Liquidation Values and the Nature of Lenders

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September 4, 2002

Abstract

We construct an economy that features a two way link between the entry of lenders “foreign” to the market (“newcomers”) and the average riskiness of firms’ projects, with the bridge being the liquidation value of firms’ assets. Newcomers differ from incumbents in their lower ability in recovering and/or liquidating firms’ assets in the local secondary market. This lower ability makes them softer terminators of high-risk/return projects and, therefore, appealing for firms. However, this same lower ability makes their funding more costly for firms since they can recover less value if a project defaults. As newcomers spread in the economy, the number of risky projects undertaken increases spurring an increase in projects’ default rate and assets’ liquidation. This depresses assets’ liquidation value, eroding incumbents’ cost advantage. Hence, new firms switch to newcomers and choose risky projects and the effect is reinforced. We explore welfare implications and find that, by improving the allocation of resources between safe and risky projects, newcomers’ entry leads to a welfare improvement.

1 Introduction

In the last two decades several countries (e.g. US, UK, Nordic countries, East Asian countries) have experienced episodes of financial liberalisation which have resulted into a massive entry of new lenders into their credit markets. Cross-border banking has also played an important role in this process. In the US the abolition of interstate branching restrictions after the 1994 Riegle-Neal Act has encouraged banks to extend their business beyond state borders.† On a global

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†According to White (1998) cross border offices in Europe still represent less than 0.3% of total bank offices. However it is frequently argued that the integration of European banking systems will progress thanks to the adoption of a unique currency (Blander, 2001).
scale, Japanese banks increased their presence in the US during the 1980s\textsuperscript{2} and in East Asia during the 1990s (Peek and Rosengren, 2000). The expansion of banking has had a functional dimension, besides a geographic one, with banks diversifying their loan portfolios beyond their traditional area of activity.\textsuperscript{3} A widespread view is that a consequence of the entry of new lenders into liberalised economies and sectors has been to increase the riskiness of projects undertaken or, as the Economist (1999) put it, to “increase the riskiness of traditional behaviour or introduce new and inexperienced players”.\textsuperscript{4}

The target of this paper is to understand the aggregate implications of the entry of lenders “foreign” to a market. Since our theory applies both to the entry of newly born and foreign lenders into a region or sector, henceforth we generically call “incumbents” (respectively “newcomers”) lenders with a consolidated (lack of) experience of the market. We distinguish incumbents and newcomers on the ground of what we believe to be a primitive dimension: lenders’ ability to recover and/or liquidate borrowers’ assets in the local market. We assume that newcomers have lower ability in recovering value from borrowers’ assets, possibly because of lack of earlier experience of the local secondary market or insolvency practice.\textsuperscript{5} We show that this primitive difference is the source of a two way link between newcomers’ diffusion into the economy and the average riskiness of firms’ projects, with the bridge being the liquidation value of firms’ assets.

The intuition is as follows. In the model entrepreneurs can choose between safe projects and risky projects that guarantee high non-transferable returns (e.g. private benefits).\textsuperscript{6} Unlike incumbents, because of their lower ability in

\textsuperscript{2}Peek and Rosengren (2000) report that at their peak in the late 1980s Japanese banks accounted for 18% of CI loans in the US.

\textsuperscript{3}For instance, in the 1980s, Nordic and UK banks aggressively increased their involvement in the real estate sector, funding speculative builders.

\textsuperscript{4}“Finance on the loose”, The Economist, May 15th 1999.

\textsuperscript{5}Indirect evidence on the superior ability of informed banks in redeploying assets comes from the practice of Japanese main banks during the distress of their borrowers. Sheard (1989) mentions main banks’ advice on asset disposal to distressed firms.

\textsuperscript{6}The assumption that risky projects are more productive than safe projects on average
liquidating assets, newcomers always continue a project, even if it becomes clear that this project has a high probability of default. This makes newcomers appealing as a source of finance. However, their lower liquidation ability also makes their funding more costly since they can recover less value if a project defaults. In equilibrium entrepreneurs will partition between the ones who derive high non-transferable returns from risky projects and the ones who derive low ones. The former will prefer paying the extra cost of funding, borrow from newcomers and choose risky projects, while the latter will borrow from incumbents and choose safe projects, saving on funding costs. Now, suppose that because of an exogenous shock some newcomers set up in the economy and some entrepreneurs switch to them.\(^7\) Since these entrepreneurs switch to risky projects, the expected number of defaults and of liquidated assets increases. The increase in the expected number of liquidated assets depresses their expected liquidation value. 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. Since incumbents’ cost advantage derives from their higher liquidation ability, the fall in assets’ liquidation value erodes their cost advantage. Hence, new entrepreneurs switch to newcomers and choose risky projects, thus further increasing the expected number of defaults and of liquidated assets.

Incumbents’ advantage in liquidating assets can be rationalised in several ways. However, the model offers a straightforward rationale for it. Since second-hand users differ in their efficiency in employing the assets of bankrupt firms, an

\(^{7}\)In the model we consider an exogenous shock to asset liquidity, like a reduction in the number of assets’ potential buyers.
incumbent could be better in identifying the most efficient users of these assets. In 2.4 we develop a simple example along these lines.

Even though the model has mainly a positive content, interestingly we find that the above mechanism can be welfare improving. The share of high-risk/return projects is suboptimally low in an economy with incumbents and newcomers and even more so in an economy with only incumbents. Despite having higher returns than safe projects, risky projects are deterred by incumbents. Incumbents are “conservative” lenders: they are unable to appropriate the high non-transferable returns of successful risky projects and, since they recover high value from liquidating assets, they stop projects with high probability of default. For newcomers the outside option of liquidating assets has low value instead so that they allow the choice of high-risk/return projects. However, they impose on entrepreneurs the cost of their inability in liquidating assets, discouraging some of them from implementing risky projects. As the cost of their inability declines, more entrepreneurs choose newcomers and risky projects, approaching the social optimum.

The closest papers in the literature are Shleifer and Vishny (1992) and Diamond and Rajan (2001a and 2001b). Shleifer and Vishny (1992) describe the general equilibrium properties of corporate distress. When a firm cannot pay back its debt and is forced to liquidate its assets, the best users of the liquidated assets, being also the buyers ready to pay the highest price, are likely to face distress, too. In fact, the best alternative users are other entrepreneurs active in the same sector, whose financial status is highly correlated with the one of the distressed firm. Shleifer and Vishny (1992) analyse the two way interaction between firms’ indebtedness and assets’ liquidation values, but, unlike us, treat all lenders as homogeneous in recovering value from borrowers’ assets. In analysing the rationale for banks’ short-term liability structure, Diamond and Rajan (2001a and 2001b) assume that a bank has higher ability than dispersed investors in liquidating assets, an assumption analogous to ours. Diamond and Rajan (2001b) also discuss international finance implications of their theory, interpreting dispersed investors as foreign investors that hold short-term in-
terbank claims on domestic banks. When we interpret newcomers as foreign lenders, there are at least three main differences between our analysis and this application of their theory. First, we analyse macroeconomic implications of direct foreign lending rather than of interbank foreign lending. Secondly, we describe a two way interaction between the type of projects undertaken and the diffusion of new (e.g. foreign) lending through changes in assets’ liquidation values. Diamond and Rajan (2001b) analyse how short term interbank debt allows to fund illiquid projects but do not analyse possible feed-backs. Finally, the nature itself of the projects that foreign lending allows to finance differs. While they focus on illiquid projects we focus on high-risk/return ones. However, though for different reasons, both their analysis and ours predict that opening an economy to foreign lending (respectively interbank and direct) is welfare improving.\footnote{Also related is Mankiw (1986), who describes a two way link between cost of external finance and riskiness of projects undertaken. We share with Mankiw (1986) the idea of a variable nature (riskiness) of projects, even though we relate it to the nature of lenders rather than to the cost of debt.}

The paper is also related to the literature on the entry of new lenders into a credit market (see, for instance, Broecker, 1990; Dell’ Ariccia, Friedman and Marquez, 1999; Claessens, Demirgüç-Kunt and Huizinga, 2001). Most of this literature has focused on the impact of entry on the efficiency and on the structure of the banking system. To our knowledge no study has analysed the role of the market for firms’ assets and of the ability of old and new lenders in accessing this market in new lenders’ entry.\footnote{A common feature of these analyses is that existing lenders have some informational advantage on firms’ quality. This allows existing lenders to fund the best applicants, leaving entrants exposed to adverse selection and discouraging their entry.}

The paper is organised as follows: in section 2 we present the model. In section 3 we discuss extensions, limitations and empirical implications of the model. In section 4 we conclude. All the proofs are in the Appendix.
2 The Model

2.1 Setup

Environment The economy lasts for three dates, 0, 1 and 2. There is a continuum of entrepreneurs of mass 1 and two continua of lenders ("incumbents" and "newcomers") each of mass greater than 1. In the economy there is initially only the final good, while assets can be produced. All agents are risk neutral and consume final good at date 2 deriving from consumption $c_2$ a utility of $u(c_2) = c_2$.

Entrepreneurs and Technology Entrepreneurs have no endowment at date 0. At date 0 each entrepreneur can choose to run one of two projects, a safe project or a risky one. In both projects at date 0 the entrepreneur can invest 1 unit of final good and at date 1 transform it into $X > 2$ assets of size 1 necessary for production. If the project is safe, at date 2 the assets yield $\frac{X}{p_s}$ with probability $p_s$ ($0 < p_s < 1$) or the project fails and one non-depreciated asset can be redeployed outside the firm. If the project is risky the entrepreneur must inject additional $I = p_r(1 - p_r)$ units of final good at date 1.\(^{10}\)If the refinancing occurs, at date 2 the assets yield $\frac{X+b}{p_r}$ with probability $p_r$ ($0 < p_r < p_s$) or the project fails and one non-depreciated asset can be redeployed. If the refinancing does not occur and the assets are not used in production, at date 2 the project fails with certainty and the $X$ non-depreciated assets can be redeployed. We assume that only $X$ units of output are verifiable and transferrable and, in particular, $\frac{X+b}{p_r}$ represents the entrepreneur-specific non-transferrable return (e.g. private benefit) of a risky project, with $b$ uniformly distributed on the support $[0, 1]$. Henceforth we assume that an entrepreneur prefers inaction to running a project with zero net expected return.

If at date 2 an asset is redeployed outside a firm, it can be used by other entrepreneurs for production. For simplicity, we assume that each entrepreneur can use one liquidated asset at most. Let $\phi$ be the fraction and mass of en-

\(^{10}\)The value of $I$ chosen is not relevant for the results but allows only to simplify the analysis.
entrepreneurs who can use one liquidated asset. An entrepreneur produces \( \alpha \) units of final good with a liquidated asset, where \( \alpha \) is uniformly distributed on the support \([0, \phi]\). Note that a second hand user always obtains from a liquidated asset a return lower than the one obtainable by a failed entrepreneur with it \((\alpha < \phi \leq 1)\).\(^{11}\) We initially assume \(\phi = 1\), i.e. all the entrepreneurs can use one liquidated asset, though with different efficiency.

**Lenders and Contracts** Each lender has at least \(1 + I\) units of final good at date 0. Each lender can store or lend. We assume that at date 0 and date 1 lending takes place in 1 to 1 relationships, i.e. one lender funds one entrepreneur and one entrepreneur is funded by one lender only. Therefore, at date 1 the project of an entrepreneur can be refinanced only by her date 0 lender.\(^{12}\)

We assume that the date 1 refinancing decision of a lender is non-contractible.\(^{13}\) In particular, we restrict the date 0 (non-renegotiable) contract between one lender and one entrepreneur to a standard long term debt contract that specifies a loan of 1 at date 0 and a gross repayment \(R\) at date 2. If the project fails the lender can recover the assets of the entrepreneur.\(^{14}\)

There are two types of lenders, incumbents and newcomers. We think of incumbents as lenders that have been operating in the economy for a while

\(^{11}\)According to Ramey and Shapiro (2000) “Most capital is specialised by industry, so that used capital typically has greater value inside than outside the industry. Even within an industry, though, capital from one firm may not be a perfect match for another firm”.

\(^{12}\)Note that, since entrepreneurs cannot store, they cannot borrow more than 1 unit of final good at date 0. This automatically rules out the possibility for an entrepreneur of refinancing her project at date 1 with funds in excess of 1 borrowed at date 0 and stored.

\(^{13}\)The assumption that refinancing is non-contractible can appear somewhat stark. However, in our context refinancing proxies for any non-contractible date 1 action that must be implemented by the lender to allow continuation of the risky project.

\(^{14}\)We are implicitly assuming that a lender cannot be repaid with the proceeds that her borrower can get from using a liquidated asset, possibly because these proceeds accrue to entrepreneurs too late. Note also that the assumptions on the parameters do not preclude that the value of assets that can be recovered if the project is not refinanced exceeds the gross repayment due to the lender. However it is easy to show that this is always true for values of the probabilities not too high.
and of newcomers as lenders that have set up their activity in the economy only recently. The two types of lenders differ only in their ability in recovering and/or redeploying the assets of their borrower. Specifically, we assume that, possibly because of lack of earlier experience of the local secondary market and insolvency practice, each newcomer faces a liquidation cost proportional to the value of liquidated assets. Let \( 1 - \theta \) be the fraction of liquidated value that is lost by a newcomer.\(^{15}\) Since it does not matter for the positive analysis but only for welfare we defer a more detailed discussion of the nature of the liquidation cost \( 1 - \theta \) (see 2.5).

Assumption 1 imposes a lower and an upper bound on the liquidation cost faced by newcomers. This Assumption will guarantee that the gross interest rate never exceeds the maximum verifiable output \( X \) (LHS) and that a newcomer always wants to refinance a risky project at date 1 (RHS).

**Assumption 1**

\[
\frac{1 + p_r(1 - p_r - X)}{p_r(1 - p_r)} < \theta \leq \min \left[ \frac{1 - p_s}{1 - p_r}, \frac{1}{Xp_s} \right]
\]

**Secondary Market** Lenders can sell the assets recovered from failed borrowers to other entrepreneurs in a spot secondary market that opens at date 2. Let \( q \geq 0 \) be 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 the available funds are always more than enough to finance these purchases.

The demand for assets can be derived simply considering that at a price \( q \) all the entrepreneurs who can produce more than \( q \) (\( \alpha \geq q \)) will demand the liquidated assets. Hence

\[
D = \Pr(\alpha \geq q) = 1 - q
\]

\(^{15}\)In a similar way Benevenga, Smith and Starr (1995) assume that transaction costs exist in transacting capital in a secondary capital market and that these costs are proportional to the value of traded capital. Liquidation costs in selling assets in the secondary market include commissions, fees or also the time required to arrange a sale or purchase of an asset.
**Time line** In Figure 1 we summarise the sequence of events:

### 2.2 Equilibrium

#### 2.2.1 Economy with only Incumbents

We start from analysing as a benchmark an economy in which only incumbents operate in the credit market. This can proxy for an economy in which the entry of new (domestic or foreign) lenders into the credit market is deterred by regulation.

**Entrepreneurs** First, we characterize entrepreneurs’ choice. In this economy each entrepreneur has to choose only which project to implement. In so doing she compares the expected return from a safe project, i.e.

\[ X - p_s R_d \]

with the one from a risky project, i.e.

\[ d_r (X + b - p_r R_d) \]

In the expressions \( R_d \) stands for the repayment due to an incumbent, while \( d_r \) is an indicator variable for the date 1 expected refinancing decision of the lender if the project is risky (when \( d_r = 1 \) the lender refines).

**Lenders** At date 1 each lender has to choose whether to refinance a risky project. The lender chooses to refinance (\( d_r = 1 \)) if and only if

\[ qX < p_r R_d + (1 - p_r)q - I \]

i.e. if and only if the return from the redeployment of the \( X \) non-depreciated assets is lower than the net expected return from refinancing. Note that a lender cannot appropriate the return from a successful, risky project in full since this includes a non-transferrable component. Hence, if the probability of success \( p_r \) is low enough she will choose liquidation for any feasible interest rate.
Each lender has to realise zero profits at least. For what said above, a lender will have to satisfy one of the following zero-profit conditions, depending on whether the funded entrepreneur is expected to choose a safe or a risky project:

\[
p_s R_d + (1 - p_s)q \geq 1 \quad \text{(safe)}
\]
\[
d_r [p_r R_d + (1 - p_r)q] + (1 - d_r)(qX + I) \geq 1 + I \quad \text{(risky)}
\]

**Secondary Market**  Let \(b'\) be the fraction of entrepreneurs who choose safe projects.\(^\text{16}\) It is straightforward that in equilibrium there cannot be a risky project that is liquidated at date 1. In fact, such a project would return 0 to the entrepreneur and would never be implemented by her at date 0. Hence, necessarily all risky projects undertaken are refinanced at date 1. The supply of assets in the secondary market is therefore

\[
S' = (1 - p_s)b' + (1 - p_r)(1 - b')
\]

The supply is given by the fraction of projects that defaults at date 2 times the amount of assets liquidated for each project that defaults (1). In turn, using also the law of large numbers, the fraction of projects that defaults is given by the weighted sum of the probabilities that respectively a safe or a risky project defaults (1 \( - p_s \) and 1 \( - p_r \) respectively), with the weights being the shares of entrepreneurs who choose safe and risky projects (\(b'\) and \(1 - b'\) respectively).

**Equilibrium**  The equilibrium is defined by a four-tuple \((d_r, R_d, q, b')\) such that entrepreneurs and lenders maximise their utility, lenders’ zero profit condition holds and the secondary market is in equilibrium.

**Lemma 1**

*In an economy with only incumbents in equilibrium incumbents are always expected to liquidate risky projects \((d_r = 0)\), all entrepreneurs choose safe projects \((b' = 1)\), \(q = p_s\) and \(R_d = \frac{1 - p_s(1 - p_s)}{p_s}.\)

\(^{16}\)Since contracts are not contingent on entrepreneurs’ choice of project, \(b'\) defines a threshold non-transferable return such that entrepreneurs with \(b < b'\) choose safe projects.
Lemma 1 shows that in an economy with only incumbents no entrepreneur has the incentive to choose a risky project. This happens because an incumbent, thanks to her strong ability in redeploing the assets of her borrower, is never expected to refinance if she finds out that the funded project is risky.

2.2.2 Economy with Incumbents and Newcomers

Entrepreneurs We now consider an economy in which both incumbents and newcomers operate in the credit market. Hence, each entrepreneur will now face two choices: she will choose whether to borrow from an incumbent or from a newcomer and, simultaneously, she will choose whether to implement a safe or a risky project. It is straightforward that the result of Lemma 1 that an incumbent never refines a risky project continues to hold also in this economy. Therefore, the entrepreneur chooses whether borrowing from an incumbent and implementing a safe project with an expected return of

\[ X - p_s R_d \]

or borrowing from a newcomer and implementing a safe project with an expected return of

\[ X - p_s R_f \]

or, finally, borrowing from a newcomer and implementing a risky project with an expected return of

\[ d_f^r(X + b - p_r R_f) \]

In addition to the parameters already introduced, in the expressions \( R_f \) stands for the gross repayment due to a newcomer and \( d_f^r \) is an indicator variable for the expected date 1 refinancing decision of a newcomer if the project is risky (when \( d_f^r = 1 \) the newcomer refinances).

Lenders As anticipated we assume that newcomers pay a liquidation cost of \( 1 - \theta \) for each unit of liquidated value.
At date 1 each lender, newcomer or incumbent, has to choose whether to refinance the project. As anticipated an incumbent never refines a risky project. A newcomer chooses whether to refinance or liquidate according to a rule analogous to the one followed by an incumbent. In particular a newcomer will refinance if and only if

$$\theta q X < p_r R_f + (1 - p_r) \theta q - I$$

where the only difference from the corresponding condition of an incumbent is the lower return that the newcomer gets from recovering and redeploying the assets of her borrower. It is easy to see that, because of this lower return from assets’ liquidation, for given q and $R$, newcomers have a higher incentive to refinance, i.e. are softer terminators of risky projects.

The zero profit conditions of an incumbent are as before. As to a newcomer, depending on whether the funded entrepreneur is expected to choose a safe or a risky project, her zero profit conditions can be written as

$$p_r R_f + (1 - p_r) \theta q \geq 1 \quad (safe)$$

$$d^f_s [p_r R_f + (1 - p_r) \theta q] + (1 - d^f_s)(\theta q X + I) \geq 1 + I \quad (risky)$$

Again the only difference from the zero profit conditions of an incumbent is the lower return that the newcomer gets from redeploying assets. It is easy to see that, for given project and liquidation price q, borrowing from a newcomer is more costly (i.e. $R_f > R_d$). In fact, because of the liquidation cost, a newcomer can recover less value if a project defaults.

**Secondary Market** As before the supply of assets in the secondary market is

$$S' = (1 - p_s)b' + (1 - p_r)(1 - b')$$

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\^17\ A similar feature can be found in Dell’Ariccia, Friedman and Marquez (1999). They develop a model in which new banks have lower information on local firms. Hence, new banks face a more severe adverse selection problem and charge higher interest rate.
Equilibrium Let \( b'' (1 - b'') \) be the fraction of entrepreneurs who borrow from incumbents (newcomers). The equilibrium is defined by an ep-tuple \((d_r, d_r^f, R_d, R_f, q, b', b'')\) such that entrepreneurs and lenders maximize their utility, lenders’ zero profit conditions hold and the secondary market is in equilibrium.

Lemma 2

In an economy with both incumbents and newcomers in equilibrium incumbents (newcomers) are never (always) expected to refinance risky projects \((d_r = 0 \text{ and } d_r^f = 1)\), a fraction \( b' = b'' \) of entrepreneurs \((0 < b' < 1)\) borrow from incumbents and choose safe projects and a fraction \(1 - b' = 1 - b'' \) borrow from newcomers and choose risky projects.

In the proof we report the equilibrium values of \( b', q, R_d \) and \( R_f \).

Lemma 2 shows that in an economy with both incumbents and newcomers in equilibrium either entrepreneurs borrow from incumbents and choose safe projects or borrow from newcomers and choose risky projects. Moreover, there exists a positive mass of entrepreneurs who choose to borrow from newcomers. Henceforth we define equivalently with \( b' (1 - b') \) the fractions of entrepreneurs who choose safe (risky) projects and who borrow from incumbents (newcomers).

The intuition behind Lemma 2 is as follows. Because of their lower ability in liquidating assets, newcomers are softer terminators of risky projects, i.e. they always have the incentive to refinance them. This makes them more appealing than incumbents as a source of finance. However, this lower ability makes their funding more costly since they can recover less value if a project defaults. Their cost disadvantage makes them less appealing than incumbents as a source of finance. In equilibrium entrepreneurs will partition between the ones who derive high non-transferable returns from risky projects and the ones who derive low ones. The former will prefer paying the extra cost of funding, borrow from newcomers and choose risky projects, while the latter will borrow from incumbents and choose safe projects, saving on funding costs. As a result,
the share of risky projects is higher in an economy with both incumbents and newcomers.

2.3 Impact of a Shock

We now show how the diffusion of newcomers interacts with the share of risky projects undertaken. We perturb the economy with an exogenous shock to assets’ liquidity. We assume that a shock to the number of potential second-hand users occurs and in particular that a fraction $1 - \overline{\theta}$ ($\overline{\theta} > 0$) of the best users of liquidated assets (i.e. all the entrepreneurs with $\alpha \geq \overline{\theta}$) exit the secondary market. Formally, this means that $\phi$ falls from 1 to $\overline{\phi}$ and the demand for assets shift in a parallel way, with the new demand being $D = \overline{\phi} - q$. This shock can proxy for some non-modelled aggregate shock that hits the firms of the sector and that prevents them from buying assets in the secondary market. This can be a reduction of potential users’ cash flow, following a recession, for example, or a shock to government regulation that shrinks the number of potential second-hand users itself.\footnote{Changes in antitrust policies and in limitations of foreign investment are examples of such regulatory shocks (Shleifer and Vishny, 1992).}

Proposition 1 presents the main result of the paper:

**Proposition 1**

*In an economy with only incumbents a fall in the demand for firms’ assets does not affect the nature of projects undertaken. In an economy with both incumbents and newcomers a fall in the demand for firms’ assets increases the share of risky projects and the increase will be bigger the stronger is newcomers’ disadvantage in liquidating firms’ assets (i.e. the lower is $\theta$).*

The intuition behind Proposition 1 is as follows. When the demand for firms’ assets falls, in the secondary market supply exceeds demand and assets’ liquidation price falls. Since newcomers face a liquidation cost proportional to the value of the assets they liquidate, the price fall erodes their expected return
from liquidation less than incumbents’ one and the gap \( R_f - R_d \) narrows.\(^\text{19}\) By eroding incumbents’ cost advantage, 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 together with it the expected default rate and supply of assets, rise until demand and supply of assets are equal. These effects are bigger the higher is \( \theta \). The erosion in incumbents’ cost advantage is bigger the lower is \( \theta \). Hence the increase in projects’ expected default rate and supply of assets and the price fall necessary to reestablish the equilibrium are bigger the lower is \( \theta \). This explains the bigger increase in risky projects that is induced by a fall in the demand for assets when \( \theta \) is low.

Therefore, the result in Proposition 1 incorporates a two way link between the diffusion of lenders foreign to the market and the share of risky projects undertaken, with the bridge being the liquidation value of firms’ assets.

### 2.4 Endogenous Liquidation Capacity

The key assumption of the model is the different liquidation ability of incumbents and newcomers. In this subsection we analyse a simple way of endogenising this assumption.

In an economy in which second hand users feature different efficiency in employing liquidated assets, newcomers’ disadvantage in liquidating assets can be interpreted as a lower ability in identifying the most efficient users. The importance of search costs in assets’ redeployment is stressed by Ramey and Shapiro (2000). According to them “Thin markets and costly search complicate the process of finding buyers whose needs best match the capital’s characteristics. The cost of search includes not only monetary costs, but also the time it takes to find good matches within the industry”.

\(^\text{19}\)A competing force tends to induce a negative correlation between assets’ liquidation value and the gap \( R_f - R_d \). In fact, a risky project fails and leads to the liquidation of the asset with a higher probability than a safe one. Because of this effect entrants’ expected return from liquidation tends to be eroded more strongly when \( q \) falls (unlike incumbents, entrants fund risky projects). However, from Assumption 1, \( \theta < \frac{(1-p_C)}{(1-p_B)} \) and this effect is overwhelmed.
In particular, suppose that the secondary market is segmented in two islands: one island is populated by highly productive users (say the ones with \( \alpha > \bar{\pi} \)) while the other is populated by low productive users (\( \alpha \leq \bar{\pi} \)). At the liquidation time, lenders have to decide in which island to sell the recovered assets. The choice of island is reversible but, once an island has been chosen, switching to the other has a cost of \( 2(1 - \theta) \) times the value of assets to be sold. Assume also that the secondary market opens and the asset sale takes place after any switching has occurred. Finally, while ex-ante incumbents know the type of users who populate each island, newcomers cannot observe it until they have chosen the island. Hence, with probability 1/2 newcomers will initially select the island populated by the less efficient users. In particular, assume that newcomers have chosen the island populated by the less efficient users. Provided the difference between the liquidation price in the two islands exceeds the cost of switching island, newcomers will always switch and sell the recovered assets in the island populated by the best users. A necessary and sufficient condition for the switching to occur is \( q - \bar{\pi} > 2(1 - \theta)q \).

It is straightforward that at date 0 the expected date 2 liquidation cost faced by a newcomer in redeploying the residual asset of her borrower will be \((1 - \theta)q\).

2.5 Welfare

We now analyse the welfare implications of the model. Our measure of welfare is the economy-wide sum of transferable and non-transferable returns.\(^{21}\) Consistently with Proposition 1 we consider the impact on welfare of a negative shock in assets’ liquidity through changes in the share \( b' \) of safe projects undertaken. We compare this impact between an economy with only incumbents and an economy

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\(^{20}\)Clearly this condition is meaningful only if \( \theta < \frac{1}{2} \).

\(^{21}\)The inclusion of non-transferable returns in welfare is questionable. Unlike for transferable ones, their contribution to welfare depends on the weight attributed to the utilities of the agents who enjoy them. In our context, excluding non-transferable returns would reinforce our results. However this would be suspect since it would derive from the way we have specified the composition of projects’ returns.
with both incumbents and newcomers and among economies with a different disadvantage of newcomers in assets’ redeployment (i.e. different $\theta$s). Hence, we do not include in our comparison the welfare change due directly to the decline in the average productivity of external users.\footnote{For given share of bad projects, the decline in the productivity of external users reduces the return on the assets liquidated from failed projects.} This is not attributable to our mechanism and would also be sensitive to alternative specifications of the sources of the liquidity shock.

In Proposition 1 we have shown that when a negative shock in assets’ liquidity hits, in an economy with both incumbents and newcomers the share of risky projects increases while in an economy with only incumbents the nature of projects is unaffected. We have also shown that in an economy with both incumbents and newcomers the lower is $\theta$ the bigger is the increase in the share of risky projects. In Proposition 2 we show that when such a shock hits the decrease in the share $b'$ of safe projects that realises in an economy with both incumbents and newcomers is welfare improving. Moreover we show that the lower is $\theta$ the bigger this welfare improvement is.

Given its positive perspective, in our previous analysis we did not need to discuss the nature of newcomers’ liquidation cost $1 - \theta$. In analysing welfare implications we must differentiate the results according to the nature of this cost. The liquidation cost can be either a real resource loss that, aggregated across all active newcomers, enters welfare directly, or a transfer to another agent in the economy. For instance, the former would be the case of an additional effort a newcomer must bear to liquidate. The latter would be the case if for the assets of each firm there was an efficient liquidator in the economy (i.e. someone facing no liquidation cost) and a newcomer redeployed her borrower’s asset through its efficient liquidator, paying the liquidator a fee for this service. Note that if we interpret the liquidation cost as a transfer or fee, we can assume that the fees collected are simply rebated to the agents as a lump sum, so that they do not affect their decisions (i.e. the agents are given shares in the liquidation fee).\footnote{In a similar way, in a model with transaction costs in trading capital in a secondary market,}
The intuition behind Proposition 2 is that, irrespective of the nature of the liquidation cost, the share of risky projects is suboptimally low in an economy with incumbents and newcomers and even more so in an economy with only incumbents. Despite having higher returns than safe projects, risky projects are stopped by incumbents. In a sense incumbents are “conservative” lenders: they are unable to appropriate the high non-transferable returns of successful risky projects and, since they recover high value from liquidating assets, they stop projects with high probability of default. Therefore, in an economy with only incumbents the share of risky projects is stuck at zero. In an economy with both incumbents and newcomers, entrepreneurs have more flexibility in projects’ choice. In fact, for newcomers the outside option of liquidating assets has low value so that they allow the choice of risky projects. However, they impose on entrepreneurs the cost of their inability in liquidating assets, discouraging some of them from implementing risky projects. When a negative shock to assets’ liquidity occurs and assets’ price falls, newcomers’ liquidation cost falls with it and more entrepreneurs choose newcomers and risky projects, approaching the social optimum.

Beckvenga, Smith and Starr (1996) distinguish between transaction costs that represent real resource costs and transaction costs that are pure transfers (such as fees or rents to brokers or market makers). In a different context Diamond and Rajan (2001) distinguish between the cases in which a new lender can or cannot address for liquidation an old lender familiar with the assets of the firm. In their context, however, the entrepreneur herself is an efficient liquidator, so that there is no social cost due to new lenders’ lower liquidation ability.

24 Not surprisingly, the optimal share of risky projects is lower when the transaction cost is a social cost than when it is a private cost. However, even when the cost is social and is correctly internalised by firms in their decision, the share of risky projects is too low. Two externalities are at work. On the one hand, entrepreneurs tend to choose risky projects too often because they do not internalise the bigger reduction in the average productivity of liquidated assets that occurs when they choose risky projects. On the other, entrepreneurs do not fully internalise the social return of a liquidated asset since they care only about its resale price \( q \). This makes them choose safe projects too often. When \( \theta \) is equal to one the two externalities can be shown to be equal and the share of risky projects to be the optimal one. When \( \theta \) is below one the latter externality is stronger and the share of risky projects is too low.
Proposition 2

i) The increase in risky projects (reduction in \( b' \)) induced by a negative shock in the demand for assets is welfare improving. This welfare improvement is increasing in \( \theta \).

ii) If the cost \((1 - \theta)\) faced by newcomers is a real cost (a transfer), after the shock the number of risky projects is closer (respectively farther) to the optimal one.

The result in Proposition 2 can be compared to the one obtained in a different context by Dewatripont and Maskin (1995). They show that decentralised credit markets, i.e. markets in which firms borrow from several lenders, can result in a “too hard budget constraint”, inefficiently preventing the adoption of slow but highly productive projects. However, both the rationale for our results and the nature of the projects prevented by a too hard budget constraint differ.

3 Extensions and Implications

In 3.1 we discuss a simple extension of the model in which, while second-hand users have homogeneous ability in employing liquidated assets, assets themselves have heterogeneous re-usability outside the firm and second-hand users have limited information on the re-usability of the single asset. In 3.2 and 3.3 we respectively discuss limitations and empirical implications of the model.

3.1 Extensions: Asymmetric Information

In the previous analysis we have treated the secondary market as a Walrasian market with homogeneous assets and heterogeneous users of these assets. Analogous positive results can be obtained in a context in which users are homogeneous but assets are heterogeneous in their re-usability and there is asymmetric information on the re-usability of the single asset. Assume that the assets produced at date 1 in the two types of projects differ in their re-usability: the
assets produced in a safe project can be used to produce one unit of final good while the assets produced in a risky project have lower productivity outside the original firm. Buyers cannot observe or infer the nature of the asset liquidated but can observe only the average productivity of the liquidated assets. Hence, assets’ liquidation price in the secondary market will reflect only their average productivity. In this context, as the number of newcomers and risky projects increase, the average productivity and price \( q \) of the assets will decrease. For the rest the positive analysis is as in the basic model.

### 3.2 Limitations: Cross-Sector Specificity

The core feature that drives our results is incumbents’ higher ability in liquidating assets in the local market. As shown in 2.4, this higher ability can be interpreted as incumbents’ higher ability in identifying the best users of these assets. The ability of identifying the best users is probably a by-product of the information gathered by a lender in its credit relationships. Since a newcomer has had a more sporadic (or lack of) experience of local firms, she will face a natural disadvantage in gathering this information. Clearly, the more heterogeneous is the ability of sector-insiders in using liquidated assets, the higher will be newcomers’ disadvantage. Hence, our theory predicts a relationship between the within-sector specificity of firms’ assets and lenders’ entry into the sector.

Conversely, our model has little to say when the heterogeneous ability in using the assets is at the sectorial level, i.e. all the firms of the sector feature the same ability but it is the sector-outsiders that have heterogenous ability in using liquidated assets. In this case incumbents’ knowledge of the sector-insiders will probably have little role and it is unlikely that incumbents will enjoy a significant advantage in redeploying assets.

### 3.3 Empirical Implications

We identify three main empirical predictions of our analysis.

i) *Projects’ riskiness.* The model predicts that the diffusion of new (foreign)
lenders increases projects’ riskiness and, in turn, this spurs further diffusion of new lenders. The empirical prediction that the entry of foreign lenders spurs projects riskiness is close to the one obtainable in a context in which new lenders face a more severe adverse selection problem than incumbents and fund low quality domestic firms (Dell’Ariccia, Friedman, and Marquez, 1999). However, in these models adverse selection and the increase in projects’ riskiness deters the entry of new lenders while here, by reducing incumbents’ liquidation advantage, the increase in projects’ riskiness spurs the entry of new lenders.

ii) Assets’ liquidation values. The model predicts that the diffusion of new lenders leads to a decline in assets’ liquidation values and, in turn, the fall in assets’ liquidation values spurs further diffusion of new lenders. To our knowledge, existing models do not have explicit predictions on the behaviour of assets’ liquidation values at the time of new lenders’ entry.

iii) Welfare. In an economy open to direct foreign lending or, more in general, with less restrictions on entry in the credit market, a negative shock to assets’ liquidity should cause a lower welfare loss thanks to an increase in the number of high-risk/return projects funded by new or foreign lenders.

To conclude, note that in the model the entry of new lenders is associated with a rise in loan rates. This could appear at odds with the observation that generally more entry tends to reduce loan rates, mainly by favoring competition. However, what is crucial for our results is that the gap between new lenders’ loan rates and incumbents’ loan rates narrows and not that loan rates increase. Possibly, one could construct a richer framework in which loan rates decline but the mechanism described in the model is fully operational.

4 Conclusion

We have presented a model that relates the entry of lenders into an economy, the riskiness of projects undertaken and the liquidation value of firms’ assets.

If we interpret newcomers as foreign lenders, the model is probably better suited for describing the implications of cross-border lending across industri-
alised economies. When lenders of an industrialised country set up in a developing economy they are likely to feature higher efficiency and monitoring ability than local lenders. In the model, instead, we have ruled any heterogeneity in lenders’ intrinsic efficiency or monitoring ability, restricting lenders’ heterogeneity to different knowledge of the local market. Interestingly enough, the model still predicts benefits from the entry of foreign lenders into an economy. The next pressing step in future research is constructing a richer framework in which lenders’ intrinsic heterogeneity interacts with their heterogeneous knowledge of the local environment.

5 Appendix

Proof of Lemma 1

We show that \( d_r = 0, X - p_sR_d > 0 \) (hence entrepreneurs find convenient to implement a safe project) and \( b' = 1 \). We then verify that \( q = p_s \) and \( R_d = \frac{1 - p_s}{p_r} \). To have \( d_r = 0 \), it has to be that \( qX + p_r(1 - p_r) \geq p_sR_d + (1 - p_r)q \). The minimum value of \( q \) is \( p_r \). Substituting into the condition, we get \( R_d \leq X \) which is always satisfied since \( X \) is the maximum verifiable output. \( X - p_sR_d > 0 \) follows from \( R_d \leq X \). Therefore risky projects are never continued and all entrepreneurs choose safe projects (\( b' = 1 \)). This implies that the relevant zero profit condition and supply function on the liquidation market are respectively:

\[
\begin{align*}
1 & = p_sR_d + q(1 - p_s) \\
S & = 1 - p_s
\end{align*}
\]

Equating supply and demand on the liquidation market we get \( q = p_s \) and substituting into the zero profit condition we get \( R_d = \frac{1 - p_s}{p_r} \). In Lemma 2 we show that this value of \( R_d \) is lower than \( X \).

Proof of Lemma 2

We show first that \( d_r = 0, d_r = 0 \) and \( b' = b'' \). For \( d' = 1 \), it has to be that \( \theta qX + p_r(1 - p_r) < p_sR_f + (1 - p_r)\theta q \). In an equilibrium in which a newcomer continues a risky project, \( R_f = \frac{1 + (1 - p_r)\theta q}{p_r} = \frac{1 + (1 - p_r)(p_r - \theta q)}{p_r} \). Moreover the maximum value of \( q \) is \( p_s \). Plugging these values into the inequality above, we have that it will be satisfied for \( \theta < \frac{1}{p_rX} \) which is guaranteed by the RHS of Assumption 1. \( d_r = 0 \) follows from Lemma 1. To show that \( b' < 1 \) consider the zero profit conditions
of an newcomer and of an incumbent respectively:

\[ R_f = \frac{1 + (1 - p_r)(p_r - \theta q)}{p_r} \]
\[ R_d = \frac{1 - (1 - p_s)q}{p_s} \]

It is easy to see that, by the LHS of Assumption 1, for any value of \( q \), \( R_f < X \). Observe now that the gross repayment required by an incumbent is always lower than the one required by a newcomer (and, therefore also lower than the maximum verifiable output \( X \)). This implies that for a borrower the choice of a safe project financed by an newcomer is always dominated, formally

\[ X - p_s R_d > X - p_s R_f \]

Hence \( b' = b'' \). We now show that \( b' < 1 \). The price on the liquidation market is given by the equality between demand and supply on the secondary market as follows:

\[ q = (p_s - p_r)b' + p_r \]

and

\[ b' = p_r R_f - p_s R_d \]

Solving simultaneously the system we obtain:

\[ b' = \frac{p_r \left[ 1 - p_s + (1 - p_r)(1 - \theta) \right]}{1 - \left[ (p_s - p_r) \left[ 1 - p_s - (1 - p_r)\theta \right] \right]} \]

By inspection we have \( b' < 1 \). Observe moreover that \( q < p_s \) and \( R_d > \frac{1 - p_s(1 - p_r)}{p_s} \).

**Proof of Proposition 1**

Observe first that in an economy with only incumbents assets’ supply is independent of \( q \) and \( \theta \). To prove the Proposition it is sufficient to show that in an economy with both incumbents and newcomers \( b' \) decreases when \( \phi \) decreases (negative demand shock) and the decrease is stronger the lower is \( \theta \). When demand is equal to \( \phi - q \) the equilibrium value of \( b' \) is given by

\[ b' = \frac{p_r(1 - p_r) + [1 - p_s - (1 - p_r)\theta](\phi - 1 + p_r)}{1 - [(p_s - p_r)(1 - p_s - (1 - p_r)\theta)]} \]

Computing the derivative of \( b' \) wrt \( \phi \) we obtain

\[ \frac{\partial b'}{\partial \phi} = \frac{[(1 - p_s) - (1 - p_r)\theta]}{1 - (p_s - p_r)[(1 - p_s) - (1 - p_r)\theta]} \]
which is positive by Assumption 1. In turn deriving it wrt $\theta$ we get

$$\frac{\partial}{\partial \theta} \left( \frac{\partial b'}{\partial \phi} \right) = -\frac{(1-p_r)[1-2(p_s-p_r)((1-p_s)-(1-p_r)\theta)]}{(1-(p_s-p_r)((1-p_s)-(1-p_r)\theta))^2}$$

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 that the derivative is negative and completes the proof.

**Proof of Proposition 2**

We divide the proof into two parts. First we analyse the case in which $(1-\theta)$ is a private cost and does not enter welfare directly. Then we turn to the case in which $(1-\theta)$ is a social cost.

i) $(1-\theta)$ is a private cost.

Welfare in an economy with only incumbents is given by

$$W_C = X - 1 + \frac{(1-p_s)(1+p_s)}{2}$$

The third term on the RHS is the average productivity of a liquidated asset $\frac{1+p_s}{2}$ times the probability that a project defaults. Welfare in the economy with both incumbents and newcomers is a function of $b'$:

$$W_O(b') = b' \left[ X - 1 + \frac{(1-p_s)(1+q)}{2} \right] + (1-b') \left[ X - 1 - p_r(1-p_r) + \frac{(1-p_r)(1+q)}{2} \right] + \frac{(1-b')(1+b')}{2}$$

The third term on the RHS in the two square parentheses is the average productivity of a liquidated asset $\frac{1+q}{2}$ times the probability that a project defaults. The last term on the RHS is the total specific non-transferable returns enjoyed by entrepreneurs who choose risky projects.

Let us plug $q = \phi - 1 + (p_s - p_r)b' + p_r$ into $W_O(b')$. Define the welfare gap between the two economies as $G(b') = W_O(b') - W_C$. Define also the share of safe projects that maximises $G(b')$ as $b'_W$. We show that $b'_W < b'^*$, $\frac{\partial b_W}{\partial \phi} < 0$ and $\frac{\partial b^*_W}{\partial \phi} > 0$.

Solving for $b'_W$ we get

$$b'_W = \frac{p_r(1-p_r) - (p_s-p_r)(\phi - 1 + p_r)}{1 + (p_s - p_r)^2}$$

By direct inspection it is straightforward to observe that $b'_W < b'^*$. Computing $\frac{\partial b'_W}{\partial \phi}$ we get

$$\frac{\partial b'_W}{\partial \phi} = -\frac{(p_s-p_r)}{1 + (p_s - p_r)^2}$$
It is also easily shown that

\[
0 < \frac{\partial \theta'^*}{\partial \phi} = \frac{[1 - p_s - (1 - p_r)\theta]}{1 - (p_s - p_r) \cdot \frac{[1 - p_s - (1 - p_r)\theta]}{1 - (p_s - p_r) (1 - p_r)\theta}}
\]

Moreover \( \frac{\partial}{\partial \theta} \left( \frac{\partial \theta'^*}{\partial \phi} \right) = 0 \).

ii) \((1 - \theta)\) is a social cost.

Welfare in an economy with only incumbents is still given by the same expression. Welfare in an economy with both incumbents and newcomers is given by \( W_{O}(b') \) minus \((1 - b')(1 - \theta)q(1 - p_r)\), i.e. the social loss due to newcomers’ inefficient liquidation.

Define the welfare gap between the two economies as \( G(b', \theta) = W_{O}(b', \theta) - W_{C} \) and the share of safe projects that maximises \( G(b', \theta) \) as \( b'_{W} \). We show that \( b'_{W} < b'_{W, R} < b'^* \) and \( \frac{\partial \theta'^*}{\partial \phi} > 0 \). Solving for \( b'_{W, R} \) we get

\[
b'_{W, R} = \frac{p_r(1 - p_r) - (p_s - p_r) \cdot (\phi - 1 + p_r) + (1 - \theta)(1 - p_r)(\phi - 1 - p_s + 2p_r)}{1 + (p_s - p_r)^2} - 2(1 - \theta)(1 - p_r)(p_s - p_r)
\]

It is elementary but tedious to show that \( b'_{W} < b'_{W, R} < b'^* \). Computing \( \frac{\partial b'_{W, R}}{\partial \phi} \) we get

\[
\frac{\partial b'_{W, R}}{\partial \phi} = \frac{[1 - p_s - (1 - p_r)\theta]}{1 - (p_s - p_r) \cdot \frac{[1 - p_s - (1 - p_r)\theta]}{2 - (p_s - p_r) - 2(1 - p_r)\theta}} > \frac{\partial b'^*}{\partial \phi}
\]

This completes the proof.

References


