

Entrepreneurship and financial constraints in Thailand

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Abstract

We use new data from rural and semi-urban Thailand to examine how financial constraints affect entrepreneurial activity. The analysis uses nonparametric and reduced form techniques. The results indicate that financial constraints play an important role in shaping the patterns of entrepreneurship in Thailand. In particular, wealthier households are more likely to start businesses. Wealthier households are also more likely to invest more in their businesses and face fewer constraints. We also provide evidence that financial constraints place greater restrictions on entrepreneurial activity in the poor Northeast compared to the more developed Central region.

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JEL classification: M13; O16; O321

Keywords: Entrepreneurship; Financial constraints; Thailand

1. Introduction

It is difficult to overstate the importance of entrepreneurial activity for both developed and developing economies. Small, entrepreneurial firms are an important source of innovation, jobs and economic growth. There are striking similarities between small entrepreneurial firms in the US and Thailand, despite the obvious differences between the two countries. In Thailand, small firms employ 60% of the workforce and account for approximately 50% of GDP. In the US, roughly 50% of the workforce is employed in a small firm and small firms account for 38% of GDP. In addition, the typical small firm is very small. In both Thailand and the US, the vast majority of small firms have just one or two employees. Savings and funds from friends and family provide the bulk of start-up

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financing for small firms. In both US and Thailand, two-thirds of the initial investment in small firms comes from these sources. The goal of this paper is to use new data to systematically investigate the role of financial constraints in determining who becomes an entrepreneur in Thailand and to examine how financial constraints affect the way entrepreneurial activities are conducted. While some of the insights provided by this exercise will be specific to Thailand, others will have implications for small firms generally.

The average annual income of business owners in rural and semi-urban Thailand is double that of nonbusiness owners. One-third of households report that they would like to change occupations. Of the households who would like to change occupations, most would like to open a business. Many of these households report that they do not start businesses because they do not have the necessary funds. Among entrepreneurial households, 54% report that their business would be more profitable if they could expand it. When asked why they do not undertake this profitable opportunity, 56% of households report that they do not have enough money to do so. Both the formation of new businesses and the way that existing businesses are run appears to be affected by financial constraints.

If financial constraints are important, then we expect that business start-ups will be sensitive to the wealth of potential entrepreneurs. If financial constraints were not important, then potential entrepreneurs will make the decision to start a business based solely on the expected profitability of the planned endeavour. If necessary, they will be able to get outside financing to start the project, and their own wealth not be a factor in whether or not the business is started. When financial constraints are important, however, outside financing may be unavailable or insufficient—creating a link between the wealth of the potential entrepreneur and the decision to start a business. Wealthier households will be more likely to start a business. [Holtz-Eakin et al. \(1994\)](#) and [Evans and Jovanovic \(1989\)](#) use US data to investigate the impact of wealth on entrepreneurship in the US and conclude that financial constraints are important.

The operation of existing businesses will also be affected by the entrepreneur's wealth when financial constraints are present. In particular, financial constraints may prevent entrepreneurs from investing the optimal amount in their businesses. If financial constraints did not exist, then entrepreneurs would be able to make up the shortfall between their own funds and the profit maximizing level of investment by borrowing. In this situation, entrepreneurial investment and entrepreneurial wealth will be independent of one another. However, financial constraints may mean that entrepreneurs are unable to borrow, or may only be able to borrow a limited amount. In this case, wealthier entrepreneurs will be able to invest more in their businesses because they are less dependent on the availability of outside funding. [Fazzari et al. \(1988\)](#) explore this implication of financial constraints for a sample of publicly traded manufacturing firms in the US and show that, for some firms, investment is sensitive to cash flows.

Despite the general presence of financial constraints in the economy, entrepreneurial households who are sufficiently wealthy will not be constrained in how they operate their businesses because they do not need to rely on outside financing. As entrepreneurial wealth increases, we would expect household reports of being constrained and other measures of constraints, like returns to investment, to go down.

More generally, financial constraints will cause the supply and the demand for credit to be related to the characteristics of the borrower and the business, to the characteristics of

the lender as well as to the characteristics of the market where the borrower resides and the lender operates. For example, the borrower's creditworthiness, the monitoring capabilities of the lender, the competitiveness of the lending market and the size of the market for the borrower's products are all likely to affect how much the business owner would like to borrow and how much, or whether, a potential lender is willing to lend. Measuring the impact and separating out cause from effect for many of these factors is complicated. The point is that these are important factors to control for in investigating the clear predicted relationships between entrepreneurship, wealth and entrepreneurial talent in the presence of financial constraints.

The implications of financial constraints that we investigate can come out of a wide variety of assumptions about how financial markets operate. They do not depend on a particular type of financial market imperfection. For example, all of these implications are shared by a model where there is no credit (see [Lloyd-Ellis and Bernhardt, 2000](#)); a model where credit is exogenously limited to be a fixed multiple of household wealth (see [Evans and Jovanovic, 1989](#)) and a model where credit is allocated as the optimal solution to an information constrained moral hazard problem (see [Aghion and Bolton, 1996](#)).¹ They are also consistent with the asymmetric information framework emphasized by [Fazzari et al. \(1988, 2000\)](#). The analysis of the implications that are presented below corresponds to a general evaluation of the impact of financial constraints rather than to an evaluation of a particular model.²

The data that we analyze come from our own socioeconomic survey that was fielded in March–May of 1997 to 2880 households, approximately 21% of whom run their own businesses. The sample focuses on households living in two distinct regions of Thailand: rural and semi-urban households living in the Central region which is close to Bangkok and more obviously rural households living in the semi arid and much poorer Northeastern region. The Central region is wealthier and more developed than the Northeast. The data include current and retrospective information on wealth (household, agricultural, business and financial), occupational history (transitions to and from farm work, wage work and entrepreneurship), access and use of a wide variety of formal and informal financial institutions (commercial banks, agricultural banks, village lending institutions, money-lenders, as well as friends, family and business associates). The data also provide detailed information on household demographics, entrepreneurial activities and education. The retrospective data on wealth and interactions with financial institutions helps our efforts to disentangle the effects of running a business from the forces which make it possible to start a business in the first place.

Because these data provide rich and detailed information about both the firm and the entrepreneurial household as well as information on financial intermediaries, they are

¹ Whether investment and the likelihood of being constrained increase or decrease with entrepreneurial talent clearly depends on a model's assumption about whether talent and capital are complements or substitutes. [Lloyd-Ellis and Bernhardt \(2000\)](#) assume that talent and capital are substitutes. That model implies that investment and constraints will decrease when entrepreneurial talent increases. In contrast, [Evans and Jovanovic \(1989\)](#) assume that talent and capital are complements. That model implies that investment and constraints will increase when talent increases.

² In related work, [Paulson and Townsend \(2002\)](#), we formally evaluate two alternative models of financial market imperfections and discuss which model best fits the Thai data.

particularly well designed for studying the relationship between entrepreneurship and the financial system. Economic theory emphasizes that both firm and household characteristics are important in determining the supply and the demand for credit. In many studies the available data force a focus on either the firm or the household as potential entrepreneur, but do not allow for both to be treated with equal thoroughness. For example, [Evans and Jovanovic \(1989\)](#) use data from the National Longitudinal Study of Young Men, which has detailed information on the self-employed, but very sparse information about the businesses they run. In their studies of banking relationships and access to credit in small businesses, [Petersen and Rajan \(1994, 1995\)](#) analyze data collected by the Small Business Administration (SBA). The SBA data provide a wealth of detail about the firm, but very little information about the entrepreneur. [Holtz-Eakin et al. \(1994\)](#) use data from US individual tax returns. These data provide detailed information about inheritances and some information about both the entrepreneur and the firm; however, they do not include important firm and household variables, like the nature of the business and the education of the entrepreneur, for example.

Our results indicate that financial constraints play an important role in shaping the patterns of entrepreneurship in Thailand. In particular, wealthier households are more likely to start businesses. In the Central region, wealthier households are also more likely to invest more in their businesses and face fewer constraints. We also provide evidence that financial constraints place greater restrictions on entrepreneurial activity in the Northeast compared to the Central region. In addition, there is some intriguing evidence that the largest lender in rural and semi-urban areas has a greater impact on entrepreneurial activity through selection rather than through lending.

The rest of the paper is organized as follows. In the next section, we describe the household and small business data that are used in the analysis. In Section 3, we use nonparametric and reduced form techniques to evaluate how financial constraints effect which businesses are started and how existing businesses are run. We stratify the data by wealth and education and compare and contrast salient patterns of the data with the implications financial constraints using nonparametric methods. Next we introduce statistical controls and estimate reduced-form OLS and probit equations. The reduced form estimates allow us to control for the key variables that are suggested by the presence of financial constraints as well as for other variables which may be important sources of variation in the data. Section 4 concludes and discusses the policy implications of the findings.

2. Project background and the survey data

The data that we analyze in this paper are the product of a large on-going socioeconomic and institutional study in Thailand that is funded by the U.S. National Institute of Health and the National Science Foundation (see [Townsend et al., 1997](#)). The initial survey of households, village financial institutions and village key informants was completed in May of 1997 and covers regions both on the doorstep of Bangkok as well as in the relatively poor Northeast. The data provide a wealth of pre-financial crisis socioeconomic and financial data on 2880 households, 606 small businesses, 192 villages, 161 local financial institutions, 262 borrowing groups of the Bank for Agriculture and

Agricultural Cooperatives (BAAC) and soil samples from 1880 agricultural plots. We focus on the household survey data in this paper.

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

2.1. The financial environment

The financial environment that is prevalent in each survey region also differs substantially. There are two main formal sector lenders: the BAAC and commercial banks. Of these two institutions, the BAAC is much more active in rural areas. Ninety-five percent of northeastern Thai villages and 89% of Central Thai villages had at least one BAAC borrower in 1994 (Thai Community Development Department data). The BAAC offers two types of loans. One is a standard collateralized loan and the other requires no formal collateral and is secured instead through a joint liability agreement with a group of farmers who all belong to a BAAC group.

While the bulk of the BAAC's loans are uncollateralized, these loans tend to be small and the majority of funds are lent through collateralized loans. Commercial banks are active lenders in 41% of Thai villages. However, commercial bank borrowers tend to be concentrated in the relatively prosperous Central region, where 50% of villages have at least one commercial bank borrower. In contrast, only 31% of northeastern villages have a commercial bank borrower. Commercial bank loans are almost always secured with a land title. In addition to these formal sector lenders, there are a number of quasi-formal institutions that offer savings and lending services to villagers: village savings and lending institutions and rice banks. It is also common for households to borrow from relatives and neighbors and moneylenders. Often households will borrow from several sources to finance one investment project (see [Kaboski and Townsend, 2000](#) for more details).

2.2. Sample and survey instruments

In each of the four provinces, a stratified random sample of 12 tambons (subset of an amphoe or county) was chosen. The stratification ensured an ecologically balanced sample that included two "forested" tambons. Within each sample tambon, four villages were selected at random. Fifteen households were randomly selected from each of the sample villages. Soil samples were collected from randomly chosen plots belonging to the first 10 of these households. In each village, a key informant was interviewed, usually the village headman or woman. In addition, interviews were conducted with the committee members of each village financial institution. If the sample village included BAAC borrowing groups, they were also interviewed. The sampling strategy is described in more detail in [Binford et al. \(2001\)](#).

Table 1A

Number and percentage of different types of businesses by region

Business type	Whole sample		Northeast	Central
	Number	Percentage (%)	Percentage (%)	Percentage (%)
Shrimp and/or fish	157	26	13	32
Shop	154	25	41	18
Trade	115	19	12	22
Restaurant/noodle shop	31	5	6	5
Transport and construction	31	5	3	6
Sewing/silk/embroidery	26	4	6	3
Mechanic/repair shop etc.	20	3	4	3
Rice threshing	19	3	9	0
Services (haircut, laundry, etc.)	14	2	1	3
Other	39	6	6	7
Total	606	100	100	100
Total from shrimp/fish, shops and trade	426	70	66	72

The survey instruments were designed to incorporate the latest advances in economic theory. The theories that guided the design of the questionnaires include models of financial constraints in occupation choice and in input financing; models of growth with costly financial expansion; and models which take into consideration private information and incentives.³ We proceeded by extrapolating from the theory what the true story underlying Thailand's growth and the accompanying increase in inequality and rapid expansion of the financial sector might have been, or, more formally, by writing down and simulating a variety of economic models.⁴ This process generated a list of variables that were crucial to assessing the validity of a particular story or economic model. This list of variables formed the basis for designing the questionnaires and the field research.

2.3. Business and household characteristics

In this section, we highlight some of the key features of the data that are important for this study. The businesses we study are quite varied and include shops and restaurants, trading activities, raising shrimp or livestock and the provision of construction or transportation services (see Table 1A).⁵ While there are many different types of businesses, shrimp and/or fish raising, shops and trade account for 70% of the businesses in the whole sample and make up a similar percentage of the businesses in each region. Median initial investment in the households business varies substantially with business type (see Table

³ Examples are the models mentioned above, all of which can generate the implications that we evaluate: Lloyd-Ellis and Bernhardt (2000), Evans and Jovanovic (1989) and Aghion and Bolton (1996).

⁴ From the beginning of the 1980s until the middle of the 1990s, the Thai economy grew very rapidly. Over this period, real per capita GDP grew 8% per year. During this period of rapid growth the financial sector grew even more rapidly. The period of rapid growth was also accompanied by substantial increases in inequality. From 1981 to 1992, the Thai gini coefficient increased by 21%.

⁵ We rely on household reports on whether or not they ran a business except in the case of shrimp and fish farming. All of these activities are treated as businesses. It is quite common for households to run a business in addition to farming, usually rice, and working for wages.

Table 1B

Median initial investment by region and business type, 1000s of 1997 baht

Business type	Whole sample	Northeast	Central
Shrimp/shrimp and fish/fish	50	9	51
Shop	16	16	16
Trade	21	21	23
Restaurant/noodle shop	7	32	6
Transport and construction	278	855	181
Sewing/silk/embroidery	10	5	17
Mechanic/repair shop etc.	31	23	84
Rice threshing	47	59	12
Services (haircut, laundry, etc.)	20	25	14
Other	45	34	68
Total	32	19	38

1B). Despite this variation, the median initial investment appears to be relatively similar across regions for the same type of business, particularly for the most common business types. For example, the median investment in a shop is 16,000 baht in both the Northeast and the central region. In the Northeast, the median initial investment in trade is 21,000 baht compared to 23,000 baht in the central region.⁶ For future reference, note that the average annual income in Thailand in 1996 is 105,125 baht, or roughly US\$4200.

Most business households run only a single business (see Table 1C) and rely very heavily on family workers. Only 10% of the businesses paid anyone for work during the year prior to the survey.⁷ More than 60% of the businesses were established in the past 5 years. In the empirical work, we restrict our attention to these businesses. Although these results are not presented in the paper, we have also looked at businesses that were established in the past 10 years. This group includes 83% of the businesses in the sample. None of the results are sensitive to which group of businesses we examine. The decision to focus on businesses that were started in the past 5 years was the result of weighing the benefit of having more accurate measures of beginning of period wealth against the cost of eliminating the 224 households that start businesses more than 5 years ago.

Households rely heavily on savings (either in the form of cash or through asset sales) to fund initial investment in their businesses. Approximately 60% of the total initial investment in household businesses comes from savings. Loans from commercial banks account for about 9% of total business investment and the Bank for Agriculture and Agricultural Cooperatives (BAAC) accounts for another 7%. In the Northeast, the BAAC plays a larger role compared to commercial banks, and in the central region the opposite is true.

Each respondent with a household business was asked, “If you could increase the size of your business, do you think it would be more profitable?”. We call the households who

⁶ Median investment in shrimp and/or fish does differ depending on the region: in the Northeast it is 9000 baht compared to 51,000 baht in the central region. This is because shrimp farming, which requires substantial initial investment, is concentrated in the central region, while fish farms are more important in the Northeast.

⁷ This means that the set of entrepreneurial firms is unlikely to be very affected by the case where wealthy, but untalented, households hire poor, but talented, managers to run their firms.

Table 1C
Business characteristics

	Whole sample	Northeast	Central
Number of businesses per household—%			
One	82	89	79
More than one	18	11	21
Year established—%			
1–5 years ago	63	68	60
6–10 years ago	20	21	21
11+ years ago	17	11	19
Businesses completely owned by hh—%	97	96	98
Number of workers—%			
1–2 people	71	77	68
3–5 people	23	18	26
>5 people	6	5	6
Percentage who are family workers	94	96	93
Percentage who paid for work during past year	10	6	11
Sources of initial funding—percentage of total from each source			
Savings	39	31	40
Selling land/other assets	24	31	23
Store credit	2	2	2
Commercial bank	9	4	9
BAAC	7	10	6
Agricultural cooperative	2	3	2
Production credit group	0	0	0
Other organization	0	0	0
Relatives	0	0	0
Non-relatives	0	0	0
Moneylender	2	9	1
Gift	6	0	7
Employer	0	0	0
Other	9	9	9
Percentage of total funds from cash/savings	63	62	63
Percentage of total funds from loans	22	28	20
Percentage of businesses that are constrained*	54	64	50
Reason for constraint—%			
Not enough money to expand	56	72	47
Not enough land to expand	9	3	13
Not enough labor	12	6	15

*Households who reported that their businesses would be more profitable if it were expanded are labeled “constrained”.

answered yes to this question “constrained”. The respondents appear to consider the availability of capital an important factor in whether their business is operating at an optimal scale. Sixty-four percent of the household businesses in the Northeast and 50% of the households in the Central region answered yes to this question (see the bottom of [Table 1C](#)). Those who answered yes were asked to name the main barriers to expanding the business. The most common answer, especially in the Northeast, was “not enough money to expand”. Seventy-two percent of the constrained businesses in the Northeast gave this answer, compared with 47% in the Central region. Scarce land and labor were also

important reasons for not expanding, particularly in the Central region. Thirteen percent of constrained businesses in the Central region reported that they did not have enough land to expand and 15% reported that they did not have enough labor.

Table 1D provides a summary of household characteristics by region and whether or not the household has a business. Twenty-one percent of the sample households have a business, and these businesses are concentrated in the relatively prosperous Central region where 28% of the households have a business. In the Northeast, only 13% of households have a business. Business owners tend to be a bit younger and substantially more educated than their nonentrepreneurial counterparts. This is especially true in the Northeast, where 31% of the heads of business owning households have more than 4 years of schooling compared with only 14% of nonbusiness owning heads. In the Central region the difference is less dramatic: 21% of the heads of business owning households have more than 4 years of schooling compared with 15% of the heads of nonbusiness households. The percentage of business owning households who have less than 4 years of schooling is consistently lower than for nonbusiness households. In the empirical work that follows, we will use years of schooling as a proxy for entrepreneurial talent. In related work, we provide evidence that formal education and entrepreneurial talent are closely related in Thailand (Paulson and Townsend, 2002).

In both the Northeast and the Central region, the median annual income of business households is more than twice that of nonbusiness households. In addition to having higher incomes, business households are also wealthier—both at the time of the survey and prior to starting a business. In the Northeast, the average wealth of business owners is 38% higher

Table 1D

Household characteristics and current and past wealth by region and business ownership

	Whole sample		Northeast		Central	
	No business	Business	No business	Business	No business	Business
Observations	2,282	593	1,253	185	1,029	408
Percentage of sample (%)	79	21	87	13	72	28
Median household size	4	4	5	4	4	4
Median age of head	51	47	50	46	54	48
Years of schooling: head						
0–3 years (%)	21	11	20	9	21	12
4 years (%)	65	65	66	60	63	67
5–16 years (%)	14	24	14	31	15	21
Median annual income*	40,000	102,450	27,420	55,680	64,800	130,450
Current wealth from land and agricultural and household assets 1000s of baht						
Mean	876	3,241	405	559	1,450	4,456
Standard deviation	3,046	9,295	661	641	4,411	11,000
Median	238	603	212	336	306	884
Wealth from land and agricultural and household assets 6 years ago 1000s of baht						
Mean	699	2,211	329	405	1,150	3,030
Standard deviation	2,759	6,444	645	553	4,002	7,622
Median	130	225	125	180	140	304

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

than that of nonbusiness owners, and median wealth is 58% higher. The difference between business and nonbusiness households is even larger in the Central region. Average wealth is 207% higher and median wealth is 188% higher.

Because households were asked to report when they acquired household and agricultural assets and land, the data provide an indication of past wealth as well as current wealth. In the empirical work, we examine the relationship between past wealth (i.e. prior to starting a business) and entrepreneurship. This allows us to avoid some problems of endogeneity that are likely to plague current wealth measures. The past value of real assets is found by depreciating the purchase price of the asset (in 1997 baht) from the time of purchase to what it would have been worth 6 years ago. We assume that the depreciation rate for all household and agricultural assets is 10% per year. If the household purchased a tractor 10 years before the survey for 100,000 baht, we would first convert the purchase price to 1997 baht (using the Thai consumer price index) and then multiply this figure by $(0.90)^4$ to account for 4 years of depreciation between the purchase data and 6 years prior to the survey. This procedure would give us the value of the tractor 6 years prior to the survey.

Past values of land are treated differently. Households were asked to report the current value of each plot that they own. In calculating past land values, we assume that there have been no real changes in land prices. So if the household has had one plot for 10 years and the current value of that plot is 100,000 baht, then 6 years ago the value of that plot will also be 100,000 baht (in 1997 baht). We also incorporate land purchase and sale information to measure the value of land that a household owned in the past. Summary statistics for past wealth are reported in [Table 1D](#).

The indicators of past wealth that we compute are incomplete in (at least) two respects. The first issue is that we only have information on household and agricultural assets that the household still owns. If the household purchased a car 10 years ago and sold it 3 years ago, the value of the car will not be included in past wealth.⁸ If the household still owns the car, then it will be included in the measure of past wealth. Since we have information about land transactions, this issue is not a concern for the past value of land. The bulk of household wealth is held in the form of land, so distortions induced by the lack of transactions data for household and agricultural assets are likely to be small. The second concern is that we do not have any information on past financial assets and liabilities. Since financial assets and liabilities tend to make up a small fraction of current household wealth, leaving them out of our measures of past wealth is probably not too big of a problem.

The measures of past wealth indicate that current business households were wealthier than nonbusiness households, regardless of whether they had a business in the past, in the past as well as at the time of the survey, especially in the Central region. Six years ago, business households in the Northeast were 23% wealthier than nonbusiness households, on average. In the Central region, business households were 163% wealthier on average.

[Table 1E](#) examines the magnitudes and the sources of real and financial wealth for business and nonbusiness households in each region. Sources of wealth differ across business and nonbusiness households. One thing that stands out is the difference in the

⁸ Except to the extent that the proceeds from selling the car are used to buy assets that the household owns at the time of the survey.

Table 1E

Composition of wealth and participation in financial markets by region and business ownership

	Whole sample		Northeast		Central	
	No Business	Business	No Business	Business	No Business	Business
<i>Composition of wealth—median (1000s of baht)</i>						
House	130	300	100	150	200	400
Household assets	17	58	9	45	32	68
Total value of land	200	515	190	244	250	893
Land that can be collateral	30	300	40	100	15	632
Agricultural assets	7	24	17	23	0	25
Business assets	0	16	0	9	0	22
Savings in goods	0	0	5	6	0	0
Financial assets	0.5	5	0.4	2.9	1.0	7.7
Financial liabilities	6.0	23	10	23	0	22
<i>Participation in financial markets—percentage who have</i>						
Debts to commercial banks	3	9	2	8	3	9
Debts to BAAC and agricultural cooperative	34	40	40	54	28	34
Debts to others	32	30	36	37	27	27
Savings in gold	70	85	57	69	86	92
Loans owed to hh	10	16	11	20	8	14
<i>Percentage who are currently members/customers of institutions/organizations</i>						
Formal financial institution	40	67	34	55	48	73
Village institution/organization	35	40	41	51	29	36
Agricultural organization	50	56	56	74	43	48
Moneylender	15	14	16	14	14	14
ROSCA	3	9	0	0	6	13
<i>Percentage who were members/customers of institutions/organizations 6 years ago</i>						
Formal financial institution	15	29	11	18	19	34
Village institution/organization	12	13	14	14	10	13
Agricultural organization	26	32	26	36	26	30
Moneylender	4	4	4	4	4	4
ROSCA	0	2	0	0	1	3

Wealth is measured in current (1997) baht. At the time of the survey, US\$1 was equal to approximately 25 baht.

percentage of households who own titled land, which can be used as collateral.⁹ In the Northeast, the median value of land that can be used as collateral is 100,000 baht for business owners and only 40,000 baht for nonbusiness owners. In the Central region, the difference is even more dramatic. The median value of land that can be used as collateral is 632,000 baht for business owners and 15,000 baht for nonbusiness owners.

⁹ Keep in mind that cause and effect are not distinguished here and business households may have used their profits to invest in land. In many areas in Thailand, people farm land which they do not have full title to. Some people have “land-use” certificates which do not confer the same legal rights as full title. Land held by certificate cannot be used as collateral in the formal lending market, nor can it be officially sold. According to Feder et al. (1988) approximately 50% of privately held land cannot be used as collateral and can be transferred only through limited means, like inheritance. The vast majority of formal sector loans require land title as collateral. There are some smaller loan programs and lenders that allow borrowers to use savings or to pledge crops as collateral.

Table 1E also compares current and past participation in formal and informal financial market by business and nonbusiness households. We group formal and informal financial institutions into five categories. The first, formal financial institutions, includes commercial banks, finance companies, insurance companies as well as national employee credit unions like the Teachers Credit Union. The second, village institutions and organizations, is made up of PCGs, rice and buffalo banks as well as village poor and elderly funds. The BAAC, the Agricultural Cooperative and local farmer's groups are included in the third group, agricultural organizations.¹⁰ Moneylenders and Rotating Savings and Credit Associations (ROSCAs) make up the fourth and fifth groups, respectively.

The most prominent type of institution varies across the two regions. In the Northeast, agricultural organizations have the highest participation rate among both business and nonbusiness households. Formal financial institutions have the highest participation rate in the Central region. Participation includes saving as well as borrowing. In both the Northeast and the Central region, business owners are more likely to be current customers of formal financial institutions, village institutions, and agricultural organizations. Interestingly, about 14% of all households are currently customers of a moneylender and there is essentially no difference in this fraction across regions and across business and nonbusiness households. No households in the Northeast are members of a ROSCA, but ROSCAs do seem to be important in the Central region. Thirteen percent of business households in the Central region are current members of a ROSCA compared with 6% of nonbusiness households.

Households were asked to report when they became a customer or member of each organization, so we are also able to look at past participation in these same organizations. We examine the impact of these variables on the decision to start a business and the likelihood of being constrained in the analysis that follows. Six years ago, participation in all types of organizations appears to have been much lower and formal financial institutions were less prominent. Agricultural organizations had the highest participation rate for all groups, except business owners in the Central region, who were a bit more likely, even then, to be customers of a formal financial institution. Although past participation rates are lower in general, participation among eventual business owners was still higher than that of nonbusiness owners. For example, 11% of nonbusiness owners in the Northeast report being a customer of a formal financial institution 6 years ago, compared with 18% of business households. In the Central region, the same figures are 19% and 34%. The fact that households who eventually opened a business have higher levels of participation in financial markets, even prior to starting a business, suggests that access to capital may be a important component of the transition to entrepreneurship.

3. Nonparametric and reduced form evaluation of implications of financial constraints

In this section, we use the Thai data to examine how entrepreneurship is affected by financial constraints. In particular, we consider to what extent the likelihood of starting a

¹⁰ In the analysis that follows, we distinguish between customers of the BAAC who have collateralized loans and customers whose loans are secured through joint liability arrangements.

business is related to household wealth; whether evidence of financial constraints tends to decline with wealth; and how business investment is affected by household wealth. We present two types of evidence to evaluate the implications of financial constraints. We first construct tables and graphs that describe how the percentage of entrepreneurs and of constrained and unconstrained business owners varies with wealth. We also construct tables and graphs that describe how investment varies with wealth. These methods have the advantage of requiring very little structure or statistical assumptions. On the other hand, they do not control for important variation in the data that is not captured by the bivariate relationships that they focus on. In order to address these concerns, we also examine reduced form ordinary least squares and maximum likelihood probit counterparts to the implications of financial constraints.

We need to come up with appropriate measures of entrepreneurial talent and wealth in order to evaluate the implications of financial constraints. The proxy we use for entrepreneurial talent is education. While education is certainly not a perfect indicator of entrepreneurial talent, it is likely to be positively correlated with business skill.¹¹ As we mentioned earlier, in Paulson and Townsend (2002) we show that, at least for Thailand, formal education seems to be strongly associated with entrepreneurial talent. The appropriate wealth variable is beginning of period wealth, that is, wealth at the time the decision to start a business is made. As an empirical counterpart to this variable, we use wealth 6 years prior to the survey, and exclude households already in business at that time from the analysis. The items that are included in this measure are: the value of household and agricultural assets and titled and untitled land. We do not include the value of business assets that the household may have owned 6 years ago. By using past, rather than current wealth, and by excluding business assets acquired before the business was started, we hope to avoid issues of endogeneity: wealthier people are more likely to start businesses and business owners have higher earnings than wage-workers, which allows business owners to become still richer. In this scenario, current wealth captures both the cause and the effect of having been able to start a business in the past. Since 60% of businesses were founded in the past 5 years, our measure of past wealth captures conditions prior to opening the business for most households.¹²

It may be the case that households that eventually start businesses have higher past wealth because they have been saving at a higher rate in anticipation of starting a business in the future. This in fact turns out to be true in the data.¹³ Given this pattern, if we find that wealth is an important predictor of who starts a business, then it is particularly strong evidence that financial constraints are important since households have to wait to start a

¹¹ We have also experimented with including a variable that captures the likelihood that the head of the household would have migrated to Bangkok 5 years ago. We hypothesize that people with a high propensity to migrate may also have more entrepreneurial talent. Adding this variable does not substantively change the results.

¹² We eliminate households who started businesses more than 5 years ago so that we are comparing business and nonbusiness households. In addition, we have also experimented with examining households who started businesses in the past 10 years as a function of wealth 11 years ago. The results are the same regardless of whether we look at businesses started in the past 5 years or businesses started in the past 10 years.

¹³ Eleven years prior to the survey, the median wealth of households that started a business in the 5 years prior to the survey was only 58% of that of households who never started a business. However, 6 years prior to the survey, the median wealth of business households was 152% times the median wealth of nonbusiness households.

Table 2A
Entrepreneurship and constraints by wealth and education

Schooling	Wealth			
	Lowest quartile	Second quartile	Third quartile	Fourth quartile
Whole sample				
0–3 years #	150	149	127	108
No business—%	91	87	89	85
Business—%	9	13	11	15
Constrained—%	36	74 ^{##}	57	44
Unconstrained—%	64	26	43	56
4 years #	429	479	483	480
No business—%	83	83	84	68
Business—%	17 ⁺⁺	17	16	32 ^{***,++ ,###}
Constrained—%	61 ⁺	55	61	45 ^{** ,##}
Unconstrained—%	39	45	39	55
5–16 years #	127	84	95	111
No business—%	72	69	72	59
Business—%	28 ^{ooo,++ +}	31 ^{ooo,++ +}	28 ^{ooo,++ +}	41 ^{** ,ooo,+,#}
Constrained—%	50	62	52	63 ⁺⁺
Unconstrained—%	50	38	48	37
Central region				
0–3 years #	76	78	67	46
No business—%	86	81	82	80
Business—%	14	19	18	20
Constrained—%	27	67 ^{##}	50	56
Unconstrained—%	73	33	50	44
4 years #	218	225	228	257
No business—%	74	77	75	57
Business—%	26 ⁺⁺	23	25	43 ^{***,++ ,##}
Constrained—%	55 [#]	46	45	44
Unconstrained—%	45	54	55	56
5–16 years #	61	53	60	49
No business—%	67	68	70	45
Business—%	33 ^{oo}	32 ^o	30	55 ^{** ,ooo,###}
Constrained—%	55	65	56	59
Unconstrained—%	45	35	44	41
Northeast				
0–3 years #	73	74	63	57
No business—%	96	92	95	93
Business—%	4	8	5	7
Constrained—%	67	67	67	50
Unconstrained—%	33	33	33	50
4 years #	212	249	242	240
No business—%	92	89	89	84
Business—%	8	11	11	16 ^{***, +}
Constrained—%	82	64	63	72
Unconstrained—%	18	36	37	28

Table 2A (continued)

Schooling	Wealth			
	Lowest quartile	Second quartile	Third quartile	Fourth quartile
Northeast				
5–16 years #	67	33	44	50
No business—%	76	70	77	66
Business—%	24 ^{ooo,+++}	30 ^{ooo,+++}	23 ^{ooo,++}	34 ^{ooo,+++}
Constrained—%	44 ⁺⁺	50	60	65
Unconstrained—%	56	50	40	35

*, **, *** indicate the significance of the change in proportion of businesses, constrained businesses or unconstrained businesses when the lowest wealth quartile is compared to the highest wealth quartile at the 10%, 5% and 1% levels, respectively. ^o, ^{oo}, ^{ooo} indicate the significance of the change in the proportion of businesses, constrained businesses or unconstrained businesses when the lowest education category is compared to the highest education category at the 10%, 5% and 1% levels, respectively. #, ##, ### indicate the significance of the change in the proportion of businesses, constrained businesses or unconstrained businesses when the wealth quartile indicated in the column heading is compared to the next lowest wealth quartile at the 10%, 5% and 1% levels, respectively. +, ++, +++ indicate the significance of the change in the proportion of businesses, constrained businesses or unconstrained businesses when the education category indicated in the row heading is compared to the next lowest education category at the 10%, 5% and 1% levels, respectively.

business until they have accumulated enough wealth to finance it. This suggests that they are unable to borrow to start the business.

We also need to be able to tell whether or not businesses are constrained. We consider households who answered yes to the question “If you could increase the size of your business, do you think it would be more profitable?” to be constrained. There are several issues surrounding the use of this measure. First, the question refers to current, not past conditions. Second, it is unclear to what extent the respondents’ interpretations of the question match the definition of constrained suggested by economic theory. However, as was discussed above, the responses to follow-up questions about why the household did not expand the business suggest that there is at least a rough correspondence between the theoretical and the practical definitions of being constrained. In addition to this measure of being constrained, we also examine how returns to business investment vary with wealth and education. Constrained households are likely to operate on a portion of the production function where the returns to investment are greater than the optimal level.

In the discussion that follows, we consider each of the implications of financial constraints. For each implication, we consider the evidence that is found in [Tables 2A, Table 2B or Table 2C, followed by a discussion of the nonparametric estimates which are presented in Figs. 1–3. Finally, we discuss the relevant reduced form estimates which are found in Tables 3A–5.

3.1. Implications of financial constraints

3.1.1. Implication #1: holding entrepreneurial talent fixed and increasing wealth, the percentage of businesses will increase

Table 2A summarizes the percentage of nonbusiness owners, the percentage of constrained business owners and the percentage of unconstrained business owners by the education of the head of household and wealth. We split years of schooling into three

Table 2B

Median returns to business investment in business by wealth

	Wealth			
	Lowest quartile	Second quartile	Third quartile	Fourth quartile
<i>Whole sample</i>				
Business	56.7%	38.4%	20.7%	16.2%**
Constrained	96.9%	67.2%	13.8%	16.4%***
Unconstrained	10.5% ⁺⁺	31.2%	32.3%	16.1%
<i>Central</i>				
Business	80.8%	48.8%	39.1%	16.0%***
Constrained	98.2%	79.3%	28.2%	14.4%***
Unconstrained	48.0%	34.8%	56.6%	21.0%
<i>Northeast</i>				
Business	21.2%	12.7%	6.6%	10.0%
Constrained	57.9%	35.7%	23.2%	17.1%
Unconstrained	4.0% ⁺	8.9%	3.2% ⁺	0.0%
	Education			
	0–3 years	4 years	5–16 years	
<i>Whole sample</i>				
Business	5.80%	28.54%	22.77%	
Constrained	32.59%	30.44%	25.63%	
Unconstrained	2.90%	28.46%	19.37%	
<i>Central</i>				
Business	6.42%	38.99%	25.63%	
Constrained	21.84%	37.84%	25.63%	
Unconstrained	6.42%	43.89%	24.98%	
<i>Northeast</i>				
Business	4.10%	12.71%	21.40%	
Constrained	35.59%	18.69%	26.52%	
Unconstrained	– 5.43% ⁺⁺	4.32% ⁺	4.53%	

*, **, *** indicate the significance of the difference in median returns to investment for businesses, constrained businesses or unconstrained businesses when the lowest wealth quartile is compared to the highest wealth quartile at the 10%, 5% and 1% levels, respectively. ^o, ^{oo}, ^{ooo} indicate the significance of the difference in median returns to investment for businesses, constrained businesses or unconstrained businesses when the lowest education category is compared to the highest education category at the 10%, 5% and 1% levels, respectively. #, ##, ### indicate the significance of the difference in median returns to investment for businesses, constrained businesses or unconstrained businesses when the wealth quartile indicated in the column heading is compared to the next lowest wealth quartile at the 10%, 5% and 1% levels, respectively. ⁺, ⁺⁺, ⁺⁺⁺ indicate the significance of the difference in median returns to investment within the category indicated by the column heading, for constrained businesses and unconstrained businesses at the 10%, 5% and 1% levels, respectively.

groups: 0–3, 4 and 5–16 years. About 60% of the heads of household in the survey have 4 years of schooling, which was the statutory minimum when most of them attended school. Wealth is divided into quartiles. The division depends on the sample under consideration. So, for example, only northeastern households were taken into account in determining the quartiles for the Northeast. The figures in this table summarize the key features of the data

Table 2C
Median initial investment in business by wealth and education

	Wealth			
	Lowest quartile	Second quartile	Third quartile	Fourth quartile
<i>Whole sample</i>				
Business	17,053	12,317	16,917	30,583
Constrained	13,494	12,317	25,664	30,905
Unconstrained	20,257	12,536	11,658	29,639
<i>Central</i>				
Business	22,562	14,147	15,727	32,478
Constrained	13,603	18,191	19,130	43,000*
Unconstrained	38,504	10,926	13,970	28,695 ⁺
<i>Northeast</i>				
Business	12,732	12,131	5205	21,705
Constrained	12,732	7617	4856	15,720
Unconstrained	11,614	21,202	5877	33,343
	Education			
	0–3 years	4 years	5–16 years	
<i>Whole sample</i>				
Business	15,420	18,401	18,674	
Constrained	9920	25,664	14,211	
Unconstrained	36,263	14,147 ⁺	23,467	
<i>Central</i>				
Business	15,727	30,905	18,218	
Constrained	7710	32,478 ^{##}	10,419 [#]	
Unconstrained	44,398	15,942 ^{+ +}	33,478	
<i>Northeast</i>				
Business	15,329	10,063	26,677	
Constrained	12,131	11,600	30,844	
Unconstrained	15,420	5615	16,917 [#]	

*, **, *** indicate the significance of the difference in median initial investment for businesses, constrained businesses or unconstrained businesses when the lowest wealth quartile is compared to the highest wealth quartile at the 10%, 5% and 1% levels, respectively. ^o, ^{oo}, ^{ooo} indicate the significance of the difference in median initial investment for businesses, constrained businesses or unconstrained businesses when the lowest education category is compared to the highest education category at the 10%, 5% and 1% levels, respectively. [#], ^{##}, ^{###} indicate the significance of the difference in median initial investment for businesses, constrained businesses or unconstrained businesses when the wealth quartile, or the education category, indicated in the column heading is compared to the next lowest wealth quartile, or the next lowest education category, at the 10%, 5% and 1% levels, respectively. ⁺, ⁺⁺, ⁺⁺⁺ indicate the significance of the difference in median returns to investment, within the category indicated by the column heading, for constrained businesses and unconstrained businesses at the 10%, 5% and 1% levels, respectively.

along the lines suggested by the presence of financial constraints without making a commitment to a particular statistical model.

Financial constraints imply that, holding business skill fixed, as wealth increases the percentage of business owners will increase. This prediction appears to be borne out in the

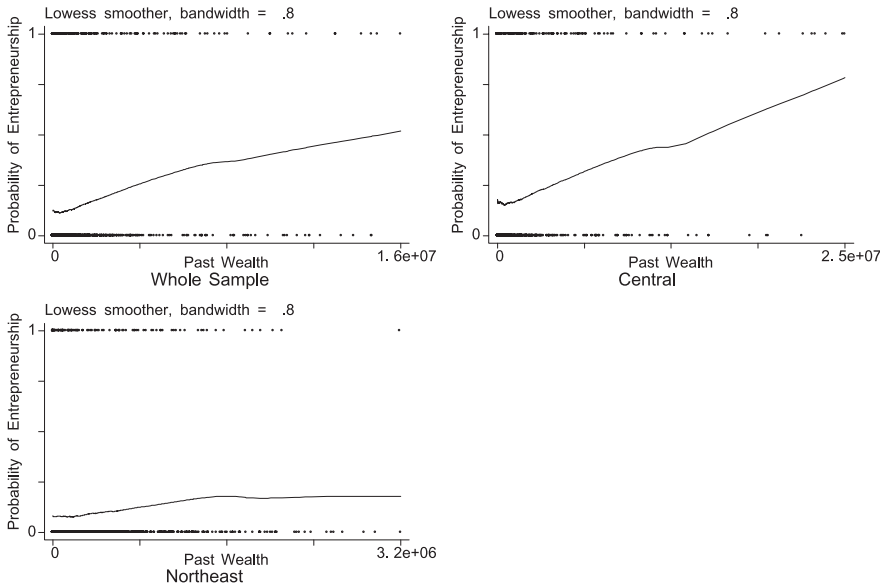


Fig. 1. Probability of entrepreneurship and past wealth. These figures represent nonparametric estimates of the relationship between having started a business in the 5 years prior to the survey and wealth 6 years prior to the survey. The dots represent the actual data points and the lines depict the estimated relationship between the likelihood of starting a business and past wealth. For each observation, a weighted regression is performed using 80% (bandwidth=0.8) of the data around that point. The data are weighted using a tri-cube weighting procedure that puts more weight on the points closest to the observation in question. The weighted regression results are used to produce a predicted value for each observation. Because the graphs can be fairly sensitive to outliers, the wealthiest 1% of the sample is dropped.

data. Comparing the percentage of business owners in the lowest wealth category to the percentage of business owners in the highest wealth category, we find that the percentage of business owners increases substantially for each region and for all education groups. The percentage of business owners increases from 14% to 20% in the Central region and from 4% to 7% in the Northeast for the lowest education group. For people with 4 years of schooling, the percentage of business owners goes from 26% to 43% (significant at the 1% level) in the Central region and from 8% to 16% in the Northeast (significant at the 5% level). For the group with 5–16 years of schooling, the percentage goes from 33% to 55% in the Central region (significant at the 5% level) and increases from 24% to 34% in the Northeast.

The increasing likelihood of becoming an entrepreneur as wealth grows can also be seen very dramatically in Fig. 1. These graphs (as well as Figs. 2 and 3) are nonparametric estimates of the relationship between entrepreneurship and wealth. For each observation, a weighted regression is performed using 80% (bandwidth=0.8) of the data around that point. The data are weighted using a tri-cube weighting procedure that puts more weight on the points closest to the observation in question. The weighted regression results are used to produce a predicted value for each observation. Because the graphs can be fairly sensitive to outliers, we have dropped the wealthiest 1% of the sample. The graphs indicate

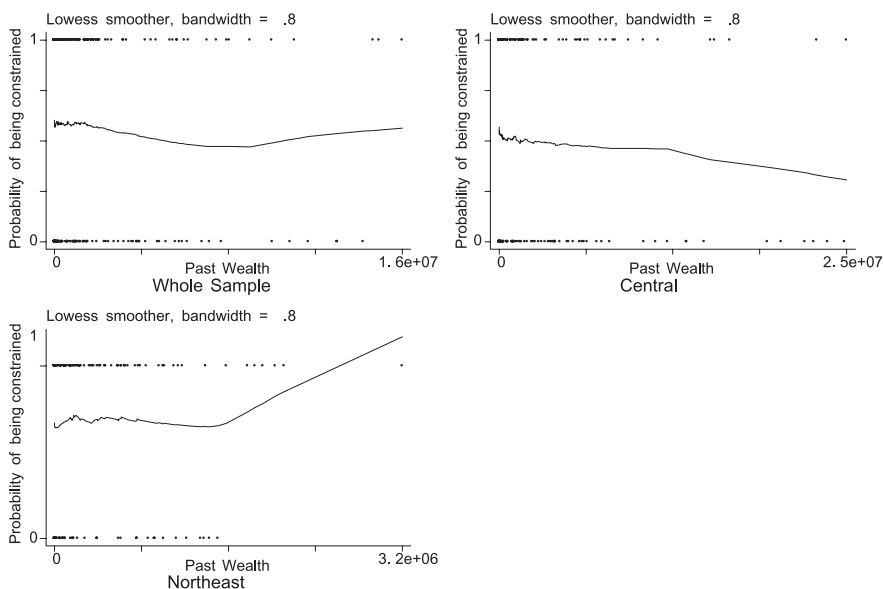


Fig. 2. Probability of being a constrained business and past wealth. These figures represent nonparametric estimates of the relationship between a businesses report of being constrained at the time of the survey and wealth 6 years prior to the survey. The sample consists of businesses that were started in the 5 years prior to the survey. The dots represent the actual data and the lines depict the estimated relationship between being constrained and past wealth. For each observation, a weighted regression is performed using 80% (bandwidth=0.8) of the data around that point. The data are weighted using a tri-cube weighting procedure that puts more weight on the points closest to the observation in question. The weighted regression results are used to produce a predicted value for each observation. Because the graphs can be fairly sensitive to outliers, the wealthiest 1% of the sample is dropped.

that the likelihood of becoming an entrepreneur increases dramatically with wealth, particularly in the Central region.

So far we have examined the implications of financial constraints for who will become an entrepreneur without making any statistical assumptions and without controlling for other characteristics of the households. In the next set of tables, [Tables 3A and 3B](#), we estimate probit models of who becomes an entrepreneur. The dependent variable is equal to one if the household currently runs a business that was founded in the last 5 years. The explanatory variables include characteristics of the household head that may be indicators of business talent: age, age squared, and years of schooling.¹⁴ There are also variables that control for the amount of household labor that is available: the number of adult males, the

¹⁴ In addition to including a variable that captures the likelihood of migrating to Bangkok, as discussed above, we have experimented with including parent's characteristics, in case entrepreneurial talent is inherited. Having parents in the top half of the wealth distribution, having parents who held a village position and having parents who had an occupation other than rice farmer have no impact on the results presented here. However, parents education does effect the likelihood of starting a business. For the whole sample, households whose parents had no education were 3 percentage points less likely to start a business and households who had a parent with more than 4 years of schooling were 10 percentage points more likely to start a business. The impact of the other independent variables is unchanged when the parental characteristics were included.

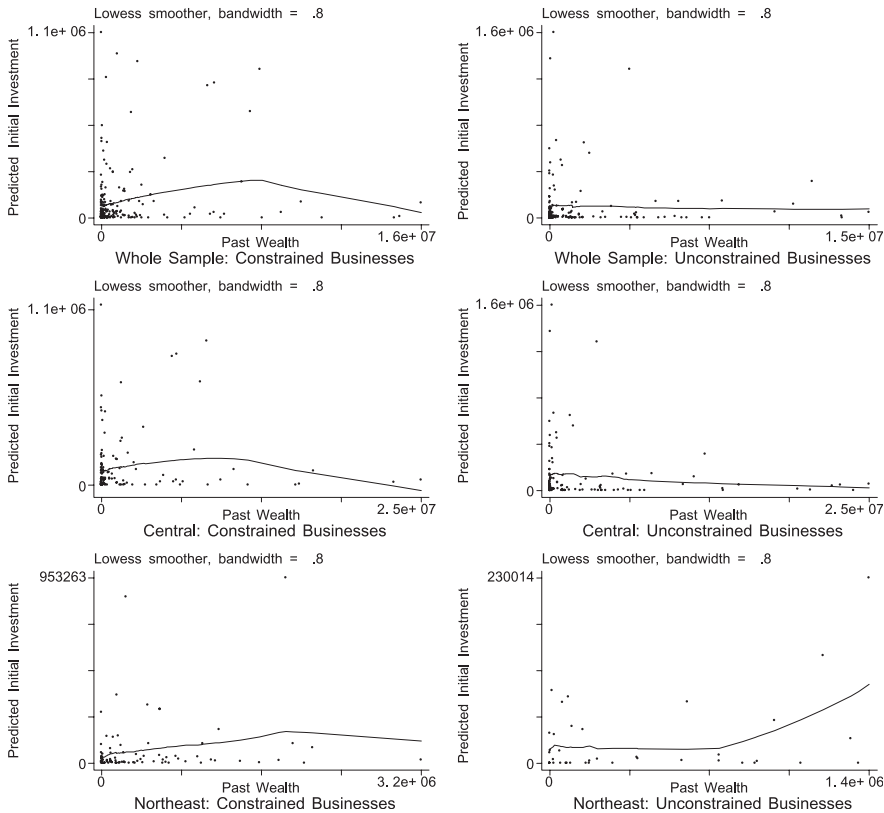


Fig. 3. Initial investment and past wealth. These figures represent nonparametric estimates of the relationship between initial business investment and wealth 6 years prior to the survey. The sample consists of businesses that were started in the 5 years prior to the survey. The dots represent the actual data and the lines depict the estimated relationship between initial business investment and past wealth. For each observation, a weighted regression is performed using 80% (bandwidth=0.8) of the data around that point. The data are weighted using a tri-cube weighting procedure that puts more weight on the points closest to the observation in question. The weighted regression results are used to produce a predicted value for each observation. Because the graphs can be fairly sensitive to outliers, the wealthiest 1% of the sample is dropped.

number of adult females and the number of children living in the household. The figures reported in the tables indicate the marginal effect of an infinitesimal change in each continuous variable on the probability of starting a business. For dummy variables, the impact of changing the variable in question from zero to one is reported.

We also include measures of household wealth, being careful to take issues of endogeneity into consideration. The wealth variables are: the value 6 years ago of household, agricultural and land assets that the household owned then. We also include the past wealth squared. If the likelihood of starting a business increases with wealth at a decreasing rate, the coefficient on this variable should be negative.

We control for credit market availability by including measures of whether or not the household was a member or a customer of various financial institutions in the past. Like

Table 3A

Probit estimates of having started business in last 5 years

	Whole sample		Northeast		Central region	
	dF/dx*	Z-statistic	dF/dx*	Z-statistic	dF/dx*	Z-statistic
Age of head	−0.0105	−3.18	−0.0106	−3.01	−0.0111	−1.84
Age of head squared	0.0001	2.52	0.0001	2.68	0.0001	1.21
Years of schooling—head	0.0080	3.01	0.0102	3.74	0.0034	0.67
Number of adult females in household	0.0013	0.15	0.0089	0.96	−0.0131	−0.85
Number of adult males in household	0.0158	2.03	0.0013	0.16	0.0345	2.41
Number of children (< 18 years) in household	−0.0045	−0.79	−0.0115	−1.80	0.0103	0.99
Wealth 6 years ago [†]	0.0276	3.25	0.0861	2.15	0.0246	2.82
Wealth squared [‡]	0.0000	−1.78	0.0000	−1.20	0.0000	−0.79
<i>Member/customer in organization/institution 6 years ago</i>						
Formal financial institution*	0.0199	1.10	0.0040	0.19	0.0314	1.03
Village institution/organization*	−0.0224	−1.05	−0.0400	−1.96	0.0239	0.55
Agricultural lender*	0.0278	1.39	0.0145	0.67	0.0511	1.40
BAAC group*	0.0397	1.72	0.0519	2.06	0.0084	0.20
Moneylender*	0.0014	0.04	0.0130	0.36	−0.0176	−0.31
Observed frequency	0.1407		0.0915		0.2070	
Predicted frequency at mean of <i>X</i>	0.1105		0.0699		0.1720	
Log likelihood	−860.30		−363.62		−488.65	
χ^2 for significance of fixed effects	152.96		28.83		85.69	
Prob> χ^2	0.00		0.19		0.00	
Pseudo <i>R</i> -squared (%)	14.14		10.87		15.59	
Number of observations	2467		1333		1135	

The sample excludes the top 1% of households by wealth.

* dF/dx is equal to the infinitesimal change in each continuous independent variable. For dummy variables, it is equal to the discrete change in probability when the dummy variable changes from 0 to 1. Dummy variables are marked by an asterisk.

[†] Wealth 6 years ago is made up of the value of household assets, agricultural assets and land. Number in table is estimated coefficient multiplied by 1,000,000.

the labor supply variables, we include these variables so that we can appropriately interpret the talent and wealth variables as evidence either in favor of, or against, the presence of financial constraints.

In order to separate the impact of the availability of a particular credit institution in the local area from the impact of being a client of the institution, the estimates also include controls for each of the tambons that were sampled.¹⁵ The tambon controls are meant to

¹⁵ There are two tambons in the Central region where no households have started businesses in the past 5 years. The 117 households in these tambons are dropped from the analysis of which households start businesses because there is no variation in the dependent variable within these tambons. We also experimented with using village fixed-effects. Using village fixed-effects requires dropping about 30 villages (542 households) because no households in the villages have started businesses in the past 5 years or because all of the households in the village have started businesses in the past 5 years. We prefer the estimates with tambon fixed-effects because fewer observations are dropped. In any case, the village fixed-effects and the tambon fixed-effects results are very similar. Any substantive differences in the two estimates are discussed in the text below.

Table 3B

Probit estimates of having started business in last 5 years

	Whole sample		Northeast		Central region	
	dF/dx*	Z-statistic	dF/dx*	Z-statistic	dF/dx*	Z-statistic
Age of head	−0.0106	−3.20	−0.0107	−3.03	−0.0112	−1.85
Age of head squared	0.0001	2.56	0.0001	2.71	0.0001	1.25
Years of schooling—head	0.0080	3.00	0.0101	3.68	0.0035	0.68
Number of adult females in household	0.0009	0.11	0.0088	0.95	−0.0145	−0.93
Number of adult males in household	0.0154	1.96	0.0017	0.20	0.0336	2.30
Number of children (< 18 years) in household	−0.0035	−0.61	−0.0114	−1.79	0.0121	1.15
Wealth 6 years ago [‡]	0.0279	3.00	0.0856	2.03	0.0220	2.17
Wealth squared [‡]	0.0000	−1.74	0.0000	−0.98	0.0000	−0.63
<i>(Wealth + inheritance) × member/customer in organization/institution 6 years ago</i>						
Formal financial institution [‡]	−0.0126	−1.76	−0.0275	−0.66	−0.0098	−1.26
Village institution/organization [‡]	0.0055	0.48	0.0287	0.53	−0.0020	−0.12
Agricultural lender [‡]	0.0085	1.07	−0.0292	−0.71	0.0082	1.00
BAAC group [‡]	0.0068	0.70	0.0207	0.49	0.0204	1.49
Moneylender [‡]	−0.0235	−1.09	−0.0041	−0.06	−0.0282	−0.93
<i>Member/customer in organization/institution 6 years ago</i>						
Formal financial institution*	0.0394	1.85	0.0198	0.65	0.0553	1.56
Village institution/organization*	−0.0270	−1.18	−0.0477	−1.76	0.0186	0.39
Agricultural lender*	0.0161	0.72	0.0304	0.99	0.0350	0.83
BAAC group*	0.0320	1.24	0.0387	1.17	−0.0269	−0.56
Moneylender*	0.0210	0.56	0.0156	0.32	0.0145	0.22
Observed frequency	0.1407		0.0915		0.2070	
Predicted frequency at mean of X	0.1105		0.0695		0.1729	
Log likelihood	−856.43		−363.01		−484.71	
χ^2 for significance of fixed effects	154.69		28.79		87.93	
Prob> χ^2	0.00		0.19		0.00	
Pseudo R-squared (%)	14.53		11.02		16.27	
Number of observations	2467		1333		1135	

The sample excludes the top 1% of households by wealth.

* dF/dx is equal to the infinitesimal change in each continuous independent variable. For dummy variables, it is equal to the discrete change in probability when the dummy variable changes from 0 to 1. Dummy variables are marked by an asterisk.

[‡] Number in table is estimated coefficient multiplied by 1,000,000.

capture geographic variations in the supply of credit along with other important characteristics, infrastructure and the size of the market, for example, that are likely to vary depending on the tambon. The inclusion of the tambon controls means that the credit market variables provide an indication of the average probability that patrons of the various institutions will start businesses, relative to the probability that households in a particular tambon will start a business.

In Table 3B, we augment the set of explanatory variables so that they correspond roughly to an environment where credit is allocated as a function of wealth. We do this by adding interactions of wealth with the measures of past use of financial institutions in order to capture the effect of wealth on credit constraints. If wealthier households are more likely

Table 4A

Probit estimates that business would be more profitable if expanded, business started in last 5 years

	Whole sample		Northeast		Central region	
	dF/dx*	Z-statistic	dF/dx*	Z-statistic	dF/dx*	Z-statistic
Age of head	−0.0012	−0.07	0.0760	2.18	−0.0248	−1.26
Age of head squared	0.0000	−0.23	−0.0007	−2.25	0.0002	0.95
Years of schooling—head	0.0091	0.73	−0.0036	−0.16	0.0153	0.96
Number of adult females in household	0.0740	1.72	0.0055	0.06	0.0948	1.96
Number of adult males in household	−0.0151	−0.38	−0.0840	−0.99	0.0296	0.65
Number of children (<18 years) in household	0.0153	0.53	−0.0272	−0.39	0.0095	0.30
Wealth 6 years ago [†]	−0.0160	−0.49	−0.3140	−0.74	−0.0010	−0.05
Wealth squared [‡]	0.0000	0.90	0.0000	0.80	0.0000	−0.14
<i>Member/customer in organization/institution 6 years ago</i>						
Formal financial institution*	−0.0843	−1.07	−0.1586	−1.01	−0.0546	−0.60
Village institution/organization*	0.0118	0.10	0.3368	1.56	−0.0340	−0.26
Agricultural lender*	0.1430	1.44	−0.0998	−0.53	0.1941	1.74
BAAC group*	−0.0824	−0.78	0.0734	0.37	−0.0842	−0.69
Moneylender*	0.2264	1.37	0.0833	0.26	0.1798	0.84
Observed frequency	0.5131		0.5870		0.4732	
Predicted frequency at mean of X	0.5136		0.6056		0.4703	
Log likelihood	−188.05		−53.59		−135.00	
χ^2 for significance of fixed effects	33.56		9.00		26.89	
Prob> χ^2	0.63		0.91		0.14	
Pseudo R -squared (%)	11.30		14.09		12.87	
Number of observations	306		92		224	

The sample excludes the top 1% of households by wealth.

* dF/dx is equal to the infinitesimal change in each continuous independent variable. For dummy variables, it is equal to the discrete change in probability when the dummy variable changes from 0 to 1. Dummy variables are marked by an asterisk.

[†] Wealth 6 years ago is made up of the value of household assets, agricultural assets and land. Number in table is estimated coefficient multiplied by 1,000,000.

[‡] Number in table is estimated coefficient multiplied by 1,000,000.

to get credit from particular institutions and use these funds to start businesses, then these variables will increase the likelihood of opening a business.

Again because we are concerned with the impact of outliers, we exclude the wealthiest 1% of households in both Tables 3A and 3B. We also exclude households who have businesses that were established more than 5 years ago so that we compare households who have started businesses in the past 5 years to nonbusiness.

We find that the likelihood of starting a business increases significantly with wealth in all of the estimates presented in Tables 3A and 3B. For example, in Table 3A for the whole sample, we find that a 1,000,000 baht increase in wealth would increase the likelihood of starting a business by about 3 percentage points.¹⁶ This is an increase of 21% above the

¹⁶ A 1,000,000 baht increase in wealth corresponds to doubling the current wealth of the median business owner and tripling the wealth of the median nonbusiness owner. By comparison, the standard deviation of current wealth is 8,850,000 baht for business owners and 4,079,000 baht for nonbusiness owners.

Table 4B

Probit estimates that business would be more profitable if expanded, business started in last 5 years

	Whole sample		Northeast		Central region	
	dF/dx*	Z-statistic	dF/dx*	Z-statistic	dF/dx*	Z-statistic
Age of head	−0.0035	−0.21	0.0854	2.45	−0.0272	−1.37
Age of head squared	0.0000	−0.11	−0.0008	−2.62	0.0002	1.05
Years of schooling—head	0.0099	0.78	−0.0117	−0.47	0.0165	1.03
Number of adult females in household	0.0766	1.77	−0.0058	−0.06	0.1038	2.07
Number of adult males in household	−0.0216	−0.53	−0.1040	−1.17	0.0257	0.55
Number of children (< 18 years) in household	0.0157	0.53	−0.0087	−0.12	0.0201	0.60
Wealth 6 years ago [‡]	−0.0027	−0.08	−0.0829	−0.18	0.0056	0.23
Wealth squared [‡]	0.0000	0.49	0.0000	0.38	0.0000	−0.34
<i>(Wealth + inheritance) × member/customer in organization/institution 6 years ago</i>						
Formal financial institution [‡]	−0.0316	−1.07	0.7040	1.87	−0.0186	−1.08
Village institution/organization [‡]	0.0393	0.84	0.2510	0.43	0.0382	1.63
Agricultural lender [‡]	0.0188	0.56	−0.4900	−1.20	−0.0099	−0.54
BAAC group [‡]	−0.0212	−0.61	−0.0729	−0.18	0.0068	0.32
Moneylender [‡]	−0.4040	−1.37			−0.3350	−1.15
<i>Member/customer in organization/institution 6 years ago</i>						
Formal financial institution*	−0.0435	−0.48	−0.4472	−1.93	0.0038	0.04
Village institution/organization*	−0.0467	−0.35	0.2861	0.80	−0.1745	−1.20
Agricultural lender*	0.1353	1.15	0.0600	0.22	0.2696	1.99
BAAC group*	−0.0454	−0.37	0.1485	0.52	−0.1470	−1.03
Moneylender*	0.4438	2.00			0.4191	1.51
Observed frequency	0.5131		0.5870		0.4732	
Predicted frequency at mean of <i>X</i>	0.5131		0.6091		0.4661	
Log likelihood	−185.18		−51.17		−131.38	
χ^2 for significance of fixed effects	32.00		9.26		26.11	
Prob> χ^2	0.70		0.90		0.16	
Pseudo <i>R</i> -squared (%)	12.65		17.95		15.21	
Number of observations	306		92		224	

The sample excludes the top 1% of households by wealth.

* dF/dx is equal to the infinitesimal change in each continuous independent variable. For dummy variables, it is equal to the discrete change in probability when the dummy variable changes from 0 to 1. Dummy variables are marked by an asterisk.

[‡] Number in table is estimated coefficient multiplied by 1,000,000.

observed percentage of households who have started a business in the past 5 years. The impact of the same increase in wealth in the Northeast is much larger. The likelihood of starting a business goes up by 8.6 percentage points, a 93% increase. The magnitude of the effect for the Central region is similar to the results for the whole sample. Table 3A suggests that the impact of wealth decreases as households get wealthier. The coefficient on wealth squared is significant and negative, although very small, for the whole sample. For the Northeast and the Central region, the sign on wealth squared is also negative but the effect is not significant.

The coefficients on the wealth variable in the regressions presented in Table 3B are very similar to the results for Table 3A. Increases in wealth appear to significantly increase the

Table 5

Regression estimates of initial investment in business, business started in last 5 years

	Whole sample		Northeast		Central region	
	Coefficient	<i>T</i> -statistic	Coefficient	<i>T</i> -statistic	Coefficient	<i>T</i> -statistic
Age of head	−0.0132	−0.23	−0.0261	−0.27	−0.0577	−0.83
Age of head squared	−0.0001	−0.15	0.0000	0.01	0.0003	0.54
Years of schooling—head	0.1208	3.13	0.1376	2.36	0.1321	2.67
Number of adult females in household	0.1250	0.89	0.2621	1.06	0.0810	0.52
Number of adult males in household	0.2007	1.55	0.3608	1.48	0.1212	0.81
Number of children (<18 years) in household	−0.0318	−0.34	−0.0497	−0.26	−0.0144	−0.14
Wealth 6 years ago [†]	0.3390	3.13	−0.3100	−0.31	0.1230	1.68
Wealth squared [‡]	0.0000	−2.51	0.0000	1.24	0.0000	−1.82
Constant	10.2197	6.71	9.6242	3.87	11.8264	6.31
Adjusted <i>R</i> -squared (%)	8.52		11.77		5.38	
Number of observations	252		83		177	

The sample excludes the top 1% of households by wealth and initial investment.

[†] Wealth 6 years ago is made up of the value of household assets, agricultural assets and land. Number in table is estimated coefficient multiplied by 1,000,000.

[‡] Number in table is estimated coefficient multiplied by 1,000,000.

likelihood of starting a business. Most of the variables which capture the interaction between past wealth and past patronage of various financial institutions are insignificant. However, for the whole sample, the likelihood of starting a business appears to be decreasing in the interaction between wealth and being a customer of a formal financial institution in the past. This finding is consistent with other evidence that households use commercial banks primarily to save rather than to borrow. There is some tentative evidence that agricultural organizations (primarily the BAAC through both collateralized and joint liability loans) facilitate business start-ups for wealthy households in the Central region.

In addition, the likelihood of starting a business is affected directly by household patronage of various financial institutions prior to starting a business. In the whole sample, households who were customers of commercial banks 6 years ago are 4 percentage points more likely to start a business, a 28% increase in the overall likelihood of business start-ups. There is a similar effect for the Central region. However, in the Northeast, past patronage of commercial banks has no significant effect on the likelihood of starting a business. In the Northeast, households who used to belong to village institutions/organizations are 5 percentage points less likely to start businesses. Many village institutions in the Northeast, rice banks, for example, cater to relatively poor households. The fact that households who relied on this type of assistance in the past may be correlated with other unmeasured household characteristics that are negatively associated with entrepreneurship.¹⁷

¹⁷ On-going work suggests that the negative impact of village banks may be largely due to selection. Kaboski and Townsend (2000) show that villages with particular institutions (Production Credit Groups) and particular policies (making loans) have positive effects on business start-ups, once selection effects have been controlled for.

The fact that entrepreneurship is also significantly affected by the age of the household head (Northeast and Central regions), the number of adult males in the household (Central region) and the number of children in the household (Northeast) can also be interpreted as evidence of financial constraints. For example, in the Central region, the presence of one additional male in the household increases the likelihood of starting a business by 3.5 percentage points. In the absence of financial constraints, we would expect households to be able to get the necessary funding to hire additional non-household labor. Similarly, each additional child under 18 reduces the likelihood of starting a business in the Northeast by 1 percentage point. In the absence of financial constraints, the household should be able to use additional funds to hire additional laborers, either to do childcare or to work in the household firm. This would eliminate the link between the number of children in the household and the likelihood of starting a business.¹⁸

Taking the evidence presented in Table 2A, Fig. 1 and Tables 3A and 3B together, there is overwhelming evidence that financial constraints play an important role in determining who will start a business and that wealthier households are much more likely to start businesses. There is also some tentative evidence that financial constraints may operate through existing financial institutions, particularly BAAC borrowing groups in the Central region. In addition, the correlation of demographic characteristics with the probability of starting a business points to the importance of financial constraints.

3.1.2. Implication #2: holding entrepreneurial talent fixed and increasing wealth, the percentage of constrained businesses will decrease

In addition to predicting that business ownership will increase with wealth, the presence of financial constraints also implies that, holding entrepreneurial skill constant, the percentage of constrained business owners should fall as wealth increases. We can examine this implication by comparing the percentage of business owners who are constrained in the lowest wealth category to the percentage who are constrained in the highest wealth category (see Table 2A). Here the results are mixed. In the Central region, the percentage of business owners who report that they are constrained increases from 27% to 56% from the lowest to the highest wealth quartile for heads with 0–3 years of schooling. For heads with 4 years of schooling, the percentage of constrained business owners decreases from 55% to 44%. For the most educated group, the percentage of constrained business owners increases slightly from 55% to 59%. In the Northeast, for heads with 0–3 years of schooling, the percentage of constrained business owners decreases from 67% to 50% from the lowest to the highest wealth quartile. For those with 4 years of schooling the percentage goes from 82% to 72%. For the most educated group, the percentage of constrained business owners increases from 44% to 65%.

The only significant difference in the proportion of businesses who report that they are constrained is consistent with financial constraints. In the whole sample, among households whose heads have 4 years of schooling, the percentage of constrained businesses

¹⁸ Other interpretations of the impact of these variables lead to similar conclusions about the presence of financial constraints. For example, the negative coefficient on children may reflect the need to divert resources away from the household business in order to pay for educational expenses. Again, if financial constraints were not an issue, the household would be able to borrow to start a business or to finance educational expenses.

decreases from 61% to 45% from the lowest to the highest wealth quartile. This decrease is significant at a 5% level.

Turning our attention to Fig. 2 which contains graphical representations of the nonparametric relationship between the likelihood of being constrained and wealth, we see that for the Central region, financial constraints appear to be important for existing businesses. The likelihood of being constrained seems to decrease substantially with wealth. For the Northeast, the relationship is perverse and is driven perhaps by an outlier. For most households in this region, there does not appear to be much relationship between being constrained and wealth. For the whole sample, the graphs indicate that the likelihood of being constrained is decreasing in wealth for most of the sample.

Tables 4A and 4B use the same sets of variables as the estimates presented in Tables 3A and 3B to predict who will be a constrained business owner, among households who started a business in the past 5 years. These tables suggest that being constrained at the time of the survey is unrelated to past wealth. While the coefficients on past wealth are negative, as financial constraints would imply, none of the coefficients are significant. Increases in wealth may also reduce the likelihood of being constrained by freeing up borrowing constraints.

This effect is included in the estimates in Table 4B via the variables that interact wealth with membership in various financial institutions. There is some evidence that the joint effect of past wealth and past membership in a village organization can actually increase the likelihood of being constrained at the time of the survey. For households in the Central region, holding other things fixed, a 1,000,000 baht increase in wealth will increase the likelihood of being constrained by 4 percentage points through this effect. As indicated above, this suggests that selection in the credit market may be important. Village institutions often cater to the poor, so a relatively wealthy household that patronizes a village financial institution may indicate that the household has particularly poor prospects despite its wealth.

Curiously, customers of formal financial institutions in the Northeast are more likely to be constrained through the wealth effect. This effect disappears if village rather than tambon fixed-effects are included and the direct effect of being a customer of a formal financial institution in the Northeast is to reduce the likelihood of being constrained by almost 45 percentage points. There is some weak evidence that the interaction of wealth with being the customer of a moneylender reduces the probability of being constrained for the whole sample. Note, however, that the direct effect of being a customer of a moneylender significantly increases the probability of being constrained. In the Central region, being the customer of an agricultural lender (usually borrowing from the BAAC with collateral) is associated with a 27 percentage point increase in the probability that the business is constrained. This finding hints at a potential source of financial constraints. In an environment with moral hazard, optimal credit allocations will be subject to a binding incentive compatibility constraint, which means that borrowing will be associated with being constrained.¹⁹

¹⁹ In Paulson and Townsend (2002), we use structural econometric techniques to examine whether the data can best be explained by a model with this type of financial constraint or by financial constraints that arise when credit is limited in a mechanical way by wealth.

Taking the evidence presented in Table 2A, Fig. 2 and Tables 4A and 4B together, there is little evidence of a systematic relationship between past wealth and household reports of being constrained. However, there is intriguing evidence that household reports of being constrained are related to the interaction of household wealth and participation in various financial institutions and that they are directly affected by household participation in both formal and informal financial institutions.

When we move away from household reports of constraints and consider other indications of constraints, there is clear evidence that constraints decline with wealth. The top panel of Table 2B reports on how returns to business investment vary with wealth. If financial constraints are important, then returns will be high for low wealth households and lower when wealth increases. For the whole sample, median returns decrease from 57% for business households in the lowest wealth quartile to 16% for households in the highest wealth quartile (significant at a 5% level). The same pattern is observed in the Central region (significant at a 1% level) and in the Northeast (not significant). The evidence that is presented in this table also bolsters the view that household reports of being constrained correspond to theoretical definitions of constraints. With two exceptions (out of 12 comparisons), the median return to business investment is higher for households who report that they are constrained, compared to households who do not complain of constraints. This difference is sometimes significant, particularly in the Northeast.

3.1.3. Implication #3: initial investment increases with wealth

If financial constraints are important, then entrepreneurial households may invest less than the optimal amount in existing businesses. If wealth were to increase, investment could go up as well. Table 2C examines how median initial investment in the business varies by past wealth and education. The patterns in the data are consistent with financial constraints. In every case, median investment is higher for previously wealthier households compared to poorer households. Median business investment for firms in the lowest wealth quartile is 22,562 baht in the Central region, compared to 32,478 baht for firms in the highest wealth quartile. In the Northeast, median investment increases from 12,732 to 21,705 baht. For the whole sample, median investment increases from 17,053 to 30,583 baht. Although the table suggests that investment increases with wealth, these differences in investment are not significant, except for constrained businesses in the Northeast.

Fig. 3 presents graphs of the nonparametric relationship between household wealth and business investment for constrained and unconstrained businesses separately. For constrained businesses in the whole sample, the bulk of the data is consistent with the presence of financial constraints: initial investment increases with wealth. For unconstrained businesses, there is very little relationship between wealth and initial investment. We would expect this to be the case if these households are in fact unconstrained and are able to invest the optimal amount of capital in their businesses regardless of their personal wealth. The graphs for the Central region are very similar to the graphs for the whole sample. Initial investment increases with wealth for most constrained businesses and there is little relationship between wealth and investment for unconstrained businesses. In the Northeast, initial investment increases with wealth for both constrained and unconstrained businesses.

We can also evaluate investment's relationship with other important variables using reduced-form techniques. Table 5 presents regression estimates of the log of initial business investment as a function of some of the same variables we have discussed earlier: age and education, the number of adult males, females and children in the household and past wealth.²⁰ While we are examining the relationship between initial investment in the business and wealth, our approach is similar to that taken by Fazzari et al. (1988). They show that firm investment is sensitive to proxies for the availability of internal funds for a sample of publicly traded US manufacturing firms. When financial constraints are important, then the availability of internal funds (i.e. wealth) will have a significant positive effect on initial investment as well. Wealth is an important predictor of initial investment in the whole sample as well as in the Central region. If past wealth were to increase by 1,000,000 baht, for the whole sample, business investment would increase by 40%. The same increase in wealth would lead to an increase in investment of 13% in the Central region. Wealth appears to affect investment at a decreasing rate. The sign on the wealth-squared term is negative and significant for both the whole sample and the Central region. Wealth does not appear to play a significant role in determining initial investment in the Northeast.

The nonparametric estimates suggest that there is a strong relationship between wealth and investment in the Northeast. However, we do not find evidence of this relationship when we impose the assumptions of the linear regression model. For the Central region and the whole sample the message of the various statistical techniques reinforce one another: investment increases significantly with wealth.

3.1.4. Implication #4: investment and constraints increase with entrepreneurial talent (if talent and investment are complements) or decrease with talent (if they are substitutes)

If entrepreneurial talent and investment are substitutes, then initial investment in the business will be decreasing with entrepreneurial talent. Less talented individuals will need to invest more than their more talented counterparts who start businesses. More talented entrepreneurs should also report fewer constraints. In contrast, if talent and investment are complements, potential entrepreneurs who are highly skilled would like to invest more, although they are more likely to be constrained. On average, however, this implies that investment will increase with talent. We can examine these implications by looking at how initial business investment and constraints vary with education. This information is summarized in Table 2A (constraints) and in the bottom panel of Table 2C (investment). The pattern of initial investment and education does not favor the possibility that talent and investment are substitutes. Instead of finding that initial investment decreases with education, we tend to find the opposite. In the Central region, median investment increases by 16% from the lowest education category to the highest. In the Northeast, the increase is even more dramatic: investment goes up by 74%. This finding offers evidence that capital and entrepreneurial talent are complements. It is important to note, however, that the differences in investment between the education groups are not always monotone or statistically significant.

²⁰ We look at initial investment in the business because the level of this variable is the counterpart to the decision about whether or not to start a business.

When we examine how household reports of constraints vary with education (Table 2A), the pattern seems to depend on the region. In the Central region, the pattern is consistent with investment and talent being complements: more households tend to report constraints when we compare households with 0–3 years of schooling with households with more than 4 years of schooling within a particular wealth quartile. In the Northeast, the percentage of constrained businesses tends to decline slightly with education, which is more consistent with investment and talent being substitutes. None of these comparisons are significant however.

If we look at how an alternative measure of constraints, returns to business investment, varies with education the evidence from both the Central region and the Northeast favors the view that investment and entrepreneurial talent are complements rather than substitutes. The bottom panel of Table 2B reports median returns to business investment for businesses whose heads have 0–3 years of schooling, 4 years of schooling and more than 4 years of schooling. In all cases, median returns to investment increase when the lowest education group is compared to the medium or highest education group. Again, these comparisons, while suggestive, are not statistically significant or monotone.

We can also examine this implication by looking at the effect of education on initial investment in the regressions presented in Table 5. In addition to the years of schooling of the head of the household, the regressions include the age and age squared of the head of the household, the number of adult males, adult females, and children in the household, as well as the wealth of the household 6 years prior to the survey. In the whole sample, the Northeast and the Central region business investment increases significantly with schooling. In the whole sample, the results suggest that a household head with 8 years of schooling would invest 67% more than an otherwise similar household whose head had gone to school for 4 years. The weight of the evidence presented in Tables 2A–2C and Table 5 clearly favors the assumption that capital and entrepreneurial talent are complements, rather than substitutes.

3.2. Regional differences and financial institutions

In addition to documenting the overall importance of financial constraints, the contrast between the Northeast and the Central region allows us to explore how the effect of financial constraints may differ with economic and financial development. This comparison draws largely on the reduced form results. If median past wealth were to increase by 100%, the percentage of business households would increase by approximately 1 percentage point in the Northeast and by 0.5 percentage points in the Central region. This corresponds to a 9% increase in the percentage of business households in the Northeast and a 1.5% increase in the percentage of business households in the Central region. The process of starting a business is more sensitive to wealth in the Northeast compared to the Central region. This finding makes sense since the Central region is wealthier and has a relatively sophisticated financial system. Financial constraints are important in both regions; however, they restrict business start-ups more in the Northeast.

However, investment increases significantly with wealth in the Central region. In the Northeast, there is no statistically significant relationship between investment and wealth. At first glance, it seems puzzling that investment would be independent of wealth in the

relatively poor and financially backward Northeast. However, we argue that it is precisely those characteristics of the Northeast that leads to these findings. Because financial constraints are so severe in the Northeast, only very selected businesses are founded. Conditional on being able to start a business, northeastern households are able to break the link between investment and wealth. In order to start a business in the Northeast, households must accumulate enough wealth to fund the business at close to the optimal level because future outside financing is unlikely to materialize. In addition to reconciling the relationship between business start-ups and wealth and investment and wealth in the Northeast and the Central region, this analysis also explains why an equivalent increase in wealth has a larger impact on business start-ups in the Northeast.

The data also allow us to examine the role of particular financial institutions in overcoming financial constraints. Here we focus on the role of the BAAC. Membership in a BAAC group (prior to starting a business) interacted with wealth facilitates business start-ups in the Central region (see [Table 3B](#)). In the Northeast, the direct effect of membership in a BAAC group is positively associated with starting a business (see [Table 3A](#)). The loans that are available through membership in a BAAC group are quite small, so it seems unlikely that BAAC group loans are playing the key role in promoting business start-ups. However, BAAC membership may reveal important characteristics about the potential entrepreneur. BAAC groups are self-selected—potential members must be accepted by the rest of the group. Therefore, membership in a BAAC group may indicate that the potential entrepreneur is very talented, a better credit risk, has access to particularly good projects and so on. The role of selection appears to be related to wealth in the Central region. To the extent that being a member of a BAAC group reveals something about entrepreneurial talent, this finding provides alternative support for the hypothesis that entrepreneurial talent and wealth are complementary.

While BAAC group membership is associated with a higher likelihood of starting a business for wealthy households in the Central region, having a collateralized loan from the BAAC (again prior to starting a business) increases the chance that a business in the Central region is currently constrained (see [Table 4B](#)).²¹ Collateralized loans from the BAAC can be of considerable size, so it seems puzzling that these loans do not reduce the probability that the business is constrained. However, as we suggest above, the finding that BAAC loans are associated with constraints may be due to the nature of the financial constraint. The regional differences in the impact of the BAAC echo [Ahlin and Townsend \(2000\)](#), who show that BAAC joint liability borrowing groups operate differently, depending on the region.

4. Conclusions and discussion

Overall, we find substantial evidence that financial constraints play an important role in determining which households will start businesses in rural and semi-urban Thailand. In

²¹ This variable is not significant in the estimates for the Northeast. However, there is some tentative evidence that the interaction of having a collateralized loan from the BAAC and wealth reduces constraints in the Northeast (see [Table 4B](#)).

particular, nonparametric as well as reduced form evidence demonstrates that wealthier households are more likely to start businesses. The importance of financial constraints is reinforced by the fact that household demographic characteristics are also key determinants of who becomes an entrepreneur. The evidence that households who eventually start businesses have been accumulating wealth more quickly than households who do not start businesses prior to starting a business—as though they were saving in an effort to overcome an inability to borrow to finance business start-up costs—also underscores the importance of financial constraints.

Financial constraints also significantly affect the way existing household businesses in Thailand are run. The nonparametric and reduced form evidence shows that returns to business investment tend to decrease with wealth and investment increases with wealth as well as with entrepreneurial talent. We have also provided evidence that entrepreneurial talent and investment are complements, rather than substitutes. This implies that the burden of being constrained falls disproportionately on more capable entrepreneurs.

In addition, the special features of the Thai data allow us to conclude that financial constraints impose a greater restrictions on entrepreneurial activity in the less developed Northeast compared to the wealthier Central region. The BAAC appears to play a key role in promoting entrepreneurial activity in both the Northeast and the Central region. However, the evidence suggests that BAAC group membership signals important characteristics of the potential entrepreneur. Loans provided by this institution do not predict business start-ups and tend to increase the likelihood that businesses are constrained. This would happen if talented entrepreneurs were more likely to join BAAC groups, and talent and investment were complements, as the results suggest.

These conclusions are strengthened by the use of a variety of statistical approaches that allow us to make sure findings are robust to alternative functional forms and the inclusion of further control variables. The nonparametric estimates rely only on limited data—examining bilateral relationships between variables of interest. Although the nonparametric estimates, which are summarized in Figs. 1–3, often reveal largely linear relationships between key variables, there are some important nonlinearities in the relationship between investment and wealth for constrained businesses.

While we are concerned with the impact of financial constraints on small, entrepreneurial firms in a developing country, these issues are also important for large firms, who in principle have access to sophisticated financial markets. For example, Fazzari et al. (2000) survey the literature that shows that firm investment is sensitive to proxies for the availability of internal funds across many different samples.

The type of evidence for financial constraints that we have presented is often used to justify policy interventions that are aimed at relieving constraints, often through subsidized credit.²² Despite the overwhelming evidence that financial constraints have an important impact on entrepreneurial activity, it would be inappropriate to extrapolate from this evidence what would happen if wealth were reallocated or credit were subsidized. For one

²² The Small Business Innovation Research program in the US is one example. This program provides subsidized credit for research and development for small firms. From 1983 to 1997, this program allocated approximately US\$7 billion to small high-technology firms (Lerner, 1999).

thing, while we have been careful to deal with some sources of endogeneity in wealth by looking at the relationship between wealth prior to starting a business and the decision to start a business, there are other potential sources of endogeneity. For example, if individuals with high levels of entrepreneurial ability accumulate wealth more quickly, so that they can start a business sooner and capitalize on their ability, then the coefficient on past wealth in the probit models for starting a business will capture the impact of wealth and of ability.

Even if one had fully accounted for all the potential sources of endogeneity in wealth, the impact of a policy intervention will still depend on the financial market imperfection that is responsible for financial constraints. For example, in Thailand a program to increase property rights in land would be particularly effective if limited commitment meant that collateral played a key role in borrowing arrangements. However, if credit were constrained because of informational constraints, as in [Aghion and Bolton \(1996\)](#), this program would be unlikely to ease financial constraints.

Acknowledgements

Comments from Daron Acemoglu, Patrick Bolton, David Denis, Lars Hansen, Boyan Jovanovic, Andreas Lehnert, Bernard Salanié, Chris Udry and from conference and seminar participants at the Federal Reserve Bank of Chicago, DELTA, IUPUI, MIT, UCLA, the University of Toulouse, Stanford and Yale are gratefully acknowledged. We also thank Francisco Buera, Xavier Giné and Alexander Karaivanov for their excellent research assistance as well as the National Institute of Health and the National Science Foundation for funding. We are much indebted to Sombat Sakuntasathien for collaboration and for making the data collection possible. The first draft of this paper was completed while Paulson was a National Fellow at the Hoover Institution and a second was completed while Townsend was visiting MIT and we thank them both for their hospitality. The views expressed in this paper are those of the authors and do not necessarily represent those of the Federal Reserve Bank of Chicago or the Federal Reserve System.

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