

Foreign Lenders and the Real Sector*

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Abstract

We develop a theory of the interaction between the entry of lenders and the real sector. The high liquidation skills of incumbent lenders render them too tough in terminating high-risk/return projects. Being “foreign” to the market, newcomers have lower ability to liquidate than incumbents. This makes them softer in liquidating high-risk/return projects but renders their funding more costly. We show that the entry of lenders and the share of high-risk/return projects can reinforce each other through firms’ liquidation values. This interaction dampens the output impact of liquidity shocks. Hence, financial liberalization can enhance stability.

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In the last two decades several financially liberalized countries, such as the United States, the United Kingdom, the Nordic countries, the East Asian countries, have experienced an

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aggressive entry of new lenders into their credit markets. Cross-border lending has played an important role in this process. Japanese banks increased their presence in the United States during the 1980s and in East Asia during the 1990s (Peek and Rosengren 2000a). In the United States, after the abolition of interstate branching restrictions by the 1994 Riegle-Neal Act, banks have expanded beyond state borders. This process is likely to continue in the future. In Europe policy makers are considering to relax regulatory and supervisory barriers that inhibit banks' cross-border expansion and the integration of national banking systems. The impact of financial liberalization has had a functional dimension besides a geographic one, with lenders spreading their loan portfolios beyond their traditional area of activity. In the 1980s Nordic and UK banks increased their involvement in the real estate sector. More recently, in several countries, banks granted loans to internet and telecom companies.

The mechanisms through which new (foreign) lenders interact with incumbent economic actors are non-obvious. The entry of lenders into liberalized economies and sectors has allegedly had dramatic effects on firms' behavior and the nature of their projects. According to *The Economist* (1999), a popular view is that an effect of this entry has been to "increase the riskiness of traditional behavior or introduce new and inexperienced players". Is this view justified? Even less obvious is therefore the impact of financial liberalization on economic stability through lenders' entry. Recent research has identified a pattern in which financial crises tend to be preceded by episodes of financial liberalization, especially in emerging economies (see, e.g., Kaminsky and Reinhart 1999). These studies consider a broad definition of financial liberalization, comprising the opening of the capital account, the liberalization of the securities and stock markets and of the domestic financial system.¹ However, they are substantially silent on the role that foreign or new banks have in the crises. Indeed, there seems to be a discrepancy on this aspect of financial liberalization between the popular

view and the extant evidence. On the one hand, concerns have mounted on the possible destabilizing behavior of foreign financial institutions (Dages, Goldberg and Kinney 2000). For example, Peek and Rosengren (2000b, p. 147) write that “Arguments against allowing the entry of foreign banks into domestic markets usually include concerns (...) that foreign banks will not serve as a stabilizing influence by providing additional credit during a crisis in the host country”. On the other hand, several empirical studies suggest that lending by foreign banks exhibits a less procyclical pattern than that by domestic ones and that foreign banks can enhance output stability. Dages, Goldberg and Kinney (2000) find that in Mexico and in Argentina in the late nineties the relative share of foreign lending exhibited a countercyclical pattern. Goldberg (2002) finds that lending by US banks to industrialized countries does not respond significantly to cyclical changes in the fundamentals of the host country, less so than lending by domestic banks. Morgan, Rime and Strahan (2003) focus on interstate banking in the United States and find a negative correlation between out-of-state bank share and state business volatility. The timing of entry also hints at a stabilizing behavior of foreign banks (see Montgomery 2003 for a review of the evidence). Diamond and Rajan (2001b) find that in the late nineties in six East Asian countries foreign banks increased their lending after the onset of the crisis. Peek and Rosengren (2000b) and Kraft (2002) disentangle a similar behavior of foreign banks during the 1994-95 Tequila crisis of Argentina, Brazil and Mexico and during the 1998-99 Croatian crisis, respectively. De Haas and van Lelyveld (2002) find that in Central and Eastern Europe foreign banks expand their credit supply during economic downturns. Foreign banks also appear to buffer shocks to volatile sectors, such as real estate: for example, in Thailand they engaged in the financing of property projects after the onset of the 1997 crisis (Bank of Thailand 2001).

In this paper, we put forward a theory of the interaction between the entry of lenders

“foreign” to a market and the nature of projects based on firms’ liquidation values. Consistent with the above evidence, we show that the entry of new (foreign) lenders can dampen the output effect of exogenous shocks. Thus, financial liberalization can enhance stability, at least through this channel. Since our theory applies to the entry of both newly born and foreign lenders, henceforth we generically label “incumbents” (“newcomers”) lenders with a consolidated (lack of) experience of the market. The crucial feature of our economy is that newcomers have lower ability than incumbents to extract value from the assets of borrowers. It is plausible that, especially when the local market and its legal system are opaque, newcomers have lower ability to recover and/or liquidate the assets of failed customers. The disadvantage of newcomers could materialize at the bankruptcy stage because newcomers could be less aware of local insolvency practices. Hermalin and Rose (1999, p. 373), argue that “an alien legal system means that a foreign lender’s domestic expertise on enforcement is of lower value; the foreign lender may, therefore, need to make expensive investments in acquiring the necessary expertise or become reliant on expensive local expertise”.² The disadvantage of newcomers could also materialize at the redeployment stage. For example, when second-hand users feature heterogeneous efficiency in employing assets, newcomers could be less able to identify efficient users. As this ability is at least partly a by-product of the information gathered in credit relationships, a newcomer with no history of lending to local firms will be likely to lack it.

We show that the entry of newcomers and the riskiness of projects can reinforce each other through firms’ liquidation values. The intuition is as follows. In our economy, entrepreneurs can choose between safe projects and risky projects with higher returns.³ With some probability, both types of projects need to be refinanced at an interim stage. Because of their high liquidation skills, incumbents have strong incentives to terminate projects with

high probability of failure and liquidate assets rather than refinancing. Because of their lower liquidation skills, instead, newcomers are reluctant to liquidate a project prematurely and always refinance, even if the project has high probability of failure. Their softer budget constraint in refinancing high-risk/return projects renders newcomers more appealing lenders than incumbents. However, their lower liquidation skills make their funding more costly because they expect a lower return from asset liquidation if a project fails. In equilibrium, entrepreneurs who derive high returns from risky projects borrow from newcomers, sustaining an extra funding cost, and choose high-risk/return projects; entrepreneurs who derive low returns from risky projects borrow from incumbents and choose safe projects, saving on funding costs.

Now, suppose that a negative shock to asset liquidity depresses liquidation values. The fall in the liquidation price of assets erodes the cost advantage of incumbents associated with their higher liquidation skills. By eroding the cost advantage of incumbents, the price fall pushes some entrepreneurs to switch to newcomers and risky projects, spurring the expected default rate and supply of liquidated assets. In turn, this induces a further fall of the liquidation price. In fact, as the number of liquidated assets increases, lenders have to sell assets to less productive second-hand users who are willing to pay a lower price for them. This induces further entrepreneurs to switch to newcomers and high-risk/return projects and so forth.

The interaction between the entry of newcomers and the share of high-risk/return projects stabilizes output following liquidity shocks. In our economy, the share of high-risk/return projects is suboptimally low. The high liquidation skills of incumbents, coupled with contractual incompleteness, render incumbents too conservative towards high-risk/return projects. Entrepreneurs can escape incumbents' too hard budget constraint by borrowing from new-

comers who, however, are an imperfect substitute for incumbents. In fact, newcomers impose on entrepreneurs the cost of their low liquidation skills, discouraging some entrepreneurs from borrowing from them and implementing risky projects. Following, for example, a negative shock to asset liquidity, the cost of the low liquidation skills of newcomers declines and more entrepreneurs choose newcomers and risky projects, approaching the optimal share of high-risk/return projects. This dampens the negative impact on output of the decline in asset liquidity. The model can thus rationalize the empirical findings on the stabilizing role of foreign lenders.

The rest of the paper is organized as follows: in section 1, we review related papers. In section 2, we present the model. In section 3, we conclude and assess policy implications. The proofs are in the Appendix.

1 Related Literature

The closest papers are Diamond and Rajan (2001a, b), Dewatripont and Maskin (1995) and Shleifer and Vishny (1992). In analyzing the rationale for the short-term liability structure of banks, Diamond and Rajan (2001a, b) argue that banks have better liquidation skills than dispersed investors. Diamond and Rajan (2001b) qualitatively discuss applications of their theory. Interpreting dispersed investors as foreign investors, they argue that foreign, short-term lending intermediated by domestic banks allows the latter to commit their liquidation skills and fund illiquid projects. When we interpret newcomers as foreign lenders, there are at least three differences between our analysis and this application of their theory. First, we analyze direct foreign lending, in substitution of domestic lending, rather than foreign lending intermediated by domestic banks. Second, we describe the interaction between type

of projects and direct foreign lending. Diamond and Rajan (2001b) analyze how short term debt spurs illiquid projects but not feedbacks, even less so through firms' liquidation values (exogenous in their context). Finally, the type of projects that foreign lending allows financing differs: while they focus on illiquid projects, we focus on high-risk/return ones.

In Dewatripont and Maskin (1995), some firms choose between long term, very profitable projects and short term profitable ones while others choose between long term poor projects and short term profitable ones. Dewatripont and Maskin (1995) show that, in an economy where firms borrow from multiple sources, lenders can have a too hard budget constraint towards long term projects and firms may implement short term ones. In their context, lenders have all the same skills so that there is no room for analyzing the entry of foreign or new lenders. Furthermore, Dewatripont and Maskin (1995) focus on "investment horizons" and project length while we focus on project riskiness and liquidation values. Shleifer and Vishny (1992) analyze the interaction between firms' debt and liquidation values and the role of asset liquidity in this interaction. Despite our different focus, we share with them the emphasis on endogenous liquidation values. If one believes that lenders' entry has important effects on firms' average riskiness and default rate, treating liquidation values as endogenous and analyzing their feedback on the entry of lenders appears to be necessary.

The paper also relates to the literature on the entry of lenders into a credit market (e.g. Broecker 1990). This literature generally analyzes the impact on the efficiency and structure of the credit sector. In analyzing limits to competition in the credit market, Dell'Ariccia, Friedman and Marquez (1999) assume that incumbents have more information than new lenders on the riskiness of borrowers. This allows them to fund safe borrowers, leaving new lenders exposed to adverse selection and blocking their entry. In their context, risk deters entry while in ours the riskiness of projects and the entry of newcomers reinforce each other.

Furthermore, in their model the asset liquidity plays no role. Finally, our model departs from theirs in its emphasis on the real sector. In particular, we analyze how the interaction between the entry of lenders and the nature of projects affects output stability. Our paper is also related to Tirole (2003). We share with his paper the analysis of the real effects of the entry of foreign lenders in an economy with incomplete contracts and agency problems. However, Tirole (2003) focuses on the interaction between the decisions of domestic firms and the government policy choices that affect foreign entry. In this paper, instead, we take the policy environment as given.

2 The Model

2.1 Setup

The economy lasts three dates, 0, 1 and 2. There is a unit continuum of entrepreneurs and two continua of lenders (“incumbents” and “newcomers”) each of mass greater than unity. There is initially only the final good, while assets can be produced. All agents are risk neutral and consume final good at date 2.

Technology Entrepreneurs have no endowment. At date 0, each entrepreneur can choose a safe or a risky project. In both types of project at date 0 the entrepreneur invests an amount I_0 of final good and at date 1 obtains $A \geq 1$ indivisible, productive assets.⁴ With probability $1 - \alpha$ production is “fast” and at date 1 the assets yield Y . With probability α production is “slow” and at date 1 the entrepreneur needs to invest an additional amount I_1 of final good. If the refinancing occurs and the project is safe, at date 2 the assets yield Y/p_s with probability p_s ($0 < p_s < 1$) or the project fails, the assets yield 0 and one

non-depreciated asset can be redeployed outside the firm. If the refinancing occurs and the project is risky, at date 2 the assets yield $(Y + y)/p_r$ with probability p_r ($0 < p_r < p_s$) or the project fails, the assets yield 0 and one non-depreciated asset can be redeployed. Finally, if the refinancing does not occur and the assets are not used in production, at date 2 the project fails with certainty and the A non-depreciated assets can be redeployed. y/p_r is the entrepreneur-specific return of a risky project, with y uniformly distributed on the support $[0, 1]$. Each entrepreneur knows her value of y when she chooses between a safe and a risky project.

At date 2 each entrepreneur can use zero or one liquidated asset. We let $\alpha \ell \in \alpha [\underline{\ell}, 1]$ ($\underline{\ell} > 1 - p_r$) be the share of entrepreneurs who can use one liquidated asset and λ the amount of final good produced with it, with λ uniformly distributed on the support $[0, \ell]$. The lower bound on $\underline{\ell}$ will guarantee that the asset liquidation price is positive.

We impose a lower bound on the output of projects:

$$Y > I_0/(1 - \alpha) + I_1 + A. \tag{1}$$

Assumption (1) guarantees that at date 0 the net expected return from a project is strictly positive and that at date 1 the expected return from refinancing a project exceeds the return from liquidating its assets.

In Figure 1 we summarize the timing of events.

Financing Each lender has an amount of final good I_0 at date 0 and I_1 at date 1 that she can store or lend. At date 0 and date 1 lending occurs in one to one relationships, i.e. a lender funds one entrepreneur and an entrepreneur is funded by one lender. Hence, at date 1 the project of an entrepreneur can be refinanced only by her date 0 lender. We assume that the refinancing decision of a lender is non-contractible. We restrict the date 0 (non-

renegotiable) contract between a lender and an entrepreneur to a standard debt contract that specifies a loan of I_0 at date 0 and a repayment R at date 2. If at date 2 the project fails, the lender recovers proceeds from the redeployment of the non-depreciated assets up to the agreed repayment R .⁵

At date 0, when she funds an entrepreneur, a lender, incumbent or newcomer, observes whether the project chosen by the entrepreneur is safe or risky. At date 2, instead, the two types of lenders differ in their ability to recover and/or redeploy the assets of their borrower. Perhaps because of lack of experience of the local market, a newcomer faces a liquidation cost proportional to the value of liquidated assets.⁶ Let $1 - \theta$ be the fraction of value that is lost by a newcomer with

$$\theta < (1 - p_s)/(1 - p_r). \quad (2)$$

Assumption 2 implies that the liquidation ability of newcomers is not too close to that of incumbents. As we clarify later (2.4), this guarantees that lenders' heterogeneity has a first order effect on asset liquidation values.⁷ We also assume that an entrepreneur faces a liquidation cost higher than that of a newcomer. This captures the idea that concentrated lenders, such as banks, develop superior skills for reorganizing funded firms and liquidating their assets (Sheard 1989; Habib and Johnsen 1999). The results are identical whether we consider the liquidation cost a transfer, as below, or as a real cost.⁸

Secondary Market Lenders can sell the assets recovered from borrowers in a spot secondary market that opens at date 2. We denote with $q \geq 0$ the resale price of an asset in the secondary market. Entrepreneurs can finance the purchase of liquidated assets borrowing in the credit market. We assume that the mass of lenders is such that at date 2 the loanable funds are more than enough to finance these purchases.

2.2 Discussion of the Setup

Technology The timing of production decisions resembles that in Dewatripont and Maskin (1995). In their economy, long term, profitable projects and long term poor ones populate entrepreneurs' opportunity set and both types of projects must be refinanced at an intermediate stage. We depart from Dewatripont and Maskin (1995) in two dimensions: the nature of the projects and the endogenous, general equilibrium determination of liquidation values. Allowing for heterogeneous ability of second-hand users to generate a downward sloping asset demand is standard: Ramey and Shapiro (2001), Shleifer and Vishny (1992) and Habib and Johnsen (1999) provide foundations for this assumption. Later in the paper (2.5), we show that this heterogeneous ability may explain the difference in the liquidation skills of incumbents and newcomers.

Financing On the financing side, we have to discuss the control of the lender through the refinancing decision and the contractual incompleteness. A word of caution is due. Since this paper has an aggregate focus, we have chosen a parsimonious specification that effectively conveys our message. In what follows, we motivate it and show that the results would carry through with richer, albeit more complex, specifications.

Control. Starting by the lender's control, we borrow from a vast literature (e.g. Rajan 1992) the idea that firms are locked into their original lenders and cannot address new financiers for refinancing. This is sometimes justified with firms' informational opaqueness: new lenders are unwilling to refinance projects because, unlike the original lenders, they lack information on them. We could endogenize such a problem of adverse selection. Some of the slow projects could be "rotten" and at the refinancing stage only the original lenders could be able to discern rotten projects. Note that the lender's "refinancing" could be replaced

by *any* costly non-contractible action necessary for the continuation of the project (see, e.g., Aghion and Bolton 1992). The action may consist of voting for a production plan if the lender has representatives on the board of the firm or providing advice. For many types of action, the original lender is irreplaceable because she has experience and soft knowledge which cannot be transferred to a new financier.

Contractual Incompleteness. It is well known in the literature that the lender's control may generate inefficiency if the lender cannot contractually commit to the interim action and it is costly or infeasible to provide her with pecuniary incentives to take this action (Aghion and Bolton 1992; Rajan 1992; Diamond and Rajan 2001a; Dewatripont and Maskin 1995). In our economy, the refinancing is non-contractible. Furthermore, standard debt prevents from specifying a repayment contingent on output. The use of debt can be motivated by assuming that only an amount Y of output is verifiable, regardless of the state of nature and the type of project. Alternatively, there are several institutional rationales for our focus on debt, which we share with a vast literature (e.g. Rajan 1992). For example, in several countries regulatory restrictions prevent banks from holding equity participations in firms. Tornell and Westermann (2003) document firms' widespread use of debt in a large number of countries. Tirole (2003) reports that in industrial countries foreign equity assets and liabilities account for 3.3% and 3.9% of wealth respectively, while for debt the corresponding percentage is much higher (11%). More in general, there is extensive evidence on the contractual incompleteness that affects credit markets, both in advanced and in developing economies (see, e.g., Hubbard 1998 and Schiantarelli 1996 for empirical surveys). Contractual incompleteness appears to affect especially informationally opaque firms, such as young ones.

Finally, the non-renegotiability of contracts is worth discussion. This is often motivated with high renegotiation costs. Even if we allowed contracts to be perfectly renegotiable

at the refinancing stage, under the assumption that output is partly non-verifiable, our results would be unaltered. Indeed, in a previous version we allowed for renegotiability with a restriction on the verifiable output Y . Alternatively, following Rajan (1992), there is a way to endogenize the non-renegotiability which bundles it together with the lock-in problem. Suppose that in the slow state, before the refinancing, the entrepreneur has to implement a costly non-contractible effort to transform final good into assets. If the contract is renegotiable, since the entrepreneur is locked into a bilateral monopoly with her lender at the refinancing stage, a hold-up problem will arise. Precisely, the lender may extract surplus beyond what necessary to compensate her for the refinancing. If the bargaining power of the lender is high enough, expecting the extraction of a large share of surplus, the entrepreneur will not exert effort and the project will yield zero surplus in the slow state. Anticipating this, the entrepreneur will enter a non-renegotiable contract at date 0.

2.3 Equilibrium

2.3.1 Agents' Decisions and Markets

Entrepreneurs First, we characterize entrepreneurs' choice at date 0. Each entrepreneur chooses whether to activate a safe project (henceforth denoted by subscript s) or a risky one (denoted by r) and whether to borrow thereafter from an incumbent (denoted by superscript i) or from a newcomer (denoted by n). Let R_j^i (R_j^n) stand for the repayment due to an incumbent (a newcomer) at date 2 if the chosen project is of type j , with $j = s, r$. Let also d_j^i (d_j^n) be an indicator variable (0,1) for the date 1 refinancing decision of an incumbent (a newcomer) if the slow state is realized and the project is of type j , with $j = s, r$ (when d_j^i (d_j^n) = 1 the incumbent (newcomer) refinances). In (3) ((4)), we report the expected return of an entrepreneur with a given specific return y from choosing a safe (risky) project

and a lender of type t ($t = i, n$)

$$(1 - \alpha)(Y - R_s^t) + \alpha d_s^t(Y - p_s R_s^t), \quad (3)$$

$$(1 - \alpha)(Y - R_r^t) + \alpha d_r^t(Y + y - p_r R_r^t) \quad t = i, n. \quad (4)$$

In equilibrium, the entrepreneur will choose the type of project and the type of lender that guarantee the highest expected return.⁹

Note that, in writing (3) and (4), we focus on the case in which the agreed repayment exceeds the liquidation value of assets, i.e. $qA < R$. In fact, the maximum value of q is p_s (see below) and in lemma 1 we will introduce restrictions on I_0 such that $p_s A < I_0$. Therefore, necessarily in equilibrium $R > qA$ otherwise the lender would be promised a repayment lower than I_0 and would not expect to break even.¹⁰

Lenders Suppose that at date 1 the slow state is realized and the lender has to choose whether to refinance the project. Breaking ties in favor of no refinancing, an incumbent will refinance ($d_j^i = 1$) if and only if

$$qA < p_j R_j^i + (1 - p_j)q - I_1 \quad j = s, r, \quad (5)$$

i.e. if and only if the return from the redeployment of the A assets is lower than the net expected return from refinancing. In equilibrium the agreed repayment will always exceed q . Hence, the lower the probability of success p_j , the weaker is the incentive to refinance. Analogously, for a newcomer $d_j^n = 1$ if and only if

$$\theta qA < p_j R_j^n + (1 - p_j)\theta q - I_1 \quad j = s, r, \quad (6)$$

where the only difference from (5) is the lower return that the newcomer obtains from redeploying assets. It is easy to see that, because of this lower return from asset liquidation,

for a given type of project, liquidation price q and repayment R , newcomers have a stronger incentive to refinance than incumbents.

At date 0, each lender must expect non-negative profits. The repayment R_j^i (R_j^n) for a project of type $j = s, r$ has to satisfy the non-negative profit condition of the incumbent (newcomer) (7) ((8)):

$$(1 - \alpha)R_j^i + \alpha \{d_j^i [p_j R_j^i + (1 - p_j)q - I_1] + (1 - d_j^i)qA\} \geq I_0 \quad j = s, r, \quad (7)$$

$$(1 - \alpha)R_j^n + \alpha \{d_j^n [p_j R_j^n + (1 - p_j)\theta q - I_1] + (1 - d_j^n)\theta qA\} \geq I_0 \quad j = s, r. \quad (8)$$

The only difference between the non-negative profit condition of an incumbent and that of a newcomer is the lower return that a newcomer obtains from asset redeployment. It is easy to see that, for a given type of project, liquidation price q , lender's expected return and refinancing decision, borrowing from a newcomer is more costly ($R^n > R^i$) because a newcomer expects lower liquidation proceeds if a project fails.

Secondary Market In the secondary market, all the entrepreneurs who can produce more than q with it will demand one liquidated asset. Therefore, the asset demand is

$$D = \alpha \Pr(\lambda \geq q) = \alpha(\ell - q). \quad (9)$$

Assumption (1) guarantees that in equilibrium all entrepreneurs are funded. Then, let y_s denote the threshold specific return such that entrepreneurs with $y < y_s$ choose safe projects; since the distribution of y is a uniform, y_s is also the share of safe projects. Let also δ_s (δ_r) stand for the share of safe (risky) projects started at date 0 and in the slow state that are refinanced. The asset supply is

$$S = \alpha \{(1 - p_s)y_s\delta_s + (1 - p_r)(1 - y_s)\delta_r + [1 - \delta_s y_s - \delta_r(1 - y_s)]A\}. \quad (10)$$

The supply is given by the share of projects that are in the slow state at date 1 and fail at date 2 times the number of assets liquidated for each project that fails. In turn, using the law of large numbers, the share of projects that fail is given by the share of projects not refinanced $1 - \delta_s y_s - \delta_r(1 - y_s)$ plus the fraction that are refinanced times the share of refinanced projects that fail. Finally, the fraction of safe refinanced projects that fail is $1 - p_s$ while the fraction of risky refinanced projects that fail is $1 - p_r$.¹¹

2.3.2 Equilibrium Characterization

Let y^i ($1 - y^i$) be the fraction of entrepreneurs who borrow from incumbents (newcomers). The equilibrium is defined by a vector $(d_s^i, d_s^n, d_r^i, d_r^n, \delta_s, \delta_r, R_j^i, R_j^n, q, y_s, y^i)$ such that entrepreneurs and lenders maximize their utility, the non-negative profit conditions of lenders hold and the credit and the secondary market clear.

Allocation of Lenders and Projects Lemma 1 characterizes the conditions under which in equilibrium incumbents and newcomers coexist in the credit market, making the analysis meaningful.

Lemma 1 *Suppose that $\underline{\theta} < \theta < \bar{\theta}$ and $I_0 > \underline{I_0}$ (see the Appendix for the values of $\underline{\theta}$, $\bar{\theta}$ and $\underline{I_0}$). In equilibrium a share $y_s = y^i$ of entrepreneurs (with $0 < y_s < 1$) choose safe projects and borrow from incumbents and a share $1 - y_s = 1 - y^i$ choose risky projects and borrow from newcomers. Incumbent and newcomers are always expected to refinance projects ($\delta_s = \delta_r = d_s^i = d_r^n = 1$).*

Lemma 1 shows that in equilibrium incumbents endogenously specialize in funding safe projects while newcomers specialize in funding risky projects. The intuition is as follows. All else equal, the lower liquidation skills of newcomers make their funding more costly because

they expect a lower return from asset liquidation if a project fails. However, their lower liquidation skills render newcomers softer in liquidating projects. In fact, because of their strong liquidation skills, incumbents have high incentive to liquidate rather than refinance projects and this is especially true for risky projects because they have high probability of failure. Therefore, incumbents must be offered a particularly high repayment R_r^i to refinance risky projects. Instead, if their disadvantage in liquidating assets is not too small, newcomers will always have the incentive to refinance risky projects, even at the repayment that guarantees them expected zero profits at date 0.

In the analysis, we restrict ourselves to the region of the parameter space in lemma 1. The restriction $I_0 > \underline{I}_0$ implies that incumbents refinance safe projects at the repayment that guarantees them expected zero profits at date 0. The restriction $\underline{\theta} < \theta < \bar{\theta}$ implies that newcomers refinance both safe and risky projects at the repayment that guarantees them expected zero profits. Moreover, this restriction implies that the repayment that induces an incumbent to refinance a risky project exceeds that guaranteeing expected zero profits to a newcomer.¹² In turn, these properties of the equilibrium imply that entrepreneurs who derive a high return y from a risky project borrow from newcomers, sustaining the associated extra funding cost, and choose high-risk/return projects; entrepreneurs who derive a low return from a risky project borrow instead from incumbents and choose safe projects, saving on funding costs.

Given the endogenous specialization of lenders, henceforth we let $y_s (1 - y_s)$ denote both the share of entrepreneurs who choose safe (risky) projects and the share of entrepreneurs who borrow from incumbents (newcomers). In the proof of lemma 1 we report the equilibrium values of y_s , q , R_s^i and R_r^n . It is especially insightful to report here the equilibrium value of

q as a function of the share of safe projects

$$q = \ell - (1 - p_r) + (p_s - p_r)y_s. \quad (11)$$

The value of q is obtained in the secondary market at the intersection between the asset supply S and the downward sloping asset demand D . Note in particular that, since the asset supply decreases with y_s , q increases with y_s .

Output In lemma 2 below we compare the equilibrium share of risky projects with that maximizing output.

Lemma 2 *The share of risky projects is lower than the optimal share (equal to 1) that maximizes output.*

The intuition is as follows. The combination of contractual incompleteness and high liquidation skills of incumbents render the latter too conservative towards high-risk/return projects. Entrepreneurs can escape incumbents' too hard budget constraint by borrowing from newcomers but newcomers are only an imperfect substitute for incumbents. In fact, newcomers impose on entrepreneurs the cost of their low liquidation skills, discouraging some entrepreneurs from borrowing from them and implementing risky projects.¹³ Therefore, the liquidation cost of newcomers distorts the share of risky projects downward.

2.4 Impact of a Shock

Now, we show that shocks to asset liquidity can originate waves of entry (exit) of newcomers that mutually interact with increases (decreases) in project riskiness. We then analyze output implications.

Allocation of Lenders and Projects We consider an exogenous shock to the number of potential second-hand asset users which occurs at the very beginning of time. Henceforth, when we refer to the effects of this shock, we implicitly compare the equilibrium with the one that would be realized in the absence of the shock. The shock to the number of users proxies for any aggregate shock that, by modifying firms' possibility to buy assets, affects the asset liquidation value. This can be a change of the cash flow of potential users due to a boom or recession or a change in regulation (e.g. antitrust policies or limitations of foreign investment) that affects the number of users directly (Shleifer and Vishny 1992).

We consider a negative shock whereby a fraction of the most efficient users of liquidated assets exit the secondary market. Formally, ℓ falls so that the asset demand shifts inward in a parallel way.

Proposition 1 *A fall in the demand for firms' assets increases the share of entrepreneurs borrowing from newcomers and implementing risky projects and decreases the liquidation value of assets. These effects are bigger the stronger is the disadvantage of newcomers in liquidating assets (i.e. the lower is θ).*

The intuition behind proposition 1 is as follows. Following a shrink in asset demand, in the secondary market supply exceeds demand and the liquidation price falls. Newcomers face a liquidation cost proportional to the value of the assets they liquidate so that the price fall erodes their expected return from liquidation less than that of incumbents and the gap $R_r^n - R_s^i$ narrows. By eroding the cost advantage of incumbents, the price fall pushes some entrepreneurs to switch to newcomers. Since entrepreneurs choose risky projects when borrowing from newcomers, the share of risky projects, and hence the expected default rate and supply of assets, rise (refer to the expression for the asset supply S and the positive

relationship of S with the share of risky projects $1 - y_s$). In turn, this induces a further fall of liquidation values (see the expression for q as a function of y_s in (11)) and a further erosion of the cost advantage of incumbents and so forth, until a new equilibrium is reached at the intersection between asset demand and asset supply. The magnitude of these effects is inversely related to θ . The erosion in the cost advantage of incumbents due to falls in liquidation values is bigger the lower is θ . Therefore, the overall increase in the share of entrepreneurs who choose newcomers and risky projects and decrease in the liquidation value of assets is inversely related to θ . In sum, the result in proposition 1 incorporates a mutually reinforcing interaction between the entry of lenders foreign to the market and the share of risky projects, with the link being firms' liquidation values.

Assumption (2) on θ guarantees that declines in liquidation values due to increases in the share of risky projects encourage further entrepreneurs to switch to newcomers and risky projects. In fact, a standard, opposite force makes risky projects less appealing as liquidation values fall. Since a risky project fails and leads to the liquidation of the residual asset with higher probability than a safe one, its expected return is eroded by a fall in the liquidation price more than that of a safe project. This conventional effect is unrelated to differences across lenders and would also operate in an economy populated only by incumbents. The condition $\theta < (1 - p_s)/(1 - p_r)$ ensures that the erosion of the cost advantage of incumbents deriving from their higher liquidation skills overwhelms this standard effect. To further grasp this, see also expression (A7) in the Appendix which gives y_s as a function of q .

Output We now turn to output. The decline in the return from liquidated assets has a *direct* negative impact on output. Here, we investigate its *indirect* impact through the change in the share y_s of safe projects.

Lemma 2 implies that the increase in the share of risky projects that follows the shock increases output and that the stronger the described mechanism (the lower θ) the bigger the output rise is. In fact, the share of risky projects approaches the social optimum.

Corollary 1 *The increase in the share of risky projects $1-y_s$ induced by a fall in the demand for firms' assets increases output. This output rise is inversely related to θ .*

Generalizing it to a positive shock, corollary 1 shows that the interaction between the entry of newcomers and the share of high-risk/return projects generates a change of output opposite in sign to the direct effect of a liquidity shock. Put differently, this interaction acts as a stabilizer when shocks to asset liquidity occur. An implication is that not only restrictions to the entry of new (foreign) lenders reduce output by depressing the share of high-risk/return projects (lemma 2), but also they increase output volatility. This implication appears striking considering that restrictions to the entry of foreign lenders are often justified with the possibly destabilizing role of these lenders (see Peek and Rosengren 2000b for a review of these concerns).

3 Conclusion

In the wake of the crises that have hit liberalized countries, such as the Nordic and the East Asian countries, concerns have developed about the effects of financial liberalization on economic stability. In this paper, we have investigated the interaction between the entry of lenders, the nature of projects and firms' liquidation values and identified a channel through which the entry of foreign lenders enhances stability. The analysis is broadly applicable. However, caution is due when applying it to credit flows across countries at a very different stage of development. Lenders of an industrialized country that operate in a developing

economy may have higher efficiency and monitoring ability than local lenders. Furthermore, banks of industrialized countries can sometimes access cheaper sources of funds than banks of developing countries because of a reputational advantage in the international financial markets (Dages, Goldberg and Kinney 2000). In the model, instead, we have ruled out heterogeneities in lenders' monitoring ability or funding opportunities and focused on their different knowledge of the local market.

The model delivers interesting policy implications. In many countries worldwide, including high income countries (e.g. Western European ones), the process of financial liberalization and integration is underway. Furthermore, "liberalization reversals" are often invoked after periods of crisis (see, e.g., Argentina in 1982 and Venezuela in 1994 and Peek and Rosengren 2000 for a discussion). Europe probably constitutes one of the regions most exposed to cross-border bank expansion in the future. Despite the lifting of interstate banking restrictions following the implementation of the Second Banking Directive in 1993, legal and institutional barriers have thus far inhibited cross-border banking. In the EU countries in 2002 the market share of foreign branches and subsidiaries amounted to only 15.2% (Expert Group on Banking 2004). In evaluating the implementation of the 1999 Financial Services Action Plan, the Expert Group on Banking established by the European Commission identified four concrete actions for promoting cross-border banking: i) the convergence of supervisory practices and of the legislative interpretation of EU Directives across states; ii) an homogeneous legislation for the implementation of Basel II; iii) the removal of tax obstacles to foreign banking (e.g. registration of security and related taxes) as well as the removal of legal/administrative obstacles (e.g. the prohibition of certain banking products); iv) the harmonization of banks' reporting requirements. It is believed that these actions will significantly foster banks' cross-border expansion.

Reading through the policy debate on cross-border banking, two important issues arise which are neglected in our analysis: the mode of entry of lenders and the impact of this entry on the market structure of the banking sector. This suggests two directions for future research. First, one could allow for the entry of lenders through mergers or takeovers of local lenders besides direct entry through greenfield investment. When it acquires or merges with a local bank, a foreign bank will access the knowledge accumulated by the former in the local market. Thus, it will suffer from limited or possibly no disadvantage relative to local banks. Second, one could account for the size of entrants besides their number. In fact, in the paper the credit market is assumed to be competitive and lenders' entry does not affect its degree of concentration. Interestingly, some empirical studies suggest that the positive effect that lenders' entry has on stability depends more on the number of entrants than on their (relative) size (see, e.g., de Haas and van Lelyveld 2002 and references therein). Yet, the impact of entry on the structure of the credit sector can be relevant for stability, if only because it may affect lenders' geographic diversification or managerial efficiencies (see Group of Ten 2001).

4 Appendix

Proof of Lemma 1: The values of \underline{I}_0 , $\underline{\theta}$, and $\bar{\theta}$ are respectively

$$\underline{I}_0 = \frac{(1 - \alpha)I_1}{p_s} + (1 - \alpha + \alpha p_s)(A - 1) + p_s; \quad (\text{A1})$$

$$\underline{\theta} = \frac{I_0 - I_1(1 + \alpha p_r) - (\underline{\ell} - 1 + p_r)(A - 1 + p_r)(1 - \alpha + \alpha p_r)}{\alpha(1 - p_r)(\underline{\ell} - 1 + p_r)}; \quad (\text{A2})$$

$$\bar{\theta} = \frac{p_r I_0 - (1 - \alpha)I_1}{(1 - \alpha + \alpha p_r)(p_s A - 1 + p_r) + p_r \alpha(1 - p_r)p_s}. \quad (\text{A3})$$

It is easily verified that there exist regions of the parameter space such that the interval $[\underline{\theta}, \bar{\theta}]$ is non-empty and the restriction $I_0 > \underline{I}_0$ and (2) hold. We show first that it is possible to write a contract with an incumbent that guarantees her zero profits and gives her incentives to refinance a safe project ($d_s^i = 1$). Using (5) and (7), for this to be true, $[I_0 + \alpha I_1 - \alpha(1 - p_s)q] / (1 - \alpha + \alpha p_s) > [qA + I_1 - (1 - p_s)q] / p_s$. The highest possible value of q is p_s . The lower bound on I_0 guarantees that the inequality holds. Observe also that, all else equal, the repayment that guarantees zero profits to an incumbent is lower than that guaranteeing zero profits to a newcomer. Hence, for a borrower the choice of a safe project financed by a newcomer is dominated. Moreover, a contract that leads a lender to liquidate a project ($\delta_s = \delta_r = 1$) is dominated by a contract with an incumbent that leads her to continue a safe project and guarantees her zero profits. We now show that, if $\theta < \bar{\theta}$, at the repayment that guarantees her expected zero profits, a newcomer refinances (a safe or risky) project ($d_s^n = d_r^n = 1$). In fact, using (6), to have $d_j^n = 1$, it has to be $\theta q A + I_1 < p_j R_j^n + (1 - p_j)\theta q$. Using (8), when a newcomer continues a project and expects zero profits, $R_j^n = [I_0 + \alpha I_1 - \alpha(1 - p_j)\theta q] / (1 - \alpha + \alpha p_j)$. Moreover, the maximum value of q is p_s . Plugging these values into the inequality above, we have that if $\theta < \bar{\theta}$ it will be satisfied. We now show that if, in addition, $\theta > \underline{\theta}$, an entrepreneur will never choose an incumbent to finance a risky project. In fact, using (5), the minimum repayment that would

give an incumbent the incentive to refinance a risky project is $[qA + I_1 - (1 - p_r)q] / p_r$ that, from the restriction $\theta > \underline{\theta}$, exceeds the repayment that guarantees zero profits to a newcomer under a risky project for any feasible value of q . All the above implies $y_s = y^i$. We now show that $0 < y_s < 1$. Considering the zero profit condition of a newcomer funding a risky project,

$$R_r^n = \frac{I_0 + \alpha I_1 - \alpha(1 - p_r)\theta q}{1 - \alpha + \alpha p_r}, \quad (\text{A4})$$

while, considering the zero profit condition an incumbent funding a safe project,

$$R_s^i = \frac{I_0 + \alpha I_1 - \alpha(1 - p_s)q}{1 - \alpha + \alpha p_s}. \quad (\text{A5})$$

Substituting $\delta_s = \delta_r = 1$ into the right hand side of (10) and using (9) and (10), we obtain the price q that equates asset demand and supply as a function of the share of safe projects y_s . Analogously, equalizing (3) and (4) and substituting R_r^n and R_s^i from (A4) and (A5), we obtain y_s as a function of q . The values of q and y_s are respectively:

$$q = (p_s - p_r)y_s + \ell - 1 + p_r \quad (\text{A6})$$

$$y_s = q[(1 - p_s) - \theta(1 - p_r)]. \quad (\text{A7})$$

Solving the system (A6)-(A7),

$$y_s = \frac{[1 - p_s - (1 - p_r)\theta](\ell - 1 + p_r)}{1 - [(p_s - p_r)[1 - p_s - (1 - p_r)\theta]}. \quad (\text{A8})$$

It is straightforward that the right hand side of (A8) is always positive and smaller than 1.

Proof of Lemma 2: A social planner would choose the share of safe projects in order to maximize

$$\widehat{Y}(y_s) = Y - I_0 + \alpha \left\{ -I_1 + y_s \left[\frac{(1 - p_s)(\ell + q)}{2} \right] + (1 - y_s) \left[\frac{(1 - p_r)(\ell + q)}{2} \right] + \frac{(1 - y_s)(1 + y_s)}{2} \right\}. \quad (\text{A11})$$

On the right hand side of (A11), the terms in the two square brackets are the average productivity of a liquidated asset $(\ell + q)/2$ times the probability that respectively a safe and risky project fails. The last term on the right hand side is the total specific returns enjoyed by entrepreneurs who choose risky projects. Let us plug $q = (p_s - p_r)y_s + \ell - 1 + p_r$ into $\widehat{Y}(y_s)$. Define the share of safe projects that maximizes $\widehat{Y}(y_s)$ as $y_{s,\widehat{Y}}$. We need to show that $y_{s,\widehat{Y}} < y_s$. Solving for $y_{s,\widehat{Y}}$, we obtain

$$y_{s,\widehat{Y}} = \frac{(p_r - p_s)(\ell - 1 + p_r)}{1 + (p_s - p_r)^2} < 0 \quad (\text{A12})$$

This implies that the share of safe projects chosen by the social planner is $y_{s,\widehat{Y}} = 0 < y_s$.

Proof of Proposition 1: It is sufficient to show that y_s decreases when ℓ decreases and the decrease is stronger the lower is θ . Computing the derivative of y_s with respect to ℓ , we obtain

$$\frac{\partial y_s}{\partial \ell} = \frac{[(1 - p_s) - (1 - p_r)\theta]}{1 - (p_s - p_r)[(1 - p_s) - (1 - p_r)\theta]}, \quad (\text{A9})$$

which is positive if $\theta < (1 - p_s)/(1 - p_r)$. In turn, differentiating it with respect to θ we obtain

$$\frac{\partial}{\partial \theta} \left(\frac{\partial y_s}{\partial \ell} \right) = - \frac{(1 - p_r) \{1 - 2(p_s - p_r)[(1 - p_s) - (1 - p_r)\theta]\}}{\{1 - (p_s - p_r)[(1 - p_s) - (1 - p_r)\theta]\}^2}. \quad (\text{A10})$$

Observe that $1 - 2(p_s - p_r)[(1 - p_s) - (1 - p_r)\theta] > 0$ since the maximum of $2(p_s - p_r)[(1 - p_s) - (1 - p_r)\theta]$ is reached at $\theta = 0$, $p_r = 0$, $p_s = 1/2$ where the expression is equal to $1/2$. This implies $\partial(\partial y_s / \partial \ell) / \partial \theta < 0$.

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Notes

¹The literature identifies a number of channels through which financial liberalization can endanger economic stability. For example, Tornell and Westermann (2003) investigate the problem of currency mismatch between banks' liabilities, denominated in foreign currency, and banks' assets, denominated in local currency. Another problem consists of the maturity mismatch between banks' assets and liabilities (see Diamond and Rajan 2001 and references therein).

²Analyzing the East Asian crisis, Rajan and Zingales (1998) argue that foreign lenders were exposed to this problem in East Asia, where accounting standards and disclosure and bankruptcy laws are poorly drafted and enforced.

³The assumption that on average risky projects are more productive than safe ones is common (see, e.g., new technologies).

⁴Notice that the only critical restriction is that the number of assets A is positive.

⁵We are implicitly assuming that a lender cannot be repaid with the proceeds that her borrower can obtain from using a liquidated asset, possibly because these proceeds accrue to the entrepreneur too late.

⁶Bencivenga, Smith, and Starr (1995 and 1996) assume proportional costs (commissions, fees) in trading second-hand capital.

⁷In practice, it will become evident that (2) constitutes a sufficient condition such that the repayment required by a newcomer for financing a risky project exceeds that required by an incumbent for financing a safe project.

⁸The liquidation cost can be a transfer, like the fee of a liquidator facing no liquidation cost, or a dead-weight output loss.

⁹For the marginal entrepreneur, the value of y will be such that she is indifferent between two different combinations lender-project.

¹⁰We also focus on the case in which output always exceeds the agreed repayment. It is straightforward that we can always choose values of Y consistent with the parameter restrictions and with the limited liability constraint of the entrepreneur.

¹¹It is useful to look at the expression for the asset supply S when $\delta_s = \delta_r = 1$, which will indeed occur in equilibrium (see lemma 1). This is

$$S = \alpha [(1 - p_r) - (p_s - p_r)y_s].$$

This expression shows that the asset supply decreases with y_s as $p_s > p_r$.

¹²The region of the parameter space defined by $\underline{\theta}$, $\bar{\theta}$ and \underline{I}_0 depends on the parameters of the model in a complex manner. Since assets play a key role in the analysis, it is especially useful to observe that an increase of A raises the value of \underline{I}_0 while it reduces the values of $\underline{\theta}$ and $\bar{\theta}$. In words, if it is assumed that firms have more redeployable assets when projects are terminated (A is larger), the analysis will also fit economies where the liquidation skills of incumbents are far better than those of newcomers (in fact, the minimum admissible value of θ , i.e. $\underline{\theta}$, will be lower). Analogous comparative statics exercises can be carried out with the other parameters of the model.

¹³The liquidation cost has also a second distortionary effect. Assume that the cost is real and that necessarily incumbents (newcomers) fund safe (risky) projects even in the centralized equilibrium. Two externalities are at work. On the one hand, entrepreneurs tend to choose risky projects too often because they do not internalize the bigger reduction in the average productivity of liquidated assets that occurs when they choose risky projects. On the other hand, entrepreneurs do not fully internalize the social return of a liquidated asset since they care about its price. This makes them choose safe projects too often. When $\theta < 1$ the second externality prevails and the share of risky projects is lower than the choice of a social planner.

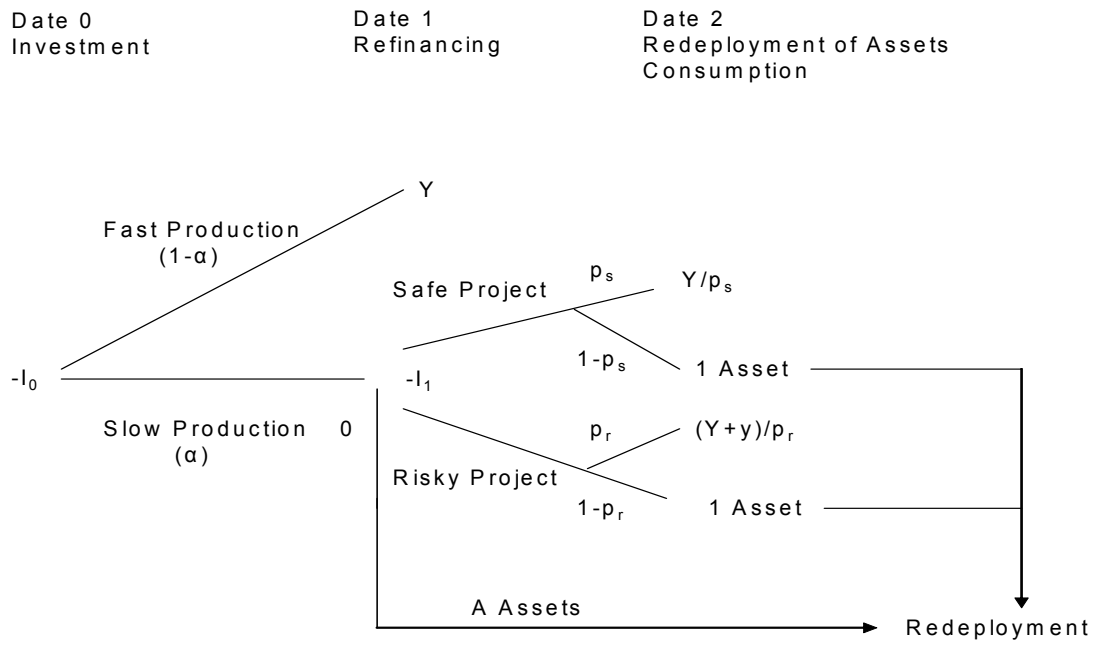


Figure 1: Timing of Events.