flows, the rich country receives a positive net reward, accordingly. Thus, our model predictions are consistent with the three empirical facts mentioned above.

Building upon this model, we make three contributions to the literature. First, we show that full capital mobility can raise output in the poor country as well as globally, despite “uphill” net capital flows. Intuitively, financial frictions depress the return on and, hence, the level of aggregate saving. Allowing for international capital mobility provides domestic households with better returns on savings. Thus, by ameliorating the interest rate distortions, capital mobility indirectly raises aggregate savings in the less financially developed country. If saving is sufficiently interest-elastic, the rise in aggregate saving may exceed net capital outflows so that aggregate investment and output in the less financially developed country as well as globally can be higher than under IFA.

The interest elasticity of saving has been the focus of the debates on the effectiveness of tax reform (Bernheim, 2002; Evans, 1983; Summers, 1981), financial liberalization (Bandiera et al., 2000), and other public policies (Corbo and Schmidt-Hebbel, 1991) on capital accumulation. Our model complements the existing literature by emphasizing the relevance of interest-elastic saving to the output implications

of capital account liberalization policies.<sup>2</sup> The empirical evidence on the magnitude of the interest elasticity of savings is rather mixed (Giovannini, 1983; Loayza et al., 2000). In particular, Ogaki et al. (1996) provide evidence that savings are more responsive to rates of return at higher income levels.

As our second contribution, we show that financial capital flows affect the owners of credit capital and equity capital in opposite ways and so do FDI flows. Capital flows also affect the intergenerational income distribution. Such distributional effects offer an explanation for why capital account liberalization often encounters both support and opposition in a given country.

Third, we analyze a scenario where one country is more financially developed and in its steady state, while the other country is less financially developed and below its steady state before capital account liberalization. We study the interactions of international capital flows and the economic convergence in the second country. The results show that the pattern of international capital flows may reverse along the convergence path, depending on the relative strength of the neoclassical effect and the financial underdevelopment effect. We then use the data from ten Central and Eastern European countries and five ASEAN countries to offer some suggestive evidence supporting these predictions.

Our model differs from the existing literature in the following aspects. The static model of Ju and Wei (2010) is useful for analyzing the immediate impacts of capital account liberalization, while our OLG model facilitates a short-run and long-run analysis. Devereux and Sutherland (2009), Mendoza et al. (2009), and Tille and van Wincoop (2010) capture international capital flows in settings with aggregate or idiosyncratic uncertainty, while our model features international capital flows in a deterministic setting. Angeletos and Panousi (2011), Buera and Shin (2010), Carroll and Jeanne (2011), Sandri (2010), Song et al. (2011) address “uphill” financial capital flows, while we focus on the joint determination of financial capital and FDI flows. Caballero et al. (2008) and Mendoza et al. (2009) analyze the joint determination of financial capital and FDI flows in an endowment-economy model, while endogenous capital accumulation is crucial in our model. Caballero et al. (2008) assume that foreign direct investors from the more financially developed country have an advantage in capitalizing the return on investment in the host country and Mendoza et al. (2009) assume that investors from the more financially developed country can insure their FDI using the better risk-sharing opportunities in their home country. We do not need these extra assumptions. Carroll and Jeanne (2011) and Sandri (2010) feature the precautionary savings channel in a model with idiosyncratic risk and incomplete markets, while we feature interest-elastic savings in a model with limited commitment.

Caselli and Feyrer (2007) present a direct estimation of cross-country MPK differences to assess the importance of international credit market frictions. They abstract from domestic financial frictions so that the MPK is the rate of return to investors and the driving force behind international capital flows. They find that, if one focuses on reproducible capital and adjusts for the higher relative prices of capital goods in poor countries, the MPK does not differ much between developed and developing countries. Thus, they conclude that international credit market frictions cannot go far in explaining observed capital flows between these countries. We take this as a starting point and assume that there are no barriers to international capital flows in the scenario of full capital mobility. Instead, we focus on the implications of domestic financial frictions for international capital flows.

<sup>2</sup> Interest-elastic saving is a key to the output gains in our model. It results from the assumption that individuals work and consume in both periods of life. The higher the future labor income, the more interest-elastic the saving is, which is known as the human wealth effect (Summers, 1981). Our model predicts that saving is more interest elastic in fast-growing countries so that capital mobility is more likely to be beneficial for such economies.

<sup>1</sup> Matsuyama (2004) and von Hagen and Zhang (2010) show that this may indeed be the case.

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