

*Transformation risk, inefficiency of the legal system
and financial dualism in developing countries*

Philippe Bernard

EURISCO

Université Paris IX

Baptiste Venet

EURISCO

Université Paris IX

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Abstract

Developing countries economies are well-known for both the inadequacy of the institutional framework (this is particularly relevant for the legal system) and the presence of informal financing. The former characteristic significantly reduces the efficiency of contractual mechanisms. As a result, the importance of transformation risk increases. Such a context induces entrepreneurs and lenders to implement some new non-contractual mechanisms. The diversity of monitoring techniques as well as the heterogeneity of borrowers' initial endowments and investment projects lead to an endogenous financial dualism. Borrowers choose formal or informal financing according to the quality of their investment project, their initial wealth and to the efficiency of the legal system.

J.E.L Classification: E44, O16, O17

1 Introduction

The importance of financial sector development in the economic development process was one of the essential topics of McKinnon [1973] [25] and Shaw [1973] [31]’s initial contributions. Disputing the legitimacy of the financial repression policy, they advocated a “liberalization” of the domestic financial market. One of the positive consequences of such a policy was to unify the domestic financial market by inducing the disappearance of the informal financial sector. Thus, the existence of informal finance would be only due to financial repression in the financial liberalization theory. However, this conclusion would seem to be a consequence of a very limited analysis of informal finance.

This approach was disputed in the early 80’s by the so-called “neo-structuralist school” (Taylor [1983][35], Van Winjbergen [1983][37]) which insisted on the “structural” nature of financial dualism in developing countries. Empirically, there is some doubt about the validity of the financial liberalization conclusion concerning financial dualism. For example, financial liberalization policies implemented in Ghana, Nigeria and Malawi at the beginning of the Nineties, did not lead to a significant contraction of the size of informal financial market (Aryeetey & Udry [1995][2]).

This persistence suggests that the financial structure is strongly dependent on the institutional context of the financial system (Rajan & Zingales [2003][29]). Thus, because it uses reputation mechanisms, the banking system is often regarded as less dependent on legal framework development than on a market-based financial one (Rajan & Zingales [1998][28]). For its part, informal finance appears, by its very nature, even less dependent on the efficiency of the legal framework. Also, when the latter is particularly weak, financial liberalization has few chances to engage financial development.

Financial infrastructure development is all the more necessary as data available on debtors’ defaulting in developing countries illustrates the importance of intentional default¹. But those are only the tip of the iceberg of *transformation risk* to which creditors (shareholders, banks...) are ultimately subjected to asset substitution (Jensen & Meckling [1976][17], the entrenchment of managers (Shleifer & Vishny [1989][32]), private profit either from the squandering of corporate resources or from the sales of assets at inappropriate prices (Zingales [1998][40]). Lenders must deal with this kind of risk. In order to do so, they use various mechanisms: contractual ones like covenants or collateral, etc.

¹It was also true in the “developing countries” of the nineteenth century, i.e. the United States, Germany or Scandinavia (Berglof, Rosenthal & von Thadden [2001] [4], Lamoreaux & Rosenthal [2001] [23]).

which restrict the power of borrowers, reputation mechanisms which encourage debtors not to exert various “illicit” opportunities being offered to them.

These various elements of thought on financial dualism, financial infrastructure and transformation risk, lead to some interesting questions. Do informal financial institutions and formal financial intermediaries have different “comparative advantages” in the use of monitoring mechanisms? Could the diversity of these techniques be a good explanation of the existence of financial dualism? What is the impact of the legal framework inefficiency? Is this a necessary condition to the existence of financial dualism? Is it a major determinant of the size of the informal sector? How does it modify the quality of debtors? To address these various questions, our paper relies on *transformation risk*. It is thus an extension of two contemporary literatures: one empirical, the other theoretical.

The empirical literature is that which, following on the papers of King & Levine [1993][18] [19], tried to assess the impact of financial development on economic activity. One of the most significant developments of this literature seems to be the seminal work of La Porta, Lopez-de-Silanes, Shleifer & Vishny [1998][20]. In a moral hazard or adverse selection context, the financing capacity becomes very largely dependent on the quality of financial governance (Stulz [2000][34]). The latter is strongly determined both by the efficiency of the legal framework and by its capacity to guarantee investors’ rights: “In the end, the rights create finance” (La Porta & alii [1999][22]). Consequently, the empirical literature was directed towards the empirical evaluation of investors’ legal protections (shareholders and creditors) in industrialized countries and its impact on the capacity of financing economic development.

La Porta, Lopez-de-Silanes, Shleifer & Vishny [1997][21] attempted to assess the contributions of the legal framework type², of different variables measuring the quality of the legal framework, and of various instrumental variables (e.g. growth of GDP, level of GDP) to external capitalization³. If the kind of legal framework is not always a significant variable, the one called “rule of law” is generally very significant. These first results were generally confirmed thereafter. Thus, Beck, Demirgüç-Kunt, Levine & Maksimovic [2000][3] revealed a significant impact of legal framework on growth and financial efficiency⁴.

²According to La Porta et alii [1998], every legal framework is tied to one of these four historical types: Anglo-Saxon Common Law, French Civil Code, German tradition and Scandinavian tradition.

³Measured by the ratio: capitalization controlled by external shareholders / GDP.

⁴Financial efficiency is an index developed by Demirgüç-Kunt & Levine [1999] [11]. It is equal to the logarithm of the ratio: financial transactions / index of banking operations cost.

The second literature which justifies this paper is the group of theoretical contributions on transformation risk and informal finance. In the context of the imperfect monitoring of borrowers - due to the poor quality of information, contracts or to the legal framework - debtors can be relatively free to use credits or available financial resources at will. In the absence of perfect congruence of debtor and creditor interests, this flexibility generates a risk for the latter, the so-called “transformation risk” (Myers & Rajan [1998][26]). It can take various forms: assets substitution, excessive manager wage, entrenchment strategies. In addition to the legal framework quality, one of the main determinants of transformation risk is liquidity. Indeed, the greater liquid the assets, the greater debtors’ capacity to liquidate assets before any creditors’ reaction. Also, for creditors, a greater liquidity does not necessarily increase the value of investment projects or the value of firms. This constitutes what Myers & Rajan [1998][26] call the “paradox of liquidity”. One of its consequences is that investment in illiquid assets can be a good way to increase debtors’ financial commitments. The imperfect monitoring of borrowers as well as the existence of transformation risk and the use of collateral are essential elements of our modeling of the banking sector.

The imperfection of the banking system constitutes a powerful incentive to seeking out other forms of financing. The existence of financial institutions resorting little to explicit contractual forms⁵ is one of the main characteristics of developing countries. Several economic explanations of these “non-market institutions” ([9]) have been proposed. Some authors like Stiglitz [1990][33] or Varian [1990][38] insisted on incentive virtues of “peer monitoring” in the presence of asymmetric information. However, others preferred insisting on voluntary default or limited commitment in credit relationship. Thus, Besley & Coate [1995][8] suggested the advantages and the drawbacks of the analysis of “collective” loan procedures. Their analysis showed the existence of a possible perverse effect of lending with a joint liability on the willingness to repay. However these negative consequences can be restricted by the existence of “social” sanctions. In our modeling, the latter are specific to the informal financial segment and distinguish it from the banking one: they

⁵For Besley [1995][9], the scarcity of explicit contractual mechanisms constitutes the common denominator of non-commercial institutions, i.e. of cooperatives of credit, ROSCAs, etc.: “In most cases these can be thought of as institutions that make relatively little use of formal contractual obligations enforced through a codified legal system.” ([9] p. 115). That is why the kind of agreements which are concluded between agents are sometimes described as “near-contracts” of credit. Platteau & Abraham [1987] [27] gave one of the first descriptions of these implicit contracts.

rise implicitly from the interdependence between various agents within relatively closed communities⁶. When social links are tied, informal finance has an additional incentive instrument: the “*community sanction*”.

The main goal of our paper is to propose an original modelling of financial dualism which focuses on the governance problems in credit relationships. In the banking - or “official” - sector, transformation risk, combined with the imperfections of the legal framework, restrain the financing of each borrower. His/Her borrowing constraint depends on his/her type, in particular his/her wealth and the risk of the project: indeed, taking into account transformation risk, investing the initial wealth in assets for which this risk is small is seen by the bank as a positive signal of his willingness to repay.

These various banking constraints lead agents to seek alternative forms of financing on the informal market. The latter is supposed to use a social sanction to monitor borrowers. More precisely, borrowers whose defaults are revealed voluntary are *ex post* excluded from the informal market. Of course, this monitoring technique implicitly supposes the existence of close social relationships on informal market. So, the social sanction implies a decrease of the “social capital” of failing contractors.

In our modelling, financial dualism depends on the behavior of agents. Strictly speaking, financial domestic market fragmentation is determined both by monitoring mechanisms of borrower and by their own characteristics: the distribution of borrowers between the two financial segments, the use or not of collateral are jointly given by the wealth and the quality of investment projects.

This paper is organized as follows. The second section is devoted to the presentation of the economy and the description of both the formal and informal financial sectors. In the third section, *we characterize optimal banking contracts when submission of a case before*

⁶Udry [1990] [36] & Coate & Ravallion [1993] [10] insisted on the importance of community “closeness”. The representation of a community space in which repeated exchanges take place allows the “folk theorem” to apply. So, the repetition of the game rationalizes the credit relationship in a world without contracts (Fafchamps [1992][13]). Bernhardt [1989][7], using a circularly monetary modelling, determines indebtedness levels when strategic default of debtors is possible. Within the circular framework, any defaulting debtor is constrained to meet in the future either the creditors victims of his failure, or the inform creditors of his past behavior. Implicitly, Bernhardt is modelling a relatively closed community where neighborly relations are obligatory. This ensures sufficient transparency of transactions and the outcome, and allows debtors to be monitored. Indeed, credit agreements are generally made, between individuals who belong to the same community (family, village...), i.e. between agents who know each other. Thus, taking into account the restricted size of communities, information circulates very quickly and the the intentional default of a borrower quickly becomes a public information.

the court is costly and the result of the legal procedure is unpredictable. The following section analyzes the properties of financial dualism. The fifth and last section is devoted to conclusion.

2 The Economy and the domestic financial market

2.1 The Economy

There are two periods ($t = 0, 1$) in the economy. During the first one, initial endowments are perceived by agents and investments are made while the second is when the results of the investments are revealed and consumption takes place. The economy is populated with a continuum of risk neutral entrepreneurs whose mass is standardized to 1. We assume that this population is distributed between several communities which are identical in their composition. The function of these communities is to provide various kinds of services. To simplify, the value of the latter is assumed to be identical and equal to S^7 . As it will be seen further, S plays a major role in the borrowing constraint of agents who are financed by informal lenders. Within each community, each agent is defined by two variables: his/her wealth (or the amount of assets held) and his/her investment projects. Within the economy, there are three different kinds of investment projects. Each of these has a linear technology which transforms goods of period 0 into that of period 1. The agents differ from the others by using the techniques which are available to them.

The first group of agents is that of “savers”. Each of them is allocated an initial endowment W . The value of W belongs to the interval $[0, \bar{W}]$ and its distribution function is noted F . Each saver can invest all or just a part of his wealth in a riskless technology whose return is equal to $r > 0$. Investments in this technology constitute the resources of lenders (banks and informal lenders) in the economy.

The second population is that of “entrepreneurs”. We assume that the latter are allocated an initial amount of a specific asset whose final income is $A \in [0, \bar{A}]$. However, entrepreneurs can decide to prematurely (i.e. at the end of period 0) and partially liquidate

⁷This assumption is made to simplify our presentation of financial dualism. One could suppose that the value of services provided by the community is a specific characteristic of agents. The results of the paper would not be substantially modified.

One also could propose an alternative modelisation where S would depend on individual wealth. For example one could adopt the following mathematical formula: $sW + S_0$, where S_0 is a strictly positive coefficient. This would not modify the results of the paper since S would not be too high.

this amount. If the initial endowment is completely liquidated, the income obtained is noted W and:

$$W = \frac{A}{R} \quad (1)$$

We assume that that liquidation is expensive, so $R > r$. In addition, since the nature and the quality of the asset vary from one entrepreneur to another, it is the same thing for W which belongs to the interval $[0, \bar{W}]$, with $\bar{W} = \bar{A}/R$, and that its distribution function is noted F . An entrepreneur can also choose to liquidate only partially his asset and so to obtain only L (with $L < W$). In that case, the income generated by the amount held is only RC with $C = W - L$.

The initial period (0) being the only one where partial or total liquidation is possible, *the transformation risk is thus null in the second period* (period 1). So, the amount held can play the role of collateral to the loan. In real life, the land - and in a more general way real goods - corresponds to this kind of asset.

Entrepreneurs have also access to a second investment technology which maximum size is identical for each entrepreneur and equal to K . For each entrepreneur, the return of the project is equal to ω when investment is a success and is equal to 0 when the state of nature is unfavorable. The average return of this second type of investment is noted $\bar{\omega}$ and verifies

$$\bar{\omega} > R > r \quad (2)$$

This second type of investment differs from the first one by two hypothesis. First, we suppose that each entrepreneur has an individual probability of success (noted ρ with $\rho \in [\bar{\rho}, 1]$, $\bar{\rho} \geq 0$). Thus, each entrepreneur is individually defined by the couple (W, ρ) ⁸. Of course, for each entrepreneur:

$$\bar{\omega} = \rho\omega \quad (3)$$

Second, we suppose that this second type of investment project is subject to transformation risk (Myers & Rajan [1998][26]). This last one compels lenders to find incentive mechanisms to avoid borrowers' strategic defaulting. However, each of the two types of lenders (banks and informal lenders) implement a specific technique.

⁸The probability ρ is also a measure of project quality.

2.2 The banking sector

On the banking segment, the transformation risk of the investment project is summarized by the parameter θ ($\in [0, 1]$) of the project: *the larger θ is, the smaller the transformation risk*. When a borrower breaks the borrowing contract, he expects to monopolize a share $(1 - \theta)$ of the risky project income but he is sure that he must give up the entire collateral (and, of course, collateral income). To manage the transformation risk, banks can require borrowers to invest all (or simply a part) of their wealth in the asset which can play a role of collateral. Like $R < \bar{\omega}$, this investment constitutes an opportunity cost for borrowers. Nonetheless, it is a good signal of the borrower's goodwill to repay⁹. The transformation risk endured by the bank depends on the composition of the borrower's portfolio. When he requests a bank credit, each entrepreneur whose characteristics are (W, ρ) must simultaneously determine the amount of his bank loan (D), his investment in the asset given as collateral (C) and that in the investment project (L). A major factor of this choice is the financing constraint which comes from the banker's will to minimize strategic default. This last aspect is detailed in the third section of the paper.

2.3 The informal sector

Informal lenders must also take into account the potential strategic behavior of borrowers. Of course, given the very definition of an "informal" activity, it is impossible for lenders to go to court. Informal lenders use another incentive mechanism : *social pressure*.

As it is underlined by Lapenu & alii [2000][24], there are two types of social pressure:

1. The first one, described as "passive", refers to the feeling of shame and guilt which can test the defaulting borrower;
2. the second one, described as "active", results in the social pressure exerted by the neighborhood on the failing borrower - verbal and/or physical attacks, information disclosure to the whole community, temporary or permanent exclusion by the group.

The second form of social pressure seems to be a characteristic of socially well organized communities. Thus Besley & Coate [1995][8] quote Adams & Landman [1979][1] and Scott [1976][30] for who "[group lending] appears to work well where village organizations are strong..." ([1] p. 87), "the intimate world of the peasantry where shared been worth and

⁹When the investment project is an *unintentional* failure, the formal lender (i.e. the bank) decides whether or not he goes to court. This decision depends on the cost of legal proceedings.

social controls combines to reinforce mutual assistance” ([30] p. 27). Wade [1988][39] also underlines that the village organization provides collective services and manages the access to collective lands too.

This form of socialization is that which is retained within our framework. The membership in a community offers various collective services to each agent. The value of those (S) can thus be interpreted like the value of the entrepreneur’s *social capital*¹⁰. Hence, an exclusion from the community is costly. Also, it constitutes the incentive mechanism of informal finance: we suppose that the strategic default of a borrower implies the *ex post* exclusion of him/her from the community and thus the loss of his/her social capital (S).

Remark 1 *Our modeling leads to clearly differentiating the two financial sectors. Each one uses a specific monitoring mechanism: the bank monitors ex ante the counterparts of the loan while the informal lender uses an ex post mechanism which is exerted on the borrower and not the loan. This monitoring mechanism seems to constitute a stylized fact of informal finance in South and East Africa (Aryeetey-Udry [1995][?]).*

In the informal sector, the borrowing power of each entrepreneur is both determined by his social capital (S) and his investment project. The full characterization of the informal optimal financing, carried out in Bernard & Venet [2003][6], shows that the total liquidation of initial asset endowment is always the optimal strategy since the quality of investment (ρ) exceeds a critical value (ρ_i) whose expression is:

$$\rho_i = \frac{(R - r)}{(R - r) + r \frac{\bar{w} - R}{\bar{w}}} \quad (4)$$

To simplify, we suppose that the minimal quality ($\underline{\rho}$) will always be strictly greater than ρ_i .

Hypothesis 1 *The informal optimal financing strategy consists in liquidating the totality of the asset initial endowment and to reinvest the amount of W as internal funds in the investment project.*

Under this assumption 1, and for a borrowed amount D and a factor of interest r_i , the entrepreneur is always honest as long as the profit of the strategic default (if the investment project is successful) i.e. $r_i D$, is lower than the loss of his social capital (S):

¹⁰Besley & Coate [1995] ([8] p. 13) use the term of social guarantee (social collateral). Concretely, the social capital of a borrower depends both on his wealth and investment projects and on his social status, and on the community to which he belongs, etc.

$$r_i \cdot D \leq S \quad (5)$$

The maximum amount of informal loan is thus S/r_i . Competition implies the nullity of informal lenders' profit¹¹, the informal rate of interest r_i is:

$$r_i = \frac{r}{\rho} \quad (6)$$

The maximum borrowed amount (D) of an entrepreneur whose characteristics are (W, ρ) is $\rho S/r$. To simplify, let's assume that an entrepreneur who finances himself on informal market does not bind his maximum investment capacity (\bar{K}) and thus that result is:

$$S < \frac{r}{\rho} [\bar{K} - \bar{W}] \quad (7)$$

Under this assumption, the entrepreneur implements his investment project if it is financed by an informal lender. Consequently, his investment expected income is:

$$\Pi^i = \bar{\omega}W + \rho(\bar{\omega} - r) \frac{S}{r} \quad (8)$$

Taking into account assumptions made on the various rates of return, the borrowing capacity and the informal borrower's expected incomes increase with the quality of the project (ρ): the larger the latter is, the smaller the repayment (if the investment project is successful) remembering that $r_i = r/\rho$. This implies that the larger the quality of the investment project is, the smaller the gain from strategic behavior ($r_i \cdot D$): *the informal incentive lending limit is a positive function of the quality of the project.*

3 Banking contracts in a renegotiation context

The efficiency of the collateral mechanism depends on the bank's capacity to obtain the effective transfer of collateral. Some empirical research (in particular Djankov & alii [2002] [12] for the contemporary period and Berglof, Rosenthal & von Thadden [2001] [4] for the nineteenth century) emphasizes both the general slowness and uncertainty of legal

¹¹Such an assumption implies that informal lenders have no monopoly power (contrary to Jain [1999] [16]). As it is underlined by Germidis & alii [1991][14], empirical studies are not systematically in favor of the monopoly power of informal lenders.

proceedings¹². In this third section, we propose a modelling of banking credit in a context where the legal system is inefficient.

3.1 Cost and uncertainty of legal proceedings

In our model, legal proceedings are both costly and uncertain. The cost encompasses all the lender's expenditures (legal expenses, lawyers' fees...)¹³. To simplify, *the cost of legal proceedings is fixed and noted c* .

In such a context, banks choose to go to court only when the net recoverable amount ($RC - c$) is positive. But, even if it is the case, because the cost c is a net loss for the borrower *and* the lender, both of them have an incentive to renegotiate¹⁴. This renegotiation process¹⁵ leads to a partition of the net recoverable amount ($RC - c$) between the two contractors. We suppose that the share of the borrower is equal to η . To limit the heterogeneity among borrowers, we suppose that c and η are identical for all borrowers, that depends on the quality of the legal system. η is a measure of the uncertainty of the result of the renegotiation process due to the inefficiency of the legal system.¹⁶

3.2 Borrowers' investment behavior and borrowing capacities

Let us assume than an entrepreneur whose type is (W, ρ) secures a loan D with a collateral C . If the investment project is an unintentional failure, the borrower transfers nothing to

¹²For Besley [1995] [9], this context explains why formal financial institutions are so underdeveloped in developing countries: "This often reflects difficulties in writing and enforcing market contracts, caused by uncertainties in the legal system, low levels of human capital in some cases, and the poor development of physical infrastructure (especially that facilitating communication)." ([9], p. 115)

¹³It is also important to take into account "implicit" costs (such as the length or the loss in the asset value) of the legal proceedings. These implicit costs could be considerable. For example, till the end of the nineteenth century, German and Swedish bankruptcy legal proceedings were so slow that they were seen as "almost endless" (Berglof, Rosenthal & von Thadden [2001] [4] p. 29). These implicit costs should be proportional to the recoverable banking amount (i.e. RC). So, they should play the same role as the parameter η of our model. That is why the cost of legal proceedings is restricted to a fixed cost noted c .

¹⁴Private negotiations (that is outside legal proceedings) was one of the main characteristics of the history of the United States during the nineteenth century. According to Berglof, Rosenthal & von Thadden [2001] [4], this could be due to the small efficiency of the legal system at that time.

¹⁵The renegotiation process is not described because it is useless in the paper. Nevertheless, one can find such a process in Myers & Rajan [1998] [26] or in Hart & Moore [1994] [15].

¹⁶If the bank was certain to obtain $(RC - c)$ after legal proceedings, then there would be no renegotiation process and, by way of consequence, $\eta = 0$. Symmetrically, if the borrower was certain to win his/her case, then the bargaining power of the banker would be insignificant and $\eta = 1$.

the bank if $RC \leq c$, and he/she transfers an amount of $(1 - \eta)(RC - c)$ otherwise. Because of the competition among banks which implies a zero-profit condition, the banker's expected income when $RC \geq c$ is:

$$\rho r_b D + (1 - \rho)(1 - \eta)(RC - c) = rD \quad (9)$$

Depending on $RC \begin{matrix} \geq \\ \leq \end{matrix} c$, this constraint leads to the following values for $r_b D$:

$$r_b D = \begin{cases} \frac{r}{\rho} D - \frac{1-\rho}{\rho} (1 - \eta)(RC - c) & \text{if } RC \geq c \\ \frac{r}{\rho} D & \text{if } RC \leq c \end{cases} \quad (10)$$

The banking contract must also encourage borrowers to be honest. Hence there is an incentive constraint that prevents borrowers from transforming assets when investment projects are successful. This “non-transformation” constraint is:

$$\omega L + RC + (\omega - r_b)D \geq (1 - \theta)[\omega L + \omega D] \quad (11)$$

When $RC \leq c$, substituting r_b in (11) and rearranging terms leads to:

$$D \leq \frac{\theta \bar{\omega} L + \rho RC}{r - \theta \bar{\omega}} \quad (12)$$

Thus, *the borrowing capacity on the banking sector (\underline{D}) when it is impossible for the bank to obtain a profitable transfer of collateral is:*

$$\underline{D} = \frac{\theta \bar{\omega} L + \rho RC}{r - \theta \bar{\omega}} \quad (13)$$

On the other hand, when $RC > c$, the same calculus leads to a maximum borrowing capacity of (\tilde{D}):

$$\tilde{D} = \frac{\theta \bar{\omega} L + \rho RC + (1 - \eta)(1 - \rho)[RC - c]}{r - \theta \bar{\omega}} \quad (14)$$

Of course, the leverage effect of collateral is greater when the bank has the capacity to go to court:

$$\frac{\partial \underline{D}}{\partial C} < \frac{\partial \tilde{D}}{\partial C} \quad (15)$$

3.3 Optimal contract in the banking sector

The borrowing constraint is now assumed to bind. The entrepreneur's program is to maximize his expected income ($\tilde{\Pi}^b$) by sharing out his initial endowment W between self-investment in the project (L) and the amount of collateral (C) under the constraints:

$$L + C \leq W \quad (16)$$

$$D \leq \tilde{D} \text{ if } RC > c, \quad D \leq \underline{D} \text{ if } RC < c$$

Solving this program implies distinguishing between two situations according to whether C is lower or higher than RC .

3.3.1 Contract without collateral transfer

If $c > RC$, the cost of legal proceedings is too high and the bank does not go to court. The entrepreneur's expected income if he chooses the banking sector and if his borrowing constraint is binding ($D = \underline{D}$) is:

$$\tilde{\Pi}^b = \bar{\omega}L + RC + (\bar{\omega} - r) \frac{\theta\bar{\omega}L + \rho RC}{r - \theta\bar{\omega}} \quad (17)$$

with:

$$\frac{\partial \tilde{\Pi}^b}{\partial L} = \bar{\omega} \left[1 + \theta \frac{\bar{\omega} - r}{r - \theta\bar{\omega}} \right] \quad (18)$$

$$\frac{\partial \tilde{\Pi}^b}{\partial C} = R \left[1 + \rho \frac{\bar{\omega} - r}{r - \theta\bar{\omega}} \right] \quad (19)$$

The first partial derivative can be interpreted as follows: each additional unit invested in the investment project raises the expected income by $\bar{\omega}$. But there is also a financial leverage effect because each additional unit invested in L ensures a rise of the borrowing capacity by $\theta\bar{\omega}/(r - \theta\bar{\omega})$ and, as a result, a rise by $(\bar{\omega} - r) \frac{\theta\bar{\omega}}{r - \theta\bar{\omega}}$ of the expected income. Because all investment projects have the same expected rate of return ($\bar{\omega}$), the financial leverage is independent of the project quality (ρ) but it is strongly related to the efficiency of the legal system (θ).

The second partial derivative can be interpreted in the same way: the direct effect comes with a positive leverage effect due to the collateral. Each additional unit invested in the guarantee (C) leads to a rise of $\rho R/(r - \theta\bar{\omega})$ in the borrowing capacity and a raise by $(\bar{\omega} - r) \rho \frac{R}{r - \theta\bar{\omega}}$ in the expected income. Thus now, the financial leverage depends on the project quality (ρ) but not on the efficiency of the legal system (θ).

The entrepreneur invests all his initial endowment (W) in the collateral ($W = C$) if $\partial \bar{\Pi}^b / \partial C \geq \partial \bar{\Pi}^b / \partial L$, that is if:

$$\rho R - \theta \bar{\omega} \geq \frac{\bar{\omega} - R}{\bar{\omega} - r} \times (r - \theta \bar{\omega}) \quad (20)$$

If:

$$\theta \bar{\omega} < r < R < \bar{\omega}$$

Then:

$$R - \theta \bar{\omega} > \frac{\bar{\omega} - R}{\bar{\omega} - r} \times (r - \theta \bar{\omega})$$

When ρ is close enough to 1, (20) is strictly verified with inequality bordered out. Thus, for each value of θ and r , there is a critical value of ρ (noted $\rho^*(r, \theta)$) which verifies:

$$\frac{\bar{\omega} - R}{\rho R - \theta \bar{\omega}} = \frac{\bar{\omega} - r}{r - \theta \bar{\omega}}$$

with:

$$\frac{\partial \rho^*(r, \theta)}{\partial r} > 0, \quad \frac{\partial \rho^*(r, \theta)}{\partial \theta} > 0 \quad (21)$$

Proposition 1 *Under the assumption $c < RW$, the optimal borrowing strategy of an entrepreneur whose type is (W, ρ) is:*

$$C = \begin{cases} W & \text{if } \rho \geq \rho^*(r, \theta) \\ 0 & \text{if } \rho < \rho^*(r, \theta) \end{cases} \quad (22)$$

Intuitively, this result can be explained as follows:

- A variation in the cost of banking resources (r) modifies the lending capacity in two ways. It reduces the expected borrowing income and it also boosts the entrepreneur's incentive to adopt a strategic behavior of deliberate failure because the borrowing cost is higher. However, for a given θ (that is for a given transformation risk) the entrepreneur's borrowing capacity is greater when the initial endowment is used as collateral. *Consequently, an increase of r has a greater negative effect on the borrower's expected income in this situation.* So, when the cost of banking resources increases, the use of collateral is less attractive and there is a greater incentive for borrowers to invest their initial endowment in the investment project. That is why $\frac{\partial \rho^*(r, \theta)}{\partial r} > 0$;

- Bank financing is also affected by θ (that is a *decrease* of the transformation risk): on the one hand, there is a direct effect which implies a reduction in the incentive to adopt a strategic behavior of deliberate failure; on the other hand, there is also an indirect effect: a decrease of the transformation risk increases the incentive to invest the initial endowment in the investment project. This second effect implies that a decrease of the transformation risk has a positive impact on ρ^* ($\frac{\partial \rho^*(r, \theta)}{\partial \theta} > 0$).

3.3.2 Contract with collateral transfer

If $c \leq RC$, the cost of legal proceedings is small enough to encourage the lender to always go to court when the investment project is a failure. Thus, the expected income of an entrepreneur who chooses bank financing and whose borrowing capacity is binding ($D = \tilde{D}$) is:

$$\tilde{\Pi}^b = \bar{\omega}L + RC + (\bar{\omega} - r) \frac{\theta \bar{\omega}L + \rho RC + (1 - \eta)(1 - \rho)[RC - c]}{r - \theta \bar{\omega}} \quad (23)$$

Because the partial derivatives of $\tilde{\Pi}^b$ with respect to L and C are independent of L and C :

$$\frac{\partial \tilde{\Pi}^b}{\partial L} = \bar{\omega} \left[1 + \theta \frac{\bar{\omega} - r}{r - \theta \bar{\omega}} \right] \quad (24)$$

$$\frac{\partial \tilde{\Pi}^b}{\partial C} = R \left[1 + \frac{\rho + (1 - \eta)(1 - \rho)}{r - \theta \bar{\omega}} \right] \quad (25)$$

the entrepreneur chooses to invest his initial endowment without any mixing between L and C .

Let $\tilde{\Pi}_c^b$ be the expected income of an entrepreneur who chooses to invest his wealth in collateral and $\tilde{\Pi}_{fp}^b$ the expected income when the initial endowment is invested in the project. We define W_1^* as the amount of wealth for which the entrepreneur is indifferent in both investment strategies, i.e. when:

$$\tilde{\Pi}_c^b = \tilde{\Pi}_{fp}^b \quad (26)$$

For each level of individual risk (ρ), W_1^* is the amount of initial wealth *beyond* which the borrower prefers to invest in collateral rather than in internal funds. In Bernard & Venet [2003][5], it is shown that W_1^* is a decreasing function of ρ as is shown in Fig. 1. When c (or η) increases, W_1^* rotates clockwise around the point I_1 whose coordinates are $(\rho^*, c/R)$.

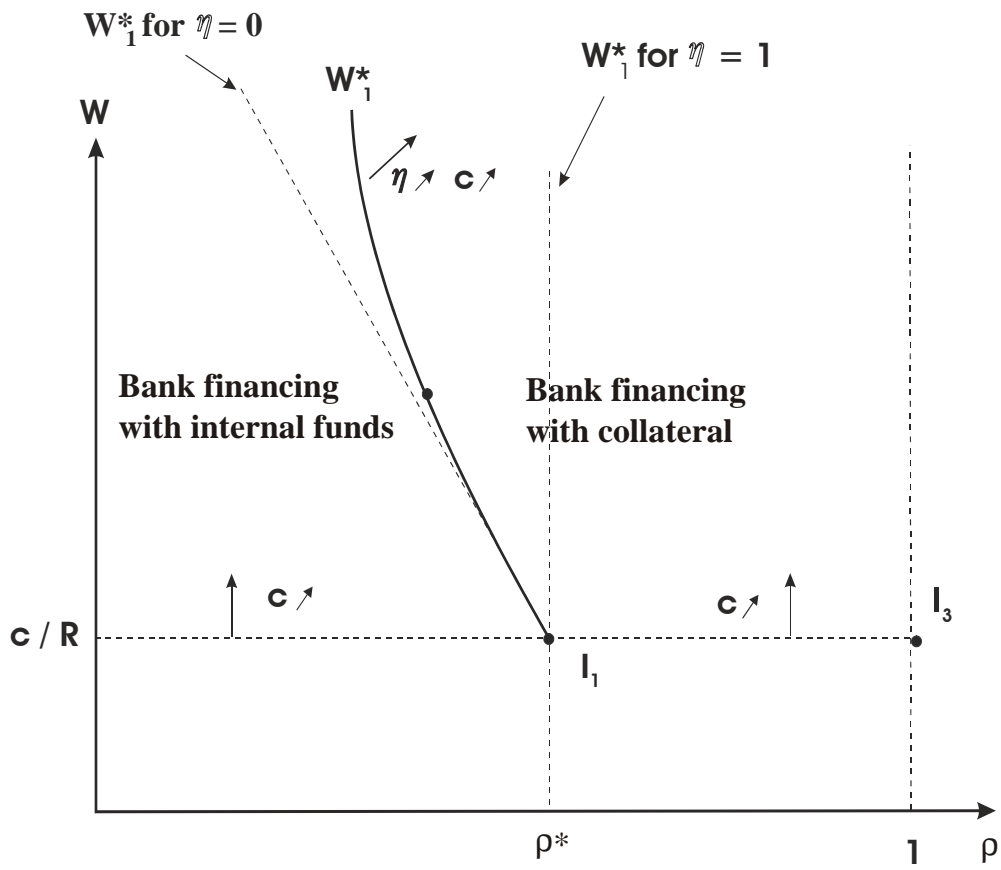


Figure 1: The choice between internal funds and collateral

To resume, the optimal expected income of an entrepreneur who chooses the banking sector is:

$$\tilde{\Pi}^b = \begin{cases} RW \left[1 + \left(\rho + (1 - \eta)(1 - \rho) \left(1 - \frac{c}{RW} \right) \frac{\bar{\omega} - r}{r - \theta \bar{\omega}} \right) \right] & \text{if } W \geq \max(W_1^*, c/R) \\ RW \left[1 + \rho \frac{\bar{\omega} - r}{r - \theta \bar{\omega}} \right] & \text{if } \rho \geq \rho^*(r, \theta) \\ & \text{and } W \leq c/R \\ \bar{\omega}W \left[1 + (\bar{\omega} - r) \frac{\theta}{(r - \theta \bar{\omega})} \right] & \text{otherwise} \end{cases} \quad (27)$$

It appears that the inefficiency of the legal system leads some entrepreneurs to invest their initial wealth as internal funds in their project as long as the quality of their investment project is too low (that is for $\rho \leq \rho^*$). This result may appear a little paradoxical. It can be understood as follows. The efficiency of the legal system plays a major role in the collateral mechanism. But the smaller the quality ρ of the investment project is, the smaller the expected income of an entrepreneur who chooses to invest his initial endowment in collateral (see eq. (25)). That is, the cost of collateral appears to be lower with the project quality. So, for low quality investment projects, the cost of collateral becomes so prohibitive that entrepreneurs have a low incentive to choose this financing.

4 Financial dualism in a renegotiation context

In this section, we begin by determining the conditions for financial dualism when the renegotiation of banking contracts is possible. Then, we present a situation where the legal proceedings are so expensive that there is no transfer of collateral when the investment result is an unintentional failure.

4.1 Financial dualism

Every borrower knows the cost of banking resources (r) and the financial techniques implemented in each financial sector. Consequently, the choice of the lender depends on the comparison between the two expected incomes.

One of the main determining factors of this choice is the investment project quality: as it has been shown in the previous section, when the exogenous probability of success (ρ) is larger than ρ^* (resp. lower), the optimal borrower's strategy is to invest his initial

endowment in collateral (C) (resp. in the investment project (L)). So the choice of the financing sector can be described as follows:

- if $\rho \leq \rho^*$, the borrower invests his own wealth in his investment project if he chooses the banking financing. In that context, the expected profits are respectively (see relation (27)):

$$\text{banking financing} : \widetilde{\Pi}_{fp}^b = \left[1 + (\bar{\omega} - r) \frac{\theta}{(r - \theta\bar{\omega})} \right] \bar{\omega}W \quad (28)$$

$$\text{informal financing} : \Pi^i = \bar{\omega}W + \rho(\bar{\omega} - r) \frac{S}{r}$$

Banking financing is strictly preferred if:

$$\left[1 + (\bar{\omega} - r) \frac{\theta}{(r - \theta\bar{\omega})} \right] \bar{\omega}W \geq \bar{\omega}W + \rho(\bar{\omega} - r) \frac{S}{r}$$

This condition leads to the definition of a new critical level of initial wealth (noted W_2^*) and whose mathematical expression is:

$$W \geq W_2^* := \phi_{FP}(r, \theta) \times \rho \times S \quad (29)$$

with:

$$\phi_{FP}(r, \theta) = \frac{r - \theta\bar{\omega}}{\theta r \bar{\omega}}, \quad \frac{\partial}{\partial r} \phi_{FP}(\theta) > 0, \quad \frac{\partial}{\partial \theta} \phi_{FP}(\theta) < 0 \quad (30)$$

- alternatively, if $\rho \geq \rho^*$ and if $RW > c$, the initial endowment is invested in collateral. Then, the expected income is (eq. (27)) :

$$\widetilde{\Pi}_c^b = RW \left[1 + (1 - \eta)(1 - \rho) \frac{\bar{\omega} - r}{r - \theta\bar{\omega}} \right] - (1 - \rho)(1 - \eta) \frac{\bar{\omega} - r}{r - \theta\bar{\omega}} c \quad (31)$$

As before, the banking sector is chosen by the borrower as soon as:

$$RW \left[1 + \left(\rho + (1 - \eta)(1 - \rho) \left(1 - \frac{c}{RW} \right) \right) \frac{\bar{\omega} - r}{r - \theta\bar{\omega}} \right] \geq \bar{\omega}W + \rho(\bar{\omega} - r) \frac{S}{r}$$

The previous mathematical condition leads to a third critical level of initial wealth (noted W_3^*) which is:

$$W \geq W_3^* := (\bar{\omega} - r) \frac{\rho \frac{1}{r} + (1 - \eta)(1 - \rho) \frac{c/S}{r - \theta\bar{\omega}}}{R \left[1 + \left(\rho + (1 - \eta)(1 - \rho) \right) \frac{\bar{\omega} - r}{r - \theta\bar{\omega}} \right] - \bar{\omega}} \times S \quad (32)$$

It appears that informal financing is mainly chosen by the poorest borrowers: indeed, the monitoring mechanism implemented by this sector restricts the borrowing capacity and, as a result, the size of investment projects.

W_3^* is a function of the transformation risk (θ), of the cost of lending resources (r) but also of legal proceedings cost (c) and of the entrepreneur's bargaining power (η). If we assume that $c = 0 = \eta$, then there is neither cost of collateral transfer nor uncertainty¹⁷. Alternatively, it is possible to study the opposite case, that is a situation where the collateral transfer never happens either because the cost is prohibitive ($c > RW$) or because the bank's bargaining power is null ($\eta = 1$). This second situation is detailed below.

4.2 Financial dualism when the transfer of collateral is costly

The distribution of borrowers between the two financial sectors depends crucially on the cost of the collateral transfer. To study the effect of this variable, first we consider the case of a prohibitive transfer cost, that is when $c > RW$. In that first situation, the only function of the collateral mechanism is to prevent the deliberate failure of borrowers¹⁸. The cost of credit is then $r_b = r/\rho$ (eq. (10)) and the expected entrepreneur's income is:

$$\tilde{\Pi}_c^b = RW \left[1 + \rho \frac{(\bar{\omega} - r)}{(r - \theta\bar{\omega})} \right]$$

An entrepreneur chooses bank financing if:

$$RW \left[1 + \rho \frac{(\bar{\omega} - r)}{(r - \theta\bar{\omega})} \right] \geq \bar{\omega}W + \rho(\bar{\omega} - r) \frac{S}{r} \quad (33)$$

and leads to define, for each level of ρ , a new critical value of initial endowment which has the following mathematical form:

$$W_3^{**} = \frac{\bar{\omega} - r}{r \left[R \left[1 + \rho \frac{(\bar{\omega} - r)}{(r - \theta\bar{\omega})} \right] - \bar{\omega} \right]} \times \rho \times S \quad (34)$$

with $\frac{dW_3^{**}}{d\theta} < 0$ and $\frac{dW_3^{**}}{dr} > 0$ ¹⁹. W_3^{**} is a decreasing function of θ : the smaller the transformation risk, the lower the cost of banking credit. As a result, the incentive to turn to bank financing rises with θ . On the other hand, an increasing cost of lending resources (r) leads to a bigger informal financial sector. It is because such a thing has a bigger negative effect on the borrowing capacity of banks because of the presence of the transformation risk which is specific to the formal financial sector.

The distribution of entrepreneurs among the two financial sectors is illustrated in Fig. 2. *Even in a perfect competition context, the presence of transformation risk, the diversity*

¹⁷This simple context is detailed in Bernard and Venet [2003][5];

¹⁸There is no more transfer when the investment project is an *unintentional* failure.

¹⁹The proof of the sign of the second derivative can be found in Bernard & Venet [2003][5].

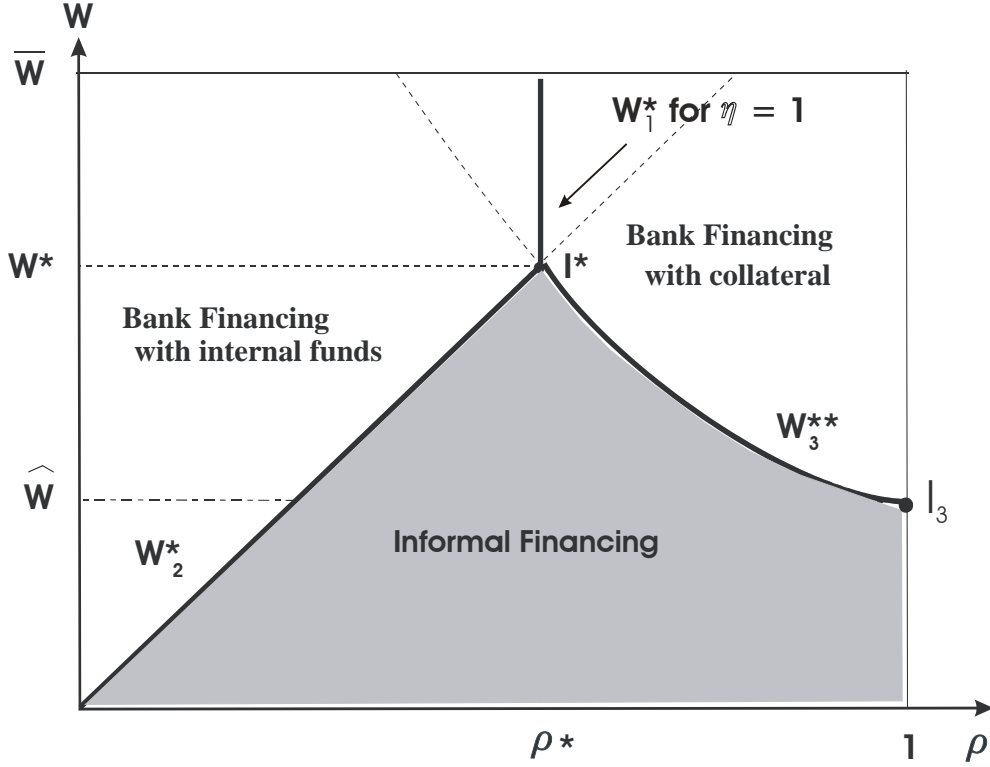


Figure 2: The distribution of entrepreneurs among the two financial sectors when $\eta = 1$.

of lending technics and the heterogeneity of entrepreneurs explain the existence of financial dualism. W_2^* (resp. W_3^{**}) is the critical value of the initial endowment which follows from eq. (29) (resp. from eq. (34)) beyond which borrowers choose the banking financing with internal funds (resp. in collateral) when $\rho \leq \rho^*$ (resp. when $\rho > \rho^*$).

Beyond ρ^* , W_3^{**} is a decreasing function of the quality of the investment project (ρ). Indeed, as it was mentioned before, the collateral plays two roles: on the one hand, it insures a minimum income for the bank when the investment project is an unintentional failure; on the other hand, it is a strong incentive for the borrower to honour his financial commitments. In the present context, the first function does not exist. So, from the banker's point of view, the value of the collateral is equal to the amount of the loss of the borrower's guarantee (ρRC) if he decides to fail. In that context, the borrowing banking in the formal sector appears to be greater with the project quality. Then, when ρ increases, the banking sector is more attractive and, consequently, W_3^{**} decreases.

The examination of Fig. 2 gives some information about the average quality of informal borrowers. Indeed, as long as $W < \widehat{W}$, informal financing implies an investment project quality above average. On the other hand, as soon as $W \in (\widehat{W}, W^*)$, the best and the

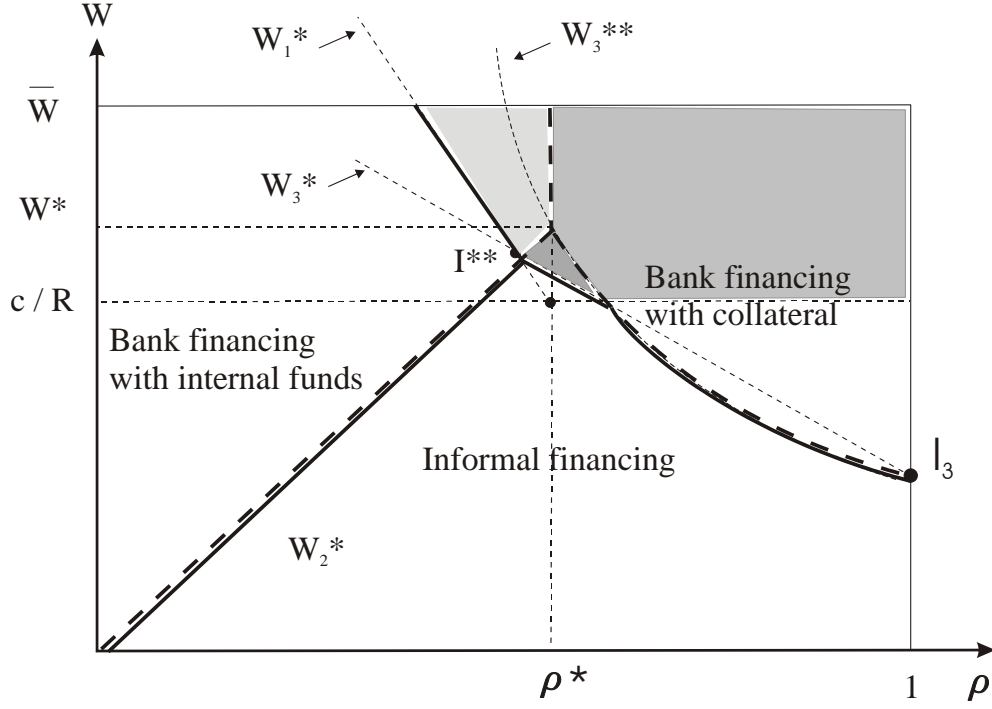


Figure 3: The distribution of entrepreneurs between the two financial sectors when $0 < \eta < 1$.

worst ones are financed by the banking sector and as a result, the quality of informal financed projects could turn out average. Lastly, informal financial dualism disappears as soon as $W > W^*$ and whatever the quality of investment projects. The latter only determines whether the initial wealth is invested in collateral or not. This implies that, in our model, the poorest (but not necessarily the riskiest) entrepreneurs use informal financing.

The existence of the bank's bargaining power ($0 < \eta < 1$) leads to a new repartition of borrowers between the two financial sectors and within the banking sector itself. The situation is presented in Fig. 3 where we suppose that the transfer cost is no more prohibitive²⁰ ($c < RW$).

First, it implies a modification of W_1^* and leads to take into account W_3^* (eq. 32). For each ρ , W_3^* is the amount of entrepreneur's wealth above which the banking financing with a collateral is better than the informal one. But in the context of renegotiation, the banking contract with collateral implies that the last is seized by the bank when the

²⁰This assumption is made to isolate the specific effect of a modification of the bank's bargaining power (η) on the financial dualism.

investment project is unsuccessful²¹. As for W_1^* , the curve rotates counter clockwise when η is decreasing (see Fig. 1) which implies, other things being equal, more financing with a collateral and consequently less financing with internal funds within the banking sector. Second, the reduction of entrepreneur's bargaining power implies a global diminution of informal financing (from an amount which corresponds to the grey triangle delimited by W_2^* , W_3^{**} and W_3^* on Fig. 3). The informal financial sector is getting smaller because the low transfer cost adds to the increasing bank's bargaining power to create a significant financial leverage which results in a larger incentive to resort to banking financing with a collateral. This result suggests that, our model, a more efficient legal system reduces (but not eliminate) the influence of informal finance.

5 Conclusion

An inefficient legal system (that is when the cost of legal proceedings (c) is high or when the bargaining power of formal lenders is weak (high η) restrains financial activities because of the potential strategic behavior of borrowers. In that context, the variety of monitoring techniques used by lenders leads to different institutional characteristics of financial domestic systems. This is the framework that we use in this paper.

In our model, the institutional characteristics of both financial sectors lead to specific monitoring techniques. On the one hand, informal financing relies on an *ex post* punishment (the expulsion from the community) from the very moment the borrower has not intentionally repaid his/her debt. On the other hand, formal banks use an *ex ante* contractual technique which forces some borrowers to invest their initial endowment in assets which can be used as collateral.

The two methods each have their advantages and drawbacks which depend on the borrower's characteristics: the initial endowment, the risk of the investment project and bargaining power. In our context, *financial dualism is a consequence of the heterogeneity of lenders and borrowers*. It also depends on the presence of the *transformation risk* on the banking sector. The imperfections of the legal system also play a major role in financial dualism even they are not the necessary condition for financial dualism. Last but not least, we show that for the poorest entrepreneurs (those for who the initial wealth is such that $W < \widehat{W}$ for a given risk of investment project), informal financing could be a signal of a quality investment project *above* the average. This is particularly im-

²¹ W_3^* is different from W_3^{**} which corresponds to a critical amount of wealth when there is *no collateral transfer*.

portant because informal financing is too often described as unable to draw good quality investment projects.

In our approach, the question of the future of financial dualism is closely linked to the improvement in the efficiency of the institutional framework and, more precisely, of the legal system. In a forthcoming paper, we will show that the size of informal finance is reduced by economic development. Thus, the domestic financial unification, advocated by McKinnon [1973] [25] and Shaw [1973] [31], seems closely tied to some improvements in governance.

References

- [1] D.W. Adams and J.R. Landman, (1979). Lending to the poor through informal groups : a promising financial market innovation? *Savings and Development*, 2:85–94, 1979.
- [2] E. Aryeetey and C. Udry, (1995). The characteristics of informal financial markets in africa. working paper, October 1995.
- [3] T. Beck, A. Demirgüç-Kunt, R. Levine, and V. Maksimovic, (2000). Financial structure and economic development: firm, industry , and counry evidence. working paper 2423, World Bank, Washington, DC., June 2000.
- [4] E. Berglöf, H. Rosenthal, and E.-L. Von Thadden, (2001). The formation of legal institutions for bankruptcy : a comparative study of the legislative history. mimeo, DEEP, University of Lausanne, February 2001.
- [5] Ph. Bernard and B. Venet, (2003). Gouvernance contractuelle, risque de transformation, et dualisme financier. document de travail, EURISCO, Université Paris Dauphine, Avril 2003.
- [6] Ph. Bernard and B. Venet, (2003). Réseaux communautaires et financement informel. mimeo, EURISCO, Université Paris IX Dauphine, en cours 2003.
- [7] D. Bernhardt, (1989). Money and loans. *Review of Economic Studies*, 56:89–100, 1989.
- [8] T. Besley and S. Coate, (1995). Group lending, repayment incentives and social collateral. *Journal of Development Economics*, 46:1–18, February 1995.

- [9] T. Besley, (1995). Nonmarket institutions for credit and risk sharing in low-income countries. *Journal of Economic Perspectives*, 9(3):115–27, Summer 1995.
- [10] S. Coate and M. Ravallion, (1993). Reciprocity without commitment : characterization and performance of informal risk sharing arrangements. *Journal of Development Economics*, 40:1–24, 1993.
- [11] A. Demirgüç-Kunt and R. Levine, (1999). Financial structures across countries: stylized facts. working paper, World Bank, Washington, DC., 1999.
- [12] S. Djankov, R. La Porta, F. Lopez-de Silanes, and A. Shleifer, (2002). Courts : the lex mundi project. NBER working paper 8890, NBER, Cambridge, MA., April 2002.
- [13] M. Fafchamps, (1992). Solidarity networks in rural africa : rational peasants with a moral economy. *Economic Development and Cultural Change*, 41(1):147–75, 1992.
- [14] D. Germidis, D. Kessler, and R. Meghir, (1991). *Systèmes financiers et développement: quel rôle pour les secteurs financiers formel et informel*. Centre de Développement de l’OCDE, Paris, 1991.
- [15] O. Hart and J. Moore, (1994). A theory of debt based on the inalienability of human capital. *Quarterly Journal of Economics*, 98:1119–58, 1994.
- [16] S. Jain, (1999). Symbiosis vs. crowding out: the interaction of formal and informal credit markets in developing countries. *Journal of Development Economics*, 59(2):419–44, 1999.
- [17] M.C. Jensen and W.H. Meckling, (1976). Theory of the firm : managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3:305–60, 1976.
- [18] R.G. King and R. Levine, (1993). Finance and growth: Schumpeter might be right. *Quarterly Journal of Economics*, 108(3):717–38, août 1993.
- [19] R.G. King and R. Levine, (1993). Finance, entrepreneurship and growth. *Journal of Monetary Economics*, 32:1–30, 1993.
- [20] R. La Porta, F. Lopez, A. Shleifer, and R. Vishny, (1996). Law and finance. *Journal of Political Economy*, 106(6):1113–55, December 1998.

- [21] R. La Porta, F. Lopez, A. Shleifer, and R. Vishny, (1997). Legal determinants of external finance. *Journal of Finance*, 52(3):1131–50, July 1997.
- [22] R. La Porta, F. Lopez-de Silanes, and A. Shleifer, (1999). Corporate ownership around the world. *Journal of Finance*, 54(2):471–517, April 1999.
- [23] N. Lamoreaux and J.-L. Rosenthal, (2001). Organizational choice and economic development : a comparison of france and the us during the mid-18th century. working paper, UCLA, 2001.
- [24] C. Lepenu, M. Zellner, and M. Sharma, (2000). Constraints of markets failures and rural poverty for micro-finance institutions: how innovations can increase outreach and sustainability? Bmz report, IFPRI, Washington, DC., 2000.
- [25] R.I. McKinnon, (1973). *Money and capital in economic development*. The Brookings Institution, Washington, DC., 1973.
- [26] S. Myers and R. Rajan, (1998). The paradox of liquidity. *Quarterly Journal of Economics*, August 1998.
- [27] J.-P. Platteau and A. Abraham, (1987). An inquiry into quasi-credit contracts : the role of reciprocal credit and interlinked deals in small-scale fishing communities. *Journal of Development Studies*, 23:461–90, July 1987.
- [28] R. Rajan and L. Zingales, (1998). Which capitalism? lessons from the east asian crisis. *Journal of Applied Corporate Finance*, 11:40–48, 1998.
- [29] R. Rajan and L. Zingales, (2003). *Saving capitalism from the capitalists*. Crown Books, 2003.
- [30] J.C. Scott, (1976). *The moral economy of the peasant*. Yale University Press, New Haven, 1976.
- [31] E. Shaw, (1973). *Financial deepening in economic development*. Oxford University Press, New York, 1973.
- [32] A. Shleifer and R. Vishny, (1989). Management entrenchment: the case of manager-specific investment. *Journal of Financial Economics*, 25(1):123–40, 1989.
- [33] J.E. Stiglitz, (1990). Peer monitoring and credit markets. *World Bank Economic Review*, 4:351–66, 1990.

- [34] R. Stulz, (2000). Does financial structure matter for economic growth? a corporate finance perspective. In A. Demirgüç-Kunt & R. Levine, editor, *Financial Structure and Economic Development - Conference Papers*, Washington, DC., February 2000. World Bank.
- [35] L. Taylor, (1983). *Structuralist macroeconomics: applicable models for the Third World*. Basic Books, New York, 1983.
- [36] C. Udry, (1990). Credit markets in northern nigeria : credit as insurance in a rural economy. *World Bank Economic Review*, 4(3):251–69, 1990.
- [37] S. Van Wijnbergen, (1983). Credit policy, inflation and growth in a financially repressed economy. *Journal of Development Economics*, 13(1-2), 1983.
- [38] H. Varian, (1990). Monitoring agents with other agents. *Journal of Institutional and Theoretical Economics*, 146:153–74, 1990.
- [39] R. Wade, (1988). *Village republics : economic conditions for collective action in South India*. Cambridge University Press, Cambridge, 1988.
- [40] L. Zingales, (1998). Why it's worth being in control. In *Mastering Finance*, pages 43–48. Financial Times Prentice Hall, 1998.