Guaranty: Where Private Ordering Meets the Legal System

Hatsuru Morita*

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*Associate Professor, Tohoku University School of Law. I am grateful to Haruna Fujisawa, Gen Goto, Atsushi Koide, Akira Tokutsu, and seminar participants at Tohoku University for their comments and suggestions. This research is supported by the Grants-in-Aid for Scientific Research (MEXT).

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1 Introduction

Recently a guaranty contract does not enjoy as much popularity in Japan as it once did. The reform of the civil code in November 2004 [1] was partly motivated by the social trends against the use of a guaranty contract in the consumer credit context. The Small and Medium Enterprise Agency also requests that the financial institutions use guaranty contract in small business finances as little as possible. Those who oppose to the use of guaranty contracts are generally concerned with the severe effect the contract may have on a guarantor in case of a default.

However, is a guaranty contract really undesirable? When we look around the world and at the history of use of this type of contract, we can find lots of guaranty and joint-liability arrangements. One of the most notable examples is the Grameen Bank of Bangladesh and other so-called microfinance programs; the Grameen Bank lends to groups of five people from the same village and the members of the same group assume joint liability. Along with other features of microfinance program lending, this joint liability mechanism allows the Grameen Bank and other microfinance programs to lend successfully against the poor in developing countries. The Grameen Bank and Muhammad Yunus, its founder, won the Nobel Peace Prize in 2006.

Considering the prevalence of the guaranty contract and joint liability in some areas, there must be some rationale for guaranty contract and joint liability. This paper tries to explore the conditions under which guaranty contract and joint liability arrangement can be efficient and to consider whether such conditions are met in Japan today. Fortunately, microfinance has gained a lot of attention from economic scholars since 1990s and we can make use of the huge economic literature of microfinance.

There is one caveat for the analysis of this paper. This paper does not

[1] See Tsusui (2005).

distinguish between guaranty contract and joint liability. It is easy to see that under joint liability arrangements all of the borrowers acquire finance from financial institution, while under guaranty contract only the borrower enjoys finance and the guarantor just assumes the risk of default of the borrower. It is true that this asymmetry causes some difference between the guaranty contract and joint liability, but the main economic arguments remain the same, [2] which will be discussed below.

The structure of this paper is as follows. Section 2 explores the economic literature of microfinance, including the empirical studies of microfinance. Section 3 and 4 looks at historical examples of joint liability arrangements. Section 3 analyzes Mujin and Tanomoshi, which is the Japanese version of microfinance. Section 4 presents the "community responsibility system", which, Avner Greif argues, prevailed in the twelfth and the thirteenth century Europe. Section 5 provides the concluding remarks.

2 Microfinance

Microfinance denotes a finance program which is targeted toward the poor typically in the developing countries. Although traditional commercial banks have tried to lend against the poor, they have suffered from the high cost structure of such lending strategies and have moved away from them. However, recently several microfinance programs, which utilize lending techniques other than those of traditional commercial banking, have been successful in lending against the poor. They have gained attention as an effective vehicle to "fight against poverty" in developing countries and the Grameen Bank, one of the pioneers of the microfinance program, won the 2006 Nobel Peace Prize.

[2] Bond and Rai (2006) discuss the difference and the similarity of guarantee contract and joint liability. They argue that guarantee contract is more efficient than joint liability when there is some form of asymmetry among the potential borrowers. Banerjee, Besley and Guinnane (1994) also discuss the role of cosigned loan utilized by German credit cooperatives.

In the following, we first browse some "successful" microfinance programs and then explore the economic literature on microfinance, emphasizing the role of joint liability. Finally, we will turn to the empirical studies of microfinance and see which of the economic models best fit the real world.

2.1 Examples of Microfinance Program

Here we will see a few examples of microfinance program which are generally ranked as "successful" program.

Grameen Bank Under the Grameen Bank's lending program, [3] five borrowers from an identical village form a lending group. Although the Grameen Bank lends to this group on individual base, the members of the same group assume joint liability; when any single member of the group is going to default, all other members need to repay the loan of that member. When the one of the group member defaults, the Grameen Bank denies any future loan against all of the group members. A set of group loans is made sequentially by the Grameen Bank. The first loans are made to the first two members of the group; when they are able to repay their loans, the Grameen Bank makes the second loans to the third and fourth members of the group; finally, the final loan is made to the fifth member of the group. The loan period is one year and one week.

Most of the borrowers are women; this fact alone makes the Grameen Bank famous as an organization for helping self-sustainability of women in developing countries. [4] The nominal interest rate is approximately 20% per year and the repayment rate is about 97 to 98 %. The Grameen Bank tries to make use of the local information network and social capital as a

[3] The Grameen Bank has changed its lending mechanism as time goes by and the mechanism which is presented in the main text is what is called "classic" Grameen system. Now the Grameen Bank has adopted the "Grameen Bank II" system, which will be mentioned later. The information about the Grameen Bank and its mechanism is available at http://www.grameen-info.org/bank/.

[4] As Rahman (1999) points out, the motivation for this feature is an open question.

local contract enforcement mechanism in order to assure loan repayment. However, the Grameen Bank cannot afford its cost fully and still depends on subsidies and donations.

BancoSol The BancoSol (Banco Solidario) in Bolivia, [5] unlike the Grameen Bank, is a business enterprise rather than a non-profit nongovernmental organization. It aims to make profits by lending against the poor. The BancoSol lets borrowers form a lending group, however, it does not make sequential loans, but gives the whole group a loan at once. The size of a lending group is flexible, ranging from three to seven. The loan period is also flexible, ranging from one month to two years. Finally, the repayment schedule is flexible, with some borrowers repaying weekly and others repaying monthly.

The interest rate per year can be as high as 48%, which enables the sustainability of the BancoSol. The BancoSol does not need to rely on subsidies and donations in order to continue its business. It seems that this "success" of the BancoSol is based on the fact that the target of the lending program of the BancoSol is not the "poorest" people but the "wealthier people among the poor". It should also be noted that the credit amount of the BancoSol is higher than that of the Grameen Bank.

Bank Rakyat Indonesia and Kredit Desa The Bank Rakyat Indonesia (BRI), [6] unlike the Grameen Bank and the BancoSol, adopts an individual-based loan program. The BRI is also unique in that it requires collateral from borrowers and therefore it excludes the "poorest" from its loan program. However, the loan officers can flexibly operate the requirement of collateral and increase the credit amount for credible borrowers. The key to the BRI loan program is its national network of local branches. These

[5] The information about the BancoSol is available at http://www.bancosol.com.bo/ and http://www.accion.org/.

[6] See Morduch (1999), pp. 1577-1578.

branches exploit local information and reduce financing cost. A loan begins from a small amount and increases as the borrower makes repayments reliably. This arrangement enables the loan officer to gather information about the borrower as the loan is repeated. The interest rate per year is 34% in general and is reduced to 24% when the borrower repays without delay.

The Bank Kredit Desa (BKD) [7] is another microfinance program located in Indonesia. The BKD also adopts an individual-based loan program; however it does not require any collateral. The target of the BKD's finance program is to serve the "poorest" people; the loan period is ten to twelve weeks, the nominal interest rate per year is approximately 55% and the repayment schedule is weekly, like the Grameen Bank.

The key to the success of the BKD is placing individual loans through village-level administrative committees that are managed by village leaders. Indonesia has an established system of local authority hierarchy all over the country and the BKD makes use of this authority system. Because the administrative committees make use of the local information network and the private enforcement mechanisms, they replace the function of group-base joint liability lending.

2.2 Theories of Microfinance

Problems of microfinance Before we proceed to the economic theories of microfinance, we need to understand why traditional commercial banks have failed to access the lending market for the poor. As Ghatak and Guinnane (1999) point out, there are four problems.

Firstly, it is difficult and costly for the financial institution to acquire information on the risk level of the borrower. This creates the problem of adverse selection; only the high risk type borrowers apply for loan and the interest rate increases, thus the low risk type borrowers are forced out from the loan market.

[7] See Morduch (1999), pp. 1578.

Secondly, the financial institution finds it difficult to monitor the borrower after it makes the loan. Borrowers may then have an incentive to invest in a risky project instead of a safe project. This moral hazard makes it difficult for the financial institutions to make the loan in the first place.

Thirdly, it is very costly for the financial institution to verify the financial status of the borrower. Therefore, when the loan becomes due, the borrower has an increased incentive to declare default, even if she has sufficient funds. As the credit amounts are generally small in the microfinance setting, this relatively high auditing cost makes it difficult for the financial institution to finance the poor.

Finally, in the microfinance setting, the borrower usually does not have any collateral and the modern legal system often does not work effectively. Therefore, when the borrower declares default, the financial institution cannot collect from the borrower's assets nor enforce the loan contract through the legal system. Therefore, the low effectiveness of contract enforcement problems increases the credit cost.

Function of joint liability Then, how do the microfinance programs overcome these problems successfully? The Grameen Bank is one of the most famous programs and as a pioneer with one of its most notable features being its mechanism of joint liability, much academic focus has concentrated on this function. Therefore, we will now explore the economic literature of joint liability.

First, as to the problem of adverse selection, joint liability lets the borrowers reveal their risk type voluntarily. [8] Let us assume that the borrowers know the risk type of the other borrowers without (or low) cost; this is because the borrowers can exploit the local information network, which the financial institution cannot. When the joint liability group consists of different types of borrowers, there is a subsidy from the low risk borrow-

[8] See Ghatak (1999).

ers to the high risk borrowers because the low risk borrowers have a low probability of default. Anticipating this result, a borrower has no incentive to form a group with those who have a higher risk than she does. In equilibrium, the borrowers form a group with the same risk type. In addition, because high risk type groups have a higher probability of members' defaulting compared to the low risk type groups, high risk type borrowers pay substantially higher interest rates compared to the low risk type borrowers.

Second, joint liability arrangements mitigate the problem of a moral hazard by harnessing mutual monitoring amongst group members. [9] When one of the group members defaults under the joint liability arrangement, all of the other members of the same group need to assume the loan of the defaulted member. This generates incentives to monitor other group members so as not to let others take risky projects or to shirk from their responsibilities. For this mutual monitoring amongst group members to work effectively, it is necessary that the group members can monitor each other without cost, or with a much lower cost than the financial institution would incur. This condition is often satisfied in the context of microfinance; the lending group consists of the borrowers from an identical village and the group size is relatively small. Social and geographical proximity enables the group members to monitor each other. [10]

Third, the local information network employed by joint liability arrangement mitigates the problem of high auditing cost. [11] Because the group members work and live in the same neighborhood, they can verify the fi-

[9] See Stiglitz (1990); Varian (1990); Banerjee, Besley and Guinnane (1994).

[10] There is another problem which is introduced by the adoption of joint liability; joint liability transfers part of the credit risk of the borrower from the financial institution to the group members. Because the financial institution in principle is a better risk bearer than the group members, this transfer can be inefficient. However, this inefficiency is offset by the benefit of the improved peer monitoring induced by joint liability, which is reflected in the form of lower interest rates, and the party has a rational incentive to adopt joint liability arrangement (Stiglitz (1990)).

[11] See Ghatak and Guinnane (1999).

nancial status of other members with a much lower cost. Under the joint liability arrangement, the financial institution needs not to audit the borrower whenever she declares a default, but to audit the whole group only when the whole group declares a default. This lowers the cost of auditing by the financial institution, thus making joint liability more desirable than individual-based lending.

Finally, joint liability arrangements exploit social cohesion that exists in a local community and mitigate the problem of effectiveness of the legal system. [12] When the group members are from the same community that has concentrated social cohesion, the defaulted members would be exposed to the social sanctions from other group members. These social sanctions include a report of the fact of the default to other community members, termination of future cooperative exchanges, social ostracism, and so on. The exercise of these social sanctions, or even just threat of them, forces the group members to repay the loan. [13] The social sanctions cannot be employed by the financial institution, which is an outsider, but by the community members. Thus, the sufficient high level of social capital can be an asset for the poor people who do not have physical collateral. However, there is one caveat. When the social cohesion is too strong, the group members do not try to exercise the social sanctions in order to enhance repayment but can collude with each other to cheat on the financial institution. Thus, the relationship between the strength of social cohesion and the repayment performance can be nonlinear. [14]

[12] See Besley and Coate (1995).

[13] However, the exercise of the social sanctions can be a dead weight loss. The truth-telling mechanism, which does not provoke the social sanction, can be more efficient than a simple joint liability arrangement. Rai and Sjöström (2004) discuss the efficiency of such cross-reporting mechanisms; a similar mechanism can be found in the lending arrangement by the Grameen Bank, "Grameen Bank II".

[14] See Ahlin and Townsend (2007a), p. F24; Laffont and N'Guessan (2000); Laffont (2003); Armendáriz de Aghion and Morduch (2005), pp. 107, 111-112. There is at least one empirical work which supports this collusion effect of social cohesion. Paxton, Graham and Thraen (2000) report that the repayment problem becomes more serious as the homogeneity of the lending group increases in Burkina Faso.

Other mechanisms of microfinance Although joint liability has been the focus of academic interest in microfinance, it is by no means the only mechanism of microfinance. As we have seen in the previous subsection, each microfinance program has different characteristics and some microfinance programs do not adopt joint liability as a financing mechanism. Here we want to take a brief survey of other complementary mechanisms. [15]

Firstly, many microfinance programs start from a small amount of lending and gradually increase the amount as the repayment performance history of the borrower develops. This staged financing mechanism introduces a repeated-game structure into the borrower-lender relationship. Even if the borrower does not have sufficient collateral and the effectiveness of contract enforcement is low, the staged financing mechanism induces a high repayment performance because the financial institution can threaten the borrower by ceasing its future lending in case of default. [16] The accelerating feature of the staged financing boosts the repayment incentive of the borrower. In addition, the financial institution can "test" the borrower by starting from a small amount being lent. [17] If the repayment performance turns out to be bad, the financial institution judges the borrower as a "bad type" and can adjust its loan policy.

Secondly, some microfinance programs adopt periodic (such as weekly) repayment schedule. Requiring repayment shortly after the loan is made forces the borrower to find financial resources other than the project that is funded under the microfinance program. Thus, only diligent borrowers have an incentive to participate in the microfinance program. In this way, weekly repayment schedules have a screening effect that mitigates the problem of adverse selection. Moreover, it mitigates part of the moral hazard problem because the financial institution can secure the repayment

[15] As to microfinance mechanisms other than joint liability, see Armendáriz de Aghion and Morduch (2005), chapter 5.

[16] See Chowdhury (2005).

[17] See Morduch (1999).

before the borrower diverts cash flow from her project. [18]

2.3 Empirical Study of Microfinance

The previous subsection has explored a number of theories of joint liability. The next step is to examine empirically whether these theories fit the real world and, if they do, which of them fits best. In this section, we first see some early empirical works of microfinance and their weakness and then we will explore some of the recent attempts to overcome such weakness.

Early empirical works and their problems Probably the earliest empirical work is Wenner (1995), who analyzes the data of Funcacíon Integral Campesina in Costa Rica. Wydick (1999) follows him using the data of Fundation para el Desarrollo Integral de Socioeconomicos in Guatemala. Wydick (1999) is well known for the comprehensiveness of explanatory variables and is cited repeatedly in later works. However, earlier works, including these two, show mixed results.

Morduch (1998) argues why the earlier empirical works show only mixed results. He attributes the failure of the earlier works to two problems. First, there is a serious self-selection bias problem in a typical microfinance setting. Participatory decision making of a borrower is not made randomly. It is expected that only those who are confident that they will be able to make repayments in the future decide to participate in the microfinance program. [19] Where this conjecture holds, we will observe a positive effect on the repayment performance by comparing the treatment group that has participated in the microfinance program and the control group that has not, even if the microfinance has no real effect. This is a typical self-selection bias problem and we cannot estimate the effect of the program by a simple comparison. Second, the placement of a microfinance program

[18] See Armendáriz de Aghion and Morduch (2005), pp. 129-134.

[19] This endogeneity problem has already empirically demonstrated by Sharma and Zeller (1997).

is not made randomly. Most microfinance programs have their own goal and they purposefully choose which village to place their program. When the placement of the program is based on some unobserved characteristics, the simple estimates of the program participation can be positively or negatively biased.

Morduch (1999) also shows, by using the data of Bangladesh, that after controlling the endogeneity by difference-in-differences method, the household consumption level does not increase significantly but that the variance of the household consumption decreases significantly. This implies that program participation has only a smoothing effect on household consumption. He considers this is because there are multiple microfinance programs in Bangladesh and the borrowers have non-microfinance sources such as informal lenders and social service organizations. [20]

Recent attempt Because the earlier empirical works have suffered from endogeneity problems and non-randomness of program placement problems, recent empirical works try to overcome these problems. Here we survey three of them, which adopt three different methodologies.

First, Karlan (2007) exploits a natural experiment. He finds that the FINCA-Peru in Ayacucho forms a lending group, not by a self-selection process, but by a kind of random selection. The potential borrowers go to the office of the FINCA-Peru and the FINCA-Peru puts their name on a waiting list. Once the waiting list has thirty names on it, the FINCA-Peru turns the thirty applicants into a single lending group and places a loan. Under this setting, the strength of social connection [21] amongst the

[20] By employing a quasi-experiment in northeast Thailand, Coleman (1999) finds that the effect of participation of microfinance programs almost disappears after controlling for self-selection bias. In contrast, Pitt and Khandker (1998), who also try to control for endogeneity problem, find that program participation has positive effects on household expenses, labor supply, and child education. See Morduch (1999) for discussion of Pitt and Khandker (1998).

[21] Karlan (2007) uses the broader term "social connection" instead of "social capital" or "social cohesion", because the former is much easier to measure than the latter.

group members is determined exogenously. Using this natural experiment setting, Karlan (2007) estimates the effect of geographical proximity and cultural proximity on default rates, savings and dropout rate. He finds that geographical and cultural proximity reduces defaults, increases savings and decreases dropouts. He argues this result supports the hypothesis that monitoring and enforcement activities, which are facilitated by social connection, improve the performance of group lending. [22]

Next empirical work, Cassar, Crowley and Wydick (2007), employs field experiment methodology. Usually laboratory experiments are not trustworthy because of the large difference between laboratory settings (usually college students in developed countries) and the real microfinance settings. Their field experiments were implemented in South Africa and Armenia and the experiment subjects participated in trust and microfinance games. In this way, they perfectly control the endogeneity problem and the non-randomness of program placement problems. They find that personal specific trust among group members and group homogeneity has a more important effect on repayment performance than general trust amongst group members.

Finally, Ahlin and Townsend (2007a) adopt the structural estimation approach; they do not try to estimate the effect on repayment performance itself, but to evaluate the relative fit amongst the possible economic models, thus not being affected by the endogeneity problem. [23] They pick up four models of microfinance: two moral hazard models of Stiglitz (1990) and Banerjee, Besley and Guinnane (1994), an adverse selection model of Ghatak (1999), and a limited contract enforcement model of Besley and Coate (1995). Because these four models lead to different predictions, they can estimate the relative fitness of the models. They use microfinance survey data from Thailand, which covers two contrasting areas: one is the

[22] Zeller (1998) also reports the positive effect of social cohesion on repayment performance, using the data from Madagascar.

[23] See also Ahlin and Townsend (2007b).

fertile and industrialized central area near Bangkok and the other is the poorer and semiarid northeast area.

They find that none of the four models perfectly explain the data, but that the limited contract enforcement model of Besley and Coate (1995) shows relatively a better fit compared to other three models. The Besley and Coate (1995) model shows an especially good fit with respect to the data subset of the northeast area, which is poorer and has less developed infrastructure. On the contrary, the adverse selection model of Ghatak (1999) shows a good fit in the central area near Bangkok.

Intermediate summary Now we can sum up where we are. It is plausible that social capital (although the definition and scope of this notion differs amongst researchers) has some positive effects on the function of joint liability lending arrangements. Karlan (2007) and Cassar, Crowley and Wydick (2007) among others, confirm this point. However, the underlying mechanism of joint liability is not empirically clear yet. The relevance of different models can be different among different countries and regions. Ahlin and Townsend (2007a) make one interesting contribution here. We might be able to infer that the limited contract enforcement model applies better in circumstances where legal infrastructure is poor, while the adverse selection model applies better in circumstances where legal infrastructure and industry is already developed and the only remaining problem seems to be an informational one. [24]

3 Mujin or Tanomoshi

Mujin, or as sometimes called Tanomoshi, is the Japanese version of microfinance. Although the practical importance of mujin has almost disappeared today, it has been an important financing and mutual insurance ar-

[24] This argument may be consistent with the finding of Kaplan and Strömberg (2003).

rangement since the fourteenth century through to the nineteenth century. In this section, we analyze the mechanism of mujin and explore how joint liability smoothes the operation of mujin.

3.1 Mechanics of Mujin

What is mujin? Although there is an academic debate about when and how mujin came into existence, it is agreed that mujin dates back to the fourteenth century and that mujin at that time had almost the same structure as it has now. [25] For example, a tanomoshi documented in 1347 had the following structure [26]:

1. When the tanomoshi is formed, the tanomoshi members need to draft a contract document and to pledge that they will comply with it.

2. The members meet two or three times per year; at each meeting they make contributions to the tanomoshi and draw lots in order to decide who takes the contributed money.

3. Each member owes an obligation to pay a fixed amount of money to the tanomoshi; when she defaults, she will lose her right to draw lots, if she has not won the lottery, and will be sanctioned if she has already won the lottery.

4. A member who has won the lottery does not have the right to draw lots again; she only undertakes an obligation to contribute the fixed amount at each meeting; she needs to provide two guarantors in order to assure her future contributions.

5. When all the members have won the lottery and made the full contribution, the tanomoshi expires.

[25] There is a mujin business regulation act in Japan, though the use of mujin has almost vanished today.
[26] See, Mori (1982), p. 18.

As can be seen from this early example, mujin was a kind of mutual insurance arrangement amongst local community members. They did not have enough funds to finance necessary projects and tried to raise money by aggregating the funding ability of the local community.

However, the purpose of mujin was various. During the early medieval period (the Kamakura era, the Muromachi era, and the Sengoku era from the fourteenth century through to the sixteenth century), while the main purpose of mujin remained mutual aid amongst the local community, especially helping distressed community members, there were other purposes. Often feudal lords, Buddhist temples, and Shinto shrines organized mujin in order to raise money for construction projects or to earn commission fee revenue. [27] It is interesting to note that riots in this period often claimed for a debt repudiation order for mujins managed by feudal lords, Buddhist temples, or Shinto shrines, but not by local communities. People rationally knew that the latter type played an essential role in the local community and that voiding it would destroy the incentive to maintain an autonomous mutual aid mechanism.

During the later medieval period (the Edo era from the seventeenth century to the half of the nineteenth century), the situation was similar. [28] The mutual aid type mujin in order to give relief to distressed members in local community was still popular and some local community members use mujin to compensate for the high cost of ceremonial occasions such as marriages, funerals and fiestas. In addition, as Japan gradually turned from agricultural economy into commodity economy, some farmers began to use mujin in order to raise funds for commercial cropping. Feudal lords employed mujin in order to encourage new industry and to finance the cost for their alternate-year residence in Edo (now Tokyo) [Sankin Kotai]; [29]

[27] See Mori (1982), p. 19.

[28] See Mori (1982), pp. 108-112, 117-141, 235, 273-275.

[29] The Tokugawa government required each feudal lord to reside in Edo each other year in order to let him consume his wealth.

Buddhist temples and Shinto shrines used mujin as a lottery system and to raise funds for their renovation and construction projects. However, from the point of view of this paper, the most interesting type of mujin is the one that was employed in the local community because we could find interaction between private ordering and the formal legal system there. So we will focus on such a type of mujin in the followings.

Why did the local community need mujin? The reason is the closed and community-based structures of the medieval Japanese society; there was no centralized authority, [30] and people were unable to rely on a cross-boundary legal system. When an unexpected accident occurred, people were unable to resort to financial resources outside of the local community; they had no way but to cope with such accident within the local community. Here came in the role of mujin. By employing mujin, distressed people, even if they themselves did not have sufficient personal funds, were able to get money at once and then repay the money by way of installment of contributions.

3.2 Incentive Problem of Mujin

We have seen why mujin was necessary in medieval Japan in the previous subsection. However, mujin has one important incentive problem. Mujin functions because every member contributes at each meeting and one person gets the whole amount of the contributed money. However, what happens to members who have already taken the contributed money? Obviously, they have no incentive to contribute the required money or even to participate in meetings. How should we address this incentive problem?

Response to the incentive problem varied amongst areas and periods. In the Kansai area, it had become the common practice to require contribution guaranty or collateral by the fifteenth century. [31] Unlike today, Tokyo

[30] Although there existed Tennno's [emperor] government and Samurai's governments in medieval Japan, they were not so powerful to establish a nationwide legal authority system.

[31] See Mori (1982), p. 158-161.

was not the heart of Japan, but the Kansai area (which includes Kyoto and Osaka) was the center of economy and politics in Japan. [32] In the Kansai area, there were many production and commercial activities and the community-level social cohesion had already weakened. Therefore, there were no means other than relying on formal guaranty or collateral.

Contrarily, in the Tohoku area, a guaranty or collateral for contribution obligation was almost never required originally and only a guaranty started to be required by the nineteenth century. [33] Mujin relied on an informal community-based enforcement mechanism, instead of formal incentive arrangement such as guaranty or collateral. In those days, the Tohoku area was the least developed area in Japan and the level of social cohesion in the local community was high. The agricultural economy was prevailing and every village was basically self-sufficient.

Here we can find a kind of joint liability arrangement, because all the mujin members guaranteed contribution obligations of all the members who had already acquired the contributed funds. What made this joint liability mechanism possible was the local information network and social sanction system. It should be noted that social mobility was low in Japan during this period and especially in the Tohoku area it was almost non-existent. This low social mobility arguably reinforced the strength of the social sanction system because those who had been subject to social sanction were unable to change their attribution to the local community.

This feature of mujin (exploitation of private ordering mechanism) can be found in other aspects of mujin. Firstly, membership of mujin was in principle inalienable. [34] This is because mujin was supported by social cohesion of the local community and the transfer of membership to outside of the local community could destroy the mechanism of mujin. Secondly,

[32] Tokyo became the political center in the seventeenth century and the economic center only just in the latter half of the nineteenth century.

[33] See Mori (1982), p. 158-161.

[34] See Mori (1982), p. 209.

it was widely observed that a party, where light refreshments were served, was held after each meeting of mujin. [35] Because rural farmers were usually poor and had little recreation, this small party was a great attraction to them. This line of practice is often observed where private ordering matters and is interpreted as a mechanism to enhance social interaction amongst community members. [36]

However, the later medieval period (the Edo era) experienced a great economic development and the Tohoku area was no exception. As the commodity economy pervaded from the Kansai area to the Tohoku area, farmers who had only been engaged in rice cultivation gradually turned to commercial cropping. In order to raise the capital needed for commercial cropping, they began to employ mujin. This new type of mujin augmented (compared to traditional mutual-aid type mujin) handling a large amount of money and the increased amount was unable to be raised within a single local community. New mujin extended beyond the borders of the local community and covered multiple communities. It was impossible to achieve homogeneity among mujin members and mujin members no longer knew each other. Private ordering within a local community was unable to solve the incentive problem of mujin any more; contribution guaranty and collateral appeared instead. [37]

This transition conforms to the analysis discussed in the previous section. For private ordering mechanisms to work effectively, a sufficient level of social capital is necessary. This level is affected, not only by the social or economic environment, but also by the joint liability arrangement itself. When the arrangement tries to connect two remote subjects, the homogeneity within the group decreases and the joint liability arrangement needs to be taken over by other formal system.

[35] See Mori (1982), p. 193.
[36] For one illustration, see Bernstein (2001), pp. 1570-1571.
[37] See Mori (1982), pp. 161-162, 185-193.

3.3 Extrapolation of Mujin

In this subsection, we see an interesting extrapolation of mujin: pledging of mujin. As we have seen before, under the traditional mujin arrangement, determination of a member who gets the contributed fund is done by a lottery. However, this selection method is obviously inefficient, incurring unnecessary transaction costs; a member who wants the contributed funds the most at the time cannot necessarily acquire it and there is often mismatch between the supply and demand. Although the determination system had gradually evolved from the lottery system into an auction system, [38] there still remained a mismatch.

In order to match the demand and supply, mujin members began to pledge mujin membership. [39] They borrowed from moneylenders outside of the local community by pledging mujin membership (the right to acquire the contributed money when they won lottery in the future). It was difficult for outside moneylenders to get information about the financial status of the borrower and to enforce the loan contract against her in case of a default. Early outside moneylenders used livestock and humans (typically children) as collateral, but as mujin developed, pledging of mujin superseded traditional physical collateral because mujin membership was safer and more powerful collateral than livestock or humans. [40]

Pledging of mujin membership was a useful conversion mechanism. An outside financier could not utilize social capital within the local community. Mujin with its joint liability arrangement could convert social capital into collateral more than an outside financier could employ. Thus joint liability of mujin harnessed social capital just as in case of microfinance.

However, the nature of mujin was forced to change in the modern period. Because a commodity economy began to prevail in every corner of

[38] See Mori (1982), pp. 104-106.
[39] See Mori (1982), pp. 212-224.
[40] See Mori (1982), p. 64.

Japan and social cohesion within the local community declined, private ordering which had supported mujin financing weakened seriously. In addition, alternative financing institution (modern banking institutions) began to take over the role of mujin; modern lottery business and insurance business also took over the role of mujin. These changes forced mujin to turn into a kind of savings group which is independent from the local community. [41]

4 Medieval Trade in Europe

Joint liability played an important role in the "community responsibility system", which emerged in the medieval intercity trade in Europe. In this section, we see the function of joint liability through the model by Greif (2006). [42]

In the twelfth century Europe, the main problem of intercity trade was to assure the enforcement of a contract. Unlike today, there was no centralized powerful government at the time and each city was independent. Merchants in Europe were unable to enforce an intercity contract through a national legal system: when a merchant did a trade with her counterpart in other city, she was not sure if the counterpart would perform the contract. When an identical merchant pair traded repeatedly and infinitely, there could have emerged a cooperation equilibrium; however, when they did not trade repeatedly or traded for only finite times, non-cooperation would have been the equilibrium of the prisoners' dilemma game. Foreseeing this outcome, no merchant would have engaged in the intercity trade activity. Here a question arises: How did the medieval merchants overcome this cooperation problem?

[41] See Mori (1982), pp. 33, 104-106, 305-328, 461; Kosaka (1930), pp. 16-17, 23.
[42] See Greif (2006), chapter 10.

4.1 Community Responsibility System

Greif (2006) argues that European merchants in the twelfth century overcame the problem of effectiveness of contract enforcement by introducing "commune", which was an intracity autonomous community. A commune had its own internal enforcement system, which was often supported by a legitimate coercion. Commune members had sufficient information about each other. It usually took a long and costly procedure in order to qualify to join a commune; therefore transfer of affiliation from commune to another one incurred a huge cost.

The "community responsibility system", under which each commune assumed obligation arising from its members' trade and the whole commune members assumes joint liability, achieved, Greif (2006) argues, enforcement of intercity impersonal trade as an equilibrium. Under the community responsibility system, a lender can sue a defaulted borrower before a court which belongs to the lender's community and this lender's community court can seize borrowers' assets which are located in the lender's community. [43] Then the borrower's community court verifies the judgment of the lender's community court and levies a fine on the defaulted borrower when the court finds that the judgment is truthful. Finally, the lender's community court decides whether it will release the seized asset after receiving the fine from the borrower's community court. Behaviors of the courts are assumed to be common knowledge.

Under this assumption, voluntary performance of intercity trade can be an equilibrium even if it is assumed that the commune members live a finite life and that every trade is impersonal in the sense that an identical pair of merchants meets once at the most. We can check the incentive compatibility conditions of the equilibrium.

[43] Although Greif (2006) does not explicitly point out, this asset can include not only the asset of the defaulted borrower herself but also any asset of the borrower's commune members other than the defaulted borrower herself.

Firstly, the borrower does not have an incentive to renege the contract if the fine levied by the borrower's community court is high and credible enough to deter reneging. Secondly, the lender has an incentive to bring the case before the lender's community court only when there is a true contract breach; because the borrower's community court verifies the judgment of the lender's community court and only the truthful judgment can induce the forfeit. Thirdly, the borrower's community court has an incentive to levy a fine from the defaulted borrower and to give it over to the lender's community court, because continuation of inter-communal trade is more beneficial than letting the defaulted borrower keep the benefit from her reneging and losing the benefit from future inter-communal trade. Finally, the lender's community court has an incentive to release the seized asset in return of receipt of the fine because retention of seizure would break down any future inter-communal trade.

One of the interesting features of a community responsibility system is that a commune with quasi-infinite life functions as an alternative of each commune member with finite life and acts as a player in an infinitely repeated game. A commune as a player has an incentive to maintain its reputation so that it does not favor its community members but tries to achieve impartiality. A commune exploited proximity among its members, in order to generate information to identify the name and affiliation of the defaulted borrower. It communicated outside non-members about who was the defaulted borrower and made them easier to exercise sanctions.

Through analyzing medieval European documents, Greif (2006) demonstrates this community responsibility system emerged in the twelfth century and became prevailing all over Europe by the thirteenth century. Medieval merchants employed joint liability of the local community in order to achieve intercity trade, even where no centralized nation had effective legal system.

4.2 Decline of Community Responsibility System

However, the effectiveness of a community responsibility system undermined the community responsibility system itself. The development of intercity trade, supported by the community responsibility system, increased the interaction amongst local communities, thereby increasing the number of communities and the size of each community.

This development resulted in aggravated heterogeneity within the local community. For example, as the population of a community increased, the noncommercial population increased too and the noncommercial citizens began to complain about the cost burden of the community responsibility system without benefit. In addition, wealthier and established merchants did not need the community responsibility system because they were able to rely on their own reputation in order to assure contract enforcement. Thus, increased heterogeneity made it impossible to distribute the cost and benefit of community responsibility equally amongst community members.

In addition, the increased number and size of communities exacerbated the identification problem. Now it became difficult to verify which merchant from which community had reneged. Falsification costs declined dramatically and verification cost increased instead. Thus, community responsibility system came to an end and gave way to alternative contract enforcement systems.

5 Concluding Remarks

We have explored examples of joint liability arrangements and analyzed the conditions under which joint liability system can achieve efficiency. Here, we summarize the results.

In the first place, guaranty contract and joint liability are necessary only when some form of market inefficiency exists, such as low effectiveness

of the legal system, insufficient amounts of collateral assets, information asymmetry, and hidden action. Where the market functions effectively, there is no need to involve third parties by way of guaranty contract and joint liability because such arrangement would just increase transaction costs without merit. It is only when direct financial transactions are impossible or highly costly that guaranty contract and joint liability is needed. However, even when direct transactions are impossible or highly costly, the following conditions need to be satisfied for guaranty contract and joint liability to achieve efficiency.

Firstly, social or geographical distance between a debtor and other debtors or guarantors needs to be short. This enables the latter to acquire information about the former less costly than the financier does. Otherwise, they would not be able to do the necessary monitoring or screening activity of the debtor. Secondly, when social cohesion exists amongst the debtor side party and the debtor finds benefits in the continuation of such a social cohesion relationship, the other group members or the guarantor can employ the relationship in order to induce contract performance by the debtor.

When these conditions are met, joint liability and guaranty arrangement can transform social capital (which an outside financier is unable to exploit directly) into general financial assets, which an outside financier can access this time. Thus, we can understand joint liability and guaranty as a tool to supplement flaw of the formal legal system by employing private ordering.

However, there is one caveat. As we have seen, there are several mechanisms by which guaranty contract and joint liability achieves efficiency and the functioning mechanisms are different among different economies. Here naturally arises a question: Which mechanisms are really working in Japan? Or is the guaranty arrangement in Japan used in some inefficient way such as abuse of dominant bargaining position? Unfortunately, until now we do not have any available dataset in order to perform empirical re-

search and this question needs to be postponed as a future research agenda. [44] Nevertheless, we could make a preliminary prediction at this stage.

The key to our inference is Ahlin and Townsend (2007a). Relying on Thailand data, they found that the limited enforcement model of Besley and Coate (1995) shows an especially good fit with respect to the data subset of the northeast area, which is poorer and has less developed infrastructure, while the adverse selection model of Ghatak (1999) shows a good fit in the central area near Bangkok. If these results were applicable to Japan, we would find the adverse selection model would show a better fit than the other models. Because strong social cohesion relationship have diminished in present Japan because of its high level of industrialization and urbanization, it would be difficult to infer that limited enforcement can be overcome by social cohesion. In contrast, there could be still room for informational advantage amongst private parties compared to outside financial institutions.

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