

Nonmarket Institutions for Credit and Risk Sharing in Low-Income Countries

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Perhaps one of the central differences between poor and rich countries is the importance of risk in the everyday lives of their inhabitants. In low-income countries, life is more precarious. Beyond the obvious risks—for example, poor sanitation creates a greater risk of contracting infectious diseases—the relative importance of agricultural activity in the economy also tends to make incomes more uncertain for large groups in the population. Market opportunities for dealing with risk, whether through insurance or through credit, are also less well developed in low-income countries, especially in rural areas. This often reflects difficulties in writing and enforcing market contracts, caused by uncertainties in the legal system, low levels of human capital in some cases, and the poor development of physical infrastructure (especially that facilitating communication).

However, low-income countries have developed nonmarket institutions for coping with risk and providing credit. This paper focuses on these nonmarket institutions. This literature attempts to bring together insights from modern microeconomics, especially information economics, contract theory, and mechanism design theory. However, it is primarily an applied field, motivated by the circumstances of the low-income countries.

I will use the term “nonmarket institution” as a catchall for many different arrangements. Good practical examples of such institutions are credit cooperatives, informal credit and insurance arrangements, rotating savings and credit associations, and interlinkages observed in agricultural contracts. In most cases, these can be thought of as institutions that make relatively little use of formal contractual obligations enforced through a codified legal system. There can,

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however, be well-defined rules of operation among the members of the institution, which are either embodied in a constitution or time-honored tradition. Such arrangements tend to be nonanonymous, with parties to any transaction knowing each other well.

The many different arrangements for risk-sharing and credit have long been a staple of the development economics curriculum. Some of the earliest work focused on agricultural contracting. Here, researchers were particularly intrigued by the predominance of sharecropping, which was argued to provide a means of sharing risk between landlord and tenant. Land contracts were also observed to be frequently interlinked with credit provision (Bell, 1987). More recently, a literature has developed that tries to study in detail the motivation for and design of risk-sharing institutions per se. In most of these stories, risk sharing and credit are closely linked, for three main reasons. First, credit serves as an insurance substitute when market opportunities for risk sharing are limited; an individual may borrow in lieu of receiving an insurance payment, thus smoothing out transitory shocks. Second, the distinction between credit and insurance becomes blurred when lenders are willing to relent on some part of the repayment in the event of an unforeseen negative shock to the borrower. Third, the optimal form of contracts when information is incomplete and/or enforcement is a problem seems to look like a combination of credit and insurance. A pure credit arrangement, rather than a contract with contingencies, is unlikely to be optimal in many risky environments.¹

Economic Background

An individual seeking protection against the risk of a fluctuating income might begin either with savings or available opportunities to diversify sources of income (as discussed by Jonathan Morduch in this symposium). It is helpful to think of economic institutions as existing to offer mutual gains for individuals that they could not have accomplished through an individual program of saving and diversification.

It is now appreciated that in low-income contexts, individuals' savings do appear to obey the rules suggested by simple models; for example, people tend to save out of windfall income and draw on their savings when times are low. Among the most convincing work on this is Paxson's (1992) study of Thailand. She uses rainfall by region in Thailand as a proxy for temporary income shocks and then finds that saving is responsive to such transitory shocks.² Such

¹Platteau and Abraham (1987) discuss the practical importance of such *quasi-credit* arrangements. Townsend (1982) and Eswaran and Kotwal (1989) develop some of the relevant theory.

²That is not to say that extreme versions of the permanent income model based on perfect capital markets are supported by the evidence. It is still possible that individuals face liquidity constraints that limit their ability to respond to shocks.

evidence casts doubt on the common view that being poor is inconsistent with some kind of rational, forward-looking behavior.

However, it remains true that opportunities for personal savings in low-income countries are often constricted. For example, good savings instruments may be scarce. Given the widespread experience with inflation in poor countries, it can be hard to find an asset that assures a positive return for postponing consumption. Moreover, fluctuations in prices of basic foodstuffs can also be an important source of risk to which monetary savings are not indexed. Saving by holding stocks, say of food, is an alternative, yet is also fraught with difficulties.³ Finally, the relevant anthropological literature makes clear the importance of social constraints that can make saving unattractive. Certain familial obligations can be difficult to resist, so that part of any stock of savings may be paid as a transfer. Finally, savings provide only a partial source of protection against a lengthy series of negative shocks, like those that may occur after floods or fires that destroy stocks of productive assets such as livestock or tree crops.

These difficulties suggest that savings alone offer only a limited potential for protection against the risk of fluctuating income; thus, there is good theoretical reason to expect that other arrangements for risk sharing could be mutually beneficial to a group of individuals. In fact, the arrangements actually observed are best thought of as reaping the gains from trade that arise in intertemporal contracting between individuals.

Thinking about the sources of gains from trade for risk and credit is helpful in clarifying which sorts of individuals will tend to form institutional connections. For example, one can imagine that different individuals who are exposed to nonsynchronous shocks to their incomes might find it worthwhile to make some risk-sharing arrangement. Similarly, individuals with access to different production technologies, or different timing of consumption needs, or differences in risk aversion are also important, as are indivisibilities.

Nonmarket institutions also tend to exploit a comparative advantage in monitoring and enforcement capacity. The former has become known, since Stiglitz (1990), as the *peer monitoring view* (see also Arnott and Stiglitz, 1990). Individuals who interact in a variety of nonmarket contexts tend to know each other well. Thus, they may have greater ability to monitor each other than do formal financial institutions, such as banks or insurance companies. This can explain why many nonmarket institutions function effectively where formal institutions fail. For example, the frequent failure of crop insurance schemes and formal banking arrangements in low-income situations is commonly attributed to informational problems, such as adverse selection and moral hazard (Braverman and Guasch, 1986; Binswanger, 1986). The peer monitoring view has been fruitfully applied to discussions of group lending schemes and credit

³Nonfinancial assets such as livestock, land and jewelry are an important alternative to saving in cash. See Rosenzweig and Wolpin (1993) for an interesting attempt to broaden the basis of savings decisions to include livestock purchases.

cooperatives, discussed in greater detail below. Risk-sharing schemes among geographically proximate individuals may also reflect that it is more difficult for individuals to shirk in such arrangements. In addition, informal insurance payments can be more sophisticated—for example, by being made contingent on the care taken by the insured—in ways that are nearly impossible in more formal arrangements. Hence, where markets would face severe moral hazard and adverse selection problems, nonmarket institutions may still be able to work.

The comparative advantage of informal nonmarket institutions in terms of enforcement has two features. The first concerns the scope of sanctions. In most social structures, mechanisms of social control already exist to limit antisocial behavior: Wade (1988) offers an illuminating description of such mechanisms in village India. Thus, an individual who fails to honor an obligation can be punished, even if no written contract has been violated. The second feature concerns the depth of sanctions. In low-income countries, many formal institutions, such as banks and insurance companies, are new, but there is a long history of cooperation in informal settings. This may reflect relative immobility that comes from regional and kinship ties. In any case, the virtuous outcomes that can be predicted by the use of punishment strategies in infinitely repeated versions of games like the prisoner's dilemma may be reasonably applicable to the type of environment in which nonmarket institutions flourish (Fafchamps, 1992).

Thinking of village economies as institutions where individuals have lived alongside each other for many generations strikes an immediate chord with the theoretical literature on mechanism design. One recent strand of this literature, reviewed in Moore (1994), has stressed the possibilities of finding efficient outcomes in environments where the agents are well informed about each other. In particular, close-knit societies may be able to make use of arrangements that are impractical when information is entirely private to each individual. Below, we discuss the link between that literature and the study of risk sharing and credit institutions.

The Literature on Nonmarket Institutions

The earliest literature that used information economics and contract theory to develop insights into rural organization was the approach pioneered by Joseph Stiglitz in the early 1970s and later reviewed in Stiglitz (1987). This material focused predominantly on agricultural contracts between landlords and tenants. Risk is central to this literature, which argues that many modes of organization, like sharecropping arrangements where the landlord receives a fixed proportion of the tenant's output, can be viewed as a rational response to limited possibilities for sharing risk and information.

For this paper, a better starting point is the related literature on credit and insurance. One strand of work has in part focused on mutual credit organiza-

tions. This includes a host of work on group lending beginning with Stiglitz (1990) and Varian (1990). Their work is motivated by the apparent success of Grameen Bank, a group lending program in Bangladesh, which has attracted an enormous amount of public and academic attention. Instead of a loan being granted to a single individual, as we are normally used to seeing in the United States, a group lending program is characterized by joint liability between borrowers. The amount of autonomy given to the group to allocate these funds across members varies. In some cases, liability is joint, but the loans are designated to a particular individual at the outset. Grameen Bank has enjoyed high rates of repayment in its lending to disadvantaged groups, making it an attractive template for lending programs elsewhere.

Group lending is an interesting contractual arrangement. Stiglitz and Varian both argued that it can improve monitoring incentives, since each borrower in the group will likely have good information about the other's actions and, under joint liability, their payoff is dependent on whether the other individual's project succeeds. In other words, joint liability acts like a kind of forced risk-sharing arrangement. However, group lending does not guarantee improved repayment incentives. It depends critically on how one models the group behavior and the project technology.

The theoretical ambiguity of how group lending will perform is amplified by Besley and Coate (1995). They model a repayment game between two borrowers and a lender with joint liability (see also Armendáriz de Aghion, 1994). In this model, group lending has both positive and negative consequences for repayment rates. If one individual's project does well and the other's does badly, then this may result in one individual repaying the other's loan to avoid the penalty from the lender. However, this possibility raises the cost of repaying a loan and may lead both individuals to default where, with individual lending, one borrower would have repaid.

Credit cooperatives are another organizational form that tries to use local information and enforcement. They typically borrow from a bank or from the government and then distribute the funds among their members as loans. Some internal fundraising from member deposits is also common. Banerjee, Besley and Guinnane (1994) have studied the optimally designed credit cooperative as a peer monitoring problem. This approach emphasizes that the constitution of the credit cooperative can affect the amount of monitoring that is undertaken. They focus on how the amount of monitoring will be affected by varying the amount of any guarantee put up by nonborrowing members, the amount that such members lend to the cooperative, and the interest rate that is paid on deposits. As we discuss below, they also attempt to test this model on German data.

The German cooperatives of the nineteenth century provided a template that has been widely adopted throughout the world. They are found in urban and rural areas. They can even survive in situations where credit markets are fairly well developed, such as with modern day employee credit unions attached

to businesses. This is not surprising if cooperatives can diminish the adverse selection and moral hazard problems that persist in fully developed financial systems and reduce the costs of loan collection. Agricultural credit cooperatives may also continue to exist in fairly well developed financial systems, where they are sometimes interlinked with other services, such as agricultural extension. However, it does seem fair to say that the relative importance of this kind of institution declines as the credit system becomes more developed, reflecting the diminished importance of local knowledge and enforcement.

Practical experience with credit cooperatives has been mixed. In part this could reflect difficulties in transporting organizational structures across time and space. Guinnane (1994) provides an interesting account of an early sobering episode where the structure of German credit cooperatives was tried out in Ireland. More generally, governments of a number of countries have found themselves picking up the pieces of credit cooperative systems that face financial ruin. One possibility is that the information needed for peer monitoring was not available. However, other explanations include the failure of cooperative design to make due allowance for covariant risk, resulting in large-scale shocks as when bad weather hits a region, causing a mass default problem. Collusion between co-op members might also be a problem. The theory of credit cooperatives suggests that members monitor each other. However, the models to date have made light of the possibility that the monitor and monitored collude to defraud the outside lender (which in practical settings may be the government). Extending the literature on credit cooperatives to take account of the emerging literature on collusion-proof mechanisms, surveyed in Tirole (1994), would be a worthwhile development.

Another informal financial institution is the rotating savings and credit associations discussed by Besley, Coate and Loury (1993). Institutions of this form are found worldwide and travel under a number of different names: *Chit* funds in India, *Hui* in Taiwan, *Tontines* in Senegal and *Kye* in Korea are examples. Under typical rules of operation, a group of individuals gets together periodically and allocates a pot of funds to one group member, either by lot or bidding. The process continues, with past winners excluded, until each member has won the pot once. This type of institution serves to enhance household capital accumulation of indivisible items, since the pot of funds can be given to one member who can invest before he would have if he were left to accumulate on his own. Rotating savings and credit associations may also serve a risk-sharing function if individuals receive shocks to their health or incomes during the rotation cycle (Calomiris and Rajaraman, 1993).

Despite their importance, quantitative information about participation in rotating savings and credit associations is relatively rare. Such evidence as we have suggests that participation is widespread. For example, some estimates suggest that around 80 percent of the Taiwanese adult population are members (Levenson and Besley, 1995). The amounts of money that are put into the pot may be quite significant; informal accounts suggest that some businesspeople in Thailand deal in pots of many thousands of U.S. dollars. However, more typical

are amounts that reflect demands for fairly small needs, such as the purchase of a household appliance.

There is good evidence that such institutions make use of local information and enforcement in their operations. Thus, a typical setting for a rotating savings association to be formed is a neighborhood or workplace. They do persist in developed countries to a degree. However, they tend to be confined to groups, such as recent immigrants, who are disadvantaged vis a vis formal credit markets. In rapidly industrializing economies, rotating savings and credit associations still appear strong in situations where certain segments of the capital market are restricted (sometimes by government policy). In Taiwan, the system for household credit is relatively poorly developed, despite advances in the market for business finance. Consequently, participation in the *Hui* does not appear to have suffered a marked decline over the last 20 years (Levenson and Besley, 1995).

However, such traditional institutions do seem in general to disappear as capital markets develop. This reflects the fact that monitoring and other technologies improve in the development process. In addition, formal institutions are able to reap scale economies in financial intermediation, which small-scale associations cannot match. Whether as a symptom or a cause, the decline of this type of nonmarket institution in the development process vividly illustrates the idea that they use certain information structures and enforcement technologies that are eroded by the transformation to a modern economy.

Instead of focusing on the strengths and weaknesses of particular institutions like mutual credit associations, group lending, credit cooperatives, and so on, other contributions to this literature have focused geographically on studying certain areas, or theoretically on studying certain problems that arise in several of these frameworks.

In his contribution to this symposium, Townsend describes his work in studying the implications of risk sharing in southern India and in Thailand. He finds some interesting evidence about the extent of risk sharing that already exists and that could exist across households and villages. Udry (1994) studies informal credit institutions in northern Nigeria, which tend to involve lending and borrowing arrangements between friends and family. He proposed a contracting model to explain the form of the loans that are observed. In similar vein, Ligon (1993) studies a specific form of second-best risk-sharing arrangements in Indian villages, and focuses on how the arrangement between a moneylender and borrowers can be viewed as offering incentives for the borrower to commit effort to repaying. Also using the ICRISAT data, Rosenzweig (1988) examines the importance of intrafamilial transfers in risk sharing. There is mounting evidence that models based on risk sharing between individuals who are acquainted with one another provide a nexus for risk sharing in village economies.⁴

⁴This is of no surprise to anthropologists who have long since studied such arrangements; see, for example, the classic study by Scott (1976).

Other contributions to the literature on nonmarket institutions have focused more directly on theoretical issues involved in insurance. Of course, the entire literature on adverse selection and moral hazard, and how they inevitably limit the possibilities for risk sharing, is relevant here. Also important in many of these situations is what occurs when enforcement capacity is limited. Coate and Ravallion (1993) have studied the theory of informal insurance in such cases. Two identical individuals agree to share their income. It is assumed that they cannot write binding contracts and are restricted to “self-enforcing” agreements. This will preclude an offer of complete insurance for large shocks, due to the fear that the other individual will renege if that individual gets “too far” ahead. They formulate an incentive constraint guaranteeing that the risk-sharing arrangement is self-enforcing: neither party chooses to renege because the one-period gain is always offset by the loss of future insurance benefits. As Kletzer and Wright (1992) have shown, it may also be optimal to make such arrangements history dependent, with contractual terms that evolve as the future reveals itself. This blurs the distinction between credit and insurance on theoretical grounds.

Progress in this area has been piecemeal. The specific details of different institutions are overwhelming, and this makes it difficult to draw general lessons. What ties the contributions together is a willingness to model institutions, sometimes in a stylized way, as a means of gaining insights. It displaces earlier, more descriptive literature and has the merit of bringing development economics further into the mainstream.

Two Perspectives on Institution Design

At this point, the reader should have a flavor of the recent studies that try to apply economic theory to understand risk sharing and credit institutions in low-income countries. This section tries to suggest a methodological distinction between two approaches, an inductive and a deductive approach, which can be found in the literature discussed above. As with any attempt at a simple classification, it should be borne in mind that many studies are not pure forms of either approach. These approaches should not be regarded as competing, although some doubtless have preferences that one approach is likely to yield more insight. After describing both approaches, I will attempt to analyze the tradeoff between them as I see it.

An inductive approach begins with observations about how the world is. Examples of this approach include Stiglitz’s (1974, 1987) work on agricultural contracts, such as sharecropping, Besley, Coate and Loury’s (1993) studies of rotating savings and credit associations, Udry’s (1994) analysis of informal credit and risk sharing in Nigeria and Hoff’s (1994) work on informal risk sharing. In each case, the researcher begins by observing an institutional arrangement in the real world. The modeling exercise is then organized around this contractual

form, and the author then tries to build a theoretical model that captures the rules.⁵ The objectives are then to compare this institution with other possibilities, to draw out some empirical implications of the model, and to seek insights on why we see this arrangement in practice. Ideally, the theory gives a set of testable conditions for when the institution will and will not be seen.

The alternative approach, the deductive approach, begins with the tastes and production technologies of a group of individuals. Given a set of information and enforcement constraints, one then characterizes the set of feasible efficient outcomes. These allocations can then be compared to what we see in the real world. In this symposium, for example, Townsend describes what full risk sharing would look like in a theoretical context, and then examines evidence for India and Thailand to see whether the evidence supports the theory. The aim in deductive research is usually to compare theoretical predictions to empirical findings. Rashid and Townsend (1992) present an overview of this approach.

The deductive approach is inspired by mechanism design theory (for example, Harris and Townsend, 1981). That literature focuses on selecting a set of rules that induce people, given their private information, to take some prescribed action. In the present context, risk sharing and credit institutions can be seen as mechanisms that attempt to deal with the various information and enforcement constraints to bring about more socially efficient outcomes. This approach also plays a role in the design of optimal government interventions where the architect can be viewed as a policymaker. The approach of Banerjee, Besley and Guinnane (1994) to the study of different forms of credit contracts views the constitution design problem in a credit cooperative as a mechanism design problem.

Both approaches enrich our understanding of nonmarket institutions. However, it is possible to argue for methodological problems with either perspective.

The inductive approach tends to emphasize the messy reality of limited information and market and government imperfections. Such studies often characterize a set of rules for an institution, and then conclude that the outcome is not efficient. Indeed, Stiglitz (1987) argues that a general implication of the "information-theoretic" approach that he has developed is that outcomes are unlikely to be Pareto efficient.⁶ But as a general criticism, the inductive approach lacks a theory as to why the world is so frequently saddled with perpetually inefficient institutions, and why other institutions do not spring up

⁵There is an interesting analogy here with the way in which theory is used in the field of industrial organization. A researcher might observe that certain firms are vertically integrated, while others are vertically separated, and then will try to build a model to capture this.

⁶In line with the general tenor of this section, Stiglitz (1987, p. 100) argues that "there is a fundamental distinction between those who believe that economic systems...function...so that outcomes are Pareto efficient, and those who believe that even when individuals behave in an individually rational way, economic systems may not be Pareto efficient."

to solve externality problems. (For example, why are externality problems not internalized by government?) Without such an explanation, the initial claim of inefficiency may be suspect, since the institution may be responding to some factors missed by the analyst.

The deductive approach offers the possibility of making institutions explicable as the optimal response to an economic environment, derived from underlying tastes and technologies. However, a choice of underlying economic model is not value free. No analyst can capture all of the constraints, and there is always a tendency to focus on which are easiest to model, given current techniques. Often notoriously absent from such models are ideas such as the simplicity of the institution or the social capital embodying the cumulative experience of the relevant population. As the deductive analyst makes a variety of modeling choices, it often seems that the analysis is motivated by a *presumption* of efficiency. Crudely put, the idea is that we observe market or nonmarket institutions and then try to find the appropriate second-best problem that makes it optimal for that institution to exist.

However, the deductive approach lacks a theory of why the second-best planning allocation solved for in the mechanism design problem should correspond to the real world. Some evolutionary model of institution formation may suffice to offer such an explanation, but it has yet to be developed. Such models as have been written down of evolutionary processes in simple environments—for an example, see Kandori, Mailath and Rob (1993)—do not make one sanguine about this possibility.

These criticisms of inductive and deductive methods are bluntly stated, and may even be overstated. But notice that in both approaches, the key shortcoming is a lack of a theory of how institutions are born, grow, change and develop. Moreover, there is no well-developed or straightforward way to test theories of institutional design and formation. Large-scale data sets for doing so are rarely available. In addition, institutional change and adaptation may be very slow, and it might be difficult to find the requisite time-series component to the data. As a result, much of the empirical testing here feels more piecemeal than in other areas of economics. In this area, much of the work to this point can best be viewed as part of the process necessary for developing broader and more relevant theories.

The approaches and data sets for these broader theories of institutions are beginning to develop. In his studies of Nigerian villages, Udry (1994) begins the task of looking at why different institutions develop. The challenge is to look for places where there is significant variation in the contracts that are used over time and space. For example, in the much-studied villages in southern India (that are included in the ICRISAT data set), some tenants have both share-cropped plots and fixed-rent plots. It has also been observed that technological change in agriculture, such as the use of tractors, has precipitated changes in agricultural contracts. In an important paper, Eswaran and Kotwal (1985) have exploited this fact to offer a tighter test of the theory of agricultural contracting models.

In another example in this spirit, Banerjee, Besley and Guinnane (1994) investigate the degree of peer monitoring implied by the design of credit cooperatives. They use nineteenth-century Germany as a testing ground, where two competing organizations existed side by side. However, one was predominantly in rural areas, where it could plausibly be argued that the information environment was different. The authors attempt to create a model that will predict that the two different institutions will evolve. Such a test is inevitably difficult, but it does illustrate one way of taking this kind of model to the data. The mechanism design approach to village organizations in Thailand that Townsend (1994) discusses is also an attempt to discover whether differences in the economic environments can be used to predict the existence of different mechanisms that theory predicts.

In future, the iterative process whereby data confronts theory, as described by Townsend in his contribution to this symposium, will become an established mode of research. It also builds important bridges between economics and anthropology.⁷ I also suspect that studying the rapid development experience of countries such as Taiwan and Korea, where market alternatives to traditional institutions are being developed, will prove fruitful. The displacement of more traditional forms of interaction is particularly noticeable in the areas of credit and insurance.

Concluding Remarks

The design of credit and risk institutions in low-income countries provides for economists one of the most exciting testing grounds for theories of contracting with imperfect information and limited enforcement. The spate of recent contributions in this area have made it one of the most active fields in development economics. One attractive feature of the literature is that although many of the researchers in the field are theorists, the work is firmly about explaining what we see in reality. This combination is healthy for intellectual vitality and real-world relevance. This review suggests that a theory of institution formation and adaptation will be a key step in enhancing our understanding of this area further.

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⁷The pioneering contribution of Bliss and Stern (1982) merits mention in this context.

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