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Formal and Informal Rural Credit in Four Provinces of Vietnam*

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Abstract

This paper uses a survey of 932 rural households to uncover how the rural credit market operates in four provinces of Vietnam. Households obtain credit through formal and informal lenders. Formal loans are almost entirely for production and asset accumulation, while informal loans are used for consumption smoothing. Interest rates fell from 1997 to 2002, reflecting increased market integration. Moreover, the determinants of formal and informal credit demand are distinct. While credit rationing depends on education and credit history, in particular, regional differences in the demand for credit are striking. A ‘one size fits all’ approach to credit policy in Vietnam would be inappropriate.

JEL classification: O12, O16, O17, O18

Keywords: rural credit, household survey, Vietnam

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1. INTRODUCTION

Vietnam has come a long way since the *doi moi* reform process was initiated in 1986, and the past 15 years have witnessed one of the best performances in the world in terms of both economic growth and poverty reduction. People's living standards have improved significantly, and the country's socio-economic achievements are impressive. Wide-ranging institutional reforms have been introduced, including greater reliance on market forces in the allocation of resources and the determination of prices. A shift can also be noted from an economy dominated by the state and co-operative sectors to a situation where the private sector and foreign investment account for a relatively high proportion of GDP. Important strides have been made over a relatively short time span to further the transition from a centrally planned to a socialist market economy. Finally, while the ratio of credit to GDP is almost twice as high in Thailand and three times as high in China and Malaysia (see World Bank, 2005), the financial deepening of the Vietnamese economy that has taken place during the past decade is remarkable.

Nevertheless, Vietnam remains a poor country. Some 70 percent of the population continues to live in rural areas, and they depend on agriculture for their livelihood. How the country can transform itself and its agricultural sector to a more modern society remains a critical policy challenge. Access to credit for smallholders is as elsewhere a key ingredient in the promotion of agricultural production and transformation. It forms an essential element of any poverty oriented strategy for the future development of the financial system.¹ Access to credit affects as aptly demonstrated by Diagne, Zeller and Sharma (2000) household welfare through at least two key channels. First, it alleviates capital constraints on agricultural households. This can significantly improve the ability of poor households to procure needed agricultural inputs, and will also reduce the opportunity costs of capital-intensive assets, encouraging labour-saving technology and raising labour productivity. The second channel identified by Diagne et al. is that credit access increases the risk-bearing capacity of households, altering risk-coping strategies. Households with access to credit may be more willing to pursue promising but risky technologies, and will be better able to avoid adopting risk-reducing but inefficient livelihood strategies.

The above kinds of considerations have as elsewhere in the developing countries led the Vietnamese Government and its donor community to set up credit programmes aimed at expanding rural households' access to credit; and significant expansion is foreseen in the coming years (see World Bank, 2003). The reliance on informal credit continues, however, to be widespread. Formal and informal credit market segments are present in Vietnam much along the lines of the dual credit market described by for example Mohieldin and Wright (2000). They cite Hoff and Stiglitz (1993), and point out – with reference to Egypt – that there are two competing views as to why formal and informal credit markets co-exist. First, government may intervene, capping interest rates, and this remains the case in Vietnam. The alternative view that differences in the cost of screening, monitoring and contract enforcement across lenders lead to fragmentation appears, however, also to carry explanatory power. Similarly, the interaction between the formal and informal credit market segments is open to conflicting interpretations. This is evident in the theoretical papers by for example Gupta and Chaudhuri (1997) and Chaudhuri (2001), on the one hand, and the careful empirical work by Zeller (1994), Diagne (1999) and Diagne, Zeller and Sharma (2000) on Madagascar, Malawi and Bangladesh, on the other. Diagne and co-authors highlight that understanding how informal institutions serve the financial needs of households and interact with the formal credit institutions is important, especially for 'sustainable and market-oriented financial institutions that plan to expand and complement the services offered by the existing informal credit market rather than substitute for them'. Diagne, Zeller and Sharma also offer a concise methodological review, which together with papers by Kochar (1997) and Petrick (2005) provide general analytical background for the present work on Vietnam. Kochar points out in the context of India that the literature on rural credit has generally assumed that households are rationed in their access to subsidized 'formal' credit; but she adds that the validity of this assumption hinges on the level of effective demand for formal credit, which is in turn a function of the demand for credit and its availability from 'informal' sources. This implies that the extent of credit market rationing may be smaller than regularly assumed. We take these cautioning findings serious and rely on them in our attempt to get credit demand right in our study of formal and informal rural credit in Vietnam.

In any case, a key motivation for our paper is that very little is actually known about the rural credit market in Vietnam, including both its degree of efficiency and the extent to which credit rationing impedes agricultural development. Appropriate development of market institutions based on well informed policies is a key prerequisite for success in Vietnam's ongoing transformation from a command-type to a more market based economy. Generating policy relevant insights into the characteristics and functioning of the rural credit market are on this background well justified. It is in this context helpful that the general academic literature on rural credit markets and their importance in developing countries (including the analysis of determinants of credit demand and the characteristics of credit constrained households) has seen a welcome expansion during the last 15 years. This has followed Japelli (1990) and Feder et al. (1990).² They relied on respectively household survey data from the US and China, and this methodological approach has subsequently been put to good use in most of the papers cited above. Our study is situated within this literature, and it relies on the methodological approach, which Diagne, Zeller and Sharma (2000) refer to as the 'direct method'. Accordingly, our household survey data allow us to establish whether households are credit constrained or not. They do not permit an analysis where the extent to which a household is credit constrained is in focus, even if we agree this would be desirable.

In sum, in this paper we provide a detailed review and an in-depth econometric analysis of how the rural credit market operates in four provinces of Vietnam, with a focus on basic characteristics and differences between the formal and informal credit markets.³ We use a new survey of 932 households designed to elicit the full credit history of households during 1997 to 2002. These data are combined with information from the 2002 Vietnam Household Living Standard Survey (VHLSS) in the econometric analysis, where the determinants of credit demand and credit rationing are identified more rigorously. We are in this process able to account carefully for possible self selection.

The paper is structured as follows. After describing the data in Section 2, we provide in Section 3 a detailed descriptive overview of the characteristics of the rural credit market

with a focus on the division between formal and informal credit. The data set has a time dimension, so trends during the 1997-2002 years can be spelled out, including developments in overall interest rates. In Section 4, we apply the econometric framework to identify the determinants of credit demand, and proceed to analyse in Section 5 household characteristics, which potentially influence the probability of being credit rationed. Some key policy measures to further the allocation of rural credit in Vietnam and develop the credit market overall are discussed in the concluding Section 6.

2. DATA

Key data used in this paper (including in particular information on the demand for credit) were generated in a comprehensive household survey of land, labour and credit markets in the provinces of Long An, Quang Nam, Ha Tay and Phu Tho. The survey, also known as the ILSSA Access to Resources Survey,⁴ was carried out in the first quarter of 2003 in collaboration among the Institute of Labour Science and Social Affairs (ILSSA), Mekong Economics, the University of Copenhagen and the Stockholm School of Economics (see Mekong Economics, 2004). A total of 932 rural households were surveyed. These households are identical to the rural households previously interviewed in quarter 1 and 2 in the rural areas of the four provinces under study here as part of the nationally representative 2002 Vietnam Household Living Standard Survey (VHLSS).⁵ In the VHLSS 2002, data were collected on income, expenditure and various other background variables. This largely pre-determined information is used in this paper in combination with our own data, collected about a year later to construct explanatory variables.⁶

The four provinces studied are located in four different regions of Vietnam as follows: (i) Long An in the fertile Mekong Delta, which is also the most densely populated of the four provinces; (ii) Quang Nam in the sparsely populated Central Highlands; (iii) Phu Tho in the North Western (Highlands), a mountainous region with a high share of ethnic minorities, and (iv) Ha Tay in the Red River Delta surrounding Hanoi, the Capital of Vietnam. The ILSSA survey is not nationally representative, but it is representative for

rural households in the four provinces under study. They cover a lot of the variation in geographical and socio-economic conditions present in Vietnam, including regional differences between the north, centre and south of the country.

The ILSSA survey covered a large variety of topics related to land, labour and credit. In this paper, we rely on the credit component, including a number of illuminating questions on the source and use of loans, designed to elicit the full credit history of households during the recent past.⁷ The general purpose of this part of the questionnaire was to help clarify the functioning of rural credit markets in Vietnam and to assess the extent to which credit rationing constrains agricultural development.⁸ Questions covered issues such as (i) number of loans applied for and actually received, including information on amounts involved, interest, period and source of the credit, (ii) whether the household had at some point wanted to apply for a loan, but refrained from doing so, and (iii) various other relevant background such as the use of the loan, collateral requirements etc.

3. THE RURAL CREDIT MARKET

Due to the design of the questionnaire the credit history of each household in the sample can be followed. Table 1 shows the distribution of households by the number of loans obtained.

[Table 1 about here]

Over the period from the beginning of 1997 to 2002, a total of 289 households did not obtain any credit at all. However, 69 percent of the sample (643 households) obtained at least one loan, and around 46 percent (432) obtained more than one loan. Table 1 also reveals that there are differences among the four provinces. In Quang Nam less than 50 percent of the households obtained a loan, whereas 71 percent secured at least one loan in Ha Tay. In Phu Tho and Long An around 80 percent of the households participated in the credit market. If we focus on households with more than one loan, Ha Tay and Phu Tho are quite similar with more than 50 percent having more than one loan. In Quang

Nam only 7 percent of the households obtained more than one loan in contrast to Long An where the corresponding share is more than two thirds.

Of the 289 households, who did not participate in the credit market during the period under study, only 12 got a loan application rejected, and another 65 reported having at some point refrained from applying even though they wanted credit. Thus, many of the 289 households can be seen as not effectively demanding credit. In sum, the overall picture emerging from Table 1 is that an active rural credit market exists in Vietnam and that regional differences are sizeable.

(a) *General trends*

The supply side of the rural credit market in Vietnam includes a number of formal and informal lending institutions. The Vietnam Bank for Agriculture and Rural Development (VBARD) is the biggest formal lender, and the much smaller Vietnam Bank for the Poor (VBP) is associated with VBARD.⁹ VBP specialises in lending to poorer households. The credit market in many developing countries is characterised by segmentation in formal and informal sectors (see for example Zeller, 1994 and Yadav et al., 1992). Table 2 shows the distribution of loans by source of credit in terms of both percentages of all loans and percentages of all loans weighted with loan size. As revealed in Table 2, there is a sizeable informal credit sector in Vietnam. The informal sector consists of private money lenders, friends and relatives,¹⁰ responsible for 35 percent of all loans in 2002.

In terms of loan amounts, the importance of the informal sector declined from 21 percent in 1999 to 17 percent in 2002, but measured by the actual number of loans the relative importance of the informal sector actually increased slightly. The figures in Table 2 compare well with previous work on credit markets in Vietnam. Duong and Izumida (2002), using data from a small household survey undertaken in 1995, found that the informal sector accounted for 17 percent of all loans.

[Table 2 about here]

‘Others’ include private banks, which have expanded rapidly in the south of Vietnam in recent years, and the sector composition of the rural credit market differs markedly among provinces. In Long An the formal sector provided 96 percent of the total loan amount in 2002 whereas only 64 percent came from the formal sector in Phu Tho, as further discussed in Section 3.3.

In what follows, we divide the rural credit market into three different segments, one formal and two informal. The formal segment includes all formal institutions,¹¹ while the informal sector consists of (i) private lending by unrelated individuals and friends charging interest, and (ii) lending from families, relatives and friends carrying zero interest. These two segments will be referred to as ‘private’ and ‘family’ in what follows. The distinction between friends, who lend and charge interest, and friends, who lend charging zero interest, may seem arbitrary. However, the data reveal a marked discontinuity at zero interest. Friends, who lend and charge interest, charge on average only slightly less than private money lenders (not characterised as friends).

To illustrate developments in the rural credit market in the late 1990s and early years of the new millennium, Table 3 shows the number of loans, the average loan size (in nominal terms) and the average monthly interest rate for the three different segments, year by year. To judge the magnitude of real interest rates the average monthly consumer price inflation for each year is also shown. The nominal overall volume of credit expanded rapidly by a factor of 2.6 in the years from 1999 to 2002. During this period Vietnam experienced an average annual consumer price inflation rate of around 1.5 percent, so the credit volume in real terms grew at about 6 percent less than the nominal growth.

[Table 3 about here]

Looking at the number of loans disbursed in the period, relatives and the informal sector increased their share from 29 to 36 percent, but in terms of loan amounts formal sector

lending increased significantly. Formal credit accounted for 76 percent of total rural credit in 1997. By 2002 this share was 83 percent. The remaining 17 percent was divided almost equally between informal loans and loans from relatives.

The trend described above is mirrored in the development of loan sizes in the three segments. While loan size increased steadily in the formal sector, it remained almost constant for friends and relatives and decreased substantially in the interest bearing part of the informal sector.

Table 3 also allows us to investigate the development in loan terms. One striking feature is that overall interest rates have fallen – and more so for informal sector loans. The trend for real interest rates is less clear due to fluctuating inflation over the period. However, real interest rates in the formal sector for 2002 are in the low end for the period, and for the informal interest bearing segment there has been steady decline. The interest rate gap between the formal and informal sector was around 0.9 percentage point (per month) in 2002. The relatively large fall in the interest rate in the informal sector (for interest bearing loans) is clearly related to the general increase in rural incomes, which made borrowing less risky. This has tended to push interest rates down, and the same goes for the increase in formal credit possibilities during the period. Another factor behind the interest rate fall is that monopoly rents obtained by private moneylenders are likely to have fallen in line with increased market integration. Increased access to collateral (in the form of red books, which are land tenure certificates issued by local authorities) have squeezed profit margins and the degree of risk associated with the portfolios of informal lenders.

Table 3 confirms that the combined informal sector is important in Vietnam with 36 percent of the total number of loans in 2002. The interest bearing segment made up 14 percentage points hereof and about half in value terms. This suggests that poor rural households in Vietnam continue to rely on networks and relatives when they try to deal with shocks and face hard times. This is in line with what is generally found in the literature on rural households in developing countries, see Platteau (1997).

Looking at the changes in the structure of the credit market it is of interest to relate these to potential changes in the use of approved loans. Table 4 shows that such changes were limited in the sample.¹² It is highlighted that to increase the probability that the correct use of each loan was elicited, we asked both about the stated purpose in the loan application and about what the loan was actually used for.¹³ Combining answers to these two questions suggests that loans were generally used as stated in the applications. In all years differences were identified in less than 5 percent of the loans, and these differences are not systematic in any way. However, even if loans are generally used for the purpose applied for, fungibility in the form of substitution and diversion – using the terminology of Von Pischke and Adams (1980) – can still be present. Substitution occurs when a household obtains a loan for a project or part of a project the household would still have undertaken in the absence of the loan. Diversion of a (small) part of the loan to other purposes can happen even if the main share of the loan is still used for the purpose stated in the application. Table 4 mainly indicates that changes in the structure of the credit market are not driven by changes in loan composition in terms of use of loans.

[Table 4 about here]

(b) *Land and credit market interaction*

Credit is obtained for many reasons, such as consumption smoothing and investment. Investment in land (including in particular land transactions) is critically important for the development of a market based economy and for the efficiency of the economy in general. It is therefore of interest to uncover any interactions between the credit and land markets. The credit and land sections of the ILSSA questionnaire were on this background designed to capture such relationships through a variety of questions; and it is apparent from the data that land (especially with a red book) is widely used as collateral in Vietnam.

In Long An province no less than 99 percent of the total number of loans involved collateral in the form of land with a red book. In Ha Tay, Phu Tho and Quang Nam the

corresponding shares were 31, 77 and 63 percent. Thus, land plays not only a significant – but a fundamental – role in determining the operation of the credit market, including who gets access to credit. The opposite statement cannot be made. There is almost no credit-based land acquisition reflected in the data as would be the case in a more developed market economy. Only six loans were granted for buying land during the period studied. This appears credible, partly since there is no evidence in the data that the use of loans was misstated, and partly because of the still underdeveloped nature of land ownership and land transactions in Vietnam.

(c) *Rural credit in 2002*

In this section we look in more detail at loans obtained in 2002. It is the most recent year from which data are available, and they provide the best up-to-date picture of the rural credit market in Vietnam. Table 5 illustrates some subtle differences between loans obtained in the different segments of the loan market. Arguably, the definition of the formal segment is broad (see the list of institutions in Appendix A). Nevertheless, the differences are illuminating.

[Table 5 about here]

The differences in terms of volume and loan size were already evident from Table 3. Loans from the formal sector have an average duration of 15 months. The duration is shorter in the interest carrying informal sector, but with an average of nine months, it is clear that this segment of the loan market is not only used for short term purposes. Borrowing from friends and relatives at zero interest is either for a short period or no specific duration is agreed for the loan. A total of 87 percent of the loans among friends have no formal length specified, suggesting that this kind of loan typically involves lending among family members or close friends. Around half (56 percent) of the interest carrying informal loans from private lenders also have no duration specified. This suggests that some households may be at risk of not generating enough income to enter into specified agreements, including regularly scheduled payments. Studying this group

in greater detail would be highly policy relevant from a vulnerability point of view, but is beyond the scope of this paper.

The default rate is the percentage of loans in each segment where households have defaulted, including non-payment of interest or repayment of the principal. The magnitude of the figures is hard to assess. One reason is that the principal is paid in full at the end of the loan term for most formal loans, so only interest payments are made regularly. Paying both interest and principal at the end of the agreed loan period is also quite common. Thus, an eight percent default rate within a period of one year (as shown in Table 5) is substantial if this involves non-payment of interest only. On the other hand, it is not clear from the data whether this payment came forward sometime later or whether the household simply stopped paying instalments on the loan.

Collateral is used for 70 percent of all formal loans whereas no collateral is needed in the informal sector. Land with red book is used as collateral in the majority of the loans. House and land without red book are also used, but to a lower degree, and there are as already alluded to significant regional differences in the use of collateral.

Table 5 confirms that Ha Tay and Phu Tho both have about 50 percent of the loans in the formal segment, whereas Long An and Quang Nam have much higher shares for this sector. In Long An almost 90 percent of the loans originate in the formal sector. This corresponds well with the perception that southern Vietnam (where Long An is situated) is relatively more 'market-based' than other regions of the country. Similarly, although households in Quang Nam obtain close to 80 percent of their loans in the formal sector, it is clear that very few households obtain any credit at all, reflecting the very underdeveloped nature of the economy of this province. The bottom of Table 5 provides information on the distribution of loans by different sources. The main difference is between Quang Nam and Long An, on the one hand, and Ha Tay and Phu Tho, on the other.

The above differences suggest that different segments in the loan market serve different needs. In Table 6 this is further explored by tabulating the use of loans in the three

credit segments. The formal sector focuses almost entirely on demand for production loans and asset accumulation.¹⁴ A higher share of loans from the informal sector is directed towards health expenditure and consumption. These loans are likely to be due to household shocks or unforeseen events. They carry a higher interest rate than those obtained in the formal sector, showing that households rely on loans from the informal sector to cope with shocks and unforeseen events due to lower transaction costs and more flexible terms of lending. It is also worth noting that more than 50 percent of the interest bearing loans from the informal sector is for production purposes, demonstrating the importance of this loan segment for the growth process of Vietnam.

[Table 6 about here]

4. DETERMINANTS OF CREDIT DEMAND

Basic characteristics and differences between the formal and informal credit markets were in focus above. In this section, an econometric framework is applied to identify more rigorously the level and determinants of credit demand at the household level. We restrict ourselves to credit demand in 2002 since this is the most recent year for which data are available and as such provide the most up-to-date picture of credit demand in Vietnam. Moreover, focusing on 2002 allows us to consider the explanatory variables relied on in this section as pre-determined as further discussed below.

In a setup where only matched (i.e. approved) loan applications are observable, the analyst cannot hope to identify correctly the characteristics affecting real credit demand at the household level. However, even with knowledge about rejected loan applications, identification of ‘self constrained’ households is normally complex and challenging. We are fortunate in the present paper that we have the information required to address these identification problems. Consequently, we are able to categorize households as demanding credit if they (i) obtained a loan, (ii) had a loan rejected or (iii) did not apply even if they wanted credit.

The underlying structural framework for analysing credit demand is a household production model with utility maximizing households, who demand credit (demand = 1) if a loan is expected to increase utility, and they do not demand credit (demand = 0) in the opposite case. If a household demands credit the size of the loan applied for is determined by variables related to the optimal investment if the loan is for investment purposes or the optimal consumption loan if the loan is for consumption. This framework leads to a hurdle model where demand for credit is first characterized by a probit model. Thus,

$$P(\text{demand} = 1) = \Phi(h(H_i, X_c, D_p)) \quad (1)$$

where h is a linear function of the vectors of explanatory variables: H_i is a vector of household characteristics, X_c captures village characteristics and D_p represents province dummies. The expected value of the amount of credit demanded given the household demands credit is described by a lognormal model such that:

$$\{\log(\text{loan amount}) | \text{demand} = 1, g(H_i, X_c, D_p)\} \sim N(g(H_i, X_c, D_p), \sigma^2) \quad (2)$$

The function $g(H_i, X_c, D_p)$ is a linear form of the same explanatory variables as in the probit model for whether or not to demand credit. The parameters in this stage can be estimated by OLS¹⁵. From the demand equation (1) and the level equation (2), the expected level of credit demand conditional on explanatory variables is given by:

$$E(\text{loan amount} | H_i, X_c, D_p) = \Phi[h(H_i, X_c, D_p)] \exp[g(H_i, X_c, D_p) + \sigma^2/2] \quad (3)$$

At the household level human capital controls include age and education of the household head, a proxy for the information level (a dummy capturing whether the newspaper ‘People’ is read or not), and productive assets. These are total land holdings, number of adults as a proxy for labour power, and feed expenditure as a proxy for the size of livestock holdings. We also control for the value of total household assets and the need for obtaining credit by including the number of dependents. Furthermore, a proxy is included to capture shocks at the household level in the form of a dummy

showing whether a household member was hospitalized within the last 12 months. The gender of the household head is also included, and we control for ‘connectedness’ through the use of a dummy, indicating whether anyone in the household has acquaintances in the existing credit institutions. Credit history is controlled for through the variable ‘not paid’ capturing whether a household has defaulted, i.e. not made a repayment on a loan in full or in part on a loan obtained prior to 2001. Finally, we take account of the influence of security of land tenure by including the share of household land area for which a red book is in hand.

Village level information includes distance to the district centre where VBARD/VBP has an office, and four province dummies capture whether households live in Ha Tay, Phu Tho, Quang Nam or Long An.

In the present analysis data for the following explanatory variables originate from the VHLSS 2002: age, gender, education, adults, dependents, animal feed, total assets, distance, information, and hospitalization. These data were collected about one year before the ILSSA survey. They therefore precede our information on credit demand in 2002 by about one year. This allows us to treat these data as pre-determined. In addition to the provincial dummies, data for the remaining explanatory variables, i.e. total land, connections, credit history and share of land covered by a red book, come from the ILSSA survey. Since land ownership was collected with a time dimension we can use the amount of land owned in 2001, which is exogenous to credit demand in 2002. Connectedness is measured by a dummy variable constructed based on responses to whether anyone in the sampled households has close personal contacts in the existing credit institutions that go beyond a standard customer relationship.

Two sets of summary statistics are given in Table 7. The first two columns show for each variable the number of observations for which data is available in the total sample of 932 households used in Section 3. However, information is missing on distance and total assets for respectively 40 and 15 households (with no overlap). In addition, two households had no land in 2001. Accordingly, the last five columns provide summary

statistics for the 875 households used in the empirical analysis, and they will be referred to as the full sample in what follows.¹⁶

[Table 7 about here]

It is clear from Table 7 that the reduction in sample size due to missing observations is not important. Means change very little. The age of the household head ranges from 22 to 93 years, and some 20 percent of households are female headed. In addition, the education variable confirms that household heads have on average more than six years of schooling. Other observations include that while the average land area is small (i.e. around two thirds of a hectare) there are indeed a few households with large landholdings and substantial assets in the form of livestock. Moreover, 19 percent of all households in the full sample had at least one member in hospital during 2002, and 21 percent of households read the newspaper 'People'. Finally, some 8 percent of households have defaulted on a loan, and 79 percent of the total household land area was registered with a red book.

We hypothesize that productive capital (land holdings, number of adults and livestock holdings) will affect the propensity to demand credit and the level demanded positively. For example, the greater the landholdings the more likely a farmer is to demand credit to provide access to fertilizer and other inputs. The coefficient on the education of the household head is likewise expected to have a positive sign as greater ability and human capital should affect investment possibilities. Similarly, being better connected, informed and with secure land rights in the form of red books should have a positive impact on credit demand. Finally, many dependents and a person hospitalized in the last 12 months are proxies for a higher probability of the household being in need of credit. They are thus more likely to have a loan demand.

A priori expectations about the signs of the variables capturing the age and sex of the household head and credit history are less clear. A number of different arguments may hold, so these variables are included as controls without well defined priors. The same can be said for the total asset base, which could theoretically affect the probability of

obtaining a loan both negatively and positively. A larger asset base would tend to make self financing of loans more viable. On the other hand, it may also improve the loan terms, which the household are offered, making it cheaper to obtain a loan.

It is expected that the distance (village) coefficient is negative. The further away the household lives from the district centre the more costly it is for the household to obtain the loan, due to for example travel costs. This argument will not necessarily hold if the household directs demand towards a local moneylender. Yet, in remote villages local moneylenders are likely to hold more monopoly lending power, demanding stricter repayment conditions (which we do not control for) and thus discourage demand for credit.

Table 8 reports results from estimation of equation (1) and (2) together with marginal effects. As explained previously the four regions where data is sampled from are diverse with respect to geography and economic development. To account for this and to investigate if coefficients differ between regions, variables of central interest were augmented with regional dummy interaction terms in the demand equation.¹⁷ Specifically, land holdings, education, distance to village centre, gender and the share of landholdings with a red book were interacted with regional dummy variables. We estimated this large model on the loan demand equation (results not reported) and retained in all subsequent regressions the interaction terms which were either individually significant or where the joint test of insignificance failed when including that variable. The procedure suggested that land area be augmented with a dummy for Long An province, distance with Quang Nam and Phu Tho dummy variables and possession of red book also with a Quang Nam dummy. The augmented variables are listed in the tables under their 'main' counterpart labelled with the province name for which the variable is augmented.

Apart from results on our full sample of 875 households, Table 8 shows the demand equation estimated on a sample which is reduced by removing 58 households, who obtained a zero interest loan from friends (column 4). The motives for demanding credit

in this situation may differ from the framework set up above, and we wish to uncover whether our results are robust to removing these households.

[Table 8 about here]

It emerges from Table 8 that the probit regressions based on the full and the reduced sample are actually quite similar. Magnitude, significance levels and signs are (with one insignificant exception) the same for all variables. Therefore, we focus on the results from the full sample.

The results confirm as expected that land is a statistically significant determinant of credit demand. However, the nature of this impact differs between Long An and the three other provinces. Outside Long An the probability of demanding credit increases with land size but this is not the case for the size of the loan. For Long An province the opposite is true. While the size of land holdings have virtually no impact on the probability of demanding credit, the amount obtained depends significantly on landholdings. However, in economic terms the effects are not large. In Long An, an extra 1,000 m² of land gives a 1.4 percentage point larger loan, whereas the probability of demanding credit goes up with 0.66 percentage points for an additional 1,000 m² in the three other provinces. There are as already referred to above many reasons for expecting that land should be significant, and it is reassuring that this is reflected in the data. The connectedness variable is positive, large and strongly significant, which confirms that being connected has clear and positive impact on credit demand. As indicated above no province differences were found for the connectedness variable, and no impact is found on the loan size. This suggests that connectedness works through increased knowledge of opportunities rather than through preferential treatment. The number of adults affects credit demand strongly both in terms of statistical and economic significance. An extra adult in the household increases the probability of demanding credit with more than 3 percentage points, *ceteris paribus*. Apart from increased investment possibilities more adults also increase the scope for demand for consumption loans. Assets and the proxy for livestock holdings (feed) have small or no effect on the probability of demanding credit, but they affect the credit amount given a

loan was obtained positively and significantly. The effects on loan size are small in economic terms. For instance, a doubling of livestock holdings (feed) from its mean level results in a 5 percent increase in loan size given the household obtains a loan. However, this result does confirm that when a household has productive assets (in this case livestock) the demand for credit goes up. The age of the household head is also significant, but the older the household head the less credit is demanded. This in all likelihood reflects that older people in the provinces studied are more settled and less likely to take new and capital demanding initiatives. Cultural values may play a role here as well.

Table 8 reveals very interesting differences in credit demand among the provinces under study. Recalling that Ha Tay is the base, there are large significant differences between Ha Tay and the three regional dummy variables for Phu Tho, Quang Nam and Long An. Controlling for other factors the demand for credit is lower in Phu Tho and Quang Nam than in Ha Tay and Long An (with a significant positive coefficient). Demand is lowest in Quang Nam, although not significantly lower than in Phu Tho, and highest in Long An. The differences have large economic significance as well. For otherwise similar households being located in Long An entails a 50 percent increase in the probability of demanding credit. This is further compounded when taking into account the differences in the amount of credit given a loan is obtained, and the marginal effects on the unconditional (on having a loan) expectation of household credit amount. These observations correspond well with the respective level of development of the provinces studied, and it confirms that credit issues are going to remain key challenges as the transformation of the Vietnamese economy proceeds. Apart from the effect of land holdings as discussed above, regional differences are also present with respect to distance from the village centre. Relative to Ha Tay province greater distance has a positive impact on the probability of demanding credit in Phu Tho. The opposite is the case in Quang Nam. While it is not obvious to see what is driving the result for Phu Tho, the finding for Quang Nam is in line with the prior expectation of this mountainous region. Finally, among the statistically significant variables, it is worth noting the coefficient on the variable ‘Red book’ – the share of land holding under the

red book. For Quang Nam the coefficient is large and positive while for the base (i.e. the other three provinces) it is small and negative.

It is important to keep in mind that pooling demand for formal and informal credit risks blurring the picture of rural credit demand. It is likely that there are differences in the way in which the various households and other characteristics affect formal credit relative to informal credit demand. Distance to the district centre (office of a formal lender) may for example be negatively related to demand for formal credit and positively related to demand for informal credit. It is also sensible to expect that households with a problematic credit history are more likely to demand credit through the informal market. Finally, it is probably also correct that negative shocks like having a household member hospitalized is more directly correlated with informal credit demand. Households may well perceive it as difficult to obtain consumption loans from formal credit sources.

To explore this, Table 9 presents results of probit regressions where formal and informal credit demand is studied separately in a bivariate probit model where non-independence in the error term is allowed for. Thus, using i to indicate households,

$$\begin{aligned} z_{1i} &= 1 \quad \text{if } z_{1i}^* = \beta_1 q_{1i} + \varepsilon_{1i} > 0, 0 \text{ otherwise} && (\text{demand for formal credit}) \\ z_{2i} &= 1 \quad \text{if } z_{2i}^* = \beta_2 q_{2i} + \varepsilon_{2i} > 0, 0 \text{ otherwise} && (\text{demand for informal credit}) \end{aligned} \quad (4)$$

where ε_{1i} and ε_{2i} have mean zero and unit variance (for normalisation), such that formally $(\varepsilon_{1i}, \varepsilon_{2i}) \sim \text{binorm}(0, 0, 1, 1, \rho_z)$, and ρ_z is the coefficient of correlation. q_j is a vector of explanatory variables with the first element being one, and β_j a conformable vector of coefficients to be estimated, $j = 1, 2$. Our interest is whether factors determining credit demand differ between the formal and informal sectors, thus we ask whether $\beta_1 = \beta_2$. The explanatory variables used here are the same as those relied on in Table 8.

The reported test for independence between the equations shows that the null hypothesis of independence cannot be rejected. Specifying an individual probit regression for each equation yields almost the exact same result (not reported) as the bivariate model.

Analogous to the results from the pooled formal and informal credit markets presented in Table 8, Table 9 shows determinants of logarithmic loan size and marginal effects conditioning on the households obtaining a loan in respectively the formal and informal sector (column 2, 3, 5 and 6).¹⁸

As regards the distinction between formal credit, on the one hand, and informal credit, on the other, it is clear why some of the insignificant statistical results were obtained in Table 8. Columns 1 and 4 of Table 9 show that countervailing impacts between the formal and informal credit market segments are involved when it comes to education, dependents, assets, credit history and the red books. They tend to make the overall effect on credit demand in Table 8 insignificant. An additional year of education of the household head significantly reduces the probability of the household demanding credit from informal sources. Also, regarding the formal segment, although education is insignificantly positive as a determinant of credit demand, it increases the size of the loan obtained with around 5 percent given a loan is obtained. In both the formal and informal market a household's asset base plays a significant role. For the formal market more assets increase the probability of demand credit; the opposite holds in the informal market. This is consistent with productive assets giving more opportunities for investments and therefore increased demand for credit from formal sources. On the other hand, a larger asset base makes borrowing less necessary in the case of negative shocks – hence, a lower probability of borrowing from the informal sector. If a loan is obtained, they tend to be larger in both segments. Arguably, this is due to easier access to collateral when the asset base is larger.

In addition to the observations outlined above two policy relevant differences are apparent between Table 8 and 9. The first relates to credit history (not paid). Recall that this dummy variable takes on the value one if the household has previously defaulted and zero otherwise. Pooling formal and informal credit demand yields a large positive

marginal effect of a 'bad' credit history, although, it should be kept in mind that the effect is insignificant. Table 9 suggests an explanation for this result. A bad credit history significantly increases the probability of demanding credit from an informal source – and the effect is large in economic terms. For the formal sector the effect is negative, though insignificant. While caution is needed in interpreting this finding, it is consistent with 'bad' credit history households being unable to secure loans in the formal sector and therefore address their demand towards the informal sector. The second issue is that of red book coverage of land holdings. A larger share of land with a red book means more secure land rights. This in turn should induce investments in productivity enhancements due to better ability to put up collateral and more secure access to returns from investments (Besley, 1995). In the pooled sample no such effect is evident, except from – insignificantly – the province of Quang Nam. Splitting the formal and informal credit market gives a large positive effect on formal credit demand bordering significance. Demand for informal credit is significantly and negatively affected by red book status suggesting that the red book enables households to obtain loans on better terms in the formal sector than those available in the informal sector.

It is of interest to look further at households, who obtained a loan from both a formal and an informal credit source. In total 29 households received a loan from both segments of the credit market in 2002. Given the limited number of households it is not feasible to make a combined formal analysis (i.e. via a trivariate probit estimation) of demand characteristics. Instead some important statistics is presented in what follows. For the 29 households over half (16) of the loans from the informal segment was from relatives carrying zero interest. The loans from relatives do not differ in the average loan amount compared to loans obtained from relatives by households not having loans from both sources. However, loans taken out from moneylenders charging interest are on average of half the size of the loans taken by other households. This is similar with the formal loans, which are also around half the size compared with the rest of the sample. Regarding the duration, informal loans tend to have lower and formal loans longer duration for households involved in both segments. It is difficult to arrive at one simple explanation consistent with these observed patterns. There is nothing to suggest that 29 households were rationed from formal lending, and therefore had to turn to the

informal segment of the credit market. Rather, it would seem that these households rely on formal lenders for longer term (i.e. longer than average) financing and on relatives and other private lenders for short term financing. However, a larger sample would be needed to unravel these explanations.

To sum up, the only variables in Tables 8 and 9 for which little systematic influence on credit demand can be uncovered one way or the other appear to be the information variable and hospitalization, which are admittedly rather crude proxies. Moreover, the data suggest as just alluded to that a key underlying distinction between formal and informal credit demand is that formal demand is particularly driven by factors such as total land and to a lesser extent by red book status. This reflects the need for credit for production and the management of assets whereas the effect of age does not differ. In contrast, informal credit is, in addition to being negatively associated with age and education positively dependent on the credit history (not paid) and on the number of dependents, reflecting household need to smooth consumption and address external shocks. When households have assets they are better able to manage these needs without relying on informal credit as reflected in the coefficient of total assets. Yet, being connected, for example, is statistically important throughout.

Finally, when it comes to provincial differences striking results stand out. In terms of the informal credit market Quang Nam and Long An have significantly less activity. For Long An this is more than compensated for by very high formal market participation relative to the base province of Ha Tay, whereas Quang Nam also has lower activity in the formal market (not significant). The province of Quang Nam is clearly a relatively underdeveloped province (as compared to Ha Tay) in terms of both formal and informal credit demand, whereas Long An stands out as the most developed province. All in all, the statistical results confirm that location specific circumstances (including the general level of development) are critical in understanding credit demand.

5. DETERMINANTS OF CREDIT RATIONING

(a) *Rationing by formal lenders, VBARD*

The Vietnam Bank for Agriculture and Rural Development (VBARD) is as shown in Table 2 by far the largest single lender to rural households in Vietnam, accounting for around one third of the total market in volume and more than half when loan size is accounted for.¹⁹ It is therefore central to rural development that credit is disbursed efficiently by the VBARD. While a complete evaluation of the lending practices of VBARD is outside the scope of the present paper, our data make it possible to identify both the characteristics of households, who obtained credit from VBARD, and the characteristics of households, who had their application turned down. The sample size for those, who got their application rejected, becomes fairly small, so results should be interpreted as indicative only.

[Table 10 about here]

Table 10 displays the mean values of the variables examined in Section 4. Total land holdings and total assets are larger for households, who were approved for a loan than for rejected households. However, the difference between the two groups is only statistically significant for total land holdings, likewise for sex and the dummies for Phu Tho and Long An. Households residing in Phu Tho are ‘overrepresented’ among the rejected households whereas the opposite holds for Long An. If any gender discrimination is present it is a bias against men. Worth noting is also that education and family size are both larger (although not significant) in the rejected group; and loan default rates are clearly important in explaining rejection, at least for other formal lenders and informal lenders. In the province of Quang Nam few households apply for a loan and few households are rejected, in line with the results for credit demand analysed in Section 4.

Given that VBARD specialises in production lending with relatively large loans compared to the other lending institutions (see Table 6) the findings in Table 10 are

sensible. They once again spell out that the regional differences in the credit market are substantial and they illustrate that VBARD is focusing its lending on relatively large land and livestock holders.²⁰

(b) *Characteristics of credit rationed households*

Earlier theoretical literature on rural credit markets in developing countries is based on the assumption that all households have a positive demand for credit (see Eswaran and Kotwal, 1989 and Braverman and Stiglitz, 1989). Thus, all households, who have not obtained credit within a given period, are considered credit rationed.²¹ Several more recent papers have, however, documented that this assumption may be too restrictive in empirical analysis, see Kochar (1997).

In this section we pursue this theme and identify factors at the household level, which influence the probability that a household with given characteristics is credit constrained. It would have been interesting to study the formal and informal sectors separately, but the number of households, who had loan applications rejected, is as already mentioned quite low.²² Nevertheless, the characteristics which influence credit rationing are likely to be at least similar in the formal and informal segments making it worthwhile to pursue the issue in the aggregated sample. Similarly, because of the sample composition, it is not feasible to augment variables with province level dummies. While this is a drawback, interesting results still emerge from the analysis.

Importantly, a household is defined as being credit rationed if it has *both* applied for a loan (in either the formal or the informal credit market) *and* had the application rejected.²³ In this setting the methodology differs from the one used in the section on credit demand. From household responses it can be established whether a household demands credit. However, for those households, who did not apply for credit, it is impossible to observe what the lender's decision would have been had those households actually applied. This sample selectivity issue is addressed by specifying a bivariate variant of Heckman's selection model (Wooldridge 2002) as follows:

$$\begin{aligned}
y_{1i} &= 1 \quad \text{if } y_{1i}^* = \delta_1 x_{1i} + u_{1i} > 0, 0 \text{ otherwise} && \text{(rationed)} \\
y_{2i} &= 1 \quad \text{if } y_{2i}^* = \delta_2 x_{2i} + u_{2i} > 0, 0 \text{ otherwise} && \text{(applied)}
\end{aligned} \tag{5}$$

Error terms are assumed to be bivariate normally distributed with zero mean, unit variance and correlation ρ_u . Thus $(u_{1i}, u_{2i}) \sim \text{binorm}(0, 0, 1, 1, \rho_u)$ and y_{1i} (i.e. a loan is approved or rejected) is observed only when $y_{2i} > 0$. The vectors of explanatory variables, x_{1i}, x_{2i} , have one as their first element. The second equation is our selection equation determining characteristics, which influence the household decision to apply for a loan ($y_{2i} = 1$). Results from Section 4 are used in specifying this selection equation.²⁴

Given that a household applies for credit ($y_{2i} = 1$), the outcome of the application process can be observed from the equation $1 - y_{1i} = 1$ if the household were awarded the loan and zero in the case of rejection. Characteristics at the household, commune and province level are aggregated together in respectively x_{1i} and x_{2i} to ease notation.

This simultaneous approach allows us to try to identify determinants of credit rationing taking into account the possible selection bias in households applying for credit. Testing for independence between the two equations is equivalent to testing the hypothesis that ρ_u equals zero.

[Table 11 about here]

Table 11 displays the results from four different specifications of the equation determining the probability of a household being rationed. The first column (base applied) shows the coefficients (not marginal effects) from the selection equation, including all of the variables used in Section 4. The same selection equation is used for all four specifications. Only results from the selection equation for the first specification are reported. Due to the simultaneous nature it differs slightly across specification.

Although not completely comparable – because of the difference in specification described above and since demanding and having applied for a loan differs in some circumstances, it is instructive to compare the results from the selection equation with those in Table 8. For the significant variables the results from the selection equation conform well with the demand equation in Table 8 – adding further robustness to the results. Thus, numbers of adults, livestock and being connected increase the probability of having applied for a loan. Also, residing in Quang Nam lowers the propensity to apply for a loan substantially whereas the opposite is true for Long An.

Our base specification of rationing is shown in column two (specification 1). We include only variables, which are believed to affect the borrower's ability to pay back the loan, and which are (at least in principle) observable to the lender, together with provincial dummies. Thus, we include land and assets, education,²⁵ feed expenditures as a proxy for livestock holdings, credit history and the share of land for which the borrower has a red book. This last variable is a proxy of the borrower's prospective for entering the land market to secure repayment of the loan. Arguably, the number of adults might also be a useful indicator of repayment ability. We do not include it in the rationed base since the lender is in effect unable to monitor the effort to repay. It might be possible for the lender to force sale of land in case of default, but not to force people to get an income-generating job. Including adults bring no qualitative changes to the result (not reported).

A bad credit history and education are significant with the expected signs. Also the coefficients for assets and the share of land with a red book have expected signs, although they fail conventional significance tests. The larger the share of land for which the household has a red book the lower the probability of being rejected credit. The sign of the coefficient on the land variable is contrary to prior expectations, but insignificant. The provincial dummies reveal significant differences in rationing given our controls among the four provinces studied here. Thus, the probability of having a loan application approved is, once we control for the propensity to apply for credit, statistically different among the various provinces considered here. Relative to Ha Tay, the households in the provinces of Phu Tho, Quang Nam and Long An all have lower

probabilities of having a loan rejected. The differences within these three provinces are not significant. The statistically significant results also carry economic significance. For instance, since in the sample around 9 percent of loan applications are rejected, a 6 percent increase in the probability of being rationed as a result of 'bad' credit history constitutes a large relative increase in the risk of being rejected. To a lesser extent the same can be said about the differences between Ha Tay and the other provinces.

Apart from land holdings, the only variable, which does not conform to our prior, is the proxy for livestock. A lender should be more willing to lend if the borrower has livestock which can be sold in case of default. In contrast, the coefficient on feed is positive, suggesting a greater possibility of being rejected, but the coefficient is insignificant.

Finally, the hypothesis of all coefficients (excluding the constant) being equal to zero in the rationing equation is rejected at less than 1 percent, and it appears that the selection framework is in the present case not strictly necessary as the independence of equations cannot be rejected.

In specifications 2, 3 and 4, we augment the rationed base regression with other variables from Table 8, but which should not in theory affect lender decisions given the information contained in the variables from the base regression. In column three (specification 2), we include age and gender of the head of household. It is evidently of interest to uncover whether systematic biases against women are present in the process of reviewing credit applications. We find no such bias here. Keeping in mind that the gender variable has woman household head as its base, the data suggest that women who apply for credit are in fact more likely than men to be approved for a loan. Again, note that the size of the marginal effect is not trivial. This result is statistically significant at the 10 percent level, whereas the corresponding age parameter is clearly insignificant. The gender result must be interpreted with caution. The nature of this issue is complex, and we recall that we do not have individual level information on loan allocations, only at household level. So robustness and channels of influence is an issue for further study. However, our result does correspond with observations made in

studies of the allocation of firm credit in Vietnam (see World Bank, 2005). With respect to the other base line variables, signs, magnitudes and significance levels are virtually unchanged for all variables. The test of independence of equations is rejected at the 10 percent level.

The third specification (in column 4) looks at the effect of distance to a district centre (distance) and a proxy for the household information level (information). We offer no prior expectations about the sign of the distance coefficient; but outreach is of particular concern, so insights on the importance of this variable is potentially important information in assessing how credit should be expanded in rural Vietnam. The rationed baseline variables remain virtually unchanged in terms of signs and magnitudes, except for the coefficients of provincial dummy variables Phu Tho and Long An which become marginally insignificant. In fact, specification 3 changes very little, and while distance has a negative and information a positive parameter, they are clearly statistically insignificant. Information has very little explanatory power with a t-value of 0.43, and the t-value of distance is not much higher at 0.18.

Finally, in the fourth specification we try to isolate the effect of being well connected (with respect to contacts in credit institutions). This is done by introducing a dummy variable (connections) equal to one if the household has contacts in any credit organisation. The estimated coefficient is negative and significant at 10 percent, which corresponds to stating that being well connected within credit institutions promotes the application process. Relative to the base specification, the coefficients are very robust to the inclusion of the connectedness variable. In this last specification the test of independence of equations cannot be rejected.²⁶

Looking at the four sets of simultaneous regressions overall it is evident that the signs of the coefficients in the base regression are very robust. Households with older heads are less likely to apply for credit. All else equal, elder households are less likely to undertake risks (i.e. apply for loan where repayment is uncertain), but when they apply they neither gain particular preferential treatment nor are they rationed. There is some evidence that males and females are treated differently in the application process, but

we interpret this result with caution as indicated above. It seems likely that better educated households are more likely to know when an application will be rejected and the data strongly suggest that once they have applied they are not being discriminated, quite the contrary. The better educated the household head, the better the probability of approval.

Feed, i.e. the measure of assets in the form of livestock, has the expected positive sign in the selection, but plays no role in rationing. This is slightly surprising since if a household decides to apply for a loan then – everything else equal – the ability to repay measured in terms of assets, which can be transferred to the lender should be negatively related to the probability of being rationed. Yet, we also note that the relevant parameters in the rationing equations are statistically insignificant.

Furthermore, as one would expect, the indicator for a bad credit history (not paid), which indicates that a household have defaulted on a loan instalment previously, is positively related to being credit rationed. Yet, it does not appear to deter household from applying in any statistically significant manner, although as noted in the previous section, demand for credit shifts from formal to informal lenders. While clearly important to rural credit, overall, the possession of a red book is not significant when it comes to the decision to apply, but there is some indication that those households who have a red book are less likely to be rationed. The variable controlling for connections has the expected sign in both the selection and rationing equations, but it is only significant at 10 percent level in the rationing equation. The household information level might be said to have the ‘wrong’ signs in both selection and rationing. We offer no convincing story for this result but note that this is statistically insignificant. The same goes for the distance parameter, though it should be kept in mind that the regressions in this section are pooled over formal and informal lending institutions. Turning to the province dummies, it is clear that provincial differences play a role as all three dummy variables are statistically significant in the majority of specifications. However, in case of rationing it seems that only Ha Tay differs significantly from the three other provinces.

In general the sign of most coefficients as analysed in this section are in line with what we expected a priori. We acknowledge that there are a few exceptions and that several variables lack statistical significance. However, we believe this is more likely to be a feature of the data not having enough variability in central variables. Given the regional differences pointed out above it is also likely that the dummy variables capture a bit too much of the differences in the data. Ideally and with unlimited data, interacting the dummies (as done in Section 4) with core variables to detect province specific effects would be desirable. This is left for future research when better data become available.

6. CONCLUSIONS

Little is known about the characteristics and the operation of the rural credit market in Vietnam. This paper was written with the aim of helping to fill this gap based on a new data set covering 932 households in four provinces (Ha Tay, Phu Tho, Quang Nam and Long An) surveyed in early 2003. In the formal analysis this data was complemented with information available in the 2002 Vietnam Household Living Standard Survey (VHLSS). A number of general observations emerge, which deserve close attention in efforts to further develop the existing credit system.

An active and growing rural credit market exists in Vietnam, and formal credit is clearly expanding its share of total credit. This is in line with the general rapid development of the economy, and overall interest rates have also fallen suggesting that market integration is in fact progressing. In parallel, a sizeable informal sector remains in existence, accounting for about one-third of all loans, and reflecting that poor rural households continue to rely on informal networks and relatives. Different segments in the loan market serve different needs, and we note that the formal sector focuses almost entirely on production loans and asset accumulation. In contrast, both the descriptive statistics and the formal analysis in this paper demonstrate that households actually demand loans for other purposes, such as consumption smoothing and health expenditures. Such loans are often obtained in response to temporary shocks (i.e. having a person hospitalized) and thus work as a consumption smoothing device.

Because of the limited formal lending for consumption smoothing, households direct this demand for credit at private money lenders. This may well be welfare enhancing if the money lenders offer alternatives preferred by the borrower. Yet, to the extent that the borrower can provide collateral (i.e. in the form of land) it should in theory make no difference to formal lenders whether a loan is used for production purposes or for temporary consumption smoothing. If the formal sector entered the market for non-production loans (on financially sustainable terms) this would provide borrowers with an alternative to private money lenders. This could well be welfare increasing, especially for marginalized low-income households. They have limited connections, and this characteristic is as shown in Sections 4 and 5 a strongly constraining factor for credit demand in both the formal and the informal sector. In the informal sector it is moreover typical that older and better educated households have less credit demand. In contrast, a larger number of dependents and a bad credit history tend to increase a household's informal credit demand. This does not necessarily reflect market failure, but it does suggest there is need and space for careful, well designed public action in expanding credit facilities. The social returns of such action may well be high.

Another key characteristic of the rural credit market in Vietnam is the one-way interaction with the land market. Land (with a red book) is widely used as collateral and plays a fundamental role in the operation of the credit market. Land is a statistically significant determinant of overall credit demand. This result is as shown in Section 4 driven by formal credit demand geared towards production purposes and asset management. This further reinforces the above conclusion about the need for carefully metered public action; but it is in parallel striking that there is almost no credit-based land acquisition in rural areas. This highlights the very considerable challenges, which remain to be addressed in establishing the necessary market based institutional framework for a more efficient functioning of the economy.

It comes as no surprise that land is widely used as collateral. Land is immobile and its quality cannot be changed at short notice. Yet, an active land market depends critically on a well functioning credit system for land transactions. The lack of such a market is

due to both supply (i.e. lending institutions do not generally finance land transactions) and to the demand side. Accordingly, the land section of the present household survey reveals that the land market among non-relatives is very thin indeed. However, productivity increases in rural agriculture will depend crucially on land consolidation and development in the years to come. The demand for loans to finance land transactions may appear small at present, but formal lending institutions should actively prepare for a more active role in this market. This will as well require that complementary institutions are put in place with the capacity to value land, and also an effective legal system to solve potential land disputes will be required.

The most striking and cross-cutting general insight emerging from this paper is the extent of regional differences in almost all aspects of the credit market. Some broad national generalizations are as already discussed possible. At the same time, it is in designing public policy indispensable to be very careful about the region, the household group and the market segment in question. The formal sector accounts for around 50 percent of loans in Ha Tay and Phu Tho. Long An and Quang Nam have much higher shares, but this characteristic is a reflection of very different levels of development in these two provinces. Few households in Quang Nam obtain credit, and credit demand in this province is clearly limited compared to the other provinces in our sample. This is so both overall and in the various market segments. Pooling demand for formal and informal credit may blur the picture of rural credit demand. Countervailing effects are at work between the formal and informal credit segments when it comes to education, distance, credit history and also the provincial dummy effects differ.

In sum, the econometric analysis confirms that specificity and the general level of development are fundamental in understanding credit demand in Vietnam. A ‘one size fits all’ approach to expanding credit is not going to be the most effective. This dimension therefore needs to be kept in mind in the planned expansion of rural credit through the Vietnam Bank for Social Policies. The VBSP aims at operating a large number of new branches throughout Vietnam (World Bank, 2003). An additional observation in this regard is that expansion needs to be carefully metered to take account of the need for credit in areas where access is presently low – such as in Quang

Nam. In Ha Tay and Phu Tho the informal sector is sizeable and as such compensate for an insufficiently developed formal sector, whereas the formal market is already much better developed in Long An. It is in this context also to be noted as shown in Section 5 that VBARD is focusing its lending on relatively large land and livestock holders. We stress that regional differences in credit rationing seems to be limited, although there are small differences showing up once selection is accounted for. In Quang Nam few households apply for credit and few are rejected. On the other hand, the analysis in Section 5 reveals that households with a bad credit history are more likely to get rationed. This merits attention as these households in all likelihood include those households, who are subject to shocks and who find it difficult to manage their lives. To detect province specific effects, it would, given the regional differences pointed out above, be desirable to inter-act the provincial dummy variables with a larger number of core variables. Yet, this is left for future research when better data become available, and the same goes for the challenge of establishing the degree of credit rationing which households experience.

NOTES

¹ See for example Kovsted et al. (2004).

² Diagne, Zeller and Sharma (2000) provide a series of other references.

³ See Duong and Izumida (2002) and McCarty (2001) for earlier work on rural credit and microfinance issues in Vietnam.

⁴ For documentation and the questionnaire used see Barslund et al. (2004).

⁵ Some 28 households interviewed during the VHLSS could not be interviewed and had to be excluded in the ILSSA survey.

⁶ The following website http://www.worldbank.org.vn/data/household_survey.htm provides access to a complete description of the 2002 VHLSS and the questionnaire.

⁷ Retrospective questions always entail a risk of imprecise or erroneous answers. However, obtaining a loan is not an 'every year' event and as such is more likely to be remembered correctly than more recurring events. Furthermore, taking out a loan often coincides with 'big' events such as major shocks or purchases, which are likely to be recalled correctly.

⁸ The credit market section of the ILSSA survey is Module B (questions 168-224), with three sections: B1 for loans actually received, B2 for loans not received, and B3 on general questions.

⁹ The VBP has recently been renamed the Vietnam Bank for Social Policies (VBSP). VBARD and VBP are associated in the sense that they often share office facilities. See World Bank (2003) and Kovsted et al. (2004) for a more detailed description of the institutional set up.

¹⁰ Private Trader was also a category in the questionnaire. It turned out that this group does not play an important role in the credit market in the four provinces studied.

¹¹ See appendix A for the full list of institutions included in the questionnaire.

¹² If loans for primary consumption are only obtainable from informal sources and there is a general increase in incomes, which makes consumption loans less needed, a change in the composition of loans may be expected. Similarly if it is easier to obtain loans for specific purposes such as production, rather than for consumption smoothing or health purposes.

¹³ The questions were, respectively: "What was the stated purpose of the loan (select one for each loan)?" and "What did your household mainly use the loan for (select one for each loan)?"

¹⁴ This includes buying/building a house, the few instances of buying land and re-lending and buying other assets.

¹⁵ Only households obtaining a loan were used in this stage, since loan amounts are not available for rejected and self-constrained households.

¹⁶ All regressions were also carried out on a sample excluding outliers, defined as observations, situated outside an interval of three standard deviations from the mean. All qualitative results remained unchanged. Full tables are available on request.

¹⁷ We are not able to specify a fully unconstrained model (i.e. with regional interaction terms on all variables). Our data are sampled in clusters (46 different clusters/enumeration areas) and, thus, have less degrees of freedom in our estimation procedures than with an 'unclustered' approach. The advantage is that the significance of our statistical results are robust to observations being independent between but not within clusters. Assuming independence of all observations strengthens our results considerably.

¹⁸ Self-rationed households did not indicate in which sector they would have applied if they had applied for a loan. Thus, self-rationed households were treated as not demanding credit in the sector specific analysis.

¹⁹ The second most important state bank, Vietnam Bank for the Poor (VBP) has recently been reorganised and is now operating under the umbrella of the Vietnam Bank for Social Policies (VBSP), which is scheduled for a large expansion in the years to come (World Bank, 2003).

²⁰ While a general characteristic, this effect does to some extent reflect higher BARD lending activity in Long An, which also tends to have larger farms.

²¹ In what follows, the terms credit constrained and credit rationed are used interchangeably.

²² In 2002, 25 households in the sample of the 875 had their loan application rejected by a lending institution (formal and informal). For the sample of 932 households the number was 29 households.

²³ In fact a household may be approved for a loan smaller than it applied for. These households are also to some extent credit rationed. We asked questions about amount obtained, amount wanted and amount applied for to identify households rationed in the loan amount. In our sample 21 households reported (credibly) that they were rationed in the amount they obtained in 2002. For simplicity these households

are considered not rationed in the present study. The qualitative results hold if we include the 21 household (except three households which were rationed in large loan amounts) as rationed.

²⁴ It is recalled that the definitions for households demanding credit and applying for credit differ as described above.

²⁵ See Nga Nguyet Nguyen (2004) who reports significantly increasing returns to schooling in recent years.

²⁶ A fifth specification with the remaining three variables from Table 8, i.e. including Adults, Dependents, and Hospitalization was also carried out. This changed none of the key results discussed, and provided no further insights except that the number of dependents is potentially important. This specification is therefore left out here, but results are available on request.

REFERENCES

- Barslund, M., Tarp, F., Nguyen Huu Dzung, and Dao Quang Vinh, (2004). Documentation of the Vietnam Access to Resources Household Survey (VARHS) 2002. Available at <http://www.econ.ku.dk/ftarp/> and on request from the authors.
- Besley, T., (1995). Property Rights and Investment Incentives: Theory and Evidence from Ghana. *Journal of Political Economy*, Vol. 103, pp. 903-937.
- Braverman, A., Stiglitz, J.E., (1989). Credit Rationing, Tenancy, Productivity, and the Dynamics of Inequality. In Bardhan, P. (ed.), *The Economic Theory of Agrarian Institutions*. Oxford University Press., New York.
- Cameron, A.C. & Trivedi, P.K., (2005). *Microeconometrics – Methods and Applications*. Cambridge University Press, New York, USA.
- Chaudhuri, S., (2001). Interaction of Formal and Informal Credit Markets in Backward Agriculture: A Theoretical Analysis. *Indian Economic Review*, Vol. 36(2), pp. 411-428.
- Diagne, A., (1999). Determinants of Household Access to and participation in Formal and Informal Credit Markets in Malawi. Food Consumption and Nutrition Division (FCND) Discussion Paper 67, IFPRI, Washington.
- Diagne, Al., Zeller, M. and Sharma, M., (2000) Empirical Measurement of Households' Access to Credit and Credit Constraints in Developing Countries: Methodological Issues and Evidence. Food Consumption and Nutrition Division (FCND) Discussion Paper 90, IFPRI, Washington.
- Duong, P. B. and Izumida, Y., (2002). Rural Development Finance in Vietnam: A Microeconomic Analysis of Household Surveys. *World Development*, Vol. 30(2), pp. 319-335.
- Eswaran, M. and Kotwal, A., (1989). Credit and Agrarian Class Structure. In Bardhan, P. (ed.), *The Economic Theory of Agrarian Institutions*. Oxford University Press, New York.
- Feder, G., Lau, L.J., Lin, J.Y. and Xiapeng, L., (1990). The Relationship between Credit and Productivity in Chinese Agriculture: A Microeconomic Model of Disequilibrium. *American Journal of Agricultural Economics*, Vol. 72(5), pp. 1152-1157.
- Gupta, M. R. and Chaudhuri, S., (1997). Formal Credit, Corruption and the Informal Credit Market in Agriculture: A Theoretical Analysis. *Economica*, Vol. 64, pp. 331-343.
- Hoff, K. and Stiglitz, J. (1993). Imperfect Information and Rural Credit Markets: Puzzles and Policy Perspectives, pp. 33-52 in K. Hoff, A. Braverman and J. Stiglitz (eds.) *The Economics of Rural Organization: Theory, Practice and Policy*, Oxford University Press, Oxford.
- Jappelli, T., (1990). Who is credit constrained in the U.S? *Quarterly Journal of Economics*, Vol. 105(1), pp. 219-234.
- Kochar, A., (1997). An Empirical Investigation of Rationing Constraints in Rural Credit Markets in India. *Journal of Development Economics*, Vol. 53, pp. 339-371.

- Kovsted, J., Rand, J. and Tarp, F., (2004). *From Monobank to Commercial Banking: Financial Sector Reforms in Vietnam*. NIAS Press, Copenhagen.
- McCarty, A., (2001). Microfinance in Vietnam: A Survey of Schemes and Issues, Survey commissioned by the British Department of International Development (DFID) and the State Bank of Vietnam (SBV). Available from: <http://ideas.repec.org/p/wpa/wuwpfi/0110001.html>
- Mekong Economics, (2004). Access to Resources. A study available at <http://www.mekongeconomics.com/publications/Access%20to%20Resources%20.doc>
- Mohieldin, M. S. and Wright, P., (2000). Formal and Informal Credit Markets in Egypt. *Economic Development and Cultural Change*, Vol. 48(3), pp. 657-670.
- Nguyen N.N., (2004). Trends in the Education Sector. Chapter 12 (pp. 425-465) in Glewwe, P., Agrawal, N. and Dollar, D. (eds) *Economic Growth, Poverty, and Household Welfare in Vietnam*. World Bank, Washington.
- Petrick, M., (2005). Empirical Measurement of Credit Rationing in Agriculture: A Methodological Survey. *Agricultural Economics*, Vol. 33(2), pp. 191-203.
- Platteau, J-P., (1997). Mutual Insurance as an Elusive Concept in Traditional Rural Communities. *Journal of Development Studies*, Vol. 33(6), pp. 764-796.
- Yadav, S., Otsuka, K., and David, C.C., (1992). Segmentation in Rural Financial Markets: The Case of Nepal. *World Development* Vol 20(3), pp. 423-436.
- Zeller, M., (1994). Determinants of Credit Rationing: A Study of Informal Lenders and Formal Credit Groups in Madagascar. *World Development*, Vol. 22(12), pp. 1895-1907.
- Von Pischke, J.D. and Adams, D.W., (1980). Fungibility and the Design and Evaluation of Agricultural Credit Projects. *American Journal of Agricultural Economics*, Vol. 62(4), pp. 719-726.
- World Bank (2003). Vietnam Development Report 2004. Hanoi.
- World Bank (2005). Vietnam Development Report 2006. Hanoi.
- Wooldridge, J.M., (2002). *Econometric Analysis of Cross Section and Panel Data*. MIT press, Massachusetts, US.

APPENDIX A

Lending institutions in the questionnaire:

Bank for the Poor (includes National Poverty Alleviation Program)

Bank for Agriculture and Rural Development

Other State-Owned Bank

National Employment Generation Program

Other National Government Program

Other (non National) Poverty Alleviation Program

Private Bank

Farmers' Union

Veterans' Union

Women's Union

People's Credit Funds

Other Credit Associations

Private Trader

State Owned Enterprise (SOE)

International Organisation

Private Money Lender

Friends/Relatives

Other (please specify)

APPENDIX B

List of variables

Name in tables	Definition	Source
Demand for credit	Dummy variable equal to 1 if household demanded credit in 2002	ILSSA 2002
Age	Age of household head in years	VHLSS 2002
Total land	Total landholdings in 1,000 m ²	ILSSA 2002
Gender	Dummy variable equal to 1 if the household is male and equal to 0 if household head is female	VHLSS 2002
Education	Education of household head, number of years of schooling	VHLSS 2002
Adults	Number of adults defined as household members between 15 and 65 years of age and not studying	VHLSS 2002
Dependents	Number of dependents are full time students and household members aged less than 15 or above 65 years	VHLSS 2002
Feed	Expenditures on livestock feed during last 12 months in mill. Dong	VHLSS 2002
Province dummies	Ha Tay, Phu Tho, Quang Nam, Long An.	ILSSA 2002
Total assets	Total value of assets in mill. Dong	VHLSS 2002
Distance	Distance to district centre in km	VHLSS 2002
Hospitalization	Dummy variable equal to 1 if at least one household member hospitalized within the last 12 months and equal to 0 is no member hospitalized	VHLSS 2002
Connections	Dummy variable equal to 1 if anyone in the household has contacts in the existing credit institutions	ILSSA 2002
Red book	The share of household land area for which a red book is in hand	ILSSA 2002
Information	Dummy variable equal to 1 if the household reads the newspaper People	VHLSS 2002
Alternative information	Index where having a radio counts 0.5 and a television 1	VHLSS 2002
Got help	Dummy equal one if the household at some point prior to 2001 got help from the authorities to apply for a loan	ILSSA 2002
Not paid	Dummy equal one if the household did at some point prior to 2001 not pay a loan instalment in full	ILSSA 2002

TABLES

Table 1. *Households distributed by number of loans obtained, 1997-2002*

Number of loans	Frequency	By province (percent)			
		Ha Tay	Phu Tho	Quang Nam	Long An
0	289	29	18	53	23
1	211	19	25	40	7
2	149	22	24	4	12
3	112	17	17	1	11
4	52	6	8	1	6
5	119	7	8	1	40
Total	932	100	100	100	100

Source: Authors' calculations based on ILSSA Access to Resources Survey 2003.

Table 2. *Distribution of loans by source (percent)^a*

	1999		2002	
	Unweighted	Weighted by loan amount	Unweighted	Weighted by loan amount
VBP	11	5	5	2
VBARD	44	64	38	56
Private lenders	8	6	11	4
Relatives	23	15	24	13
Union	9	3	12	7
Others	5	7	10	18
Total	100	100	100	100

Source: Authors' calculations based on ILSSA Access to Resources Survey 2003.

Note: 'Unweighted' refers to the simple distribution of the number of loans. 'Weighted by loan amount' indicates the distribution of loans where each loan is weighted with loan size.

^a VBP (Vietnam Bank for the Poor, now Vietnam Bank for Social Policies, VBSP), VBARD (Bank for Agriculture and Rural Development), Private Lenders (Private moneylenders and traders, and friends charging interest), Relatives (relatives and friends charging zero interest), Union (Farmers'/Veterans'/Women's Unions and People's Credit Funds), Other (Other institutions not mentioned above – see Appendix A)

Table 3. *Rural credit, 1997-2002*

	1997	1998	1999	2000	2001	2002
<i>Formal</i>						
Loan size ('000 Dong) ^a	5,191	4,657	4,583	5,360	6,400	8,426
Interest (percent per month)	1.2	1.1	1.0	0.9	0.9	0.9
Number of loans	70	130	168	223	279	250
<i>Informal – interest</i>						
Loan size ('000 Dong)	3,222	7,686	3,196	3,206	2,468	3,904
Interest (percent per month)	3.8	3.8	3.6	3.0	3.0	1.8
Number of loans	9	18	24	31	47	55
<i>Relative – zero interest</i>						
Loan size ('000 Dong)	4,175	2,107	2,375	2,522	3,558	2,602
Interest (percent per month)	0	0	0	0	0	0
Number of loans	20	29	51	69	76	84
<i>Total</i>						
Loan size ('000 Dong)	4,807	4,548	3,983	4,547	5,403	6,529
Interest (percent per month)	1.2	1.2	1.0	0.9	1.0	0.8
Number of loans	99	177	243	323	402	389
<i>Consumer price inflation</i>						
Monthly consumer price inflation (pct.)	0.26	0.62	0.34	-0.13	-0.03	0.33
<i>Distribution by source, unweighted (percent)</i>						
Formal	71	73	69	69	69	64
Informal	9	10	10	10	12	14
Relative	20	16	21	21	19	22
<i>Distribution by source, weighted by loan size (percent)</i>						
Formal	76	75	80	81	82	83
Informal	6	17	8	7	5	8
Relative	18	8	13	12	12	9

Sources: Authors' calculations based on ILSSA Access to Resources Survey 2003 and IMF, World Economic Outlook Database, September 2006.

Note: 'unweighted' and 'weighted by loans size' as defined in Table 2.

^a At the time of the survey in January 2003 the exchange rate was around 14,000 VND per USD.

Table 4. *Loan use (percent of total loans each year), 1997-2002*

Year	Repayment of				General consumption
	Production	existing loan	Asset accumulation	Health	
1997	69	3	18	9	2
1998	70	2	11	3	15
1999	74	2	14	4	6
2000	73	3	11	4	9
2001	71	3	12	6	9
2002	68	4	12	6	11

Source: Authors' calculations based on ILSSA Access to Resources Survey 2003.

Table 5. *Characteristics of loans obtained, 2002*

	Formal segment	Informal segment				
		Private lenders	Friends (zero interest)			
Number of loans	250	55	84			
Loan amount (1,000 Dong)	8,426	3,904	2,602			
Duration (average number of months)	15 (N=248)	9 (N=24)	4 (N=11)			
– Unspecified duration (percent)	1	56	87			
Interest (percent per month)	0.87	1.78	0			
Collateral (percent of loans)	71	0	0			
Partial default ^a (percent)	8	11	1			
<i>Provinces:</i>	<i>Pct.</i>	<i>Pct.</i>	<i>Pct.</i>			
– Ha Tay (percent) (N=126)	52	14	35			
– Phu Tho (percent) (N=106)	50	21	29			
– Quang Nam (percent) (N=24)	77	8	15			
– Long An (percent) (N=118)	88	10	2			
<i>Distribution of loans by source and province (weighted by loan size)</i>						
	VBP	VBARD	Private lenders	Relatives	Union	Others
– Ha Tay (percent) (N=126)	3	32	6	22	14	22
– Phu Tho (percent) (N=106)	4	42	10	27	7	12
– Quang Nam (percent) (N=24)	4	73	2	6	3	11
– Long An (percent) (N=118)	1	76	2	3	1	18

Source: Authors' calculations based on ILSSA Access to Resources Survey 2003.

^a Partial default is the default rate measured as the percentage of loans where households have defaulted.

Table 6. *Use of loan by credit source (percent), 2002*

Use of loan:	Formal segment (N = 250)	Informal segment		Total
		Private lenders (N = 55)	Relatives (zero interest) (N = 84)	
Production	81	55	36	68
Repayment of other loans	4	9	1	4
Asset accumulation	9	5	23	12
Health expenditure	3	11	12	6
Consumption	3	20	29	11
Total	100	100	100	100

Source: Authors' calculations based on ILSSA Access to Resources Survey 2003.

Table 7. Demand for credit: summary statistics, 2002^a

	N ^b	Mean	N ^c	Mean	Std. dev.	Min	Max
Demand for credit	932	0.34	875	0.367	0.48	0	1
Age	932	47.74	875	47.61	14.31	22	93
Total land (1,000 m ²)	932	6.33	875	6.49	15.44	0.02	177
Total land squared	932	265.5	875	280.2	1874.4	0.00	31,152
Gender (male=1)	932	0.80	875	0.81	0.40	0	1
Education	932	6.33	875	6.47	3.35	0	12
Adults	932	2.44	875	2.46	1.21	0	10
Dependents	932	1.93	875	1.96	1.18	0	6
Feed (mill. Dong)	932	1.38	875	1.44	4.91	0	80
Ha Tay	932	0.35	875	0.35	0.48	0	1
Phu Tho	932	0.21	875	0.22	0.42	0	1
Quang Nam	932	0.23	875	0.21	0.41	0	1
Long An	932	0.21	875	0.22	0.41	0	1
Total assets (mill. Dong)	917	12.86	875	13.02	20.91	0	370
Total assets squared	917	589.4	875	606.3	4938.0	0	137,122
Distance (km)	892	8.82	875	8.75	8.98	0	40
Information	932	0.22	875	0.21	0.41	0	1
Hospitalization	932	0.20	875	0.19	0.40	0	1
Connections	932	0.52	875	0.52	0.50	0	1
Red book	930	0.78	875	0.79	0.35	0	1
Not Paid	932	0.08	875	0.08	0.27	0	1

Source: Authors' calculations based on ILSSA Access to Resources Survey 2003.

^a For complete definitions see Appendix B.

^b Total number of observations available for each variable.

^c Number of observations used in the empirical analysis. The full sample used contains 875 households due to missing data on distance and total assets for a total of 55 households, and two households had no land in 2001.

Table 8. *Determinants of credit demand, 2002*

Dependent variable according to column headings.	Full sample						Reduced sample ^d	
	Probit (demand=1) Marginal effects ^a		OLS ^b Log(amount) if demand=1		Marginal effects ^c $\frac{\partial E(\text{amount})}{\partial x}$		Probit (demand=1) Marginal effects ^a	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Age	-0.41***	(0.12)	0.0071	(0.0059)	-12.4	(12.6)	-0.30**	(0.12)
Land	0.65**	(0.33)	-0.0004	(0.0030)	43.7	(46.7)	0.60**	(0.28)
- Long An	-0.66*	(0.34)	0.0140***	(0.0041)	-9.5	(54.6)	-0.63**	(0.30)
Gender (male=1)	-6.46	(4.40)	0.2550	(0.2003)	70.4	(408.3)	-2.74	(5.09)
Education	-0.07	(0.59)	0.0336	(0.0262)	43.6	(60.0)	-0.03	(0.57)
Adults	3.25**	(1.32)	-0.0610	(0.0590)	64.6	(148.1)	3.41***	(1.31)
Dependents	0.81	(1.35)	-0.0038	(0.0672)	34.5	(144.6)	0.56	(1.53)
Feed (mill. Dong)	0.63*	(0.34)	0.0374***	(0.0102)	107.5**	(53.7)	0.64*	(0.34)
Total assets (mill. Dong)	0.10	(0.08)	0.0077**	(0.0031)	20.8**	(9.3)	0.14*	(0.07)
Distance (km)	-0.45	(0.49)	-0.0212	(0.0154)	-65.7	(51.7)	-0.51	(0.54)
- Phu Tho	1.49**	(0.62)	0.0089	(0.0154)	97.8	(68.3)	1.65***	(0.63)
- Quang Nam	-1.48**	(0.72)	0.0184	(0.0474)	-61.9	(240.2)	-1.62	(1.09)
Information	-3.73	(4.43)	0.2715	(0.1903)	344.6	(425.1)	-3.76	(4.72)
Hospitalization	1.83	(4.66)	0.0941	(0.1873)	324.7	(426.3)	0.21	(4.55)
Connections	12.55***	(3.52)	-0.0188	(0.1386)	678.2*	(390.9)	11.75***	(3.56)
Red book	-0.90	(4.84)	0.2155	(0.2704)	397.9	(615.4)	1.04	(5.32)
- Quang Nam	27.47	(19.74)	0.5103	(0.6656)	6097.3	(10,776)	20.10	(19.60)
Not Paid	6.43	(6.01)	-0.1263	(0.2782)	112.0	(706.9)	4.22	(6.08)
Phu Tho	-14.38***	(4.86)	-0.4179**	(0.1974)	-1282.7**	(581.6)	-14.93***	(4.65)
Quang Nam	-31.98***	(12.34)	-0.2901	(0.7274)	-36215.4	(8.8E7)	-21.47	(15.09)
Long An	20.91***	(6.48)	0.6716**	(0.2679)	3187.2*	(1643.2)	27.67***	(7.27)
Constant	..	..	7.112***	(0.4409)	..	..	..	..
Test: all coefficients are zero	Wald chi2(21) p-value = 0.0000	..	F(35,44) p-value = 0.0000	..	..	..	Wald chi2(21) p-value = 0.0000	..
Goodness of fit	Mcfadden R ² = 0.13	..	R ² = 0.35	..	..	..	Mcfadden R ² = 0.15	..
Number of observations (clusters)	875 (46)	..	293 (45)	..	875	..	817 (46)	..

Source: Samples from ILSSA Access to Resources Survey 2003 as described in the main text.

Note: Standard errors in parenthesis. Level of significance robust for clustering at the enumeration area throughout. *, **, ***significant at 10, 5 and 1 percent, respectively.

^a Coefficients on continuous variables measure the marginal effect in percentage points on the probability of demanding credit, whereas they measure the effect of discrete changes for the dummy variables. All marginal effects are evaluated at sample means.

^b Coefficients (semi-elasticities) from OLS regression on log(loan amount). Only received loans included.

^c Marginal effects of coefficients on the unconditional expectation of loan amount evaluated at sample means. Robust standard errors obtained by non-parametric bootstrap with a 1000 replications.

^d The reduced sample excludes 58 households from the full sample, who obtained a zero interest loan from friends.

Table 9. *Determinants of formal and informal credit demand*

Dependent variable according to column headings.	Demand Formal (Full sample)						Demand informal (Full sample)					
	Probit (demand=1)		OLS ^b Log(amount) if demand=1		Marginal effects ^c $\frac{\partial E(\text{amount})}{\partial x}$		Probit (demand=1)		OLS ^b Log(amount) if demand=1		Marginal effects ^c $\frac{\partial E(\text{amount})}{\partial x}$	
	Marginal effects ^a						Marginal effects ^a					
	(1)	(2)	(3)	(4)	(5)	(6)		(4)	(5)	(6)		
Age	-0.24**	(0.10)	0.014*	(0.008)	0.64	(9.3)	-0.23***	(0.08)	0.004	(0.009)	12.6***	(4.0)
Land	0.32**	(0.14)	0.010	(0.007)	35.7***	(10.2)	0.01	(0.09)	-0.016**	(0.008)	-4.6	(3.8)
- Long An	-0.25	(0.16)	-0.000	(0.007)	-18.7**	(9.3)	-0.03	(0.13)	0.109	(0.083)	14.0	(44.4)
Gender (male=1)	-3.38	(4.01)	0.196	(0.239)	-59.8	(315.0)	-3.11	(2.51)	0.581**	(0.269)	136.9	(143.1)
Education	0.48	(0.49)	0.052**	(0.025)	102.7***	(31.2)	-0.75**	(0.34)	-0.015	(0.040)	-31.5	(20.4)
Adults	2.82**	(1.09)	-0.058	(0.086)	106.0	(98.5)	0.67	(0.74)	-0.178*	(0.104)	-47.5	(54.7)
Dependents	0.09	(1.33)	0.022	(0.080)	31.4	(91.5)	1.54*	(0.79)	-0.042	(0.123)	7.7	(55.3)
Feed (mill. Dong)	0.53**	(0.27)	0.016***	(0.003)	51.5***	(8.7)	0.33**	(0.15)	0.058***	(0.005)	40.0***	(9.7)
Total assets (mill. Dong)	0.17***	(0.06)	0.005**	(0.002)	16.2***	(3.2)	-0.17***	(0.06)	0.026**	(0.012)	5.7	(6.2)
Distance (km)	-0.53	(0.39)	-0.017	(0.012)	-53.7***	(16.0)	0.03	(0.26)	0.006	(0.024)	16.4	(10.4)
- Phu Tho	1.06**	(0.49)	-0.008	(0.016)	52.8***	(20.0)	0.35	(0.33)	-0.016	(0.040)	-2.7	(18.2)
- Quang Nam	-1.03	(1.00)	-0.022	(0.064)	-77.5	(64.4)	-0.39	(0.43)	0.034	(0.033)	-13.6	(14.4)
Information	-1.63	(3.94)	-0.140	(0.250)	-237.8	(340.4)	-2.27	(2.15)	0.628**	(0.258)	139.8	(217.2)
Hospitalization	-0.90	(3.01)	0.250	(0.220)	267.1	(433.0)	4.44	(3.25)	0.192	(0.246)	396.3	(307.5)
Connections	6.96**	(2.70)	0.153	(0.132)	648.3**	(279.7)	6.74***	(2.33)	-0.278	(0.238)	261.7**	(130.7)
Red book	7.63	(4.84)	-0.302	(0.232)	207.8	(283.6)	-5.27*	(3.17)	0.417	(0.455)	39.0	(220.9)
- Quang Nam	11.17	(18.11)	1.102	(0.667)	1817.3**	(710.1)	7.83	(9.34)	-1.897	(3.970)	-573.6	(1878.6)
Not Paid	-0.79	(4.37)	-0.048	(0.392)	-144.9	(541.1)	7.38*	(4.35)	-0.280	(0.543)	-14.2	(250.1)
Phu Tho	-4.50	(4.50)	-0.432	(0.281)	-679.4**	(312.1)	-1.04	(4.21)	-0.529	(0.681)	-184.0	(292.6)
Quang Nam	-8.89	(16.75)	-0.384	(0.492)	-843.8	(981.1)	-15.4***	(4.62)	1.228	(3.355)	-330.4	(885.7)
Long An	29.91***	(8.51)	0.793***	(.275)	4458.4***	(1288.2)	-8.18***	(2.92)	-0.487	(0.730)	-420.5	(316.4)
Constant	..	7.33***	(.430)	..	..	..	..	7.12***	(0.659)	..	..	..
Test: all coefficients are zero	Wald chi2(42)	F(21,20)	p-value = 0.0000	..	Wald chi2(38)	F(21,13)	p-value = 0.0000	p-value = 0.0000	..	..	..	..
Goodness of fit	Wald test $\rho=0$, p-value 0.96	R ² = 0.37	..	Wald test $\rho=0$, p-value 0.84	R ² = 0.34	..	..	..	..	..	..	..
Number of observations (clusters)	875 (46)	192 (41)	875	875 (46)	113 (34)	875	875 (46)	113 (34)	875	875	875	875

Source: Samples from ILSSA Access to Resources Survey 2003 as described in the main text.

Note: Standard errors in parenthesis. Robust standard errors and adjustment for clustering at the enumeration area throughout. *, **, ***significant at 10, 5 and 1 percent, respectively

^a Coefficients on continuous variables measure the marginal effect in percentage points on the probability of demanding credit, whereas they measure the effect of discrete changes for the dummy variables. All marginal effects are evaluated at sample means. Estimated jointly with bivariate normal error term. Estimate of correlation coefficient: $\rho=0.03$.

^b Coefficients (semi-elasticities) from OLS regression on log(loan amount).

^c Marginal effect of coefficients on the unconditional expectation of loan amount evaluated at sample means. Standard errors obtained by the delta method.

Table 10. *Household characteristics for approved and rejected loan applications by lenders^a*

Variables	VBARD		Other Formal Lenders		Informal Lenders		Full Sample
	Approved	Rejected	Approved	Rejected	Approved	Rejected	
Age	46.44	47.05	46.94	44.33	45.02	47.80	47.61
Total land (1,000 m ²) ^b	13.52	3.66	4.43	2.54	4.52	10.72	6.49
Gender (male=1) ^b	0.85	1.00	0.76	0.67	0.79	0.80	0.81
Education	6.74	7.05	7.07	6.89	6.65	5.77	6.47
Adults	2.79	3.16	2.62	2.44	2.51	2.66	2.46
Dependents	1.96	1.79	1.87	1.67	2.02	2.46	1.96
Feed (mill. Dong)	2.17	1.49	2.16	0.51	1.54	1.44	1.44
Ha Tay	0.25	0.16	0.42	0.67	0.51	0.60	0.35
Phu Tho ^b	0.19	0.58	0.38	0.11	0.35	0.09	0.22
Quang Nam	0.10	0.05	0.10	0.22	0.03	0.03	0.21
Long An ^b	0.45	0.21	0.10	0.00	0.10	0.29	0.22
Total assets (mill. Dong)	19.49	12.15	11.36	6.47	10.98	11.25	13.02
Distance (km)	9.75	12.05	7.52	11.94	9.41	7.09	8.75
Information	0.17	0.21	0.17	0.22	0.19	0.20	0.21
Hospitalization	0.22	0.16	0.18	0.22	0.24	0.26	0.19
Connections	0.60	0.68	0.59	0.44	0.61	0.57	0.52
Red book	0.85	0.83	0.80	0.85	0.74	0.69	0.79
Not Paid	0.09	0.05	0.06	0.33	0.06	0.17	0.08
Number of observations	209	19	124	9	186	35	875

Source: Samples from ILSSA Access to Resources Survey 2003 as described in the main text.

^a Information for 2001 and 2002 is used, and variable mean values are indicated (see Appendix B for full variable definitions).

^b Means are statistically (5 percent) different between the two first columns.

Table 11. *Credit rationing, 2002*

Variables	Base Applied ^a	1. Rationed Base ^b	2. Age, gender ^b	3. Distance, information ^b	4. Connections ^b
Age	-0.0117*** (0.0030)		0.024 (0.044)		
Total land (1,000 m ²)	0.0030 (0.0039)	0.022 (0.024)	0.021 (0.025)	0.022 (0.025)	0.029 (0.023)
Gender (male=1)	-0.2081* (0.1076)		1.379* (.0754)		
Education	-0.0004 (0.0162)	-0.363*** (0.112)	-0.390** (0.171)	-0.375*** (0.112)	-0.331*** (0.095)
Adults	0.0951** (0.0387)				
Dependents	0.0012 (0.0367)				
Feed (mill. Dong)	0.0188** (0.0078)	0.054 (0.056)	0.050 (0.055)	0.057 (0.054)	0.052 (0.057)
Total assets (mill. Dong)	0.0023 (0.0026)	-0.019 (0.034)	-0.021 (0.032)	-0.020 (0.034)	-0.016 (0.032)
Distance (km)	0.0002 (0.0097)			-0.015 (0.082)	
Information	-0.1726 (0.1188)			0.513 (1.225)	
Hospitalization	0.1187 (0.1312)				
Connections	0.3686*** (0.0947)				-1.554* (0.892)
Red book	0.1341 (0.1360)	-1.607 (1.295)	-1.731 (1.223)	-1.598 (1.278)	-1.697 (1.263)
Not paid	0.1674 (0.1476)	6.206* (3.586)	6.571* (3.739)	6.401* (3.740)	6.767* (3.870)
Phu Tho	-0.0137 (0.1599)	-1.641* (0.945)	-1.648* (0.889)	-1.488 (1.015)	-1.585* (0.945)
Quang Nam	-0.7387*** (0.1807)	-2.967*** (0.806)	-2.987*** (0.775)	-2.959*** (0.828)	-2.940*** (0.782)
Long An	0.3043* (0.1650)	-1.472* (0.826)	-1.510** (0.771)	-1.366 (0.882)	-1.583** (0.791)
Constant	-0.2189 (0.2540)				
Test: all coefficients are zero		F(9,37), p-value = 0.006	F(11,35), p-value = 0.000	F(11,35), p-value = 0.017	F(10,36), p-value = 0.004
Test: Independence of equations		Wald test $\rho=0$, p-value 0.14	Wald test $\rho=0$, p-value 0.07	Wald test $\rho=0$, p-value 0.06	Wald test $\rho=0$, p-value 0.38
Number of observations / uncensored / clusters	875 / 311 / 46	875 / 311 / 46	875 / 311 / 46	875 / 311 / 46	875 / 311 / 46

Source: Samples from ILSSA Access to Resources Survey 2003 as described in the main text.

Note: Standard errors in parenthesis. Robust standard errors and adjustment for clustering at the enumeration area throughout. *, **, *** significant at 10, 5 and 1 percent, respectively.

^a Coefficients from the selection equation estimated jointly with 'Rationed Base'. The selection results from the other specification differ only marginally due to the simultaneous structure and are not reported.

^b Marginal effects in percent.