Court-ship, *Kinship* and *Business*:
A study on the interaction between the formal and the informal institutions and its effect on entrepreneurship[*]

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1 Introduction

Effective contract enforcement is the key to the process of economic development. A contract can be enforced by formal legal court or by informal community courts known as *panchayats* in South Asia. In less developed societies both types of institutions co-exist often coming in each others way which are well documented in the context of marriage market and common property management (Nagraj, 2010; Yadav, 2009; Chowdhry, 2004; Madsen, 1991; Keremane et al., 2006). However, we have not come across any study that analyzes and estimates the effect of such interaction on economic decision making. In this paper we look at the effect of the interaction between the informal loan network and formal court system on the decision to run a business using both analytical and quantitative methods. We find that the informal network helps in business proliferation when the court system is weak but creates hindrance for the same when the court system is sufficiently strong.

There is a consensus among economists that better institutions encourage capital accumulation and subsequent growth (Acemoglu et al., 2001, 2002; Rajan and Zingales, 1998). However, the existing empirical literature on the effectiveness of formal institutions mostly look at the institutions of property rights which prevent the elites from expropriating. One exception is the paper by Acemoglu and Robinson (2003) which distinguishes between the effects of property rights institutions and contracting institutions on growth. Using a cross country data set they found that while good property right institutions have positive effect on growth, the effect of contracting institutions is not robustly significant. This result is counter intuitive and one possible reason could be that their data, which only measures the quality of formal contracting institutions fails to account for the role of informal network based institutions. Evidence shows that in the absence of effective formal courts of law, business often thrive under the informal institutions (Biggs and Shah, 2006; McMillan and Woodruff, 1999). In fact, the caste system prevailing in India can also be seen as a grand mechanism of contract enforcement using the reputation mechanism (Freitas, 2006). The key to the success of such reputation based mechanism is information about one's past action (therefore reputation) flowing in the community network (Ghosh and Ray, 1996; Rosenthal and Landau, 1979; Kandori, 1992). Many credit institutions in less developed countries such as ROSCA in East Asia (Besley et al., 1993)

and Grameen Bank in Bangladesh (Ghatak, 1991) crucially depend on such information flow within communities. The use of community level information for enforcing contracts was also ubiquitous in medieval Europe (Greif et al., 1994; Greif, 1993; Slivinski and Sussman, 2009).

Besides the general literature on institutions and its impact on economic growth, this paper is also related to the role of network in credit provisioning. Network membership which is often characterized by caste or ethnicity may work both in positive and negative ways. Community membership can increase the probability of getting loan if one's own community controls the supply of loan as a number of studies found in the African context (Biggs and Srivastava, 2002; Fafchamps, 2000, 2003; Gajigo and Foltz, 2010; Fisman, 2003). On the other hand it may also decrease the probability if the credit granting authority has any negative bias towards the credit applicants ethnicity. This result has been confirmed by various studies in the context of the United States (Blanchflower et al., 1998; Fairlie and Robb, 2007).

However, most of these papers mentioned above look at the formal and informal institutions as separate phases of development – the informal system getting replaced by the formal ones in due course of development. At best some authors have adopted a dual sector approach – making formal and informal two parallel set of rules without interfering with one another (Straub, 2005). But in reality, formal and informal institutions interact and mutually constitute each other. In less developed countries *de facto practices* are quite different from *de jure rules* – and these differences are often shaped by the interaction between formal and informal institutions. The only theoretical exposition of such interaction that we have come across is Dixit (2004) where he argues that the development of formal may have a detrimental effect on the informal mechanism. The informal system relies heavily on the reputation mechanism where someone with a reputation of cheating does not get a job within his/her community. People using formal contract however do not care about reputation – punishment under formal contracting is direct and enforced by third party (fine, imprisonment). Hence one can always cheat someone using the reputation mechanism and then find the next employment with another employer using formal contract.

We can expect such interaction will have stronger impact on small and medium scale enterprises than on their large scale counterparts. This is because small and medium size business often avoid accessing formal courts for its high costs. In India, the use of informal contracts are ubiquitous among SMEs. Harriss-White (2010) finds that in absence of effective formal institutions Indian SME s are largely regulated by what she calls "social regulation". This is nothing but informal institutions working through community network and reputation mechanism. There are very few papers on the impact of the formal court system on business decisions in India. In one such paper Chemin (2010) finds that reforms in civil court procedure leads to lower breach of contract, higher access to capital and building of new capacity in India. However, what Chemin finds is an average effect of more efficient courts. His research does not look whether the effect is different for areas with different initial conditions such as presence of *caste panchayat.* Our contention is that the effect of better legislation on business decisions will critically depend on these initial conditions. The two institutions might come in the way of each other producing undesired results in places where traditional, community based dispute resolving systems are widespread.

Our paper is also very closely related to the literature which looks at the interaction between social capital and formal institutions. In one such paper, Guiso and Zingales (2004) looked at the effect of social capital on financial decisions by using a data set on Italy and found that in high social capital areas people are more likely to use formal checks, invest less in cash and more in stock, have higher access to institutional credit and make less use of informal credit. The effect of social capital is stronger in areas with weaker legal enforcements. In a similar line of research, Karlan (2005) used experimental approach to find the effect of social capital on financial decisions. He made his subjects play the trust game and then use the result of trust game to predict their financial outcomes such as savings, default and dropping from the lending group. Our paper, in a broad sense, is also related to the literature which looks at the role formal institutions and informal norms in the management of common property resources. For example, Sandner (2003) looked at the interaction between formal institutions and norms of Kuna community in central America for preservation of marine resources. He shows that erosion of norms and insufficient development of formal institutions can lead to over exploitation of marine resources.

The paper is arranged as follows. In the next section we present an analytical model whose result is tested using a data set in the empirical section.

2 Model

2.1 Agents: Contractors and Entrepreneurs

There is a pool of potential entrepreneurs who produce a good G. For producing the good G they need an input X which is supplied by a set of contractors who come from a traditional X producing caste C. The entrepreneurs however may come from both the traditional caste (C) and outside caste (NC). The production of the input requires high skill but only a fraction of the caste C received the training from their ancestors – we call them High type contractors. The rest of the contractors who we call Low type do not have the necessary skill to supply the input. Therefore, if a low type is chosen the entrepreneur makes zero profit. Whether a contractor is High type is a common knowledge within the C caste but not outside. So, when a contractor from C caste asks for work a typical NC entrepreneur cannot tell whether the contractor has the appropriate skill. This however is a common knowledge for a C entrepreneur. For an NC entrepreneur the first problem is to distinguish between the High and the Low type.

However, there is a second level of problem as well – the problem of moral hazard. Even after a High type contractor is selected, he may supply bad quality input instead of good quality input as it saves effort cost for the contractor. Note that using a bad quality input for producing G is worse than hiring a Low type contractor. A Low type contractor is a fraud who does not have the skill to produce the input even of bad quality. Hence, from an entrepreneurs perspective, a High type supplying bad quality input yields a better outcome than hiring a Low type contractor who cannot supply any input. We write the condition as follows:

$$0 < \kappa < \pi^B < \pi^G \tag{1}$$

where κ is the reservation income of the entrepreneur. π^j is his income by hiring high type contractor where the contractor supplies quality j input $(j = B, G)$. If the entrepreneur hires the Low type contractor he gets 0 profit which is less than his reservation pay-off. Hence, while choosing a contractor

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faces two types of problems. The first one is a typical problem of adverse selection while the second one is of moral hazard.

The entrepreneurs can be characterized in two dimensions: caste identity and ability. An entrepreneur i is endowed with business skill θ_i and the skill is distributed according to the distribution ϕ. An entrepreneur i's output y_i is positively related to his ability. There is another dimension of any entrepreneur – either he belongs to a traditional business caste (C) or does not belong to that caste (NC). However, the distributions for *theta* are the same for C and NC type entrepreneurs. The main difference between C and NC types is in terms of accessing informal institutions – only C type entrepreneurs can access the informal network for adjudicating any dispute with the contractors. However, both C and NC type entrepreneurs can access formal court. Remember that the quality of an input (good or bad) cannot be verified by the court. Hence, the court is only useful if a Low type contractor misrepresented himself as a High type and took money for supplying the input.

The entrepreneur faces two levels of problems where finding a High type is the first level of problem. In the second level, the entrepreneur has to ensure that the High type is not behaving opportunistically – i.e. not supplying bad input after being hired.

2.2   Institutions

Let us now elaborate the role of institutions in solving the two types of problems mentioned above. There are two types of contracting institutions available in the economy. One is formal courts characterized by third party enforcement and the second is informal network characterized by reputation based mechanism. These two institutions solve the problem of asymmetric information in two different ways.

The informal network of C members possess the information regarding its member's skillfulness. Hence, belonging to the caste network can solve the problem of adverse selection for a C entrepreneur. But NC entrepreneurs cannot access this information. Instead, they can sign a formal contract with a possible contractor and if it turns out that the contractor does not have

the necessary skills to make X, the formal court can punish the contractor. Hence, with a sufficiently strong formal court, Low type caste members will not pose as a High type member.

The second (moral hazard) problem however cannot be solved by any third party as the quality of the input is not verifiable by the third party. Only the entrepreneur can find out the quality of the input and the punishment she can inflict is not hiring a cheater contractor for subsequent periods. The monetary value of the punishment can be measured by wage that a contractor loses if he is fired. We follow the efficiency wage theory framework proposed by Shapiro and Stiglitz (1984) and Greif (1993) for analyzing the solution to the moral hazard problem.

2.3   Adverse Selection Problem: The role of court

We have already mentioned that there are two types of problem that an entrepreneur faces: Low type posing as High type and after recruitment, high type supplying bad quality input. From the entrepreneur's point of view low type contractor (who can only supply zero input) is worse than hiring a high type who supplies bad quality. There are two ways of catching and punishing a Low type. The informal network contains the information about Low type contractors i.e. everybody in the caste knows which member in the caste does not have the necessary training to produce X. Hence, no Low type contractor is hired by a C type entrepreneurs. For NC entrepreneurs, there is no way they can have the information about one's true type. However, ex-post they can file lawsuit against the Low type posing as High and get the Low type punished with probability σ. Hence σ is the quality of the formal court. Mimicking the High type is not worthwhile for the low type if

$$\sigma(P - M) + (1 - \sigma)(P) < 0 \tag{2}$$

where P is the price that the low type gets by posing as the High type and M is the penalty he pays if he gets caught. The reservation pay-off of the Low type is 0. The condition tells us that there will be no Low type posing as High type if

$$\sigma > \frac{P}{M} = \sigma^* \tag{3}$$

For $\sigma < \sigma^*$ the quality of formal institutions is so bad that Low type can mimic High types and get away with it. This makes the NC type entrepreneurs find that it is not worthwhile to join the market. For low enough *sigma*, all low types mimics as high type and given that C type entrepreneurs already know who is low type, there is a very high probability that NC type entrepreneurs are matched with Low type. This leads to our first theorem:

Theorem 2.1 *For a sufficiently high quality of formal institutions (σ^*) Low types do not find it worthwhile to mimic the High type and as a result NC entrepreneurs enter the market.*

2.4 The Moral Hazard Problem

We start with the case where $(\sigma < \sigma^*)$ and only C type entrepreneurs operate. C entrepreneurs solve the adverse selection problem of selecting the High type through the information network. Hence, they face the moral hazard problem only – the problem of ensuring that High type supplies good quality input.The entrepreneur can solve the problem by offering a payment to the contractor so that cheating pay-off is less than honesty pay-off.

The contractor supplies one unit of the input to the entrepreneur and gets a payment ρ. If he supplies bad quality input he saves some cost η but at the end of the period gets fired. However, there is an exogenous probability of terminating the contract given by q. In that case, if the contractor is honest, he is hired again. For characterizing the honesty inducing equilibrium we define the following expressions:
The pay-off for an honest agent is given by

$$V_h = \rho + \beta(1-q)V_h + qV_h^u \tag{4}$$

where β is the discount factor and V_h^u is the pay off for an unemployed honest agent. The pay off of an unemployed cheater who remains honest if given another chance is given by

$$V_c^u = \beta p_c V_h + \beta(1-p_c)(\overline{\omega} + V_c^u) \tag{5}$$

where $\overline{\omega}$ is the reservation pay off of the contractor. p_c is the probability of rehiring someone who have cheated in the past. The pay-off of an honest unemployed is given by

$$V_h^u = \beta p_h V_h + \beta(1-p_h)(\overline{\omega} + V_h^u) \tag{6}$$

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where p_h is the probability of rehiring someone who have been honest in the past. The wage that prevents contractors from cheating one time must satisfy the condition $V_h \geq \eta + V_c^u$. It is easy to understand that no entrepreneur has any incentive to pay a wage more than the minimum honesty inducing wage.

Theorem 2.2 *The honesty inducing wage is rising in the probability of rehiring a cheater agent*

We provide the formal proof in the appendix. But the intuition of this theorem is quite straight forward. The only punishment an entrepreneur can inflict is firing the agent which involves the monetary cost of the forgone wage. If the cheater agents can easily be rehired the cost of losing the current job is low. In that case the input price (that he misses because of getting fired) needs to be big enough to prevent one from cheating. So we find $\rho^* = \rho(p_c), \rho' > 0$. We assume that that caste members will not appoint a contractor who has cheated another caste member i.e. in all C member environment $p_c = 0$. However, an NC type contractor cannot access any such information. Hence, she cannot distinguish between an agent who cheated in the past and the one who did not. For her $p_c = p_h > 0$. This leads to the next corollary:

Corollary 2.3 *The honesty inducing wage for the NC entrepreneurs is higher than that for the C entrepreneurs.*

2.5   The Interaction Effect

In this section we shall review the interaction effect between the formal and the informal institutions and its effect on the volume of business. In the previous sections we have assumed that there is one homogeneous caste network where the probability of rehiring a cheater is zero. We now extend this set up by introducing heterogeneity in terms of caste network. We assume that there are n districts and each district j is characterized by network size ν_j. We further assume that the probability of rehiring a cheater is a falling function of the network size.

$$p_c^j = g(\nu_j) \tag{7}$$

where $g' < 0$. This assumption implies that in a district characterized by big network, a large number of people know about one's cheating history and

the cheater finds it difficult to get a job. In this section we elaborate how the improvements in the formal court system affects districts with different degree of network differently. First we analyze how the improvements in the formal court system affects the C type entrepreneurs.

NC type entrepreneurs can only enter the market if the formal institutions are good enough to solve the adverse selection problem. Hence, a good court allows the NC entrepreneurs to enter the market. Once in the market, the NC entrepreneurs solve the moral hazard problem the same way the C entrepreneurs solve the problem i.e. paying the honesty inducing price. But the entry of NC entrepreneurs will have an indirect impact on the C entrepreneurs as the equilibrium price for the input will go up reducing the profit margin of the existing C entrepreneurs. This determines the number of C entrepreneurs. Who are the C entrepreneurs running business? The entrepreneurs with ability θ_i will be in business such that

$$y_i \geq \rho^* \tag{8}$$

where ρ^* is the equilibrium price for the input. Solving (7) for equality we get lowest ability entrepreneur that can be in the business $\widetilde{\theta} = \theta(\rho^*)$ where $\widetilde{\theta}$ is rising in ρ^*. From this we get our next proposition

Theorem 2.4 *The cut-off ability level of the entrepreneurs is a function of the input price and the cut-off goes up as the input price goes up*

If the equilibrium input price (ρ^*) goes up, only the entrepreneurs with sufficiently high ability can stay in the market. As the input price goes up following the entry of the NC type entrepreneurs the cut-off ability level goes up. Let us now look at the number of business following the entry of the NC entrepreneurs. Entry of the NC entrepreneurs increase the number of NC business, but it decreases the number of the C entrepreneurs as the cut-off ability level gets revised. Hence, theoretically the net effect is ambiguous making the empirical investigation important.

Suppose the number of possible caste entrepreneurs is M_c. In period 0 with we do not have any NC entrepreneur in the market. So the number of business is equal to the probability that a potential C entrepreneur will start

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a business times M_C. Suppose in period 0 the cut off ability level was θ_0. Hence the total number of business is given by

$$B_0 = M_C \times (1 - \Phi(\theta_0)) \tag{9}$$

In period 1, NC entrepreneurs enters and as a result input price goes up moving the cut-off ability level to $\theta_1 > \theta_0$ for both C and NC entrepreneurs as they both face the same input price. Hence, while new entrants (NC entrepreneurs) add to the volume of business quitting caste entrepreneurs reduce it making the net effect ambiguous. Assume that the pool of potential NC entrepreneurs is M_N. The volume of NC business is given by

$$B_1^N = M_N \times (1 - \Phi(\theta_1)) \tag{10}$$

The number of caste business in period 1 is given by

$$B_1^C = M_C \times (1 - \Phi(\theta_1)) \tag{11}$$

Hence, total business is period 1 is given by

$$B_1 = M_N \times (1 - \Phi(\theta_1)) + M_C \times (1 - \Phi(\theta_1)) \tag{12}$$

The change in business is given by

$$B_1 - B_0 = M_N(1 - \Phi(\theta_1)) - M_C(\Phi(\theta_1) - \Phi(\theta_0) \tag{13}$$

From this we get $B_0 \lesseqgtr B_1$ according as

$$\frac{M_N}{M_C} \gtreqless \frac{(\Phi(\theta_1) - \Phi(\theta_0))}{(1 - \Phi(\theta_1))} \tag{14}$$

Theoretically we do not have any clear cut answer whether entry of NC entrepreneurs will lead to increase or reduction in the number of business. This depends on the relative size of the pool of C and NC entrepreneurs and the shape of the ability distribution. The larger is the value of M_C compared to M_N, more likely it is that with the improvement in the formal institutions (and consequently entry of the NC entrepreneurs) total number of business will fall. This will happen when the new entry will not be sufficient to cover for the exit of the caste entrepreneurs.

Let us now examine the role of interaction between the existing network and the formal institutions in determining the volume of business. In period 0, larger the network, lower is the probability for a cheater contractor to be rehired, and lower is the input price. Hence, in a district characterized by a larger network, the cutoff ability level for the C entrepreneurs is lower than that in a district with smaller network. This means

$$\theta_0 = \theta(\nu) \tag{15}$$

where ν represents the size of the network and $\theta'(\nu) < 0$. This means that the value of θ_0 is low in high network districts. Given that θ_1 is determined by the cut-off level of the NC entrepreneurs which has nothing to do with the existing network size, the expression $(\Phi(\theta_1) - \Phi(\theta_0))$ is rising in the network size. Given that the size of the quitting business is rising in $(\Phi(\theta_1) - \Phi(\theta_0))$ we get the following theorem

Theorem 2.5 *If formal institutions improve sufficiently allowing the NC entrepreneurs to set up business the reduction in the caste business will be higher in high network districts than that in the low network business. If the negative impact of the quitting C entrepreneurs is strong enough this will lead to greater reduction in total volume of business in the districts with higher network.*

3   Empirical Specification

Empirically, a way to test the theoretical predictions would be to estimate the following specification:

$$P(SE)_{id} = \beta_0 + \beta_1 II_d * SI_d + \beta_2 II_d + \beta_3 SI_d + X_{id} + \epsilon_{id} \tag{16}$$

where, $P(SE)_{id}$ reflects the probability with which a household i in district d chooses to be self-employed over being wage employed. II_d is a proxy for the quality of informal institutions in district d. It measures the fraction of households in a district d that takes loans from informal sources viz. friends, relatives and community credit groups. SI_d is a proxy for the quality of formal legal institutions and is defined as the fraction of households in a district d who perceives the judiciary to be strong. The interaction between II_d and SI_d is our main variable of interest. According to theoretical predictions of our model, a positive β_2 and a negative β_1 would imply that

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households choose to do a business when informal network is large which thereby helps to uphold a contract. On the other hand, when the quality of formal court increases, so that formal legal systems encroach upon informal norms, a larger informal network proves disadvantageous for setting up a new business.

X_{id} includes a range of household and district level controls. Specifically we include religion, caste, education, amount of loan taken and any caste-group membership at the household level and availability of formal loans, size of caste and religious organizations at the district level.

4 Data

Data for this study come from the India Human Development Survey (IHDS). The IHDS is a nationally representative survey of 41,554 households interviewed in 2004 and 2005 (Desai et al. 2009). Surveyed households are distributed across 382 of India's 602 districts. Our study covers households which are either self-employed, wage employed or unemployed. This leads to a sample size of 34521 households across 373 districts in our study. For our dependent variable we use the information on employment status of different members of a household to create a household level variable of self-employment status. We define a household to be self employed if at least one member in the household owns a business in the non-agricultural sector. A household is defined to be wage-employed if at least one member is wage-employed and no one is self-employed. A household is defined to be unemployed if no one in the household is employed.[1]

Our main variables of interest are formal and informal institutional quality. Quality of formal courts is a measure of perceived quality. Specifically, the survey asks households to rank different institutions on a scale of one to three where three signifies least confidence in a particular institution and one signifies most confidence. We consider a the perceived court quality to be strong when a household's ranking of court efficiency is one.

Table 1 provides the summary of our estimation sample. About 23% of our full sample is self employed. However, when we disaggregate by sector, we

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[1]We also define a separate category as agricultural household if at least one member owns an agricultural land or is employed in agriculture and no one is self-employed or wage-employed. However, we did not include this reference category in our analysis because they form a very small fraction of the total number of households.

find a much higher prevalence of self employment in the urban sector - about 29% of the sample is self-employed in urban as opposed to 19% in the rural sector. This has implications for the importance of the relationship between self-employment and institutional quality which we revisit in Section 5.1. When we look at the prevalence of informal loan we find that about 12% of the sample has borrowed from informal sources. Moreover, the extent of informality is not very different between urban and rural sectors. With respect to the quality of formal institutions, 53% of our sample perceive the court to be efficient. Once again the difference in perception is small between urban and rural sectors. The Table additionally reports the means for the various controls that we use in our empirical specification.

5 Results

Table 2 reports the results from a linear estimation of equation 1. The outcome variable reflects the probability of a household being self-employed compared to being wage employed. Column 1 includes a measure of Informality at the district level (II_d), an indicator for strong institutions(SI_d), and an interaction between the two. Since our variables of interest vary only at the district level, we report clustered standard errors at the district level in all specifications.

The results in column 1 indicate a nonlinear relationship between the degree of informality and self employment. The coefficient on Informal suggests that a greater extent of informality in a district predicts a higher probability of self-employment. However, this relationship depends on the strength of formal institutions.Specifically, the negative coefficient on the interaction term implies a nonlinear relationship. This can be seen from the following equation.

$$\frac{\partial Pr(SE)}{\partial II_d} = -\beta_1 SI_d + \beta_2 \tag{17}$$

Our result implies $\frac{\partial Pr(SE)}{\partial II_d} \gtreqless 0$ according as $SI_d \lesseqgtr \overline{SI_d} = \frac{\beta_1}{\beta_2}$. This means that greater informal network positively affects the probability of starting a business as long as the quality of the formal court is below a certain threshold. Moreover, more informal network discourages business in an environment

characterized by strong formal court. This is our main result which remains unaltered even we enter different controls.

This relationship is depicted in figure

Requires graphicx

$$\frac{\partial SE}{\partial Inf} > 0 \qquad\qquad\qquad \frac{\partial SE}{\partial Inf} < 0$$

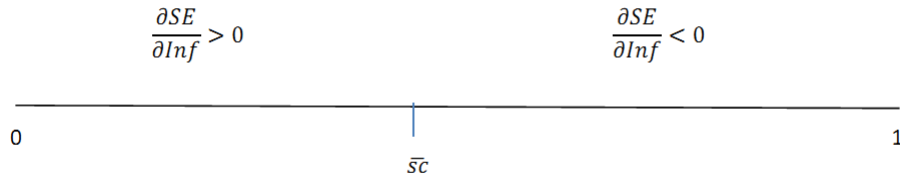0 $\overline{sc}$ 1

Figure 1:

more specifically the coefficients can be interpreted in the following way. In column 1, the estimates imply that the threshold level of formal institutions is given by 0.54 (β_2/β_1). Hence, districts where more than 54% of the households perceive the judiciary to be strong are above the threshold level of formal institutions. Now consider two districts within this group - one with low prevalence of informal network (D_{LI}) and another with high prevalence of informal network (D_{HI}). Then our coefficients imply that the probability of self employment is lower in D_{HI} compared to D_{LI}[2] Specifically, if 60% of households perceive the court to be efficient, then a one unit difference in the extent of informal network between D_{HI} and D_{LI} leads to a 10 percentage points lower probability of Self Employment in D_{HI} compared to D_{LI} districts.

Conversely, now consider the situation where the level of formal institution is less than the threshold level of 0.5. Consider the same two districts, D_{HI} and D_{LI}. Here our coefficients imply that the P(SE) is higher in D_{HI} compared to D_{LI}. Specifically, if only 40% of the households in a district

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[2]For $SI_d = 0.6, P(SE) = \beta_0 + \beta_1 II_d * 0.6 + \beta_2 II_d$.

perceive the court to be strong, a one unit higher level of informal network leads to a 10 percentage point higher likelihood of doing business.

Next we add a number of control variables to the above basic specification.It is possible that districts with greater availability of informal loans also have a higher availability of any loan so that Informal simply captures the extent of total loan availability in the district instead of the extent of informality. Hence, we control for the availability of formal loan in the district in column 2. The coefficients indicate similar effects of informality.

Column 3 includes a proxy for the credit worthiness of a household indicated by the maximum amount of loan taken. Results remain unchanged here as well.The coefficient on the control variable suggests the obvious that if a household has taken more amount of loan, it is more likely to start a business.

Column 4 controls for other household level characteristics like religion, caste and an indicator whether a household has any literate member. The results are in the same spirit as before.The coefficients on "Brahmin" and "Education" are as expected. More educated households and traditionally higher castes are more likely to be self employed. "Hindu" households, on the contrary, are less likely to self employed, compared to households from other religious backgrounds.

Another concern is that districts which have larger caste or religious networks provide higher self employment opportunities and at the same time might also facilitate greater access to informal loans. Hence, in column 5 we control for additional district level network variables like "religious network", reflecting the size of the religious network and measured by the fraction of households associated with any religious organization. Similarly "caste network" reflects the size of the caste association and is measured by the fraction of households associated with any caste organization. The individual effect of informality becomes stronger after controlling for the size of caste and religious networks. However, the threshold, level of Institutions, at which the non-linearity sets in, is now lower. At the same time, we see that a bigger caste network reduces the probability of self-employment while a bigger religious network is beneficial for self employment.

Finally, in column 6 we also control for household participation in a caste network since that might increase both a household's probability of getting a loan and starting a business. Results remain the same as before. Moreover, as expected, household participation in caste network increases the probability of self-employment.

To further verify that our results are not sensitive to varied specifications we carry out the following robustness check. In Table 3 we include unemployment in the reference category. We now compare the probability of self employment with wage employment and unemployment. The results remain unaffected by the inclusion of unemployment in the reference category. The coefficients on the interaction term and informal institutions show similar nonlinear effect of informal network on business decision, depending on the extent of formal institutions.

5.1   Heterogeneity Analysis

Since business is a typically a more urban phenomenon, we expect the link between informality and self employment to be more relevant in the urban region. Hence in Table 4, we estimate the relationship separately for rural and urban regions. [3] As is evident, the results discussed in Table 2 are primarily driven by the urban region. Informality by itself or its interaction with formal institutions doesn't play a significant role in predicting self employment for the rural region.

Next, we conduct a heterogeneity analysis by estimating our model for different sizes of caste network.It is possible that the effect of informality flows from a stronger informal network within the community. To see whether this is the channel we conduct a heterogeneity analysis by estimating the relationship separately for districts with large and small caste networks. Specifically, we define a district to have a strong network effect if the size of the caste network is higher than the median. Moreover since the relationship is driven primarily by the urban sector, we restrict this analysis to the urban sector. Interestingly, while the relationship between self employment and the interaction of informality and institutions holds in both types of districts, it is

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[3]These results are robust to all the specifications reported in Table 2. However, we only report the specification with full set of controls

much stronger when the size of the caste network is large. This possibly underlines the importance of network effect in driving the above results.

Finally, we expect the relationship to depend on the extent of migration into a district since it changes the outside options for players within a district.Therefore we did a heterogeneity analysis and estimated the relationship separately for districts with higher and lower prevalence of migration into a district.In particular we define a district to have high migration if the fraction of migrants in that district is greater than the median. Once again we conducted this heterogeneity analysis for the urban sector. The same non-linear relationship between informality and self employment is seen for the low migration districts. However no such significant relationship holds for the districts with higher extent of migration. Even though this result seems counter intuitive this is perfectly matches with our theoretical model. In a high migration district we can expect higher number of NC entrepreneurs than low migration districts and high input prices. Hence, all other things equal the ability cut off will be higher in the high migration districts than their low migration counterpart. Now according to our theory interaction between the high formal and high informal would mean further rise in the cut off ability and reduction in business. But because there are already high ability entrepreneurs in high migration districts such interaction will have much weaker effect than the low migration districts which are populated by low ability entrepreneurs who will be forced to quit with the improvement in the formal institutions.

6 Conclusion

In this paper we empirically and theoretically examine how the interaction between the formal court system and the informal loan network affects a household's decision to start a business. We find that when the formal court system is weak, expansion of informal credit network leads to the proliferation of business. However, with a sufficiently strong court system, expansion of credit network has a negative effect on business prospects. This is because informal network's reputation sharing mechanism put downward pressure on honesty inducing wage allowing less able entrepreneurs to operate in the market. Rise in the formal system allows non-caste entrepreneurs in the market who raise the honesty inducing wage as they are not part of the

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information sharing network. This has a negative impact on the volume of business. This implies a negative interaction effect between formal and informal system on the volume of business. However, such interaction will increase the average ability of the existing entrepreneurs. This implies that even if in the short run it increases inequality, in the long run the society may gain from the dynamic effect of higher ability entrepreneurs.

A   Appendix

$$V_h[1 - \beta(1 - q)] = \rho^* + qV_h^u \tag{18}$$

$$V_h^u = \beta p_h V_h + \beta(1 - p_h)(\overline{w} + V_h^u) \tag{19}$$

$$V_c^u = \beta p_c V_h + \beta(1 - p_c)(\overline{w} + V_c^u) \tag{20}$$

$$V_h \geq \alpha + V_c^u \tag{21}$$

Define $T = \frac{1}{1 - \beta(1-q)}$ So we have

$$V_h = T\rho^* + TqV_h^u \tag{22}$$

Substituting this in equation (8) we get

$$V_h^u = \beta p_h[\rho^* T + TqV_h^u] + \beta(1 - p_h)V_h^u + \beta(1 - p_h)\overline{w} \tag{23}$$

$$V_h^u[1 - \beta p_h Tq - \beta(1 - p_h)] = \beta p_h + \beta(1 - p_h)\overline{w} \tag{24}$$

From the last equation we get,

$$V_h^u = \frac{T\rho\beta p_h}{[1 - \beta p_h Tq - \beta(1 - p_h)]} + \frac{\beta(1 - p_h)}{[1 - \beta p_h Tq - \beta(1 - p_h)]}\overline{w} \tag{25}$$

We can the write the previous expression as

$$V_h^u = \rho T_{1h} + T_{2h}\overline{w} \tag{26}$$

From equation (9) we get

$$V_c^u(1 - \beta(1 - p_c)) = \beta p_c V_h + \beta(1 - p_c)\overline{w} \tag{27}$$

The above expression can be written as

$$V_c^u = T_{1c}V_h + T_{2c}\overline{w} \tag{28}$$

where $T_{1c} = \frac{\beta p_c}{1 - \beta(1-p_c)}$ and $T_{2c} = \frac{\beta(1-p_c)}{1 - \beta(1-p_c)}$. The honesty inducing condition tells us

$$V_h - V_c^u \geq \alpha \tag{29}$$

Substituting from the previous expressions we find

$$V_h - (T_{1c}V_h + T_{2c}\overline{w}) \geq \alpha \tag{30}$$

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From equations (11) and (15) we find,

$$T\rho^* + Tq[\rho T_{1h} + T_{2h}\overline{w}] \geq \frac{\alpha}{1 - T_{1c}} + \frac{T_{2c}}{1 - T_{1c}}\overline{w} \tag{31}$$

From this we get,

$$\rho T[1 + TqT_{1h}] \geq \frac{\alpha}{1 - T_{1c}} + \frac{T_{2c}}{1 - T_{1c}}\overline{w} - TqT_{2h}\overline{w}$$

(32)

This leads to the condition

$$\rho \geq \frac{1}{T[1 + TqT_{1h}]} \times [\frac{\alpha}{1 - T_{1c}} + \frac{T_{2c}}{1 - T_{1c}}\overline{w} - TqT_{2h}\overline{w}] \tag{33}$$

We find that

$$\frac{1}{1 - T_{1c}} = 1 + \frac{\beta}{1 - \beta}p_c \tag{34}$$

and

$$\frac{T_{2c}}{1 - T_{1c}} = \frac{\beta(1 - p_c)}{1 - \beta} \tag{35}$$

Hence, we find,

$$\frac{\partial \rho^*}{\partial p_c} = \frac{1}{T[1 + TqT_{1h}]} \times (\alpha - \overline{w})\frac{\beta}{1 - \beta} \tag{36}$$

This expression is positive as long as $\alpha - \overline{w} > 0$ which tells us that one time cheating payoff is more than the reservation pay-off. This has to be the case because industry pay-off is more than reservation wage and one time cheating pay-off is more than the industry pay-ff.

References

Acemoglu, D., Johnson, S., and Robinson, J. (2001). The colonial origins of comparative development. *The American Economic Review*, 91(5):1369–1401.

Acemoglu, D., Johnson, S., and Robinson, J. (2002). Reversal of fortune:geography and institutions in the making of the modern world income distribution. *Quarterly Journal of Economics*, 117(4):1231–1294.

Acemoglu, D. and Robinson, J. (2003). Unbundling institutions. NBER Working Paper 9934.

Besley, T., Coate, S., and Loury, G. (1993). The economics of rotating savings and credit associations. *The American Economic Review*, 83(4):792–810.

Biggs, T., R. M. and Srivastava, P. (2002). Ethnic networks and access to credit: Evidence from the manufacturing sector in kenya. *Journal of Economic Behavior and Organization*, 49:473–486.

Biggs, T. and Shah, M. K. (2006). African smes, networks, and manufacturing performance. *Journal of Banking & Finance*, 30(11):3043 – 3066.

Blanchflower, D. G., Levine, P. B., and Zimmerman, D. (1998). Discrimination in the small business credit market. NBER Working Paper.

Chemin, M. (2010). Does court speed shape economic activity? evidence from a court reform in india. *Journal of Law, Economics, and Organization*.

Chowdhry, P. (2004). Caste panchayats and the policing of marriage in haryana: Enforcing kinship and territorial exogamy. *Contributions to Indian Sociology*, 38(1-2):1–42.

Dixit, A. (2004). *Lawlessness and economics: alternative modes of governance*. Princeton University Press.

Fafchamps, M. (2000). Ethnicity and credit in african manufacturing.

Fafchamps, M. (2003). Ethnicity and networks in african trade. *Contributions to Economic Analysis and Policy*, 2(1):Article 14.

Fairlie, R. W. and Robb, A. M. (2007). Why are black-owned businesses less successful than white-owned businesses? the role of families, inheritances, and business human capital. *Journal of Labor Economics*, 25(2):pp. 289–323.

Fisman, R. J. (2003). Ethnic ties and the provision of credit: Relationship-level evidence from african firms. *The B.E. Journal of Economic Analysis & Policy*, advances.3(1):4.

Freitas, K. (2006). The indian caste system as a means of contract enforcement. Working Paper.

Gajigo, O. and Foltz, J. D. (2010). Ethnic networks and enterprise credit: The serahules of the gambia. Working Paper.

Ghatak, M. (1991). Group lending, local information and peer selection. *Journal of Development Economics*, 60(1):27–50.

Ghosh, P. and Ray, D. (1996). Cooperation in community interaction without information flows. *The Review of Economic Studies*, 63(3):491–519.

Greif, A. (1993). Contract enforceability and economic institutions in early trade: The maghribi traders' coalition. *The American Economic Review*, 83(3):525–548.

Greif, A., Milgrom, P., and Weingast, B. (1994). Coordination, commitment, and enforcement: The case of the merchant guild. *Journal of Political Economy*, 102(August):745–776.

Guiso, Luigi, P. S. and Zingales, L. (2004). The role of social capital in financial development. *The American Economic Review*, 94(3):526–556.

Harriss-White, B. (2010). Globalization, the financial crisis and petty production in indias socially regulated informal economy. *Global Labour Journal*, 1(1):152–177.

Kandori, M. (1992). Social norms and community enforcement. *The Review of Economic Studies*, 59(1):63–80.

Karlan, D. (2005). Using experimental economics to measure social capital and predict financial decisions. *The American Economic Review*, 95(5):526–556.

Keremane, G. B., McKay, J., and Narayanamoorthy, A. (2006). The decline of innovative local self-governance institutions for water management the case of pani panchayats. *International Journal of Rural Management*, 2(1):107–122.

Madsen, S. T. (1991). Clan, kinship, and panchayat justice among the jats of western uttar pradesh. *Anthropos*, 86:351–365.

McMillan, J. and Woodruff, C. (1999). Interfirm relationships and informal credit in vietnam. *The Quarterly Journal of Economics*, 114(4):1285–1320.

Nagraj, V. (2010). Local and customary forums : Adapting and innovating rules of formal law. *Indian Journal of Gender Studies*, 17(3):429–450.

Rajan, R. and Zingales, L. (1998). Financial dependence and growth. *The American Economic Review*, 88(5):559–586.

Rosenthal, R. and Landau, H. (1979). A game theoretic analysis of bargaining with reputation. *Journal of Mathematical Psychology*, 20:235–255.

Sandner, V. (2003). Myths and laws: Changing institutions of indigenous marine resource management in central america. In Breit, H., Engels, A., Moss, T., and Toja, M., editors, *How Institutions Change*. Leske and Burdich.

Shapiro, C. and Stiglitz, J. E. (1984). Equilibrium unemployment as a worker discipline device. *The American Economic Review*, pages 433–444.

Slivinski, A. and Sussman, N. (2009). Taxation mechanisms and growth, in medieval paris. Working Paper.

Straub, S. (2005). Informal sector: The credit market channel. *Journal of Development Economics*, 78(2):299 – 321.

Yadav, B. (2009). Khap panchayats: Stealing freedom? *Economic and Political Weekly*, 44(52):16–19.

Table 1: Summary

	ALL	RURAL	URBAN
Fraction Self Employed	0.2319	0.1944	0.2897
	(0.422)	(0.3957)	(0.4536)
Mean District Population	815.0262	808.6339	826.5572
	(438.6)	(349)	(565)
Prevalence Informal Loan	0.1242	0.1306	0.1125
	(0.1134)	(0.111)	(0.1265)
Prevalence Strong Institutions	0.5331	0.5448	0.512
	(0.1925)	(0.193)	(0.2145)
Prevalence Formal Loan	0.1531	0.1658	0.1302
	(0.0991)	(0.103)	(0.1033)
Loan Amount	44381.67	32719.12	73513.91
	(212311)	(108359)	(356614)
Size Religious Network	0.1444	0.1537	0.1277
	(0.2189)	(0.234)	(0.199)
Size Caste Network	0.1328	0.1477	0.106
	(0.1944)	(0.2131)	(0.172)
Hindu	0.8068	0.8238	0.7762
	(0.394)	(0.381)	(0.416)
Brahmin	0.0583	0.0408	0.0897
	(0.234)	(0.1979)	(0.285)
Fraction literate in the hh	0.7909	0.7295	0.9014
	(0.4067	(0.4442)	(0.298)
HH membership in Caste Association	0.133	0.1479	0.1063
	(0.3396)	(0.355)	(0.308)
Observations	41554	26734	14820

Table 2: Probability of self employment vs wage employment

Dependent Variable: Self Employment

	1	2	3	4	5	6
Informal*Strong	-0.633**	-0.675***	-0.792***	-0.667**	-0.749***	-0.744***
	(0.249)	(0.255)	(0.29)	(0.26)	-(0.24)	(0.239)
Informal	0.355**	0.384**	0.344**	0.334**	0.408***	0.405***
	(0.148)	(0.152)	(0.172)	(0.156)	(0.142)	(0.142)
Strong Institution	0.0314	0.0434	0.0948*	0.084	0.0784	0.0776
	(0.034)	(0.036)	(0.053)	(0.052)	(0.050)	(0.0508)
Formal		-0.0829	-0.0722	-0.136*	-0.170**	-0.170**
		(0.051)	(0.066)	(0.0713)	(0.0676)	(0.0676)
Loan Amount			1.26e-07**	1.07e-07**	1.07e-07***	1.08e-07***
			(5.19E-08)	-4.16E-08	-4.14E-08	(4.15E-08)
Religious Network					0.145***	0.146***
					(0.038)	(0.0386)
Caste Network					-0.0646*	-0.0947**
					(0.0353)	(0.0377)
HH Caste Association						0.0284**
						(0.0137)
Hindu				-0.0794***	-0.0745***	-0.0739***
				(0.0125)	(0.0124)	(0.0123)
Brahmin				0.0671***	0.0658***	0.0661***
				(0.0233)	(0.0233)	(0.0233)
Education				0.144***	0.142***	0.142***
				(0.009)	(0.009)	(0.009)
Constant	0.213***	0.218***	0.207***	0.170***	0.161***	0.161***
	(0.019)	(0.019)	(0.031)	(0.032)	(0.032)	(0.032)
Observations	34,521	34,521	14,185	14,159	14,159	14,156
R-squared	0.001	0.002	0.007	0.033	0.036	0.036

Table 3: Probability of self employment vs wage employment & unemployment

Dependent Variable: Self Employment

	1	2	3	4	5	6
Informal*Strong	-0.596**	-0.630***	-0.798***	-0.688***	-0.772***	-0.767***
	(0.23)	(0.237)	(0.275)	(0.251)	(0.23)	(0.23)
Informal	0.355***	0.379***	0.354**	0.350**	0.427***	0.425***
	(0.137)	(0.141)	(0.164)	(0.151)	(0.137)	(0.137)
Strong Institution	0.0315	0.0413	0.102*	0.0921*	0.0860*	0.0853*
	(0.0335)	(0.035)	(0.0519)	(0.0514)	(0.0498)	(0.0496)
Formal		-0.0713	-0.0806	-0.142**	-0.176***	-0.176***
		(0.0505)	(0.066)	(0.0705)	(0.0662)	(0.0662)
Loan Amount			1.19e-07**	1.00e-07***	1.01e-07***	1.01e-07***
			-4.75E-08	-3.78E-08	-3.76E-08	-3.77E-08
Religious Network					0.150***	0.152***
					(0.0373)	(0.0372)
Caste Network					-0.0678**	-0.0988***
					(0.0341)	(0.0365)
HH Caste Association						0.0292**
						(0.0135)
Hindu				-0.0714***	-0.0665***	-0.0659***
				(0.0122)	(0.0121)	(0.012)
Brahmin				0.0595***	0.0579**	0.0582**
				(0.0225)	(0.0225)	(0.0225)
Education				0.139***	0.137***	0.137***
				(0.00912)	(0.009)	(0.009)
Constant	0.196***	0.201***	0.195***	0.155***	0.146***	0.146***
	(0.0183)	(0.0188)	(0.0307)	(0.0322)	(0.0319)	(0.0318)
Observations	36,837	36,837	14,737	14,708	14,708	14,704
R-squared	0.001	0.002	0.007	0.031	0.034	0.034

Table 4: Probability of self employment vs wage employment: Rural & Urban

Dependent Variable: Self Employment

	All	Urban	Rural
Informal*Strong	-0.744***	-0.895***	-0.43
	(0.239)	(0.299)	(0.275)
Informal	0.405***	0.466***	0.196
	(0.142)	(0.173)	(0.173)
Strong Institution	0.0776	0.112	0.0526
	(0.0508)	(0.0837)	(0.0526)
Formal	-0.170**	-0.13	-0.186***
	(0.0676)	(0.124)	(0.0637)
Loan Amount	1.08e-07***	5.85e-08***	3.02e-07***
	(4.15E-08)	(2.00E-08)	(9.16E-08)
Religious Network	0.146***	0.237***	0.0990***
	(0.0386)	(0.0836)	(0.034)
Caste Network	-0.0947**	-0.048	-0.0697*
	(0.0377)	(0.0936)	(0.0359)
HH Caste Association	0.0284**	0.0362	0.0233
	(0.0137)	(0.0267)	(0.0154)
Hindu	-0.0739***	-0.0324*	-0.0810***
	(0.0123)	(0.0196)	(0.0159)
Brahmin	0.0661***	0.0153	0.0902***
	(0.0233)	(0.0347)	(0.0328)
Education	0.142***	0.130***	0.124***
	(0.00925)	(0.0218)	(0.0098)
Constant	0.161***	0.152***	0.180***
	(0.0325)	(0.0513)	(0.0353)
Observations	14,156	4,534	9,622
R-squared	0.036	0.023	0.039

Table 5: Heterogeneity Analysis: Network Size

Dependent Variable: Self Employment

	Large Network	Small Network
Informal*Strong	-1.128***	-0.724**
	(0.376)	(0.318)
Informal	0.602***	0.404**
	(0.219)	(0.169)
Strong Institution	0.119	0.105
	(0.0787)	(0.0693)
Formal	-0.0965	-0163
	(0.0938)	(0.103)
Loan Amount	0.000757*	0.000512**
	(0.000410)	(0.000208)
Religious Network	0.212***	0.645***
	(0.0568)	(0.189)
Caste Network	-0.0522	-0.605
	(0.0701)	(0.933)
HH Caste Association	0.0274	0.147
	(0.0272)	(0.0927)
Hindu	-0.0313	-0.0399
	(0.0242)	(0.0250)
Brahmin	0.0499	-0.0168
	(0.0421)	(0.0372)
Education	0.130***	0.122***
	(0.0322)	(0.0295)
Constant	0.148***	0.154***
	(0.0571)	(0.0514)
Observations	2,323	2,211
R-squared	0.024	0.021

Note: Mean Cut-off

Table 6: Heterogeneity Analysis : Migration

Dependent Variable: Self Employment

VARIABLES	High Migration	Low Migration
Informal*Strong	-0.952	-0784**
	(0.599)	(0.368)
Informal	0.452	0.505**
	(0.295)	(0.248)
Strong	0.178	0.0322
	(0.119)	(0.117)
Formal	-0.0161	-0.0709
	(0.172)	(0.174)
Loan Amount	0.000501***	0.00157***
	(0.000164)	(0.000594)
Religious Network	0.269**	0.0846
	(0.107)	(0.142)
Caste Network	-0.135	0.247
	(0.103)	(0.190)
HH Caste Association	0.0706*	-0.0155
	(0.0375)	(0.0375)
Hindu	-0.0397	-0.0184
	(0.0264)	(0.0302)
Brahmin	-0.0141	0.0607
	(0.0427)	(0.0583)
Education	0.121***	0.147***
	(0.0283)	(0.0357)
Constant	0.145**	0.143*
	(0.0697)	(0.0792)
Observations	2786	1748
R-squared	0.023	0.033