Financial Development, Financial Integration, and International Capital Flows

Jürgen von Hagen

University of Bonn, Indiana University Kelley School of Business, and CEPR

Haiping Zhang

Singapore Management University and University of Bonn

May 2010

Preliminary draft, do not quote without permission

This paper was prepared for the 2010 Conference in Rethymno, Crete

Correspondence:
Jürgen von Hagen
Lennèstrasse 37
D-53113 Bonn
vonhagen@uni-bonn.de

1. Introduction

Since the mid-1980s, the world has seen a strong and steady increase in financial market liberalization and international capital mobility in many countries. Consider figure 1, which is taken from Abiad et al. (2008). The figure shows an index of financial market liberalization for 91 countries around the world from 1973 to 2005. It is coded such that larger numbers indicate more liberal capital market regimes. The figure illustrates that liberalization has been an ongoing process over the entire period and in all country groups, and that it accelerated during the 1980s. Financial markets around the world are much more liberal today than they were at the beginning of the 1970s.

One important dimension of financial liberalization is increasing access and exposure to international financial markets. Figure 2, taken from Chinn et al. (2008) presents indices of capital market openness for a large number of countries around the world. It shows that, over the same period, countries have opened their financial system substantially to capital inflows and outflows. Developing countries and emerging market economies followed the lead of the industrialized countries in this regard since the early 1990s. As a result, financial markets have become more internationally integrated. Beck and Demirgüc-Kunt (2009) show that financial systems have become increasingly interlinked with international markets. Lane and Milesi-Ferretti (2006) document the growth of foreign assets and liabilities in many countries.

Financial market liberalization and opening national financial systems to world markets have promoted financial development and globalization around the world. Chinn and Ito (2002, 2005) and Beck et al. (2002, 2009) use a variety of indicators to document that financial markets and institutions have grown faster than the rest of the economy in a large number of countries. Dorrucci et al. (2009) develop a composite index of financial development in mature and emerging market economies to illustrate the process of growing financial development in both groups of countries over the past decade. Financial development includes the growing size of financial markets (e.g., stock market capitalization, the volume of bond markets, and the assets of financial institutions compared to GDP), improvements in the quality of financial institutions and regulatory frameworks, financial innovation, and improved access to finance for the private non-financial sector. Generally, the empirical

evidence suggests that financial development has been broad based in developed and emerging market economies.

Nevertheless, there remain large differences in the stages of financial development in different countries. The World Economic Forum's (2008) Financial Development Index illustrates these differences for 53 countries around the world. It suggests that, among the countries considered, Venezuela has the lowest and the US the highest level of financial development, and that there are noticeable differences in financial development even among countries that belong to the European Union and the euro area. The IMF (2006) provides a study of financial development in advanced economies from 1995 to 2004, see figure 4. It shows that the level of financial development increased in all countries considered except Greece. At the same time, however, cross-country differences in the level of financial development did not become smaller; in fact, the coefficient of variation has grown by 16 percent. Thus, heterogeneity of financial systems across countries persists and even increases. The same is implied by the persistent differences in the scores of financial liberalization index for different country groups in Figure 1. Beck and Demirgüc-Kunt (2009) document cross-country heterogeneity of financial development by looking at a large range of indicators. They show that there are systematic, positive correlations between levels of income and levels of financial development.

Increasing financial openness and integration and increasing financial development imply that capital flows much more easily across borders than in the past.[1] Traditional international macroeconomics suggests a benign view of these developments. Standard theories imply that capital flows from countries where it is abundant and, hence, earns relatively low marginal products, to countries where it is scarce and earns high marginal returns. International capital flows should, therefore, equalize marginal returns. In doing so, they should lead to an increase in world output and promote economic convergence by spurring growth in poor countries and slowing down growth in rich countries. Figure 5, however, shows that this has not generally happened in the past 30 years. The figure plots the relative per-capita GDP of different country groups compared to the US. It shows that significant convergence has happened only for two country groups, the non-G7 advanced economies and the

[1] Taylor and Obstfeld (2004) suggest that international capital flows were much larger before 1914 than during most of the 20th century. The increasing financial integration of the world economy in the past 30 years is, therefore, sometimes referred to as the second wave of financial globalization.

newly industrialized Asian economies. The figure also shows that the coefficient of variation has remained stable over the period under consideration. More formal empirical studies have also documented the lack of economic convergence. Bianchi (1997), Jones, (1997), and Quah (1997), for example, find that the distribution of incomes across countries has developed from a unimodal to a bimodal one between the 1960s and the 1990s. Joyce (2008) illustrates the growing per-capita income gap between the richest and the poorest countries in the world. Despite the optimistic predictions of conventional international macroeconomics, it is, therefore, not clear that financial development and global financial integration are beneficial from a national economic perspective.

More recent literature on international capital flows has added the feature of heterogeneity of financial development to the analysis. It explores the implications of capital flows between countries with different levels of financial development in terms of the patterns of capital flows and in terms of economic welfare. The basic idea is that financial markets suffer from distortions and incompleteness, and different levels of financial development translate into different degrees of severity of these distortions and incompleteness. Matsuyama (2004), Kikuchi (2008), and Böhm and Vachadze (2009) use this approach to explain the lack of convergence among countries linked by integrated financial markets. Caballero et al. (2008) and Mendoza et al. (2009) use these approaches to explain the patterns of international capital flows.

This paper presents a review and an assessment of this literature. We begin in section 2 with a review of the patterns of capital flows observed over the past decade. Section 3 presents two basic approaches to modeling international capital markets and flows in the presence of heterogeneous financial market development, one focusing on distortions related to credit demand, the other on distortions related to credit supply. Section 4 presents some data for the development of capital flows in the recent global financial crisis. It then sets out a model combining the two approaches to draw out their implications for international capital flows. In doing so, we interpret the crisis as a sudden decline in the level of financial development in the US, i.e., an increase in the severity of financial market distortions in that country. Section 5 concludes.

2. Patterns of International Capital Flows

The stock of foreign assets held around the world has increased from six percent of world GDP in 1960 to 25 percent in 1980, and 92 percent in 2000 (Taylor and Obstfeld, 2004). This increase in the financial integration of the world economy was facilitated by an enormous increase in international capital flows. Prasad et al. (2006) illustrate this by showing that the ratio of the combined current account surpluses around the world to world GDP increased from 0.5 percent in 1970 to almost two percent in 2004. Nevertheless, Lucas (1990) already noted that, despite the large volume of international capital flows observed empirically, international capital flows are actually "too small" in the sense that they have not equated marginal products of capital internationally. In the same vein, Aizenman et al. (2004) show that capital imports have financed only a small fraction of the total capital accumulation in developing countries.

As documented by Lane and Milesi-Ferretti (2001, 2006, 2007) and Prasad et al (2006, 2007), the patterns of international capital flows observed in the past 20 years stand in stark contrast to the prediction that capital flows from capital-rich to capital-poor countries. Consider Figure 6, which shows the average ratio of net foreign assets to GDP for several groups of countries in 1996 and 2004. This ratio fell for the group of industrialized countries and rose for the African, Asian, and CIS countries. Thus, net foreign assets fell in the relatively rich countries and increased in the relatively poor countries, a clear contradiction to the notion that capital should flow from the former to the latter. Only the European emerging market economies and the Western Hemisphere countries conform to the pattern predicted by conventional macro economics in the sense that these countries borrow from the rest of the world.

The observation is confirmed by Figure 7, which plots the development of net foreign assets as a ratio of GDP for the US, other industrial countries, and the emerging market and developing countries. US net foreign assets have declined as a ratio of GDP since the early 1980s and became negative in 1985. Interestingly, the net income the US has drawn from its foreign asset position has remained positive for much longer, indicating that the country receives higher returns on its foreign assets than it pays on its foreign liabilities (Gourinchas and Rey, 2007; Hausmann and Sturzenegger, 2007). Emerging market economies and developing countries

have seen an increase in their net foreign asset ratio since about 1993, interrupted shortly by the financial crisis years of 1997-98. Other industrial countries have seen a decline in their net foreign asset ratio since the beginning of the 2000s.

Prasad et al. (2006) show that, since the late 1970s, the relative per-capita income of countries running current-account surpluses compared to the globally richest country each year has been steadily trending downward, i.e., there has been an increasing tendency for relatively poor countries to export capital. At the same time, relatively rich countries have increasingly tended to import capital; an observation which is not due to the large current account deficits of the US alone. Thus, there is ample evidence that net international capital flows have been “uphill” – from relatively poor to rich countries – rather than “downhill” as predicted by standard international macroeconomics.

A more refined view of this “uphill” puzzle emerges, if one distinguishes between foreign direct investment (FDI) and portfolio capital flows. Prasad et al (2006) show that net FDI flows between developed countries and emerging and developing countries tend to be “downhill” as predicted by standard models, while net portfolio flows are “uphill.” Ju and Wei (2007) show that, over the period since 1990, developed countries have typically been net exporters of FDI and net importers of financial capital, while emerging economies have been net importers of FDI and net exporters of financial capital flows. This is illustrated by Figures 8a and 8b. Thus, capital flows have been in both directions, although total net flows were “uphill.” Figures 8b and 8b also illustrate that the group of “other developing countries” were net recipients of both financial and FDI flows.

Standard international macro economics predicts that capital should flow predominantly to countries with relatively high rates of investment and growth. However, Gourinchas and Jeanne (2009) and Benhima (2009) show that, over the period since 1980, there is a negative correlation between the ratio of investment to GDP and net capital inflows among the developing and emerging market economies. In the same vein, Prasad et al. show (2007) that there is a negative correlation between current account balances and real growth rates for emerging economies and other developing countries. Kose et al. (2009) find that there is very limited empirical support for the hypothesis that capital account liberalization, by allowing for more investment to be financed, has positive effects on economic growth. These

observations defy the traditional notion that foreign capital contributes positively to economic growth by financing investment in excess of domestic savings. Gourinchas and Jeanne (2009) call this the “allocation puzzle” of international capital flows.

These four features of international capital flows, “too small”, “uphill”, “two-ways”, and the allocation puzzle pose considerable challenges to international macroeconomic models. A first, straightforward response to Lucas’s (1990) observation is that marginal products of capital reflect social returns to capital, while international capital flows respond to differences in the private returns accruing to investors in different countries. Weak enforcement of contracts, corruption, and other market distortions may cause private returns to fall below social returns and explain why capital flows do not suffice to equate social returns to capital and may even go in the wrong direction. In this vein, Gertler and Rogoff (1990) argue that differences in capital market imperfections between countries can dampen capital flows from rich to poor countries and even reverse their direction. This argument alone, however, does not explain the difference between portfolio capital flows and FDI. Richer models are necessary to explain all four puzzles.

A second approach starts from the argument that international financial markets also serve to insure consumers and investors against aggregate, country specific risk. If so, consumption growth should not be strongly correlated with country-specific income shocks and consumption growth should be more strongly correlated across borders than output growth. Early empirical literature on this issue, however, found output growth more strongly correlated than consumption growth (Backus et al, 1995; Lewis, 1996; Obstfeld and Rogoff, 2001). This suggests that international risk sharing is not very effective. More recent studies (Artis and Hoffmann, 2008; Becker and Hoffmann, 2006) find that risk sharing among countries has improved due to the growth and integration of financial markets, but that it is the developed economies that mostly benefit from this (Kose, Prasad and Terrones, 2009). Even though many emerging market economies have reduced capital controls and experienced large capital flows, their ability to share risk seems to remain very limited.

This approach can explain uphill capital flows, if such flows are implied by the global patterns of correlation of country-specific shocks, and two-way capital flows, if different types of financial instruments provide insurance against different types of

shocks and with different degrees of efficiency, a point supported by the evidence reported by Kose, Prasad, and Terrones (2009). Nevertheless, the argument remains unsatisfactory, because it begs the question why the correlation patterns should be like that.

3. Financial Development and Capital Flows

A large and fast growing literature has taken up this challenge in recent years. It focuses on international differences in financial development, which is defined in terms of the severity of capital market imperfections: More developed financial systems are characterized by less severe market distortions. Two dimensions of financial market development have been explored in this literature. The first builds on the notion that credit markets do not function properly because of imperfect enforceability of financial contracts. This is in the tradition of Hart and Moore (1994) and Townsend (1979). The second builds on the notion that financial systems may offer a less than full range of instruments for consumption smoothing and insurance against idiosynchratic endowment and investment risk (Heathcote, Storesletten, and Violante, 2009). This is in the tradition of the literature on precautionary saving (Aiyagari, 1994). In both approaches, heterogeneity of economic agents plays a prominent role to explain capital market allocations. In the first line of models, market distortions limit the amount of credit investors can obtain to finance productive projects. We call these credit demand distortions. In the second line, market incompleteness induces individuals to accumulate wealth to hedge against idiosyncratic shocks and distorts the choice between different types of assets. We call these credit supply distortions. In the next two sections, we review the two lines of literature.

3.1. Credit Demand Distortions

Models of credit demand distortions explore the macroeconomic consequences of financial market imperfections due to moral hazard, asymmetric information, or imperfect contract enforcement. Credit markets serve to channel household savings to entrepreneurs, who use them to make productive capital investments. There are three critical interest rates in the economy: the rate on loans from households to entrepreneurs (possibly through financial intermediates), the marginal product of capital, and the rate of return on equity, i.e., the own funds

invested by the entrepreneurs. In a world without capital market imperfections, all three rates would be the same and equal the social return on capital. At the heart of the argument is the assumption that capital markets are imperfect in the sense that entrepreneurs can borrow funds only against collateral, and that the collateral constraint is binding. This implies that the three interest rates will differ from each other: The return on equity will be larger than the social rate of return on capital and the loan rate will be lower.

Consider two countries which are identical in all respects except the severity of the borrowing constraint facing entrepreneurs.[2] In the absence of international capital flows, the return on equity will be higher and the loan rate lower in the country with the more severe borrowing constraint. If barriers to capital flows are lifted, households in the country with more severe borrowing constraints will start lending funds to entrepreneurs in the other country to benefit from the higher loan rate there. At the same time, entrepreneurs in the country with the less severe borrowing constraint will make direct investments in the other country to benefit from the higher return on capital. Thus, capital flows (of different types) occur in both directions. In the new equilibrium, the country with the more severe borrowing constraint will end up with a lower capital stock and less output, and net capital flows can go uphill. Marginal products of capital are not equated in equilibrium.

Consider a two-country world. Each country is populated with two types of individuals, entrepreneurs and workers, in two generations. Entrepreneurs are more skilled than workers in the use of physical capital. Their share in the population is η, the share of workers $1-\eta$. Each generation lives for two periods. All individuals work and receive a wage, w_t, when they are "young," i.e., in the first period of their lives, and consume the proceeds of their savings when they are old. All individuals have linear preferences over consumption in the second period of their lives. There is a tradable consumption good, Y_t, serving as the numéraire and a non-tradable capital good used in production. The price of the capital good in period t is v_t.

Entrepreneurs can invest the good Y in a productive process that produces capital goods after one period. A project investment of i_t yields a return of Ri_t next period and generates project revenue $v_{t+1}Ri_t$, where $R > 0$. Young workers lend their wages to entrepreneurs for a loan rate r_t. Entrepreneurs invest their own wage

[2] The following exposition follows von Hagen and Zhang (2010a, b), which builds on Matsuyama (2004) and Kiyotaki and Moore (1995). Static versions of the same type of model are presented by Ju and Wei (2006, 2007). Caballero et al (2009) use a similar mechanism.

income and borrow $z_t = i_t - w_t$. In period t+1, they repay their loan $r_t z_t$ and consume $c^e_{t+1}=v_{r+1}Ri_t-r_r z_t$. Due to limited commitment problems, entrepreneurs can borrow only up to a certain fraction, $\theta \leq 1$, of their future project revenues. Thus, they face the credit constraint $r_t z_t \leq \theta v_{t+1} R i_t$. Workers' consumption when old is $c^w_{t+1}=r_r w_t$. Production evolves under a Cobb-Douglas technology,

$$Y_t = \left(\frac{K_t}{\alpha}\right)^{\alpha} \left(\frac{L_t}{1-\alpha}\right)^{1-\alpha},$$

where $0 < \alpha < 1$ and L is the labor force. There is no uncertainty. Factor prices are determined by the respective marginal products, $v_t K_t = \alpha Y_t$ and $w_t L_t = (1-\alpha)Y_t$. Capital fully depreciates each period.

When the credit constraint is binding, $0 < \theta < (1-\eta)$, the return on equity obtained by entrepreneurs is

$$\Gamma_t = \frac{(1-\theta)Rv_{t+1}}{i_t - z_t}$$

while the loan rate is

$$r_t = \frac{\theta R v_{t+1}}{1 - \frac{w_t}{i_t}}$$

In equilibrium, the equity rate exceeds the loan rate whenever the credit constraint is binding. In that case, the equity rate also exceeds the marginal return on capital, Rv_{t+1}, while the loan rate falls short of it.

We first consider a situation where no capital flows are possible between the two countries. A steady state equilibrium is a combination of prices, wages, interest rates, output, consumption and investment such that all markets clear and all variables are constant over time. In the current set-up, such a combination exists and is unique. If the two countries are the same in all respects, the steady state equilibria are identical.

Now assume that the two countries differ in their state of financial development, which we interpret in the sense that a higher level of financial development implies a less severe borrowing constraint. Let the less financially developed country be the home country, H, and the more financially developed country the foreign country, F, and let $0 < \theta^H < \theta^F < (1-\eta)$. In the steady state, be now have

$\Gamma = \frac{(1-\theta)\rho}{\eta}, r = \frac{\theta\rho}{1-\eta}, \rho = \frac{\alpha}{1-\alpha}$.

Thus, the equity rate is higher and the loan rate lower in the less financially developed country. Output, investment, and consumption are the same in the two countries. Thus, in the absence of international capital flows, financial development only affects the distribution of income within a country. Entrepreneurs are better off and workers worse with less financial development. Figure 9 illustrates these results.

Now assume that capital flows are allowed between the two countries. Obviously, capital will flow to where it yields higher returns. More specifically, workers in country H will start lending to entrepreneurs in country F, possibly through financial intermediates, to enjoy the larger loan rate in country F. At the same time, entrepreneurs from country F will take their investment project to country H and invest there to benefit from the higher return on equity. We interpret the flow of loans from H to F as portfolio investment and the flow of equity capital from F to H as FDI. In equilibrium, equity rates and loan rates must equalize between the two countries. A unique steady state exists in which two-way capital flows occur.

As long as the credit constraints are binding and the degree of financial development is not too large in the foreign country, i.e., θ^F is sufficiently below (1-η), the world equity rate exceeds the world loan rate in equilibrium, net capital flows are from country H to country F. Less capital is produced in country H and more in country F. Output and wages in H fall, while output and wages in F rise. Thus, the world divides into a relatively rich and a relatively poor country, and the less financially developed country is the poorer one. Capital flows “uphill.” The richer country becomes a net debtor, but, due to the higher equity rate in country H, it receives positive net investment income.

In the equilibrium with international capital mobility and uphill net capital flows, the distribution of income has changed in each country. Since wages and the equity rate fall in H, entrepreneurs are unambiguously worse off there. Workers in H suffer from the lower wages, too, but they benefit from having access to the loan market in F, where they receive a higher return on their loans. Whether or not they are better off depends on which effect dominates. In country F, entrepreneurs are unambiguously better off, since the wage rate rises and they benefit from having access to investment in country H, where the equity rate is higher. Workers in F benefit from higher wages, but suffer from receiving lower returns on their savings. Finally, world output falls due to international capital flows. Thus, the less financially

developed country suffers from opening its economy to international capital flows, and there is no room for compensating it through international transfers. This is a typical *second-best* result: Removing the constraint on international capital movements does not necessarily improve the world allocation of capital, since there are still credit market imperfections at play.

Figure 10a illustrates the main results. It plots the steady state values of some key macro economic variables against the difference in financial development between the two countries, expressed as ($\theta^F - \theta^H$). FDI and financial capital flows are expressed in levels, all other variables are expressed in terms of percentage deviations from the steady state with no capital flows. Ψ and Ω refer to financial capital and FDI outflows, respectively (negative numbers meaning inflows). The most left panel shows that the home country experiences financial capital outflows, FDI inflows, and net capital outflows under full capital mobility, and these flows increase as the difference in financial development widens. The middle panel shows that, as a result, the steady-state capital stock in the home country falls and the steady-state capital stock in the foreign country rises. The right panel shows the corresponding developments of home, foreign, and world output.

The result that world output falls due to international capital movements can be avoided by assuming that workers also have an investment project available, albeit one with lower productivity than the project of the entrepreneurs. Assume that workers can invest in a project with declining marginal returns to capital, but that the return is never larger than the entrepreneurs' project. In each country, the loan rate cannot fall below the marginal product of capital in the workers' project, as workers would refrain from lending to entrepreneurs and invest in their own project otherwise. A lower loan rate due to less financial development then implies higher levels of investment in the workers' project in country H in the absence of capital flows. Removing barriers to capital flows then makes workers invest less in their own projects as the loan rate rises in country H. Output in country H still falls, but world output rises. International financial integration in this case not only reallocates capital between countries but also within countries. Thus, although the less financially developed country suffers from international capital flows, there is room for Pareto-improving international transfers. Figure 10b illustrates these results.

Finally, if the level of financial development in country F is very high, such that θ^F is very close to (1-η) and the difference between the two countries is sufficiently

small, capital still flows in both directions, but net capital flows are zero. In this case, output, wages, and investment are the same in both countries in the steady state equilibrium. International capital flows simply allow workers in country H to “by-pass” the inefficient financial system there and benefit from the more efficient one in F, while entrepreneurs from F take their funds back to H and invest them there. This result is similar to the “by-pass effect” in Ju and Wei (2006, 2007). In the new equilibrium, workers are better off in H and worse off in F, while entrepreneurs are better off in F and worse off in H. World output is the same as in the absence of international capital flows.

Matsuyama (2004) uses a very similar setup to show how international financial integration can lead to symmetry breaking: Two countries which are identical in all respects *including* the level of financial development and, therefore, have a unique and symmetric steady-state equilibrium without international capital flows end up in an asymmetric equilibrium where one is poor and the other rich, when capital flows are admitted. The only two differences in his model compared to this one is that the investment to produce capital goods requires a fixed size and that the share of entrepreneurs is endogenously determined by the interest rate. Intuitively, investment operates at the extensive margin in his model and on the intensive margin in the current one. This makes the symmetric steady state unstable and leaves two stable, asymmetric ones.

3.2. Credit Supply Distortions

Complete capital markets offer consumers and investors opportunities to insure themselves against all kinds of shocks by buying and selling state-contingent assets. Recent literature on credit supply distortions in our context build on the notion that the range of insurance opportunities is limited in incomplete financial markets, where only a limited range of state-contingent assets is traded in addition to non-contingent assets. When consumers cannot insure themselves against shocks to their individual incomes, they have an incentive to accumulate more non-contingent assets than otherwise and use their wealth as a means of self-insurance. Mendoza et al. (2009) interpret the degree of financial market completeness as a measure of financial development: In a more financially developed economy, a wider range of state-contingent assets exists and is traded. Less financially developed economies

are, therefore, characterized by larger demand for, and, therefore, lower prices and higher returns on non-contingent assets.

Mendoza et al. (2009) consider a world consisting of two countries which are identical except for their stages of financial development. In each country, there is a productive asset which is fixed in supply and yields returns which are subject to investment-specific, idiosyncratic shocks. Furthermore, agents in both countries are exposed to idiosyncratic shocks to their endowments, while aggregate endowments are fixed. An intuitive interpretation is that both capital and labor incomes are exposed to idiosyncratic shocks, but these shocks are uncorrelated. There is no aggregate risk.

In the financially more developed country, which we continue to call the foreign country, F, households can buy and sell a full range of state-contingent assets to insure against both types of risk, allowing them to completely get rid of idiosyncratic risk. Loosely speaking, contingent claims insuring against shocks to capital income can be viewed as state-contingent corporate bonds. In the financially less developed country H households can buy only non-contingent bonds. The wish to insure themselves against idiosyncratic risk generates precautionary savings.

3.2.1. Uninsurable Labor Income Risk

Consider first the case of labor income risk alone. In the absence of international capital flows, households in the home country save more and hold more non-contingent bonds than households in country F. This implies that the interest rate is lower and the price of the productive asset is higher in H than in country F. When international capital flows are permitted, households in H acquire non-contingent claims in F to benefit from the higher interest rate there. Interest rates and, therefore, the price of the productive assets equalize between the two countries. In the equilibrium with international capital flows, country F ends up with a negative net foreign asset position. Since the supply of productive assets is fixed in both countries, total output does not change due to international capital flows.

We can embed this type of credit supply distortions of this kind into our previous model by taking a shortcut through the micro foundations developed in Mendoza et al (2009). For our purposes, the main implication of uninsurable labor income risk is that households in the financially less developed country have a greater incentive to save than households in the more developed country. We model this by assuming that households consume in both periods of their lives and choose

consumption in the first period according to a life-time utility function $U(c_t, c_{t+1}) = \ln(c_t) + \beta\varphi\ln(c_{t+1})$, where $\beta\varphi < 1$ and $\beta < 1$ is the usual discount factor. Households have the same discount factor in both countries. The credit supply distortion is represented by the parameter φ. We assume that it is equal to one in country F and larger than one in country H. Furthermore, we assume that borrowing constraints are not binding in either country. In a steady state equilibrium with no international capital flows, agents save more and accumulate more capital in country H. As a result, the loan rate and the equity rate is lower than in country F and output is higher, i.e., the less financially developed country ends up with a higher level of output and income. This reveals the role of the assumption of a fixed supply of the productive asset in Mendoza et al (2009). It assures that lower financial development does not endogenously produce higher income, a result which seems counterintuitive at first sight.

When international capital flows are permitted, financial capital flows from H to F due to the differences in loan rates. FDI may flow from H to F, too. Thus, the model produces neither two-way nor uphill capital flows. However, by adding a credit demand distortion as before and choosing θ to be sufficiently low in country H, we can generate uphill capital flows as well.

3.2.3. Uninsurable Investment Risk

Next, consider the case of idiosyncratic capital income risk. In country F, households can perfectly insure against such risk by holding state-contingent bonds. Alternatively, we can interpret this scenario as one in which firms in country F can issue state-contingent corporate bonds insuring their output. In country H, this is impossible; households can hold only non-contingent bonds. Incomplete financial development now has two effects. It generates precautionary savings as before and it creates an incentive to hold less productive assets in total wealth than under prefect financial markets. Mendoza et al (2009) show that, in an equilibrium without international capital flows, the interest rate is again lower in country H. Furthermore, the expected yield on the productive asset now contains a risk premium. This implies that the asset price is lower in country H, too.

When international capital flows are possible, agents in country H acquire financial assets in country F. Furthermore, agents in F purchase shares in the productive asset in H, the returns from which they can insure by issuing contingent bonds in their home financial market. Investors in F are thus able to appropriate the

risk premium on productive assets in country H. The model generates two-way capital flows and, in equilibrium, country F ends up with a negative net position in financial assets and a positive net position in productive assets. Loosely speaking, it finances purchases of productive assets with debt raised in the less developed country. Due to the risk premium on productive assets in the less developed country, the more developed country earns positive net foreign asset income. Since the total supply of productive assets is fixed, however, output does not change and the model does not generate uphill capital flows.

We now modify our previous model to allow for capital accumulation and explore the implications of uninsurable investment risk for international capital flows. Our model builds on Angeletos and Panousi (2009). As before, we consider an OLG model with two countries. We drop the distinction between entrepreneurs and workers and assume that all agents have identical preferences over consumption in the two periods of their lives, $U_t=\ln(c_{y,t})+\beta\ln(c_{o,t+1})$, where "y" and "o" refers to the first and the second period of an individual's life. Individuals supply one unit of labor in each period of their lives and receive a wage rate, w, equal to the marginal product of labor. Thus, the lifetime labor income of a generation born in period t is $W_t = w_t + w_{t+1}/(R_t)$, where R_t is the riskless gross interest rate. Saving can take two forms. Agents can buy or sell a risk-free bond, b, or invest in the production of capital goods. We assume that an investment of i^j_t units of output in period t by individual j yields $k^j_{t+1} = \exp(a^j_{t+1})i^j_t$ in period t+1, where a^j refers to an idiosyncratic, investment-specific shock, which is iid across individuals and has log-normal distribution, i.e., $E_t a^j_{t+1} = -\sigma^2/2$ and variance $Var_t(a^j_{t+1})= \sigma^2/2$, such that expected productivity is $E_t\exp(a^j_{t+1})=1$. There is no aggregate risk and, therefore, the price of the capital good in period t+1, v_{t+1}, is known with certainty in period t. An old individual born in t consumes $c^j_{o,t+1} = \exp(a^j_{t+1})i^j_t + R_t b^j_t + w_{t+1}$.

A young individual in this economy is faced with two choices: How much to save in the first period of his life and to allocate his savings between risky capital investments and risk-free bonds. It is convenient to write consumption and savings when young as proportional to lifetime labor income, $c_{y,t}=(1-\varsigma_t)W_t$, and $s_t= \varsigma_t W_t = i_t + b_t + w_{t+1}/R_t$. Furthermore, we let φ_t be the share of risky capital investment in total savings. The expected, risk-adjusted gross return on savings is defined as ξ_t, where $\ln(\xi_t) = E_t \ln [\varphi_t\exp(a_{t+1})v_{t+1}+(1-\varphi_t)R_t]$. The young individual chooses his savings ratio ς and his risky investment ratio φ to maximize his expected lifetime utility. From the

log-linear utility function, the savings ratio is β/(1+β). The first-order conditions for the second problem give

$$\ln(\xi_t) \approx \ln\left(R_t + \frac{(\ln(v_{t+1}) - \ln R_t)^2}{\sigma^2}\right)$$

and

$$\varphi_t \approx \frac{\ln(v_{t+1}) - \ln R_t}{\sigma^2}$$

Thus, if individuals invest in risky capital, $0 < \varphi_t$, the riskless rate R_t is smaller than the gross rate of return ξ_t. There is a risk premium on investing in productive capital.

In the absence of international capital flows, bond market clearing implies that bond holdings are zero. In the steady state, the equilibrium is characterized by a three-dimensional system determining the risk-free interest rate, R, the share of risky capital investment, φ, and the real wage rate, w:

$$\frac{\beta}{(1+\beta)}(1+R)(1-\varphi) = 1;\ \varphi = 2\varrho(1-\varphi)Rw^{\frac{1}{\varrho}};\ \varphi = -\frac{\frac{1}{\varrho}lnw + lnR}{\sigma^2}.$$

In this framework, we can interpret the variance of uninsurable, idiosyncratic shocks to capital productivity as a measure of financial development. The larger this variance, the more important is uninsurable risk, and the less developed is the financial system. Figure 11 shows the behavior of the steady-state equilibrium as the variance increases from zero to strictly positive values. The risk-free interest rate declines as households wish to save more in bonds rather than risky capital. The marginal product of capital, v, increases. The share of risky capital in household portfolios declines and the savings-income ratio declines. Output and the real wage fall as the capital stock decreases. As a result, expected utility decreases.

Now consider two countries, H and F, where, as before, F has reached a higher level of financial development than H, $\sigma_F < \sigma_H$. In the absence of international capital flows, the risk-free rate is lower and the average marginal product of capital is higher in country H compared to country F. Output is lower, too. When international capital flows are possible, H-households wish to buy bonds in country F to take advantage of the higher risk-free rate, and F-households invest in risky capital in H to benefit from the higher average marginal product of capital.

At this point, a crucial question arises: Where do investors from the foreign country obtain insurance for the risky investments they acquire in country H? There are two possibilities: First, the more developed financial system in country F provides

that insurance, implying that, from the point of view of investors in F, real capital has the same risk characteristics in both countries. In this case, international capital flows equalize the returns on risk-free bonds and on risky capital in both countries. This implies that the capital stocks must be the same in both countries and that net capital flows are zero. Thus, the model cannot reproduce uphill net capital flows. There is now more investment in the home economy implying that the capital stock and output rise there. The less financially developed country benefits from participating in international capital markets. World output unambiguously rises. This is in contrast to the results with credit demand distortions. Figure 12a illustrates the results by plotting the steady-state values of some key variables against the difference in the variance of uninsurable idiosyncratic risk.

Second, investors from F insure the projects they acquire in country H in that country's financial market. Since this market is less financially developed, investors from F demand a risk premium on their investments, implying that the rates of return do not equalize. In this case, the capital stock in H falls and the capital stock in F rises after capital flows have been allowed. Financial capital flows from H to F and FDI in the opposite direction. Net capital flows are from H to F. Thus, the model can reproduce two-way and uphill capital flows. However, the model now predicts that FDI flows in both directions, as investors in country H invest in country F to obtain safer projects than they can obtain in their own country. This is awkward because empirically FDI flows from emerging market economies to developed economies are almost non-existent. Furthermore, FDI flows alone suffice to equalize the risk-free interest rates in the two countries. This implies that financial capital flows are not necessary to achieve this and that the level of financial capital flows is indeterminate in equilibrium In other words, there is a continuum of equilibria with different combinations of FDI and financial capital flows from H to F all leading to the same level of net capital flows.

Figure 12b illustrates the results by plotting the steady-state values of some key variables against the difference in the variance of uninsurable idiosyncratic risk. Here, we pick the equilibrium with no FDI flows from H to F. Since saving in risk-free bonds now becomes more attractive, H-households invest less in risky capital; the opposite occurs in the more financially developed country. As a result, the capital stock declines in H and rises in F. Output falls in H and rises in F, but world output rises. The home country has financial capital outflows, FDI inflows and net capital

outflows, all of which increase in the difference in financial development. As in the model with credit demand distortions, the capital stock in H falls due to net capital outflows and the capital stock in F rises. Output in the home country falls as a result, while foreign output and world output rise. Thus, while the less developed country suffers from participating in international capital markets, there is room for Pareto-improving international transfers.

4. Capital Flows in the Global Financial Crisis

In the previous section, we have shown that the welfare implications of international capital flows in the presence of financial market frictions depend critically on the nature of these frictions. With credit demand distortions, capital mobility has negative welfare effects, with credit supply distortions, it has positive welfare effects. Obviously, one would like to know which of these are more important empirically. In this section, we take a stab at this question by using the global financial crisis that started in 2007 and worsened sharply with the default of Lehman Brothers in September 2008 as an experiment. For this purpose, we interpret the crisis as a sudden setback in US financial development.[3] This is plausible under both types of financial frictions. Starting from a credit-demand perspective, one can note that the crisis caused a significant tightening of credit conditions in the US coupled with a stronger demand for high-quality collateral from potential borrowers. Starting from a credit-supply perspective, one can note that the crisis caused the drying out of entire segments of the US financial system as well as a weakening of a large part of the financial industry. This suggests that previously existing opportunities to hedge idiosyncratic risk may have vanished. We ask what the implications of such developments would be in our models presented above and then compare these predictions with the actual developments in the recent past.

4.1. Patterns of Capital Flows and Macro Outcomes During the Crisis

Figures 13-18 illustrate the reactions of the US and the emerging and developing economies to the global financial crisis that started in 2007. Figure 13 shows that output growth declined in both regions starting in 2007, with a trough in

[3] Mendoza et al () use their model to analyze a shock to bank balance sheets.

2009. Growth was sharply negative in the US, but still positive in the emerging and developing countries. Relative to the preceding five-year average growth rate (6.7 percent in the emerging and developing economies, 2.7 percent in the US), the recession was deeper in the US than in the developing and emerging economies.

Figure 14 shows that, since 2006, the US current account balance has improved by about one percent of world GDP. The counterpart to this adjustment is a decline in the current account surpluses of China and Emerging Market Asia and the oil-exporting countries. Overall, the crisis has caused a decline in net capital flows from relatively poor countries to the US.

Figure 15 shows that the adjustment in capital flows has been different for different types of capital. Net FDI inflows into emerging market economies have declined slightly relative to GDP. However, the adjustment of other capital flows has been much stronger. Net portfolio outflows from emerging market economies have declined from seven percent to three percent of GDP. These different reactions are confirmed by Figure 16, which presents US balance of payments data with a group of emerging market economies. The figure shows that total capital inflows from emerging market economies into the US, which increased steadily in the years until 2008, fell sharply in 2009. Note that the vast majority of these “uphill” flows consist of portfolio capital. In contrast, the decline in US-owned foreign assets that continued until 2007 sharply reversed in 2008, but returned to negative, though more moderate values in 2009. FDI outflows from the US to emerging market economies declined only in 2009, but the adjustment was much milder than that of the other capital flows.

Figures 17 and 18 compare the internal economic adjustment processes in the US and the emerging market economies. Figure 17 shows that, between 2007 and 2009, private savings increased by five per of GDP in the US, while investment fell by three percent of GDP. US private consumption fell. As indicated by Figure 18, in the emerging market economies, national savings (data for private savings do not exist for these countries) declined relative to GDP, i.e. consumption increased slightly. Investment was flat relative to GDP in 2008 and declined slightly in 2009.

4.2. Two Interpretations of the Financial Crisis

Consider the model with credit demand distortions described in section 3. Let the US be the financially more developed country (country F) in the models and the group of emerging market economies the financially less developed country. We start

from a steady-state equilibrium as described above, which is characterized by uphill capital flows, with financial capital flowing from H to F and FDI in the other direction. We now ask, what would happen, if borrowing constraints suddenly tighten in the US? More specifically, we let $\theta^F = 0.8$ and $\theta^H = 0.4$ initially, and assume that θ^F falls to 0.6 at time t=0. Thereafter, θ^F gradually moves back to its initial level in an autoregressive process with coefficient 0.9.

Figure 19 shows the adjustment of the two economies to the initial shock and over the following periods. There is a sharp decline in FDI inflows to the home country initially, combined with a decline in financial capital outflows and a reduction in net capital outflows. Note that this is different from the notion of a "sudden stop" as described by Calvo (). Sudden stops are characterized by a decline of both FDI and net capital *inflows*, tightening the economy's resource constraint. Our model predicts a reduction of net capital *outflows*, which expands the resource constraint in the financially less developed country. This is crucial because, as the figure illustrates, the capital stock in the home country rises while the capital stock in the foreign country falls. This is because there is now more domestic capital available for investment in the home country. Output rises in the home country and falls in the foreign country. Consumption falls sharply in the foreign country due to the loss in output. In the home country, consumption falls on impact, but rises thereafter due to the higher level of output. Subsequently, the economies gradually return to the initial steady states.

How do these reactions compare with the stylized facts of the crisis? The model is consistent with the observation of a much deeper recession in the US than in the developing and emerging market economies. The model predicts an increase in output in the latter group which is in contrast to the observations, but this difference may be a result of the fact that the model abstracts from any output demand effects. The decline in net capital flows, FDI flows and financial capital flows is as predicted. The model predicts an increase in US savings, which is observed in the data, and an increase in consumption in the developing and emerging market economies, which is consistent with the decline in the savings rate, there. The model also predicts a decline in US investment, which we observe in the data, and no strong reaction of investment in the developing and emerging market economies at least initially. This is also consistent with the data.

Next, consider the model with uninsurable investment risk. We consider the case in which investors obtain insurance for foreign investment projects in the host country and focus again on the case of no FDI flows from H to F. Here, we assume that the financial crisis is an increase in the variance of idiosyncratic shocks in the US. Specifically, we assume that σ^F=0.2 and σ^H=0.6, initially, and that σ^F rises to 0.4 due to the financial shock in period t=0. Afterwards, it returns to its initial level with an AR(1) process with coefficient 0.9.

Figure 20 shows what will happen to the two economies. The increase in the variance of uninsurable shocks to investment makes real capital a less attractive form of saving in the US economy. Thus, the share of financial capital in US portfolios increases, the risk-free rate falls and the return to capital increases. The capital stock falls in F. With a lower risk-free rate, acquiring US portfolio assets becomes less attractive for individuals in country H. As a result, portfolio capital flows from H to F decline and the share of real capital investment in the portfolios of households in H increases. Investors in H now invest more in risky capital at home and the capital stock in H rises as a result. Output declines sharply in country F, while output in country H rises and remains above the initial steady state level for a long time. Consumption in F rises on impact as households save less, and falls later on due to the reduced level of output and labor income. Consumption in country H rises and remains above its initial steady state level for a long period of time.

Comparing these predictions with the observed data, we see that they are consistent as regards the patterns of capital flows as well as output in the US and, accounting for possible output demand effects as before, output in the developing and emerging market economies. However, the model makes wrong predictions regarding consumption in the US and it predicts a stronger and more persistent increase in consumption in the developing and emerging market economies than what we observe in the data.

Clearly, these are only very suggestive results and more rigorous tests are necessary. Nevertheless, it seems that an explanation of the crisis based on credit demand distortions is a more promising approach.

5. Conclusions

In this paper, we have reviewed alternative explanations of international capital flows and the puzzles they pose in recent years. We have proposed two

approaches to explain these puzzles, one based on credit demand distortions and one based on credit supply distortions. The unifying idea is that capital flows are driven by differences in financial development.

Both approaches can explain the Lucas puzzle that international capital flows do not equate marginal products of capital internationally, the observation of “uphill” net capital flows from poor to rich countries, and the observed composition of capital flows, i.e., the fact that developing and emerging market economies are net exporters of financial capital and net importers of FDI, while developed countries are net exporters of FDI and net importers of financial capital.

The two approaches, however, have very different implications for the welfare effects of international capital flows. With credit demand distortions, welfare effects are most likely to be negative for the less financially developed countries, and they imply complicated patterns of income redistribution within the developed countries and the developing and emerging market economies. With credit supply distortions, the welfare effects of international capital flows are much more likely to be positive. We have used the recent financial crisis to show that empirically the approach based on credit demand distortions performs better. However, informed policy decisions regarding the regulation of international capital flows require more research to differentiate between the two models and explore their empirical relevance.

Our review leaves us with the allocation puzzle, the strong negative correlation between current account balances and real growth rates, unexplained. Neither one of the two approaches considered here has a clear answer for this. *Assuming* that poor countries grow faster than rich countries, which is true in standard growth models, the observation of uphill capital flows would just be a restatement of the allocation puzzle. However, the models considered here to explain uphill flows do not embed an explanation for economic growth. Importantly, they take the level of financial development as exogenous. Studying international capital flows in a growth model and endogenizing financial development remains a challenge for further research.

References

Aiyagari, S. (1994), "Uninsured idiosyncratic Risk and Aggregate Saving." *Quarterly Journal of Economics* 109:3, 659-84

Angeletos, G. M., and V. Panousi (2009), "Financial Integration and Capital Accumulation." Working Paper, MIT Department of Economics

Artis, M., and M. Hoffmann (2008), "Financial Globalization, International Business Cycles, and Consumption Risk Sharing." *Scandinavian Journal of Economics* 110:3, 447-471

Backus, D., J. Kehoe, and F. E. Kydland (1995), "International Business Cycles: Theory and Evicence." In: T. F. Cooley (ed.), *Frontiers in Business Cycle Research.* Princeton: Princeton University Press, 331-56

Beck, T., A. Demirgüc-Kunt, and R. Levide (2000), "A new database on financial development and structure." *World Bank Economic Review* 14, 597-605

Beck, T., and A. Demirgüc-Kunt (2009), "Financial Institutions and Markets across Countries and over Time – Data and Analysis." Mimeo, CentER, Tilburg University

Becker, S. O., and M. Hoffmann (2006), „Intra- and International in the Short and in the Long Run." *European Economic Review* 50:3, 777-806

Bianchi, M., (1997), "Testing for Convergence: Evidence From Non-parametric Multimodality Tests." *Journal of Applied Econometrics* 12, 393-409

Böhm, V., and G. Vachadze (2009), "Endogenous Inequality of Nations Through Financial Asset Market Integration." *Macroeconomic Dynamics*

Boyd, J. H., and B. D. Smith (1997), "Capital Market Imperfections, International Credit Markets, and Nonconvergence." *Journal of Economic Theory* 73:2, 335-364

Caballero, R., E. Farhi, and P.-O. Gourinchas (2008), "An Equilibrium Model of 'Global Imbalances' and Low Interest Rates.". *American Economic Review* 98:1, 358-93

Chinn, M., and H. Ito (2000), "Capital Account Liberalization, Institutions, and Financial Development: Cross Country Evidence." NBER Working Paper 8967

Chinn, M., and H. Ito (2006), "What Matters for Financial Development? Capital Controls, Institutions, and Interactions." *Journal of Development Economics* 81:1, 163-192

Chinn, M., and H. Ito (2007), "A New Measure of Financial Openness." Mimeo, University of Wisconsin

Dorrucci, E., A. Meyer-Cirkel, and D. Santabárbara (2009), "Domestic Financial Development in Emerging Economies – Evidence and Implications." Euiropean Central Bank Occasional Paper 102.

Gourinchas, P.-O., and O. Jeanne (2007), "Capital Flows to Developing Countries: The Allocation Puzzle." NBER Working Paper 13602

Gertler, M., and K. Rogoff (1990), "North-South Lending and Endogenous Domestic Capital Market Inefficiencies." *Journal of Monetary Economics* 26:2 245-266

Heathcote, J., K. Storesletten, and G. L. Violante (2009), "Quantitative Macroeconomics With Heterogeneous Households." *Annual Review of Economics* 1:1, 319-354.

Jones, C. I. (1997), "On the Evolution of the World Income Distribution." *Journal of Economic Perspectives* 3, 19-36

Joyce, J. P., (2008), "Globalization and Inequality Among Nations." Mimeo, Dept. of Economics, Wellesley College

Ju, J., and S-J Wei (2007), "Domestic Institutions and the By-Pass Effect of Financial Globalization." NBER Working Paper 13148

Kikuchi, K., (2008), "International Asset Markets, Nonconvergence, and Endogenous Fluctuations." *Journal of Economic Theory* 139, 310-334

Kose, A., E. Prasad, and M. E. Terrones (2009), "Does Financial Globalization Promote International Risk Sharing?" *Journal of Development Economics* 89:2, 258-70

Kose, A., E. Prasead, K. Rogoff, and S. J. Wei (2009), "Financial Globalization: A Reappraisal." IMF *Staff Papers* 56:1, 8-62

Lane, P.R., and G. M. Milesi-Ferretti (2007), "The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970-2004." *Journal of International Economics* 55:2, 263-294

Lewis, K. K., (1996), "What can Explain the Apparent Lack of International Consumption Risk Sharing?" *Journal of Political Economy* 104:2, 267-97

Matsuyama, K., (2004), "Financial Market Globalization, Symmetry-Breaking, and Endogenous Inequality of Nations." *Econometrica* 72, 853-884

Mendoza, E., V. Quadrini, and J. V. Rios-Rull (1009), "Financial Integration, Financial Development, and Global Imbalances." *Journal of Political Economy* 117:3, 371-416

Obstfeld, M., and K. S. Rogoff (2001), "The Six Major Puzzles in International Macroeconomics: Is There a Common Cause?" *NBER Macroeconomic Annual* 15, 339.412

Obstfeld, M., and A. M. Taylor (2004), *Global Capital Markets: Integration, Crisis, and Growth.* Cambridge: Cambridge University Press

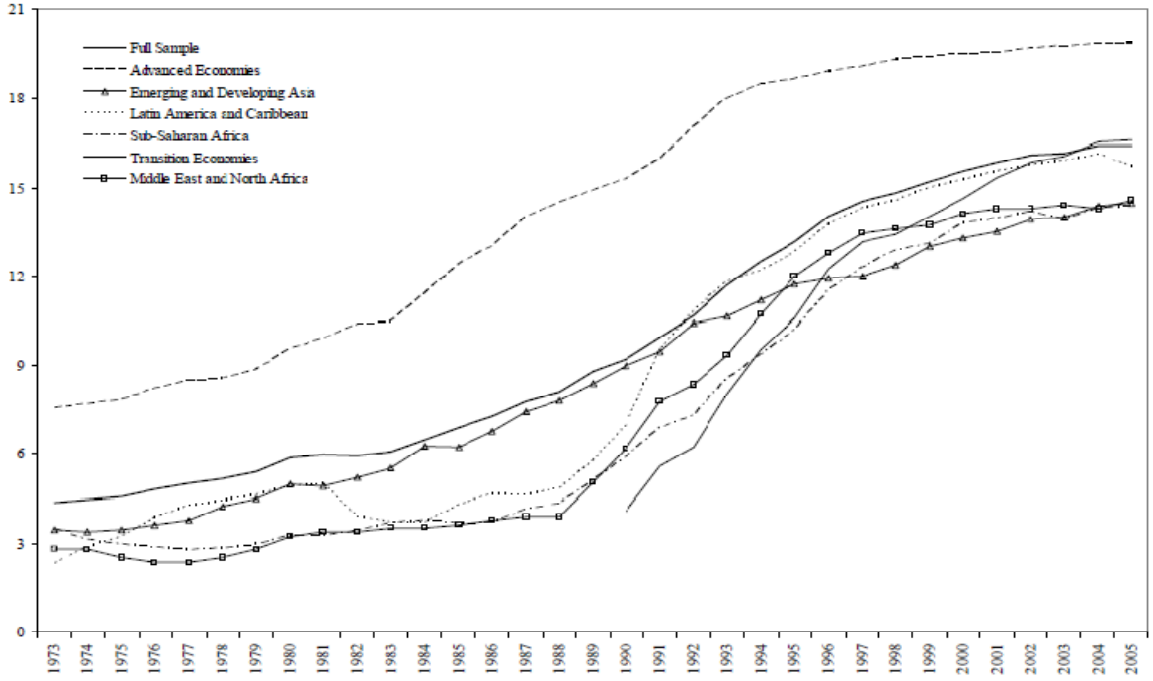
Prasad, E. S., R. Rajan, and A. Subramanian (2006), "Patterns of International Capital Flows and the Implications for Economic Development." In: Federal Reserve Bank of Kansas City, *Proceedings of the 2006 Jackson Hole Symposium*, 119-158

Prasad, E. S., R. Rajan, and A. Subramanian (2007), "Foreign Capital and Economic Growth." *Brookings Papers on Economic Activity* 38(1), 153-230

Quah, D. (1997), "Empirics for Economic Growth and Distribution: Stratification, Polarization, and Convergence Club." *Journal of Economic Growth* 2, 27-59

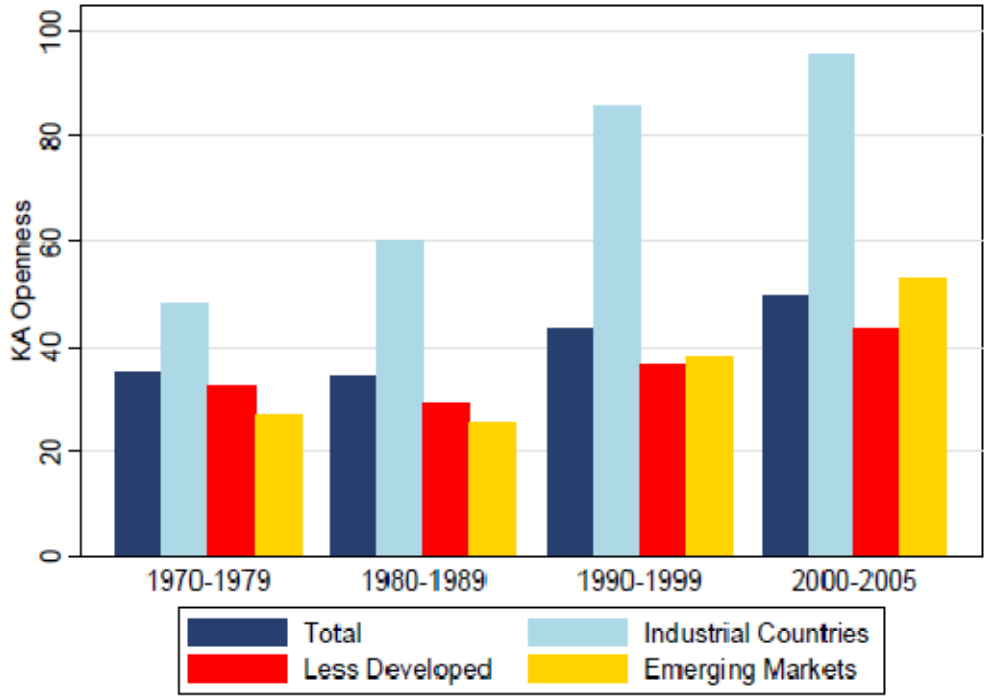
World Economic Forum (2008), *Financial Development Report 2008.* Geneva: World Economic Forum.

Figure 1: Financial Liberalization Index



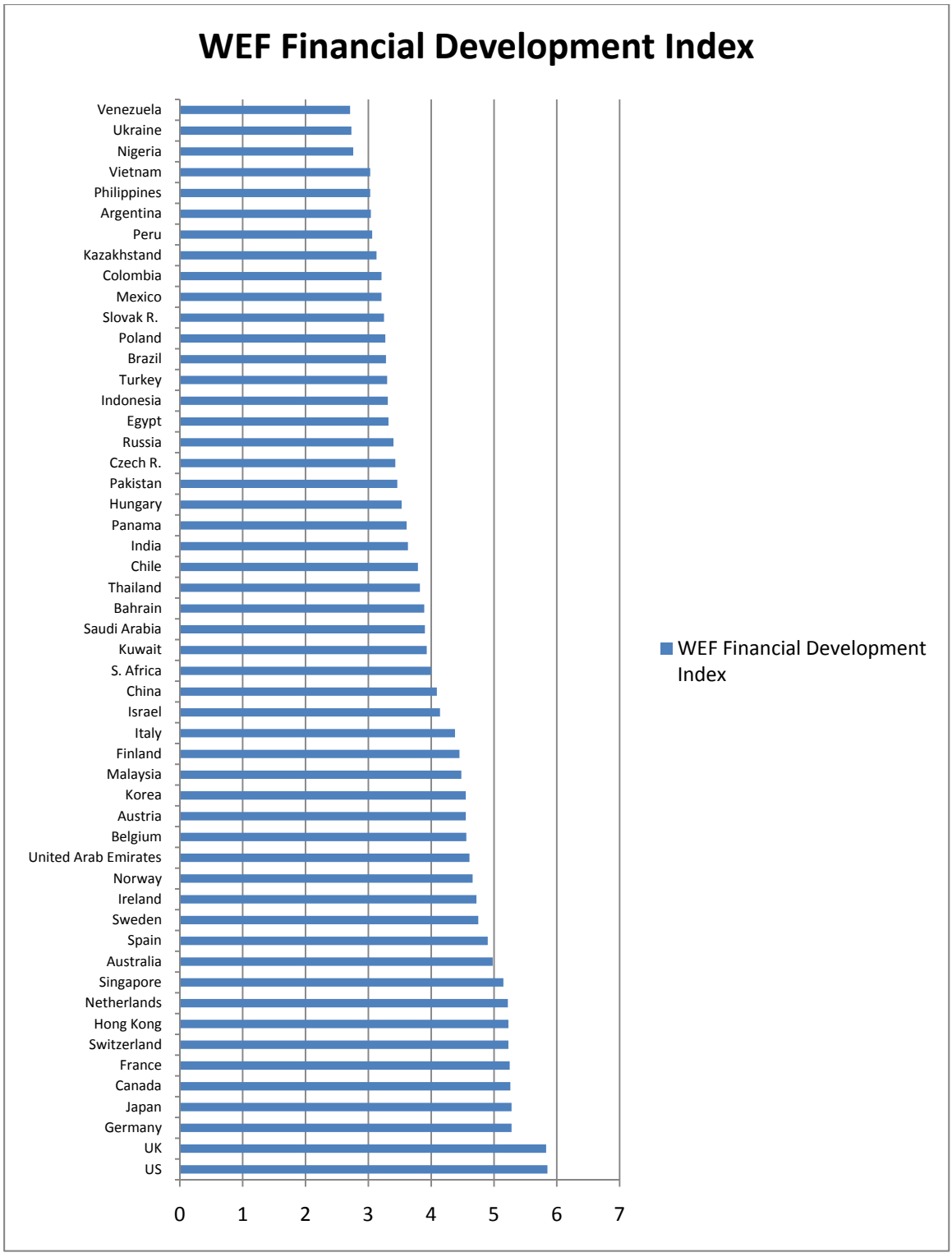
Source: Abiad et al. (2008)

Figure 2: Capital Account Openness



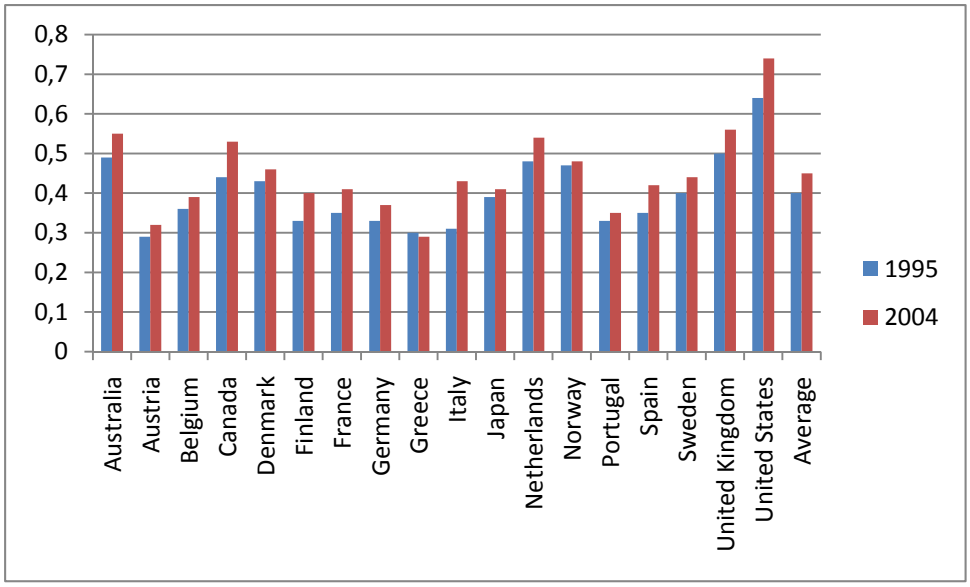
Source: Chinn et al. (2008)

Figure 3: WEF Financial Development Index



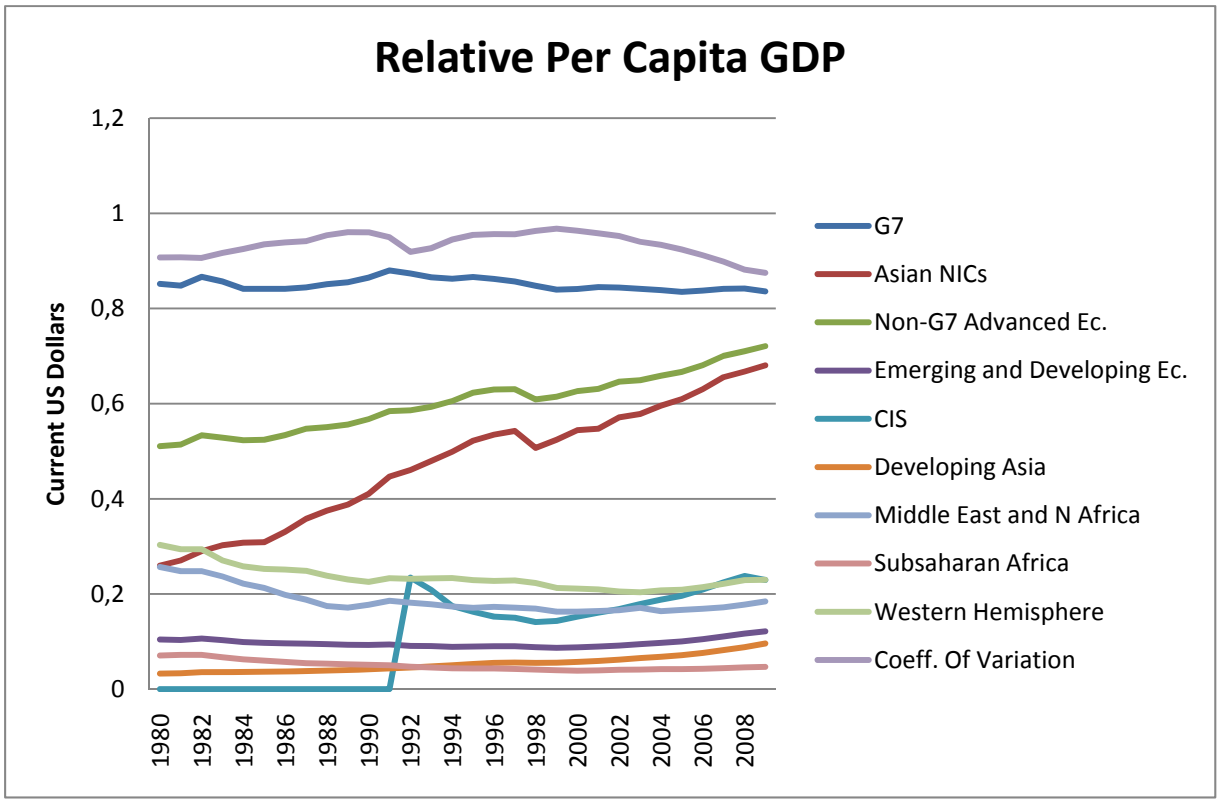
Source: World Economic Forum (2008)

Figure 4: IMF Financial Index for Advanced Economies



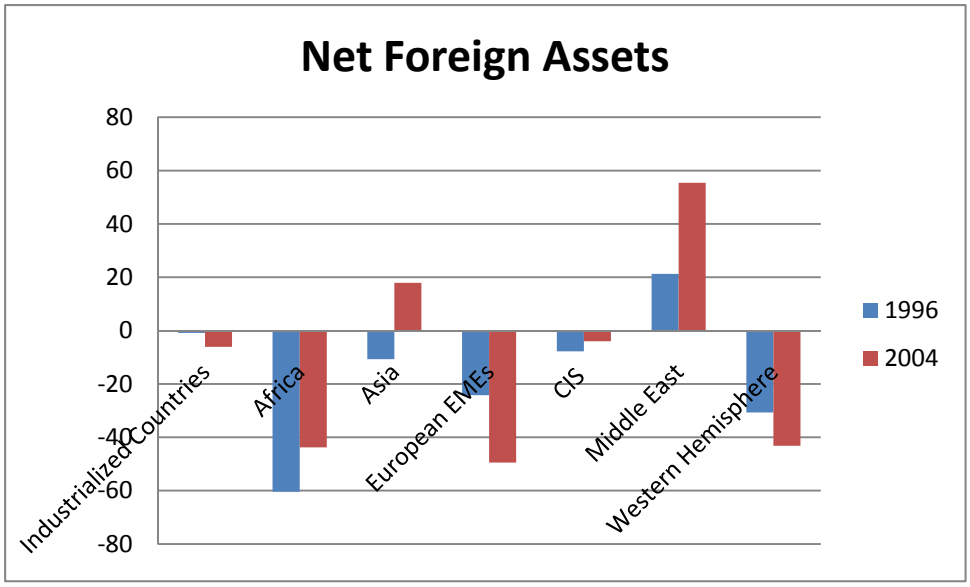
Source: IMF (2006) chart 4.5

Figure 5: Relative Per-Capita GDP



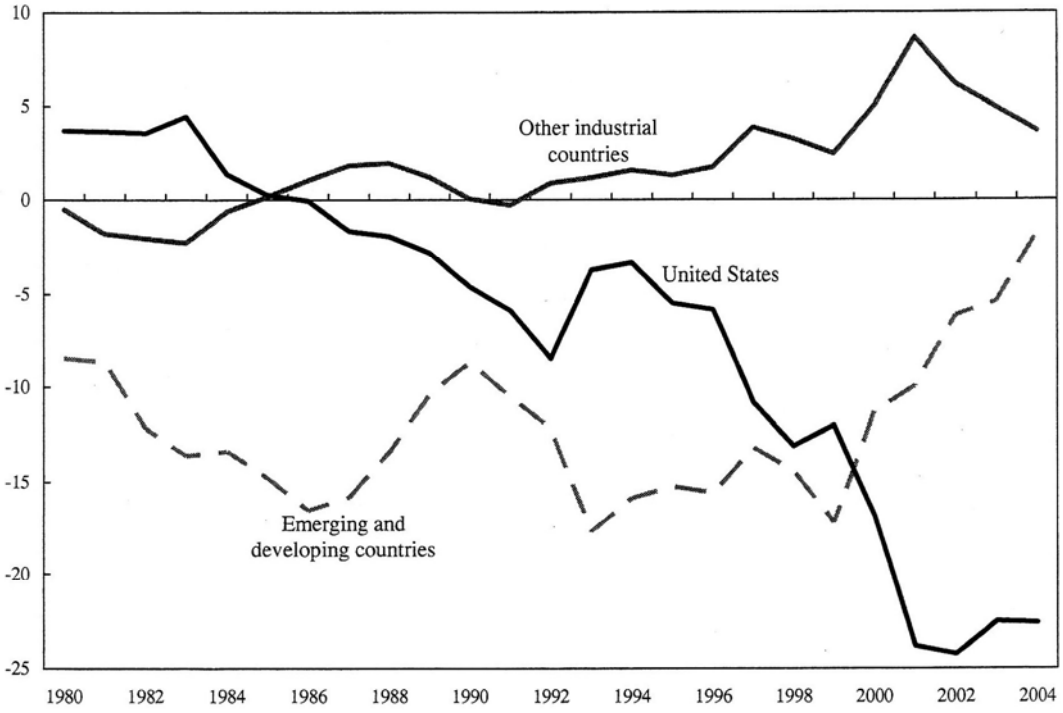
Source: IMF, WEO Database April 2010

Figure 6:



Source: Lane and Milesi Ferretti (2006), Table 3

Figure 7: Net Foreign Assets by Income Groups



Note: The chart plots aggregate net foreign assets for the two country groups and the United States, divided by each group/country's GDP. The group "other industrial countries" includes all industrial countries except the United States.

Source: Lane and Milesi-Ferretti (2006)

Figure 8a:

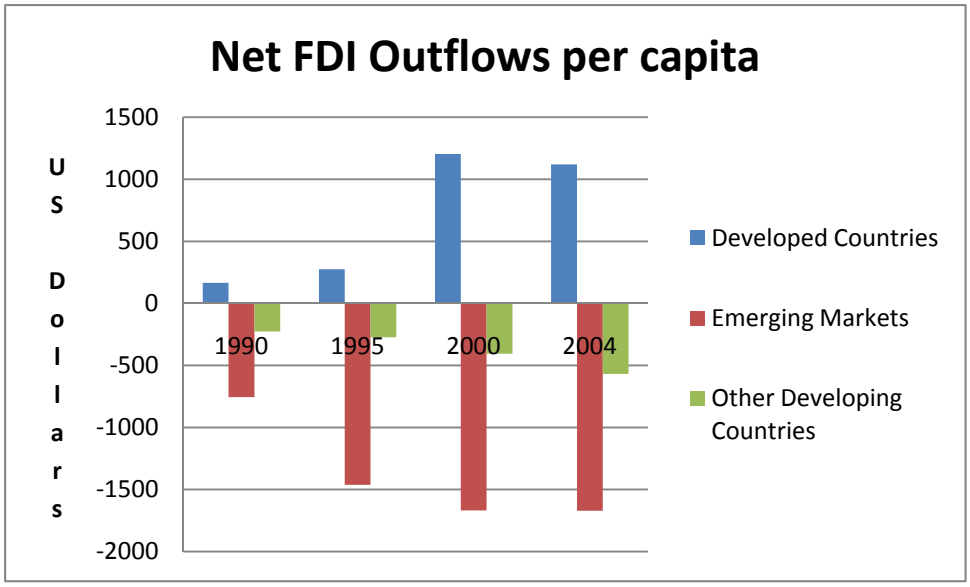
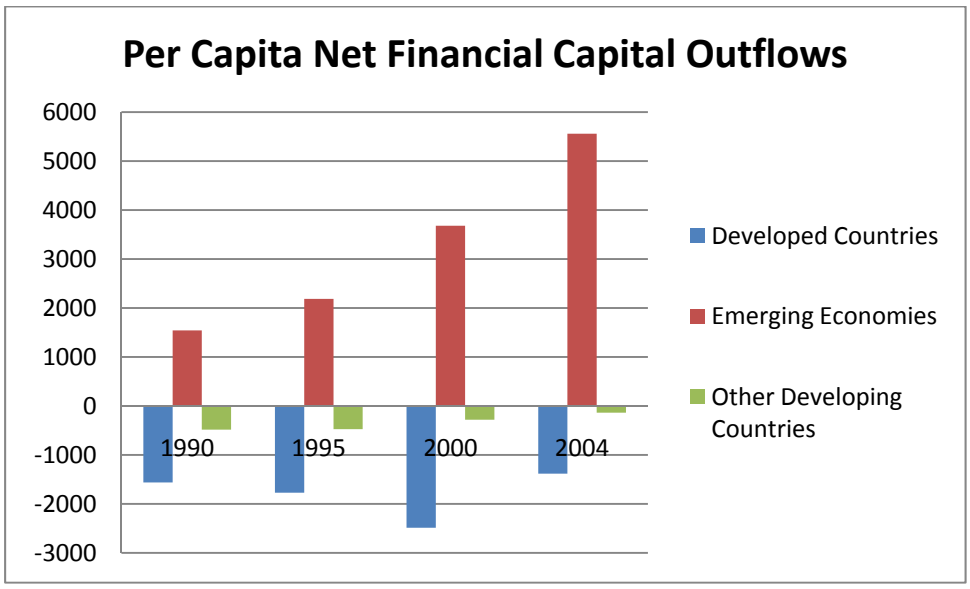
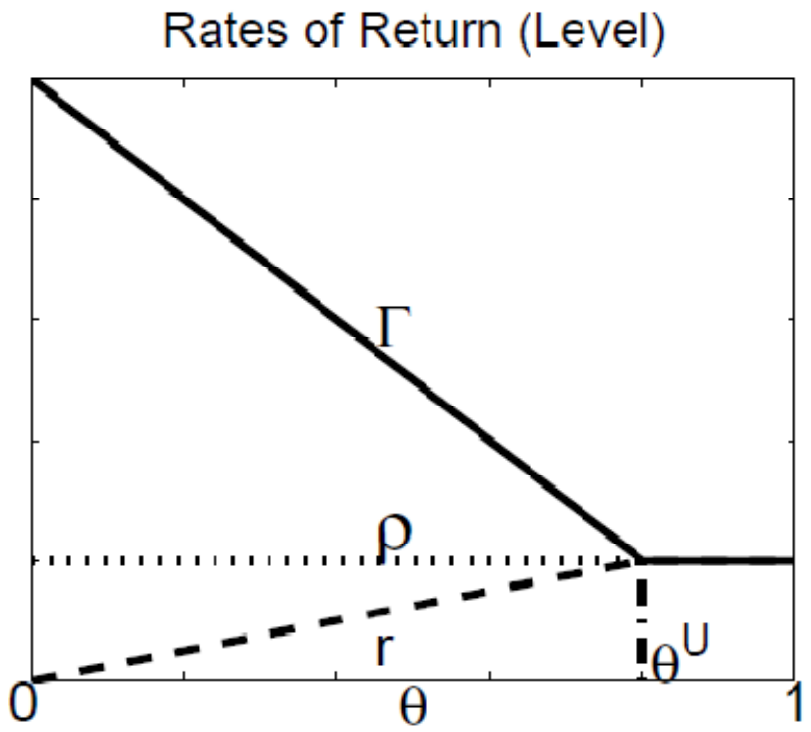


Figure 8b:



Source: Ju and Wei (2007)

Figure 9: Rates of Return with Credit Demand Frictions



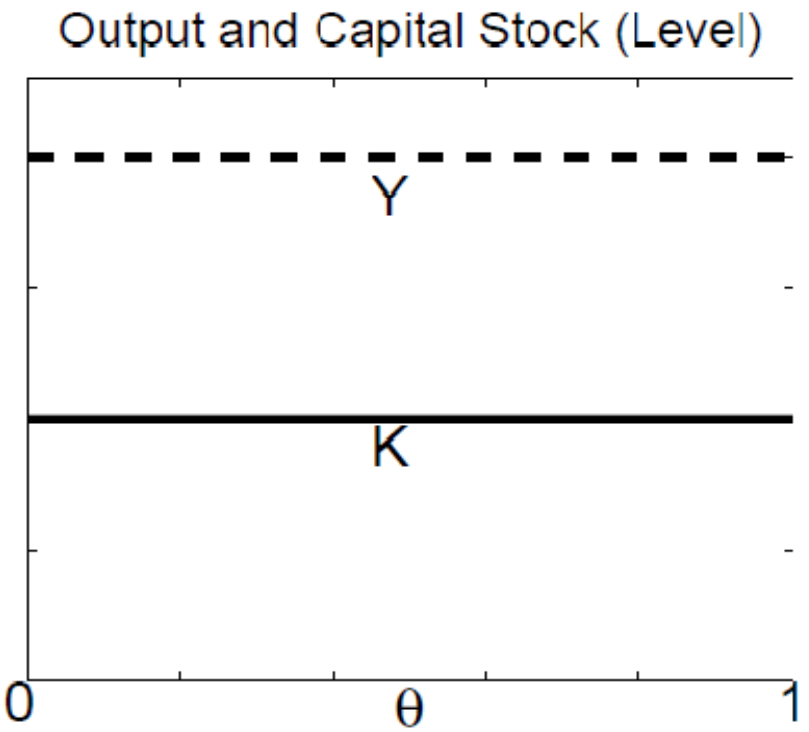


Figure 10a: Capital Flows and Their Effects With Credit Demand Frictions

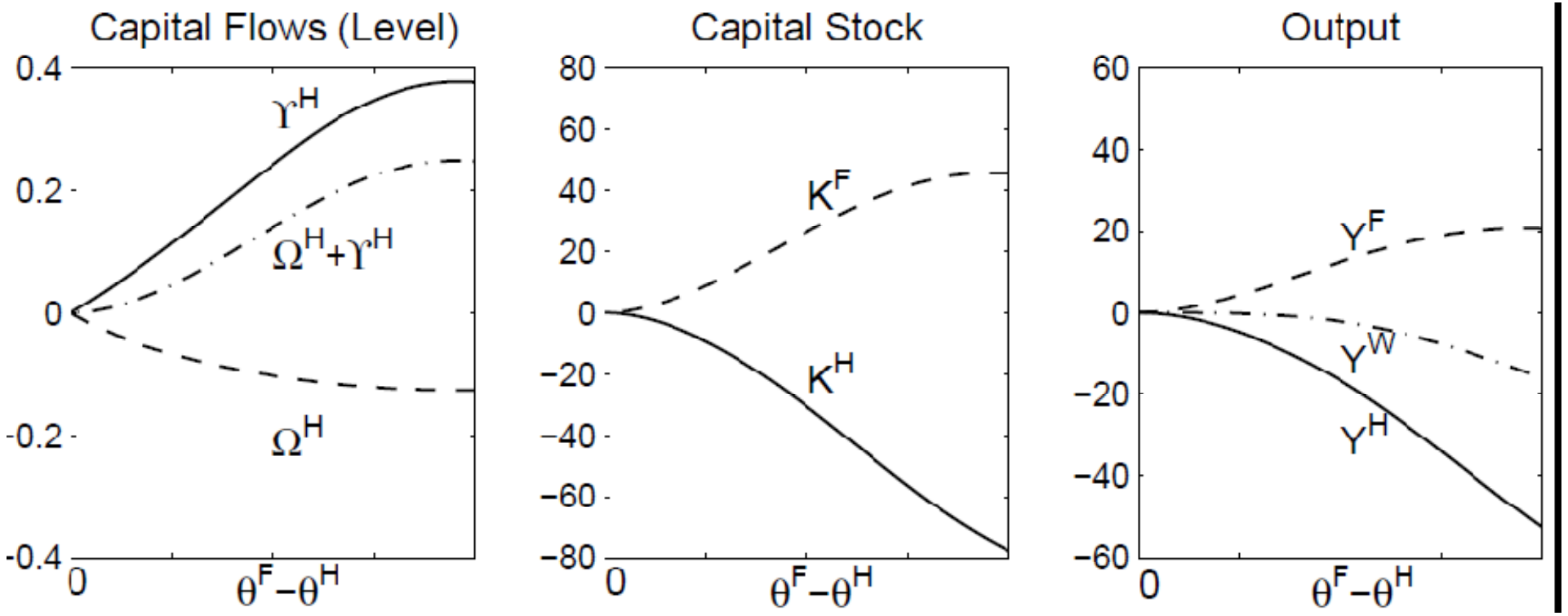


Figure 10b: Credit Demand Frictions With Internal Allocation Effects

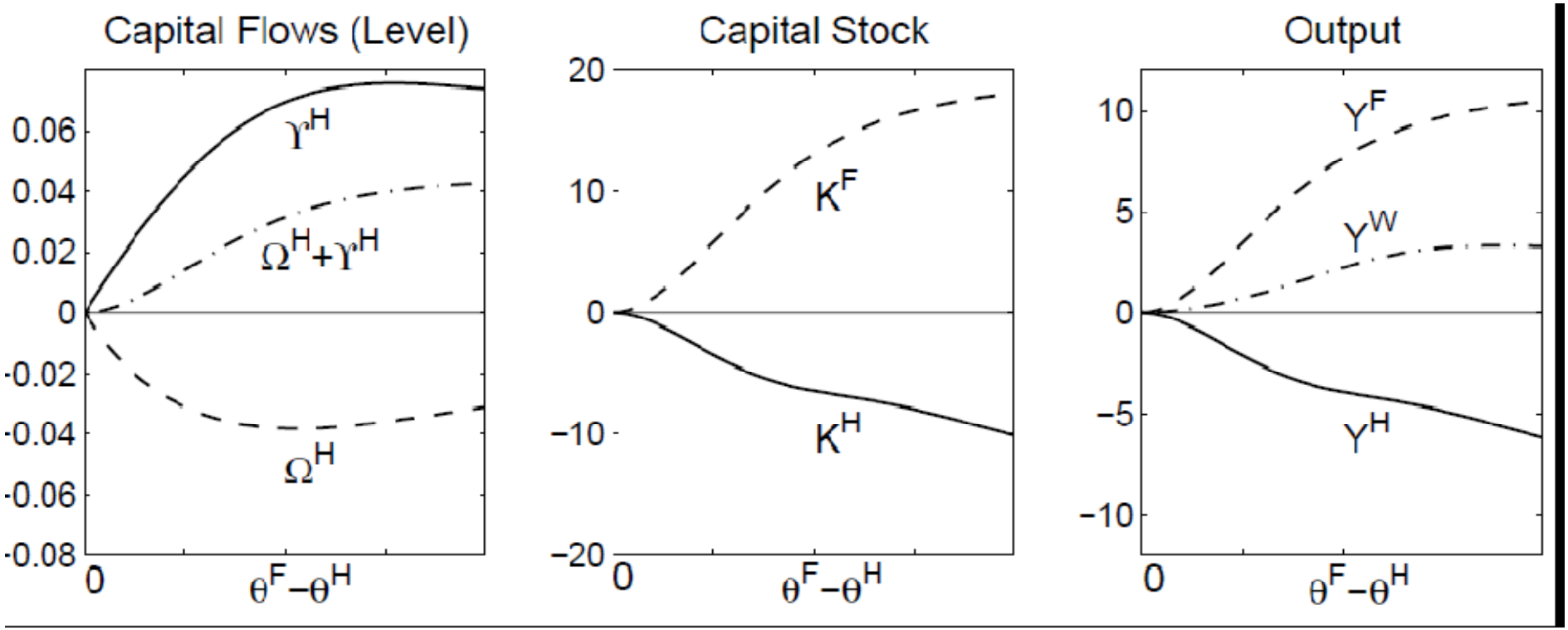
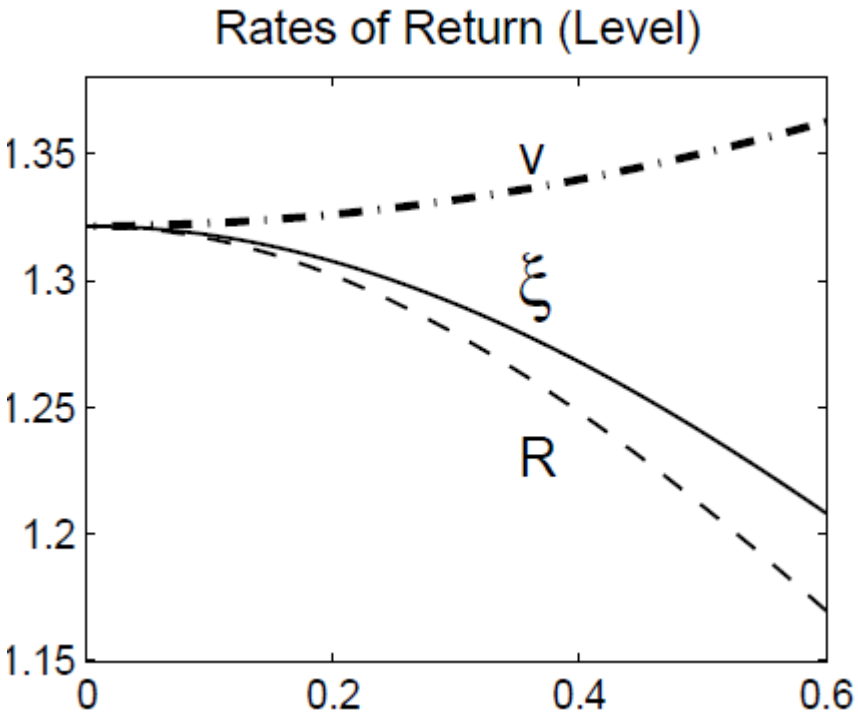
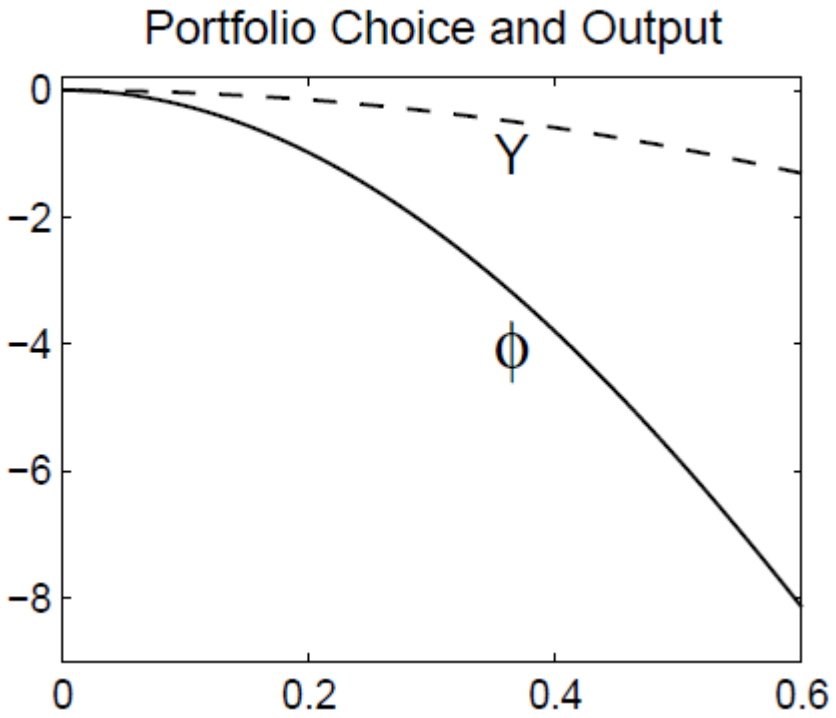


Figure 11: Rates of Return, Portfolio Choice and Output With Credit Supply Frictions

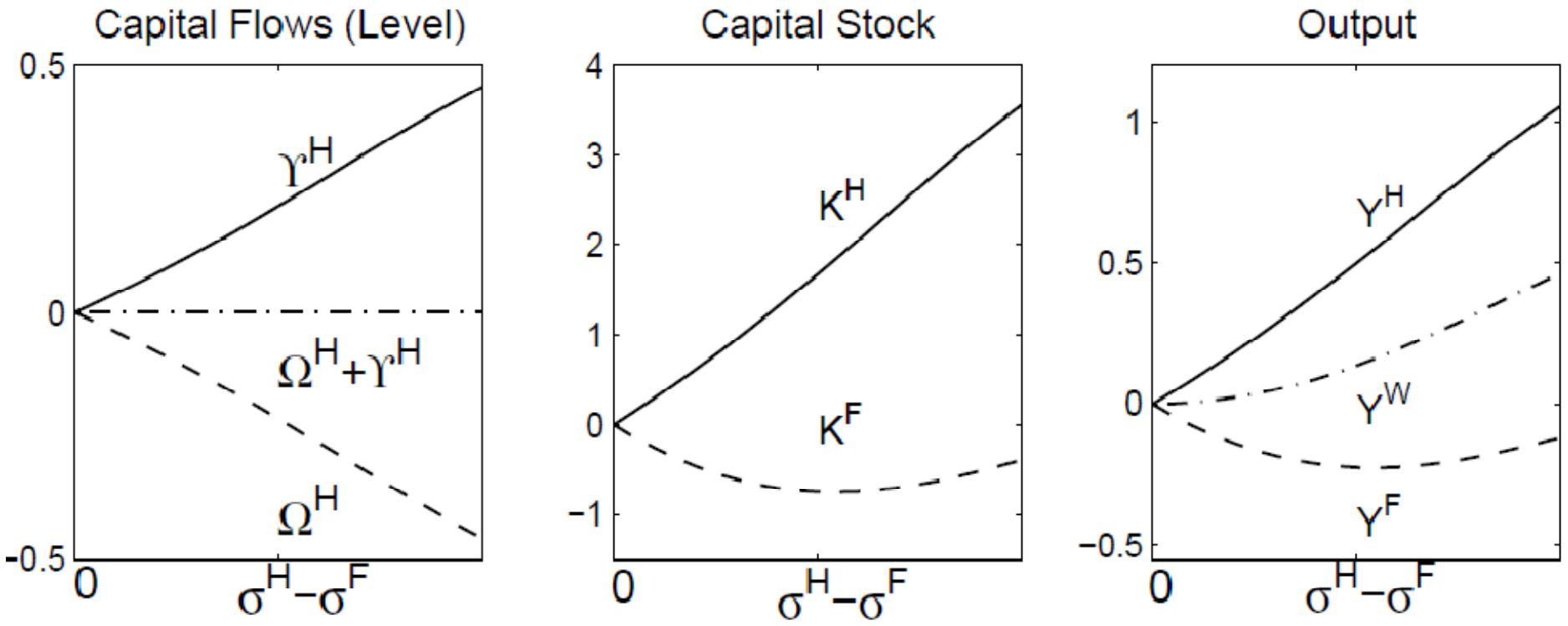


Variance of uninsurable shocks



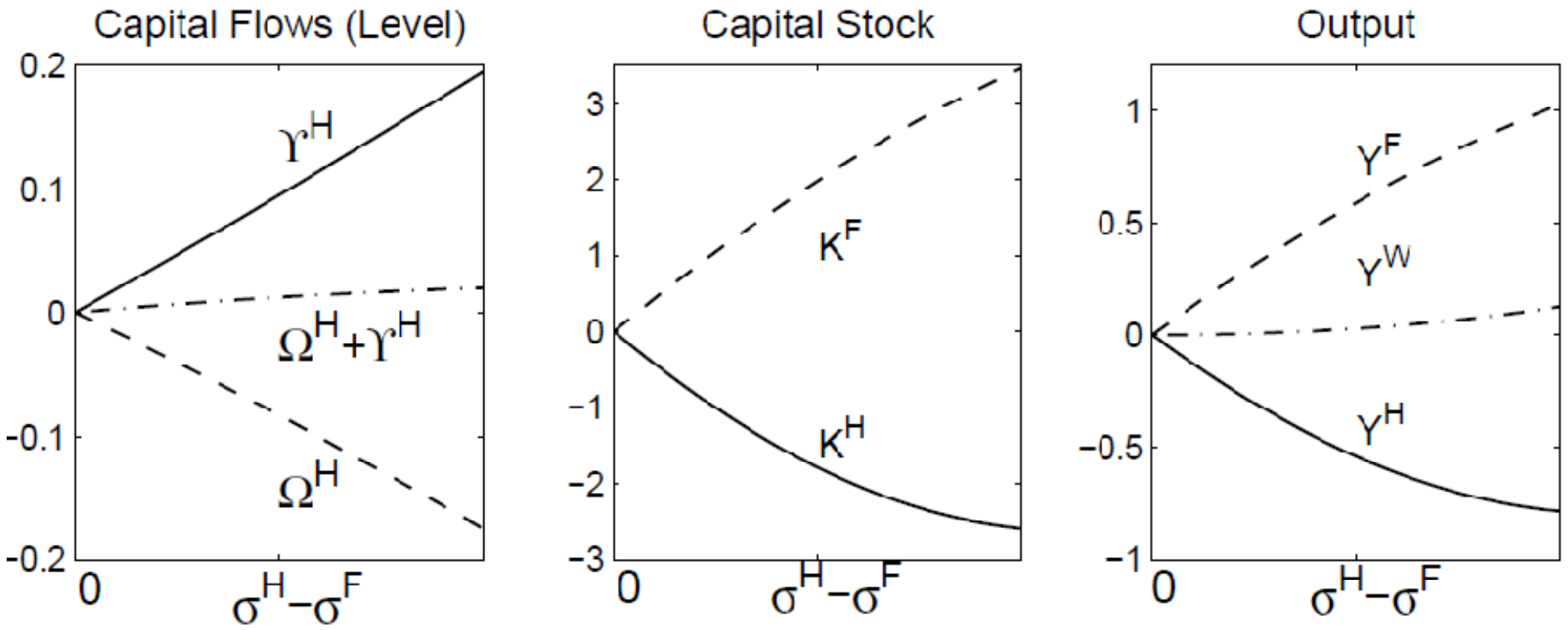
variance of uninsurable shocks

Figure 12a: Capital Flows and Macroeconomic Outcomes With Uninsurable Investment Risk



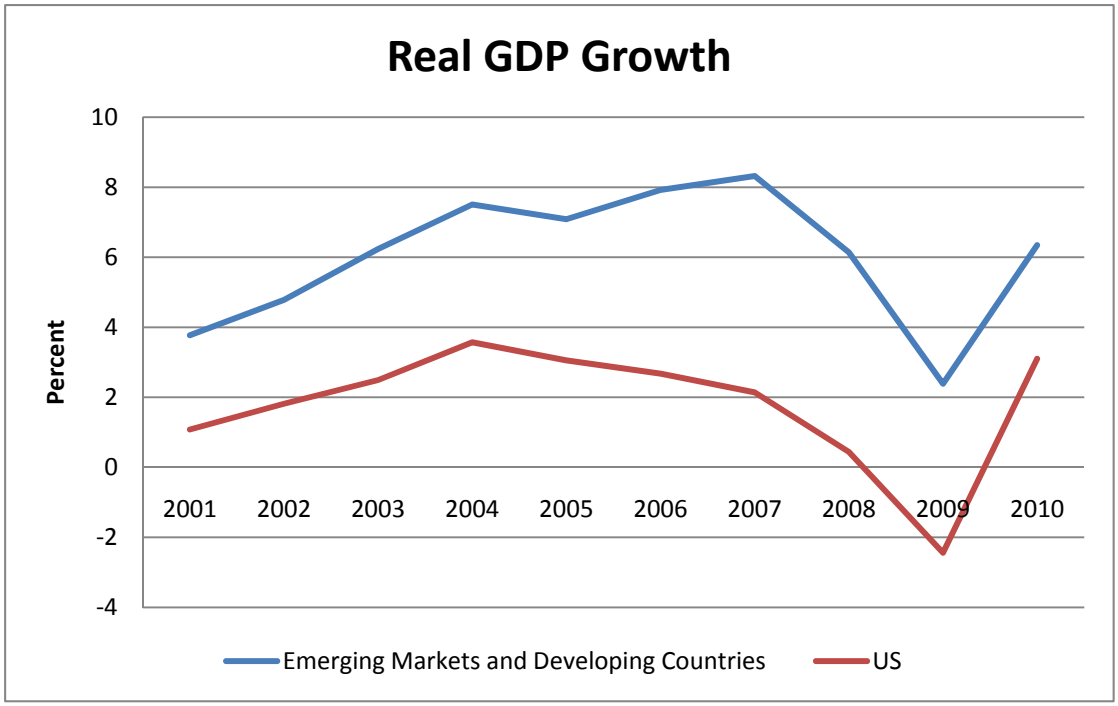
FDI insurance in the Home Country

Figure 12b: Capital Flows and Macroeconomic Outcomes With Uninsurable Investment Risk



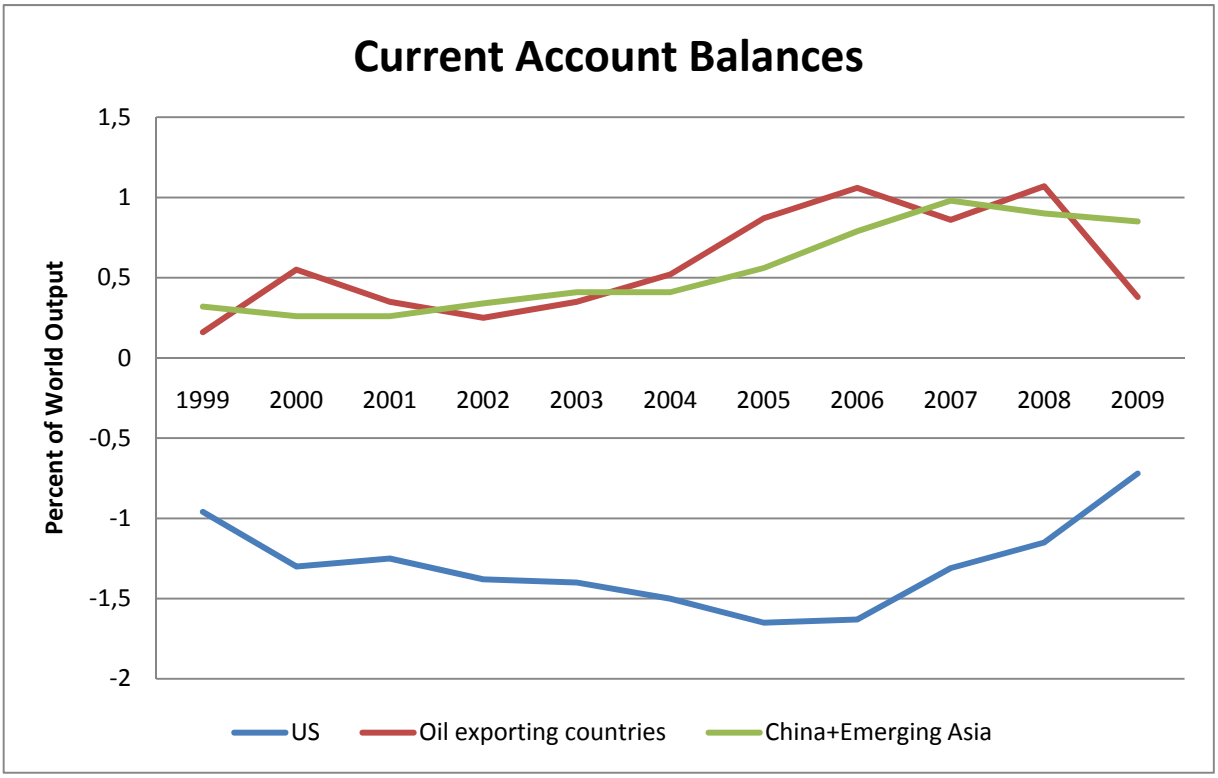
FDI Insurance in the Host Country

Figure 13:



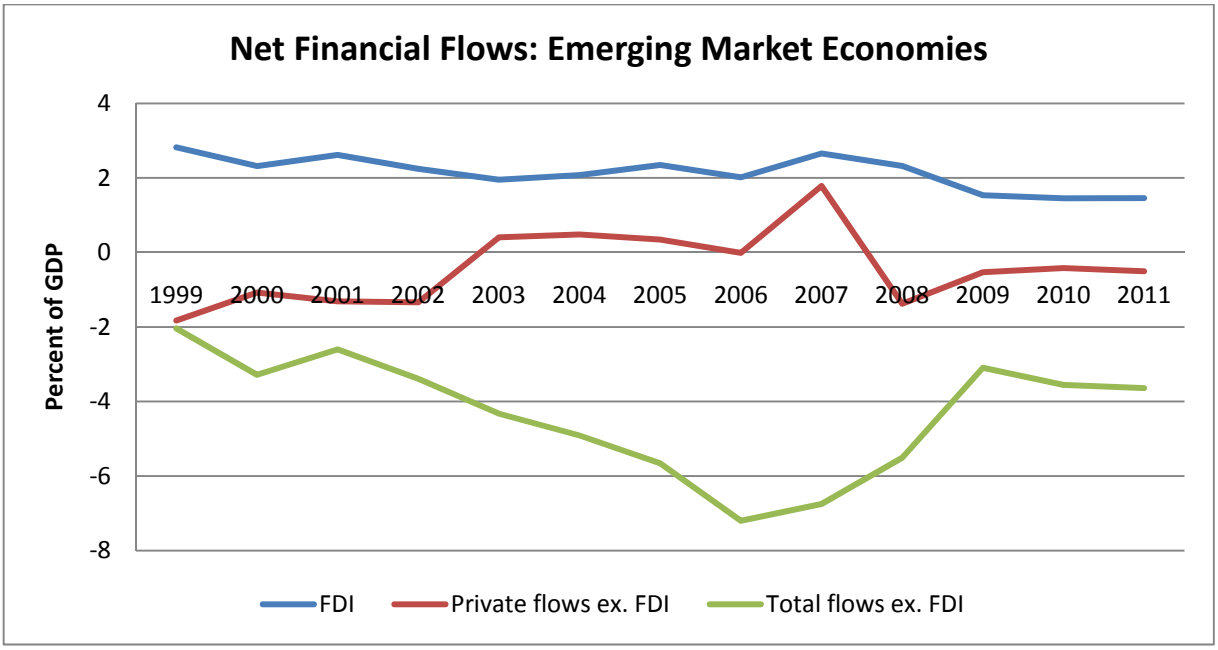
Source: IMF WEO Data Base

Figure 14:



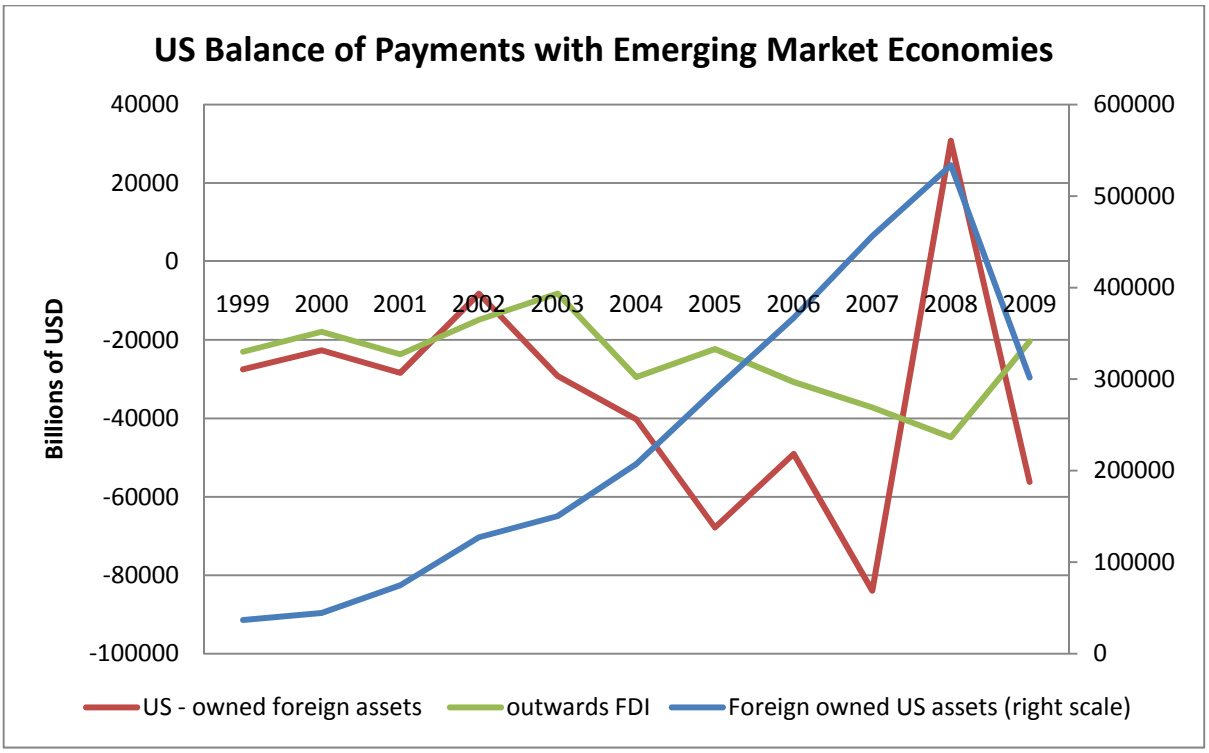
Source: IMF, WEO April 2010

Figure 15:



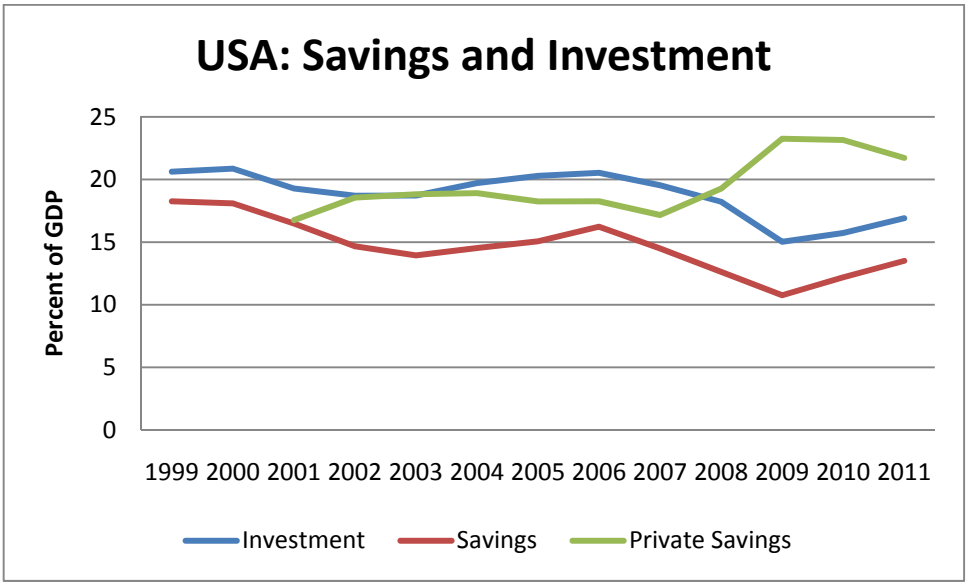
Source: IMF WEO Database April 2010

Figure 16:



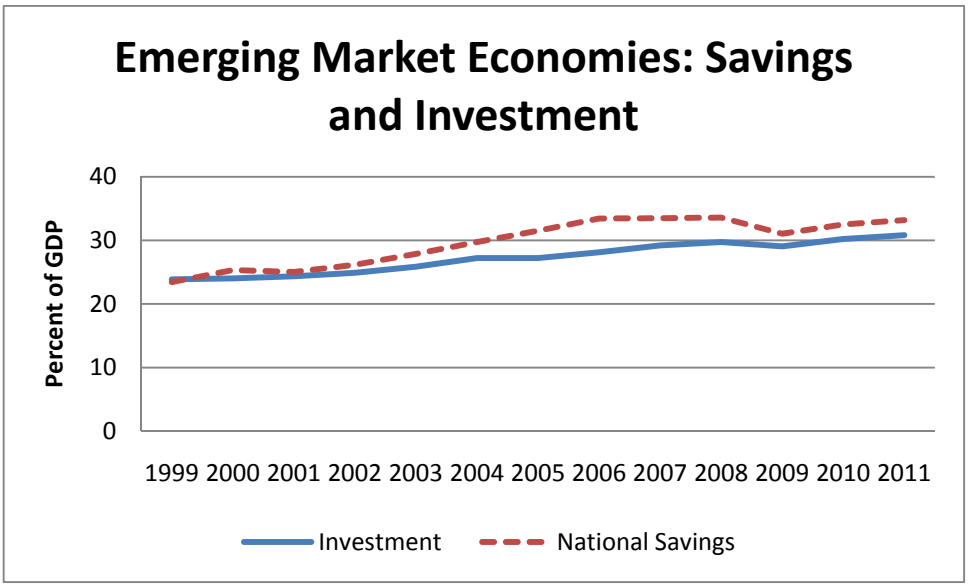
Source: Bureau of Economic Analysis, International Economic Accounts, US International Transactions Account Data, April 2010

Figure 17:



Source: IMF WEO Database April 2010

Figure 18:



Source: IMF WEO Database April 2010

Figure 19: The Financial Crisis With Credit Demand Distortions

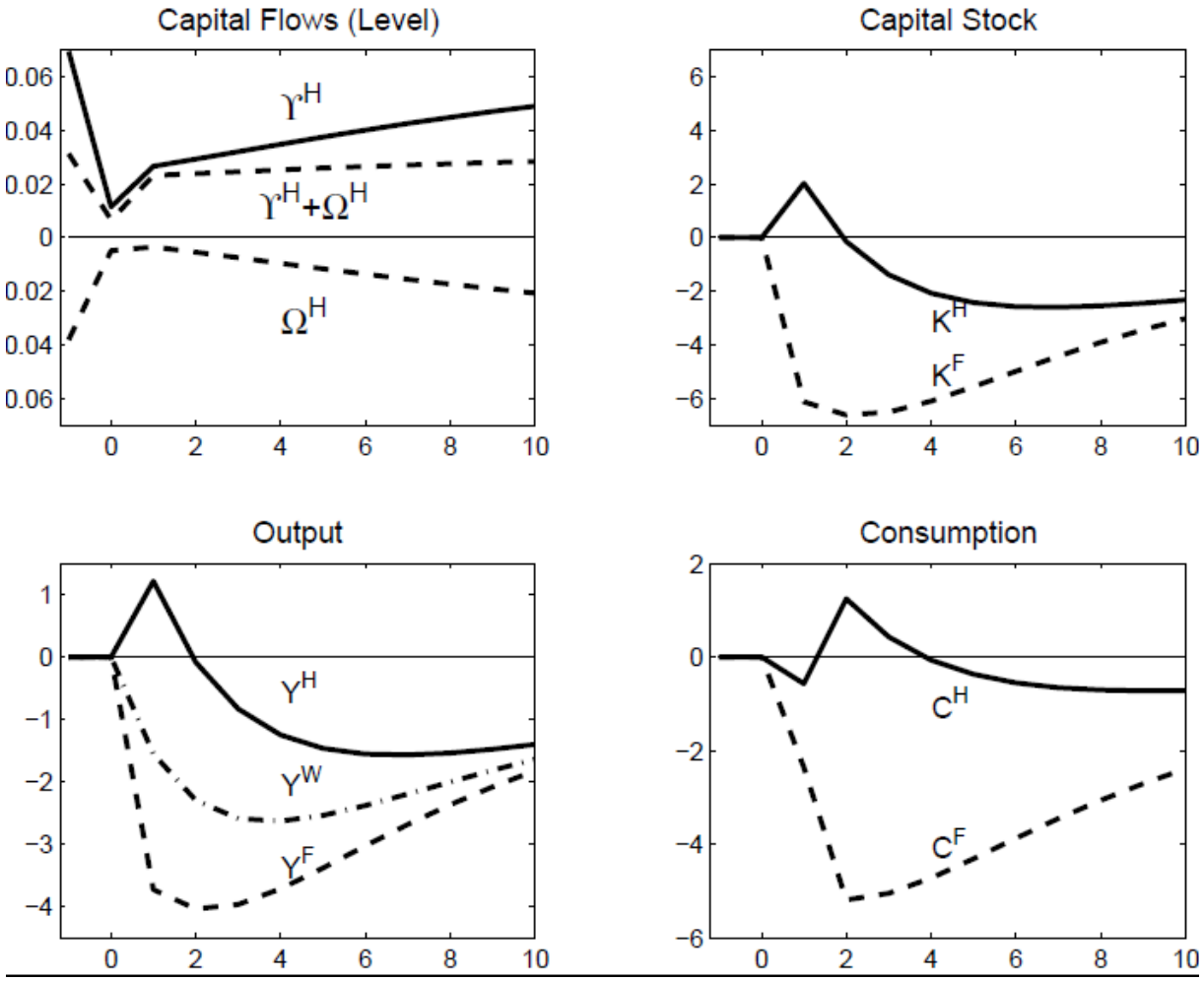


Figure 20: The Financial Crisis With Credit Supply Distortions