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An Evaluation of Village-Level Microfinance Institutions
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Abstract

This paper evaluates village-level microfinance institutions in rural and semi-urban Thailand using data from a large stratified, clustered cross-sectional survey. As is typically the case, micro-finance institutions have emerged in Thailand without the benefit of experimental controls. Thus, the data has neither randomized participation nor program placement. In addition, we do not study a pre-specified, narrow set of institutions with known operational and selection policies. Indeed, as is often the case, we do not have reliable pre-survey information on the presence of or absence of a plethora of possible institutions, including those emerging endogenously at the local level. Nor do we have variations in policies across these many institutions. There is, however, at least one advantage in this — the variation in policies observed in the survey allow an assessment of policies correlated with success.

A key ingredient of the Thai survey and analysis here is the use of data from multiple instruments — institutions, households and village key informants. From these various instruments to highlight important institutional and village characteristics that are correlated with proximate targets for institutional success: growth of membership, growth of saving and growth of credit. Membership success is positively correlated with underlying member characteristics (i.e. stable landowning memberships). Savings success is positively correlated with several institutional policies (i.e. pledged savings accounts, low collateral requirements, open membership, the use of minimum initial deposit requirements and membership application forms); positively correlated the provision of emergency assistance and non-agricultural training; and positively correlated with member characteristics (i.e. relatively poor memberships). Lending success is positively correlated with some institutional policies (i.e. using savings as collateral for loans and making cash loans), positively correlated with the provision of agricultural training, and negatively correlated with recently established large initial funds.

There is much evidence in the data that villages with institutions, and with successful institutions in particular, differ from villages without institutions, or with unsuccessful institutions, in ways not related to the institutions themselves. That is, villages where institutions exist prior to, at the time of, or after a retrospective date tended to have more financially active households, but the villages are poorer, more agricultural, and more informal. Villages with successful lending institutions average significantly lower incomes and educational levels, and have tighter credit. Villages with successful savings institutions tend to have higher levels of credit, but more limited savings. Evidence from recently established institutions and institutions without savings suggest these characteristics predate the institutions themselves. In short, there is ample evidence of selection bias.

An assessment of the direct impact of micro-finance institutions on household and household businesses must take individual and village selection into account. Linear regressions and simple probits of the frequency of household business start-ups, credit constraints in business or agriculture, occupational mobility, reliance on moneylenders, and asset growth would show that village-level institutions have insignificant or even perverse effects. Controlling for village-level selection and explicitly allowing for individual selection, correlated errors, or simultaneity in membership and impact equations eliminates all perverse effects and estimates significant positive effects of institutions on promoting asset growth, reducing credit constraints in agriculture, reducing reliance on moneylenders and increasing occupational mobility.

*Thank you
1 Introduction

Over the past fifteen years, "microfinance" has become a key word among both researchers and policymakers in development economics. Proponents argue that the unique policies of microfinance institutions enable them to bring credit and savings services to underdeveloped areas and to people who would otherwise have insufficient or no access to contemporary financial systems. Moreover, the hope and claim is that the provision of saving and credit is both effective in fighting poverty and more financially viable than other means. Detractors point to the frequent failure of microfinance institutions or reliance, implicitly or explicitly, on subsidies. Unfortunately, there is still a great deal of ignorance about the experiences and impact of microfinance institutions. This paper provides important contributions toward that end, focusing on Thailand, but developing methods which may be applicable more generally.

Beyond its geographical focus, this paper differs from other studies of microfinance institutions in several important ways. First, other papers (e.g. Pitt and Khandker (1998), Morduch (1998), and Mosley (1996)) have focused on a single, or at most a handful of larger institutions, such as Bancosol in Bolivia or the Grameen Bank, BRAC and BABD in Bangladesh. In contrast, our research is based on a cross-section survey of village-level financial institutions conducted without prior knowledge of the presence or absence of institutions in these villages. Since the institutions uncovered in the survey are operated and administered at the village-level, our data shows a great deal of important variation in their policies and experiences. Thus, the cross-section allows us to measure the relationships between the policies of microfinance groups and successful or unsuccessful experiences of the institutions. The second critical feature is that our analysis combines detailed information from a stratified, clustered, random sample of not only institutions, but also households and key informants. This data thus allows us to examine the link between institutions and the economic and financial characteristics of both members and non-members in their local environments. A third feature is that the institutions we study are not simply introduced into the village from the outside and they are not the lone source of formal credit for villagers. Finally, our study analyzes both lending and savings services and the interaction between the two. While most research has focused on credit, access to savings may play an important role in building assets and overcoming credit constraints. In addition, some of these institutions are involved in other activities such as running a rice mill or village shop.

The analysis is based on data from a survey conducted in May 1997 (before the financial crisis hit) in four provinces (changwats) of Thailand - the semi-urban changwats of Chachoengsao and Lopburi in the Central region and the more rural Si Saket and Buriram in the poorer Northeast region. This paper utilizes three sub-components of this survey: the household module, the institutional module, and the key informant module. The household survey was administered to 2880 Thai households – 15 households in each of 192 survey villages. The villages were divided evenly across the four provinces and selected in a clustered, random sample. Households provided an extensive array of socio-economic and demographic information: occupation history; household, agricultural and business assets; financial status involving borrowing, lending and saving; and organizational involvement. The institutional survey was given to all known micro-financing institutions that were encountered in the villages at the time of the household survey. In total, 161 institutions were found across 108 of the villages. Thus 56.3 percent of the villages had at least one institution present and the remainder of the villages were without an institution. The survey questions focused on the individual policies and experiences of the institutions, including their founding, membership, and saving and lending services. Finally, the key informant module was administered to the village headmen in each of the 192 villages and was used to acquire village histories, among other things. We use this latter survey to gain retrospective knowledge of earlier failed institutions in the village.

A major concern in our evaluation of these institutions is selection bias, a well known problem in program evaluation and an important issue in the evaluation of microfinance projects in particular (see Pitt and Khandker (1998) and Morduch (1999)). In this study, two important types of selection bias may exist: 1) within a village, member households may differ from non-member households in important unobservable ways; and 2) across the sample, villages that start institutions may differ in unobservable ways from those that don’t. In evaluating the impact of these institutions, we attempt to minimize both of these possible biases. For household-level bias, we use an obviously blunt instrument for whether a household is a member of an institution in a specific year, the presence or absence of an institution in the village at that time. We account for the village-level bias by controlling for whether a village has ever had an institution. The idea is that villages that had institutions at any time (either prior to, during, or after the year of interest) differ in
important ways from those that have never had an institution. The results are consistent with selection bias along both individual and village dimensions.

The analysis of the factors correlated with growth of membership, savings, and credit indicate that characteristics of both the institution and village environment are correlated with these proximate measures of institutions’ success. The most important institutional characteristics correlated with savings growth were the demographic characteristics of members and the type of savings accounts offered. For lending and membership growth, the pattern of institutional correlates were less clear. However, the provision of training and consultation were generally positively correlated with growth, while the provision of occupational, livelihood and other coordinated services were not.

The study of village characteristics correlated with membership, credit and savings growth uncovered a much more consistent pattern for lending success than for savings success. Households in villages with successful lending institutions averaged lower incomes and education levels. In these villages, households tended to have proportionately more savings in rice storage and save less as cash or with commercial banks. Perhaps most importantly, institutions tended to be successful with lending services in villages where there were fewer loans and less total credit (from other sources). For the villages with successful saving institutions, the opposite was observed - loans were more common, larger, and longer term. The evidence suggests that these village characteristics associated with saving and borrowing are not caused by the institutions themselves, but exist before the institutions are introduced.

Finally, the evaluation of the impact of the institutions showed varying levels of impact along several dimensions. Before correcting for selection biases, institutions appear to have no significant positive impacts and actual perverse effects on households starting businesses or switching occupations. After accounting for selection biases, however, we estimate large and significant impacts of institutions on promoting the growth of assets, reducing credit constraints, and reducing the reliance of households on moneylenders. In addition, in the Northeast we find that membership in a village institution increases occupational mobility. Given the proposed model, we find an important role for both village- and individual-level selection bias.

The remainder of the paper is organized as follows. Section 2 describes the village institutions and summarizes key aspects of the programs’ founding, membership, and saving and lending services. The institutions differ from other available financial services in important ways. These characteristics are relevant in the analysis of the correlations between institutional characteristics and success and also the examination of possible selection bias in their memberships. Section 3 focuses on the membership, lending and savings experiences of the individual institutions over their first five years. The variation in these experiences is presented and the reasons given by institutions themselves for their growth or decline in services are discussed. Classifications for success or failure in several dimensions are developed and their correlations with important policies are examined. Section 4 integrates the institutional data with village data from the larger household survey. The results show evidence of significant links between the presence and success of institutions and their economic and financial situations of their respective villages. Section 5 presents an attempt to evaluate the impact of institutions along several key dimensions: the founding of new enterprises, the presence of credit constraints, occupational mobility, reliance on moneylenders and the building of assets. Conclusions are drawn and summarized in Section 6.

2 Description of Programs

The 161 institutions surveyed are distributed somewhat unevenly between the central and northeastern provinces. Institutions were nearly twice as common in the poorer, rural provinces of Buriram and Sisaket in the northeast and so sixty-four percent of the sample are from these areas. In contrast, the central provinces of Chachoengsao and Lopburi are semi-urban and although the same number of villages were surveyed in these provinces, many fewer institutions existed. Still, at least twenty-five institutions were surveyed in each changwat.

As stated earlier, the institutions operate at the local level. The vast majority (ninety-one percent) operate at the village level, while the remainder operate at the next organizational level – the subdistrict (tambon). Both the membership and administration is thus confined to the local level. Still, the vast majority of them have some relationship with the Thai government, most often the Community Development Department (CDD). Indeed, without being prompted, 84 percent of the institutions mentioned government
involvement in their founding and 60% mentioned the CDD specifically. Many institutions receive funding from these sources, but the government agencies also offer advice, training, and end-of-the-year accounting assistance.

The data contain a variety of different types of village institutions, including production credit groups (PCGs), rice banks, poverty eradication programs (PEPs), women’s groups, buffalo banks and general "village funds". These institution types are distinguished by their memberships, the services they offer, their purposes and level of funding. The individual types of groups are discussed below and many of the distinctions are highlighted in Table 1.

PCGs are the most common type of institution. Members of PCGs are relatively less likely to be the poorest in the village and are more likely to be mostly women. These institutions were often founded to promote "good savings habits" within the village and providing credit was a secondary goal, if a goal at all. Thus, they are relatively more likely to offer savings and income generating services and actually less likely to offer loans than other types of institutions.

The second most common village institution are rice banks, which usually make small, short-term consumption loans intended primarily for consumption smoothing within the village. These loans are rice and are made at higher interest rates than other institutions make. Members are generally required to deposit or donate a given amount of rice at the founding of the institution to build an initial (hopefully, self-sustaining) fund. Thus, rice banks are significantly more likely to lend, and less likely to accept savings or invest in income generating services. There memberships are relatively more likely to be primarily poor people and male. The rice banks are concentrated in the poorer, more rural provinces of Sisaket and Buriram.

PEPs are the next most common type of institution. These institutions are part of a government-sponsored micro-finance project to help fight poverty in the poorest areas of the country. Grants of 280,000 baht (almost $12,000 at pre-crisis rates) were given to villages selected by the government with a requirement that the village have per capita incomes averaging under 15,000 baht/year. The funds were not only intended for poorer villages, but also the poorer households within those villages. We initially hoped that we could use these programs as examples where selection purposefully occurred. The actual targeting of the PEPs is somewhat questionable, however, since they are more concentrated in the wealthier central provinces of Chachoengsao and Lopburi. In addition, no significant correlation was found between the placement of programs and a separate socio-economic rankings of villages produced by the CDD themselves.

Because of their unusually high endowment, PEPs tended to make larger and longer-term loans than most other village institutions. The monies were supposed to be distributed as interest free loans for initial investment in "occupational promotion" activities – such as arts and craft production or the raising of livestock or cash crops – that would yield higher incomes than traditional rice farming. These activities were generally suggested by the CDD and occupational advice and training generally accompanied the introduction of the programs. Grants to the first villages were made in 1995 and the program has been expanding since then. As expected, our data shows that PEPs are significantly more likely to lend, and less likely to accept savings or to invest, as an institution, in income generating activities. As their names suggest, their memberships are more likely to consist of mostly poor and landless people.

As a category, women’s groups are apparently distinguished more by their female membership than by their financial activities. While women participate in PCGs and other groups (not only as members but also in leadership positions) the women’s groups are groups that specifically target women. Many of the groups are also linked with training and funding for occupational promotional activities that might allow women new ways of bringing income into their households.

Buffalo banks are institutions that are formed to lend out buffalo or cattle. The loan is "repaid" when the initial buffalo gives birth and the young buffalo is returned to the fund. Once lent out, if the buffalo dies or does not give birth, no further loans can be made. Thus, many buffalo banks made loans initially, but were not (or no longer) lending at the time of the survey. Buffalo banks do not generally accept savings since their loans and repayments are in the form of livestock.

Descriptions of the founding, membership, lending and saving characteristics of the institutions follow. These characteristics are described here briefly, since many of the policies and characteristics will later be shown to be significantly correlated with either the successful or unsuccessful experiences of institutions. In addition, the membership characteristics will naturally be related to selection bias issues addressed in Sections 4 and 5, while the founding data will be crucial in both identifying selection bias and accounting for it in our evaluation of institutions’ impacts.
2.1 Founding

Most of the institutions were not very old at the time of the survey (1997). While the average founding year was 1991, over sixty-percent of the institutions were founded after 1991 and over forty percent after 1994. The oldest institution was started in 1976. There are two reasons that the sample is skewed toward younger institutions. First, and most importantly, the microfinance movement is relatively young and the rate of establishment of these institutions has been higher in recent years. Secondly, failed institutions could not be surveyed for the institutional survey and this biases the sample against older institutions. In the key informant survey, informants were asked to list all institutions (existing or failed) that had operated in the village. Examination of these founding dates indicates that forty percent of all institutions were founded after 1993 and sixty percent after 1989. The average date of founding was 1990. About 13% of the institutions in the key informant survey had failed. This data on founding date and failed institutions will be important in accounting for selection bias in our evaluation of the institutions' impacts in Section 5.

As stated earlier, most of these institutions were founded with some government (or occasionally military) involvement. While the large majority (over seventy percent) of the founders were village members, most institutions had multiple founders and so often both villagers and non-villagers were part of the founding group. Over half of the village-member founders held leadership positions and most of the founders were still officers in the institution. Thus, in general, while the institutions may have been founded at the suggestion and assistance of outside organizations, they were not started without the leadership and cooperation of people within the village.

Training played an important role in the founding, especially for officers. Although the training was generally brief (a day or two), almost eighty-five percent of the institutions trained their officers at the time of foundation and many provided additional training. Officers were most commonly taught how to organize the group and the benefits of the institution, but loan management, accounting, membership application procedures are also included in the majority of officer training sessions. The vast majority (80.4 percent) of institutions also trained members at the time of foundation, but this training tended to be larger scale and concentrated more on the benefits of the institution. Thus, much of this “training” may simply have been advertising. Training – especially the initial training of officer – was typically conducted by CDD officers, while the officers and headmen played relatively larger roles in membership training.

Institutions typically started with an average of thirty to forty members, although one fund in an extremely large village started with over 700 members. The institution’s funds at founding were worth an average of 76,300 baht (about $3200), but there was a great disparity in the size of these initial funds. Rice banks had smaller funds, while PEPs averaged easily the largest funds with their 280,000 baht of government seed money. In contrast, sixty percent of the institutions had funds valued at less than 14,000 baht at the time of their founding. Naturally, funds with larger resources were more capable of lending immediately.

The disparity in initial fund size was also related to the source of funds. The sources of funds were generally related to how the institutions were founded – while some (PEPs, for example) were placed in the village using a top-down approach, others arose within the village from the bottom up. For example, in an informal interview, members of one village explained that they had started their PCG after hearing about the PCG of a neighboring village. The funds that were generated completely from within the village tended to be much smaller, while institutions with outside financial assistance tended to have much larger funds. Member funding averaged 4000-9000 baht, while loan and donation amounts from organizations outside the village averaged 77,000 and 177,000 baht, respectively. Over twenty percent of the institutions were funded completely by member savings, but another twenty percent had their funds totally donated from outside organizations.

On average fifty-one days were needed to collect the initial fund, but at least sixty percent of the funds were collected in less than a month. Reasons for longer collecting periods included government red tape or delay and trouble raising membership and funds.

About two-thirds of the institutions had their initial funds in the form of cash, while funds of nearly twenty percent of the institutions were rice. Additionally, some funds were in the form of buffalo and others were partly or wholly in the form of other crops, fertilizer or construction materials.
2.2 Membership

As stated above, new funds had typically thirty to forty members. Being a member is often synonymous with being a saver or being a borrower, for institutions that offer these respective services. The members are generally villagers and the characteristics of the members are closely related to the characteristics of the villages. Table 2 sheds insight into which demographic groups these institutions serve.

As one would expect, the members of these institutions are typically common people. Only about three percent of the institutions stated that their members are generally wealthier people. The rest of the institutions were split fairly evenly among the poor and middle class with a slight trend toward serving more middle class people as institutions grew older. It is unclear whether this is a result of changing their target populations or members becoming wealthier over time. We will see in Section 5, that membership tended to have strong positive effects on the growth rate of assets.

Rice farming is the primary occupation of the members. This was true for over sixty percent of the institutions and over ninety of the institutions had most of their members working in some type of farming. While the members were usually poor to middle-class, they generally own their own land. Over three-quarters of the institutions had memberships of mostly landowners.

Are these characteristics peculiar to institution members or typical of households in general? Insight into this question can be gained by comparing the institutional membership data with the household survey’s data on the overall population. In just 36.8 percent of household survey’s villages, the majority of households were rice farmers. Similarly, in the 72.5 percent of villages, the majority of households were agricultural workers in general, and in 95.9 percent of villages the majority were landowning. Thus, the members of institutions appear to be more likely to be in agriculture (rice farming in particular) and to be landless. Thus, institutions are either drawing their memberships from the more landless, agricultural households within the villages, are located in villages with more landless and agricultural populations, or some combination of both.

The institutions are fairly evenly split in terms of the typical sex of members. Over forty percent of the institutions had primarily female memberships. Less than ten percent of the sample are women’s groups, so many other institution’s also focus on the female population. Women often handle the finances in Thai households and correspondingly hold leadership positions in the village institutions.

The local-level institutions surveyed tended to have fairly lax policies in terms of recruiting and evaluating members. For many institutions, anyone living in the village automatically became a member at founding and other institutions had voluntary, but unrestricted membership. Only forty percent of institutions interviewed applicants for membership, while less than one-third had written policies for recruiting, and even fewer had member application forms. For most of the institutions that did not interview applicants, interviewing was considered unnecessary since the officers already know the applicants. As described in the next section, institutions with more formal policies tended to grow over time.

In institutions where applicants must apply for membership, the head of the institution or the committee were usually in charge of the evaluation and decisions. For institutions with saving the most common criteria used for membership is the expected amount of saving. Occupation and reputation were also common criteria. Application fees were required from less than a quarter of the institutions and membership fees were even less common. These fees were typically small (about ten to fifteen baht), but ranged as high as 1400 baht ($56) for one institution. The revenue generated from these fees was usually used to pay for minimal administrative expenses like notebooks and pens for recordkeeping.

2.3 Lending

About eighty percent of the institutions had experience offering lending services to their members and the most of the institutions still offered loans at the time of the survey. Except for rice banks and buffalo banks, which lend rice and livestock respectively, the vast majority – nearly two-thirds of the all institutions – offered cash loans. In addition, about five percent of the institutions lent fertilizer.

Average annual interest rates on loans fluctuated between 14% and 19% and were comparable to money market interest rates from commercial banks\(^1\), but most interest rates were much lower. PCG interest rates averaged just five percent and PEP and buffalo bank loans were typically interest free. Rice banks averaged

\(^1\)In Bangkok, money market rates at the time of the survey (May 1997) ranged from 15.25 to 16.75%
high interest rates of over twenty percent, but the real interest rates of these loans are often repaid in rice at harvest time when the price of rice is much lower.

Interest rates were relatively constant over time and only about one-fifth (18.5 percent) of the institutions had ever changed their interest rates. When interest rates were changed, they were usually lowered, often at the request of the members. In fact, institutions were over three times as likely to lower their rates than to raise them.

A summary of the amounts, durations and collateral ratios of the typical loans are presented in Table 3. Some institutions offered more than one type of loan and the information in Table 3 are averages that count each loan type as a separate observation. The typical loan size was about 6000 baht ($240), but the variation in loan sizes was much greater across loan types (and, thus, institutions) than within a loan type. Within loan types there tended to be about a two- to four-fold difference between the smallest and largest loans given. The variation across loan types is far more striking; the lowest twenty percent of the observations had average loans of less than 900 baht ($36) while the highest twenty percent had average loans of 10,000 baht ($2400) or greater. The institution with the largest loans averaged 62,000 baht ($14,880), while the smallest averaged just 90 baht (less than $3). Much of this variation is because the different types of institutions - rice banks and PEPs, for example - lend for very different purposes.

The average loan duration was thirteen months, but the majority of loans were annual. Loans were also generally repaid in one payment at the end of the loan period. These policies are natural, since most of these institutions exist in agricultural communities where income is seasonal. Although the payment frequency was often annual, more frequent monitoring was usually done during the loan period. The loan durations were fairly consistent across institutions, with the exception of PEPs, which generally make much longer-term loans, and rice banks, which lend for just a few months on average.

One of the unique features of microfinance is that credit is made available to poorer people without proper collateral. Our survey data reflect this trend. Only fourteen loan types (ten percent of the lending sample) required collateral, and of these three had collateral/loan ratios of 0.50 or less. The average collateral ratio of 1.3 for these fourteen loan types is less than ten percent of the household survey’s average collateral ratio (15).

The loan characteristics reported by the institutions were consistent with loan information from households. In comparison with the institutional averages (14 to 18%), in the household survey the average interest rate on loans from rice banks was 41%, but those of production credit groups and other village funds were much lower: 13% and 11% respectively (Kaboski and Townsend, 1998). Median loan sizes calculated for loans from these three groups (1900 baht, 8000 baht, and 7500 baht, respectively) were also comparable to the typical loan size reported by institutions (6000 baht). Households’ median loan periods for each of these groups were twelve months, while the typical loan duration reported by institutions averaged thirteen months. Finally, the fraction of loans requiring collateral from rice banks (nine percent), village funds (six percent) and PCGs (seventeen percent) were also not far from those reported by institutions (ten percent).

Although the survey responses indicated very few collateral requirements, the lack of collateral may have been slightly exaggerated. Many institutions claimed to not have collateral requirements, but limited loan size by the amount of savings in the institution. Thus, these loans are similar to withdrawals except for an obligation to redeposit. In any case, such "loans" could be fully collateralized. Despite these oddities, it seems overall that collateral requirements of village microcredit institutions are smaller and much less common than those of other lenders (see Kaboski and Townsend, 1998).

As a substitute for the apparently low levels of collateral, guarantors were commonly used, as is typical in microfinance. Over sixty percent of the loan types required guarantors. (The numbers from the household survey were slightly lower – thirty-seven percent for PCGs, twenty-one percent for village funds, and just nine percent for rice banks.) Between one and three guarantors were usually necessary, and the guarantors were almost always required to be members of the institution as well. It is possible that given the assets of the guarantors, many of these loans are also fully collateralized.

### 2.4 Savings

Just under half of the institutions had experience with savings services. Almost all PCGs offered savings services, while no PEPs or buffalo banks and relatively few village funds and rice banks accepted savings. Except for the rice banks, which accepted savings in the form of rice, cash was almost always the form of
savings.

Still, there were many different types of savings accounts and savings tended to be much more structured and less flexible than typical savings accounts. Over sixty percent of the institutions offered "pledged" accounts, where savers agree to deposit a specified amount. For most of the accounts, savings was done monthly on a specified date. Only fifteen percent of accounts allowed members to save whenever they desired, while another fifteen percent had members save annually. Withdrawal was typically difficult too. Only eleven percent of the accounts allowed savers to withdraw whenever they desired. Examples of reported withdrawal restrictions are: only being able to withdraw if the member moved or died; forcing withdrawers to leave the group; only allowing withdrawal up to a certain fraction of savings; only allowing withdrawal at the end of the year; and allowing withdrawal only in cases of serious need. In cases where withdrawal demands exceed available liquidity, the majority of institutions disbursed the available cash to those most in need. Others divided the available cash equally or distributed it on a first come, first serve basis.

There are, however, a few indications that these pledged accounts are not as stringent as they might appear to be. For almost ten percent of pledged accounts the pledge could be changed at any time and for another twenty percent the amount could be changed at the end of the year. In addition, for fifteen percent of the accounts there were no consequences for failing to save and for another six percent negligent savers simply received less interest or dividends then they would have otherwise..

From informal interviews, there were several reasons for these "pledged" accounts. First, a major goal of the PCGs were to "promote good savings habits" and the structure of a pledged system was viewed as a better approach for such a goal. Secondly, pledged savings was also convenient for the administrators. It greatly simplified bookkeeping. (In fact, some institutions only offered one pledge amount.) Also, the specific saving date allowed the responsible party to make one trip a month into town to deposit the institution's new savings into a formal account without the risk of holding large quantities at home for extended periods. More generally, banking is costly, especially if education levels are low and infrastructure is poor.

Table 4 summarizes the data on annual deposits and interest rates of the savings accounts in 1996. As done earlier, each type of account is analyzed as a separate observation. The average annual deposit is about 750 baht, but most accounts are smaller. At least sixty percent of accounts have average annual deposits of less than 600 baht. These numbers are slightly lower than those obtained from households themselves. In the household survey, the median annual amount deposited by households in PCGs and rice banks were 600 baht and 900 baht, respectively. The savings amounts showed a great deal of variation; the largest annual deposit reported for any member was 60,000 baht (2500 dollars), while the smallest was 10 baht (about forty cents). The variation in savings amount among members seemed to be much larger for accounts with larger average savings.

The interest rates averaged twelve percent annually, but again the typical savings account paid a much lower interest rate. Sixty percent of the accounts had interest rates of nine percent or less. For institutions that didn't lend, these interest rates were usually equivalent to interest rate on the institution's own savings account at a formal bank. For lending institution or those operating income generating activities, the interest rate would depend on the profitability of the institution.

3 Membership, Lending, and Savings: Growth in the First Five Years

This section analyzes the experiences of institutions with their membership, lending and saving services over time. The criteria established for successful experience are based on the growth in membership and services over time. Of course, institutional growth is at best a proxy for the direct positive impact on the households and businesses themselves, something we analyze in more detail below. Here we take growth as a productive if not necessary ingredient for that direct impact. In other studies data on institutional success is the only data analyzed.

We focus on the growth in the first five years from an institution's founding (for membership growth) or from the implementation of a service (for lending and saving growth). Thus, the analysis ignores chronological

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2 It is, of course, possible than some households had multiple accounts in PCGs or rice banks. This would make the typical amount deposited by a household greater than the typical amount deposited into any single account.
years and concentrates instead on the age of the institution or relevant service. We first summarize the variation in the experience of the institutions and then examine which policies are correlated with success.

3.1 Summary of Institutional Experiences

The analysis is limited to only the first five years of experience, since the sample size drops off rapidly after five years\(^3\). Growth rates are given for both the initial year and an average over the first five years. The samples for these two growth rates are not identical, since many institutions and services were younger than five years old. Other services failed before their fifth year. Consequently, the five year growth rates reported are conditional on the institution or service existing or surviving for at least five years (an obvious selection bias).

Table 5 summarizes the distribution of the growth rate in membership during the first year and the average annual growth rate over the first five years. The institutions had mixed experiences with respect to membership growth, but many showed little change, especially in the first year. In fact, about fifty-five percent of the institutions had constant membership for the first year, while thirty percent of the institutions had no net change in membership over the first five years.

The mean annual growth rates in the first year was sixteen percent. The mean was considerably higher than the median of constant membership, since less than ten percent of the sample experienced falling memberships in the first year. Still, one institution failed in the first year. The average annual growth in membership over the first five years was a less than dramatic negative one percent. Nevertheless, twenty percent of the institutions grew at annual rates of 10 percent or more over the first five years, so high growth instances exist in the data as do instances of low growth. The lowest growth rate for the first five years was 100 percent since three institutions that survived for five years, failed in the sixth year.

Overall, across the sample there were about twice as many year-to-year increases in membership as decreases. Many reasons were given by the institutions for the growth and decline in membership they experienced. Increased publicity of the institutions were a major reason for growth in membership, either through people realizing the benefits of the institution on their own (thirty-two percent of all increases) or by active self-promotion of the institution (twelve percent). Additionally, in some cases, good financial years for the institution helped in growth by both attracting new members (four percent) and/or allowing the available supply of loans to increase (nine percent). Finally, growth in the village population also was a source of membership growth in many cases (nine percent).

Changes in village population played an even larger proportionate role in declining membership, however. Nearly one-fifth (nineteen percent) of all decreases in membership were reportedly caused by declines in population. This number includes members leaving the village, but also members dying. The fund size and availability of loans again played a role in membership declines (thirteen percent), as did increased demand for loans (nine percent), poor management of the institution (eight percent), bad financial years (six percent) and competition from other institutions (six percent).

As with membership, lending experiences also showed a great deal of variation. In Table 6, the distribution of growth rates in number of loans and total credit is displayed. The mean growth rate was positive for the first year, but negative over the first five years. These averages belie the true situation, however. For both the first year and the first five years the median growth rates were close to zero, but a larger fraction of the sample showed increases in the number of loans rather than decreases. The first year mean included both positive outliers (twenty percent of the institutions had growth rates of at least forty percent) and negative outliers (some institutions failed). In contrast, the five-year mean is lower because while there were negative outliers (failure in the sixth year), there were no institutions sustaining dramatically high growth rates over five years. Still, growth at both stages showed a great deal of variety as at least twenty percent of either sample experienced substantial declines in the number of loans, while at least twenty percent experienced substantial increases. Although total credit tended to grow slightly faster than number of loans, the same variation exists in total credit. It should be noted, however, the sample size for the five year growth in total credit is only ten institutions.

The reasons given for year-to-year changes in the number of loans and total credit were almost always identical. Both supply and demand tended to be important factors for the decline and expansion of lending.

\(^3\)The sample sizes are: membership (130 first year growth rates and 54 five-year growth rates); number of loans (58 and 22); total credit (40 and 10); number of savers (50 and 9); and total savings (46 and 17).
The reasons for an increase were fairly evenly distributed among four major causes: increases in available funds, bad crops or economic conditions, other shocks that increased the demand for loans, and growth in membership. The reasons for giving fewer loans were generally the opposite of these. A good economy or crop yield decreased the demand for loans in thirty-two percent of the cases, while other decreases in loan demand accounted for an additional nineteen percent. Failure of members to repay lowered the number of loans by both decreasing the available funds (twenty-three percent) and also by making members ineligible for loans (nine percent). Member ineligibility also occurred in an additional five percent of the cases because of an increase in member incomes.

Table 7 presents a summary of the institutions’ savings growth in the first five years. The measures of savings are total number of savers and total savings. The number of savers tended to either remain constant or grow in the first year. Forty percent of the sample had first year growth rates of at least five percent and the mean growth rate was twenty-three percent. A large number of institutions maintained the same number of savers in the first year as well. Growth averaged over the first five years still tended to be positive, but much less dramatic. Although over sixty percent had positive growth, the existence of some failed savings programs in the sixth year actually caused the average growth rate to be negative.

As one would expect, total savings showed strong growth over time. The average growth rate over five years was twelve percent, while the median was twenty percent. Savers tended to deposit fixed amounts, so deposits represent smaller percentage increases as the accounts grow. This explains why growth rates over five years tended to much lower than in the initial year. While the vast majority of institutions had positive growth in total savings, there were nevertheless a significant number of institutions with positive or zero growth.

The changes in number of savers tended to mirror the changes in the number of members of the institution (Kaboski and Townsend, 1999). Many of these increases and declines are in response to village migrations. Institutions that grew often grew because of either self-promotion or because people gradually realized the benefits and trusted the institutions. Institutions that started with a high fraction of their village (or potential membership) already as members had little possibility for growth.

Often reasons given for not growing were related to institutional policies. Either new membership was restricted (or restricted to certain times) or villagers did not have enough money to meet savings requirements during hard times. These responses are not in complete harmony with the statistical analysis below. Although emergency assistance services were positively correlated with growth, institutions with flexible savings policies were actually less likely to grow.

The average interest rate remained fairly consistent over time, ranging between 8% and 10% and did not appear to be a major factor in the growth of savings. Generally, for those institutions that did not change their interest rates, the rate was pegged to an outside interest rate, often either a commercial bank or the BAAC. Different reasons were given for these changing interest rates. In some cases members either joined or left and so earnings or dividends were divided among a different number of people. In other cases interest rates were increased if the institution had made many loans that year, or decreased when fewer loans were given. Finally, other institutions changed their interest rate in response to the interest rate that the institution was receiving from a larger account.

### 3.2 Statistical Correlations with Growth

In this section we will analyze the characteristics and policies that were significantly correlated with the growth of institutions and their services. We concentrate simply on correlations since we do not have sufficient data for regression analyses. For these reasons, the reported levels of significance (fifteen percent and lower) are also considerably higher than is standard. Success in this section and the next is viewed in terms of the growth experience of the institution. In place of actual growth values, the analysis merely utilizes the sign of the growth variable. Signs were used instead of magnitudes because we viewed the signs of growth as more

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4The data on total savings may suffer from measurement error. While institutions were asked to provide the number of new savings in a given year, those institutions for which we have photocopies of the actual record books actually provided the total stock of savings in the given year. Thus, the data was assumed to be total savings. Consequently, however, two possibilities for measurement error exist. First, some institutions may have responded correctly and provided the data on new savings. Second, some institutions may have reported total savings as the value of the institution’s outside savings account. Thus, this number would be net of loans and total savings would be under-reported.
reliable and better indicators of success than the specific magnitudes.

A second reason for concentrating simply on the signs of growth is that single indicators of lending and savings success were desired. Signs allowed us to easily combine the growth in loans and total credit (or savers and total savings) into a single indicator of lending (savings) growth, giving both equal weighting. This was especially desirable since many institutions did not have records of both variables. For these composite indicators (lending and savings growth), the institution was deemed successful if both variables indicated success, i.e., were positive or at least nonnegative. For institutions that only reported one variable, the sign for that variable was used.

The approach of simply using signs, however, required a decision on how institutions that experienced neither decline nor expansion should be classified. According to the initial classification, institutions with zero growth were grouped together with the positive growth institutions. The idea was that institutions that had zero growth might have had no possibility for growth (especially in terms of membership and number of savers, given restrictions on eligibility). The fact that the institutions did not experience negative growth might indicate that villagers were happy with the institution and that the services were beneficial. Nevertheless, institutions experiencing zero growth represent a large fraction of the institutions, so the alternative classification was also examined. This classification proved crucial and, therefore, only correlations robust to reclassification are reported below.

Sign indicators were created for a total of six characteristics:
- membership growth in the first year (120 institutions with non-negative and 10 with negative);
- membership growth over the first five years (38 and 16);
- savings (both total savings and number of savers) growth in the first year (40 and 11);
- savings growth over the first five years (13 and 6);
- lending growth (both total credit and number of loans) in the first year (42 and 21); and
- lending growth over the first five years (16 and 7).

Success tended to be highly correlated across the six indicators. Twelve of fourteen cross-correlation estimates are positive. The first-year and five-year indicators of the individual characteristics (membership, savings and lending) are all significantly positively correlated at the 3% level. In addition, first-year savings and membership growth are correlated at the one percent level. This is plausible because saving was required for membership of most saving institutions.

The relationships among the growth of institutions' membership, saving and lending and their individual policies and characteristics are discussed sequentially in the following paragraphs. While for savings growth, the member characteristics and type of savings accounts seemed to be the primary determinants of growth, the significant correlates with membership and lending did not follow such a clear pattern. In general, the provision of training and consultation seemed to be positively correlated with growth (of lending, saving and membership), however, while the provision of occupational, livelihood and other coordinated services were not important correlates with growth. The significant determinants (or correlates) of growth are summarized in Table 8.

Many of the correlates with membership growth are in harmony with the reasons for membership changes given by the institutions themselves (see above). Since one of the primary reasons given for membership declines was people leaving the village, it is not surprising to find that institutions with mostly landowning memberships are significantly (five percent level) less likely to experience declining memberships. Landowning villagers may tend to be less mobile and less likely to permanently leave the village. The existence of lending services also affected the growth in membership. Groups that offered lending were significantly (ten percent level) more likely to have experienced membership growth over the first five years. This would be consistent with a supply side argument to credit. For example, if loans rotate and membership is defined as those people who have borrowed, membership would grow over time. In addition, for lending institutions successful enough to continue five years, the available resources would likely have grown to allow for more lending. This would be consistent with the fact that institutions claimed that a growth in available credit were reasons for growth in both loans and membership. One final interpretation, however, would be one of reverse causality: PCGs that started with saving and grew for five years might have been more likely to raise sufficient funds to begin lending out.

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5 Early tests using the actual magnitudes produced few significant relationships.
6 One cross-correlation could not be calculated since one of the variables was constant.
In summary, membership growth is related to underlying village characteristics, i.e., higher for more stable landowning memberships and is correlated with savings and lending success, though the relationship among them is surely endogenous.

Savings policies were another major determinant of membership growth. Groups in which savings was optional (i.e., not required of all members) were significantly more likely to experience membership declines over the first five years. It could be that a large fraction of villagers joined initially, since there was no savings obligation, but then were also more likely to leave. The fact that having a minimum deposit requirement is significantly correlated with positive growth would also be consistent with such a theory. The minimum deposit rule would operate exactly like a mandatory savings rule in screening out less committed members. In addition, these rules might make others wait to see if the group is successful before joining. This would be consistent with the institutions’ claims that people joined later, after acknowledging the benefits, and that good financial years for the institution tended to attract members.

Many of the other correlates of savings policies with savings growth would also be consistent with these theories. Minimum initial deposits were also positively correlated with growth in saving in the first year at a significance level of 5 percent. Institutions with membership application forms also were less likely to have falling savings (five percent significance for five-year growth). Probably most important for growth in savings, however, was the fact that savings accounts be pledged. Institutions were significantly more likely (five percent level) to experience savings growth both in the first year and over the first five years if they had pledged accounts. In contrast, ordinary savings accounts were more likely to have declines in saving in the first year (ten percent level) and time deposits were more likely (five percent level) to have negative growth over the first five years.

The fact that pledged accounts would make total savings grow is not surprising as long as membership doesn’t fall. In addition to total savings, however, the savings indicators also include growth in the number of savers. It is less clear why the number of savers would be correlated with pledged accounts. Perhaps, these structured savings plans attracted serious savers and were actually successful in promoting good savings habits” in the villages. It could also be that the relatively simple accounting allow these accounts to be better managed.

A related correlate is the provision of non-agricultural consultation or advice. Non-agricultural consultation was positively correlated with first year savings growth at the fifteen percent significance level (with even stronger correlations when zero growth institutions are grouped with the negative growth institutions). As described in Section 2, this consultation was generally provided by CDD officers. It included bookkeeping assistance and general promotion of the program and the benefits of the institution.

The provision of emergency assistance services along with savings services was also positively correlated with five-year growth. Since many savings policies required savings and restricted withdrawal, perhaps the reassurance of emergency services make it easier for villagers to save. Additional livelihood services such as insurance, death benefits, medical care or other livelihood services were not correlated with growth, however.

Savings growth was significantly associated with two membership characteristics: institutions with “mostly poor” memberships were more likely (ten percent level) to have five year savings growth and institutions that only allowed villagers to be members were less likely to have savings growth in the first year. Thus, it seems that allowing a larger potential savings pool made it more likely that savings would grow.

A final policy that is significantly correlated with savings growth is the collateral ratio. While few institutions required collateral, those that offered lower collateral ratios were associated with savings growth in the first year. Perhaps the high collateral ratios lowered access to the institutions’ credit and dissuaded members from saving. Still, no other loan evaluation criteria were correlated with savings growth and collateral ratios were not significantly correlated with membership growth.

In summary, savings growth is positively correlated with institutional policies (i.e., pledged savings, low collateral in lending, and open membership); positively correlated with the provision of supplementary services (i.e., emergency assistance and non-agricultural training); and positively correlated with individual or village characteristics (i.e., relatively poor memberships).

The major characteristics of the institution that were correlated with lending growth involved type of institution, the founding of the institution and the initial fund, and a few lending policies.

Two types of institutions were significantly correlated with lending growth. First, PEPs were significantly (ten percent significance level) more likely to have experienced negative growth in lending over the first year. This is not surprising since PEPs started with high initial funds and hence high initial lending in the first
year while lending in the second year tended to be much less. Related perhaps, PEP loans were also generally long term and so by the second year the funds had not yet been fully repaid to the institutions for relending. Second, buffalo banks were less likely to have experienced non-negative growth in lending over the first five-years. This may be inherent to the nature of buffalo banks; if a buffalo dies or doesn't give birth, the loan cannot be repaid and lending often stops.

More recently founded institutions, larger initial funds, and longer periods necessary to collect the initial fund were all associated with declines in lending in the first year (i.e., from the first year to the second). These characteristics are all descriptive of the PEPs, which were relatively new with much larger initial funding than other institutions. In addition, villagers generally had to choose an occupational investment project and go through a relatively lengthy, formal application to receive the funding.

One policy that does not fit as easily into this logic was the provision of agricultural training. Although agricultural training was often administered to PEP members (among others) as part of their promotion of new occupational activities, agricultural training was positively correlated with growth in lending during the first year.

A few of the lending policies were also correlated with the type of institution. Institutions that made relatively longer term loans were more likely to have lending drop off in the first year. As explained above using PEPs as an example, these institutions would lend out money in the first year. The loans would not be repaid until later and, consequently, they would have less money to lend during the second year. Telling perhaps that long term loans per se are not a problem, loan duration was not significantly correlated with longer term (five year) growth. First year growth in lending also depended on the form of the loan. Lenders of cash were significantly (ten percent level) less likely to experience declines in lending after the first year, while rice lenders were significantly more likely (fifteen percent level).

Using an applicant's amount of savings as an evaluation rule for borrowers was positively correlated with five year lending growth at a five percent significance level. As noted previously, for many institutions amount of savings was used as a de facto collateral policy. Loans that were made to individuals with savings could be easily defaulted upon without financially crippling the institution. Perhaps this made institutions much less likely to have to reduce lending in the long run.

In summary, lending growth is positively correlated with some institutional policies (i.e., savings as collateral for loans and loans in cash), negatively correlated with recently established and large initial funds; and positively correlated with the provision of agricultural training. But individual and village characteristics may be involved to the extend that available savings and PEP placement depend on the individual and village characteristics.

A final note on policies and the growth of services: interest rates were not significantly correlated with growth in lending, saving or membership.

4 Institutional Environment and Village Characteristics

While institutional policies may help to determine the positive or negative experiences of the institutions, other factors that could cause variation in experiences involve the market and environment in which the institutions operate. We now address this possibility explicitly by focusing on how villages with successful institutions differ from those with unsuccessful institutions. We also examine the extent to which the environments where institutions are located differ from places without institutions. The issue of selection bias in the placement of micro-finance institutions has been discussed heavily in the literature evaluating their impact. Are institutions placed in the least developed villages, where they may experience difficulties, or do they tend to be placed specifically in wealthier or growing villages that are likely to experience positive change even without these institutions? This section examines the variation in household characteristics across areas with no village-level financial institutions and villages with financial institutions experiencing varying degrees of success. The analysis focuses on the basic demographic data along with credit and saving characteristics of households within these villages.

The analysis requires coupling the success indicators from the institutional survey with the data in the household survey. That is, we need to define the institutional environments of the different villages in the survey. The first step was to determine which villages had ever had institutions and which have never\(^7\).

\(^7\text{We examined two different village classification schemes: the first divided the villages between those that currently (1997)\)
Data on institutions is provided by the key informant survey, along with the institutional survey. The 108 villages with at least one institution in the institutional database (at the time of the 1997 interview) were clearly villages with institutions. For the remaining 84 villages, we looked and the retrospective data from the key informant survey to see if the village had ever had an institution. This produced an additional 19 villages that had institutions at one point.

The success indicators were developed directly from the growth indicators in the previous section. Three types of success were examined: membership, lending, and savings. **XX redo the overall as membership**
The criteria for determining a successful lending institution was that both the first year and five-year lending growth indicators be non-negative. Institutions that experienced negative growth in either the first year or the first five years were categorized as unsuccessful. Institutions with only one of the two indicators were evaluated based on that loan growth indicator alone. The procedure for labeling successful savings institutions was identical. Thus, in summary the success indicators distinguish those institutions that experienced negative growth from those that did not.

Some issues arose in labelling the villages using these success indicators. Some villages had multiple institutions with conflicting experiences. In this case, the village was grouped with the successful category. Thus, a successful lending village, for example, would be a village that had any institution with successful lending experience.

Since the household sample is much larger than the institutional sample, a stricter criterion for significance is used in this section. Relationships are only reported if they are significant at the five percent level. Despite this higher standard of significance, the classifications uncovered considerable differences in the demographics and credit and savings environments of villages across these various categories. The specific demographic variables considered were: income levels; agricultural, business and total wealth levels; relative number of rice farmers; relative number of agricultural workers; and average education levels. The financial variables considered were: percent of households that were customers of formal financial institutions; percent that were customers of moneylenders; total number of loans per household; total number of savings accounts; distribution of credit (savings) across lenders (account types, respectively) and reason for borrowing (saving); size of loans (savings accounts); length of loans; interest rates on loans; percent of loans at zero-interest; percent of loans collateral-free; and average "activity" on savings accounts. Although only differences in survey-level means are reported, differences in means within stratified sub-groups were also tested. The data was stratified into groups by income tercile (within the village and within the survey), county (chanywats), reason for borrowing, reason for saving, lending institution, saving institution, and households with and without formal credit. The relationships measured using these sub-groupings were used to analyze the consistency of survey-level relationships across sub-groups.

We view these differences as having existed before the institutions were introduced as opposed to them being a consequence of the institutional presence. This view is tested and supported by examining whether the observed differences also exist for 1) villages with only recently introduced institutions (for the demographic data and credit characteristics) and 2) villages with institutions that don’t offer savings services (for the savings characteristics). As explained above, the signs of estimated relationships using the restricted data sets are consistent with the sign of the identical relationship using the full sample over ninety percent of all cases (including the non-reported relationships within sub-groupings mentioned above). While differences in demographic and credit characteristics exist between villages with and without institutions the same differences exist for villages that only recently obtained institutions. It would be difficult for these institutions to have already had such an impact on credit and demographics, so it seems unlikely that these differences could be caused by the institutions themselves. Similarly, observed differences in savings characteristics exist between villages with and without institutions even when the institutions in the village do not offer savings.

Table 9 summarizes the findings. Institutions tended to be founded in poorer, more agricultural villages. In these villages, credit is more common, especially credit from family or the BAAC. Savings is also more common, but the primary reason for savings is more often for emergency reasons. The fact that these villages are unique from villages without institutions in these important observable ways also makes plausible the assumption that they may also differ in other unobservable ways. This possible bias will need to be accounted for in Section 5’s evaluation of the institutions’ direct impacts. Within this subset of villages with institutions, have institutions and those that don’t, while the second divided those that had ever had an institution with those that had never had an institution. Both dichotomies produced very similar results, but we will present the results of the second dichotomy (have or ever had an institution), since it will be used in Section 5.
those with successful lending experiences existed in villages with much lower levels of, and perhaps tighter, credit. In contrast, institutions with successful saving experiences tended to be in villages with more credit. These villages tended to save more in rice, and less in cash than villages with unsuccessful experiences. In addition, fewer households reported bequests or agricultural investment as their primary reason for saving.

We first present the detailed evidence for how villages where institutions are founded tend to differ from those where no institutions were ever started. We then examine how villages with successful institutions differ from those with unsuccessful institutions. Finally, we conclude by presenting the evidence that these differences pre-date the institutions.

4.1 Villages That Have Ever Had Institutions

There is substantial evidence that the villages where institutions have been founded tend to differ from the villages that have never had institutions in many observable ways. In general, the data indicate that the villages where institutions have existed tend to have more financially active households, but the villages are also poorer, more agricultural, more informal and perhaps less advanced.

In villages that have or have had institutions, total wealth per household (1.2 million vs. 1.3 million baht) and business wealth per household (16,600 vs. 28,700 baht) were significantly lower than in villages that have never had an institution. In villages where institutions were present, a higher fraction of household heads were rice farmers (24.1 vs. 18.6 percent) or agricultural workers in general (38.3 vs. 31.0 percent). Surprisingly, however, in villages with institutions the household heads actually average more years of schooling (4.2 vs. 3.9 years).

The differences in credit characteristics indicate that institutions are placed in villages with more widespread credit, although the characteristics of the loans are very different. In villages with institutions, more people tended to have both loans (70.3 vs. 64.9 percent) and formal\(^8\) loans in particular (46.9 vs. 39.9 percent) than in villages without institutions. More people also claimed to be customers of moneylenders (19.8 vs. 14.3 percent), however. Villages with institutions averaged 1.26 loans per household, compared to 1.12 in villages without institutions. By particular lender type, households averaged more loans from relatives (0.21 vs. 0.16 loans/household), the BAAC (0.56 vs. 0.49), and, of course, village institutions (0.04 vs. 0.01).

Although moneylenders did not give significantly more loans in an absolute sense, they gave significantly fewer loans as a fraction of total loans. The percentage distribution showed that moneylenders and neighbors gave significantly lower fractions of loans in villages with institutions, while institutions gave a significantly higher fraction of loans.

Examining the purpose of loans, significantly more loans were given for fertilizers/pesticides/etc. (0.27 vs. 0.23 loans/household) and for agricultural investment (0.13 vs. 0.06). As a fraction of total loans, however, only the difference in agricultural investment remains significant at a five percent level, while the fraction of loans for fertilizers/pesticides/etc. is significantly actually lower in villages that have or have had institutions.

Despite the given differences in the distribution of lenders and reasons for loans, the characteristics of the loans themselves in villages with institutions did not tend to significantly differ from those in other villages. Although differences in the size of loans, collateral ratios, interest rates, frequency of zero-interest or collateral-free loans existed within subgroups of the survey, they were insignificant for the survey overall. The one exception to this was that the average loan period was significantly longer in villages with institutions (twenty-three vs. twenty months).

In villages with institutions household savings characteristics also differed somewhat. While the value of their savings was not significantly different, households in villages with institutions tended to have more savings "accounts"\(^9\). That is, they tended to save in more numerous locations or ways. Households in villages with institutions had fewer accounts and a smaller fraction of their savings with commercial banks, but, nevertheless, more of them had formal accounts (86.9 percent vs. 69.7 percent). Instead of commercial banks, these households tended to have more accounts and a higher fraction of their non-cash\(^10\) savings in rice storage, village institutions, the BAAC and other savings accounts.

\(^8\)Village institutions were included in the definition of formal sources of credit along with commercial banks, the BAAC (Thai Bank of Agriculture), and the agricultural cooperatives affiliated with the BAAC. Informal sources included friends, neighbors, moneylenders, landlords, shopkeepers and suppliers or purchasers.

\(^9\)Savings of cash, rice or jewelry were deemed as savings "accounts", comparable to savings in formal institutions

\(^10\)Households were not asked the specific amount of cash held.
Households’ primary reasons for saving were also different in villages with institutions relative to those without institutions. They were more relatively more likely to save for emergencies (50.8 vs. 46.6 percent), bequests (13.8 vs. 9.0 percent) and farm equipment (1.8 vs. 0.9 percent) than their counterparts in villages without institutions. In terms of the number of total accounts, higher fractions of accounts (and thus higher absolute numbers of accounts, since the total number of accounts per household were higher) were used to save for emergencies, bequests and building/buying a house.

Reason for saving is the lone variable analyzed where it seemed plausible that the observed differences could be an actual consequence of the institution itself rather than something inherent to the village environment. For example, the fraction of people who saved for emergencies was much larger in villages with new or non-saving institutions (56.0 and 55.0 percent, respectively) than the overall average for villages with institutions (50.8 percent). Similarly, in villages with non-saving institutions, significantly fewer households saved for old age and significantly more saved to build or buy a home compared to villages without institutions. The same could not be said for households in villages with any institution, in general. Perhaps the "savings habit" promotion of the institutions, actually affected the reasons that villagers chose to save.

In summary, it appears that villages with institutions differed in important observable ways from those without institutions. Furthermore, the evidence (explained in subsection (4.4)) indicates that these observable differences are not the result of the institution, but existed prior to the institutions arrival. Institutions tend to exist in poorer, more agricultural villages. Credit is common, especially credit from family or the BAAC. Savings is also more common, but the primary reason for savings is more often in case of emergencies. The fact that these villages differ from other villages in these important observable ways also makes plausible the assumption that they may also differ in other unobservable ways. Thus, this possible bias will need to be accounted for in Section 5’s evaluation of the institutions’ impacts.

4.2 Successful Lending Institutions

This subsection highlights the important differences between villages with successful lending institutions and those with unsuccessful lending institutions. The numerical comparisons are therefore within a subset of villages that have institutions; villages without institutions are not involved in the analysis.

Villages with successful lending institutions averaged significantly lower incomes (88,400 vs. 159,500 baht) than those with unsuccessful lending institutions. They also had lower education levels (4.0 vs. 4.7 years of schooling). Average wealth levels differences between these villages were only significant within certain subdivisions of the sample.

The credit environments in villages with successful lending institutions indicate that success may be demand driven. In the villages with successful lending institutions, households averaged fewer loans (1.29 vs. 1.54 loans). In addition, fewer households had loans (69.4 vs. 80.8 percent) and fewer were customers of formal financial institutions (42.1 vs. 53.4 percent). In addition, fewer (and a smaller fraction of) loans were zero-interest in villages with successful lending institutions and higher fraction of their loans were formal (51.1 vs. 44.4 percent). Finally, more loans were taken for educational expenditures, which is interesting with regards to the lower educational levels of these villages.

The savings environments in villages with successful lending institutions differed in how and why villagers saved. Households in these villages had higher shares of their non-cash saving and more accounts in rice storage (54.8 vs. 34.6 percent; 0.62 vs. 0.41 accounts) and more accounts in institutions (0.22 vs. 0.09 accounts) than in villages with unsuccessful lending institutions. Conversely, households in villages with institutions had fewer accounts in cash (1.03 vs. 1.22 accounts) and smaller fractions of their non-cash savings in commercial banks (16.9 vs. 27.9 percent) and the BAAC (7.7 vs. 13.7 percent).

While the distribution of households across savings reasons did not differ significantly, there were differences in the distribution of accounts (or households weighted by their number of accounts). In villages with successful lending institutions, more accounts were used to save for bequests, to invest in existing businesses or to purchase or build a home than in villages with unsuccessful institutions. Fewer accounts were used to save for cars/trucks/motorcycles and for education expenditures.

Overall, it appears that the successful villages have much less, and perhaps tighter credit than the unsuccessful villages. This is despite the unsurprising fact that those villages with successful institutions tended to have more loans from village institutions. Households in villages with unsuccessful institutions had relatively high numbers of loans, especially compared to the numbers above for villages with and without
institutions. In addition, a very high fraction of people in these villages also had loans. These differences in the environments could influence the success of the institution in at least two ways. The demand for credit may have been higher in villages where the institutions were successful. This would be consistent with the observation that households in these villages had fewer zero-interest and fewer formal loans. A second possibility is that the weight of high credit in the unsuccessful villages made it difficult for members to repay their loans.

4.3 Successful Saving Institutions

This subsection focuses on comparisons between villages with successful saving institutions and those with unsuccessful savings institutions. While differences in borrowing and saving characteristics existed, the demographic variables (income, wealth, occupation, education) did not significantly differ between the two groups. The lack of any difference in village income levels in the household data is intriguing, since institutions that described their members as "mostly poor" in the institutional survey were more likely to have experienced growth (recall Table 8).

Villages with successful savings institutions tended to have higher levels of credit than villages with unsuccessful savings institutions. They averaged more loans (1.35 vs. 1.11 per household), larger loans (55,700 vs. 35,700 baht), and longer term loans (twenty-one vs. fifteen months). The average loan duration for villages with unsuccessful saving institutions is particularly short, even compared to those for villages without institution. Another difference in credit was that loans were significantly less likely to come from village institutions in the villages with successful savings institutions. In fact, the absolute number of village institution loans was lower in these villages. Households had more loans for educational expenditures in villages with successful savings institutions, though, as noted above, education levels did not differ significantly. Finally, in villages with successful savings institutions relatively more households (13.0 vs. 5.9 percent) were customers of moneylenders than in villages with unsuccessful saving institutions.

The differences in savings characteristics are very interesting. While the amounts of non-cash savings did not differ significantly, households in villages with successful savings programs actually had significantly less savings accounts in village institutions (0.21 vs. 0.41 per household). This is in harmony with the evidence in Section 3 that more successful savings programs restrict their memberships by using minimum deposit requirements and pledged savings. While households in villages with successful savings institutions have fewer village institution savings accounts, they tend to have more savings "accounts" in cash (1.10 vs. 0.70 per household). In addition, a smaller fraction of their savings is in rice storage (39.4 vs. 49.4 percent). Thus, the share of savings in rice storage for villages with successful savings institutions was comparable to the share in villages without institutions.

Reasons for savings also differed in villages with successful savings institutions. Again, it is not clear that these differences should be viewed as differences that are independent of the institution itself, since many times part of the institutions' training was to explain the benefits of saving. In villages with successful savings institutions households were less likely to be saving for bequests (13.1 vs. 21.4 percent) and farm equipment (1.5 vs. 5.1 percent) than in villages with unsuccessful saving institutions. A smaller fraction of accounts were also held by people saving for these reasons. In addition, smaller fractions of accounts were held by people saving to start new businesses or saving for TVs/VCRs/etc. Conversely, larger fractions of accounts were held by people saving for emergencies, educational expenditures, investment in existing businesses and building/buying houses.

4.4 Evidence for Pre-existing Differences

In attempt to discern whether (or which of) the above-mentioned differences between villages were the result of the institution and which were likely just correlated with the institutions presence (or success/failure), two variations on the above tests were run: the first looked at villages with only new institutions, while the second looked at villages with only institutions that didn't offer savings.

Since the effects of institutions on the demographic variables and borrowing variables are not likely to happen instantaneously, we checked whether the different characteristics of villages with institutions were present even when simply considering villages with only newly introduced institutions. In order to yield a sizable sample for analysis, the year 1996 was chosen as a cut-off for categorizing an institution as "new". 
Since the household survey was conducted in May of 1997, these institutions were at most seventeen months old. We focus only on the mean comparisons of means where an estimate for either the full institution sample (107 villages) or the new institution sample (twenty two villages) was significantly different from the sample of villages without institutions.

In 93.8 percent of all the mean comparisons in which the difference for the full institution sample was significant (at a five percent level), the difference in means using only the new institution subsample had the same sign. Of these, 54.7 percent were also significant at the five percent – despite the fact that the sub-sample was less than one-fourth the size of the full sample. Most of the survey-wide results mentioned above were significant for both groups.

In addition, the sign of the full sample comparison was in agreement in 96.7 percent of the cases where significant differences were estimated using the sub-sample and was significant in 73.3 percent of the cases. Finally, when either of the two estimates were significantly different from the no institution sample, the other estimate had a consistent sign 95.0 percent of the time.

Nevertheless, a few possible effects of the institutions could be discerned. Both the full institution sample and the new institution sub-sample of villages had a higher fraction of loans than non-institution villages value of 0.1 percent. However, the magnitude and significance level of the full sample (2.0 percent, significant at a 0.001% level) was much higher than for the sub-sample (0.7 percent, significant at a 5% level). This is supportive of the assumption that new institutions would have made smaller impacts on the credit market.

Two other observations may indicate that institutions have positive impacts on their villages. First, while both the full-sample and the sub-sample showed significantly lower average levels of business wealth than the non-institution sample of 28,700 baht/household, the average for the new institution sub-sample was much lower (4000 baht vs. 16,700 baht, both at a five percent significance level). This indicates that although villages with institutions have lower levels of business wealth, perhaps the households had substantially lower levels before the institution existed, and that over time the institutions help these levels to rise. Second, the only observations on credit listed above that did not also hold for the new institution sub-sample were the full institution sample observations that: 1) a smaller fraction of loans were from moneylenders; and 2) a higher fraction of loans were for agricultural investment. Villages with new institutions showed the opposite case had higher fractions of loans from moneylenders and lower fractions for agricultural investment. These observations would be consistent with an argument that institutions tend to promote business wealth accumulation and agricultural investment and reduce reliance on moneylenders. These issues will be examined more formally in Section 5.

While lending generally starts small with only a few people getting loans at a time, savings can sometimes involve the entire village. Thus, looking at new institutions may not adequately control for the effect of savings programs. If this is the case, it would be possible for many of the differences, especially in savings and wealth characteristics, to be affected even by newly formed institutions. Following this thinking, we checked to see if villages with institutions that don’t offer savings (the no-saving subsample) differed significantly from the full institution sample. This no-saving sub-sample included sixty-one villages.

The results were again overwhelmingly consistent. In 94.0 percent of the cases in which the comparison for the full institution sample was significant (at a five percent level), the sign of the comparison for the new institution subsample was in agreement. Of these 66.0 percent were also significant at the five percent. It is not surprising that this value is higher than that for the new institution sub-sample, since the no-saving sub-sample was nearly three times as large. Almost all of the survey-wide results mentioned above were significant for no-saving the sub-sample as well.

The sign of the full sample comparison was in agreement in one hundred percent of the cases where significant differences were estimated using the sub-sample and was significant in 88.6 percent of the cases. Finally, when either of the two estimates were significantly different from the no institution sample, the other estimate had a consistent sign 94.4 percent of the time.

5 Estimation of the Impact of Institutions

The two previous sections focused primarily on uncovering possible explanations for why some institutions declined over time while others had more successful experiences of stability or even growth. In this section, we attempt to estimate the actual impact of the institutions on members’ economic situations. The criteria
chosen are dimensions along which theories have argued that access to financial access could possibly help poor households. Furthermore, increased financial intermediation may play a role in allowing households to build assets through saving (see Greenwood and Jovanovic, 1990). The role that credit constraints play in occupational mobility, the decision to start a business and the scale of businesses has been examined by many authors (Banerjee and Newman, 1993, Lloyd-Ellis and Burnhardt, 1999 and Evans and Jovanovic, 1989, for example). Finally, it has been argued that lack of formal credit forces the poor to seek credit from moneylenders, who generally charge higher rates than formal sources.\footnote{For the household sample, the average annual interest rate for moneylenders is 57\% compared to 39\%, the average interest rate for all formal lenders. (Kaboski and Townsend, 1998)} Thus, institutions may also help villagers by reducing their reliance on moneylenders. Since presumably the institutions’ loans are preferred to moneylenders’, this would be a net surplus gain for borrowers. Using these rationale, the six dimensions along which we evaluate the institutions are their effect on members: 1) growth in assets; 2) probability of starting a business; 3) probability of being credit constrained in business; 4) probability of being constrained in agriculture; 5) probability of switching primary occupation; and 6) probability of becoming a moneylender customer (if not already).

The issue of selection bias in evaluating the effects of microfinance programs has been discussed greatly in the literature. Two types of important selection biases may exist. First, since involvement with these institutions is generally voluntary, the households who choose to become members may differ in important ways from those who do not. While observable differences in individuals can, in principle, be controlled for, unobservable differences or imperfect measurement of controlled variables can cause selection effects. Secondly, even if individual households participation within the village were randomized, the villages that have institutions may differ significantly from villages that do not have institutions making direct comparisons of individuals across villages invalid.

A priori it is not clear in which direction these effects would bias estimates. For example, if current income and wealth are not perfect measures of credit risk and the riskier borrowers are the villagers who elect to join the program, we might underestimate the effects of the institutions. In contrast, if the institutions screen out the risky borrowers on unobservable characteristics, standard estimates would overstate the impacts of the institutions. On the individual level, if institutions are founded with the help of the government, it could be that they are founded in the places that are most "backward" and "backwardness" is a difficult characteristic to measure. Conversely, it could be that the villagers own initiative is important in starting the institutions and so perhaps institutions are located in villages where people are better organized and more enterprising.

Evidence for the importance of selection bias in our particular data set comes from two sources. First, the facts presented in Section 4 about the important differences between villages with institutions and those without seem to indicate that villages with institutions are poorer and more agricultural with higher levels of existing credit. Since these observable differences exist it is not implausible to presume that other unobserved differences also exist. Second, using the same data, Paulson and Townsend (2000) estimate sizable and significant negative effect of initial (1991) village institution membership on the probability of starting a business over the next five years (1992-97) or of business owners claiming to be credit constrained in 1997. While many possible explanations exist for the negative effect of membership on business starts, a reasonable explanation for how institution membership could exacerbate credit constraints are more difficult to derive.

Our approach for dealing with these biases is also two-fold. First, we use statistical controls to account for observable differences between members and non-members. Of course, given the limited sample size, we do not attempt to control for every observable difference. Instead, as Paulson and Townsend (2000) do, we use theory to choose the primary explanatory variables. In addition to observable statistical controls used to account for differences between members and non-members, we attempt to control for unobservable differences between households in villages with and without institutions - "village-level selection bias" - by controlling for whether the household's village has ever had an institution. This is in accord with the results in the previous section that villages where institutions are founded differ in important ways from other villages. Secondly, we account for any possible individual-level selection bias by jointly estimating both the impact and membership equations and explicitly allowing for a correlation in the error terms. The simultaneous-equation maximum-likelihood method is effectively a seemingly-unrelated regression approach.

Identification of the impact equation in this simultaneous system requires an exclusion restriction. That is, a variable that accounts for membership needs to be excluded from the impact equation in order to
identify its parameters. The excluded variable we use is a dummy variable of whether a household’s village had an institution in the initial year (1991). Since membership is generally only offered to villagers, this variable is clearly correlated with whether a household was a member of an institution. It is thus present in the membership equation. The exclusion restriction requires that it not be present in the impact equation and not be correlated with the error term. We have already seen that villages with institutions differ from villages without institutions and so perhaps this restriction could seem dubious. However, we include controls for whether a village has ever had an institution. Thus, our exclusion restriction amounts to an assumption that the villages that had institutions in 1991 are a random sample of those villages that have ever had institutions. The approach is valid to the extent that the unobservables of villages with institutions in 1991 did not differ from those villages that had earlier failed institutions or founded institutions in later years. Appendix A develops this more explicitly. If such an approach is indeed biased, the direction of any bias is not clear. Naturally, both the standard regression (not accounting for village- or individual-level selection) and the controlled, simultaneous regression results are presented.

5.1 Results

The results highlight the positive impacts of village institutions and the importance of correcting for selection bias. Before correcting for selection bias, no significant, positive benefits of village institution membership can be measured. In fact, simple estimates that ignore the problem of selection bias estimate marginally significant perverse effects of membership on the probability of switching jobs and starting businesses. After correcting for selection bias, however, no perverse effects can be measured. In fact, we find very strong and significant positive effects of membership on the growth rate of household assets and the reduction of credit constraints in agriculture. Furthermore, given the model, the regressions indicate that selection bias is important for these two criteria. In addition, we estimate that village institution members are significantly less likely to borrow from moneylenders (in the Central region, especially), while in the Northeast region, members of village institutions are significantly more likely to switch occupations. The detailed estimation results are discussed below.

5.1.1 Asset Growth

The first impact measured was the effect of membership in an institution on asset growth. The results of an ordinary least squares regression of the log change in assets from 1992 to 1997 on control variables and institutional membership are presented in Table 10. Although many variables are significant at the five percent level, the explanatory variables with the highest significance level are initial log wealth (and wealth squared)\(^1\). Growth rates are higher for younger and more educated heads of household. At average log wealth levels (11.8)\(^2\), asset growth rates are convexly decreasing in initial wealth. This negative relationship is likely due (at least in part) to measurement error in the level of initial wealth, especially since wealth six years ago was asked retrospectively.

Other significant relationships are in harmony with theory. Asset growth rates are significantly higher for households whose heads have more years of schooling of the head of household, which is consistent with workers realizing the value of their human capital. At average age levels (30.7), the growth rate of assets is decreasing and convex in age of the head as one would predict from a life-cycle theory. Finally, households with more adults, male or female, tend to have higher growth rates in assets, as do customers of formal financial institutions.

The primary number of interest is, of course, the coefficient on village institution/organization membership, which is insignificant for both the overall sample and the Northeast and Central regions separately.

Table 11 presents the results of the simultaneous equation estimation. This estimation technique allows individual-level selection bias by estimating the membership and asset growth equation simultaneously. The

\[ \frac{\partial \text{log ratio}}{\partial w} = \gamma_1 + 2w\gamma_2 \]

We evaluate this expression at the average value of \(w\) in the sample.
membership equation is very significant. The identifying variable (whether a village had an institution six years ago) is positive and strongly significant, as expected. Membership in agricultural organizations and formal financial institutions are also positively correlated with membership. Finally, wealthier and more educated people tend to be significantly more likely to be members of village institutions.

Focusing on the asset growth equation, we see that the signs, magnitudes and significance of the relationships discussed above are fairly similar to those in Table 10. However, we measure a significant interrelationship between this equation and the membership equation. The correlation of the error terms of these equations is estimated to be -0.7170 and is strongly significant (z-statistic of -16.36). This negative correlation would indicate that those people who tended to be members (idiosyncratically) are also people who would otherwise have low asset growth rates (idiosyncratically). Thus, individual-selection bias lowers the measured impact of the institution. In addition, the fixed effect of the village-level control (ever having had an institution) is also negative and significant. Thus, village-level selection also would cause a downward bias on the impact of the institution measured by a simple least squares regression.

Controlling for these biases, the estimates of the effect of village institutions are not only positive and significant, but quite sizable. The estimated coefficient of 1.1457 (16.16 z-statistic) for five year growth is equivalent to members of institutions experience annual growth rates in assets 23 percent higher than they otherwise would have.

Taken at face value these impacts alone are astronomical. Consider the following back of the envelope calculation: adding up all initial funding and subsequent outside funding for the institutions in the survey, we find an average of 89,300 baht per institution. For these institutions (for which we have funding levels), the initial starting membership was about sixty-five\textsuperscript{14}. Thus, ignoring the considerable labor costs of organization, training, etc., a rough estimate of the cost of an organization would be the ratio of these two, or 1400 baht per member. From the household data, the average wealth level six years ago of village institution members was 407,800. The estimated effect of 23 percent higher growth in assets thus implies an annual return of 93,300 baht from membership. Thus, the coefficient imply a 6900 percent rate of return on the initial investment. Even using the median wealth level of 190,900, we calculate rate of return of 3200 percent on the investment. Of course, we have neglected possible costs of increased savings (foregone consumption), increased labor and the costs of management and training required for the institution.

An additional caveat on the estimated parameters should be mentioned. We are controlling for endogeneity between the village institution membership and credit constraints, but we are not controlling for the endogeneity of membership in agricultural organizations or formal institutions. Since memberships are positively correlated, it could be that we are imprinting the effects of agricultural organization or formal financial institution membership to village organizations. Thus, our estimates might exaggerated the true effects of institutional membership alone.

In summary, although simple regressions estimate no effect of institutional membership on asset growth, after accounting for village- and individual-level selection bias, we estimate large, positive, significant effects of membership.

5.1.2 Starting a Business

Table 12 presents simple probit results of whether a household started a business in the past five years. These results are essentially identical to those in Paulson and Townsend (2000), except we do not add tambon (district) fixed effects\textsuperscript{15}. The low pseudo R-squared values indicate that the bulk of variation in the sample is left unexplained. Wealth again plays the dominant role in whether a household started a business. At average levels of initial log wealth, the probability of starting a business is increasing in wealth and concave. The effect of membership in a village institution is estimated to be negative (-0.0340), significant at a ten percent level but not at five percent (z-statistic=-1.65). In the Northeast, the effect of institutional membership is perverse (-0.0579) and significant (-2.36) – being a member of an institutions makes a household five percent

\textsuperscript{14}Although there was a great deal of variation, on average memberships change little over time.

\textsuperscript{15}Fixed effects at the tambon level proved difficult since many times the tambon effect could completely explain the dependent variable for every village in the tambon. That is, no variation existed within the tambon, especially after considering other explanatory variables. This would force us to drop large portions of the sample. The fixed effects did not seem to dramatically affect the estimates, except in cases where large portions of the sample were dropped, hence we omitted these dummy variables from consideration.
less likely to start a business. In contrast, membership in agricultural organizations seemed to increase the chances of starting a new business in both the Northeast region, the Central region and the survey overall. The results for the simultaneous estimation are presented in Table 13. The coefficient on institutional membership in the business starting equation is still negative, but now clearly insignificant. In the Northeast, the effect is actually positive but again insignificant. In the Central region, however, the effect of institutions is measured to be perverse (-0.2191) and marginally significant at the ten percent level. The evidence of selection bias (and thus the justification for simultaneous estimation) is far weaker in the case of starting a business than it was for asset growth. The measured correlation of errors across the two equations is positive in the sample overall and the Central, but negative in the Northeast. These estimates are not significantly different from zero at even a ten percent level. The village control is also insignificant in both the overall sample and the Northeast region. It is, however, positive (0.0789) and significant (2.87) in the Central region. Thus, villages that have ever had institutions have relatively more people starting businesses. Accounting for this, lowers the measured effect of the institution themselves and produces the marginally-significant, perverse result. In summary, membership in an institution does not appear to have a clear effect (positive or negative) on the probability of starting a business.

5.1.3 Credit Constraints on Businesses

Table 14 presents simple probit estimates of whether or not a households claimed to be credit constrained in the operation or scale of their business. Only those households who owned businesses were included in the regression. Again, the bulk of the variation is left unexplained. This is perhaps not so surprising, since the dependent variable itself is a subjective measure of credit constraints. None of the explanatory variables are measured as significant in the full sample. This may partially be a result of the reduced sample sizes (about twenty percent of the full sample). Even wealth does not appear to play an important role in whether a business owner is credit constrained. In fact, the positive relationship between the number of adult females and the probability of being credit constrained in the Central region is the only significant relationship measured. As with the other variables, village institution membership is insignificantly related to the presence of credit constraints.

The results of the simultaneous estimation are shown in Table 15. Again, the variables in the equation for whether a business owner was credit constrained in business are rather insignificant. The one exception, however, is the effect of village institution membership in the Northeast region. The coefficient of -0.5863 indicate that members of village institutions are less likely to be credit constrained in business. This coefficient is highly significant (z-statistic=-4.18).

The indications of selection bias are again mixed. The village control is insignificant in all three of the estimations. The correlation of errors in the two equations are very positively correlated in the Northeast. The estimate approaches unity, in fact. Thus, business owners who joined in the Northeast were typically people who were also credit constrained in their business. While the reported z-statistic (0.02) does not indicate that this correlation is significant, a likelihood ratio test strongly rejects the null that the errors are uncorrelated. The difference in these results is likely due to the extreme nature of the estimate and the limited data.

In summary, the data is limited and the explanatory power of the regressions is small. Still, after controlling for selection there is tentative evidence that village institutions had a positive impact in reducing credit constraints for business in the Northeast.

5.1.4 Credit Constraints in Agriculture

The simple probit estimates for farmers being credit constrained in the operation or scale of their agricultural enterprises are shown in Table 16. Again, the low pseudo R-squared values indicate that the majority of variation is left unexplained. However, since the sample contains many more farmers than business owners, the sample sizes are considerably larger and the regressions uncover significant relationships. At average wealth levels, the probability of being credit constrained in agriculture is decreasing in log wealth, but convex. The number of adult women in a household is negatively related to being credit constrained, while the number of male adults is positively related. At average age levels, the effective coefficient on the age of the household head is negative. That is, older household heads are less likely to be constrained in agriculture.
Furthermore, members/customers of agricultural organizations and moneylenders were more likely to be constrained than non-members. Finally - and most importantly for our purposes - although the coefficients are negative, according to the probit estimates, membership in village institutions has no significant effect on the probability of being credit constrained.

In contrast, the simultaneous estimation method produces very different results. Table 17 presents these estimates. Although the signs, magnitudes and significance of the significant relationships for the discussed above are fairly similar, the estimates of the effect of village institution membership on the probability of being credit constrained are very different. For the overall sample, the coefficient on whether a household was a member of a village institution is -0.3994 and is strongly significant (z-statistic=-3.30). This coefficient means that members of village institutions were 40 absolute percent less likely to be credit constrained in farming than they otherwise would have been. The large effects and significance of this relationships holds for both the Northeast and Central regions separately.

As with asset growth, the results seem to be consistent with selection bias at both the village and individuals levels that bias the simple probit estimate toward a perverse effect. The village control is significantly positive (0.0889, z-statistic=3.63), which indicates that households in villages that have ever had institutions are more likely to be constrained ceteris paribus. Thus, the villages where institutions locate tend to be more credit constrained. Secondly, the correlation of the error terms in the membership and credit constraint equations are positively correlated (0.5426) and significant (z-statistic=2.42). Thus, the unobservable components that make households more likely to join also make them more likely to be credit constrained. These relationships also hold and are significant for both the Northeast and Central regions separately. The caveat regarding the possible endogeneity of other memberships should still be take into consideration, of course.

In summary, simple estimates indicate that village institution membership has no effect on whether households are credit constrained in agriculture. However, after accounting for village- and individual-level selection bias, we estimate large, significant effects of membership on reducing credit constraints in farming.

5.1.5 Occupational Mobility

We are interested in testing the impact of membership in a village institution on the probability that a household will switch occupations. The dependent variable defined is a binary variable indicating whether or not the head of household changed primary occupations over the past five years. While development economists focus on occupational mobility, clearly the focus is on upward mobility. For this reason, we do not count households whose heads have switched into inactivity (due to either unemployment, non-employment or retirement) as having experienced an occupational change. Table 18 presents a table of the distribution of the remaining 456 occupational changes. The largest exodus was out of rice farming (38.2 percent) and farming of other crops (26.8 percent) The largest categories for new jobs were the farming of other crops\textsuperscript{16} (29.0 percent), businesses or skilled trades (21.3 percent) and shrimp farming (15.4 percent). Thus, it appears that the majority of these occupational changes are indeed upwardly mobile changes.

The results for the simple probit estimation are displayed in Table 19. Again, the overall explanatory power of the regression is relatively weak. For the overall regression, log wealth is the only significant explanatory variable. At average wealth levels, the probability of switching occupations is increasing in wealth and concave. In addition, in the Northeast the number of adult males in the household is negatively related the probability of switching primary occupation and in the Central region, members of formal financial institutions are significantly less likely to switch jobs. The effect of village institutions are estimated to be negative, but insignificant (the overall estimate is significant at only a 15 percent level).

Table 20 shows the results of controlling for selection bias. Again, the above mentioned significant relationships also exist for the simultaneous estimation. The estimated effect of institutional membership on switching occupation are now positive for the overall sample and the Central region, and significantly positive (0.1880, z-statistic=2.23) for the Northeast. Thus, members of village institutions have a 19 percent higher probability of switching primary occupation. This is of course in harmony with many of the institutions' goals of "occupational promotion".

\textsuperscript{16}Note that 14.9 percent of the changes were from the farming of one non-rice crop to the farming of another non-rice crop. This accounts for over half of those whose old jobs were the farming of non-rice crops (26.8 percent) and also those whose new job are the farming of non-rice crops (29.0 percent).
The evidence of selection biased is mixed. While the signs of the coefficient on the village control are negative, none are significant. The correlations of the error terms are also negative, but marginally significant in the only Northeast region (z-statistic of -1.88 is significant at 6 percent level). Thus, it is possible that perverse selection of individuals within villages biased the simple probit estimate of the institutional membership impact downward.

In summary, simple probit estimates measure negative, but insignificant effects of institutional membership. In contrast, the simultaneous regressions uncover a significantly positive impact of membership on job mobility in the Northeast region and positive, insignificant effects in the Central region and whole sample.

5.1.6 Borrowing from a Moneylender

This analysis is intended to study whether or not membership in village institutions reduces the reliance of households on credit from moneylenders. The dependent variable is therefore whether or not households who weren’t moneylender customers six years ago (1991) became customers over the past five years. This was true for 14.4 percent of the sample overall, and this frequency was fairly similar in both the Northeast and Central regions.

The simple probit results are presented in Table 21. Again, the adjusted R-squared value for the estimation (1.88 percent) is quite low and so the majority of variation is left unexplained. Still, there exists several significant explanatory variables. The probability of borrowing from a moneylender over the past five years is increasing in the number of children in the household. This is plausible, since moneylenders lend disproportionately for consumption reasons (Kaboski and Townsend, 1998). Interestingly, households with heads that are inactive or without occupation are actually significantly less likely to borrow from moneylenders. Perhaps, also surprising is the fact that initial log wealth is not a significant predictor of whether a household borrows from moneylenders in the overall sample. Looking at the estimates for the separate regions sheds some light on this fact. In the Central region, at average initial log wealth levels\(^{17}\) the probability of becoming a customer of a moneylender is decreasing and convex in wealth, but in the Northeast it is actually increasing and concave. Thus, the trends in the two regions cancel out in the full sample. These region specific estimates are significant at a ten percent level.

Members of formal financial institutions are significantly less likely to borrow from moneylenders. The coefficient also indicate that members of agricultural organizations are less likely to borrow. According to the simple probit, members of agricultural organizations are significantly less likely to borrow from moneylenders as well, but this coefficient is only significant at a ten percent level. The effects of agricultural organization membership are very significant in the Northeast region, but not at all in the Central region.

It is not surprising that outside financial access lowers the probability of visiting a moneylender. Still, according to the simple probit estimates the effect of membership in village organizations is not significant. After correcting for selection bias, however, this effect becomes significant. This is shown in the simultaneous equations estimates shown in Figure 22. The estimate of -0.2309 (z-statistic=-2.54) indicates that members of institutions were 23 percent less likely to borrow from moneylenders than they would otherwise have been. This negative coefficient is primarily driven by the data in the Central region; in the Northeast, this coefficient is actually positive though insignificant.

The evidence of selection bias is again mixed. The correlation of errors is positive (0.4452) and marginally significant (ten percent level). Thus, those more likely to join institutions were also more likely to borrow from moneylenders \textit{ex ante}. In the central region, where the effect of membership is largest, the correlation of errors – our measure of individual selection bias – is both stronger and more significant. The coefficient on the village control, which might capture village level selection, is positive but insignificant. Again, in the Central region the effect is stronger and marginally significant (z-statistic=1.66). Thus, perhaps in the central regions those villages that had institutions were also more likely to be villages with more moneylender borrowing.

Again, the he caveat regarding the possible endogeneity of other memberships may still apply. In fact, the significance of the effects of formal financial institutions and agricultural institutions are lower in the simultaneous estimation results

In summary, probit estimates show that membership in village institutions lowers the probability of borrowing from a moneylender, but this relationship is statistically insignificant. After correcting for selection

\(^{17}\) The average initial log wealth in the Central region is 12.5, while that in the Northeast is 11.8.
bias, these benefits of membership are indeed estimated to be significant, especially in the Central region.

6 Conclusions

This analysis of the experience and impact of village institutions in rural and semi-urban Thailand is an important contribution to the literature on evaluating micro-finance institutions. By combining detailed data from multiple instruments on households, institutions and village histories, we were able to identify important institutional characteristics and policies and environmental/village characteristics and that are correlated with the successful or unsuccessful experiences of institutions. In addition, although the data lacked experimental controls, by using statistical controls to account for the presence of selection bias, we were able to better identify impacts of these institutions. After correcting for selection biases, we measured significant positive impacts of these institutions in helping members grow assets, loosening credit constraints in agriculture and reducing reliance of members on credit from moneylenders. Indeed, these impacts seem sizable enough to potentially outweigh the costs of subsidization.

More ...
References


7 Appendix A

We first demonstrate the validity and assumptions of the approach for the binomial estimation which applies to the estimations for business starts, relaxation of credit constraints (business and farming), job mobility and use of money lenders. We then address the estimation of the asset growth equation separately.

For a binary evaluation criteria, $D_Y$, we assume an index $y$ exists such that:

$$D_Y = 1, \text{ for } y > 0$$
$$D_Y = 0, \text{ for } y \leq 0$$

We likewise assume an index $m$ exists for the binary institutional membership variable $D_M$:

$$D_M = 1, \text{ for } m > 0$$
$$D_M = 0, \text{ for } m \leq 0$$

Empirical relationships exist for both of these indexes. These two equations hold for all households 1...N:

$$y_n = \sum_{i=1..I} \alpha_i X_{i,n} + \beta D_{M,n} + \varepsilon_{y,n}$$

(1)

$$m_n = \sum_{j=1..J} \gamma_j X_{j,n} + \delta I_{1991,n} + \varepsilon_{m,n}$$

(2)

Here $X_{i,n}$ and $X_{i,n}$ are household characteristics, $I_{1991,n}$ is a dummy variable indicating whether an institution was present in the household's village in 1991, and $\varepsilon_{y,n}$ and $\varepsilon_{m,n}$ are unobserved error terms. We assume that $\varepsilon_{y,n}$ is independent of all $X_{i,n}$ and $\varepsilon_{m,n}$ is independent of all $X_{j,n}$ and $I_{1991,n}$.

A simple approach to estimating the parameters above would be to assume (normal) distributions for the error terms and estimate the equations directly using maximum likelihood probit estimators. This
estimation procedure is used for the first set of estimates. The reported estimates are the partial derivatives of the likelihood function with respect to the explanatory variables and evaluated at the sample means.

The problem with estimating equation (1) directly, however, is that we have reason to believe that \( D_{M,n} \) and \( \varepsilon_{y,n} \) may be correlated with each other, which would produce inconsistent estimates. There are two types of selection biases: household level and village-level. Household level bias results from households self-selecting whether to join an institution or not. Thus, the error term \( \varepsilon_{y,n} \) may be correlated with \( \varepsilon_{m,n} \) to the extent that these idiosyncratic components are known to the individual, but not observed by the econometrician. For example, selection bias could result from the household specific effects of institutional membership. In such a model, the evaluation criteria index \( y \) contains not only the common component \( \beta \), but also an idiosyncratic component \( \beta^*_m,n \):

\[
y_n = \sum_{i=1..I} \alpha_i X_{i,n} + (\beta + \beta^*_m,n)D_{M,n} + \bar{\varepsilon}_{y,n}
\]

\[
y_n = \sum_{i=1..I} \alpha_i X_{i,n} + \beta D_{M,n} + (\beta^*_m,nD_{M,n} + \bar{\varepsilon}_{y,n})
\]

\[
\varepsilon_{y,n} = \beta^*_m,nD_{M,n} + \bar{\varepsilon}_{y,n}
\]  

(3)

Village-level bias is caused by the covariation of \( D_{M,n} \) and \( \varepsilon_{y,n} \) through \( I_{1991,n} \). That is, even if households within a village were randomized into the village institutions so that no individual correlation existed between the error terms, it is possible that the error terms of households in villages with institutions differ on average from those in villages without institutions. The fact that villages with institutions and those without institutions differ in important observable ways, indicates that they may differ in important unobserved or omitted ways as well. These omitted terms will be included in the error term \( \varepsilon_{y,n} \). These village effects will be constant across households in a village and we will therefore represent this component as \( v_n \). Equation (3) can now be written:

\[
y_n = \sum_{i=1..I} \alpha_i X_{i,n} + \beta D_{M,n} + (\beta^*_m,nD_{M,n} + v_n + \bar{\varepsilon}_{y,n})
\]

\[
\varepsilon_{y,n} = \beta^*_m,nD_{M,n} + v_n + \bar{\varepsilon}_{y,n}
\]

Here, \( v_n \) is correlated with \( I_{1991,n} \), which causes the village-level selection bias.

The approach to solving these two problems is two-fold. First, we assume that the village component is determined by whether the village has ever had an institution \( I_{even,n} \). That is,

\[
y_n = \sum_{i=1..I} \alpha_i X_{i,n} + \beta D_{M,n} + (\beta^*_m,nD_{M,n} + \mu I_{even,n} + \bar{\varepsilon}_{y,n})
\]

\[
v_n = \mu I_{even,n}
\]

The rationale is that the unobserved differences in villages with and without institutions do not exist because institutions are there at the time, but exist prior to and after the introduction of institutions. Thus, there is nothing particular about the year 1991 and the observed component is not determined by \( I_{1991,n} \) but by \( I_{even,n} \). The correlation of \( v_n \) and \( I_{1991,n} \) is simply a result of the obvious correlation between \( I_{1991,n} \) and \( I_{even,n} \). This assumed absence of \( I_{1991,n} \) in the impact equation gives us the exclusion restriction necessary for identification of the equation’s parameters.

Given this assumption, we control for the village-level term by adding \( I_{even,n} \) as an explanatory control variable. The equations are now:

\[
y_n = \sum_{i=1..I} \alpha_i X_{i,n} + \beta D_{M,n} + \mu I_{even,n} + \varepsilon_{y,n}
\]  

(4)

\[
m_n = \sum_{j=1..J} \gamma_j X_{j,n} + \delta I_{1991,n} + \varepsilon_{m,n}
\]  

(5)

\[
\varepsilon_{y,n} = \beta^*_m,nD_{M,n} + \bar{\varepsilon}_{y,n}
\]  

(6)

Even if we assumed that \( \bar{\varepsilon}_{y,n} \) and \( \varepsilon_{m,n} \) were uncorrelated, the problem of household-level selection bias would still exist since \( \varepsilon_{y,n} \) and \( \varepsilon_{m,n} \) could be correlated through \( \beta^*_m,nD_{M,n} \). Instead we allow for a true
correlation between the two stochastic error terms by assuming that \( e_{y,n} \) and \( \varepsilon_{m,n} \) are distributed joint normally:

\[
(e_{y,n}, \varepsilon_{m,n}) \sim \text{Bivariate Standard Normal}(0,0,\rho)
\]

The estimated log-likelihood function is:

\[
\ln \mathcal{L} = \sum_{n=1}^{N} \ln \Phi_2 \left( (2D_{y,n} - 1) \sum_{i=1..I} \alpha_i X_{i,n} + \beta D_{M,n} + \mu I_{ever,n}, (2D_{M,n} - 1) \sum_{j=1..J} \gamma_j X_{j,n} + \delta I_{1991,n}, \rho \right)
\]

Given the above assumptions, a standard proof can be used to show the consistency and efficiency of this maximum likelihood estimator. The coefficients presented are the analog to those presented for the simple probit estimation. We calculate the change in the marginal probability that \( D = 1 \) caused by a marginal change in the explanatory variable *within the relevant equation*. For example, for the mean household the probability that \( D_y = 1 \) is:

\[
\text{Prob}(D_y = 1) = \Phi_2 \left( \sum_{i=1..I} \alpha_i X_{i,n} + \beta D_{M,n} + \mu I_{ever,n}, \sum_{j=1..J} \gamma_j X_{j,n} + \delta I_{1991,n} \right) + \\
\Phi_2 \left( \sum_{i=1..I} \alpha_i X_{i,n} + \beta D_{M,n} + \mu I_{ever,n}, - \sum_{j=1..J} \gamma_j X_{j,n} + \delta I_{1991,n} \right), \rho
\]

The reported coefficient would for \( X_i \) would be:

\[
\left[ \frac{\partial \text{Prob}(D_y = 1)}{\partial I_{ever}} \right]_{\text{mean values}} = \phi(z_1) \left[ \Phi \left( \frac{z_2 - \rho z_1}{\sqrt{1 - \rho^2}} \right) - \Phi \left( \frac{-z_2 - \rho z_1}{\sqrt{1 - \rho^2}} \right) \right] \alpha_i
\]

\[
z_1 = \sum_{i=1..I} \alpha_i \bar{X}_i + \beta \bar{D}_M + \mu \bar{I}_{ever}
\]

\[
z_2 = \sum_{j=1..J} \gamma_j \bar{X}_j + \delta \bar{I}_{1991,n}
\]

Any chain rule terms of the partial derivative that might operate through \( X_i \) presence in index of institutional membership \( (z_2) \) is ignored.

One final note should be made. Instead of using \( I_{ever,n} \) as a village level control, a more general and preferable way of controlling for village level selection would be to allow villages to vary idiosyncratically by adding village dummy variables to the estimation. The above likelihood function shows why this approach is not chosen. Identification of the two equations is obtained through a standard exclusion restriction, where the variable \( I_{1991,n} \) is excluded from the first equation. If villages dummies were used in the first equation, since \( I_{1991,n} \) is a dummy variable at the village-level (i.e. constant across all households in a village), it could be reproduced as a linear function of the village dummies. Hence, the exclusion restriction would not apply and all identification would be off of functional form.

For assets, the evaluation criteria is not binary, but continuous. In this case, we interpret the equation for \( y \) to be the actual criterion (asset growth) instead of merely an index. The stochastic component of this equation, \( e_{y,n} \) can no longer be simply normalized to have a variance of one. We therefore consider a general bivariate normal function:

\[
(e_{y,n}, \varepsilon_{m,n}) \sim \text{Bivariate Normal}(0,0,\sigma_y,\sigma_m, \sigma_{ym})
\]

We are still free to normalize \( \sigma_m = 1 \), so we can equivalently write:

\[
\left( \frac{e_{y,n}}{\sigma_y}, \varepsilon_{m,n} \right) \sim \text{Bivariate Standard Normal}(0,0,\rho)
\]
The likelihood function for assets can be written:
\[
\mathcal{L} = \left( \prod_{n} P(m_n > 0 | y_n) P(y_n) \right)^{D_{M,n}} \left( \prod_{n} P(m_n \leq 0 | y_n) P(y_n) \right)^{1-D_{M,n}}
\]

The unconditional density of \( y_n \) is simply a normal density function:
\[
P(y_n) = \phi \left( \frac{y_n - [\sum_{i=1}^{T} \alpha_i X_{i,n} + \beta D_{M,n} + \mu \epsilon_{even,n}]}{\sigma_y} \right)
\]

With a bivariate standard normal, the conditional distribution of \( m \) given \( y \) is distributed normally with mean:
\[
\left[ \sum_{j=1}^{J} \gamma_{n}X_{j,n} + \delta I_{1091,n} \right] + \rho \left[ \frac{y_n - (\sum_{i=1}^{T} \alpha_i X_{i,n} + \beta D_{M,n} + \mu \epsilon_{even,n})}{\sigma_y} \right]
\]
and variance \( 1 - \rho^2 \). Thus, the final log likelihood function is:
\[
\ln \mathcal{L} = \sum_{n=1}^{N} \ln \phi \left( \frac{y_n - [\sum_{i=1}^{T} \alpha_i X_{i,n} + \beta D_{M,n} + \mu \epsilon_{even,n}]}{\sigma_y} \right)
\]
\[
+ \sum_{n=1}^{N} D_{M,n} \ln \Phi \left( \left[ \sum_{j=1}^{J} \gamma_{n}X_{j,n} + \delta I_{1091,n} \right] + \rho \left[ \frac{y_n - (\sum_{i=1}^{T} \alpha_i X_{i,n} + \beta D_{M,n} + \mu \epsilon_{even,n})}{\sigma_y} \right] \right)
\]
\[
+ \sum_{n=1}^{N} (1 - D_{M,n}) \ln \Phi \left( \left[ \sum_{j=1}^{J} \gamma_{n}X_{j,n} + \delta I_{1091,n} \right] + \rho \left[ \frac{y_n - (\sum_{i=1}^{T} \alpha_i X_{i,n} + \beta D_{M,n} + \mu \epsilon_{even,n})}{\sigma_y} \right] \right)
\]

The first summation is the log-likelihood of observed sample of asset growths, the second summation is the likelihood of observing members given asset growth, and the final summation non-members given asset growth. The reported estimates for the membership equation are again the partial derivatives of the probability of membership evaluated at the mean values.