

Credit and Risk:
Analyzing Determinants of Willingness to Borrow More
Credit in rural Vietnam*

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June 4, 2009

* Thanks to the International Fund for Agricultural Development (IFAD) and the University of Washington for funding the project upon which this research is based

I. Introduction

Seventy-five percent of people living in the rural, developing world live in poverty [World Bank Development Report, 2008]. The development community has long viewed the inadequate supply of credit in rural areas as a serious constraint on economic development, and a critical solution to redressing persistent poverty. Rural areas are particularly affected by a scarcity of credit [World Bank Development Report, 2008]. Many people living in rural areas are credit constrained due to high transaction costs [Besley, 1995; Ghosh *et al.*, 2001]. The cost of obtaining information on a rural applicant's credit worthiness is too great, while the number of people being served is lower than in urban areas for most credit providers. Nevertheless, research has shown that improving the rural poor's access to credit improves a household's risk coping strategy, removes capital constraints, and enables investments in more productive technologies [Diagne *et al.*, 2000]. Recognition of the rural credit problem has led to a significant growth in the provision of credit by governments and NGOs interested in its potential to help alleviate poverty in the rural developing world [Fletschner, 2009]. Due to the recent growth in the rural credit supply, researchers are starting to reexamine the demand for credit in the rural developing world [Barslund and Tarp, 2008; Duong and Izumida, 2002; Fletschner, 2009].

The availability of credit is important in mitigating risky outcomes for many individuals. In general, human beings are risk averse [Croson and Gneezy, 2004; Fellner and Maciejovsky, 2007]. This has serious implications for market activities and economic development. Risk-averse individuals have been observed displaying lower levels of market participation [Fellner and Maciejovsky, 2007]. Increased levels of risk aversion inhibit the poor from undertaking certain activities that might be beneficial [Dercon, 2006]. However, relatively little is known about the impact that behavioral characteristics and risk perceptions have on a rural individual's demand for credit. The inclusion of an individual's risk perceptions can help supplement the neoclassical economic model by providing information on new types of constraints, such as risk attitudes, that may be impacting rural credit demand as well.

In Vietnam, 70 percent of the population lives in rural areas. In the past decade, Vietnam has provided the setting for several studies on rural credit supply [World Bank, 2006]. Despite a recent rise in economic growth, many rural Vietnamese continue to face significant credit constraints [Duong and Izumida, 2002; Barslund and Tarp, 2008]. Recent work argues that rural Vietnamese suffer significant credit constraints primarily due to poorly functioning credit markets, and that rural credit demand is determined primarily by easily observable variables such as the amount of agricultural land, and number of livestock [Duong and Izumida, 2002; Barslund and Tarp, 2008].

In March 2008, a survey conducted in Vietnam showed that although many rural Vietnamese, by conventional economic theory *should* be demanding credit due to their low economic status, over 60 percent of the surveyed population was uninterested in receiving more. Given the potential benefits from taking advantage of rural credit opportunities, one would hypothesize the opposite to be true. This case in Vietnam challenges conventional economic assumptions about the way we think about individual behavior. My goal is to incorporate an individual's risk perceptions and other behavioral characteristics with neoclassical economic theory in order to further elaborate on the theory of rural credit demand. Potentially offering a better model explaining why credit constrained individuals may choose not to avail themselves of a credit opportunity.

II. Background

Rural Credit and Risk

Due to a host of factors ranging from poor drinking water to civil war, poor, rural individuals more frequently face environmental, health, and market risks than individuals in the developed world [Binswanger and Rosenzweig, 1986; Binswanger and McIntre, 1987; Bromley and Chavas, 1989]. Not only do rural individuals face more risky outcomes, but they are often poorly equipped to confront them as well [Fafchamps, 1999]. Most rural individuals work in the agricultural sector, and this is also true in Vietnam, where 70 percent of individuals live in rural areas and agriculture accounts for over 50 percent of GDP [World Bank, 2008]. A method for coping with these risks is for rural individuals to access credit [Diagne *et al*, 2000].

Across the globe, rural individuals have developed methods of coping with both *ex-ante* and *ex-post* risks by minimizing their exposure in advance, saving and liquidating assets in order to be able to respond, and sharing the risk within households and across communities [Fafchamps, 1999]. One of these methods has been to access credit. Credit impacts rural individuals in three basic ways. Credit offers individuals the ability to invest in more productive technologies, smooth household consumption levels, and insure against risky outcomes [Diagne *et al*, 2000].

Farmers often face significant capital constraints, especially for purchasing new technology and inputs. Therefore, rural credit is critical to agricultural development. The adoption of new technologies can be both capital intensive and risky, credit mitigates both of these constraints. Credit enables individuals to undertake riskier, yet potentially more profitable enterprises [Eswaran and Kotwal, 1990]. Even if the individual does not avail himself of credit, the fact that the option exists allows the individual to take on riskier activities knowing he can borrow if the need arises.

Due to the seasonal nature of production, farmers often need help maintaining a consistent level of consumption year round and credit enables “consumption smoothing” [Khandker, 1998; Pitt and Khandker, 1998]. From the time the farmer plants the crops until harvest, rural households still need to be able to purchase items. Therefore, credit allows farmers to maintain consistent consumption levels until the time to harvest their crops arrives.

Finally, credit allows farmers to insure themselves against risky outcomes. Farmers face special risks due to their reliance upon the weather for high crop yields and their proximity to pests that can damage crops as well as human health. Over the past decade, Vietnam has experienced a significant amount of economic growth due to trade liberalization and industrialization [World Bank, 2008]. These economic changes can be mitigated by the ability to access credit. Vietnam’s large rural, agriculturally dependent population makes the topic of rural credit particularly significant. Due to these factors Vietnam has been the setting for several studies on the supply of rural credit and determinants of rural credit demand [Duong and Izumida, 2002; Barslund and Tarp, 2008].

Beginning in 1986, Vietnam began the process of *doi moi*, the liberalization of Vietnamese markets. Since that time, the Vietnamese government has worked to improve its financial sector, especially in rural areas. The main provider of formal agricultural credit is the Vietnamese Bank for Agriculture and Rural Development (VBARD).

VBARD accounts for 75 percent of all formal rural loans and serves roughly four million people [Asian Development Bank, 2000]. The Vietnamese credit market is

segmented by formal and informal sources of credit [Duong and Izumida, 2002]. Even with VBARD's considerable outreach, many Vietnamese remain credit constrained and turn to informal sources of credit when available. Duong and Izumida (2002) found that individuals were "very rational" in their choice to access the formal or informal credit markets of Vietnam. The majority of individuals seeking production loans accessed formal sources like VBARD, while loans for consumption purposes (i.e. food or medical care) were generally sought from informal lenders, such as family members or neighbors [Duong and Izumida, 2002].

Economic Theories

Neoclassical economic theory underlies the policies and programs of many governments and NGOs, and continues to shape our perceptions of human interactions and worldview. This case in Vietnam challenges our basic understanding of individual economic behavior. Over the past decade, behavioral science has been used with greater frequency, especially in the field of economics. Neoclassical economic theory assumes people are rational, have perfect information, and will take the action that maximizes their individual utility. Actions are determined by the interaction of an individual's preferences and constraints. Behavioral economics does not supplant neoclassical economic theory, but rather allows for a more thorough examination of the various constraints individuals face.

Individuals living in the rural developing world face risky situations more frequently than those living in the developed world. The rural poor are also the least capable of coping with these risks due to often weak social safety nets and an inability to access credit [Fafchamps, 1999]. The rural poor have less of a margin to withstand shocks and insulate themselves against risky outcomes. The majority of the poor are food insecure as well, increasing their level of risk aversion. An inability to effectively manage risk is a common occurrence for many of the world's poor. The poor in the rural developing world often respond differently to what those in the developed world might consider typical business transactions.

These behavioral "anomalies" that many researchers and scientists encountered in previous studies in the developing world may in fact be much closer to the norm than previously thought [Anderson and Stamoulis, 2006]. The situation in most developing countries can be characterized by a lack of well-functioning markets, a high concentration of poor, and a high incidence of poverty and food insecurity [Anderson and Stamoulis, 2006]. All of these factors can alter the behavioral characteristics of an individual living in the developed world.

While neoclassical economic theory explains the majority of economic activity, work by behavioral economists have shown that the inclusion of behavioral characteristics can shed more light on many of these market interactions. The model in this study incorporates several different behavioral characteristics into the standard neoclassical model determining credit demand. These behavioral characteristics being included in the rural credit model are an individual's marginal degree of positionality, discount rate, status quo bias, and risk perceptions.

III. Dependent and Independent Variables

Dependent Variable: Willingness to Borrow More

In order to gain a better understanding of rural credit demand, the March 2008 survey included a series of questions designed to capture an individual's previous borrowing history, in addition to several hypothetical questions relating to credit preferences. These hypothetical questions were designed to gauge interest in credit activities, as well as an individual's credit preferences, such as what types of loans they most preferred.

This study focuses primarily on one question in the survey regarding an individual's interest in more credit. All respondents were asked, "During 2006-2007, would you have liked to borrow more than what you have borrowed?" Depending on how respondents answered, three discrete boxes could have been marked: (1) "Yes, and I had applied for more/some funds but did not receive them," (2) "Yes, but I have not applied for more/any funds," or (3) "No, I did not want to borrow anymore."

Table 1: Summary of Descriptive Characteristics for Unwilling and Willing to Borrow Pop.

Descriptive Characteristics		Unwilling to Borrow (%) (N=669)	Willing to Borrow (%) (N=496)	Total (%) (N=1165)
Age	Youth (17-30)	15	10	13
	Middle (31-45)	67	67	67
	Older (46-65)	18	23	20
Gender	Male	43	46	44
	Female	57	54	56
HH Wealth Compared to Commune Average	Below	29	34	31
	Average	59	57	58
	Above	12	9	11
Marital Status	Couple Household	89	93	91
No Savings over 200,000 VND		43	55	48
Risk Averse		54	48	52
Food Insecure		64	76	69
Own Red Book Land		98	97	98
Receive Remittances		27	22	25
Taken Out A Loan Before		44	57	49

Following his/her response, a series of options were then given for the possible reasons he/she either did not apply or receive a loan. To further clarify, this survey question did not refer to whether any of the individuals had previously borrowed, but was a hypothetical question designed to obtain a measure of an individual's satisfaction with his or her current level of borrowing. Sixty-one percent of individuals (n=713) responded that they did not want to borrow more (Option 3), the remaining 39 percent of individuals (n=452) chose Option 1 or Option 2, stating they were interested in accessing more credit.

Next, individuals who chose Option 3, but who had also indicated in their explanation that they were supply constrained rather than being unwilling to borrow more, were removed. The new population choosing Option 3 due to demand constraints now

comprises 57 percent (n=669) of the sample. Those willing to borrow more, Options 1 and 2, comprise 43 percent (n=496) of the population, with 44 individuals being recorded as willing to borrow more. Of these 995 individuals were included in the regression models, with 170 individuals being removed due to missing data. Most of the individuals were removed due to a lack of information surrounding either their age or education level. A summary of descriptive characteristics for these two populations, those (un)willing to borrow more, can be found in **Tables 1 and 2**.

In general, the majority of the sample is middle aged and female, with people between the ages of 31 and 45 years old making up 67% of the population. Women make up 56% of the surveyed population. Most of the surveyed individuals are average income compared to the rest of the commune. Of the population that is unwilling to borrow more, 29% are from below average income households, compared to 34% of those willing to borrow more. A notable difference between the two populations is the proportion of those who had taken out a loan previously, 57% of those willing to borrow more had previously borrowed either formally or informally compared to 44% of those unwilling to borrow. The vast majority of surveyed individuals possess land with red book value and tenure rights. Red book is the appraised value of the land and is important when reselling land on the market or using land as collateral.

Table 2. Means and Standard Deviations of Descriptive Characteristics

	Unwilling to Borrow More (N=669)		Willing to Borrow More (N=496)		Sig. Levels
	Mean	Std. Dev.	Mean	Std. Dev.	
Age	39.7	7.10	39.3	6.65	.037
Total Land Used (m ²)	3700.46	2228.87	4433.31	2367.57	.000
Land with Red Book (m ²)	3357.92	2018.01	3822.09	2036.11	.000
Education (years)	8.62	2.49	8.93	2.34	.108
Household Size	4.88	1.38	4.94	1.31	.424
Dependents under 16	2.00	1.19	1.96	1.17	.635
Total HH Income 2007 (VND)	25,680,784.75	19,338,712.68	21,008,034.27	16,182,993.80	.002

Independent Variables

Previous studies examining rural credit demand in Vietnam use a variety of variables connected to the agricultural sector. Agriculture related variables, such as amount of agricultural land and ownership of livestock, have been known to be primary predictors for rural credit demand [see McCarty (2001), Duong and Izumida (2002), and Barslund and Tarp (2008) for greater detail]. Eighty percent of the sample identified themselves as farmers, and this is comparable to the larger Vietnamese population. Along with certain agriculture variables, variables representing individual, household, and behavioral characteristics are included in the regression models.

Previous theory places a great level of importance on whether or not an individual has tenure rights to agricultural land. Strong and secure land rights have been found to be important determinants of increased credit demand [Barslund and Tarp, 2008]. This is due presumably to the greater level of investment individual's make when land is privately owned. If an individual does demand credit, the total amount of agricultural land is also

significant in how much he or she will be able to obtain [Barslund and Tarp, 2008]. In the mid-1990s, Vietnam began the process of de-collectivizing rural farmlands. In order to control for land ownership, a variable was included indicating what percentage of the agricultural land used by the individual had red book value. A higher percentage of land with red book value indicates stronger and more secure land rights [Barslund and Tarp, 2008]. Similarly, the owning livestock was also a determinant of credit demand [Barslund and Tarp, 2008]. In order to capture the role that livestock plays, a variable was created to measure what percentage of a household's overall production was based on livestock. Based on past studies, it is presumed that the greater the proportion of household production is based on livestock the more probable an individual will be willing to borrow more credit.

Aside from the agricultural variables, it is important to account for the individual characteristics of each respondent, such as age and gender. In this model, controls are included for gender (Female=1) as well as for the age of each person surveyed. Women have been shown to be more risk-averse than men on average [Croson and Gneezy, 2008; Fellner and Maciejovsky, 2007]. Likewise, women often have a lower degree of market participation, and therefore demand less credit [Fellner and Maciejovsky, 2007]. It seems reasonable to hypothesize that women will have a positive marginal effect signifying a lower probability of demanding credit than men. Education is also an important variable to consider when examining credit demand. The higher the level of education, the more likely an individual is to demand credit [Barslund and Tarp, 2008].

History is also an important aspect to take into consideration. Decisions made in the present are often based upon past personal experiences. The survey included questions regarding an individual's credit history, but due to endogeneity issues this variable was omitted from the regression. **Table 3** shows that borrowing history is significantly related to an individual's current willingness to borrow more. Of those who are willing to borrow more, 57 percent had taken out a loan previously. On the other hand, of the population who was unwilling to borrow more, 56 percent had not taken out a loan before.

Table 3. Proportion of Individuals who were willing to borrow more by previous borrowing history***

		Willing to Borrow More	Unwilling to Borrow More	Total
Taken Out A Loan Before	Yes	57	44	49
	No	44	56	51

Findings are significant at *10%, ** 5%, *** 1% across gender and income

Numbers may not add to 100 percent due to rounding

$\chi^2 = 17.82$

Several other financial controls are included in the model, such as whether the respondent receives remittances or has savings over 200,000 VND. Twenty-seven percent of those unwilling to borrow more received remittances of over 100,000 VND the previous year compared to only 22 percent of people willing to borrow more (Remittances=1). Remittances are a significant source of income for many in the developing world, and are the second largest source of foreign capital in flows after foreign direct investment [Giuliano and Ruiz-Arranz, 2008]¹. Savings are controlled for with a variable (No Savings=1) that captures

¹ Remittances are an important source of funds for the Vietnamese economy. In 2003, recorded remittances totaled \$2.4 billions USD, and accounted for 7.4 percent of GDP [Hernandez-Coss, 2004].

whether an individual has savings over 200,000 VND. The level of savings serves as both a proxy for currently available capital, but also potentially represents an individual's discount rate [Anderson *et al.*, 2004]. This study hypothesizes that the greater the level of savings, the less likely an individual will be willing to demand credit since they have another source of capital they could potentially use for production or consumption purposes.

Building upon previous research, this study also includes several behavioral variables, most notably one measuring an individual's risk perception, and another capturing an individual's marginal degree of positionality. This paper hypothesizes that if a person is risk averse they will have a lower probability of being willing to borrow more. Their aversion of risk will prevent them from availing themselves of a credit opportunity.

Food insecurity is also controlled for in my model since food insecure individuals tend to be both poorer and more risk averse than food secure individuals thus decreasing their probability of demanding credit. To capture food insecurity, a variable was created that accounts for what percentage of rice a household produces is then consumed by the household. Respondents were asked to divide up 20 beans into various activities representing the percentage of a household's production capacity that went toward each activity. Respondents were then asked about their consumption levels. The greater the percentage of rice consumed that the household had produced the greater the level of food insecurity.

Another variable included captured the comfort people have with changes in their relative status compared to their peer group – either being better or worse off than their peers. The marginal degree of positionality variable measures how comfortable individuals are with inequality and their relative position in society [see Carlsson *et al.*, 2007 for more experimental details]. Its hypothesized that individuals with a lower degree of positionality will be more willing to borrow more since being different from their peers does not make them uncomfortable.

IV. Data and Methods

Data

Data are drawn from a survey conducted by researchers from the University of Washington and the Institute for Family and Gender Studies in Hanoi, partnering with the International Fund for Agricultural Development (IFAD). The survey aimed to explore patterns in farmer attitudes among the intended recipients of IFAD's Program for Improving Market Participation of the Poor in Ha Tinh and Tra Vinh Provinces (IMPP). The IMPP program, sponsored by IFAD, is designed to build infrastructure, invest in skills training, and offer financial services to diversify livelihood strategies for the rural poor. The survey was conducted in March 2008. Vietnamese enumerators were trained on how to properly administer the survey. The survey was in both English and Vietnamese.

The analysis that follows is based on data collected from 1,165 individuals in 637 households from three communes in Ha Tinh province, Vietnam. Ha Tinh province is in the central coastal region of Vietnam and is primarily rural with relatively low population density. Male and female heads of households were interviewed separately. The surveyed population was 44% male (n=513) and 54% female (n=652). The majority of respondents were from households where both the husband and wife reside (n=1060), which were coded as "couple households." The remaining observations were from single female-headed households. Of the single-headed households, 39 were widowed or divorced, and in 70

cases the husband had migrated for work. The annual household income averaged 23.7 million VND or 1,333 USD^{II}.

Ha Tinh is a rural, agriculturally based province. Ha Tinh province is located on the northern central coast of Vietnam. Commune leaders keep track of household wealth for tax and other purposes, and their assessments of relative wealth produces a distribution: 31 percent or 357 individuals were classified below average, 58 percent or 681 individuals were classified as average, and 11 percent or 127 individuals were classified as above average income. Food insecurity is pervasive; over half of even the wealthiest village members reported being unable to afford the healthy food they need for their families and more than 80 percent of those with below average wealth reporting this type of food insecurity.

Statistical Model

An examination of risk attitudes and behavioral constraints is missing from much of the literature regarding rural credit demand. In most analyses, risk is not included as a variable. Scientists know it exists, but it is difficult to capture since people's risk perceptions influence or is influenced by so many aspects of an individual's life.

The primary goal of this paper is to show the influence of risk perceptions on a rural individual's credit demand as well as previous borrowing history. To illustrate this point this study contains several separate multivariate probit regression models examining an individual's willingness.

$$\text{Probit (Willing to Borrow More = 1)} = \Phi (b(H_c, I_c, B_c, D))$$

The willingness to borrow more than already borrowed is characterized by a probit model. Therefore, b is a linear function of the vectors of explanatory variables. H_c represents household characteristics, I_c for individual characteristics, B_c represents behavioral characteristics, and D stands in for commune dummies. Model 1 contains all of the control variables that are to be included in the model, but without any inclusion of risk or borrowing history. Model 2 contains a variable capturing whether a person is risk averse, as well as risk aversion interacting with several other key variables. Finally, Model 3 introduces the effect village location may have on an individual's probability of being willing to borrow more. Analysis was conducted with SPSS 16.0 software to recode and organize variables, and STATA 10 for regression analyses.

V. Results and Discussion

Gender

A lack of credit seems to impact poverty alleviation efforts in rural areas, especially for women. Women often face significant legal, financial, and cultural barriers when trying to access credit [Fletschner, 2009]. These barriers make women more likely to be credit constrained than men [Fletschner, 2009]. This disparity in credit access has made women the focus of many microcredit financial efforts by NGOs and governments. According to **Table**

^{II} As of May 29, 2009, \$1 USD equals 17,770 Vietnam Dong (VND)

Table 5. Determinants of willingness to access more credit Probit (Willing To Borrow More= 1)

Dependent Variables	Model 1			Model 2			Model 3		
	df/dx	Std. Err. ¹	P> z	df/dx	Std. Err.	P> z	df/dx	Std. Err.	P> z
Risk Averse				-.018	.036	0.611	.002	.039	0.968
Tuong Son Catholics							-.495***	.049	0.000
Thac Lac Catholics							.560*	.243	0.072
Controls									
Age	-.007**	.003	0.012	-.006**	.003	0.012	-.005	.003	0.105
Gender (Female=1)	.298***	.035	0.000	.299***	.035	0.000	.281***	.038	0.000
Education Level (Years)	.008	.008	0.296	.008	.008	0.322	.017**	.009	0.048
Couple Household (Couple HH=1)	.171***	.055	0.005	.171***	.042	0.000	.161***	.051	0.007
Number of Kids Under 16	.028*	.016	0.089	.028*	.016	0.089	-.015	.017	0.379
Catholic (Catholic=1)	-.239***	.042	0.000	-.239***	.042	0.000	.331	.287	0.250
Percent of Rice Consumed/Produced	-.372***	.093	0.000	-.371***	.093	0.000	-.160	.099	0.105
Tuong Son (Tuong Son=1)	.324***	.050	0.000	.323***	.050	0.000	.496***	.053	0.000
Thac Lac (Thac Lac =1)	-.136**	.052	0.012	-.135**	.052	0.012	-.575***	.042	0.000
Party Member (Communist=1)	-.093	.067	0.184	-.092	.068	0.190	-.155**	.059	0.025
Recall Ability (Out of 9)	-.015*	.009	0.097	-.015*	.009	0.095	-.018*	.010	0.064
Relative Status	.014	.011	0.212	.014	.011	0.215	.010	.012	0.397
No Savings (No Savings =1)	.002	.037	0.947	.003	.037	0.928	.055	.040	0.172
Remittances (Remittances=1)	-.076*	.041	0.065	-.077*	.041	0.065	-.043	.044	0.341
Stable Income (No Change=1)	-.062	.036	0.947	-.061*	.036	0.099	-.075*	.039	0.055
Livestock as Percent of HH Prod.	-.047	.159	0.767	-.046	.159	0.775	-.102	.170	0.548
New Economic Activity	.093**	.036	0.012	.092**	.036	0.013	.078**	.039	0.049
Percentage of land used with red book value	-.251***	.088	0.004	-.250***	.088	0.004	-.355***	.097	0.000
Log Likelihood	-512.855			-512.726			-364.781		
Pseudo R ²	0.2441			0.2443			0.4624		
Number of observations	995			995			995		

Source: Stated Preferences Survey, Ha Tinh, Vietnam – March 2008 as described in main text

Notes: Findings are significant at * 10%, ** 5%, and 1%, respectively.¹ Standard error terms may be correlated because two individual respondents may come from the same household and share basic household level data that only one individual gave.

4, a significantly greater proportion of women than men are willing to borrow from the below and average income populations. Likewise, a significantly smaller proportion of women than men are unwilling to borrow from these same income categories.

Table 4. Proportion of individuals (un)willing to borrow by gender and income

		Willing to Borrow More		Unwilling to Borrow More	
		Male (%)	Female (%)	Male (%)	Female (%)
HH Wealth	Below***	27	73	54	46
Compared to	Average***	26	74	57	43
Commune Avg.	Above	40	60	53	47

Findings are significant at *10%, ** 5%, *** 1% across gender and income

$\chi^2 = 27.3$ (Below), $\chi^2 = 64.6$ (Average)

Table 5 shows that, in all models, gender significantly impacts the probability that someone is willing to borrow more than what they have already borrowed. Surprisingly, this challenges previous research findings stating women are more risk averse and that this aversion to risk leads to less market participation [Fellner and Maciejovsky, 2007]. These findings show that being a woman significantly increases the probability of being willing to borrow.

Currently, it is unclear if the finding indicates a currently unmet demand by women or if this is evidence of higher levels of risk-seeking behavior by the female population. In all the models, a woman is roughly 30 percent more likely to be interested in more credit than a man. Once again, these findings though do not indicate that women are more risk seeking than men or more entrepreneurial, but speculatively it may indicate that women are only willing to borrow *more* than what they already borrowed before which in many cases may be zero. Furthermore, many credit programs, especially microcredit programs, target women so this finding may be capturing that effect.

Risk

These findings demonstrate that, in this situation, risk-aversion is not a significant determinant of willingness to increase levels of credit. While being risk averse most likely remains an important variable to include in future credit models, in this case, the model explains risk aversion thoroughly. The effects of risk aversion are most likely being captured with gender, food security, and level of savings. As previously mentioned, individuals in the rural developing world face significant levels of risk and uncertainty compared to their counterparts in the developed world [Feder *et al.*, 1985; Fafchamps, 1999; Anderson and Stamoulis, 2006]. For these reasons researchers should take into consideration behavioral constraints that may exist when examining determinants of credit demand.

Catholicism and the Village Effect

One of the most interesting findings from this study is the role that Catholicism and location play in being an important determinant of credit. The majority of Vietnamese are non-religious, but there are some religious minorities, the largest being Catholic. Historically, in Ha Tinh province, French missionaries arrived and began their mission work near the coast. Due to their settling on the coast, the largest congregation of Catholics also resides

near the coast. Of the three communes surveyed, Thac Lac and Tuong Son contain the largest proportion of Catholics. In Thac Lac, 43 percent of the population surveyed identified themselves as Catholic. While in Tuong Son, Catholics made up 31 percent of the population. Rather than showing some type of religious determinant for increased levels of credit, this model captures the effect that the location of your village has on your willingness to borrow more.

Commune dummies were included in the model as controls. Living in Thac Lac significantly decreases an individual's willingness to borrow more credit by 57 percent. However, being a Catholic in Thac Lac you are significantly more likely to be willing to borrow more than you previously had. The opposite situation occurs in Tuong Son where Catholics are significantly less likely to be willing to borrow more credit, but residing in Tuong Son overall increases the overall probability of being willing to borrow more. Some of these may be due to the type of jobs and land that primarily exist in these locations. Many of the Catholics surveyed are fishermen by trade, and therefore, may require less credit as fishing is less capital intensive. Furthermore, the land along the coast tends to be less productive, and is not used intensively for agriculture due to its high saline content. The village effect indicates that the exact village where an individual lives is a significant determinant of willingness to borrow more.

Couple Households, New Economic Activities, Remittances and the Food Insecure

These findings suggest that couple households are significantly more willing to take on increased levels of credit than non-couple households. The magnitude by which couple households are willing to increase their levels of credit increases when including risk averse and borrowing history. Couple households are often able to cope with risks easier due to the extra support and income a spouse can bring in.

Individuals who want to undertake a new economic activity in the coming year are also significantly more likely to be willing to borrow more. Suggesting that many of the loans are most likely being used for production purposes rather than consumption, which is sustainable in the long run. This may be due to the fact that when people borrowed previously it was from formal institutions such as VBARD or IMPP. The rules governing many of the rural loans distributed by the formal finance sector stipulate that loans be used for production purposes only [Duong and Izumida, 2002].

In Models 1 and 2, receiving remittances of over 100,000 VND is a significant variable in the willingness to borrow more. If an individual received more than 100,000 VND in remittances in a year than they are significantly less likely to be willing to borrow more possibly due to the increased level of capital already available to them. Though after including risk aversion and the Catholic/Commune interaction variables, receiving remittances becomes insignificant, but still has a negative effect. Interestingly, the fact that someone has savings was not a significant determinant of willingness to borrow more, but the positive coefficient indicates that a higher level of savings makes people increasingly willing to borrow more, though not significantly.

A food insecure individual is significantly less likely to be willing to borrow than a food secure individual. These findings support previous studies showing that food insecure individuals are in general more risk averse and have less market orientation. In Model 1, the level of food security is strongly significant, but when the other variables are added the effect weakens. This may be due to the different agricultural production levels in each commune, and the quality of the land that the interaction terms are capturing as well. Age is also a

significant determinant, but its marginal effect on an individual's willingness to borrow more credit is weak. As an individual gets older the probability of being willing to borrow more credit decreases.

Similar Findings to Previous Studies

Like earlier studies land is a significant factor in whether someone is willing to increase his level of credit. The greater the percentage of land an individual has with red book value is significant. What is surprising is the strong negative effect strength of land rights has on an individual's willingness to borrow more. According to Model 2, the greater the percentage of land that you own with red book value, the probability of being willing to borrow more decreases by 35 percent.

Agricultural activity can be capital intensive, and the more land a farmer has the greater the needed investment in seeds and technology, which is why the finding is unexpected. The data indicates that as the percentage of land an individual owns with red book increases that this significantly lowers an individual's probability of demanding credit. This is in stark contrast to previous studies stating strength of land rights promotes greater levels of capital investment.

One of the significant differences is that level of education is insignificant in determining the probability of whether someone will want more credit. This is surprising as previous work concludes education levels do matter. Related to that is recall ability which was found to be significant in all models. This reveals another surprising finding, which is that as recall ability improves the probability of an individual being willing to borrow more decreases.

VI. Conclusion

The past two decades has seen greater emphasis placed on the importance of having access to credit, especially in rural areas. Governments and NGOs alike have created programs to allow individuals greater access. When designing and evaluating these programs it is important to take into consideration all the constraints that individuals may be facing. Economic, behavioral, and cultural barriers all may be constraining individuals who otherwise are willing to participate.

According to this study, the primary determinants of willingness to borrow more credit are gender, village location, commune, and the amount of agricultural land with red book value. In this case, behavioral constraints did not appear to be a significant factor in determining whether a person was willing to borrow more than they had previously borrowed. Risk may still be an important factor constraining economic activities, but for this case, other factors may be capturing the risk aversion influence as well. Risk perceptions are an important factor that future research should take into consideration. By focusing on solely on risk attitudes, rather than other behavioral factors, may also yield more information regarding the influence of risk perceptions on economic activities.

Further research on the exact nature of the loan process, and local interest rates could help researchers better understand the level of demand. Also, a comparison across provinces, and areas both rural and urban can help improve understanding of the rural credit markets in Vietnam. Taking into consideration individual preferences, as well as, all the constraints being faced by individuals will lead to more effective programs for those who need it most.

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