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Alper Duman, Izmir University of Economics

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Izmir University of Economics
Department of Economics
Sakarya Cad. No: 156
35330, Balcova Izmir
TURKEY

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Abstract

We model the organizational choice of a small firm given formal and informal credit market parameters. We observe a positive relationship between the size of the informal sector and the spread across countries. We take spread as relative inefficiency of the formal credit markets. Furthermore we also witness a convex positive relationship between the start-up costs and the size of the informal sector. The start-up costs are extremely important sunk costs for the micro and/or small enterprises. We argue that both the spread and the start-up costs are important parameters for the small enterprises in terms of the organizational choice. We provide a simple model to account for these main empirical regularities.

Keywords: Organizational forms, Formal and Informal Credit Markets
JEL Classifications: F21, O17

Alper Duman
Department of Economics
Izmir University of Economics
Izmir, Turkey 35330
e-mail: alper.duman@ieu.edu.tr

1 Introduction

Small and especially micro firms present unique challenges for capital markets. Even though they have very high birth rates, their survival rate is rather low. Determining which firms could have the potential for growth and hence the ability to repay loans is difficult. Enterprise owners often have few assets that can be used for collateral (De Soto, 1989) [1]. In spite of these difficulties, the small and medium enterprises (SMEs) in developed market economies frequently have access to bank credit.

For instance, among a sample of firms with fewer than five workers operating in United States, half reported having a current bank loan (Woodruff, 2001) [8]. As a percentage of total bank loans, SME have enjoyed 47 percent in United States, 50 percent in Japan 49 percent in South Korea, 39 percent in France, 27 percent in Germany, and 15 percent in India. Formal credit is much less common among the SME in developing countries. In Turkey, the corresponding figure used to be around 4-5 percent of all bank lending till early 2000s (OECD 2004). [5]

The picture for the microenterprises is even bleaker. Fewer than 3 percent of the small firms surveyed in 2000 say that they have ever had a bank loan. Economists have examined the link between access to capital and the foundation and performance of firms from many angles. The main body of the literature focuses on the role of the formal financial system in channeling capital to firms which have generally greater size and stability than microenterprises. Although a more important source of finance for microenterprises, informal lending has seldom been examined by researchers. On the other hand specific microenterprise loan programs have been the subject of much research (see Morduch, 1999, for a review). [4] The latter can be considered as semi-formal.

Even if the up-to-date evidence does not uniformly point out that microfinance can provide Pareto efficient outcomes, there is considerable consensus that it can expand the opportunity set of the self-employed and asset-poor people and somewhat improve their earnings.

We model the organizational choice of a small firm given formal and informal credit market parameters. We observe a positive relationship between the size of the informal sector and the spread across countries. We take spread as relative inefficiency of the formal credit markets. Furthermore we also witness a convex positive relationship between the start-up costs and the

size of the informal sector. The start-up costs are extremely important sunk costs for the micro and/or small enterprises. We argue that both the spread and the start-up costs are important parameters for the small enterprises in terms of the organizational choice.

2 Model

We follow Holmstrom and Tirole (1997) [3] and Straub (2005) [7] as the benchmark model. Risk neutral firms (or entrepreneurs) have initial capital K, which can be cash or some kind of productive assets that can be pledgeable as collateral and can be used for the project at the same time. Assets in the economy have an initial distribution characterized by a cumulative distribution function $F(K)$, over a range $[0, K^{Max}]$.

By accessing the credit market, firms intend to borrow an amount $(I-K)$ and undertake productive projects of variable size I, yielding $R(I) = RI$ in the case of success and 0 in the case of failure. So the production function is a constant return-to-scale type. Moreover, the probability of success depends on the firm's effort, which is not observable for by the lender.

Moral hazard is here formalized by assuming that the firm can either work and can be diligent, in which case the probability of success is p_H, or shirk, in which case it is only $p_L < p_H$, but enjoys a private benefit $B(I) = BI$ (where $B(I) > 0$), where I is the size of the investment project. This private benefit is assumed to be proportional to total investment, to capture the reasonable assumption that more resources can be diverted away from the larger projects [1].

In order to make the problem interesting we assume that

$p_H RI - \mu I \geq 0$ and $p_L RI - \mu I < 0$ for all $I > \underline{I}$.

In simple words, all diligent investment projects above minimum size are socially profitable, while all non-diligent projects are not.

[1] The consumption of loan funds to cover an emergency or personal event (e.g. wedding) is a good example of a private benefit to the borrower that can not be captured by the lender even if it were discovered. This action raises the probability of the project failure if, for example, it means purchasing fewer or lower quality inputs to carry out the project.

The sequence of actions is as follows. The borrower and the lender agree on the terms of an outcome-contingent loan contract and loan funds are invested in the project. The borrower next decides whether to be diligent or non-diligent after which point the nature determines the verifiable outcomes. Outcome-contingent repayments are then made according to the terms of the pre-arranged contract. Incentives to be diligent are embedded in the terms of the loan contract. The credit contract implies an agreement on a level of financing I and a sharing rule $R_I = R_B + R_L$ where R_B and R_L are the shares corresponding to the borrower and the lender respectively.

We now modify the model along the following lines. First, in contrast to Holmstrom and Tirole (1997)[3] we will introduce structurally separate credit markets in which the enforcement mechanisms will differ. Second, as opposed to Straub (2005) [7] we will include the opportunity cost of capital for the lenders explicitly in each separate credit market based on a common risk-free rate of return. Third, we will explicitly derive the comparative statics based on important institutional parameters. The contract design problem can be captured by the following optimization problem.

$$\max p_H(RI - R_L) \tag{1}$$

subject to incentive and compatibility constraints

$$p_H R_L \geq \mu(I - K) \tag{2}$$

$$p_H(RI - R_L) \geq \underline{U} \tag{3}$$

and lastly

$$p_H(RI - R_L) \geq p_L(RI - R_L) + BI \tag{4}$$

The first inequality refers to the lender's participation constraint stating that the expected revenue from the loan must be greater than or equal to the lenderâĂŹs opportunity cost, determined by a risk-free rate of return (Âţ). The second inequality states that the for the borrower expected revenue from the project should be greater than or equal to the reservation income, $\underline{U}$. The third inequality is the borrower's incentive compatibility constraint.
The last constraint implies

$$p_H - p_L)(RI - R_L) \geq BI \tag{5}$$

or

$$(RI - R_L) \geq \frac{BI}{\Delta} \tag{6}$$

where $\Delta = p_H - p_L$

Rearranging the terms we get an upper bound for the repayment to the lender

$$R_L \leq RI - \frac{BI}{\Delta} \tag{7}$$

The last inequality implies the maximum pledgeable income $R_L = RI - (BI/\hat{I}\check{T}P)$. Assuming that the credit market is competitive, so profits are null and the lender's participation constraint is binding, by substitution we obtain:

$$p_H(RI - \frac{BI}{\Delta}) = \mu(I - K) \tag{8}$$

and

$$I = (\frac{\mu}{\mu + p_H\frac{BI}{\Delta} - p_H R})K \tag{9}$$

Denoting the term within brackets as m, and then we will have

$$I \leq mK \tag{10}$$

In this model then, the borrowers (the firms) maximize the leverage (hence the level of investment) that satisfies their incentive compatibility constraint as well as that allowing them to pay the minimum to the lender that satisfies her participation constraint. For the sake of simplicity let's assume that the borrower has a simple utility function solely based on the expected net return from the project. Moreover, we will assume the competitive nature of the credit market ensures that borrowers get the entire surplus (making it optimal for them to invest as much as possible), so that[2]

[2]Assuming $p_H R < 1 + \frac{p_H B}{\Delta}$ will ensure that the optimal size of the firm is not infinite.

$$U_B(K) = (p_H R - 1)I = (p_H R - 1)mK \tag{11}$$

The last equation states that the all the exogenous parameters given, the utility of the borrower is a linear function of her asset level.

Building on this basic model, firms have the choice between two different operating modes: they can operate as a legally registered firm and try to get access to the formal credit or decide to stay informal and depend on informal lending.

2.1 Operating Formally

If the firm decides to be formal, it has to pay a fixed "entry cost" C[3]

Being formal means the firm is registered and has accounting data, so its accounts are at least partially transparent, and that it can engage in legal contractual relationships. This enables it to access the formal credit market. The firm in that case disposes of an initial capital of $K - C$. Accordingly, the amount of invested is given by:

$$I^F = m(K - C) \tag{12}$$

where the superscript F denotes "Formal", and the firm's utility is

$$U_B^F = (p_H R - 1)m(K - C) \tag{13}$$

2.2 Operating Informally

On the other hand, the firm might decide to stay informal, avoiding the entry cost C, in which case it lacks the credentials to borrow from the formal credit market and has to rely on informal lenders.

We formalize informal lending by assuming non-verifiability of revenue, alongside the possibility for the lender to impose a loss L on the borrower in case of non repayment (thus L can be either a pecuniary cost due to the seizure of personal assets, or consistently with a limited liability assumption,

[3]the entry cost can be substantial. In 1997, the total cost of entry constituted 36 percent of GDP per capita. For the median microenterprise it would have taken 3.3 years to save that amount from the net revenue with a 10 percent saving rate.

a non pecuniary one in case of Mafia-style enforcement or social sanctioning in terms of ostracism). Moreover due to the nature of the cost, the lender only recovers a fraction γL, where γ is within the range of $[0, 1]$. The parameter γ might refer to effectiveness of the monitoring and enforcement mechanisms used by the informal lenders. Lenders will lose L for sure if the project fails, but the lenders will only recover γL of the assets that the borrower possesses.

Note that, although the cost of L is supposed to be a punishment in case of shirking, it is in fact imposed also when the project fails because of bad luck or other exogenous shocks (with probability $1 - P_H$) thus inflicting a cost to the borrower ex ante, a cost that would be higher than solving the moral hazard problem ex post would require.

Since L and γ play important roles in the model, a few words about each may be in order. First it is important to differentiate L from the collateral that a formal lender may require for a loan. Collateral is generally sunk into the credit transaction ex ante, whereas L is an ex-post threat. It may or may not be pecuniary. Its main role is to enhance the credit relation between a potential successful borrower, who may lack the sufficient capital to become formal (or who may lack the sufficient capital to post as collateral if the formal lender requires such) and the informal lender who could recover, ex post, some of her capital lent by various informal means including forceful acquisition of monetary or non-monetary assets.

We are aware that the informal lenders can range from family member, close relatives and friends to pawn shops and moneylenders. Each type of informal lender obviously differs in terms of both the capability of enforcing the punishment (γ) and the capacity of determining the absolute value of punishment (L). Since we have no reliable data on the structural parameters that influence the lending decision of each informal moneylender we lump them together in our discussion.

The lack of data also makes difficult the job of assessing the relative competitiveness of informal lenders. We take them to be perfectly competitive, first to simplify the model and because second we believe that this is more relevant given that the gap between formal and informal lending rates would attract many informal moneylenders into this potentially profitable business.

Under these assumptions, the constraints of the previous model are modified in the following way: there are now two incentive constraints for the borrower, the standard one ensuring effort is exerted, and the entrepreneur

is diligent; and a second one to induce truthful declaration of income. The latter arises due to the fact that it may be preferable to declare default and just pay the ex-post enforcement cost, L, and capture what remains of the entire surplus. The incentive constraint implies

$$p_H R_B - (1 - p_H)L \geq p_L R_B - (1 - p_L) + BI \tag{14}$$

which implies

$$R_B \geq \frac{BI}{\Delta} - L \tag{15}$$

The latter requires the truthful declaration of income, that is

$$p_H R_B - (1 - p_H)L \geq p_H RI - L \tag{16}$$

which in turn implies

$$R_B \geq RI - L \tag{17}$$

Since $RI > (\frac{BI}{\Delta})$, the last inequality implies the former and only the last one is binding:

Therefore, $R_B = RI - L$. The participation constraint of the lender is then

$$p_H R_L + (1 - p_H)\gamma L \geq \mu(I - K) \tag{18}$$

Note that the opportunity cost parameter for the lender is the same, but the borrower operating informally would not have to incur any entry cost thus could borrow $(I - K)$. By substitution we get:

$$p_H(RI - R_B) + (1 - p_H)\gamma L \geq \mu(I - K) \tag{19}$$

requiring

$$p_H L + (1 - p_H)\gamma L \geq \mu(I - K) \tag{20}$$

Assuming competition in the informal credit market yields the feasible level of investment (the superscript I denotes "informal"):

$$I^I = K + \frac{\phi}{\mu} L \tag{21}$$

where

$$\phi = p_H + \gamma(1 - p_H) \tag{22}$$

so that ϕ lies within the interval of $[p_H, 1]$.

The utility of the borrower is given by (again assuming that the borrower captures the entire expected net return if the project is successful):

$$U_B^I(K) = (p_H R - 1) I^I - (1 - p_H) L \tag{23}$$

The second term is due to the confiscation by the lender even though the firm was diligent, but by bad luck the project failed. By substitution we get

$$U_B^I(K) = (p_H R - 1)[K + \frac{\phi}{\mu} L] - (1 - p_H) L \tag{24}$$

and

$$U_B^I(K) = (p_H R - 1) K + [\frac{\phi}{\mu}(p_H R - 1) - (1 - p_H)] L \tag{25}$$

Note that depending on the value of γ, the second term on the right hand side might be positive or negative. Obviously if it is negative (which happens for low values of γ), the firm is better off renouncing the loan.

$K*$ that equalizes the utility levels of entrepreneurs can be found as

$$U_B^F(K) = U_B^I(K) \tag{26}$$

and

$$K^* = \frac{(p_H R - 1) m \mu C + ((1 - p_H)\mu - (p_H R - 1)\phi) L}{(p_H R - 1)(m - 1)\mu} \tag{27}$$

Evidently to have a positive equilibrium level of $K*$, we should have

$(1-p_H)\mu > (p_H R-1)\phi$

2.3 Comparative Statics

Assume that the effectiveness of the sanctioning function of the informal lenders improves. The comparative statistics will give the range in which the voluntary informality will extend.

$$\frac{\partial K*}{\partial \phi} = \frac{L}{(m-1)\mu} > 0 \tag{28}$$

Naturally as ϕ is a linear function of γ, the partial derivative, $\frac{\partial K^*}{\partial \gamma}$ will have the same sign.

$$\frac{\partial K^*}{\partial \gamma} = \frac{L(1-p_H)}{(m-1)\mu} \tag{29}$$

and

$$\frac{\partial K^*}{\partial \gamma} = \frac{(1-p_H)\mu - (p_H R-1)\phi}{(p_H R-1)(1-m)} < 0 \tag{30}$$

if we keep the plausible condition that K^* holds.

And under the assumption of

$(p_H-1)m\phi > (1-p_H)$ we have

$$\frac{\partial K^*}{\partial \gamma} = \frac{mC(p_H R-1) + L[(m\phi(p_H R-1) - (1-p_H)]}{(p_H R-1)(m\mu-1)^2} > 0 \tag{31}$$

The first and the third comparative statistics demonstrate that the space for voluntary informality increases as K^* shifts to the right. As the slope of the utility curve for the formal credit borrowers is greater, that implies a foregone productivity gain and welfare efficiency loss.

As L, the loss in the case of default of informal credit borrowers, goes up the direct negative effect on expected utility dominates the indirect effect

of increased availability of informal lending and hence K^* shifts to the left. Being formal becomes more likely.

3 Optimal Choice of the Firm

We can now compare the benefits from becoming formal or staying informal at different levels of asset K. From the expressions of $U_B^F(K)$ and $U_B^I(K)$, we have constructed Figure 1 below.

In the top panel of Figure 1, we see that there is a cutoff level K^*, below which staying informal dominates. The fixed cost of formality C plays an important role in shifting $U_B^F(K)$ curve to the right. However, even if $C = 0$, there would be a range over the firm gets a higher utility by being informal.

This is due to the term, $L[\frac{\phi}{\mu}(p_H R - 1) - (1 - p_H)]$

thus the stronger enforcement capacity of informal lenders, which benefits informal borrowers indirectly by enhancing their access to credit.

The bottom panel maps the corresponding investment levels to the utility curves displayed in the top panel. The critical point is that the investment curve for the formal firms has a steeper slope than the investment curve for the informal firms. In our empirical analysis below we investigate whether this critical point is confirmed.

3.1 Extentions of the Model

3.1.1 Bargaining

Assume that the formal credit market is still perfectly competitive, but the informal credit market is subject to monopolistic competition so that the borrower and the lender engage in a generalized Nash bargaining in which the borrower could get the entire net expected surplus to zero share. In that setting, the allocation will maximize the generalized Nash product, that is

$$\psi(\alpha) = (U_B^I(K) - \underline{U})^{\alpha}(U_L^I(K) - \mu(I^I - K))^{1-\alpha} \tag{32}$$

where the exponent $\alpha \in [0, 1]$ is termed as the bargaining power of the borrower, $\underline{U}$ is the reservation utility of the borrower and $\mu(I^I - K))$ is the reservation utility of the lender; that is what she would be getting from the risk free financial market. The allocation that maximizes this expression (for

$\alpha \in [0,1]$) is that which distributes utilities to the borrower and to the lender to satisfy the first order condition.

$$\frac{\alpha(p_H - 1)}{(U_B^I(K) - \underline{U}} = \frac{(1-\alpha)U_L^I(K)}{[U_L^I(K) - \mu(I^I - K} \tag{33}$$

which implies that utility curve of the borrower will shift downwards for any value of Îś smaller than one. In turn, K^* will decrease and the space for voluntary informality will shrink.

3.1.2 Fixed and Variable Cost of Lending

So far we have assumed that the lenderâĂŹs participation constraint only included the opportunity cost of her funds. However, if there are indeed other costs of lending such as monitoring and screening then the share of the lender should also cover these costs. Assume that the total costs of lending have two parts; a fixed cost, T and a variable cost, V. Further assume that fixed cost a decreasing function of the number of borrowers and the variable cost is an increasing function of the number of borrowers. More precisely

$T = T(n)$ and $V = V(n)$ given $T' < 0$ and $V' > 0$.

We assume that the formal lenders, generally banks, do only incur fixed costs. They overwhelmingly rely on collateral as a screening device. The informal lenders on the other hand have to bear both types of costs. It is straightforward to see that

$$I^F = mK - T(n) \tag{34}$$

and

$$I^I = (K - T(n) - V(n)) + \frac{\phi}{\mu}L \tag{35}$$

The implication of lending costs on the investment decision is obvious. In both sectors the level of investment goes down. However, more intriguing is the question of the effect of an increase in the number of borrowers.

The net effect in the formal credit market would be a positive one, as the fixed cost is divided over more borrowers, and hence becomes smaller. The net effect in the informal credit market depends on potentially counteracting

factors: (1) if the fixed cost declines faster than the increase in the variable cost, then ceteris paribus the level of investment goes up, and (2) if the bargaining coefficient is an inverse function of the number of the borrowers in the informal sector, then the share of the borrowers will go down and this will dampen the incentive to invest.

4 Evidences

As a very preliminary check on our model we have used cross-country scatter graphs. One is based on the relation between the degree of informality (as measured by Schneider and Enste (2000) [6]) and the total opportunity cost of "Formality" (as measured by Djankov et al (2002) [2]). As it is seen from Figure 1 there is a positive relationship between these two variables. As C, (the cost of "formality") goes up and K^* shifts to the right both the space for involuntary informality and voluntary informality expands.

Secondly, we graph the relationship between the degree of informality and the "spread" (the difference in lending and deposit rates). The latter we think crudely shows the inefficiency of the formal credit market, and as expected the degree of informality is positively related with the measured inefficiency (see Figure 2).

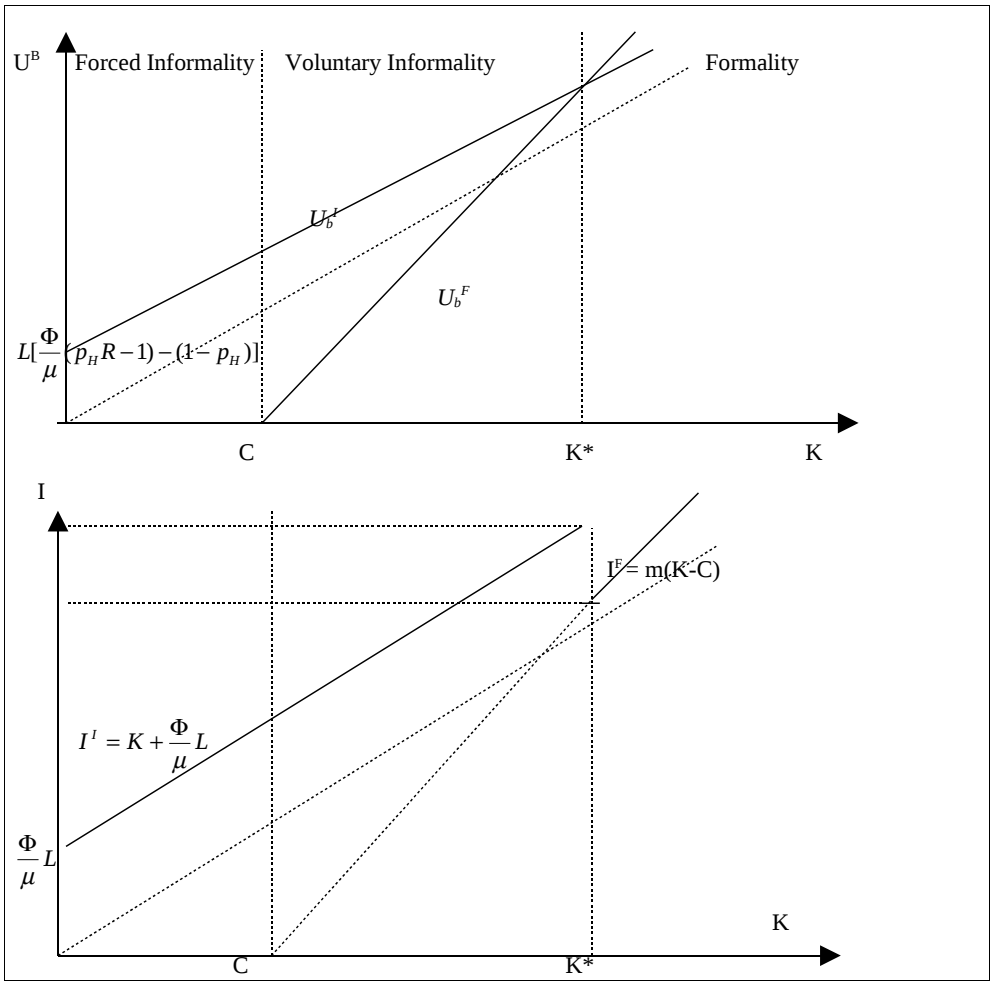
First we check whether the formalization cost is a major obstacle. We assume that the microenterprise owners maintain the level of their net earnings throughout a long period of time and save a certain percentage of their earnings to ensure formalization via the accumulated savings.

Table 1: Formalization Costs Given Microenterprise Earnings

Assuming 10 percent saving rate	Number of months to save full formalization cost	Number of years full formalization cost
For the 30th centile	62.5	5.2
For the median	40	3.3
For the 90th centile	20	1.6

Source: The calculations are based on the total formalization cost data for Turkey from Djankov et. al. (2002)

Figure 1: The optimal choice of the organizational form



If our model is explanatory we should see a relationship between the size of the involuntary informality and relative inefficiency of formal credit markets. In that respect we examine the cross country evidence illustrating the relationship between the spread and the size of the informal sector. Spread is taken as a proxy for the efficiency of the formal credit markets. The lower the spread the more efficient the formal credit markets. Thus we would expect higher informality with higher spreads.

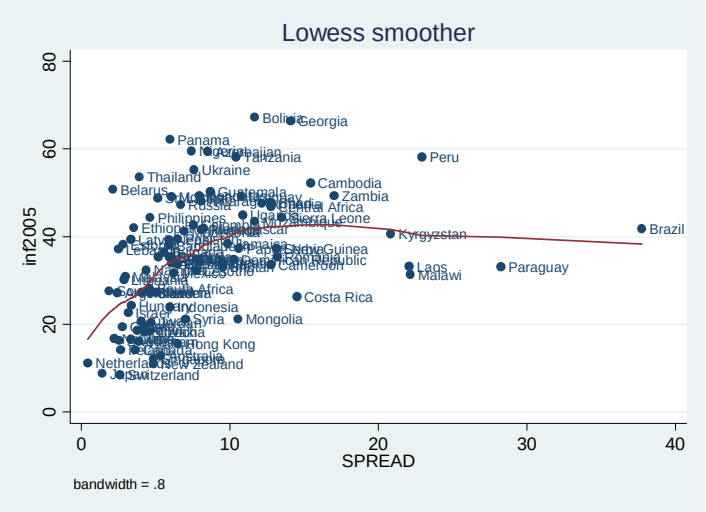
5 Conclusion

Wealth and credit constraints can limit the opportunity to choose optimal contractual forms, to start-up a business, to invest and to grow. At the firm level for micro enterprises the costs of being formal mean significant fixed costs, aggravating the wealth and credit constraints for the asset-poor entrepreneurs. If we assume that being formal also entails the access to the formal credit, we conclude that some of the asset-poor entrepreneurs will be forced to stay informal and some others will under invest.

Although the importance of micro enterprises for economic growth, employment growth and poverty reduction is widely recognized for the developing countries, there has been little empirical, policy-relevant research into the determinants of choice of organizational form and of access to external credit in the micro enterprise sector.

Access to external finance, either in terms of start-up capital or in terms of a loan, is very limited for the micro-enterprises in Turkey. The firms are heterogeneous; some show signs of dynamic growth and others seem to be doomed for bare survival.

Figure 2: Spread and Informality



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