Capital markets liberalization and global imbalances

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VERY PRELIMINARY AND INCOMPLETE

Abstract

This paper studies the consequences of capital markets liberalization for global imbalances (non-zero foreign asset positions) when countries are heterogeneous in the degree of financial market development. Countries characterized by more advanced financial markets tend to accumulate large foreign liabilities while countries with less developed markets tend to accumulate positive foreign asset positions. The paper also shows that the formation of global imbalances takes a long period of time and their long-term values could reach very high levels as a percentage of domestic production.

1 Introduction

The last two decades has witnessed an acceleration in financial globalization, that is, an increase in cross-country foreign assets. This has been the consequence of the international liberalization of capital markets. During the same period, we have seen the emergence of increasing international imbalances, that is, the accumulation of negative foreign asset positions by some countries and positive foreign asset positions by others. In particular, while the United States have been accumulating a sizable stock of net foreign liabilities, several Asian countries—most notably Japan and more recently China—have accumulated positive net foreign assets. When considered as a whole, the European countries occupy an intermediate position.

Several explanations have been proposed in academic and non-academic debates for the growing U.S. foreign liabilities. However, none of these explanations are completely satisfactory as argued by Backus, Henriksen, Lambert, & Telmer (2005). The goal of this paper is to investigate the importance of financial market heterogeneity among the participants in the integration process. More specifically, the question addressed in this paper is whether the growing imbalances are the natural consequence of international capital markets liberalization when countries are characterized by different financial markets conditions.

The paper is motivated by the observation that the domestic financial conditions of countries accumulating foreign imbalances differ substantially. An indicator of the internal financial conditions is the ratio of financial liabilities accumulated by the household sector compared to the value of non-financial wealth. As shown in the first panel of Figure 1, the United States is the country with the highest ratio. This ratio is smaller in Japan and in Europe. The second panel shows the current account balance for these countries. As can be seen, the United States is the country which, since the beginning of the 1980s, have experienced persistent negative current account deficits (with the exception of one year). On the other hand, Japan have experienced current account surpluses while Europe is in an intermediate position.

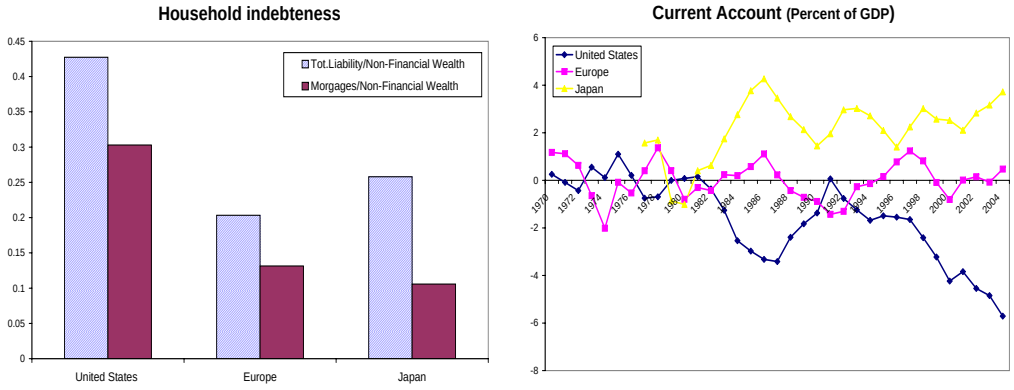

Figure 1: Current account balance and household indebtness.

The pattern shown by the above graphs can also be observed in the comparison of industrialized countries with emerging economies in recent years. It is well-known that several emerging economies are accumulating positive stocks of foreign asset positions. China is the most evident case. At

the same time, the financial structure of these countries is still developing and the extent of households' credit quite limited.

This paper asks three main questions. First, if countries involved in the process of capital markets liberalization are characterized by different financial markets characteristics, do we expect to see the type of imbalance observed in the data? Second, are the imbalances temporary or permanent? Third, what type of policies can revert this trend and, more importantly, are these policies desirable?

These questions are addressed in the context of a multi-country open economy model where countries are populated by a continuum of ex-ante identical consumers. Consumers are subject to idiosyncratic shocks that cannot be insured because of the unavailability of state-contingent contracts. Countries are heterogeneous in the degree of financial deepness which is captured by short-selling constraints and by the feasibility of state-contingent contracts. Numerical simulations of the model shows that relatively small differences in the deepness of the domestic financial markets can lead to long-term imbalances (net foreign asset positions) above 100 percent of output. Furthermore, the formation of these imbalances is a slow process that can easily extend over a period of 30 or 40 years.

2 The model

There are I countries, indexes by i, each populated by a continuum of agents maximizing the expected lifetime utility $E\sum_{t=0}^{\infty}\beta^t U(c_t)$, where c_t is consumption at time t and β is the intertemporal discount factor. Agents receive a stochastic endowment w. The endowment is idiosyncratic to each agent and follows a N-state Markov process with transition probability $g(w_t, w_{t+1})$. In each country there is an asset that delivers a constant flow of consumption goods, d. There are no aggregate shocks.

Agents can sign state-contingent contracts with which they buy units or shares of the country-asset conditional on the realization of their endowment w_{t+1}. These shares are denoted by $s(w_{t+1})$. Denote by P_t the current (unconditional) price of a share. The absence of aggregate shocks implies that the price of a share conditional on the realization of the idiosyncratic endowment w_{t+1} is $g(w_t, w_{t+1})P_t$. The 'deepness' of the financial markets is captured by the restrictions imposed to the set of feasible state-contingent assets. We denote this set by $D_t^i(w)$. The precise form of this set will be specified in the application section.

Let $\{P_\tau^i\}_{\tau=t}^{\infty}$, be a (deterministic) sequence of asset prices in country i. The optimization problem can be written as:

$$V_t^i(w,s) = \max_{c,s(w')} \Big\{ U(c) + \beta \sum_{w'} g(w,w') V_{t+1}\Big(w', s(w')\Big) \Big\} \tag{1}$$

subject to

$$w + (d + P_t^i)s = c + \sum_{w'} g(w,w') P_t^i s(w') \tag{2}$$

$$\{s(w_1), ..., s(w_N)\} \in D_t^i(w) \tag{3}$$

This is the optimization problem for any deterministic sequence of prices, not only steady states. This motivates the time subscript t in the value function. Equation (2) is the budget constraint and (3) defines the set of feasible state-contingent contracts. In general, deeper financial markets are characterized by a larger feasibility set $D_t^i(w)$. When the set is sufficiently large, agents will be able to perfectly insure.

3 Equilibria with and without capital mobility

Given the idiosyncratic nature of the endowments, in each period there will be a distribution or measure of agents over w and s. We denote this distribution by $M_t^i(w,s)$. Following are the definitions of equilibria with and without international mobility of capital.

Definition 1 (Autarky) *Given the deepness of the financial markets, $D_t^i(w)$ and initial distributions $M_t^i(w,s)$, for $i \in \{1, ..., I\}$, a general equilibrium without mobility of capital is defined by sequences of: (i) agents' policies $\{c_\tau^i(w,s), s_\tau^i(w,s;w')\}_{\tau=t}^{\infty}$; (ii) value functions $\{V_\tau^i(w,w)\}_{\tau=t}^{\infty}$; (iii) asset prices $\{P_\tau^i\}_{\tau=t}^{\infty}$. Such that: (i) the policy functions solve problem (1) at each point in time and $\{V_\tau^i(w,s)\}_{\tau=t}^{\infty}$ are the associated value functions; (ii) asset markets clear in each country, that is, $\int_{s,w,w'} s_\tau^i(w,s;w') M_\tau^i(w,s) = 1$ for all $\tau \geq t$; (iii) the distributions $M_\tau^i(w,s)$, for $\tau > t$, evolve according to the individual policies and the stochastic properties of the idiosyncratic shock.*

Definition 2 (Capital mobility) *Given the deepness of the financial markets, $D_t^i(w)$ and initial distributions $M_t^i(w,s)$, for $i \in \{1, ..., I\}$, a general*

equilibrium with mobility of capital is defined by sequences of: (i) agents' policies $\{c^i_\tau(w,s), s^i_\tau(w,s;w')\}^\infty_{\tau=t}$*; (ii) value functions* $\{V^i_\tau(w,s)\}^\infty_{\tau=t}$*; (iii) asset prices* $\{P^i_\tau\}^\infty_{\tau=t}$*. Such that: (i) the policy functions solve problem (1) at each point in time and* $\{V^i_\tau(w,s)\}^\infty_{\tau=t}$ *are the associated value functions; (ii) asset prices satisfy* $P^i_\tau = P_\tau$ *for all* $i \in \{1,...,I\}$ *and the global asset market clears, that is,* $\sum_i \int_{w,s,w'} s^i_\tau(w,s;w') M^i_\tau(w,s) = I$ *for all* $\tau \geq t$*; (iii) the distributions* $M^i_\tau(w,s)$*, for* $\tau > t$*, evolve according to the individual policies and the stochastic properties of the idiosyncratic shock.*

The definitions of equilibria with and without mobility of capital are similar. The only difference is that with mobility there is a global market for assets and the prices are equalized across countries. This also implied that the assets owned by a country is no longer equal to the asset located in the country. Therefore, foreign asset positions are not zero in general.

4 Quantitative properties

This section shows how capital market liberalization leads to international imbalances when countries are heterogeneous in the deepness of their financial markets. In the model, the deepness of the financial market is captured by the characteristics of the feasibility set $D^i(w)$. Therefore, financial markets heterogeneity is formalized by differences in the set $D^i(w)$.

A simple formulation of the feasibility set is as follows:

$$D^i(w) \equiv \left\{ s(w_j) - s(w_k) \leq \Delta^i,\ \forall j,k \in \{1,...,N\}\ ,\quad s(w') \geq \underline{s}^i \right\}$$

In this specification there is a limit to the range of state-contingent contracts. This constrains the amount of insurance that can be achieved through state-contingent contracts. These constraints may arise from the asymmetry in information about the realization of the endowment w. The extend of the agency problems created by the asymmetry is captured, in reduced form, by the country-specific parameter Δ^i. In addition, there is a limit to short selling, that is, $s(w') \geq \underline{s}^i$, which may also differ across countries. Short-selling constraints can be justified with some enforceability argument.

The parametrization of the model is as follows. There are only two countries with the same characteristics except in the parameter $\underline{s}^i$ or Δ^i. We will consider several specifications of these parameters. The discount factor is

$\beta = 0.95$ and the risk aversion parameter is $\sigma = 1.5$. The stochastic endowment takes two values, $w \in \{0.5, 1.5\}$, with symmetric transition probability matrix and persistence $g(w_1, w_1) = g(w_2, w_2) = 0.9$. We interpret w as labor income and d as net capital income, which we set to $d = 0.2$.

Heterogeneity in short-selling constraints: We start with the case in which state-contingent contracts are not available—that is, $\Delta^1 = \Delta^2 = 0$—and countries only differ in short-selling constraints which we set to $\underline{s}^1 = -0.25$ and $\underline{s}^2 = 0$. This implies that households in country 1 can borrow up to about 95 percent the average income while there is no borrowing in country 2.

The top section of Figure 4 plots the transition dynamics of 'asset prices' and 'net foreign asset positions' after capital markets liberalization. Before the liberalization, each country is in the steady state equilibrium and the opening of capital markets is not anticipated.

Before the liberalization, the asset price in country 1 is lower than in country 2. Because of the lower constraint, country 1 tends to save less, and therefore, demands less assets. This reduces the price of the asset. In country 2, instead, the tighter constraint induces higher savings, and therefore, higher demand of the asset.

After liberalization, the prices immediately equalize. As a result, country 1 experiences an asset price boom while country 2 experiences an asset price crash. Because the two countries continue to differ in their financial conditions, they have different propensity to save. The increase in asset prices (or lower interest rate) in country 1 leads households to save less while the drop in asset prices in country 2 induces households to save more. This implies that country 2 will buy more and more of the country 1 asset. Consequently, country 2 accumulates positive asset positions while country 1 accumulates negative foreign asset positions. The accumulation of these positions is gradual until the two economies converge to a new steady state.

Heterogeneity in state-contingent contracts: We now consider the case in which countries differ in the extend to which they can use state-contingent contracts but they face the same short-selling constraint—that is, $\underline{s}^1 = \underline{s}^2 = 0$. We set $\Delta^1 = 0.05$ and $\Delta^2 = 0$, implying that country 1 has a greater ability to insure against idiosyncratic risks than country 2. It should be point out that the use of state-contingent contracts has a similar effect

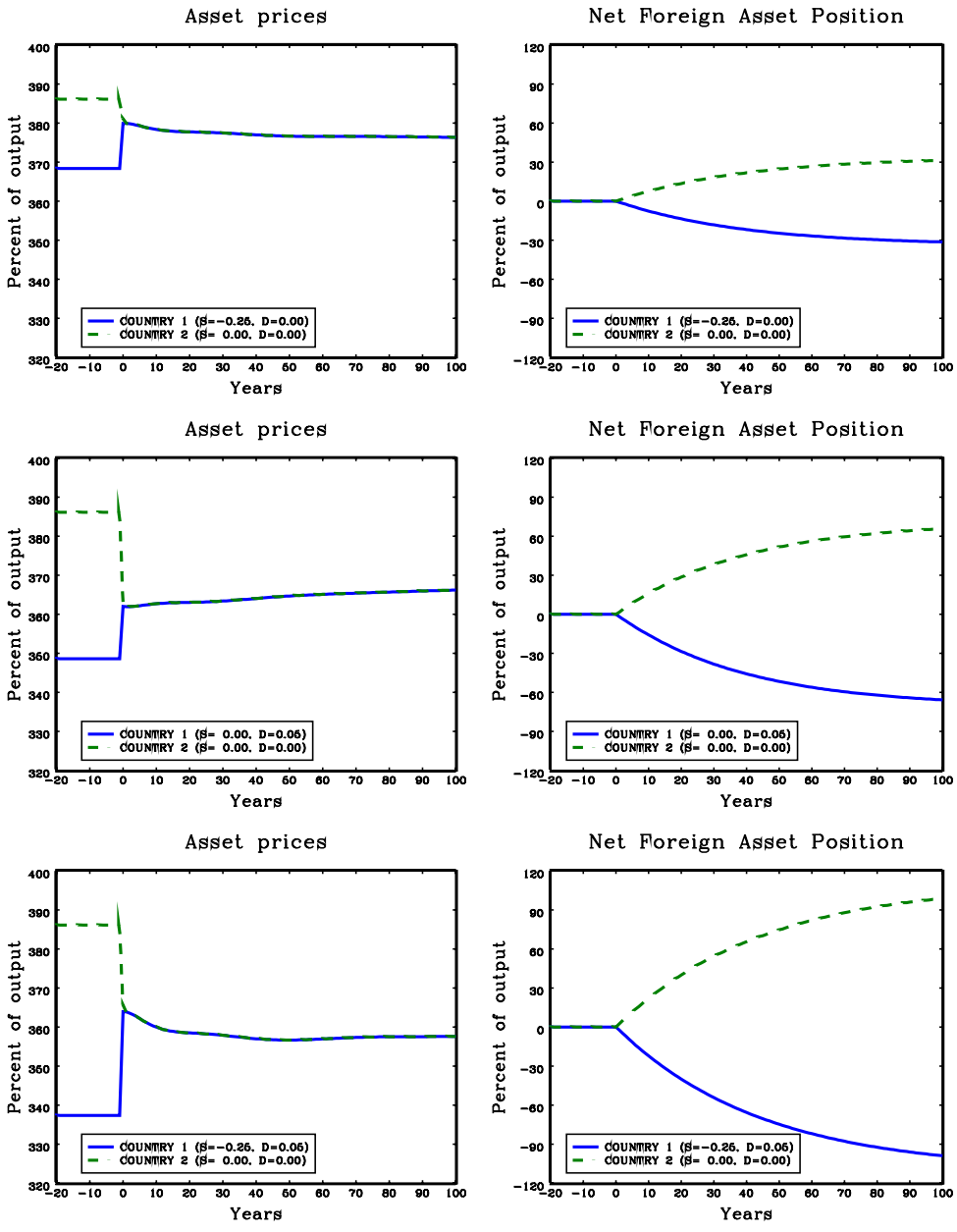

Figure 2: Transition dynamics after capital market liberalization.

of reducing the volatility of the endowment (but without state-contingent contracts). The degree of insurance allowed by $\Delta^1 = 0.05$ is approximately equivalent to reducing the volatility of the endowment from $w \in \{0.5, 1.5\}$ to $w \in \{0.6, 1.4\}$. Therefore, it is a relatively small improvement in insurance.

The qualitative dynamics induced by capital markets liberalization is similar to the previous case in which countries were heterogeneous only in the short-selling constraints. As shown in the middle section of Figure 4, before liberalization, the asset price in country 1 is lower than in country 2. Because of the greater insurance, country 1 tends to save less, which pushes down the price of the asset. The opposite arises in country 2 where the higher savings lead to higher asset prices.

Also in this case, liberalization creates the conditions for country 2 to accumulate positive foreign asset positions while country 1 accumulates negative positions. What is remarkable in this exercise, is that small differences in the degree of insurance can lead to very large differences in foreign asset positions. In the long-run, the foreign asset liabilities of the first country will be 70 percent of domestic output.

Heterogeneity in state-contingencies and short-selling: To complete the analysis we also consider the case in which countries differ in both, the feasibility of state-contingent contracts and short-selling constraints. The parameters are $\Delta^1 = 0.05$, $\Delta^2 = 0$, $\underline{s}^1 = -0.25$, $\underline{s}^2 = 0$. Therefore, country 1 has a deeper financial market because of greater availability of state-contingent contracts and looser short-selling constraints.

The dynamics induced by capital markets liberalization is shown in the bottom section of Figure . As expected from the previous two simulations, country 1 tends to accumulate large negative foreign asset positions while country 2 accumulates positive foreign asset positions.

The exercise outlines three important points. First, the country with more developed financial markets—which in the model is the country with the lower $\underline{s}$—accumulates foreign asset liabilities. Second, the magnitude of these liabilities can be large even with moderate financial differences. For the particular parametrization, the long-term foreign liabilities of country 1 are larger than domestic production (GDP). Third, the formation of imbalances is a smooth process that takes a long period of time. For the particular calibration, only 35 percent of the long-term liabilities are accumulated during the first 20 years since the liberalization of capital markets.

5 Discussion

The theory proposed in this paper has important implications for the current debate about the causes of the recent international imbalances and, consequently, for its policy prescriptions. The first point is that the growing US foreign liabilities are the consequence of its advanced financial markets. In this sense, the imbalance is a sign of the US economic strength, not weakness. Of course, this also implies that US residents are becoming less wealthy compared to other countries. However, this does not imply that the country welfare is improved by restricting the accumulation of these liabilities.

The second point is that the current global imbalances are likely to persist in the near future. In this sense, there is no reason to believe that the inflow of capital to the US should suddenly reverse in the short-term, causing a dramatic drop in the value of the dollar and an economic recession. The inflow of capital will eventually stop. However, this will arise when the other major economic blocks have become sufficiently wealthy compared to the US.

The third point is that the most effective way (in terms of welfare enhancement) to reduce the imbalances is through an improvement in the financial structure of countries with growing foreign asset positions.

References

Backus, D., Henriksen, E., Lambert, F., & Telmer, C. (2005). Current account facts and fictions. Unpublished Manuscript, Stern School of Business, NYU.