

Financial Reforms, Savings and Growth

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Abstract

This paper argues that savings are important to understand the growth effects of different financial reforms. Using data for 90 countries between 1973 and 2005, I split reforms into macro financial reforms (reforms that target aggregate prices and quantities in financial markets) and micro financial reforms (reforms that target competition in financial markets). I show that simultaneous reforms of macro and micro dimensions are associated with larger growth only if the savings rate is large. If the savings rate is low, growth is larger when reforms target macro dimensions. These observations are robust to different definitions of reform and empirical approaches. They are consistent with a model of second best financial reforms where the interaction between domestic externalities and strategic enforcement breakdown makes the first best unattainable.

JEL classification: F33, F34, O16

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1 Introduction

The last forty years have seen a wave of financial reform unprecedented in its intensity and scope. Figure 1 plots the unweighted cross-country average of a financial liberalization index for different dimensions of financial policy. The solid black line measures overall financial liberalization. According to this index in the late 1980s and early 1990s the World Economy substantially liberalized financial policy. These reforms represent some of the most important economic policy changes in recent times. Understanding their impact on economic growth is of paramount importance.

In this paper, I investigate macro and micro financial reforms. I argue that this simple distinction contributes to our understanding of the effect of financial reforms on growth. Using data for 90 countries between 1973 and 2005, I first document substantial variation in the implementation of different financial reforms. Most reform events focus on macro dimensions. A smaller but substantial share include both dimensions, and only a negligible share focus solely on micro dimensions (see Table 1 and Figure 1).

I divide macro and micro reforms with respect to the instrument of policy. Macro financial reforms target aggregate prices and quantities in financial markets. Examples include lifting capital account restrictions, and abolishing interest rate and credit controls. On the contrary, micro financial reforms target the structure and organization of financial markets. Examples include allowing free entry in the financial sector, the privatization of financial institutions, the promotion of equity markets and the establishment of regulation and supervision of the banking sector.¹

Studying different reform strategies is important because they come associated with different outcomes in terms of growth. Although most financial reforms are correlated with larger growth, countries reforming both dimensions simultaneously tend to grow more (see Figure 2).

These growth differentials are consistent with the empirical literature on financial reform and growth, in particular with papers arguing that equity market liberalizations lead to growth.² I extend on this work by unveiling a crucial variable to understand these growth differences in the data: the savings rate. I document that countries with higher savings rates grow more following simultaneous reforms, while countries with lower savings rates grow more following macro reforms. These effects are present even after controlling for the direct effect of savings on growth. In the model, I provide an explication for these observations grounded on non-discriminatory contract enforcement problems.

According to the neoclassical growth model, an increase in the savings rate is associated with a temporary effect on growth. Henry (2007) makes the point that financial reforms have the same quantitative effects as a permanent increase in the savings rate: opening to capital flows, allowing competition in the banking sector, introducing equity markets; all increase the pool of resources available to finance domestic investments and lead to a temporary increase in growth. If savings rates are independent of financial reforms, a country with lower savings rate should benefit more from these reforms. Looking at the data, I find that this only holds when reforms focus on macro dimensions. On

¹The division follows Bandiera et al (2000). These authors study the effect of different reforms on domestic savings for a small group of countries. In this paper, I use a larger dataset and investigate the effect of reforms on growth.

²Bekaert et al (2005) and Henry (2007) study equity market liberalizations and capital flows liberalization. In my work I use a larger sample, and investigate a larger set of reforms. More importantly, I explicitly study the growth effect of different reform strategies.

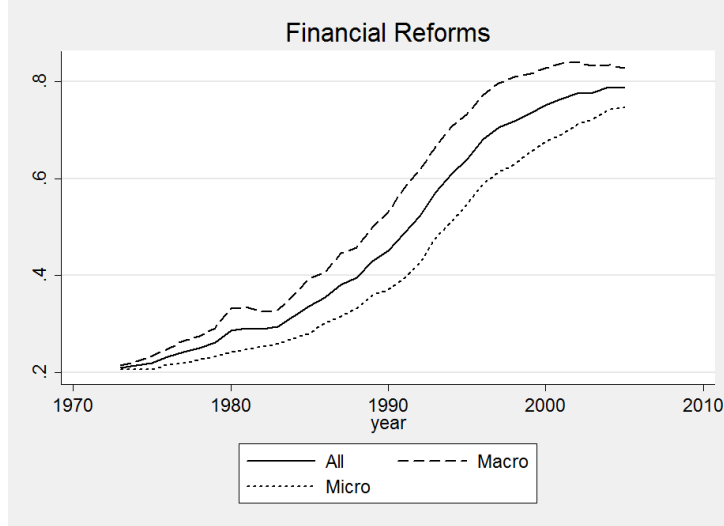


Figure 1: All refers to the sample mean of all the entries of the financial reform index constructed by Abiad et al (2010). Macro reforms include capital account restrictions, interest rate controls and credit controls. Micro reforms include entry and regulation in the banking sector, privatization and the establishment of equity markets. All sub-indices take larger values if there is more liberalization except for regulation where the opposite is true.

the contrary, when reforms simultaneously affect macro and micro dimensions, growth is larger when the savings rate is large.³

I argue that these patterns are consistent with a second best view of financial reform. I write a simple model of financial trade and focus on two policy dimensions: capital flows (as macro reforms) and domestic financial competition (as micro reforms). I assume that this economy would like to import capital from abroad and that there are no natural reasons to have a monopolist intermediating financial trades. In the model, the first best can only be obtained by lifting all restrictions to capital flows and competition. But in this economy the enforcement of financial contracts is strategic and non-discriminatory, and the interaction enforcement and externalities can make the first best unattainable.

Strategic enforcement means that a planner will compare the costs and benefits of the enforcement decision. The planner benefits from enforcement breakdown in two ways. First, it avoids payments by domestic agents abroad. Secondly, enforcement breakdown can generate desirable redistribution. Enforcement in this paper is non-discriminatory. That means that the planner can not avoid payments to foreigners without canceling payments between domestic agents, and can not target different types of domestic agents. An important result from this non-discrimination assumption is that the first best is not always attainable when domestic savings are small relative to foreign borrowing.⁴

In this paper I propose that a less competitive financial sector has its incentives aligned

³Bandiera et al (2000) argue that savings rates are essentially unaffected following financial reforms. Of course, it could be that my results are driven by another variable correlated with savings. But note that this variable would have to affect reforms asymmetrically.

⁴The assumption of non-discrimination between domestic and foreigners has been recently used by Kremer and Mehta (2000), Brutti (2010), Guembel and Sussman (2009), Broner and Ventura (2011), Broner and Ventura (2010) and Gennaioli, et al (2012). Broner et al (2010) argue that this assumption can be rationalized with sufficiently deep secondary markets.

Ordering of Reform			
% of episodes in which following dimension (partially) reformed first			
Regions	Macro Reforms	Micro Reforms	Simultaneous
All	47.3	15.3	37.3
Advanced	43.3	16.7	40.0
Developing	48.3	15	36.7

Table 1: I normalize macro and micro indices between 0 and 1. Table 1 defines a macro (micro) reform as a change in these indices such that the macro (micro) index is above 0.5, while the other component is below 0.5. A reform is considered simultaneously macro and micro if it is such that both indices are above 0.5. I employ a 3 year window around each event and give priority to earlier events in case of overlap.

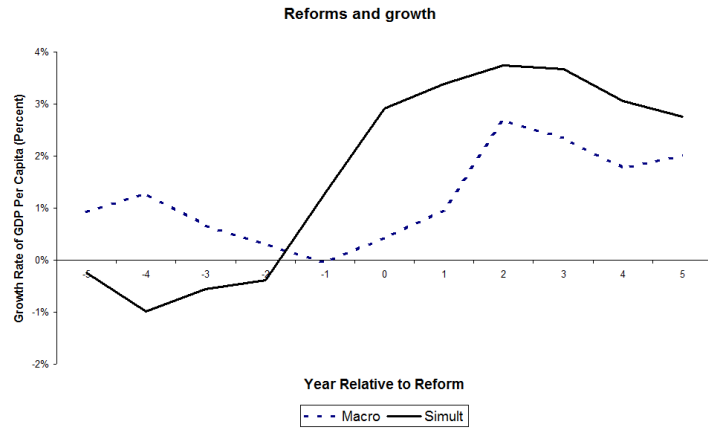


Figure 2: The average growth rate of GDP per capita rises less when countries perform macro reforms first. The x axis denotes time in years relative to each type of liberalization. Table 9 in Appendix 1 shows the reform dates used in this figure

with enforcement and corrects the externalities. The intuition for this result is that profits are only made under contract enforcement. I show that a simple second best argument justifies the growth effects of different reform strategies that I document in the data. In particular, it can explain why countries with large savings rate benefit the most with simultaneous reforms, and why countries with low savings rate are better off doing only macro financial reforms, relative to doing simultaneous reforms. Reforming both dimensions with low savings can lead to an enforcement crisis which translates into a negative effect on growth.⁵ The monopolist financial sector does not necessarily replicate the planner's preferred outcome. It cares only about maximizing profits. In fact, an optimal credit policy by a government could always lead to the first best, but the objective of this paper is to study situations where the government can not implement the first best, and has to resort to second best policies.⁶

⁵In the neoclassical model considered for example in Henry (2007) the relationship between savings and growth following liberalization should be monotonic. In this paper, I model the presence of thresholds in the savings rate, that determine the success of different financial reforms.

⁶The reasons why the government can not implement the first best are two fold. First, it can not discriminate between savers and entrepreneurs, just as it can not discriminate between domestic and foreign agents. Second, even if it could, it can not commit to credit policies.

The theoretical view proposed in this paper is closely related to the work by Broner & Ventura (2010). Their paper is the first to study the effects of macro financial reforms under strategic enforcement with non-discrimination. They do this for a given level of competition in the financial market. In my paper, I explicitly study two dimensions of reform, and I draw implications regarding the empirical relationship between reforms, savings and growth.

The empirical work in this paper is related to the literature on growth and financial liberalization. I use methods described in Bekaert et al (2005), Henry (2000, 2007) and Bonfiglioli (2008) to assess the impact of different reform strategies on growth. These approaches differ mostly with respect to the horizon during which reforms should affect growth. In this paper I take an agnostic view on this issue, and highlight that results appear to be robust to testing for both temporary and permanent effects. I find that growth following financial reforms of both macro and micro policy dimensions is two times as large as reforms that focus only on macro dimensions.

Other theories have been proposed to explain some of the facts presented in this paper. Gertler & Rogoff (1990) argue that severe domestic financial frictions can lead to capital flight following macro financial reform. Instead, I emphasize enforcement problems and the effect of different levels of competition in domestic financial markets. Ragan & Zingales (2003) suggest there are political economy factors behind the implementation of different financial reforms. With respect to this literature, this paper presents a rational alternative that is complementary to the political economy of reform. In my paper it is the market failure that induces the lack of reform, and not the political capture. Other political economy explanations of reforms associated with ideology find mixed results (see Alesina & Roubini (1992) and Bartolini & Drazen (1997)). Fernandez & Rodrik (1991) present a learning story where successful initial reforms promote further reforms. It does not explain which reforms should be implemented. The theory presented in this paper suggests that countries with low savings rates should reform price and quantities in financial markets but not necessarily domestic financial competition.

The rest of the paper proceeds as follows. Section 2 develops the model and discusses the main results. Section 3 studies the determinants of financial reform, and tests whether the view presented in this paper can account for the negative growth effect described above. Section 4 concludes and points to future research.

2 A simple model of financial reforms

I study financial reforms in a simple model of asset trade and investment. There are three types of agents in this economy: savers, entrepreneurs and financial intermediaries. Savers and entrepreneurs take as given policies from a benevolent planner. I will focus on two aspects of policy. First the planner decides on the rules governing financial trade. Secondly, it decides whether to enforce previously written financial contracts. There is an important asymmetry in the ability of the planner to commit to these two different types of policy. I assume that the planner can commit to rules governing financial trade but can not commit to enforce financial contracts.

The planner can choose macro and micro rules for financial trade. I will focus on competition in the financial sector as a micro reform and on opening to international capital flows as a macro dimension. Later I discuss other financial reforms.

I begin by studying an economy that is in financial autarky, where only domestic trades

are allowed. This allows me to illustrate the trade-off behind enforcement but also the role played by financial intermediaries with different levels of competition. If the country is in financial autarky, failing to enforce contracts has no effect on average consumption but can have important distributional effects. When the autarky solution rewards any type of agents too much relative to other types, a planner that cares about average utility might be willing to break down contracts as a redistribution tool. In anticipation, savers will not engage in financial trade, and investment and output will be low.

Ultimately, these enforcement problems are the consequence of externalities that interact with the lack of commitment from the planner. Entrepreneurs and savers are atomistic which can lead to over borrowing by entrepreneurs and coordination problems between savers. Reducing competition in financial markets allows the financial intermediary to not take as given the actions of the planner, and to internalize the externalities and induce enforcement.

I then open up this economy to international capital markets. If the economy is importing capital, enforcement breakdown can now increase average consumption. The temptation to break down contracts is larger the smaller are savings. I show how different choices between macro and micro reforms affect investment depending on the level of savings.

I finalize this section by discussing the sequencing of financial reforms, relating to different types of macro and micro financial reforms and drawing empirical implications from the model, that I test in the next section.

2.1 Preliminaries and assumptions

There are three maximizing private agents in this economy: savers, entrepreneurs and financial intermediaries. Savers (s) and entrepreneurs (e) are atomistic and have masses $1-\varepsilon$ and ε , respectively. Savers have funds but do not have good investment opportunities. Entrepreneurs lack funds but have good investment opportunities. I assume that only domestic financial intermediaries can lend to entrepreneurs. Furthermore, these are the only domestic agents that can borrow in the foreign market for capital when capital flows are liberalized.⁷ The number of intermediaries operating in the market depends on policy set by the planner. If the planner chooses perfect competition there is an infinite number of intermediaries; if it decides to restrict competition there is only one.

There is one good that can be used for consumption, storage or investment. There are two periods $T = 0$ and $T = 1$. In period $T = 0$, the planner first decides on the institutional arrangement: perfect competition vs. no competition in the financial sector, financial autarky vs. capital flow liberalization. Then, agents choose investment decisions. In period $T = 1$, the enforcement of financial contracts is decided strategically by the planner, and agents consume.

There are two technologies in this economy, storage (l) and investment (k). Storage is less productive than investment - it simply transfers resources across time without a return. Investing l unit of the good in storage today yields l unit of the good tomorrow. On the contrary, investment has a return. Investing k units today, yields k^α units tomorrow, where $\alpha \in (0, 1)$. These different technologies are the source of gains from trade in this

⁷There are different ways to justify this assumption. Financial intermediaries may have collateral that is valuable abroad, or they may have assets abroad that are seized in case of non-repayment, or can simply be foreign and have branches in the domestic economy.

economy. Domestic savers can not operate the investment technology and would like to access its returns. Foreign savers would like to benefit from the larger returns relative to their alternative investments.

Intermediaries maximize period by period profits and distribute these profits proportionally between domestic agents. There is an asymmetry between saving and borrowing. Contrary to borrowers, domestic savers can save with domestic intermediaries or with the foreign market when capital flows are liberalized.⁸

Institutional arrangements are determined by a forward looking calculation of average welfare in the economy. They can not be overturned. On the contrary, contracts are subject to an enforcement decision at $T = 1$ that is strategic. In particular, I assume that the enforcement of these contracts maximizes the utility of the average domestic agent at $T = 1$. A crucial assumption in this paper is that the enforcement decision can not discriminate between domestic and foreign agents. This implies that canceling contracts with foreigners implies also destroying domestic asset trade. That is the only cost associated with enforcement breakdown.

To summarize this discussion, at $T = 0$ the planner chooses between four possible institutional arrangements:

$$X \times Y = \{(x, y) | x \in X = (PC, MP) \text{ and } y \in Y = (AUT, CF)\}$$

where PC stands for perfect competition, MP for monopoly, AUT for autarky and CF for liberalized capital flows. Institutional arrangements (x, y) are chosen to maximize:

$$U_0 = E_0 [(1 - \varepsilon) \ln(c_1^s(E_1)) + \varepsilon \ln(c_1^e(E_1))] \quad (1)$$

where E_0 stands for the expectations operator, E_1 summarizes the enforcement decision at $T = 1$. To simplify the analysis, I will assume throughout that the parameter space is such that the planner prefers liberalizing both dimensions to liberalizing only macro dimensions. If the first option is not attainable he prefers to liberalize macro dimensions only relative to the other options.⁹

The first best may not be attainable due to strategic enforcement breakdown. Enforcement E_1 can take two values. If $E_1 = 1$ there is enforcement of financial contracts. If $E_1 = 0$ there is enforcement breakdown of financial contracts and the economy is in a situation of widespread default. Enforcement is chosen in period $T = 1$ to maximize average utility of that period, which is given by:

$$U_1 = (1 - \varepsilon) \ln(c_1^s(E_1)) + \varepsilon \ln(c_1^e(E_1)) \quad (2)$$

Savers wish to maximize utility at $T = 1$. A saver receives an endowment in period 0 and 1 of w_0^s and w_1^s , respectively. He has access to two investment options: (i) the storage technology (l_0) transforms one unit of the good at time 0 into one unit at time 1; and

⁸This asymmetry between the financial trades of savers and entrepreneurs can be justified by monitoring asymmetries. Deposits do not need monitoring, but loans need to be monitored by a domestic financial intermediary who is subject to domestic law and therefore to strategic domestic enforcement. It is not crucial for any of the results in this paper.

⁹This assumption is not necessary for any of the results to be presented in this paper but it substantially simplifies the presentation of these results by omitting the discussion of empirically irrelevant cases. I will further assume that parameters are such that in autarky it is better to have a single intermediary over perfect competition.

(ii) financial trades with domestic intermediaries (b_0^s), for a gross return of R^s in period 1. Formally, a saver solves the following problem:

$$\begin{aligned} & \max_{c_1^s, b_0^s, l_0} E_0 [\ln (c_1^s)] \\ & \text{s.t.} \\ & b_0^s = w_0^s - l_0 \\ & c_1^s = \begin{cases} w_1^s + R^s b_0^s + l_0 + \pi & \text{if } E_1 = 1 \\ w_1^s + l_0 + \pi & \text{if } E_1 = 0 \end{cases} \end{aligned}$$

Where π are profits generated by financial intermediaries. Savers decisions are taken after the institutional choice. They use backward induction to solve for the enforcement decision and therefore face no uncertainty.

The decision to invest in the domestic financial market relative to storage depends crucially on the enforcement decision. If enforcement holds, savers will deposit their funds with financial intermediaries when the return on deposits exceeds the return on storage. On the other hand, if enforcement does not hold, or the return on deposits does not exceed 1, savers store their funds at $T = 0$. Formally:¹⁰

$$b_0^s = \begin{cases} w_0^s & \text{if } R^s > 1 \text{ and } E_1 = 1 \\ [0, w_0^s] & \text{if } R^s = 1 \text{ and } E_1 = 1 \\ 0 & \text{if } R^s < 1 \text{ or } E_1 = 0 \end{cases}$$

In a symmetric equilibrium the total supply of funds is perfectly rigid if $R^s > 1$, and given by:

$$S = (1 - \varepsilon) b_0^s \quad (3)$$

2.1.1 Entrepreneurs

Entrepreneurs wish to maximize utility at $T = 1$. An entrepreneur receives endowments in period 0 and 1 of $w_0^e = 0$ and $w_1^e > 0$, respectively. He has access to two investment options: (i) investment (k_0) that yields k_0^α in period 1; and (ii) financial trades with domestic intermediaries (b_0^e), for a gross return of R^e in period 1. Formally, an entrepreneur faces the following problem:

$$\begin{aligned} & \max_{c_1^e, k_0, b_0^e} E_0 [\ln (c_1^e)] \\ & \text{s.t.} \\ & b_0^e = -k_0 \\ & c_1^e(E) = \begin{cases} w_1^e + k_0^\alpha + R^e b_0^e + \pi & \text{if } E = 1 \\ w_1^e + k_0^\alpha + \pi & \text{if } E = 0 \end{cases} \end{aligned}$$

¹⁰Savings and consumption follow: $l_0 = w_0^s - b_0^s$ and $c_1^s(E = 1) = w_1^s + R b_0^s + l_0 + \pi$ and $c_1^s(E = 0) = w_1^s + l_0 + \pi$.

The entrepreneurs would like to borrow to equate the marginal return of investment to its marginal cost. The solution to their problem is given by:¹¹

$$k_0^e = \left(\frac{\alpha}{R^e} \right)^{\frac{1}{1-\alpha}}, \quad b_0^e = -k_0^e \quad (4)$$

In a symmetric equilibrium, the aggregate demand of funds is given by:

$$D = \varepsilon \cdot \left(\frac{\alpha}{R^e} \right)^{\frac{1}{1-\alpha}} \quad (5)$$

And it is possible to see that $\frac{\partial D}{\partial R^e} < 0$. The demand of funds is elastic and depends negatively on the interest rate.

2.1.2 Financial intermediaries

Financial intermediaries maximize profits. To simplify I will consider only extreme cases of competition. Therefore, it is irrelevant if competition is a la Cournot or Bertrand. Domestic intermediaries are the only agents that can lend to entrepreneurs, and the only domestic agents that can borrow abroad. Whatever profits they obtain from intermediation, they transfer to domestic savers and entrepreneurs in a proportional fashion.

2.1.3 Equilibrium

In this simple economy there are two possible equilibria that I label Pessimistic (P) and Optimistic (O). Before analyzing the effect of market structure on financial trade and investment it is useful to study these equilibria resorting to two results. The first result highlights the importance of expectations in this simple model: there is always a pessimistic equilibrium where savers just store their funds and no financial trades occur. The second result states that an equilibrium with financial trade and investment does not always exist, and that it depends on the interest rates charged to savers and entrepreneurs. Replacing the consumptions derived in the previous section in equation (2), it is possible to see that $E_1 = 1$ is sustainable if and only if:

$$(1 - \varepsilon) \ln \left(\frac{w_1^s + R^s w_0^s + l_0 + \pi}{w_1^s + l_0} \right) + \varepsilon \ln \left(\frac{w_1^e + (1 - \alpha) \cdot \left(\frac{\alpha}{R^e} \right)^{\frac{\alpha}{1-\alpha}} + \pi}{w_1^e + \left(\frac{\alpha}{R^e} \right)^{\frac{\alpha}{1-\alpha}}} \right) \geq 0 \quad (6)$$

In financial autarky, the enforcement decision has no effect on average consumption. But enforcement can still break down because the planner wishes to redistribute away from savers and towards entrepreneurs. The following two lemmas summarize this discussion.

Lemma 1 *There is always a pessimistic equilibrium where enforcement breaks down and $k_0 = 0$.*

Proof. If all savers expect that enforcement will break down at $T = 0$ there are no financial contracts to be enforced under autarky, and the enforcement decision is irrelevant. ■

¹¹Consumption levels are given by $c_1^e(E = 1) = w_1^e + (1 - \alpha) \cdot \left(\frac{\alpha}{R} \right)^{\frac{\alpha}{1-\alpha}} + \pi$ and $c_1^e(E = 0) = w_1^e + \left(\frac{\alpha}{R} \right)^{\frac{\alpha}{1-\alpha}} + \pi$.

Lemma 2 *The optimistic equilibrium exists if and only if inequality (6) is satisfied.*

Proof. This condition can be obtained using the consumptions in footnotes (10) and (11) in equation (2) and rearranging. ■

To simplify the analysis I assume for now that if the optimistic equilibrium exists, it is played. If the optimistic equilibrium does not exist, then the pessimistic equilibrium is played. We are now ready to analyze the effects on investment and output of different levels of financial competition under autarky.¹²

Equilibrium under perfect competition

Under perfect competition with enforcement intermediaries make zero profits. There is a single interest that clears the market, $R : \int b^i(R) di = 0$. This interest rate is given by $R^e = R^s = R^{PC,AUT} = \alpha \left(\frac{\varepsilon}{(1-\varepsilon)w_0^s} \right)^{1-\alpha}$. It depends negatively on w_0^s and $(1-\varepsilon)$ and positively on ε and α . I assume that $R^{PC,AUT} \geq 1$, such that storage is dominated by deposits. The solution is represented in Figure 3.

For this equilibrium to exist enforcement must occur. Replacing these interest rates in (6), together with $l_0 = 0$ and $\pi = 0$, it is possible to rewrite this condition as:

$$(1-\varepsilon) \ln \left(\frac{w_1^s + \alpha \left(\frac{\varepsilon}{1-\varepsilon} \right)^{1-\alpha} (w_0^s)^\alpha}{w_1^s} \right) + \varepsilon \ln \left(\frac{w_1^e + (1-\alpha) \cdot \left(\frac{1-\varepsilon}{\varepsilon} w_0^s \right)^\alpha}{w_1^e + \left(\frac{1-\varepsilon}{\varepsilon} w_0^s \right)^\alpha} \right) \geq 0$$

Equilibrium under one financial intermediary

Suppose that there is only one financial intermediary. Under autarky this financial intermediary will have both monopolist and monopsonistic powers. Therefore the interest rates for savers and entrepreneurs will not be the same. Savers get R^s , which will also be the marginal cost of funds for the monopolist. The monopsonist can push down the returns of savers to the point they are indifferent between storing and depositing. On the other side of the market, the monopolist charges R^e to entrepreneurs and will constrain the amount of funds available to entrepreneurs. This agent makes profits when $R^e > R^s$. I assume that the intermediary is owned by the private agents in this economy. The problem of the financial intermediary in the absence of competition is given by:

¹²More generally, the equilibrium that is played depends on the realization of a sunspot variable at $T = 0$ given by $\chi = (O, P)$, with probabilities $\Pr(\chi = O) = 1 - \rho$ and $\Pr(\chi = P) = \rho$. If O realizes, the optimistic equilibrium is played. If P realizes, the pessimistic equilibrium is played. I assume that the sunspot is revealed and perfectly observable as of $T = 0$, but only after the institutional arrangement is in place. This assumption implies that only the institutional decision at $T = 0$ is taken under uncertainty. This sunspot does not depend on the level of competition in the domestic financial market.

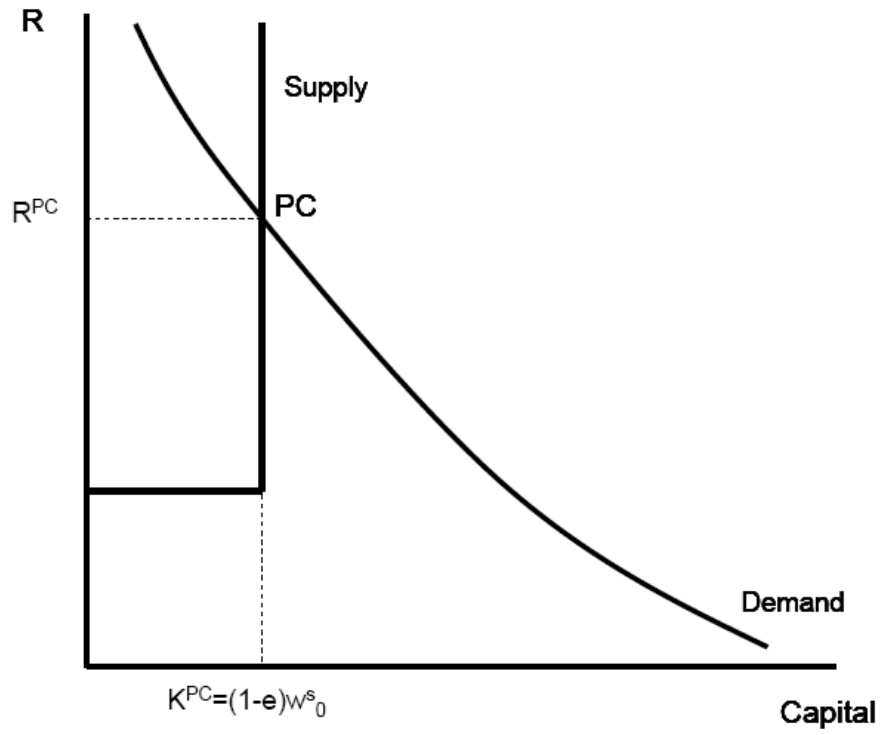


Figure 3: Perfect Competition. The interest rate that clears the market is given by R^{PC} .

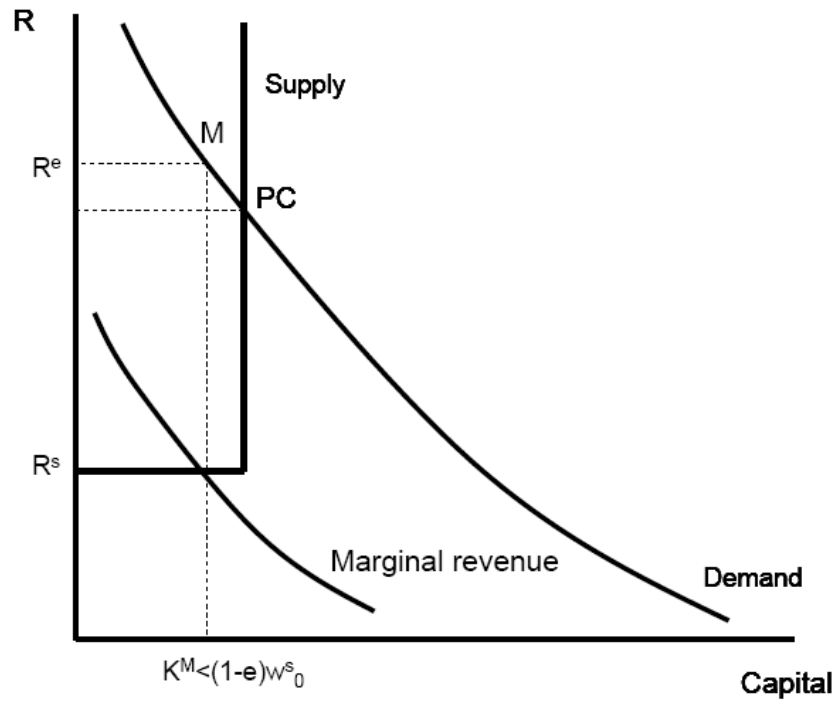


Figure 4: Unconstrained financial intermediary. The interest rates are R^e for entrepreneurs and R^s for savers.

$$\begin{aligned}
(R^s, R^e) &= \arg \max_{E_0} \left[E_1 \cdot (R^e - R^s) \cdot \varepsilon \left(\frac{\alpha}{R^e} \right)^{\frac{1}{1-\alpha}} \right] \\
&\quad s.t. \\
(M1) \quad &\varepsilon \cdot \left(\frac{\alpha}{R^e} \right)^{\frac{1}{1-\alpha}} \leq (1 - \varepsilon) \cdot w_0^s \text{ and } R^s \geq 1 \\
(M2) \quad &R^e \cdot \varepsilon \cdot \left(\frac{\alpha}{R^e} \right)^{\frac{1}{1-\alpha}} \leq \varepsilon \cdot \left(\frac{\alpha}{R^e} \right)^{\frac{\alpha}{1-\alpha}} \\
(M3) \quad &E_1 = \arg \max_{E_1 \in \{0,1\}} (1 - \varepsilon) \cdot \ln(c_1^s(E_1)) + \varepsilon \cdot \ln(c_1^e(E_1)) \\
&\quad c_1^s(E_1), c_1^e(E_1) \text{ solve agents' problems}
\end{aligned}$$

The first constraint (M1) states that the intermediary can raise the funds it wishes to supply. In this simple model under autarky, the supply of funds is fixed if $R^s \geq 1$. Note that savers have no better outside option other than storage. I assume that if they are indifferent between storing or depositing, they deposit their funds. The second constraint (M2) states that total repayment is constrained by the total amount of resources produced by entrepreneurs. The third constraint (M3) summarizes the enforcement decision at $T = 1$. Because the intermediary only makes profits when enforcement is guaranteed, we can replace (M3) with an analogous constraint where $E_1 = 1$:

$$(1 - \varepsilon) \cdot \ln \left(\frac{c_1^s(E_1=1)}{c_1^s(E_1=0)} \right) + \varepsilon \cdot \ln \left(\frac{c_1^e(E_1=1)}{c_1^e(E_1=0)} \right) \geq 0 \quad (M3')$$

If no constraint binds, then the solution to this problem is given by the traditional condition that equals marginal revenue to marginal cost: $k^e = (\alpha^2)^{\frac{1}{1-\alpha}}$ and $R^e = 1/\alpha$. Figure 4 plots the solution to the unconstrained problem.

Let us now discuss the solution when constraints do bind. The first constraint (M1) is a constraint on the quantity of funds supplied by the monopolist, and translates into a constraint on the interest rate: it can not be too low, $R^e \geq \alpha \left(\frac{\varepsilon}{(1-\varepsilon)w_0^s} \right)^{1-\alpha}$. The second constraint (M2) puts an upper bound on how many resources the monopolist can extract from entrepreneurs. Put differently, the interest rate charged to these agents can not be too large: $R^e \leq \alpha^{\frac{\alpha}{1+\alpha}}$. Finally, (M3') summarizes the strategic decision at $T = 1$ of whether to enforce contracts. The monopolist only makes profits if this condition is satisfied. It will therefore choose R^s, R^e in order to guarantee that enforcement happens.

Figure 5 plots the solution to this problem when a financial intermediary is constrained by the amount of savings he has access to under autarky, that is when M1 binds. I will assume that the economy is in such a situation¹³ In this situation, competition has no negative impact on investment and output. It simply redistributes surplus from savers to entrepreneurs. Savers get $R^s = 1$, the value of their outside option, while entrepreneurs are charged $R^e = R^{MP,AUT} = R^{PC,AUT} = \alpha \left(\frac{\varepsilon}{(1-\varepsilon)w_0^s} \right)^{1-\alpha}$. Profits are equally divided between savers and entrepreneurs. This creates some redistribution but is not crucial. If instead savers owned the intermediary, this agent would still find a way to induce enforcement. In other words, if at these interest rates (M3') would not be satisfied, the financial intermediary chooses a different combination to satisfy this constraint.¹⁴

¹³This assumption is not necessary if the supply of funds is upward slopping. This is the case if the

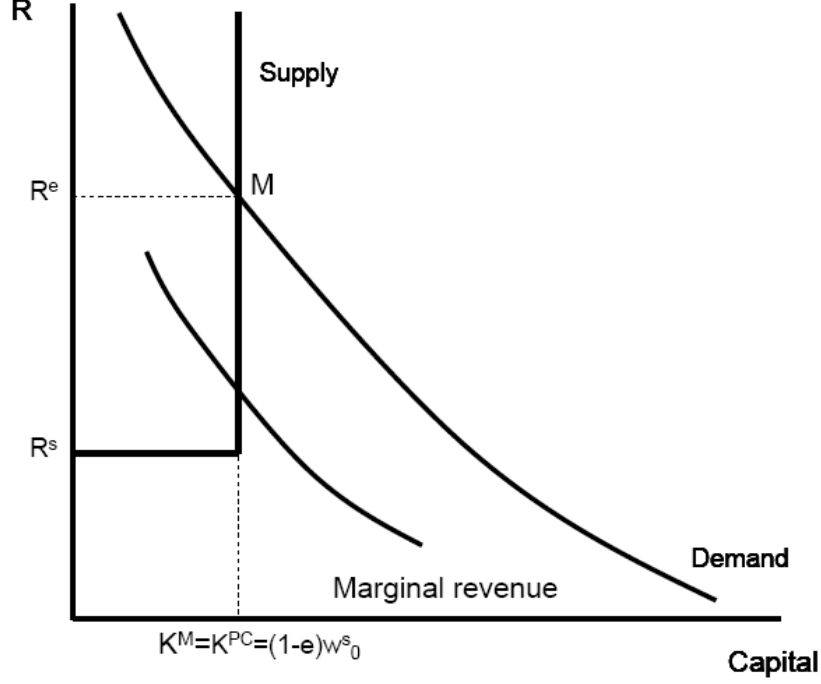


Figure 5: Constrained monopolist. Monopolist only redistributes surplus from savers to entrepreneurs.

2.1.4 Policy and Investment under Autarky

Under autarky, enforcement breakdown has no effect on average consumption but still has distributional effects. Having one financial intermediary eases the temptation to break financial contracts by the planner and can in some cases generate higher utility and investment. This result is summarized in the following proposition:

Proposition 1 *Under financial autarky with (M1) binding, investment is larger under a monopolist/monosponist if and only if:*

- $(1 - \varepsilon) \ln \left(\frac{w_1^s + \alpha \left(\frac{\varepsilon}{1-\varepsilon} \right)^{1-\alpha} (w_0^s)^\alpha}{w_1^s} \right) + \varepsilon \ln \left(\frac{w_1^e + (1-\alpha) \cdot \left(\frac{1-\varepsilon}{\varepsilon} w_0^s \right)^\alpha}{w_1^e + \left(\frac{1-\varepsilon}{\varepsilon} w_0^s \right)^\alpha} \right) < 0$
- $(1 - \varepsilon) \cdot \ln \left(\frac{w_1^s + w_0^s + \pi}{w_1^s} \right) + \varepsilon \cdot \ln \left(\frac{w_1^e + (1-\alpha) \cdot \left(\frac{1-\varepsilon}{\varepsilon} w_0^s \right)^\alpha + \pi}{w_1^e + \left(\frac{1-\varepsilon}{\varepsilon} w_0^s \right)^\alpha} \right) \geq 0$

utility of savers is not of the log type. The monopolist is always constrained then.

¹⁴Replacing this interest rate in (M2), it is possible to see that this is always feasible if $w_0^s \geq (\alpha)^{\frac{1}{1-\alpha^2}} \frac{\varepsilon}{1-\varepsilon}$. As savers have no outside option and the elasticity of deposits to the interest rate is zero, $R^s = 1$. Monopolist profits are given by $\Pi = (R^e - R^s) \cdot k^M$. It is still necessary to confirm that under these prices, there is enforcement. Replacing in equation (M3'):

$$(1 - \varepsilon) \cdot \ln \left(\frac{w_1^s + w_0^s + \pi}{w_1^s} \right) + \varepsilon \cdot \ln \left(\frac{w_1^e + (1 - \alpha) \cdot \left(\frac{1-\varepsilon}{\varepsilon} w_0^s \right)^\alpha + \pi}{w_1^e + \left(\frac{1-\varepsilon}{\varepsilon} w_0^s \right)^\alpha} \right) \geq 0$$

where $\pi = \left(\alpha \left(\frac{\varepsilon}{(1-\varepsilon)w_0^s} \right)^{1-\alpha} - 1 \right) (1 - \varepsilon) w_0^s$. If w_0^s is sufficiently large, this is the case.

where $\pi = \left(\alpha \left(\frac{\varepsilon}{(1-\varepsilon)w_0^s} \right)^{1-\alpha} - 1 \right) (1-\varepsilon) w_0^s$.

Proof. The proof follows from the analysis above. ■

This result highlights an important feature of this economy with strategic enforcement. It states that under some conditions having one single financial intermediary in autarky is the optimal institutional arrangement. The reason for this is that a large intermediary can internalize the planner's enforcement decision at $T = 1$. The planner can not commit to enforce financial contracts. But the single financial intermediary provides him with a powerful commitment technology: profit maximization by a private agent.

Let us now discuss why the planner has to resort to this second best institution in light of its commitment problem. Instead, it could develop credit policies or operate a state-owned bank that would induce enforcement of contracts. Unfortunately, this requires commitment and if these policies are also subject to the commitment problem, the planner can not do better than the intermediary. In particular, the planner can not commit to any policy where $c_1^s \neq c_1^e$. It then faces a similar problem as with enforcement. Ex-ante it would like to promise that enforcement does not leave any agent worse off compared to no trade in domestic financial markets. But ex-post the planner will break enforcement and redistribute. If the consumption at $T = 1$ is smaller than what savers would get on their own, that is, if $((1-\varepsilon)w_0^s)^{1-\alpha} + w_1^s(1-\varepsilon) + w_1^e\varepsilon < w_1^s + w_0^s$, then savers are better off not participating in the financial market with the planner policy. In these cases, the planner is better off resorting to the single financial intermediary as a commitment technology.

2.2 Capital flows liberalization

Assume now that there is a deep international market with no enforcement problems willing to supply or demand funds in period 0 in exchange for a gross interest rate of $R^* = 1+r$ in period 1. Defaulting on contracts with the international market comes with no externally imposed costs, but it can have internal costs. This is the consequence of the assumption that it is not possible to discriminate between domestic and foreign asset trades. Under this assumption, enforcement breakdown means also that all the planned domestic trades are canceled.

Following capital flow liberalization, savers can deposit abroad or at home, but entrepreneurs have to borrow from domestic intermediaries, who in turn access foreign markets or domestic savers. Agents in this economy face different interest rates on their financial trades with the international market due to enforcement problems. If an agent is borrowing from abroad $R^{B,*}(E) = \frac{1+r}{\Pr(E=1)}$, but if an agent is lending abroad $R^{L,*} = 1+r$.¹⁵

Once again there are two possible equilibria that I label Pessimistic (P) and Optimistic (O). In the pessimistic equilibrium, savers invest abroad and enforcement always breaks down, independently of the level of competition. Savers are better off compared to autarky, as they can now benefit from the international interest rate and avoid storing. In the optimistic equilibrium, savers save domestically and enforcement can happen, but it may depend on the level of competition in financial markets.

In order to have enforcement it is necessary that the deposits made by savers are subject to the enforcement decision. But it is not sufficient. In case of enforcement

¹⁵Throughout, I will assume a symmetric equilibrium for all agents in the economy and that gross positions are minimized.

breakdown entrepreneurs do not repay what they borrowed. Strategic enforcement will trade-off the costs of enforcement breakdown borne by savers, with the benefits accruing to entrepreneurs. It follows that for an optimistic equilibrium to exist, entrepreneurs must not promise too many payments abroad through financial intermediaries.

Like before, assume that if the optimistic equilibrium exists it is played. If the optimistic equilibrium does not exist, then the pessimistic equilibrium is played instead. In order to distinguish between domestic and foreign trades, let b^i stand for domestic financial of agents trades, with $B^s = (1 - \varepsilon) b^s$, $B^e = \varepsilon b^e$ and $F = B^e + B^s$ for foreign trades. Under autarky, $F = 0$. I will focus on economies that following opening to capital flows, import capital from abroad.

2.2.1 Equilibrium under perfect competition

As discussed under autarky, under perfect competition the existence of the optimistic equilibrium is not always guaranteed. Under capital flow liberalization, besides redistributive concerns, enforcement breakdown comes with the benefit that payments abroad are canceled at $T = 1$.¹⁶

In an optimistic equilibrium savers deposit domestically, and intermediaries complement these funds with foreign borrowing to supply entrepreneurs. I can construct the optimistic equilibrium by finding conditions under which enforcement breakdown would destroy so much domestic asset trade that this does not compensate avoiding payments abroad. If that is the case:

$$R^{S,*} = R^{B,*} (E = 1) = 1 + r \quad (7)$$

and domestic deposits are again given by:

$$B_0^s = (1 - \varepsilon) w_0^s \quad (8)$$

while borrowing by entrepreneurs and intermediaries is given by

$$B_0^e = -\varepsilon \left(\frac{\alpha}{1 + r} \right)^{\frac{1}{1-\alpha}} \quad (9)$$

$$F_0^e = B_0^s + B_0^e$$

The condition determining the existence of this equilibrium when the domestic economy is a net capital importer is given by:

¹⁶To see that the pessimistic equilibrium with $k_0 = 0$ and $F = \omega_0^s (1 - \varepsilon)$ always exists, suppose all savers deposit abroad and all intermediaries catering entrepreneurs borrow from abroad. Then, enforcement only implies a transfer of resources abroad, and there is enforcement breakdown. Since contracts are never enforced, the interest rate $R^B(P) = \infty$, and investment is zero. In this economy, there is no capital flowing to the country, only capital flight. Entrepreneurs do not invest at all, and savers move their capital abroad to earn the international interest rate.

$$(1 - \varepsilon) \ln \left(\frac{w_1^s + (1 + r) w_0^s}{w_1^s} \right) + \varepsilon \ln \left(\frac{w_1^e + (1 - \alpha) \cdot \left(\frac{\alpha}{1+r} \right)^{\frac{1}{1-\alpha}}}{w_1^e + \left(\frac{\alpha}{1+r} \right)^{\frac{1}{1-\alpha}}} \right) \geq 0 \quad (10)$$

Enforcement breakdown hurts savers and benefits entrepreneurs. If $E_1 = 0$, savers lose $(1 + r) w_0^s$ and entrepreneurs win $\alpha \left(\frac{\alpha}{1+r} \right)^{\frac{1}{1-\alpha}}$. Note that if $1 + r$ is smaller than $R^{AUT,PC}$ savers are worse off following liberalization. In the optimistic equilibrium the incentives to redistribute towards entrepreneurs are less prevalent compared to autarky. Observing equation (10) it is possible to see that if savings are sufficiently large this equilibrium always exists. Finally, the need of intermediation also plays a role, in particular if $\alpha / (1 + r)$ is too large, this inequality will not hold and the optimistic equilibrium does not exist.

2.2.2 Equilibrium under one financial intermediary

Under capital flow liberalization the single financial intermediary is still a monopolist, but no longer a monopsonist as savers can now deposit abroad. Besides redistribution, there is a new way a monopolist can induce enforcement. The monopolist can constrain lending to make sure that the optimistic equilibrium exists in situations where foreign borrowing would otherwise be too large.

The problem of the monopolist looks very similar to the one under autarky, except that now there are no constraints on the amount of funds he has access to. Furthermore, because now savers can also deposit their funds abroad, the marginal cost of funds is larger. The problem can be summarized as:

$$\begin{aligned} (R^s, R^e) &= \arg \max_{E_0} \left[E_1 \cdot (R^e - R^s) \cdot \varepsilon \cdot \left(\frac{\alpha}{R^e} \right)^{\frac{1}{1-\alpha}} \right] \\ &\quad \text{s.t.} \\ R^e \varepsilon \cdot \left(\frac{\alpha}{R^e} \right)^{\frac{1}{1-\alpha}} &\leq \varepsilon \cdot \left(\frac{\alpha}{R^e} \right)^{\frac{1}{1-\alpha}} & (M2) \\ (1 - \varepsilon) \cdot \ln \left(\frac{c_1^s(E_1=1)}{c_1^s(E_1=0)} \right) + \varepsilon \cdot \ln \left(\frac{c_1^e(E_1=1)}{c_1^e(E_1=0)} \right) &\geq 0 & (M3') \\ R^s &\geq 1 + r \\ c_1^s(E_1) &= \begin{cases} w_1^s + R^s b_0^s + (1 + r)(w_0^s - b_0^s) + \pi & \text{if } E_1 = 1 \\ w_1^s + (1 + r)(w_0^s - b_0^s) & \text{if } E_1 = 0 \end{cases} \\ c_1^e(E_1) &= \begin{cases} w_1^e + (1 - \alpha) \left(\frac{\alpha}{R^e} \right)^{\frac{1}{1-\alpha}} + \pi & \text{if } E_1 = 1 \\ w_1^e + \left(\frac{\alpha}{R^e} \right)^{\frac{1}{1-\alpha}} & \text{if } E_1 = 0 \end{cases} \end{aligned}$$

Suppose that (M2) does not bind and that $E_1 = 1$. The solution is represented in Figure 6, and is such that: $R^s = 1 + r$ and $R^e = (1 + r) / \alpha$.

If at this interest rate $R^e = (1 + r) / \alpha$ there is no enforcement and $E_1 = 0$, the monopolist will increase it further to ensure that enforcement occurs.¹⁷

This section has argued that the monopolist can solve the overborrowing externality that makes the optimistic equilibrium unattainable under the perfect competition. The monopolist can always reduce entrepreneurial borrowing to satisfy the condition that the optimistic equilibrium exists. There is another potential role for the monopolist. To the

¹⁷If it can ex-ante discriminate between domestic and foreign savers, it will make sure that domestic savings are invested in the domestic economy, and are subject to the enforcement decision, thus avoiding the pessimistic equilibrium.

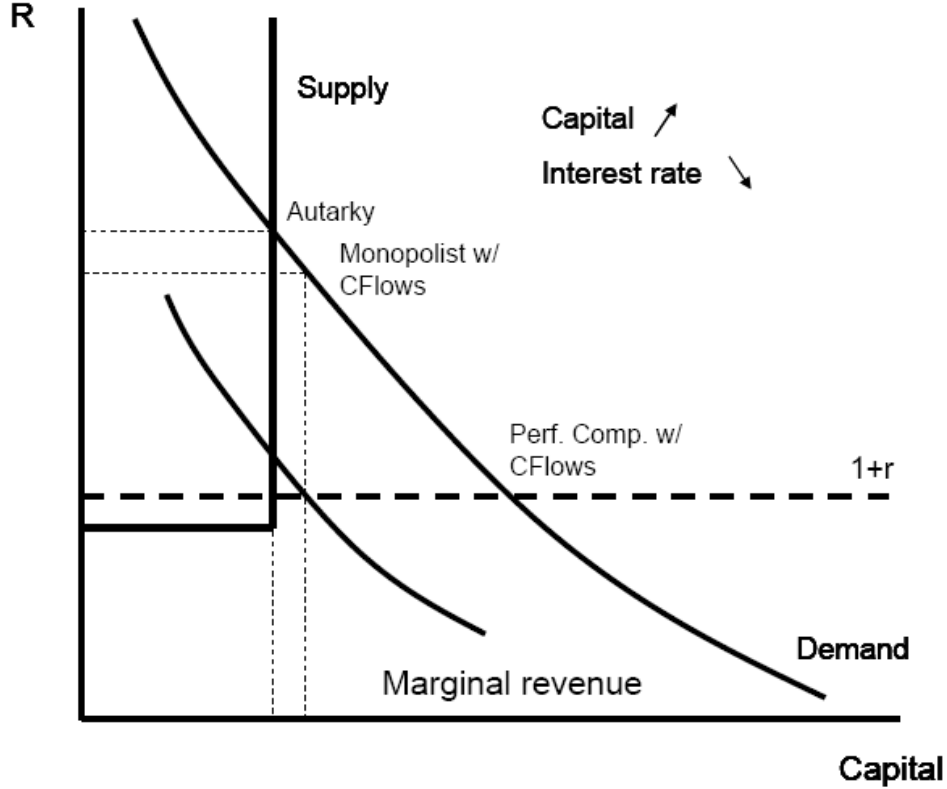


Figure 6: Capital Flow Liberalization with Perfect Competition and with Monopoly.

extent that the monopolist can engage in ex-ante discrimination between domestic and foreign depositors, it can attract domestic savings by paying a larger interest rate on its domestic depositors and this way eliminate the pessimistic equilibrium.¹⁸

The next section studies conditions that determine the optimal institutional arrangement at $T = 0$ under capital flow liberalization.

2.2.3 Policy and investment

I have argued that a monopolist will constrain credit if necessary and make sure that the optimistic equilibrium exists. It is possible to see this beneficial role of the monopolist in Figure 7. This figure shows a situation under which the optimistic equilibrium does not exist with perfect competition. For a given level of domestic savings, the horizontal line represents the smallest level of R^e such that the optimistic equilibrium exists. Let's define this interest rate as $\underline{R}^e$, given by:

¹⁸For the ex-ante discrimination to be effective the monopolist must also guarantee that these deposits are not tradable abroad. Note that I have assumed that if the optimistic equilibrium exists it is played but this need not be the case. Instead if savers are indifferent regarding where to keep their savings, a sunspot variable would determine the symmetric equilibrium. By making sure that domestic savings are invested domestically, the monopolist coordinates savers towards a situation that is independent of the sunspot variable.

$$(1 - \varepsilon) \ln \left(\frac{w_1^s + (1 + r) \cdot w_0^s + \pi}{w_1^s} \right) + \varepsilon \ln \left(\frac{w_1^e + (1 - \alpha) \cdot \left(\frac{\alpha}{\underline{R}^e} \right)^{\frac{\alpha}{1-\alpha}} + \pi}{w_1^e + \left(\frac{\alpha}{\underline{R}^e} \right)^{\frac{\alpha}{1-\alpha}}} \right) = 0 \quad (11)$$

where $\pi = (\underline{R}^e - (1 + r)) \varepsilon \left(\frac{\alpha}{\underline{R}^e} \right)^{\frac{1}{1-\alpha}}$. The optimistic equilibrium only exists if the interest rate charged entrepreneurs is large enough, or in another words, if investment and foreign borrowing are small enough. Crucially, the amount of savings relaxes this constraint which in turn determines when it is better to have perfect competition together with capital flows liberalization.

The next proposition summarizes these results.

Proposition 2 *Under capital flows liberalization, it is better to have a monopolist that can at most constrain trade and capital flows if two conditions are guaranteed:*

1. *The optimistic equilibrium with perfect competition must not exist, $\underline{R}^e(w_0^s) > 1 + r$.*
2. *The optimistic equilibrium with a monopolist must exist.*

These conditions are more likely to be satisfied the lower are savings w_0^s .

Proof. The proof of 1. follows from the analysis above. As argued before, 2. is guaranteed by the monopolist. Finally, the last statement is obtained by noting that $\partial \underline{R}^e / \partial w_0^s < 0$ together with part 1 of this proposition. ■

2.3 Discussion and empirical implications

In this simple framework I have identified a socially valuable role for a monopolist through a classic second best argument. The monopolist is distortionary but has a stake on enforcement. This happens because only through enforcement it can extract rents from the economy. The single financial intermediary can make the optimistic equilibrium possible by constraining the amount of funds supplied to the entrepreneurial sector. In a situation where enforcement would break down under perfect competition due to over-borrowing, a sufficiently large mark-up can correct these imbalances, allow for capital to flow in and spur investment.¹⁹ The main insight of this simple model is to show how reducing competition in financial markets allows intermediaries to internalize externalities and induce enforcement. Profit making intermediaries have a stake on the enforcement of financial contracts, and this in turn substitutes for the lack of commitment by the planner.²⁰

¹⁹This complementarity between capital flows, private agents actions and enforcement is also present in Brutti (2009) and Gennaioli et al (2012), in a different formulation. Furthermore, these two papers focus on the sustainability of public debt.

²⁰Remember that if a monopolist could ex-ante discriminate between domestic and foreign savers he will be interested in keeping domestic savings subject to the enforcement decision. This notion of ex-ante discrimination is considered in Broner & Ventura (2011) as a desired policy by a planner. They argue that it goes against the non-discrimination assumption that is crucial for their analysis. The same argument applies here. One interesting extension would be to understand if private agents can engage better in ex-ante discrimination, perhaps through targeting activities, and if this way the monopolist could also eliminate the pessimistic equilibrium.

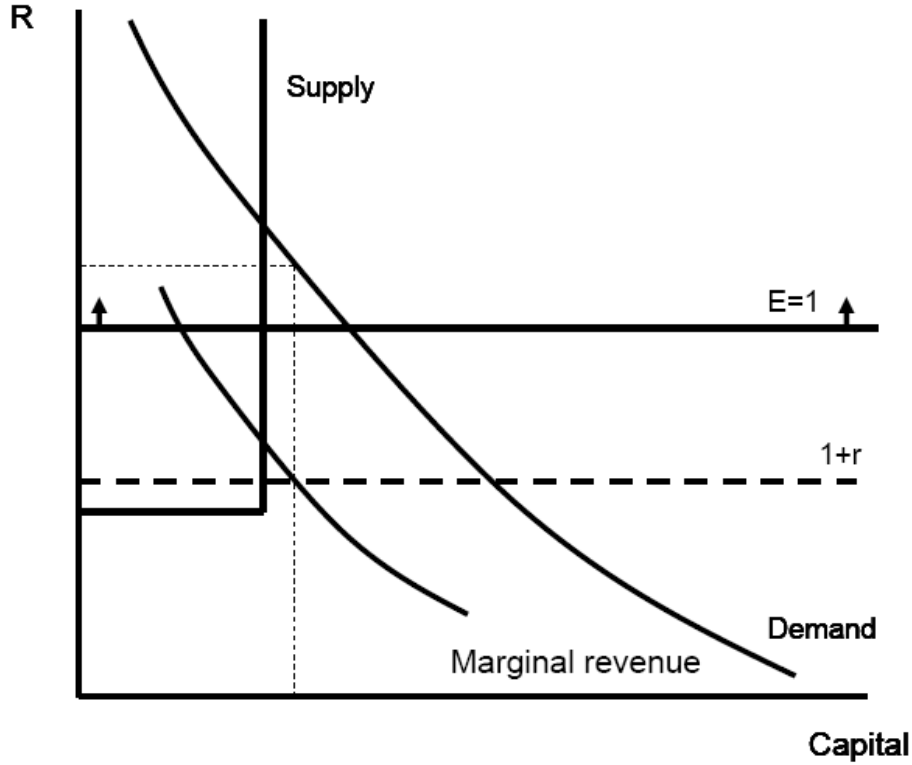


Figure 7: Enforcement breakdown under perfect competition, but enforcement under monopoly.

In the model I have focused on capital flows and domestic competition but many other reforms can be thought of as having similar effects. For example, other macro restrictions such as restrictions on the interest rate and on the quantity of credit, can be thought of as limits on the amount of funds that can be traded in the economy. In a perfectly competitive financial market these can reduce the amount of intermediation but will not necessarily correct the externalities I discuss in the model. This is because ultimately, it matters where the credit comes from. Regarding micro restrictions, the establishment of equity markets can be thought of as an increase of competition. Equity markets allow firms to get funds in the stock market, directly from savers. Therefore, this reform is very similar to introducing competition in the financial sector, to the extent that debt and equity are close substitutes.

This model has non-trivial empirical implications. From an ex-ante perspective, the model suggests that opening to capital flows and to competition should depend on the ability to raise domestic savings. If savings are large both macro and micro reforms should be implemented. If savings are small, reforms should focus only on macro dimensions. This yields two sets of predictions regarding financial reform. If the choice of reform is exogenous, we should observe strong growth for countries doing simultaneous reforms only if they have high savings. If they have low savings, growth should be larger if only macro reforms are implemented.²¹

²¹The model presented in this paper is static by nature. It is still possible to gain some intuition as to what would be the optimal sequencing of different financial reforms. We have seen that a country with low savings relative to entrepreneurial borrowing is better off reforming macro dimensions but not micro.

The choice of reform is most likely not exogenous in the data. It is still possible to see if any correlations between different portfolio of reforms and savings are present in the data. To the extent that countries endogenously select reforms to maximize growth, this should bias the growth coefficients against finding growth differentials in the data due to savings. From an ex-post perspective, the model suggests that opening up to capital flows should increase credit more if there is perfect competition in the domestic financial sector.

The following section turns to the data to see if the insights from the model can help us understand the growth effects of financial liberalization.

3 Empirical analysis

In this section I study empirically the growth effect of different financial reforms. In order to minimize data mining biases I use definitions and specifications from previous work on related topics. In particular, I use the definition of macro and micro reforms by Bandiera et al (2000). In the regressions, I follow closely the specifications of Bekaert et al (2005) and Henry (2007) and Bonfiglioli (2008). Throughout, I investigate the robustness of my results to using alternative definitions of reforms and empirical specifications. Three main results emerge from this analysis.

First, different reform strategies matter for growth. I find that a financial reform incorporating both macro and micro dimensions leads to larger growth than a reform featuring mostly macro dimensions. I extend on the previous literature by using a larger data sample, detailed information on the types of reforms implemented and studying the intensity of reforms. More importantly, I focus on the growth effect effects of different portfolios of reforms.

Second, I argue that savings play a crucial role in the relationship between different reforms and growth. I find that a high savings rate at the time of the reform contributes to explaining the growth differential between simultaneous and macro reforms. Simultaneous reforms come with larger growth only if the savings rate is large. Countries with low savings rates grow more if they perform first macro reforms.

Finally, I show that the distribution of the savings rate is not consistently different across different reforms.

3.1 Data

3.1.1 The Abiad et al (2010) index of financial reform

The main innovation of this index is the breakdown of reform in different dimensions of financial policy: (1) capital account restrictions, (2) credit controls, (3) interest rate controls, (4) entry barriers, (5) state ownership in the banking sector, (6) equity market policy and (7) supervision of the banking sector. Along each dimension, a country was given a score on a graded scale from zero to three, with zero corresponding to repression and three indicating full liberalization (with the exception of supervision of the banking sector, where the opposite is true). This index is available for a sample of 91 countries over

But as capital flows into the country, the borrowing needs of entrepreneurs are smaller. This wealth effect can free the economy from the enforcement problems, make the monopolist obsolete, and allow for reforms also of micro dimensions.

	Obs	Mean	Std. Dev.	Min	Max
Macro	2671	0.5597	0.3424	0	1
Micro	2671	0.4403	0.2974	0	1
GDPgrowth	5807	0.0191	0.0654	-0.5005	1.476
GrossPrivSav/GDP	5308	0.1729	0.1642	-1.426	0.8688
Secondary	4491	60.60	33.71	0.1698	166.17
Life Expectancy	6349	64.19	10.68	26.41	82.51
Gov/GDP	5248	0.1662	0.0720	0.0138	0.8316
POPgrowth	6864	0.0176	0.0167	-0.3586	0.1895
Trade/GDP	5418	0.8053	0.4681	0.0031	4.381
Inflation	5808	41.34	395.18	-53.71	15442.3
CurrentAcc/GDP	4556	-0.0360	0.1057	-2.405	0.567

Table 2: Summary statistics.

the period 1973-2005, making it the most comprehensive database on financial reforms available.

From this database I extract the dates and intensity of different financial reforms. To do so, first I construct two sub-indices of macro and micro financial reforms. I follow Bandiera et al. (2000) and separate this index between macro (1-3) and micro reforms (4-7). I construct the following two indices:

$$macro_t = \frac{capital\ flows_t + credit\ controls_t + interest\ rate\ controls_t}{9} \quad (12)$$

$$micro_t = \frac{entry\ barriers_t + state\ ownership_t + equity\ markets_t + regulation_t}{12} \quad (13)$$

The first two rows in Table 2 show the summary statistics for the macro and micro sub-indices.

3.1.2 Other country characteristics

I use data from the World Development Indicators on the following variables: *GDP* per capita, savings rate, secondary education, life expectancy, government spending as a share of *GDP*, population growth, current account in percent of *GDP* and credit in percent of *GDP*. Merging with the financial reform dataset I obtain an unbalanced panel of 90 countries between 1973 – 2007. Table 2 shows the summary statistics for these variables.

3.2 Financial reforms in the data

In this subsection I outline the definition of financial reforms used in this paper. I then document substantial variation in the way reforms are implemented in the data. This evidence highlights two main strategies of reform: macro financial reforms only, and both dimensions simultaneously.

The main definition of financial reform used in this paper is a threshold definition. The first contribution of the literature on financial reforms and growth is to identify the dates when policy changes take place (namely, Bekaert et al, 2005 and Henry, 2007). I

obtain comparable dates for different financial reforms using the dataset by Abiad et al (2010) and constructing the macro and micro indices defined by equations (12) and (13). In my main specification, I will identify a particular dimension as reformed if the sub-index is above 0.5 (its theoretical mean value). I construct a set of mutually exclusive dummies that take a value of 1 when a dimension is reformed and 0 when it is not. This set of dummies is defined as $\text{Reform}_{i,t} = \{\text{Macro}, \text{Micro}, \text{Simultaneous}\}$. The dummy regarding macro (micro) dimensions is equal to 1 if the macro index is reformed and the micro (macro) index is not reformed. The simultaneous dummy takes on a value of 1 if both dimensions are reformed, and 0 if at least one dimension is not reformed. This dummy approach mirrors the work of Bekaert et al (2005). It differs in that it explicitly accounts for cases when different dimensions are liberalized and cases when these dimensions are simultaneously liberalized.

An alternative definition of reform is to identify reform events (Henry, 2007). I define an event as a change in policy where the subindices move above or below the 0.5 threshold. Events differ with respect to the dimensions that are reformed following the change in policy. I construct a set of dummies that take on the value of one at the moment of reform and up to 5 years following the reform, and zero otherwise: $\text{Reform}_{i,t} = \{\text{Macro}, \text{Micro}, \text{Simultaneous}\}$. Some of these events overlap. A *Macro* (*Micro*) reform is such that following the policy change, only *Macro* (*Micro*) dimensions are reformed. A *Simultaneous* reform is such that both dimensions are reformed. To isolate events, I employ 3 year bands around the date of the event ($T = 0$), and in case of overlap I give priority to the earlier event. If any overlap remains, I give priority to the event that is closest to the actual reform date, i.e., to $T = 0$. Following these rules eliminates all possible overlap between events. The frequency of reforms shown in Table 1 are computed using this approach, and correspond to the dates where $T = 0$. In Table 3 I extend Table 1 and divide policy events by geographical reasons. The main message of this table is that there are no substantial differences in the pattern of reforms across different geographical regions (Table 9 in Appendix B.1 collects these dates).²²

3.3 Financial reforms and growth

In this section I present the effect of different reforms on growth for the main definition of financial reform outlined in the previous section. I investigate these effects using two different approaches, that correspond to the two definitions of reforms discussed above. The first approach tests for a permanent effect of financial reform on growth. The second tests for a temporary effect of financial reform on growth.

3.3.1 Permanent effects

In Table 4 I describe the results of a standard growth regression that follows Bekaert et al (2005). I regress non overlapping five year average growth rates on traditional growth determinants and on the dummies associated with different types of financial reform. The specification is given by:

²²Note that using this definition I am treating a situation where a *Micro* reform is reversed (but a *Macro* reform is not) as a *Macro* reform. This is done to be consistent with the definition of reform that follows Bekaert et al (2005). As a robustness check I have considered reversals as alternative policy events and found similar results.

Ordering of Reform			
Regions	% of episodes in which following dimension (partially) reformed first		
	Macro Reforms	Micro Reforms	Simultaneous
Advanced	43.3	16.7	40
Emerging Asia	56.6	13	30.4
Latin America	51.4	17.1	31.4
Sub-S. Africa	45.8	16.7	37.5
Transition	39.2	14.2	46.4
N. Africa & M. East	50	10	40

Table 3: I normalize macro and micro indices between 0 and 1. Table 1 defines a macro (micro) reform as a change in these indices such that the (macro) index is above 0.5, while the other component is below 0.5. A reform is considered simultaneously macro and micro if it is such that both dimensions are now above 0.5.

$$y_{i,t+k,t} = \alpha_0 + \beta Q_{i,1980} + \gamma' X_{i,t} + \alpha' \text{Reform}_{i,t} + \varepsilon_{i,t+k,k} \quad (14)$$

where $y_{i,t+k,t}$ is the average growth over non-consecutive 5 year windows. $Q_{i,1980}$ represents logged *GDP* per capita in 1980, and the other controls ($X_{i,t}$) include government spending as a percentage of *GDP*, proportion of secondary school enrollment, population growth and life expectancy. I perform a pooled OLS regression where I test the impact of different financial reform dummies ($\text{Reform}_{i,t} = \{\text{Macro}, \text{Micro}, \text{Simultaneous}\}$). I follow the literature and present coefficients and standard errors corresponding to the averages of three non-overlapping 5 year windows, starting in 1981, 1982 and 1983.

This regression captures the average growth effect over 5 years of having different dimensions of financial policy liberalized, independently of when the change in policy took place. Growth regressions have been criticized because of collinearity of the regressors. In order to address this concern, I introduce controls individually. The OLS estimates are consistent and show that the simultaneous liberalization coefficient is large (0.018 in column (7) when all the controls are introduced) and more than four standard errors away from zero. It is also almost double the size of the coefficient associated with performing only macro reforms (0.010). This suggests that, on average, having both dimensions liberalized is associated with a 1.8 percentage points increase in the average of real per capita growth in *GDP* relative to a situation where no dimension is liberalized, and 0.8 percentage points compared to a situation when only the macro dimension is reformed. This is a huge effect of a simultaneous liberalization.²³

The approach of pooling non-overlapping data has the advantage of being simple and transparent, but it is subject to biases. To correct for these I follow Bonfiglioli (2008) and estimate the following system with GMM:

$$dgdp_{it} = \alpha_0 + \beta dgdp_{it-5} + \gamma' dX_{it} + \alpha' \text{Reform}_{it} + dv_t + d\varepsilon_{it} \quad (15)$$

$$gdp_{it} = \alpha_0 + \beta gdp_{it-5} + \gamma' X_{i(t-5,t)} + \alpha' \text{Reform}_{i(t-5,t)} + \eta_i + v_t + \varepsilon_{it} \quad (16)$$

where $dgdp_{it}$ corresponds to $\log\left(\frac{gdp_{it}}{gdp_{it-5}}\right)$, and controls and reform dummies are like in

²³The coefficients associated with the control variables have the expected signs (see Bekaert et al, 2005).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)		(8)
Macro	0.014 (0.005)	0.016 (0.005)	0.013 (0.005)	0.015 (0.005)	0.011 (0.005)	0.012 (0.005)	0.010 (0.005)	Mac Low	0.019 (0.006)
Micro	0.000 (0.009)	0.005 (0.009)	0.003 (0.009)	0.000 (0.009)	-0.001 (0.008)	-0.001 (0.009)	0.011 (0.009)	Mac High	0.015 (0.007)
Simult	0.017 (0.004)	0.023 (0.004)	0.019 (0.004)	0.015 (0.004)	0.012 (0.004)	0.013 (0.004)	0.018 (0.004)	Micro	0.014 (0.009)
$\ln(GDP)_0$		-0.004 (0.002)					-0.017 (0.003)	Sim Low	0.017 (0.005)
Gov/GDP			-0.068 (0.029)				-0.016 (0.032)	Sim High	0.02 (0.005)
Second.				0.003 (0.006)			-0.009 (0.011)	Sim Full	0.023 (0.006)
PopGr					-0.565 (0.133)		-0.957 (0.170)	Privsav $_{t-1}$	0.017 (0.019)
Log(life)						0.028 (0.012)	0.099 (0.022)	Controls	Yes
Constant	0.009 (0.003)	0.043 (0.013)	0.019 (0.005)	0.008 (0.004)	0.021 (0.004)	-0.105 (0.048)	-0.239 (0.083)		-0.193 (0.084)
Obs	409	399	404	392	409	409	377		376
Adj. R2	0.052	0.066	0.061	0.048	0.091	0.063	0.213		0.227

Table 4: Average coefficients and standard errors for 3 separate OLS regressions: 81-05, 82-06; 83-07. All regressions control for log(initial GDP per capita), log(life expectancy), government expenditure as a share of GDP, % secondary school enrollment, population growth. Column (8) controls also for the one period lagged savings rate.

the previous regressipn. Variables with $(t - 5, t)$ are averages between t and $t - 5$, η_i are country-fixed effects, v_t time-fixed effects and ε_{it} is the error term.

Country effect in (15) corrects omitted variable bias. Differences in equation (16) and the estimation using instrumental variables tackle consistency problems. I follow the literature and instrument differences of the endogenous and predetermined variables with lagged levels in equation (15) and levels with differenced variables in equation (16). This system is estimated using the two-step Generalized Method of Moments:

$$\begin{aligned}
E[dgdp_{it-5s}(\varepsilon_{it} - \varepsilon_{it-5})] &= 0, s \geq 2 \\
E[dz_{it-5s}(\varepsilon_{it} - \varepsilon_{it-5})] &= 0, s \geq 2, z = \{X_{it}, \text{Reform}_{it}\} \\
E[gdp_{it-5s}(\eta_i + \varepsilon_{it})] &= 0 \\
E[dz_{it-5s}(\eta_i + \varepsilon_{it})] &= 0 \text{ for } s = 1, z = \{X_{it}, \text{Reform}_{it}\}
\end{aligned}$$

The instruments are valid if the residuals from (15) are not serially correlated, and the coefficient estimates are consistent and efficient. Sargan test of overidentifying restrictions + second order correlation test of the residuals.

	(1)	(2)	(3)
Macro Reform	0.00732** (0.00288)	0.00732** (0.00360)	0.000664 (0.00185)
Micro Reform	0.00981 (0.00505)	0.00981 (0.00734)	0.00347 (0.00331)
Simultaneous	0.0193*** (0.00246)	0.0193*** (0.00335)	0.00491*** (0.00184)
Observations	2588	2588	2588
Number of cc	90	90	90

Table 5: Country and year fixed effects in both regressions. Column (1) shows Huber robust standard errors. Column (2) clusters standard errors at the year and country level. Column (3) reports the coefficients from a cross-sectional time-series FGLS regression. (***) $p < 0.01$, (**) $p < 0.05$, (*) $p < 0.1$)

3.3.2 Temporary effects

Table 5 summarizes the results of an alternative approach that follows Henry (2007). I regress yearly growth on a set of country and time effects, and on a set of country specific dummy variables that take on the value of one in the year that country i performs a particular reform, and on each of the five subsequent years:

$$y_{i,t} = \alpha_0 + \alpha'_{it} \text{Reform}_{i,t} + \varepsilon_{it} \quad (17)$$

where $\text{Reform}_{i,t} = \{\text{Macro}, \text{Micro}, \text{Simultaneous}\}$.

This event-time approach captures the average temporary effect on growth of these different reform strategies using the full time series. Figure 2 shows that countries performing macro reforms grow less than countries performing both reforms simultaneously. The omitted dummy corresponds to the average of the status quo, independently of the actual policy in place. Inspecting columns (1) and (2) of Table 5 it is possible to see that the coefficient associated with a simultaneous episode for the full sample is large, an average increase in growth of 1.93 percentage points over five years, and highly significant. More importantly, it is two times larger than the coefficient associated with performing Macro reforms first.²⁴ These results suggest a stronger growth difference between simultaneous and macro reforms in the short run.²⁵

Taken together my results indicate that simultaneous reforms have large effects on growth, and that these effects are captured both when testing permanent and temporary growth effects of reforms. The data mirrors the effects predicted by the model. In the model growth is indeed largest only when both reforms are implemented, but it is also the

²⁴Column 3 shows the coefficients associated with a FGLS regressions are lower in magnitude but that the difference between simultaneous and macro reforms subsists.

²⁵A potential omitted variable problem is that in a balance of payments crisis, an IMF based reform may not maximize growth opportunities. In particular, it can be tilted towards macro reforms, both for liberalizations and reversals. If that is the case, the dummy variable capturing macro reforms is in fact capturing the recession during a balance of payments crisis. In related research I address this issue by introducing information on balance of payments crisis and on the content of IMF programs. IMF induced reforms are a potential source of exogenous variation in reform, and may be key to uncover the causal effect of reforms on growth.

case that differences in growth should be to some extent due to differences in the savings rate. I turn to these issues next.

3.4 Financial reforms, savings and growth

In this section I extend the analysis of the previous section. In particular I am interested in what drives the positive and large effect of simultaneous reforms on growth.

3.4.1 Permanent effects

I perform two median splits. First, I split the simultaneous dummy into three different components according to the level of the savings rate one period before a reform took place. That is, I replace the dummy variable *Sim* into *SimFull*, *SimLow* and *SimHigh*. *SimFull* corresponds to cases where both dimensions of reform are fully liberalized throughout the sample. This dummy captures very few developed economies, for which we do not have information on the savings rate before the reform. *SimLow* and *SimHigh* correspond to developing economies where the savings rate falls below and above the median of the countries reforming simultaneously.²⁶ Then, I perform the same median split for the macro reform only dummy.²⁷

$$y_{i,t+k,t} = \beta Q_{i,1980} + \gamma' X_{i,t} + \beta_1 MacHigh_{i,t} + \beta_2 MacLow_{i,t} + \beta_3 Mic_{i,t} + \beta_4 SmFull_{i,t} + \beta_5 SmHigh_{i,t} + \beta_6 SmLow_{i,t} + \beta_7 \frac{Sav}{GDP_{i,t-1}} + \varepsilon_{i,t+k,k} \quad (18)$$

Column (8) in Table 3 shows the results. These results suggest a pecking order in terms of financial reform and growth. Countries with larger than median savings rates that have both dimensions reformed (*SimHigh*) tend to do better in terms of growth. But countries with low savings seem better off having only macro dimensions reformed. Abusing notation slightly, we can see in column 8 that $SimFull > SimHigh > MacroLow > SimLow > MacroHigh$. Although these differences are not very large, they are important. For example, a country with higher than median savings rates that has macro dimensions liberalized would grow 0.5 percentage points more over 5 years if it opted to have both dimensions liberalized. Countries with lower than median savings rates would be better off performing only macro reforms (on average 0.2 percentage points more over 2 years).²⁸

3.4.2 Temporary effects

Focus now on the event approach regression. First, I break down Figure 2 according to the level of savings. In Figure 8 I plot the growth effect of a Simultaneous reform for advanced countries (the full line), and for developing countries with higher and lower than

²⁶For this median split to be meaningful I compute the median of the savings rate one year before a simultaneous liberalization, otherwise the median split could be contaminated by growth.

²⁷Bekaert et al (2005) perform a similar analysis to investigate the drivers of growth following equity market liberalizations. They focus on financial development, legal environment, quality of institutions and investment conditions; but not on savings.

²⁸Note I perform these median splits conditional on the type of reform. I also ran the same regressions doing an overall median split and the effects were similar.

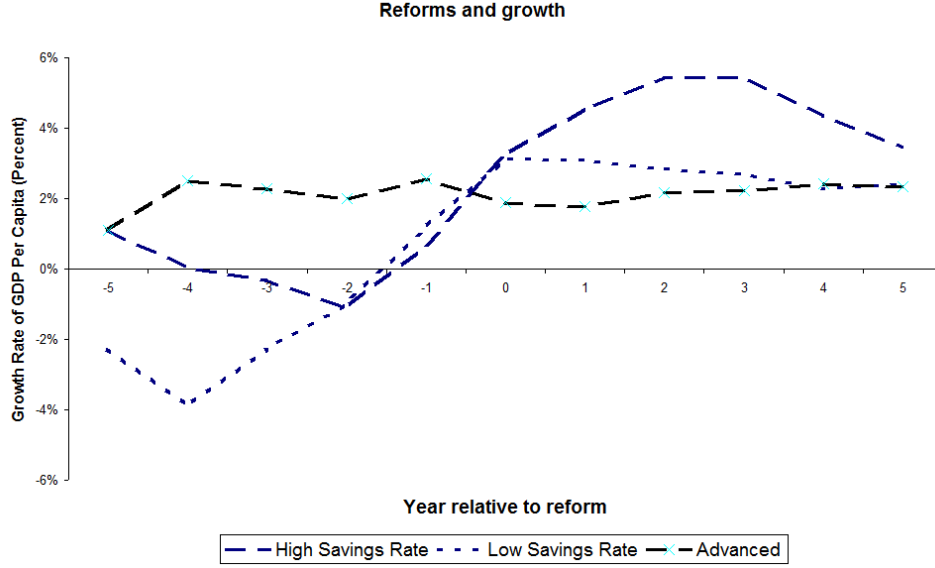


Figure 8: The average growth of GDP per capita following a simultaneous reform rises more for countries with larger than median savings rate.

median savings rates one period before the reform (dashed and dotted lines). In Figure 9 I perform a similar exercise for Macro reforms. Even in this unconditional analysis it is possible to see that growth is larger for developing countries performing Simultaneous reforms if their savings rate is larger than the median. The picture is less clear for Macro financial reforms.

It is useful to run a regressions where I split reforms into three components: Advanced, Higher than median and Lower than median. Just like in the previous section this median split is done one period before the reform. I then run the following regression in a panel of countries, controlling for country and year fixed effects:

$$y_{i,t} = \alpha_0 + \alpha'_{it} \text{Reform}_{i,t} \times \text{SavDum}_{i,t} + \varepsilon_{it} \quad (19)$$

where $\text{Reform}_{i,t} \times \text{SavDum}_{i,t}$ captures whether a particular reform should be treated as higher than median or lower than median. Table 6 collects the results. These results suggest that the temporary effects are even larger than the permanent effects. A country with lower than median savings rate performing macro reforms grows substantially more than a country with high savings (1.3 percentage points over 5 years). A country with higher than median savings rate performing simultaneous reforms grows more than a country with lower than median savings rate. The temporary effect of simultaneous reforms is so strong that simultaneous reform now always dominates other reforms.

3.5 The savings rate and the implementation of reforms

In the previous sections I have identified a positive growth effect of implementing simultaneous reforms relative to macro reforms. I have also argued that the savings rate is important to understand these growth differentials. For the interpretation of this analysis to be casual, it would be necessary that both the timing of reforms and the choice of reform to be exogenous relative to the savings rate. If this decision is not exogenous, countries

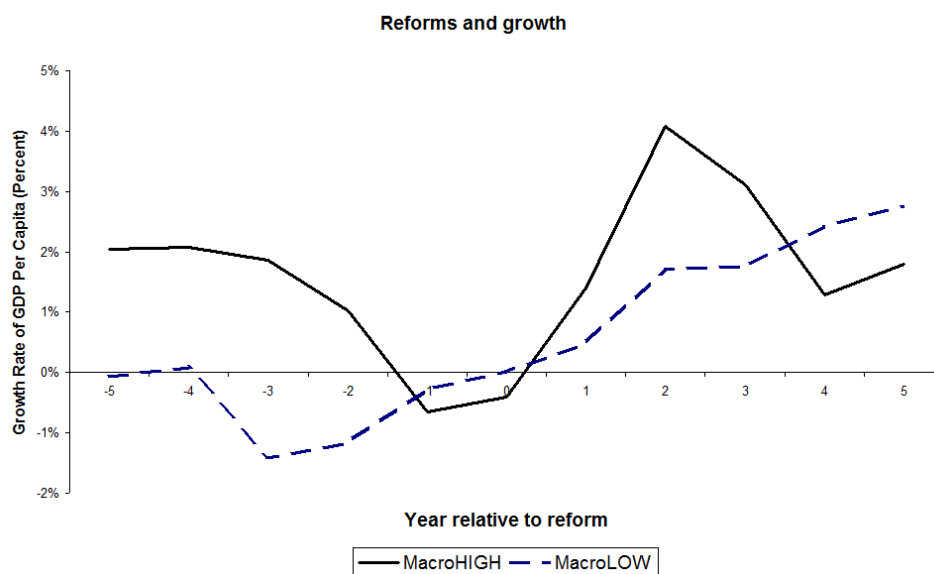


Figure 9: The average growth of GDP per capita following a macro reform by savings rate median split.

	(1)	(2)	(3)
Macro Low Sav	0.0134*** (0.00485)	0.0134** (0.00615)	0.000274 (0.00299)
Macro High Sav	0.00112 (0.00472)	0.00112 (0.00558)	-0.001000 (0.00355)
Macro Adv	0.00795** (0.00356)	0.00795 (0.00615)	0.00428 (0.00272)
Micro	-0.00301 (0.00528)	-0.00301 (0.00734)	0.00202 (0.00336)
Simult. Low Sav	0.0236*** (0.00519)	0.0236*** (0.00757)	0.00689** (0.00331)
Simult. High Sav	0.0264*** (0.00581)	0.0264*** (0.00843)	0.0130*** (0.00386)
Simult. Adv	0.00606** (0.00269)	0.00606* (0.00306)	0.00279 (0.00242)
L.privsav	-0.0645** (0.0311)	-0.0645* (0.0386)	0.0488*** (0.00772)
Observations	2486	2486	2486
Number of cc	89	89	89

Table 6: Country and year fixed effects in both regressions. Column (1) shows Huber robust standard errors. Column (2) clusters standard errors at the year and country level. Column (3) reports the coefficients from a cross-sectional time-series FGLS regression. (***) $p < 0.01$, (**) $p < 0.05$, (*) $p < 0.1$)

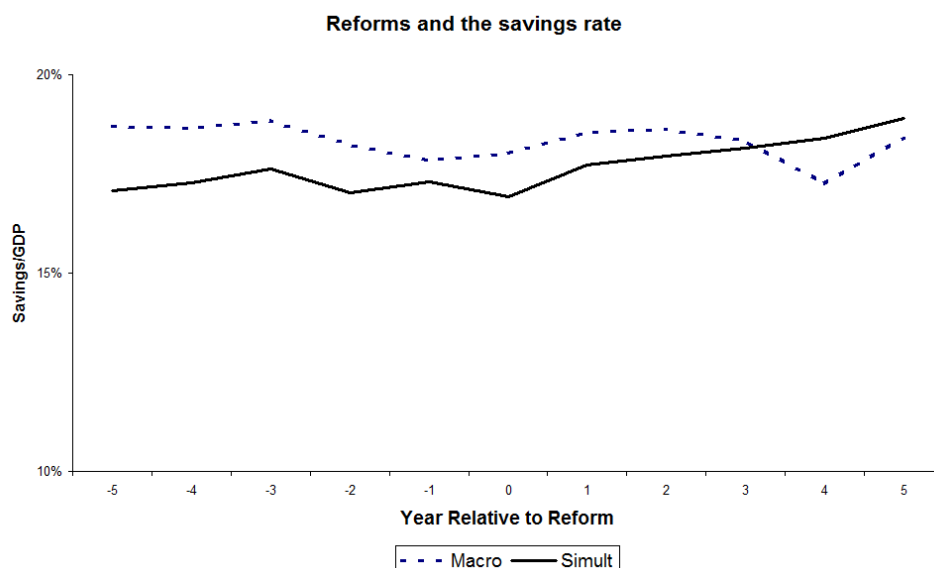


Figure 10: The average savings rate is constant following a simultaneous reform and a macro reform.

would self select into types of reform according to their savings rate. This would bias the analysis, but importantly, it would bias the coefficients against finding growth differentials between reforms. Controlling for the savings rate would be sufficient to account for both the choice of reform and the growth effects that followed.

Unfortunately, it is not possible to test whether the choice of the timing or the choice of financial reform is exogenous. We can still check what were the savings rates before reform and whether there were substantial differences between the two types of reform. If all countries selected reforms according to the optimal plan prescribed by the model, the distributions of savings rates should look very dissimilar. They should have different means and substantial differences in mass, where most countries with large savings rates opt to perform simultaneous reform, and the opposite is true for macro reforms.

Figure 11 plots the one period lagged distribution of savings rates conditional on different types of reform. In the left panel I plot the relevant distribution for the Permanent effect median split. In the right panel I do the same for the Temporary effect median plot. It is possible to see that the distribution of lagged savings rate is not substantially different across reforms.

Another important issue is whether savings rates are themselves affected by financial reform. Previous research has argued that there are no important effects of reforms on savings rates (Bandiera et al, 2000). To address these two issues, first look at Figure 10. This figure plots the average saving rate the two different types of liberalization episodes considered in this paper. It is possible to see that this rate is essentially constant for both simultaneous reforms and macro reforms.²⁹ More importantly, average savings rates are somewhat larger for countries performing simultaneous reform.

²⁹This is consistent with the analysis of Bandiera et al (2000) for a smaller sample of countries, and an earlier data sample.

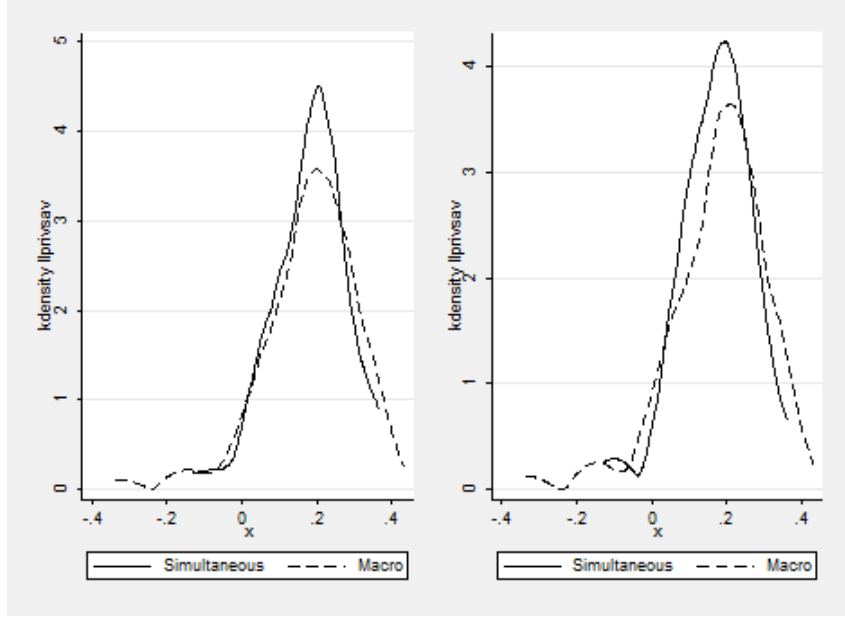


Figure 11: The distribution of savings rates used in the median split in the permanent (left panel) and temporary (right panel) approaches.

3.6 Other predictions of the model

The model predicts that credit should increase more in countries performing both types of reform simultaneously, while savings should not be affected. Figures 10 and 12 confirm this for the average economy doing a specific reform strategy. Savings are essentially constant for both types of financial reforms. On the other hand, credit increases more for the countries simultaneously reforming macro and micro dimensions.

3.7 Robustness

In this subsection I check the robustness of the two most important empirical results in this paper. First, I investigate if the growth differential between macro and simultaneous reform is robust to different definitions of financial reforms and controls. Then, I present evidence that the interaction between reforms and savings is robust. I focus on the permanent effects of growth and investigate two types of robustness checks: on the dummy approach and using alternative specifications. In the dummy approach I control for additional reforms, use an alternative threshold to define reforms and use alternative definitions of the macro and micro indices. Regarding alternative specifications, I use the actual value of the indices and also changes in these indices instead of dummies.

3.7.1 Dummy approach

A potential issue with the analysis presented in the previous subsections is that other reforms can take place at the same time as financial reforms. In this subsection I investigate if the growth difference between reforms is still present after controlling for trade and macroeconomic reforms. These policies that could have independent effects on growth. I measure these reforms by including trade as a share of GDP and the inflation rate (both

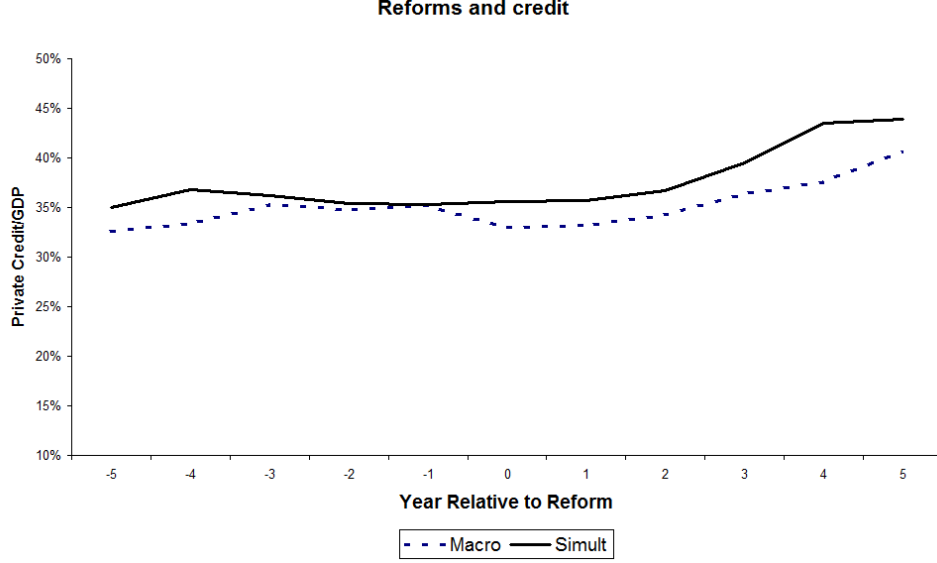


Figure 12: Credit as percentage of GDP increases more following a simultaneous reform.

lagged) as additional controls in the regressions described above. The results are presented in column (1) and (4) of Table 7. They should be compared with the results in column (7) and (8) of Table 4. The first thing to note is that adding additional reforms decreases the magnitude of the reform coefficients. This reflects the interaction between financial reforms and other reforms. The second thing to note is that the difference between macro and simultaneous reforms subsists for column (7), and only simultaneous reforms are more than two standard deviations away from zero. The result that growth is larger for simultaneous reforms with large savings does not seem to be robust to the introduction of these reforms. This could reflect that inflation and trade are more important determinants of growth for countries doing simultaneous reforms with large savings.

In the dummy approach presented in sections 3.3 and 3.4 I chose a threshold of 0.5 for the subindices. This value is the theoretical mean of the normalized indices. I now investigate if results are robust to using a different threshold definition: the sample mean. For each subindex I compute the sample mean between 1973 and 2005 and use these values as the threshold (see Table 2 for the actual values). I present the results in column (2) and (5) of Table 8. Comparing them to the results in column (7) and (8) it is possible to see that results are similar or stronger compared to the main specification.

Finally, I define macro and micro reforms using the indices that are closest to the model. In particular, I redefine macro as capital flows reforms, and micro reforms as the average between entry barriers in the banking sector and equity market liberalization:

$$macro_t = \frac{capital\ flows_t}{3} \quad (20)$$

$$micro_t = \frac{entry\ barriers_t + equity\ markets_t}{6} \quad (21)$$

The results are shown in columns (3) and (6) of Table 3.7.1. It is possible to see that the magnitude of the coefficients is comparable to the previous analysis, but these coefficients are less finely estimated for macro reforms. For simultaneous reforms results

	(1)	(2)	(3)		(4)	(5) mean	(6) reduced
Macro	0.008 (0.005)	0.009 (0.005)	-0.003 (0.009)	Mac Low	0.015 (0.006)	0.021 (0.006)	0.013 (0.011)
Micro	0.006 (0.008)	0.011 (0.007)	0.000 (0.005)	Mac High	0.008 (0.006)	0.008 (0.008)	0.015 (0.025)
Simult	0.010 (0.004)	0.016 (0.004)	0.011 (0.004)	Micro	0.008 (0.008)	0.013 (0.007)	0.001 (0.005)
				Sim Low	0.011 (0.005)	0.014 (0.005)	0.011 (0.005)
				Sim High	0.011 (0.005)	0.020 (0.005)	0.016 (0.006)
				Sim Full	0.011 (0.006)	0.021 (0.006)	0.011 (0.006)
				Privsav _{t-1}	0.019 (0.018)	0.017 (0.019)	0.016 (0.018)
Inflation _{t-1}	0.010 (0.004)			Inflation _{t-1}	-0.015 (0.004)		
Trade _{t-1}	0.009 (0.004)			Trade _{t-1}	0.008 (0.004)		
Constant	-0.122 (0.080)	-0.238 (0.083)	-0.212 (0.084)	Constant	-0.092 (0.081)	-0.197 (0.084)	-0.166 (0.087)
Obs	373	377	377	Obs	373	376	376
Adj. R2	0.280	0.210	0.198	Adj. R2	0.288	0.224	0.200

Table 7: Average coefficients and standard errors for 3 separate OLS regressions: 81-05, 82-06; 83-07. All regressions control for log(initial GDP per capita), log(life expectancy), government expenditure as a share of GDP, % secondary school enrollment, population growth.

go through and are the coefficients are always two standard errors away from zero.

3.7.2 Alternative specifications

In columns (1) and (3) of Table 8 I use the information on the actual indices, that now take on values between 0 and 1, which allows me to measure the intensity of reform. The OLS estimates confirm the results of column (1). The coefficient associated with micro dimensions of the financial index is positive (0.022) and larger than the coefficient associated with macro dimensions (0.012). It is also more than two standard deviations away from zero. When I interact these indices with lagged savings, the difference between macro and micro indices is even larger. Looking at column (3) it is possible to see that the coefficient associated with the micro index is now three times larger than the coefficient associated with the macro index. Note that I control independently for the level of lagged savings so this is not the effect of the savings rate on growth.

Columns (2) and (4) perform a similar analysis but defining a reform as a change (over 5 periods) in each index.

	Indices	Changes		Indices	Changes
Macro	0.012	0.003	Mac×Privsav _{t-1}	0.037	-0.007
	0.008	0.07		0.039	0.033
Micro	0.022	0.020	Mic×Privsav _{t-1}	0.091	0.107
	0.010	0.010		0.043	0.051
			Privsav _{t-1}	-0.042	0.027
				0.022	0.015
Constant	-0.232	-0.09	Constant	-0.240	-0.050
	0.082	0.066		0.084	0.068
Obs	377	358	Obs	376	358
Adj. R2	0.229	0.329	Adj. R2	0.215	0.335

Table 8: Average coefficients and standard errors for 3 separate OLS regressions: 81-05, 82-06; 83-07. All regressions control for log(initial GDP per capita), log(life expectancy), government expenditure as a share of GDP, % secondary school enrollment, population growth.

$$y_{i,t+5,t} = \alpha_0 + \beta Q_{i,1980} + \gamma' X_{i,t} + \alpha' \Delta Lib_{i,t,t-5} + \varepsilon_{i,t+5,t} \quad (22)$$

The analysis is very similar to the specification with the index values. Note how the difference between macro and micro indices is of one magnitude larger when interacted with savings. Savings interact positively with the micro index, but not with the macro index. Together with the fact that reforms tends to occur more often in macro indices alone, this analysis is consistent with the view that savings and different types of reform interact in non trivial ways.

4 Conclusion

This paper presents a simple model that highlights why restricting domestic financial competition when opening up to capital flows might be a desirable policy mix. A first pass at the data suggests that these mechanisms are important empirically, but also unveils a more general view that the different financial reforms matter empirically.

Future research should study the robustness of the mechanism. Theoretically, this simple model can be explored in the context of a dynamic stochastic general equilibrium framework. This would deliver predictions regarding the sequencing of different financial reforms that can be taken to the data. Furthermore, there are other reasons why domestic financial competition might be hurtful when opening up to capital flows. The debate on competition and stability in the banking sector is an alternative explanation (see Beck (2008) for a survey). A general model of competition and capital flow liberalization should add these to the mechanisms considered in this paper, and evaluate the relative contribution of complementary explanations.

The biggest challenge lies with empirical work. This paper has presented some suggestive evidence but if stops short of a full test of the theory. Although the episodes and regressions presented in Section seem to support the view that macro financial liberalization interacts with domestic financial competition in non-trivial ways, the role of

competition remains hard to discern empirically. One difficulty with the data is that it is hard to measure competition in the financial sector.

As the world economy exits the most important crisis since the great depression and finds itself struggling with a backlash against market-based financial reforms, the understanding of the optimal policy mix and timing of different reforms is of incalculable value. The last 40 years have been rich in different experiences with reform and reversals which provides economists with a laboratory to study the theory of financial reform. For these reasons, the topics addressed in this paper remain an interesting field for future research.

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Country	Macro Reform	Country	Macro Reform	Country	Macro Reform	Country	Macro Reform	Country	Simultaneous
Albania	1994	Italy	1982	Turkey	1986	Paraguay	1982	Hungary	1996
Albania	2003	Jamaica	1991	Tanzania	1993	Sweden	1980	Indonesia	1999
Argentina	1977	Japan	1979	Uganda	1994	Uzbekistan	2002	Ireland	1985
Argentina	1990	Kazakhstan	1994	Ukraine	1994	Venezuela	1994	Israel	1994
Australia	1984	Kenya	1991	Uruguay	1979	Zimbabwe	2002	Italy	1992
Austria	1980	Kyrgyz Rep	1993	Venezuela	1978			Jamaica	2000
Austria	1990	Korea, Rep	1984	Venezuela	1989	Country	Simultaneous	Jordan	1990
Azerbaijan	1995	Korea	1997	Vietnam	2002	Albania	1999	Japan	1991
Burkina Faso	1989	Sri Lanka	1992	South Africa	1982	Australia	1988	Kazakhstan	2000
Bangladesh	1992	Lithuania	1993	Zimbabwe	1991	Azerbaijan	2004	Kenya	1996
Bulgaria	1994	Madagascar	1990			Belgium	1977	Kyrgyz Rep	1996
Bolivia	1985	Mexico	1989	Country	Micro Reform	Burkina Faso	1998	Sri Lanka	2000
Chile	1977	Mozambique	1994	Argentina	1982	Bangladesh	2005	Lithuania	1997
China	2004	Malaysia	1978	Austria	1985	Bulgaria	2000	Latvia	1994
Costa Rica	1991	Nicaragua	1993	Bulgaria	1997	Belarus	2004	Malaysia	1989
Czech Rep	1992	Norway	1983	Belarus	1993	Bolivia	1992	Nigeria	1996
Denmark	1982	Nepal	2001	Brazil	1996	Chile	1986	Nicaragua	1997
Dominican Rep	1991	New Zealand	1976	Chile	1982	Côte d'Ivoire	1992	Pakistan	2004
Algeria	1994	New Zealand	1984	Côte d'Ivoire	1976	Colombia	1991	Peru	1993
Ecuador	1992	Pakistan	1995	Cameroon	1996	Germany	1975	Philippines	1994
Ecuador	1998	Peru	1990	Ecuador	2005	Dominican Rep	1999	Paraguay	1993
Egypt	1991	Philippines	1984	Spain	1983	Ecuador	2001	Russian Fed	1995
Spain	1977	Portugal	1988	Finland	1982	Egypt	1996	Senegal	1996
Ethiopia	1974	Paraguay	1988	Korea, Rep.	1989	Spain	1987	Sweden	1985
Ghana	1990	Romania	1993	Morocco	1994	Estonia	1994	Thailand	1992
Greece	1990	Senegal	1989	Malaysia	1975	France	1984	Turkey	1995
Guatemala	1990	El Salvador	1992	Nigeria	1988	United Kingdom	1979	Tanzania	1998
Indonesia	1983	Thailand	1989	Nepal	2005	Georgia	1996	Ukraine	1997
India	1998	Thailand	1998	New Zealand	1981	Ghana	2004	Uruguay	1990
Israel	1987	Tunisia	1994	Poland	1992	Greece	1993	South Africa	1986
						Guatemala	2002	Zimbabwe	1997

Appendix: Table 9