Human Capital and the Development of Financial Institutions:

Evidence from Thailand

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Abstract

Village banks and other financial institutions often have very simple contracts that seem to rule out some transactions on an ad hoc basis. In one Thai village bank, for example, all loans must be in multiples of one thousand baht. If you want to borrow 1,500 baht, you are out of luck. All of the loans that this bank makes must be repaid on December 31st, and the same amount must be repaid regardless of when the loan was made. A loan of 1000 baht that is made on January 1st will require a repayment of 1200 baht as will a loan of 1000 baht that was made on July 1st. Clearly, the person who borrows on July 1st pays a higher interest rate. Savings transactions have similar features. For example, the amount you save must be a multiple of 100 baht.

This paper examines the link between the financial contracts offered by village banks and the education of the people who run the financial institution and the institution's customers using data on village financial institutions and households from rural and semi-urban Thailand. I find that bank policies tend to be influenced more by the education of villagers than by the education of the bank manager. The results indicate that financial contracts become increasingly simple, or rigid, as village education goes from very low to intermediate levels. When village education rises above the intermediate level, bank policies become less rigid. Bank policies are also important determinants of which households participate in village banks. In general, rigid policies make it less likely that households will participate in the village bank. Since these village banks operate with no regulatory oversight, the simplicity of the contracts seems to facilitate monitoring of bank managers by depositors who often have very low levels of education.

1. Introduction

Education and financial development have been identified as key engines of economic growth (see Barro (1991), Mankiw, Romer and Weil (1992) and King and Levine (1993), for example) but we know relatively little about their relationship to one another. This paper investigates the role of education in promoting the development of effective financial institutions, focusing particularly on village banks in Northeastern and Central Thailand. Village banks operate at the intersection of a number of issues where the education of various actors may be crucial. These institutions are self-regulating and managed by members of the village. The accuracy of financial statements, the nature of the savings and lending services that are offered and other bank policies may all depend on the skill and education of the bank's manager. In addition to needing the requisite skills to run the bank, the bank manager is also in a position of great trust. This individual or group of individuals has access to the accumulated savings of the village bank members. The village bank members have the implicit responsibility for monitoring the bank manager and making sure that he or she does not abscond with their money. Effective monitoring may depend on the education and skill of the village bank members – their ability to read and interpret the bank's financial statements.

Village banks often offer only very rigid contracts. In one Thai village bank, for example, all loans must be in multiples of one thousand baht. If you want to borrow 1,500 baht, you are out of luck. All of the loans that this bank makes must be repaid on December 31st, and the same amount must be repaid regardless of when the loan was made. A loan of 1000 baht that is made on January 1st will require a repayment of 1200 baht as will a loan of 1000 baht that was made on July 1st. Clearly, the person who borrows on July 1st pays a higher interest rate. Savings transactions have similar features. For example, the amount you save must be a multiple of 100 baht.

In an interesting contrast to the rigid contracts that are offered by village banks, flexibility characterizes bilateral arrangements between individuals in developing countries. Often insurance is provided together with credit or other items. For example, Ligon (1993) finds evidence of insurance in long-term sharecropping arrangements in India. Udry (1990) reports that the timing and the amount of repayment on informal loans in Northern Nigeria vary as a function of the circumstances of both the borrowing and the lending household. Lillard and Willis (1997) find that the probability and the amount of remittances from Malaysian children to their parents are sensitive to the current and permanent income of the child's family. Paulson (1999) finds similar patterns in Thai remittances.

Rigid contracts may help to enforce repayment and ensure optimal effort on the part of borrowers. However, the fact that village banks which offer only savings services also have very rigid policies indicates that problems of strategic default and moral hazard on the part of borrowers should not be the key reason for rigid policies. While it is certainly not definitive, if villagers have flexible arrangements with one another, the rigid policies

of village banks are also not likely to be due to fundamental information asymmetries between villagers and bank managers (who are also villagers).[1] However, in the course of running the bank, bank managers may gain an informational advantage over villagers: bank managers will be more informed about the bank's financial health relative to villagers. This informational advantage will be exacerbated if it is difficult for villagers to understand the bank's financial statements.

Using rich new data that includes household and village institution characteristics from rural and semi-urban Thailand, I examine how the policies of 161 village banks vary as a function of the education and training of the bank managers and villagers using parametric and non-parametric techniques. In addition, I explore how household participation in village banks (for villages with village banks) is influenced by the bank's policies, the education and training of the manager and the education of the household members. The Thai village banks are well suited to exploring these issues. These village banks vary considerably in their operating procedures and history. Some are purely the result of the desire of villagers to establish a bank. Others have received some outside support and technical assistance from the Ministry of Agriculture or the Ministry of the Interior's Community Development Department. Generally the level of outside technical support is fairly minimal, and all of the village banks are managed by someone who lives in the village. Often the village bank members are meet on a regular basis to set the bank's policies.

The Thai village banks are also interesting to study because they are associated with considerably improved outcomes for their members. Using statistical methods which control for village and individual selection effects, Kaboski and Townsend (2000) show that belonging to a village bank promotes asset growth, reduces credit constraints in agriculture and reliance on moneylenders and increases occupational mobility.

I find that the education of the villagers and the bank's money manager significantly influence the village bank's policies. Bank policies tend to be influenced more by the education of villagers than by the education of the bank manager. The results indicate that financial contracts are apt to become increasingly simple, or rigid, as village education goes from very low to intermediate levels. When village education rises above the intermediate level, bank policies become less rigid. Bank policies are also important determinants of which households participate in village banks. In general, rigid policies make it less likely that households will participate in the village bank.

The rest of the paper is organized as follows. In the next section, I summarize the Thai data and describe the operation of village banks in more detail. The empirical findings are presented and discussed in section 3. In section 4, I consider the theoretical issues that might provide a rational for the findings and discuss some policy implications.

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[1] Some policies, like mandatory monthly savings, for example, may serve important screening roles, however, ensuring that only villagers who are able to comit to saving on a regular basis will join the bank.

2. Thai Household and Institutional Data

The data that are analyzed in this paper are the product of a large on-going socio-economic/institutional study in Thailand that is funded by the National Institute of Health and the National Science Foundation in the U.S. through the University of Chicago/NORC. The initial survey of households, village financial institutions and village key informants was completed in May of 1997 and covers regions both on the doorstep of Bangkok as well as in the relatively poor Northeast. The data provide a wealth of pre-financial crisis socio-economic and financial data on 2880 households, 606 small businesses, 192 villages, 161 local financial institutions, 262 borrowing groups of the BAAC and soil samples from 1880 agricultural plots. This paper uses data from the household surveys and the surveys of financial institutions.

The data cover four provinces in Thailand. Two of the provinces, Lopburi and Chachoengsao are in the Central region and are relatively close to Bangkok. Chachoengsao borders the Bangkok Metropolitan Area and forms part of the industrial corridor that extends to Thailand's eastern seaboard. The other two provinces, Buriram and Sisaket are much further from Bangkok and are located in the relatively poor northeastern region. Sisaket is one of the poorest provinces in the country. The contrast between the survey areas is deliberate and has obvious advantages.

In each of the four provinces, a stratified random sample of twelve tambons (subset of an amphoe or county) was chosen. The stratification ensured an ecologically balanced sample that included two "forested" tambons. Within each sample tambon, four villages were selected at random. Fifteen households were randomly selected from each of the sample villages. In addition, interviews were conducted with the committee members of each village financial institution.

There is a great deal of variation in how Thai village banks operate. There are rice banks and buffalo banks where all (or most) transactions take place in rice or in buffalo. More commonly, transactions are in cash. Some village banks offer only savings, others only lending. Others do both. Some banks also do investment activities – using the pooled savings of members to establish a store or a gas station, for example, and distributing profits to bank members. Other banks buy inputs (like fertilizer) in bulk and sell (or lend) them at a discount to members. Some banks have been established by villagers themselves, others were "promoted" by the Community Development Department (CDD) of the Thai Ministry of Interior. The CDD often donates some funds to help establish the initial funding of the bank, provides some limited training to management and members and helps with the accounting on an annual basis.

Relative to other village bank initiatives led by non-government organizations that often provide professional staff to operate banks, Thai village banks operate with minimal outside help. Villagers manage all of the village banks that are studied here. Bank members typically elect a management committee and vote on policies in annual meetings. The variation in bank policies and procedures and the fact that these policies and procedures are determined by villagers rather than by an outside organization allows

for an exploration of how policies and procedures vary with the education of villagers and the village bank managers.

Despite the considerable variation in how village banks operate, it is worthwhile to describe briefly how a candidate village bank might operate – keeping in mind that there is no "typical" village bank. Members of the village bank pledge to save a certain amount – usually per month, although the conditions vary by village. For example, in villages where wage work is prevalent sometimes saving is done weekly. In agricultural villages, savings may take place only at harvest time.   The amount that is saved represents a "share" in the village bank. The village bank has periodic meetings where people deposit their savings.   This savings is pooled and is deposited in an interest bearing account at a formal institution (a commercial bank, the BAAC, or the Government Savings Bank). By pooling their savings, the village bank members take advantage of higher interest rates that are offered to accounts with larger balances.

Interest may be paid to savers as a "dividend" depending on the number of shares that they own. One share is often related to a round number in terms of monthly saving – e.g. 100 baht per month. Sometimes only integer multiples of savings are allowed. Two hundred baht would be fine but 150 baht would not be. The dividend that is paid is based on the village banks accumulated earnings on the banks activities: interest from the pooled saving account, interest proceeds from loans (if any), profits from investment activities less expenses. The dividend is often calculated once a year and funds must be on deposit at the time the dividend is calculated in order for a member to receive any.

Withdrawals of savings are sometimes not allowed.   In some banks, the only way to withdraw all of your savings is to resign membership in the village bank. In order to get funds without resigning their membership, villagers take out a "loan" from the village bank – if the bank makes loans. The accumulated savings of the member secures the loan.   Some banks limit loans to 150% (or some other figure) of the members accumulated savings. Larger loans may be allowed if other bank members co-sign the loan and pledge some portion of their savings as collateral. Repayment of interest and principle is often made in one single payment and loans are often for a period of one year. Interest rates range from 12 – 15% per year.   Records of bank lending, savings and investment activities are usually kept by hand in ledgers.

Village banks tend to be located in poorer villages. There are more village banks in the Northeastern region of Thailand which is significantly poorer than the Central region. In the Northeast, nearly 60% of the sample households live in villages with village banks, compared with only 40% of sample households in the Central region (see Table 1A). Within the Northeast, households in villages with village banks are also somewhat poorer.   Among households who live in villages with village banks in the Northeast, median wealth is 90% of the median wealth of households who live in villages without village banks. In the Central region the difference is less dramatic – median wealth for households that live in places with village banks is 98% that of households who live in places without village banks. Measures of past wealth reveal a similar pattern. Median real wealth six years ago in villages that currently have village banks was 85% that of

villages that do not currently have a village bank. In the Central region, villages that currently have village banks were actually wealthier in the past – median wealth in village bank villages was 121% that of villages without banks. See Kaboski and Townsend (2000) for a much richer description of household and village characteristics that are associated with the presence of a village bank.

The figures in Table 1A suggest that there is little difference in educational achievement between households who live in villages with and without village banks. However households in villages with village banks are slightly less likely to be rice farmers in the Northeast and more likely to farm a crop other than rice. In the Central region, the pattern is similar.

Table 1B summarizes the household data for villages that currently have a village bank, and compares households who belong to a village bank with those who do not. In the Northeast, 48% of the sample households in villages with a village bank are currently members. In the Central region, membership is less common – 40% of the sample households are currently members of a village bank. In both the Northeast and the Central region, village bank members tend to have slightly larger households and have slightly younger heads. Village bank members are more likely to be rice farmers and less likely to be inactive in the Northeast. In the Central region, village bank members are more likely to farm a crop other than rice. This provides an interesting contrast to the pattern for where village banks are located – although village banks are more likely to be located in villages where there are fewer rice farmers, their clients are more likely to be rice farmers.

In both the Northeast and the Central region, village bank clients tend to be more educated than their counterparts who do not use the village bank. Heads of household who belong to a village bank are less likely to have 0 – 3 years of schooling and more likely to have more than 4 years of schooling than heads of households that do not belong to a village bank. A similar pattern is observed for the most educated member of the survey household.

While village banks tend to be located in poorer villages, among villages with village banks the households that participate in village banks tend to relatively well off. For example, in the Northeast the median current wealth of village bank members is 135% that of non-members. In the Central region, the same figure is 132%. Village bank members were even wealthier in the past in the Northeast. The median past wealth of northeastern village bank members is 171% that of non-members. In the Central region, comparisons of past and current wealth are similar: median past wealth of village bank members is 124% that of non-members. Current income is also higher for village bank members. In the Northeast, the median current annual income of village bank members is 124% that of non-members. In the Central region it is 136%.

Tables 2A and 2B summarize some important characteristics of the 161 active village banks that are analyzed in the paper. As was clear from the household data, village banks are more prevalent in the relatively poor northeastern region. Sixty-four percent of the

village banks are located in the Northeast. Banks are more likely to provide loans than to provide savings. Sixty-eight percent of the banks in the Northeast and 81% of the banks in the Central region make loans, while only 35% of the banks in the Northeast and 53% of the banks in the Central region offer savings. It is also relatively rare for banks to provide both savings and lending services. In the Northeast, only 17% of the banks offer savings and lending. In the Central region, 40% of the banks offer both savings and lending services. In the Northeast, the median bank has been in operation for 7 years, compared to 2 years in the Central region. Bank membership is similar across the two regions. Median bank membership is 41 people in the Northeast and 38 in the Central region. The median number of loans made during the year prior to the survey, for banks that make loans, is also similar across the two regions: 15 loans in the Northeast and 14.5 in the Central region. The median loan is 4,000 baht, or $160 (using the 1997 exchange rate). Most loans last for 12 months. A typical bank customer saves 500 baht, or $20 in a year. The median annual interest rate for savings is 8% and the average is 12%.

The person who manages the bank's money tends to be a long time village resident. The median money-manager has lived in the village for 30.6 years in the Northeast and for 32.8 years in the Central region. Money managers tend to be younger and more educated than the heads of the survey households. In the Northeast, the average money manager is 41.5 years old, compared with 50.6 years for the average member of a village bank. In the Central region the pattern is similar, if slightly less dramatic. Money managers are 46.9 years on average compared with an average age of 51.3 years for village bank members. Money managers are also substantially more educated than village bank members. On average, money managers have gone to school for 5.7 and 5.9 years in the Northeast and the Central region, respectively. The median village bank member has four years of schooling. Fifty-nine percent of money managers in the Northeast and 64% of money managers in the Central region received some accounting training when the bank was established. This training typically lasted for one day.

Table 2A also summarizes the bank policies that are analyzed in the next section. Approximately one-third of the banks that offered savings services reported that the minimum deposit amount was the same as the maximum deposit amount. This may mean these banks required a specific sum to be saved by all bank members. This characteristic is more common in the Central region (39%) than in the Northeast (28%). Most village banks that offer savings require savings as a condition of membership. Fifty-eight percent of village savings banks in the Northeast have mandatory savings, as do 55% of the banks in the Central region. Most banks offer only one type of savings account. This is typically a "pledge" savings account where the village bank member commits (or pledges) to save a particular amount at each deposit period. Only 3% of the savings banks in the Central region have more than one type of savings account. In the Northeast, 19% of the banks offer more than one type of savings account. This may reflect the fact that northeastern banks have typically been in operation longer.

The household data was also used to infer something about the savings policies of the village bank. Households were asked how much they had saved, in total, with village banks over the past 12 months. They were also asked how many deposits they made. In

45% of the villages with a village savings bank, the amount deposited per period was evenly divisible by 50 baht for all of the survey households in the village that reported doing some saving with the village bank. This may mean that these village savings banks required households to save a "round" number, a multiple of 50 or 100, for example. This practice is more common in the Central region (57% of village banks) compared to the Northeast (31%).[2]

The banks' lending policies are also summarized in Table 2A. Compared to savings accounts, a much smaller percentage of banks that make loans report that the minimum loan is equal to the maximum loan. In the Northeast, 11% of banks report that the minimum loan is equal to the maximum loan. Twenty-four percent of banks have this characteristic in the Central region. The principle and interest on most loans is repaid together in a single payment, rather than in installment payments. This is the case for 84% of the banks in the Northeast and 66% of banks in the Central region. Very few banks offer more than one type of loan. In the Northeast, 21% of banks have more than type of loan. In the Central region, only 11% of banks have more than one loan type.

The picture that emerges from this summary of the data is that village banks tend to be located in poorer villages, although their clients tend to be wealthier than villagers who do not participate in the village bank. Village bank clients are also more educated. The policies of the village banks vary considerably and rigid policies appear to be quite common.

3. Empirical Analysis

In this section, the determinants of village bank policies and membership are analyzed in detail using parametric and non-parametric techniques. The non-parametric estimates have the advantage of being flexible and they do not impose unnecessary structure on the relationships between the key variables of interest. On the other hand, these estimates do not take into account the effect of other important village and bank characteristics, and they do not lend themselves to calculating statistical significance. The non-parametric results inform the decisions about transformations of key variables that should be included in the parametric estimates – quadratic terms in village schooling for example.

A. Village Bank Policies

The relationship between the village bank policies that were discussed in the previous section and the education of the villagers and the bank managers are analyzed in Figures 1 - 6 and in tables 3A, B, and C. Figures 1, 3, and 5 describe how the likelihood of various bank policies varies non-parametrically with the average years of schooling of

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[2] One concern is that the households provide rough estimates of their savings when they were asked about it during the survey and these rough estimates may be round numbers. This should not be too much of a problem however, since the key variable was calculated by dividing the answer to the question about how much was saved in total over the past 12 months by the answer to the question about how many times savings were deposited. Also a village bank is only considered to have "round savings" if *every* survey household in the village with savings in a village bank reported saving an amount per period evenly divisible by 50.

village heads of household. Figures 2, 4 and 6 describe the relationship between the same bank policies and the years of schooling of the village bank's money manager. All of the graphs are produced by performing a weighted regression for each schooling observation using 80% (bandwidth = 0.8) of the data around that observation. The data are weighted using a tri-cube weighting procedure that puts more weight on the points closest to the observation in question. The weighted regression results are used to produce a prediction of the likelihood of observing a particular bank policy for each schooling observation.

Figures 1 and 2 examine how the likelihood that the maximum loan size will be equal to the minimum loan size varies with village education and the education of the money manager, respectively. The first thing to notice is that while the relationship between the policy variable and the money manager's education appears to be fairly linear (Figure 2), the relationship between the policy variable and the villager's education is highly non-linear (Figure 1). The likelihood that the minimum loan will be the same size as the maximum loan appears to decrease slightly with the schooling of the money manager. In contrast, at low to medium levels of village education, the likelihood that the maximum loan will equal the minimum loan is *increasing* in the average years of schooling of the heads of household. When the average years of schooling reaches approximately 5.5 years, the opposite effect is found. As village education increases above 5.5 years, the likelihood that the maximum loan will equal the minimum loan decreases dramatically.

The same pattern is observed for other lending policy variables as well. Figures 3 and 4 describe the relationship between whether or not loan principle and interest are repaid in a single payment with the education of the village heads and the bank money managers. The likelihood of observing a single repayment appears to be more or less linear and increasing slightly in the money manager's education, especially when we consider that the very small number of money managers who have fewer than four years of schooling drives the non-linear portion of the graph. The likelihood of observing a single repayment has a very non-linear relationship with village education. Ignoring the portions of the graph that are sensitive to outliers, the likelihood of having a single loan repayment is increasing from low to intermediate education levels and then decreasing as education rises further.

Savings policies have the same relationship with village and money manager education. Figures 5 and 6 examine how village and money manager education influence the likelihood that everyone in the village who saves with the village bank saves a periodic amount that is evenly divisible by 50. Again the relationship between this bank policy variable and money manager education is more or less linear and increasing slightly with money manager education. The likelihood that all savings deposits are evenly divisible by 50 is increasing and then decreasing in the average education of the village heads of households.

These findings suggest that the parametric estimates of bank policies should allow for non-linearities in the effect of village education. Beyond, their implications for the parametric estimation, these figures suggest that variations in village education will effect

bank policies more dramatically than variation in the education of the bank managers. One possible reason for this finding may lie in the fact that roughly 60% of village bank managers have received some (usually minimal) accounting training. This training may mitigate the effect that their education might otherwise have had on bank policies. Essentially, the accounting training may make a bank manager with 4 years of schooling more similar to a bank manager who has 10 years of schooling.

The non-monotonic patterns that are found in Figures 1, 3 and 5 for the relationship between bank policies and village education suggest that at low levels of education, villagers may not be sufficiently sophisticated to realize that rigid bank policies may benefit them. This realization increases with increases in schooling. At some point, however, rigid policies become a burden for relatively educated villagers and these policies are relaxed.

Probit estimates of various bank policies for savings are presented in Table 3A. The sample is restricted to village banks that offer savings services. The number of observations is fairly limited, so the results should be interpreted with caution. Based on the non-parametric evidence, linear and quadratic terms in the average schooling of village heads of households are included as independent variables. Other independent variables are the log of median village income, the percentage of the surveyed households in the village who have a business, the years of schooling of the bank's money manager, the interaction between village education and money manager education, a variable that is equal to one if the money manager received any accounting training, the number of years that the money manager has lived in the village, the age of the money manager, the log of the years that the village bank has been in operation, a variable that is equal to one if the bank offers loans and a variable that is equal to one if the bank is in a northeastern village.

Three savings policy variables are studied. The first policy that is analyzed is whether all of the surveyed households who save with the village bank save an amount that is evenly divisible by 50. The second dependent variable is equal to one if savings is mandatory, and the dependent variable in the third estimate is equal to one if the bank reported that the maximum savings was equal to the minimum savings.

The education of money manager, whether the money manager received any accounting training and the interaction of village and money manager education are insignificant in all of the specifications. The age of the money manager and the number of years that the money manager has lived in the village are also insignificant. The rest of the variables do not appear to vary consistently across the three specifications. It is more likely that all of the villagers will save an amount that is evenly divisible by 50 when income is higher and when there are more business households in the village. This practice is also much more common (45% more) in the Northeast. Mandatory saving also appears to be more common when a greater percentage of households have businesses. Mandatory saving is less likely if the village bank also offers loans (significantly negative at a 9% level). The probability that minimum saving equals maximum savings is significantly influenced by the average schooling of household heads. The relationship is non-linear, as the non-

parametric estimates would suggest. The likelihood that maximum savings equals minimum savings is increasing in the education of the villagers as long as average schooling is less than 5.9 years. If average schooling is greater than 5.9, more education will lower the probability that maximum savings equals minimum savings. This practice is also less likely the longer the bank has been operating.

Table 3B presents probit estimates of lending policies as a function of the same independent variables that were included in the savings policy estimates. The estimates of lending policies are restricted to village banks that currently offer loans to their members. The lending policies that are analyzed are whether the maximum loan size is the same as the minimum loan size, whether loans are repaid in a single payment, and whether more than one type of loan is available. All of these policies appear to be common in the Northeast.

Village education is an important determinant of whether the maximum loan is equal to the minimum loan and whether loans are repaid in a single payment. The effect is non-linear, as in the savings policy estimates. Additional schooling raises the likelihood that the minimum loan size will equal the maximum loan size until the average years of schooling of village household heads reaches 5.6 years. Increases in schooling beyond this level are associated with decreases in the likelihood that the maximum loan will equal the minimum loan. The pattern is similar for the estimate of whether there is a single repayment, although the significance is a bit lower. The likelihood of having a single repayment increases to 3.6 years of schooling and decreases after that.

The schooling of the money manager also has a significant impact on whether the minimum loan is equal to the maximum loan. This variable does not significantly effect the other two dependent variables. Interestingly, increases in the education of the money manager, all else equal, are associated with a higher probability that the maximum loan will equal the minimum loan. Each additional year of schooling for the money manager increases the likelihood that the minimum loan will equal the maximum loan by 19%. This effect is mitigated by the joint effect of the education of the money manager and the villagers. If the education of both the money manager and the average education of the village heads are increased by one year, the likelihood that the maximum loan size will be the same as the minimum loan size decreases by 5%. The training of the money manager is also important in determining whether the maximum loan is equal to the minimum loan. Having accounting training reduces the likelihood that the minimum loan will equal the maximum loan by 7% (significantly negative at a 7% level). These three variables (education of money manager, interaction of money manager and village education, and whether the money manager received accounting training) do not have a significant effect on whether loans are repaid in a single payment or whether more than one loan type is available.

There is some tentative evidence that the longer the money manager has lived in the village, the less likely it is that the maximum loan will equal the minimum loan (significantly negative at a 10% level). This variable has the opposite effect on whether loans will be repaid in a single payment and the probability that more than one loan type

is available is decreasing in the number of years that the money manager has lived in the village. The estimates all include the age of the money manager, so one might have expected the number of years that the money manager has lived in the village to be a proxy for how trustworthy (or easy to punish) the money manager is. However, the results suggest that this variable may be correlated with unobserved ability – and that the longer the money manager has lived in the village (even controlling for age), the less able he or she is.

The money manager's age has no significant effect on whether the maximum loan is equal to the minimum loan or whether there is a single repayment. However, the likelihood that more than one loan type is available is increasing in the age of the money manager. Banks that offer savings are also significantly more likely to have more than one type of loan, although this variable has no effect on the other bank lending policies. Higher village income is positively associated with single repayments and the maximum loan being equal to the minimum loan. Villages with more business households are less likely to have a single loan repayment. One explanation of this finding is that business households are more likely to receive income relatively smoothly over the course of the year, compared to farm households. This effect would make single repayments more attractive for villages where farming is prevalent and less attractive in places where there are more businesses. The percentage of business households in the village has no effect on whether the maximum loan equals the minimum loan or whether more than one type of loan is available.

Table 3C presents regression estimates of average loan size and average loan duration on the same set of independent variables plus a control for loan duration (in the case of the loan size estimate) and for loan size (in the case of the loan duration estimate). Average loan sizes and durations do not appear to be affected by the education of village heads of household or by the education of the money managers. However, the average loan is significantly smaller if the money manager has received accounting training and average loan duration is significantly longer if the money manager has received accounting training. Both loan size and loan duration are smaller the longer the money manager has lived in the village. There is also some evidence that loans are larger in villages where there are more business households and when the bank also offers savings services.

Taking the evidence presented in Figures 1 – 6 and Tables 3A, 3B and 3C together, there is substantial evidence that the education of villagers has an important and non-monotonic effect on some village bank savings and lending policies. The education of the money manager seems to be more important in determining lending policies and lending policy rigidities appear to be reduced only when there are increases in the education of both the money manager and the villagers.

B. Village Bank Membership

The estimates found in Figures 7, 8 and 9 and Tables 4A, 4B, 4C and 4D explore how village bank membership is affected by individual, village and money manager

education. These estimates are restricted to households who live in villages with village banks.

Figures 7, 8 and 9 provide non-parametric estimates of how the likelihood of village bank membership varies with the education of the household head, the education of the village bank's money manager and the average education of the household head's in the village, in turn. According to these estimates, households are more likely to join village banks when they are more educated, when the bank's money manager is more educated and when the village as a whole is more educated. The relationships between village bank membership and the various education measures appear to be fairly linear and the response to increases in village education appears to be more dramatic than the response to increases in household or money manager education.

Tables 4A, 4B, 4C and 4D each report on two probit estimates of village bank membership. The first estimate does not include bank policy variables and the second does. Because policy variables are sometimes missing or are only calculated for cash transactions, the sample sizes are often significantly smaller for the second specification. Tables 4A and 4B provide probit estimates of whether the household is currently a member of a village bank that offers savings services for the Northeast and the Central region, respectively. Table 4C and D provide analogous estimates for village banks that make loans.

Since the non-parametric estimates did not reveal any important non-linearities in the education variables, only the direct effects of the years of schooling of the head of the household, the years of schooling of the money manager and the average schooling of the heads of the village households are estimated.

All of the estimates also include the following household level variables: the age of the household head, the age of the household head squared, the number of adult females in the household, the number of adult males in the household, the number of children in the household, a measure of the real wealth of the household six year prior to the survey and this variable squared. The estimates also control for whether the household is a current member or customer of a formal financial institution, a BAAC group, a formal agricultural lender or a moneylender.[3]

In addition to the household level independent variables, various village level characteristics are also included. In addition to the average years of schooling of the household heads and the years of schooling of the money manager, all of the village bank participation estimates also include the percentage of the surveyed households in the village who have a business and the log of median village income. Village bank and village bank manager characteristics are also included in all of these estimates. These

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[3] BAAC (Bank for Agriculture and Agricultural Cooperatives) groups are joint liability lending groups. The BAAC makes loans without formal collateral to group members whose future borrowing depends on the other members of the group repaying their loans. Each group member co-signs the loans of the others. The formal agricultural lenders include the BAAC and various Agricultural Cooperatives which receive funds from the BAAC. These loans are generally collateralized with land.

variables are: the years the village bank has been in operation, a variable which is equal to one if the bank received external donations to establish the initial fund, whether the money manager received any accounting training, the number of years the money manager has lived in the village and the age and sex of the money manager. In addition, the estimates include a variable that is equal to one if the village bank makes loans in the case of estimates of participation in savings banks and an analogous variable for saving in the case of the estimates of participation in banks which make loans.

Membership in Savings Institutions in the Northeast
Table 4A presents two probit estimates of whether the household is currently a member of a village savings bank for the Northeast, for the sample of households who live in villages with a village savings bank. In addition to the variables described above, the second specification also includes bank policy variables: a variable which is equal to one if the maximum deposit equals the minimum deposit, the number of types of savings accounts that are available, whether all of the households in the village save an amount with village banks that is evenly divisible by 50, and whether savings is mandatory. According to the both specifications, households are more likely to be member of a village bank when they are wealthier, although the effect decreases as households get wealthier. A 1,000,000 baht increase in past wealth (about one standard deviation) increases the likelihood of participation in the village bank by 55% or 74% depending on the specification. Participation in other financial institutions is also important. Households who are currently customers of commercial banks (this is typically for savings) are 10% more likely to be members of the village savings bank. However, the significance of this variable drops when bank policy variables are included. Households who are currently members of BAAC borrowing groups are 21% more likely to be members of the village bank. The impact rises to 31% when bank policy controls are included.

While the household head's schooling and the average schooling of the village do not have a significant effect on whether or not the household is a member of the village savings bank in either specification, membership is more likely the more schooling the money manager has, regardless of the specification. An additional year of schooling for the money manager raises the probability of membership by 6% or 10% depending on the specification. Village bank membership is not significantly influenced by whether the money manager received accounting training. Interestingly, Northeastern households are 18% *less* likely to join the village savings bank if the money manager is male (significantly negative at 8% level), although this effect disappears when bank policy variables are added. There is some tentative evidence that households are less likely to join village banks the longer the money manager has lived in the village (significantly negative at 10% level in the specification without bank policy controls). Again, this suggests that the number of years that the money manager has lived in the village may be correlated with unobservables.

Households are more likely to join village savings banks when there are more business households in the village, although the significance of this effect drops when bank policy variables are included. Households are less likely to join village savings banks when

median income in the village is higher, although again the significance of this variable disappears when bank policy controls are added. In the specification without bank policy variables, households are more likely to join village banks that have been operating longer, less likely to join village savings banks that offer loans and less likely to join village savings banks that received external donations to start the bank.

The only bank policy variable that is significant is the variable that is equal to one if all of the households in the village who save with a village bank save an amount that is evenly divisible by one. Households are 49% less likely to join village savings banks when this is the case. This "rigidity" or simplification appears to be unattractive all other things being equal.

Membership in Savings Institutions in the Central Region
Table 4B reports on probit estimates of who participates in village savings banks for the Central region. The sample is restricted to sample region households who live in villages with village banks that offer savings services. These estimates use the same dependent variables as above with one exception. The variable that is equal to one if the village bank received external donations is dropped because when there is an external investor in the Central region, all of the sample households participate in the village bank. The first notable result is that the pattern of participation in village banks by wealth differs significantly across the regions. In the Central region, wealthier households are less likely to join village savings banks. This effect is only significant in the estimate that includes policy variables. The point estimate suggests that the likelihood of village bank membership decreases by 7% when past wealth increases by 1,000,000 baht (significantly negative at 6.5% level). Demographic characteristics of Central household appear to play a role in determining bank membership. Older households are more likely to participate, although this effect decreases with age. Households with more adult males are also more likely to belong to village savings banks, although this variable is only significant in the specification that does not include bank policy variables. Like in the Northeast, participation in other financial institutions is an important predictor of village bank membership. In contrast to the Northeast, however, the key institutions are formal agricultural loans that offer primarily collateralized loans. Households who currently have a collateralized loan from the BAAC or borrow from an agricultural cooperative are 21% or 24% more likely to belong to a village bank, depending on the specification. In the Northeast having a joint liability loan had a similar effect.

The education of the household head does not appear to be an important determinant of village savings bank participation in the Central region. There is some evidence, however, that households are more likely to participate in village banks when the average schooling of the village is higher. If average years of schooling for the village head's of households were to increase by one year, the probability of bank membership would increase by 7%, according to the specification without policy controls. When policy control variables are included, village education is no longer significant. The money manager's education is not important in either specification. In the specification without policy controls, it appears that households prefer to join village banks with younger money managers. Once policy control variables have been added, however, the results

indicate that households are more likely to participate in village savings banks with *older* money managers. This suggests that it is the policies' of older money managers, rather than age itself, that the households object to. In an interesting contrast to the results for the Northeast, Central region households appear to prefer money managers who are male, although the significance of this variable disappears when the policy variables are included. Surprisingly, households are less likely to join village banks if the money manager has received accounting training, according to the specification with policy controls. One interpretation of this result is that money managers who require accounting training are particularly ill suited to the job in terms of their underlying ability. Another, more speculative, interpretation is that money managers with accounting training may be more likely to use relatively sophisticated book keeping methods that may be more difficult for bank members to decipher. The number of years that the money manager has lived in the village is insignificant in both specifications.

There is some tentative evidence from the estimate that includes policy variables that households are more likely to join village banks the greater the percentage of business households in the village. If the percentage of business households were to go from zero to 20%, which is the actual percentage of business households in the sample, the likelihood of village savings bank membership would increase by 11% (significantly positive at a 8% level).

The only savings policy variable that is significant is whether the village bank requires members to save. If this is the case, households are 43% more likely to join the bank. Rather than being put off by this "rigid" policy, households prefer it. It seems likely that requiring mandatory savings serves as an important screening/commitment device. Households who are too poor to commit to saving every period will not participate in the bank. If the institution makes loans, they may be particularly concerned about repayment from especially poor households. Perhaps more importantly, mandatory savings may help to ensure households that other village bank members will be committed to monitoring the village bank manager, since their savings is at risk as well.

Membership in Lending Institutions in the Northeast
Table 4C presents probit estimates of whether the household is a member of a village bank that makes loans for households in the Northeast. The sample is made up of households in the Northeast who live in villages where there is a village bank that currently offers loans. The second specification includes bank policy variables and the first does not. The policy variables are: a variable that is equal to one if the maximum loan size is the same as the minimum loan size, the number of types of loans that are available, and a variable that is equal to one if interest and principle are repaid in a single lump sum payment. In addition, the second specification includes controls for the size of the average loan made by the village bank during the past year and the number of months the typical loan was for.

In the specification that does not include bank policy controls, it appears that households who were wealthier in the past are more likely to join village-lending banks. However, this variable is no longer significant when the policy variables are added. Households

with more adult female members are more likely to join village banks which loans, according to the estimates that include policy controls. Each additional adult female member of the household increases the likelihood of participation by 19%. Current participation in other financial institutions is also important. As was the case for participation in village savings institutions in the Northeast, if the household currently has a joint liability loan from the BAAC, they are 17% to 16% more likely to join the village-lending bank, depending on the specification. In contrast to the village savings bank estimates, participation in a commercial bank is not important. This suggests that these variables may capture "demand" characteristics of the household.

The education of the household head is a significant predictor of membership in a village bank that makes loans. Each additional year of schooling increases the likelihood of participation by 2 – 4% depending on the specification. The average education of the village household heads is not an important predictor of who joins the village bank, however. In contrast, membership is more attractive when the money manager is more educated, according to the specification that does not include bank policy variables. It appears that the education of the money manager is important because of how this individual's education shapes bank policy. When policy variables are included in the estimation, the education of the money manager is no longer significant. Whether the money manager has had accounting training has a similar effect. Accounting training has a significant and positive effect on bank membership – increasing the likelihood of membership by 18% -- in the specification without policy controls. It is insignificant when policy controls are added. Older money managers are less attractive regardless of whether the policy controls are included, and the number of years that the money manager has lived in the village is not important in either specification. Northeastern households prefer female money managers. They are 19% to 35% less likely to participate in a village bank that makes loans if the money manager is male, depending on the specification.

Households are more likely to participate in a village lending bank the more business households there are in the village, although this effect disappears when bank policy variables are included in the estimation. In addition it appears that households are *less* likely to join a village lending institution when village income is lower.

The only lending policy variable that is significant is whether the bank reports that the maximum loan size is the same as the minimum loan size. If this is the case, the probability that a household will join the village bank decreases by 51%. All else equal, it appears that households in the Northeast prefer institutions that allow members to borrow variable amounts. In addition, households are less likely to join village lending institutions if the institution also has savings services. It is possible that this reflects the common practice of requiring savings. Households who want to borrow may find mandatory savings requirement particularly onerous. They may also be concerned about the potentially greater monitoring requirements associated with offering savings and loans.

Membership in Lending Institutions in the Central Region
Table 4D reports on similar estimates for whether the household is a member of a village bank that make loans for Central region households who live in villages where there is a village bank that makes loans.

In contrast to the results for the Northeast, participation in village lending banks is unaffected by past household wealth in the Central region, regardless of the specification. However, households with more adult females and households with more adult males are more likely to participate, regardless of which specification we examine. In the Central region, the key institution which signals demand for loans is the variable which is equal to one if the household currently has a collateralized loan from the BAAC or is a customer of the Agricultural Cooperative. If the household is currently the customer of the BAAC or the Agricultural Cooperative, they are 9% more likely to belong to a village bank which offers loans (significantly positive at the 8% level). In the Northeast, joint liability loans from the BAAC were the important variable.

The education of the household head does not appear to be an important determinant of participation in village banks that make loans in the Central region. However, the average education of the village heads of household is important in each specification. If average education were to increase by one year, the probability of joining a village lending bank would increase by 18%, according to the specification that includes policy variables. This pattern is the opposite of what was observed in the Northeast. In the Northeast, the household head's schooling was important, but the education of the village as a whole was insignificant. Village bank participation is not significantly affected by the education of the money manager. However, households prefer to join institutions with younger money managers who have *not* received any accounting training. When bank policy controls are added the significance of these variables disappears. The number of years the money manager has lived in the village and his or her sex do not play an important role.

Households are more likely to join a village bank that offers loans when there are more business households in the village and when village income is lower, regardless of the specification. If the percentage of business households were to increase from zero to 20%, the likelihood of bank membership would increase by nearly 10%.

The bank policy variables are important determinants of membership in village banks that make loans in the Central region. Membership is 16% less likely when the minimum loan is the same size as the maximum loan (significantly negative at 7% level). Households are 17% less likely to join a village bank when there is a single repayment date (significantly negative at 2% level). Membership is also 17% less likely if the village bank offers savings in addition to loans (significantly negative at 4% level). Interestingly, membership is also less likely (14% less) if the village bank received external donations as part of its initial funding. The average loan size, the average duration of the loan, and the number of types of loans offered are insignificant.

Overview of Membership Estimates

Some notable patterns emerge when the membership estimates for savings and lending institutions and the results for the Northeast and the Central region are considered together. First, education encourages participation in village banks, although whose education is important varies with the institution and by region. In the Northeast, the money manager's education appears to be most important. In the Central region, the average education of village heads of household is more essential. Participation in lending institutions in the Northeast is strongly influenced by the education of the head of the household as well.

In the Northeast, the importance of the money manager's education for participation in lending institutions is eliminated when bank policies are taken into account. The importance of village or bank manager education remains, however, when bank policy variables are included in the estimates of membership in village lending banks in the Central region and village savings banks in both regions. This suggests that education matters beyond the effect that it has on bank policies. All else equal, households are more likely to join banks with more flexible policies, although the policy that matters seems to differ by region. One exception to this finding is the effect of mandatory savings policies in the Central region: households are more likely to join the village bank if it has this feature.

In the Northeast, wealthier households are more likely to participate in village institutions, especially savings institutions. In the Central region, villagers are more likely to join village savings banks when they are poorer. Participation in lending institutions is more likely when village income as a whole is lower. There is also some suggestion that households prefer female money managers for savings banks in the Northeast, regardless of the inclusion of bank policy variables. In the Central region, households prefer male money managers, although once policy controls are added the sex of the money manager is no longer significant.

4. Conclusions

This paper shows that education is a crucial component of village bank success. Village bank policies are significantly influenced by the education of both villagers and money managers. In addition, village bank membership depends on the education of the village as a whole, the education of the bank manager and on the policies of the bank.

The first order effect of simple savings and lending policies is to make it easier for people with limited education to run a village bank. Ultimately, however, the contract rigidities that characterize village banks are costly. On the intensive margin they mean that village bank member face transactions costs and non-convexities in making borrowing and saving decisions.[4] The incomplete contracts will in turn distort investment decisions. On

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[4] These may be avoided if people combine village bank services together with other financial arrangements. In one village, the managers of the village bank used funds borrowed from the village bank to supplement their own money lending activities. The village bank offered loans only on particular days. However, the

the extensive margin, they effect whether people join the village bank and the extent to which the village bank can compete with other institutions.

In considering the theoretical issues that might underlie the rigid savings and lending policies of village banks and their relationship to the education of the village bank members and the money manager, preventing fraud by the money manager also seems to very important. While simple contracts may make it easier to prevent villagers from misusing village bank funds as well, for a number of reasons, I suspect that the policies are primarily tools that make it easier for village bank members to evaluate the bank manager, rather than the other way around.

First of all, simple contracts and policies are prevalent in savings as well as in lending institutions. The potential for moral hazard or fraud on the part of villagers seems to be much greater if they can borrow. Also, when the village bank does offer loans, other mechanisms, like collateral and co-signers, are in place to prevent borrowers from using borrowed funds inefficiently. This leads me to focus primarily on the corporate governance of the village bank rather than on the problems inherent in lending to poor households. While this focus is somewhat novel from the perspective of most theoretical work on banking, there is a vast array of corporate finance literature that is concerned with the possibility that corporate managers will misbehave.

If we accept that one of the problems that has to be solved in establishing a village bank is preventing the bank manager from diverting village bank funds, the potential theoretical justification for contract rigidities seems clearer. For example, one could imagine a twist on a costly state verification model (see Townsend 1978). Instead of auditing the borrower when a payment is not made, the bank would be audited whenever the bank failed to pay dividends, or some other event. Simple contracts and rigid policies would help in several dimensions in this context. First, they would help in clearly defining the event that would trigger a bank audit. Second, simple contracts will lower the cost to the village bank members of performing an audit. Finally, because they lower the cost of auditing the bank, simple contracts would make the threat to perform an audit more credible. On the other hand, the results presented above suggest that rigid policies may also restrict bank membership and potentially the bank's profitability. The rigidity of the contracts will have to be chosen as a trade-off between effective monitoring and the optimal size of the bank.

There may be free-rider problems in effective bank monitoring. These problems might be exacerbated when bank policies are complicated. For example, if only particularly educated households can understand the bank's financial records, then they may be reluctant to join the village bank, knowing that the bulk of the monitoring duties will fall on them. Simpler policies will protect households with high educational resources and perhaps make them more willing to participate in the village bank.

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bank managers would lend their own funds on other days with the expectation that they would be repaid when the village bank was next open for loans.

Even when bank policies are simple, it may still be difficult to provide appropriate incentives for monitoring, since monitoring will benefit all village bank members not just the household that incurs the cost of monitoring. This may explain the popularity of mandatory savings policies. If all households are required to make deposits to the bank then they will all have a stake in keeping the bank manager on the straight and narrow. Their incentives will vary as a function of their accumulated savings in the institution – members with more savings will have more at stake. Households with more education tend to be wealthier. This would mean that households with the greatest monitoring skills would also have the strongest incentives to monitor, assuming they belong to the village bank and make deposits proportional to their wealth.

There may be other methods for preventing the bank manager from diverting the village bank's resources. Part of the problem is that the bank manager has access to particularly liquid assets – the accumulated deposits of the membership or the loan fund. Myers and Rajan (1998) suggest that requiring illiquid investments may help to solve corporate governance problems. Some of the banks that are studied here do make these types of investments – in stores or gas stations or in bulk purchase of fertilizer. It would be interesting to explore whether banks with these activities rely less on simple contracts.

Any explanation of rigid bank policies and their relationship with village education will have to consider the possibility of bounded rationality. The non-monotonic relationship between contract rigidity and village education – with contract rigidities increasing and then decreasing with village education – suggests that at low levels of education villagers may not be sophisticated enough to choose simple policies.[5] If this is the case, then there is a role for policy makers to work with villagers in less-educated villagers to help establish bank policies that allow for effective monitoring of bank managers.

The village banks that are the focus of this paper are examples of micro finance institutions. Micro finance institutions have been the focus of much interest and hope on the part of policy makers and researchers because of their potential to reduce poverty, even among very poor households (see Morduch 1999). However, these hopes have been tempered by questions about whether micro finance institutions are sustainable without donor funds. Financial sustainability has been the focus of this debate. However, the analysis presented here suggests that technical sustainability may be equally important and very much related to financial sustainability.[6] Many, perhaps most, micro finance institutions operate with substantial professional help and support which adds of course to the expense of operating these institutions.

On a broader note, while the analysis presented here is clearly limited to a small number of institutions, it suggests an important link between human capital and the development of effective financial institutions. The importance of both village and money manager

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[5] Alternatively, these villages may have a particularly high demand for flexibility, if incomes are especially variable, for example. It is also possible that these villages rely on some other mechanism to motivate the bank manager, like investing some of the bank's resources in fixed assets.

[6] See Fruman (1999) who describes a very interesting village banking effort in Mali where the goal of financial *and* technical sustainability has been incorporated into the program design.

education hints at an "O-ring" (Kremer 1993) model of financial institution development where the education of the least educated may be a key determinant of the effectiveness of an institution. This provides a novel argument for the importance of universal education. Promoting financial institution development will depend on offering educational opportunities to many, not just on providing specialized training to a few potential accountants.

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Figure 1: Maximum Loan = Minimum Loan

Average Schooling of Village Heads

Figure 2: Maximum Loan = Minimum Loan

Schooling of Money Managers

Figure 3: Single Repayment

Average Schooling of Village Heads

Figure 4: Single Repayment

Schooling of Money Managers

Figure 5: Round Deposits

Average Schooling of Village Heads

Figure 6: Round Deposits

Schooling of Money Managers

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Figure 7: Village Bank Participation
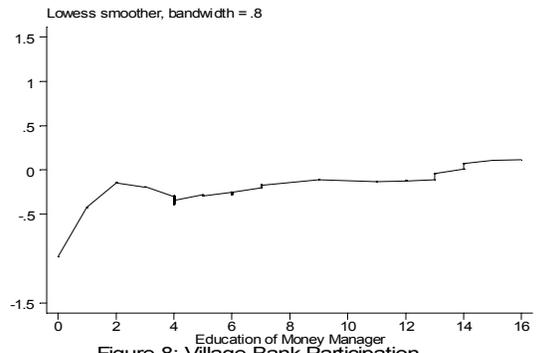
Figure 8: Village Bank Participation
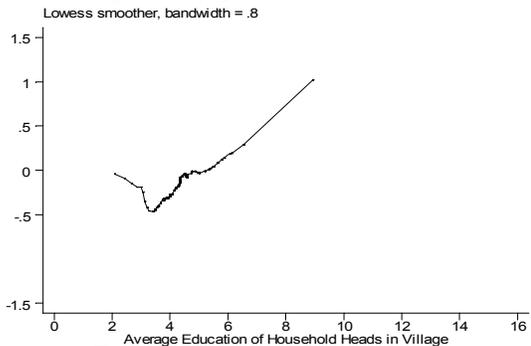
Figure 9: Village Bank Participation

Table 1A: Household Characteristics by Region and Presence of Village Bank

	Whole Sample		Northeast		Central	
	No Village Bank	Village Bank	No Village Bank	Village Bank	No Village Bank	Village Bank
Observations	1439	1431	585	849	854	582
Mean Household Size	4.6	4.5	4.8	4.6	4.5	4.4
Mean Age of Head	52.0	50.8	51.0	50.6	52.6	51.3
Years of Schooling: Head						
0 – 3 yrs. %	20	18	20	18	19	18
4 yrs. %	67	66	67	67	67	63
5 – 16 yrs. %	13	16	13	14	14	19
Years of Schooling: Most Educated						
0 – 3 yrs. %	3	3	3	3	3	3
4 yrs. %	18	18	17	19	18	18
5 – 16 yrs. %	79	79	80	78	79	79
Primary Occupation of Head						
Inactive %	13	12	10	10	15	14
Farming – rice %	38	39	63	54	20	17
Farming – not rice %	17	19	6	11	24	30
Livestock and Shrimp/Fish %	5	5	2	2	7	9
Construction %	3	5	4	5	3	5
Skilled work %	8	7	6	4	10	10
Admin. and Gov't work %	3	3	2	3	3	4
General Labor %	8	7	4	7	12	8
Other %	4	4	3	4	5	4
Median Annual Income*	53,820	44,600	27,670	30,000	80,670	75,900
Median current total wealth	589,633	487,862	407,838	366,342	905,548	885,878
Median current real wealth	334,943	305,703	260,767	227,225	484,684	513,446
Median real wealth six years ago	157,469	151,486	148,500	126,615	169,250	204,863

* Median Annual Income includes income from wages and salaries and net income from farming, livestock and business activities. Income is measured in current (1997) baht. At the time of the survey, $1 was equal to approximately 25 baht. Currently, $1 equals approximately 38 baht.

Table 1B: Household Characteristics by Region and Participation in Village Bank in Villages with Banks

	Whole Sample		Northeast		Central	
	Not a Member of Village Bank	Member of Village Bank	Not a Member of Village Bank	Member of Village Bank	Not a Member of Village Bank	Member of Village Bank
Observations	784	647	440	409	344	238
Mean Household Size	4.4	4.7	4.5	4.7	4.2	4.7
Mean Age of Head	51.5	50.1	51.2	49.9	51.9	50.4
Years of Schooling: Head						
0 – 3 yrs. %	20	16	20	17	20	15
4 yrs. %	67	64	69	65	64	63
5 – 16 yrs. %	13	19	11	18	16	22
Years of Schooling: Most Educated						
0 – 3 yrs. %	4	2	4	1	4	2
4 yrs. %	21	16	21	17	20	15
5 – 16 yrs. %	76	82	75	82	76	83
Primary Occupation of Head						
Inactive %	13	10	12	8	13	14
Farming – rice %	36	42	51	57	17	16
Farming – not rice %	19	18	12	9	28	32
Livestock and Shrimp/Fish %	5	4	2	2	9	8
Construction %	6	4	6	4	6	4
Skilled work %	6	7	4	5	9	11
Admin. and Gov't work %	3	4	2	4	4	4
General Labor %	8	7	7	6	8	9
Other %	5	3	3	4	6	2
Median Annual Income*	40,343	48,200	28,280	34,975	67,900	92,015
Median current total wealth	432,644	545,182	322,007	434,047	808,786	1,064,027
Median real current wealth	260,218	344,900	197,474	277,130	478,172	581,772
Median real wealth six years ago	113,160	188,140	102,239	175,000	175,460	218,368

* Median Annual Income includes income from wages and salaries and net income from farming, livestock and business activities. Income is measured in current (1997) baht. At the time of the survey, $1 was equal to approximately 25 baht. Currently, $1 equals approximately 38 baht.

Table 2A: Characteristics of Village Banks

	Whole Sample	Northeast	Central
# of Village Banks	161	103	58
% of banks which offer savings	42%	35%	53%
% of banks which offer lending	73%	68%	81%
% of banks which offer savings and lending	25%	17%	40%
Median Years of Operation	4	7	2
Median # of Members	40	41	38
Median # of Loans	15	15	14.5
% who received external funds for start-up	27%	32%	22%
% of Banks with the following features			
Maximum Savings = Minimum Savings	33%	28%	39%
Savings of All HH in Village is evenly divisible by 50	45%	31%	57%
Savings is Mandatory	57%	58%	55%
More than One Type of Savings Account is Available	12%	19%	3%
Maximum Loan = Minimum Loan	16%	11%	24%
Single Lump-Sum Repayment	77%	84%	66%
More than One Type of Loan is Available	17%	21%	11%
Characteristics of the Money Manager			
Average Years of Schooling	5.7	5.7	5.9
% who received accounting training	61%	59%	64%
Age	43.6	41.5	46.9
# of Years lived in the Village	31.4	30.6	32.8
% Male	65%	66%	63%

Table 2B: Savings and Lending by Village Banks, baht*

	Lending		
	Median	Mean	Standard Deviation
Typical Loan Size	4000	5900	8200
Largest Loan	5000	11000	13800
Smallest Loan	1390	4000	7400
Loan Duration (months)	12	13	12
	Savings		
	Median	Mean	Standard Deviation
Typical Annual Deposit	500	700	1100
Largest Annual Deposit	1200	2900	8900
Smallest Annual Deposit	200	300	300
Annual Interest Rate	8%	12%	14%

*At the time the data was gathered 25 baht was equal to $1.

Table 3A: Probit Estimates of Village Bank Policies, Savings

	All Villagers save amount evenly divisible by 50		Savings is Mandatory		Minimum Savings = Maximum Savings	
	dF/dx*	Z-statistic	dF/dx*	Z-statistic	dF/dx*	Z-statistic
Mean Schooling of Heads of Household	-0.1163	-0.31	-0.0517	-0.09	0.8251	1.63
Mean Schooling Squared	0.0093	0.28	-0.0181	-0.36	-0.0652	-1.50
Log Median Village Income	0.3765	2.41	0.0884	0.46	-0.0222	-0.13
% business households	0.7670	1.93	0.6687	1.40	-0.4601	-1.12
Years of Schooling – money manager	-0.0581	-0.50	-0.0920	-0.66	0.1216	0.98
Years of Schooling – money mgr. x hh heads	0.0067	0.28	0.0237	0.83	-0.0186	-0.77
Manager received accounting training*	-0.1377	-1.01	-0.1020	-0.61	-0.0219	-0.15
Years Money Manager has lived in Village	-0.0018	-0.34	-0.0071	-1.05	-0.0039	-0.66
Age of Money Manager	0.0019	0.29	0.0038	0.39	0.0064	0.74
Log Years of Operation of Village Bank	-0.0652	-0.98	0.0720	0.78	-0.1473	-1.67
Bank Offers Loans*	0.1598	0.89	-0.2571	-1.38	0.0028	0.02
Village is in Northeast*	0.4495	2.26	0.0807	0.30	-0.1655	-0.72
Log Likelihood	-42.12		-37.20		-31.81	
Pseudo R-squared	17.39%		11.58%		12.35%	
Number of Observations	76		61		59	

*dF/dx is equal to the infinitesimal change in each continuous independent variable. For dummy variables it is equal to the discrete change in probability when the dummy variable changes from 0 to one. Dummy variables are marked by an asterisk.

Table 3B: Probit Estimates of Village Bank Policies, Lending

	Minimum Loan = Maximum Loan		Single Repayment		More than one Loan type is available	
	dF/dx*	Z-statistic	dF/dx*	Z-statistic	dF/dx*	Z-statistic
Mean Schooling of Heads of Household	1.4612	2.54	0.5734	1.39	0.3689	0.87
Mean Schooling Squared	-0.1344	-2.33	-0.0794	-1.65	-0.0639	-1.13
Log Median Village Income	0.1493	2.40	0.1923	1.66	0.0518	0.62
% business households	-0.0866	-0.57	-0.6623	-2.43	0.1200	0.51
Years of Schooling – money manager	0.1888	2.04	-0.0480	-0.60	-0.1034	-1.26
Years of Schooling – money mgr. x hh heads	-0.0468	-2.09	0.0136	0.77	0.0227	1.21
Manager received accounting training*	-0.0740	-1.49	-0.0132	-0.15	0.0134	0.20
Years Money Manager has lived in Village	-0.0024	-1.28	0.0059	1.58	-0.0043	-1.56
Age of Money Manager	0.0024	0.96	0.0041	0.75	0.0054	1.46
Log Years of Operation of Village Bank	-0.0336	-1.36	-0.0373	-0.74	0.0191	0.53
Bank Offers Savings*	0.0689	1.20	-0.0661	-0.68	0.1724	1.96
Village is in Northeast*	0.0935	1.27	0.2496	1.52	0.2004	1.80
Log Likelihood	-34.55		-47.52		-39.43	
Pseudo R-squared	28.18%		15.41%		15.51	
Number of Observations	105		104		106	

*dF/dx is equal to the infinitesimal change in each continuous independent variable. For dummy variables it is equal to the discrete change in probability when the dummy variable changes from 0 to one. Dummy variables are marked by an asterisk.

Table 3C: Regression Estimates of Village Bank Policies, Lending Continued

	Average Loan Size		Average Duration of Loan	
	β	t-statistic	β	t-statistic
Mean Schooling of Heads of Household	-4614.64	-0.47	-9.39	-0.74
Mean Schooling Squared	310.90	0.23	1.74	1.20
Log Median Village Income	1818.85	0.76	-3.91	-1.26
% business households	8022.29	1.54	-3.82	-0.55
Years of Schooling – money manager	-41.98	-0.03	1.27	0.57
Years of Schooling – money mgr. x hh heads	31.32	0.08	-0.38	-0.78
Manager received accounting training*	-4500.85	-2.19	4.81	1.77
Years Money Manager has lived in Village	-126.50	-1.66	-0.16	-1.65
Age of Money Manager	8.38	0.08	0.09	0.70
Log Years of Operation of Village Bank	-1172.09	-1.07	0.07	0.05
Bank Offers Savings*	3964.24	1.75	-4.11	-1.37
Average Loan Duration or Loan Size	156.90	1.62	0.00	1.62
Village is in Northeast*	-3184.36	-1.04	-2.34	-0.58
Constant	3308.39	0.09	63.40	1.39
Adjusted R-squared	19.90%		9.32%	
Number of Observations	74		74	

Dummy variables are marked by an asterisk.

Table 4A: Probit Estimates of Who Participates in Northeastern Village Banks, Savings

	dF/dx*	Z-statistic	dF/dx*	Z-statistic
Household Characteristics				
Age of Head	-0.0047	-0.28	-0.0187	-0.72
Age of Head Squared	0.0000	-0.29	0.0001	0.24
Years of Schooling – Head	-0.0059	-0.48	0.0101	0.61
# of Adult Females in household	0.0137	0.33	-0.0306	-0.50
# of Adult Males in household	0.0603	1.55	0.0379	0.70
# of Children (< 18 years) in household	0.0134	0.52	-0.0286	-0.79
Wealth Six Years ago ‡	0.5450	3.13	0.7400	2.96
Wealth Squared‡	0.0000	-2.46	0.0000	-2.40
Member/Customer in Organization/Institution				
Formal Financial Inst.*	0.1026	1.61	0.1193	1.33
BAAC Group*	0.2115	3.03	0.3087	3.17
Agricultural Lender*	0.0468	0.66	-0.0672	-0.67
Money Lender*	-0.0485	-0.57	0.0601	0.46
Characteristics of Village and Village Bank				
Years of Operation	0.0181	1.63	0.0033	0.14
Offers Loans	-0.1511	-1.57	-0.2925	-0.85
Initial fund included external donations*	-0.2734	-1.70	-0.1769	-0.26
Manager received accounting training*	0.0835	0.77		
Age of money manager	0.0044	0.82	-0.0085	-0.48
Sex of money manager (=1 if male)*	-0.1840	-1.41	-0.1164	-0.33
Years money manager has lived in village	-0.0044	-1.27	0.0115	1.09
Years of Schooling – money manager	0.0609	2.49	0.1018	1.56
Average Schooling of Heads of Household	-0.0433	-0.73	-0.1153	-0.75
Maximum Deposit = Minimum Deposit			0.1890	0.68
# of Savings Accounts Offered			-0.1661	-0.81
Savings of All Households is evenly divisible by 50			-0.4928	-2.25
Savings is Mandatory			0.0482	0.24
% business households	0.7245	1.94	1.1317	1.24
Log mean village income	-0.2001	-1.50	-0.3294	-0.77
Log Likelihood	-180.90		-104.65	
Pseudo R-squared	16.04%		24.46%	
Number of Observations	318		200	

*dF/dx is equal to the infinitesimal change in each continuous independent variable. For dummy variables it is equal to the discrete change in probability when the dummy variable changes from 0 to one. Dummy variables are marked by an asterisk. ‡Number in table is estimated coefficient multiplied by 1,000,000. The sample excludes the top 1% of households by wealth.

Table 4B: Probit Estimates of Who Participates in Central Village Banks, Savings[*]

	dF/dx*	Z-statistic	dF/dx*	Z-statistic
Household Characteristics				
Age of Head	0.0194	1.24	0.0329	1.60
Age of Head Squared	-0.0002	-1.42	-0.0003	-1.59
Years of Schooling – Head	0.0041	0.34	0.0145	1.00
# of Adult Females in household	0.0513	1.35	0.0477	0.99
# of Adult Males in household	0.0881	2.08	0.0681	1.23
# of Children (< 18 years) in household	-0.0181	-0.63	-0.0193	-0.49
Wealth Six Years ago ‡	-0.0244	-1.05	-0.0746	-1.51
Wealth Squared‡	0.0000	1.50	0.0000	1.45
Member/Customer in Organization/Institution				
Formal Financial Inst.*	0.0670	1.00	0.0659	0.78
BAAC Group*	-0.0314	-0.38	0.1331	1.24
Agricultural Lender*	0.2056	2.95	0.2426	2.79
Money Lender*	-0.0164	-0.17	-0.0846	-0.61
Characteristics of Village and Village Bank				
Years of Operation	0.0364	3.62	-0.0082	-0.40
Offers Loans	-0.0792	-0.89	0.0490	0.29
Initial fund included external donations*				
Manager received accounting training*	-0.0400	-0.50	-0.5747	-3.31
Age of money manager	-0.0133	-2.22	0.0283	2.02
Sex of money manager (=1 if male)*	0.1689	1.81	0.0736	0.35
Years money manager has lived in village	-0.0041	-1.29	-0.0023	-0.34
Years of Schooling – money manager	-0.0132	-1.02	0.0420	0.96
Average Schooling of Heads of Household	0.0721	2.20	-0.0810	-0.93
Maximum Deposit = Minimum Deposit			-0.1576	-0.76
# of Savings Accounts Offered			-0.0382	-0.11
Savings of All Households is evenly divisible by 50			-0.0871	-0.29
Savings is Mandatory			0.4288	1.87
% business households	-0.0401	-0.20	0.5371	1.39
Log mean village income	0.1166	1.20	0.1337	0.84
Log Likelihood	-192.55		-119.71	
Pseudo R-squared	15.50%		22.86%	
Number of Observations	329		228	

*dF/dx is equal to the infinitesimal change in each continuous independent variable. For dummy variables it is equal to the discrete change in probability when the dummy variable changes from 0 to one. Dummy variables are marked by an asterisk. ‡Number in table is estimated coefficient multiplied by 1,000,000. The sample excludes the top 1% of households by wealth.

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[*] When the initial fund included donations from an external source in a Central savings institution, all villagers participate in the village bank, so this variable has been dropped.

Table 4C: Probit Estimates of Who Participates in Northeastern Village Banks, Lending

	dF/dx*	Z-statistic	dF/dx*	Z-statistic
Household Characteristics				
Age of Head	0.0070	0.49	0.0125	0.57
Age of Head Squared	-0.0001	-0.69	-0.0001	-0.75
Years of Schooling – Head	0.0206	1.68	0.0356	2.12
# of Adult Females in household	0.0118	0.27	0.1896	2.66
# of Adult Males in household	-0.0405	-1.10	-0.0498	-0.76
# of Children (< 18 years) in household	0.0005	0.02	-0.0072	-0.19
Wealth Six Years ago ‡	0.4180	2.36	0.0438	0.15
Wealth Squared‡	0.0000	-0.96	0.0000	0.51
Member/Customer in Organization/Institution				
Formal Financial Inst.*	0.0700	1.12	0.0568	0.59
BAAC Group*	0.1729	2.58	0.1643	1.61
Agricultural Lender*	0.0187	0.28	-0.0190	-0.18
Money Lender*	0.0629	0.73	0.0473	0.41
Characteristics of Village and Village Bank				
Years of Operation	0.0101	1.60	0.0300	1.69
Offers Savings*	-0.2834	-2.83	-0.3903	-1.67
Initial fund included external donations*	-0.0544	-0.59	0.0532	0.22
Manager received accounting training*	0.1794	2.15	0.1564	0.56
Age of money manager	-0.0061	-1.89	-0.0123	-1.62
Sex of money manager (=1 if male)*	-0.1868	-2.24	-0.3520	-2.08
Years money manager has lived in village	0.0028	1.09	-0.0033	-0.41
Years of Schooling – money manager	0.0216	1.73	0.0130	0.36
Average Schooling of Heads of Household	-0.0445	-0.88	0.0885	0.97
Maximum Loan = Minimum Loan*			-0.5121	-2.03
# of Loan types Offered			0.1798	0.63
Single Repayment date*			0.0837	0.44
Average Loan Size			-0.0001	-1.11
Average Duration of Loans			0.0172	0.89
% business households	0.6595	2.49	0.8955	1.11
Log mean village income	-0.2055	-1.87	-0.4576	-1.75
Log Likelihood	-206.16		-100.98	
Pseudo R-squared	12.74%		26.40%	
Number of Observations	341		198	

*dF/dx is equal to the infinitesimal change in each continuous independent variable. For dummy variables it is equal to the discrete change in probability when the dummy variable changes from 0 to one. Dummy variables are marked by an asterisk. ‡Number in table is estimated coefficient multiplied by 1,000,000. The sample excludes the top 1% of households by wealth.

Table 4D: Probit Estimates of Who Participates in Central Village Banks, Lending

	dF/dx*	Z-statistic	dF/dx*	Z-statistic
Household Characteristics				
Age of Head	0.0089	0.76	0.0155	1.16
Age of Head Squared	-0.0001	-0.96	-0.0002	-1.29
Years of Schooling – Head	0.0038	0.41	0.0038	0.39
# of Adult Females in household	0.0555	1.83	0.0574	1.72
# of Adult Males in household	0.0723	2.21	0.0664	1.83
# of Children (< 18 years) in household	-0.0030	-0.14	0.0117	0.49
Wealth Six Years ago ‡	-0.0123	-0.65	0.0035	0.15
Wealth Squared‡	0.0000	0.82	0.0000	0.48
Member/Customer in Organization/Institution				
Formal Financial Inst.*	0.0192	0.38	0.0331	0.58
BAAC Group*	-0.0704	-1.14	-0.0380	-0.52
Agricultural Lender*	0.0844	1.49	0.0926	1.40
Money Lender*	0.0777	1.13	0.0212	0.27
Characteristics of Village and Village Bank				
Years of Operation	0.0070	0.69	0.0049	0.37
Offers Savings*	-0.0265	-0.36	-0.1704	-1.77
Initial fund included external donations*	-0.0614	-0.79	-0.1380	-1.42
Manager received accounting training*	-0.1426	-2.35	-0.0489	-0.61
Age of money manager	-0.0104	-2.32	-0.0046	-0.67
Sex of money manager (=1 if male)*	0.0251	0.41	-0.1102	-1.04
Years money manager has lived in village	0.0008	0.31	0.0062	1.23
Years of Schooling – money manager	0.0063	0.59	0.0194	1.25
Average Schooling of Heads of Household	0.2410	5.05	0.1768	2.46
Maximum Loan = Minimum Loan*			-0.1572	-1.48
# of Loan types Offered			-0.0727	-0.46
Single Repayment date*			-0.1710	-2.10
Average Loan Size			0.0000	-0.13
Average Duration of Loans			0.0036	1.06
% business households	0.5995	3.58	0.4786	2.26
Log mean village income	-0.3342	-4.08	-0.2896	-2.11
Log Likelihood	-272.08		-217.05	
Pseudo R-squared	11.37%		16.46%	
Number of Observations	463		393	

*dF/dx is equal to the infinitesimal change in each continuous independent variable. For dummy variables it is equal to the discrete change in probability when the dummy variable changes from 0 to one. Dummy variables are marked by an asterisk. ‡Number in table is estimated coefficient multiplied by 1,000,000. The sample excludes the top 1% of households by wealth.