Financial constraints and entrepreneurship: Evidence from the Thai financial crisis

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Introduction and summary

Poorly functioning financial markets can limit entry of new firms and lead to inefficient production in existing firms. Small-scale entrepreneurs that have limited access to formal financial markets may be particularly affected by financial constraints. Despite this, small entrepreneurial firms are an important source of innovation, jobs, and economic growth in both developed and developing countries. In the U.S., 44 percent of the private work force is employed in small firms, which account for approximately 50 percent of non-farm gross domestic product (GDP).[1] Striking similarities exist between small firms in the U.S. and those in developing countries. In Thailand, for example, small firms employ 60 percent of the work force and account for approximately 50 percent of GDP.[2] Investment from banks and other formal financial institutions is typically limited in small firms. Thus, in both the U.S. and Thailand, two-thirds of the initial investment in small firms comes from savings and funds from family and friends.[3]

Outside investment in small firms may be limited for a number of reasons, including the difficulty of providing credible information to investors about the expected profitability of a planned investment project or the entrepreneurial skill of a potential borrower. This type of problem is typically called asymmetric information. In addition, the provision of a loan may reduce the incentives for an entrepreneur to exert the necessary effort to make a project successful, since the profits of a successful project will have to be shared with investors. This type of problem is called moral hazard. Asymmetric information and moral hazard are concerns in both developed and developing economies. However, these problems are likely to be acute in developing economies where financial markets are less efficient.

When financial markets are less developed, entrepreneurial activity may also be vulnerable to events like the Asian Financial Crisis. This crisis began in July 1997 when the Thai government abandoned its policy of pegging the value of Thailand's currency, the baht, to a basket of developed countries' currencies heavily weighted to the U.S. dollar. The Asian Financial Crisis led to widespread turmoil in international financial markets and to recessions in many Asian countries. In the wake of the crisis, the Thai economy entered a period of marked contraction. In 1997 Thailand's GDP fell 1.5 percent, and in 1998 it fell 11 percent.[4]

At the same time, entrepreneurial activity in Thailand *increased*. In the 12 months following the onset of the crisis, data from a survey we conducted reveal that the number of business households more than doubled (see figure 1). In the spring of 1997, approximately 11 percent of survey households operated a business. One year later, the percentage had tripled, with more than 30 percent of the survey households operating a business. By studying entrepreneurial activity in Thailand before, during, and after the financial crisis, we can enhance our understanding of entrepreneurship and financial constraints generally, and improve our understanding of the role of small businesses during a period of economic contraction.

We use new longitudinal data from rural and semi-urban Thailand to examine the factors that influence entrepreneurial activity in the pre-crisis and crisis periods. The data cover an interval from the spring of 1997 to the spring of 2001, so we are also able to gain

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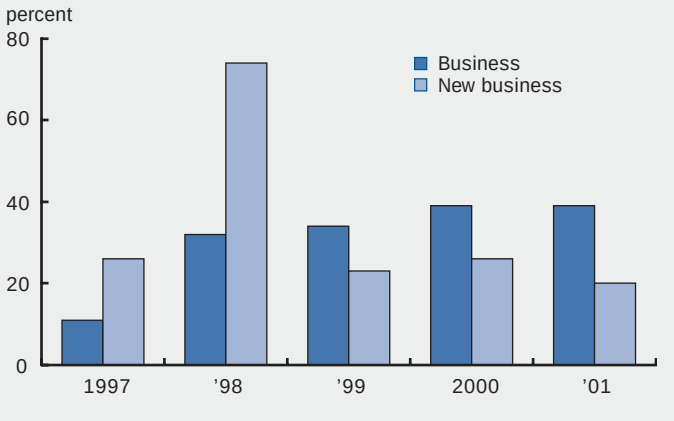
FIGURE 1

Thai business households and new business households, by year



some insight into the post-crisis period. We are particularly interested in entrepreneurial activity during the crisis period.

Before the crisis, we find that wealthier households are more likely to start businesses and that they invest more in these businesses than their less wealthy counterparts (Paulson and Townsend, 2004). During the crisis, however, the positive correlation between entrepreneurial activity and wealth disappears. These findings are robust to the inclusion of various control variables, alternative functional form assumptions, and various techniques for controlling for the endogeneity of wealth. The traditional explanation of these findings would be that financial markets were inefficient prior to the Asian Financial Crisis, but effectively allocated capital to entrepreneurial activities during the crisis.

However, this interpretation strains credulity, given the major weaknesses of the Thai financial system revealed by the crisis itself. Restricting our attention to the operation of financial markets in rural and semi-urban areas, where the survey takes place, we find it difficult to imagine that imperfections in these financial markets were somehow alleviated during the crisis period.

Instead, we argue that rising unemployment and falling real wages during the crisis led to changes in the types of people who started businesses—and in the types of businesses they started. For instance, businesses that were initiated at the height of the financial crisis required only a *median* of 1,250 baht (approximately $50) in start-up capital.[5] The median initial investment in businesses that were started prior to the crisis was 36,750 baht (approximately $1,470). To put these figures into context, note that median annual income in Thailand in the year before the crisis was 40,000 baht ($1,600) for non-business households and 100,000 baht ($4,000) for business households.

In this article, we provide some insights into how rural and semi-urban households in Thailand coped with the financial crisis. The results of this article also underscore the importance of carefully controlling for changes in the returns to non-entrepreneurial activities, notably labor market conditions, in studying the determinants of entrepreneurial activity more generally. These findings help us to understand, for example, increases in self-employment observed in the U.S. during the recession that ended in November 2001.

The rest of this article is organized as follows. First, we discuss some of the relevant related literature. Then, we provide more background on the impact of the Thai financial crisis, detail the financial environment in the survey areas, and describe the longitudinal data that we analyze. Next, we use regression analysis to examine the role of financial constraints in explaining patterns of entrepreneurship before, during, and after the crisis. Finally, we consider how to interpret these findings in the light of other trends in entrepreneurial characteristics over the 1997–2001 period.

Related literature

If financial constraints were not important, then potential entrepreneurs would make the decision to start a business based solely on the expected profitability of the planned endeavor. If necessary, they would be able to get outside financing to start the project, and their own wealth would not be a significant factor in whether the business was started. When financial constraints are important, however, outside financing may be unavailable or insufficient. Wealthier households will be more likely to start a business than poorer ones under these conditions.

Holtz-Eakin, Joulfaian, and Rosen (1994) use data from tax records in the U.S. to examine the reduced-form relationship between inheritance and entrepreneurship, and conclude that financial constraints are important. Using U.S. data from the *National Longitudinal Survey of Youth* (NLSY), Evans and Jovanovic (1989) draw the same conclusion in their structural study of the impact of wealth on career choices. On the other hand, Hurst and Lusardi (2004) find no evidence that entrepreneurial activity in the U.S. is affected by

financial constraints when they allow for a non-linear relationship between wealth and entrepreneurship.

In work that is particularly relevant to this article, Rissman (2003) and Aaronson, Rissman, and Sullivan (2004) point to the importance of taking into account labor market conditions when analyzing the decision to be self-employed. Rissman (2003) models self-employment as an alternative to unemployment, suggesting that self-employment is countercyclical. This conclusion is supported by her analysis of U.S. data from the NLSY. Aaronson, Rissman, and Sullivan (2004) also find some evidence of countercyclical self-employment in the U.S. in their analysis of *Current Population Survey* data. They find that higher rates of unemployment are associated with higher rates of self-employment. They attribute recent increases in self-employment to weak labor market conditions during the recession ending in November 2001.

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 would be independent of one another. When there are financial constraints, however, entrepreneurs may be unable to borrow, or only be able to borrow a limited amount. In this case, wealthier entrepreneurs will be able to invest more in their own businesses, since they are less dependent on the availability of outside financing.

Fazzari, Hubbard, and Petersen (1988) explore this implication of financial constraints in a sample of publicly traded manufacturing firms in the U.S. and show that investment is sensitive to cash flows for some firms. In their two studies, Petersen and Rajan (1994, 1995) hypothesize that banking relationships increase small businesses' access to credit by overcoming information problems that would otherwise constrain the availability of credit to them. Their analysis of data collected by the Small Business Administration (SBA) suggests that banking relationships do indeed play this role for small firms. In contrast, McKenzie and Woodruff (2003) use semi-parametric techniques to show that returns on investment do *not* increase with investment in a sample of small Mexican firms, as one would expect if financial constraints were important.

A number of other theoretical studies, relying on a wide variety of assumptions about how financial markets operate, imply a positive relationship between entrepreneurship and wealth and between investment and wealth.[6] Paulson, Townsend, and Karaivanov (2005) show that moral hazard concerns limit entrepreneurial activity in Thailand in the period leading up to the Asian Financial Crisis.

Background and data

Thai financial crisis

The initial repercussions of the Thai financial crisis were felt in large urban areas, especially in Bangkok, where many construction workers were laid off. Total unemployment increased from an annual rate of 1.1 percent in 1996 to 3.4 percent in 1998, and wages and hours worked fell as well.[7] By some measures, rural areas were particularly hard hit. In these areas, unemployment increased from 3 percent to 8 percent. In the poor northeastern region, real earnings fell by 8 percent.[8] Workers with little education were particularly vulnerable. Real earnings fell 13–20 percent among those who had, at most, completed primary school. Prices also rose during this period, with the Consumer Price Index increasing by 14 percent from 1996 to 1998. From 1998 to 2001, annual inflation in Thailand averaged 1.2 percent.[9]

The overall poverty rate in Thailand increased 24 percent from 1996 to 1999, from 17 percent to 21 percent.[10] However, increases in poverty were not uniform across the country. In the Northeast, for example, rural poverty rates increased nearly 40 percent, going from 28 percent to 39 percent. In the Central region, rural poverty actually decreased from 13 percent to 12 percent from 1996 to 1999. However, urban poverty in the Central region increased nearly 9 percent, going from 6.96 percent to 7.59 percent.

Financial environment

The formal financial sector in Thailand provides two main sources of funding for households in rural and semi-urban areas: the Bank for Agriculture and Agricultural Cooperatives (BAAC) and commercial banks.[11] Of these two, the BAAC is much more active in rural areas. Ninety-five percent of northeastern Thai villages and 89 percent of Central Thai villages had at least one BAAC borrower in 1994. 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 percent of Thai

villages. However, commercial bank borrowers tend to be concentrated in the relatively prosperous Central region, where 50 percent of villages have at least one commercial bank borrower. In contrast, only 31 percent 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.

Survey data

The data that we analyze were derived from our own ongoing socioeconomic study in Thailand, which is funded by the U.S. National Institutes of Health and the National Science Foundation. The initial survey of households, village financial institutions, and village key informants was completed in May 1997. It covers regions at the doorstep of Bangkok as well as in the relatively poor Northeast. The data provide a wealth of pre-financial crisis data from 2,880 households, 606 small businesses, 192 villages, 161 local financial institutions, 262 borrowing groups of the BAAC, and soil samples from 1,880 agricultural plots. A subset of these households was included in an ongoing longitudinal survey, which takes place between March and May of each year. The data we analyze cover the period from 1997 to 2001 and include 960 households.

The study focuses on four Thai provinces that were chosen because of the availability of retrospective data from the Thai *Socio-Economic Survey* (SES). These provinces are emblematic of two distinct regions of Thailand: rural and semi-urban households living in the Central region, 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.

In each province, four geographic areas, called tambons, were chosen at random. Each tambon includes approximately ten villages. In each sample tambon, four villages were chosen at random.[12] Fifteen households were randomly selected from each sample village. Overall, the data include five years of information for 960 households (4 provinces $\times$ 4 tambons $\times$ 4 villages $\times$ 15 households) from 64 Thai villages (4 provinces $\times$ 4 tambons $\times$ 4 villages).

The data include survey year and retrospective information on wealth (household, agricultural, business, and financial); occupational history (transitions to and from farm work, wage work, and entrepreneurship); and access to and use of a wide variety of formal and informal financial institutions (commercial banks, agricultural banks, village lending institutions, and moneylenders, 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 help us to disentangle the effects of running a business from the forces that 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 particularly well designed for studying the relationship between entrepreneurship and the financial system. Economic theory emphasizes that both firm and entrepreneurial characteristics are important in determining the supply and demand for credit. In many studies the available data force a focus on either the firm or the entrepreneur, but do not allow both to be treated with equal thoroughness.[13]

Business characteristics

In this section we highlight some of the key features of the data that are important for this article. 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. We rely on household reports on whether its members 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 working for wages and farming, usually rice. Most business households run only a single business and rely very heavily on family workers. Only 10 percent of the businesses paid anyone for work during the year prior to the survey.

While there are many different types of businesses, shrimp and/or fish raising, shops, and trade account for most of the businesses. These categories account for 65 percent of businesses founded prior to the crisis, 60 percent founded in the year of the crisis, and 39 percent founded in the immediate post-crisis period. The distribution of business types within these categories changes substantially following the crisis. Trade accounts for 17 percent of all businesses that were started in the five years before the crisis. However, 47 percent of the businesses that were founded in the year of the crisis were in trade. The trade category includes retail and wholesale trading activities, ranging from selling desserts in a local market to selling gasoline to shops and gas stations.

There is substantial variation in initial investment in new businesses over time, as we alluded to in the introduction (see table 1). The median initial investment in a business founded prior to the crisis, between 1992 and 1997, is 36,747 baht. The median initial investment in a business that began at the height of the crisis in 1998 is 1,350 baht. The median initial investment in a trading business was 52,533 baht prior to the crisis, just 793 baht in the year of the crisis, and zero in the three years following the crisis. For all the major business types, median initial investment is substantially lower for businesses founded during the first year of the crisis and afterwards compared with businesses founded between 1992 and 1997.

Households rely heavily on savings (either in the form of cash or through asset sales) to fund initial investment in their businesses. Approximately 60 percent of the total initial investment in household businesses that were founded between 1992 and 1997 comes from savings. Loans from commercial banks account for about 9 percent of total business investment, and BAAC loans account for another 7 percent. In the Northeast, the BAAC plays a larger role compared with commercial banks, and in the Central region, the opposite is true. In the crisis and post-crisis periods, when investment is lower, the importance of credit for funding initial investment in the business declines.

In some of the empirical work, we control for participation in formal and informal financial markets by business and non-business households. We group formal and informal financial institutions into six categories. The first, formal financial institutions, includes commercial banks, finance companies, insurance companies, and national employee credit unions, such as the Teachers Credit Union. The second, village institutions and organizations, is made up of production credit groups (PCGs),[14] rice and buffalo banks, and village poor and elderly funds. Formal loans from the BAAC, the Agricultural Cooperative, and local farmers' groups are included in the third group, agricultural organizations. BAAC customers whose loans are secured through joint liability arrangements make up the fourth group. Moneylenders and rotating savings and credit associations (ROSCAs) make up the fifth and sixth groups, respectively. Households were asked to report when they became a customer or member of each organization. Hence, we are able to look at the influence of participation in these organizations prior to starting a business, as distinct from becoming a client of an institution because of the business.

Because households were asked to report when they acquired household and agricultural assets and land, the data provide measures of past wealth as well as current wealth. In the empirical work, which we discuss in the next section, we examine the relationship between past wealth (that is, wealth prior to starting a business) and entrepreneurship. This allows us to avoid some problems of endogeneity that are likely to plague current wealth measures, since current wealth reflects both the resources available to start a business for potential entrepreneurs and the past profitability of a business for current entrepreneurs. Because we can measure wealth before a business was founded, we can isolate the resources available to start a business.

For the time being, however, our interest is in current rather than past wealth. Panel A of figure 2 describes the trend in median wealth in real 1997 Thai baht for business and non-business households over the years 1997–2001. Business households are wealthier than their non-business counterparts over the entire span, and all households experience modest declines in wealth during the crisis. Between 2000 and 2001, median wealth increases for all households, with

TABLE 1

Thai business types and median initial investment

	Pre-crisis		Crisis		Post-crisis	
Business types	**Percent**	**Median inv.**	**Percent**	**Median inv.**	**Percent**	**Median inv.**
Shrimp and/or fish	19	42,027	6	37,800	10	14,745
Shop	29	26,595	7	10,366	4	5,362
Retail and wholesale trade	17	52,533	47	793	25	0
Other	35	78,626	40	5,166	61	0
All	100	36,747	100	1,350	100	0
Sample size	102		208		213	

Notes: Pre-crisis refers to businesses that were started between 1992 and 1997 and were still in operation in 1997. Crisis refers to businesses that were started in 1998 and were still in operation in 2001. Post-crisis refers to businesses that were started between 1999 and 2001 and were still in operation in 2001. Median initial investment (median inv.) is in real 1997 Thai baht.

increases being more dramatic for business households compared with non-business households.

In figure 2, we compare important characteristics of business and non-business households from 1997 to 2001. Prior to the crisis, the heads of business households were more educated than the heads of non-business households (see figure 2, panel B). Business household heads had almost 4.8 years of schooling compared with 3.9 years for non-business household heads. Table 2 provides further details on the distribution of education (and other variables) for business and non-business households. While 61 percent of business and non-business household heads had completed four years of school in 1997, 23 percent of business household heads had additional education compared with just 13 percent of non-business household heads.[15] During the crisis, the gap in education between business and non-business households narrowed substantially, indicating that individuals who started businesses during the crisis were less educated than those who started businesses prior to the crisis. Among households that started businesses in 1999, for example, 35 percent of household heads had less than four years of schooling (see table 2, panel B).

We see a similar pattern with age (see figure 2, panel C). The heads of business households tend to be younger than the heads of non-business households. Before the crisis, they are almost three years younger. However, this gap virtually disappears during the crisis. This indicates that the people who founded businesses during the crisis were significantly older than the individuals who founded businesses prior to the financial crisis.

In panel D of figure 2, we examine trends in household size for business and non-business households. Here we see a different pattern. Business households tend to be larger than non-business households, and the difference increases between 1997 and 2001. There are two potential explanations for this trend, both of them related to urban migrants returning to rural and semi-urban areas in the wake of the crisis. One possibility is that existing business households were more likely to be joined by family members who had migrated prior to the crisis. Another possibility is that urban migrants were more likely to rejoin households that did not have a business prior to the crisis, and these migrants spurred the creation of businesses during the crisis.

Panel E of figure 2 reports on trends in median income (net of expenses for business and farm activities) for business and non-business households.[16] Business households have higher median income than the non-business households over the 1997–2001 period. However, while non-business income drops modestly during the crisis, business income decreases significantly with the onset of the crisis. In 1997 median business income is nearly 90,000 baht, and in 1998 it is just 65,000 baht. As before, there are two potential factors that lie behind this decline. Businesses in operation prior to the crisis may have experienced a dramatic drop in income during the crisis. In addition, businesses started during the crisis may simply generate less income than those started before the crisis. We return to which of these factors is likely to be more important later in this article.

In panel F of figure 2, we examine trends in median expenditure for business and non-business households. Expenditure provides a measure of both current welfare and also reflects expectations about future economic conditions. Households that expect crisis conditions to continue are likely to curtail their expenditures more than households that expect the crisis to be resolved relatively quickly. Median expenditure is higher for business households compared with non-business households throughout the 1997–2001 period, and expenditure decreases from 1997 to 2000 and then increases in 2001 for all households. However, business households experience a sharper decline in expenditure from 1997 to 1998 than non-business households, potentially driven by the entry of new households into this category. By 2001, median non-business household expenditure exceeds pre-crisis levels. For business households, median expenditure in 2001 is still lower than it was in 1997.

Before moving on to discuss the results of a more formal analysis of the role of financial markets before, during, and after the crisis period, it is useful to review the observations that we would like to be able to account for:

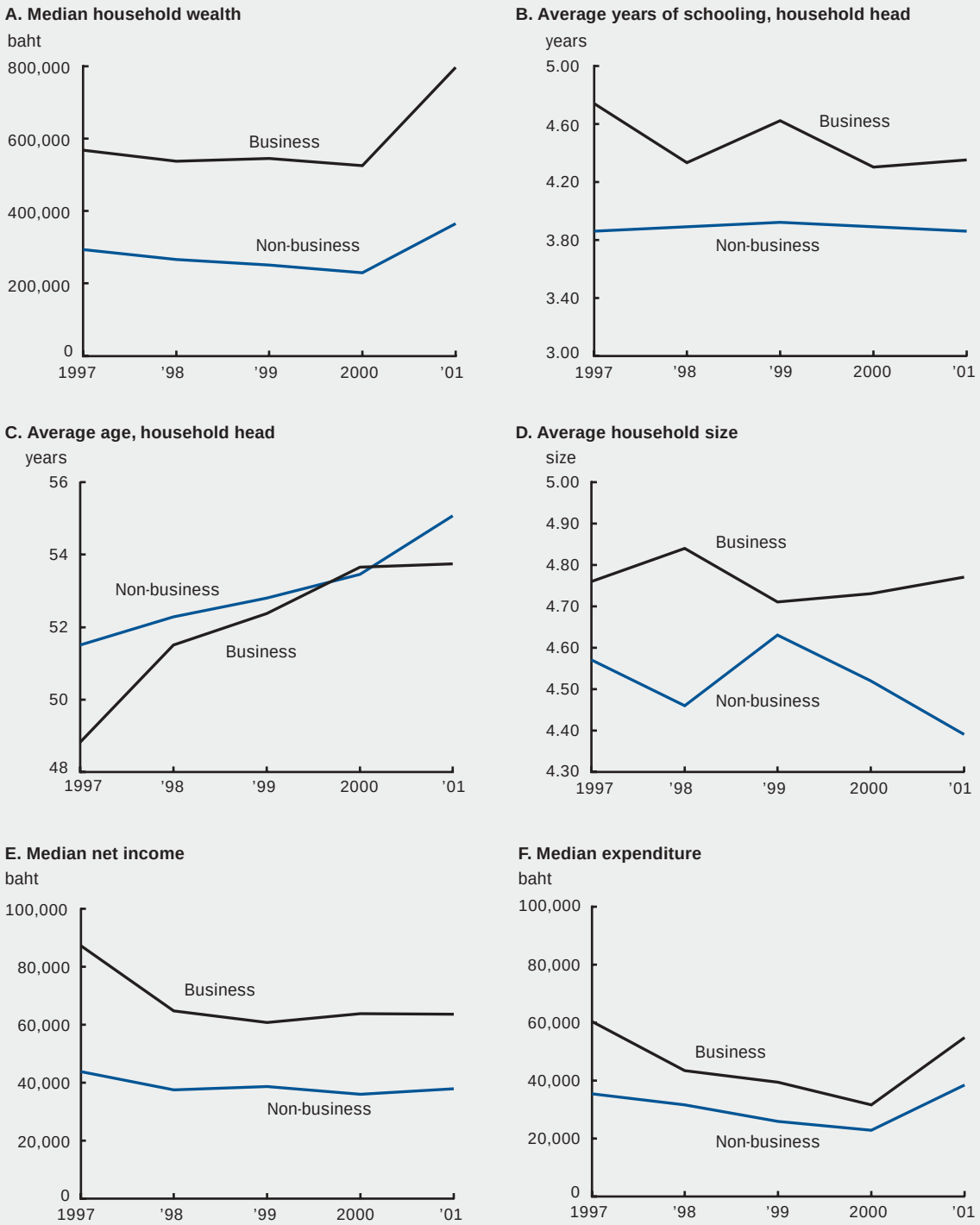
- The percentage of business households nearly tripled during the crisis.
- Businesses started during the crisis tend to have very low or even no initial investment.
- The heads of households who established businesses during or after the crisis tend to be less educated and older than the heads of households with businesses already in operation prior to the crisis.
- Business households have higher wealth, net income, and expenditure compared with non-business households, although the gap between business and non-business households narrows during the crisis period.

Evidence of financial constraints

In this section, we consider the evidence that financial market imperfections played a role in shaping patterns of entrepreneurship before, during, and after

FIGURE 2

Characteristics of Thai business households vs. non-business households



Notes: In panels A, E, and F, amounts are in real 1997 Thai baht. In panel B, years refer to years of schooling completed by head of household. In panel C, years refer to the age of head of household. In panel D, size refers to the number of individuals that make up a household.

TABLE 2

Thai household characteristics

A. Non-business households, by year

	1997	1998	1999	2000	2001
Age of head	51.51	52.28	52.80	53.45	55.08
	(13.45)	(13.71)	(13.58)	(13.84)	(13.44)
Years of schooling—head					
Average	3.86	3.88	3.92	3.89	3.86
	(2.81)	(2.84)	(2.89)	(2.87)	(2.79)
0–3 years (percent)	26	24	24	25	24
4 years (percent)	61	63	64	62	64
5–16 years (percent)	13	13	13	14	12
No. of adult males in household	1.42	1.39	1.43	1.38	1.38
	(0.94)	(0.84)	(0.91)	(0.91)	(0.91)
No. of adult females in household	1.55	1.49	1.51	1.49	1.49
	(0.78)	(0.73)	(0.73)	(0.75)	(0.73)
No. of children (< 18 years) in household	1.60	1.58	1.69	1.64	1.52
	(1.24)	(1.20)	(1.25)	(1.26)	(1.22)
Mean past wealth (in 000s)	803	945	360,000	1,140,000	20,400
	(3,217)	(3,615)	(5,630,000)	(25,100,000)	(428,000)
Median past wealth (in 000s)	135	254	270	244	237
No. of observations	790	607	547	492	479

B. Business households, by year business was started

	1992–97	1998	1999	2000	2001	1999–2001
Age of head	48.79	52.37	53.22	55.16	53.07	53.95
	(14.89)	(13.18)	(13.99)	(12.69)	(12.76)	(13.11)
Years of schooling—head						
Average	4.74	4.18	3.74	4.15	3.97	3.97
	(3.35)	(2.98)	(3.04)	(3.01)	(2.93)	(2.99)
0–3 years (percent)	16	23	35	19	28	26
4 years (percent)	61	62	52	71	54	60
5–16 years (percent)	23	16	14	11	18	14
No. of adult males in household	1.46	1.56	1.39	1.44	1.61	1.47
	(0.88)	(1.01)	(0.83)	(0.78)	(0.97)	(0.86)
No. of adult females in household	1.55	1.63	1.45	1.59	1.52	1.53
	(0.77)	(0.76)	(0.61)	(0.68)	(0.67)	(0.66)
No. of children (< 18 years) in household	1.75	1.67	1.30	1.52	1.69	1.50
	(1.20)	(1.22)	(1.00)	(1.12)	(1.26)	(1.13)
Mean past wealth (in 000s)	1,479	1,196	1,432	110,000	3,853	45,500
	(2,994)	(2,817)	(3,383)	(1,000,000)	(23,700)	(634,000)
Median past wealth (in 000s)	258	414	398	325	319	328
No. of observations	102	208	67	85	61	213

Notes: Standard deviations are in parentheses. For 1998 through 2001, two rows—mean past wealth and median past wealth—refer to wealth in real 1997 Thai baht in the year prior to the year the business started. For example, for the column headed 2000, past wealth is the value of wealth in 1999, expressed in real 1997 Thai baht. However, for the column headed 1997 in panel A, past wealth is the value of wealth in 1991, expressed in real 1997 Thai baht. And for the column headed 1992–97 in panel B, past wealth is the value of wealth in 1991, expressed in real 1997 Thai baht. In panel B, for 1998 through 2001, the figures describe businesses that were started in that given year and were still in operation in 2001; the column headed 1992–97 describes businesses that were started between 1992 and 1997 and were still in operation in 1997.

the financial crisis. We examine the implications of financial constraints for business start-ups and for initial investment in new businesses.

In the analysis, we divide household businesses into three groups:

1) Pre-crisis businesses: businesses founded between 1992 and 1997, still in operation in 1997;
2) Crisis businesses: businesses founded in 1998, still in operation in 2001; and
3) Post-crisis businesses: businesses founded between 1999 and 2001, still in operation in 2001.

For ease of exposition, we label the third group "post-crisis," but we do not mean to imply that the impact of the Thai financial crisis was limited to 1998. We concentrate on businesses that survived for some period because of the design of the 1997 survey. The 1997 survey identifies businesses that were in operation at the time of the survey—that is, businesses that were started at some point in the past and were still in operation in 1997. We restrict our attention to businesses that were started in the five years prior to this survey. To make sure that we are looking at roughly comparable businesses after 1997, the analysis excludes businesses that were started in 1998 but failed between 1998 and 2001 and businesses that were started between 1999 and 2001 and were not in operation in 2001. Of the businesses that were founded at the height of the crisis in 1998, 63 percent were still in operation in 2001.

To examine the importance of financial constraints, we focus on two key relationships. The first is the relationship between the likelihood that a household starts a business and household wealth prior to the time that the business was founded. The second is the relationship between the initial investment in the business and household wealth prior to the time that the business was founded. If financial constraints are important, we expect that business start-ups will be sensitive to the wealth of potential entrepreneurs and that wealthier entrepreneurs will invest more in their businesses.[17]

In order to evaluate the implications of financial constraints, we need to come up with appropriate measures of entrepreneurial talent and wealth. 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 related to business skill. In Paulson, Townsend, and Karaivanov (2005), we show that, at least for Thailand, formal education seems to be strongly associated with business skill.

The appropriate wealth variable is wealth at the time the decision is made to start a business. For the pre-crisis analysis, we use wealth six years prior to the 1997 survey as an empirical counterpart to this variable. We exclude households with businesses that were founded prior to 1992 from the analysis. For the crisis and post-crisis periods, we measure wealth in the year before the business was started. The items that are included in the wealth variable are: the value of household and agricultural assets and land. We do not include the value of any business assets that the household may have owned prior to starting a business.

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 allow business owners to become even richer. In this scenario, current wealth captures both the cause and the effect of having been able to start a business in the past.

Wealth and the likelihood of starting a business

In table 3, we estimate probit models of who becomes an entrepreneur for the three periods. The first set of results in this table reports on the pre-crisis findings. The dependent variable is equal to one if the household runs a business in 1997 that was founded between 1992 and 1997 and zero if the household does not have a business in 1997.[18] The second set of results reports on the crisis findings, where the dependent variable is equal to one if the household starts a business in 1998 that survives until 2001, and it is equal to zero otherwise. The post-crisis findings are found in the third set of results, and the dependent variable in this regression is equal to one if the household has a business in operation in 2001, which was founded between 1999 and 2001, and it is equal to zero otherwise. The figures reported in the table indicate the marginal effect of an infinitesimal change in each continuous variable on the probability of starting a business. For dummy variables, we report the impact of changing the variable in question from zero to one.

In addition to wealth prior to starting a business, the explanatory variables include characteristics of the household head that may be indicators of business talent—age, age squared, and years of schooling. There are also variables that control for the amount of household labor that is available—the number of adult males, adult females, and children under the age of 18 living in the household.[19]

We control for credit market availability by including measures of whether the household was a member or customer of various financial institutions in the past. Like the labor supply variables, we include

TABLE 3

Probit estimates of Thai business start-ups

	Pre-crisis		Crisis		Post-crisis	
	dF/dx	z-statistic	dF/dx	z-statistic	dF/dx	z-statistic
Age of head	–0.0127	–2.36	–0.0003	–0.02	0.0062	0.93
Age of head squared	0.0001	2.14	–0.0000	–0.08	–0.0000	–0.83
Years of schooling—head	0.0097	2.46	0.0086	1.25	0.0079	1.88
No. of adult males in household	0.0135	1.12	0.0311	1.63	0.0217	1.72
No. of adult females in household	0.0055	0.37	0.0662	2.68	–0.0077	–0.47
No. of children (< 18 years) in household	0.0030	0.34	–0.0014	–0.08	0.0021	0.22
Past wealth	0.0226	2.53	0.0318	1.11	–0.0040	–0.85
Past wealth squared	–0.0008	–1.77	–0.0022	–0.77	0.0000	0.85
Past member or customer of						
Formal financial institutions[a]	0.0135	0.44	–0.0128	–0.33	0.0098	0.43
Village institutions/organizations[a]	–0.0398	–1.12	–0.0320	–0.76	0.0096	0.39
Agricultural lenders[a]	0.0332	1.11	–0.0033	–0.08	0.0158	0.67
BAAC groups[a]	–0.0009	–0.03	0.0749	1.70	–0.0086	–0.34
Moneylenders[a]	–0.0160	–0.28	0.0143	0.27	0.0404	1.21
Pseudo R-squared (%)	12.94		14.67		17.00	
Log likelihood	–268.58		–244.27		–212.70	
No. of observations	824		514		472	

[a]Dummy variables.

Notes: Pre-crisis refers to businesses that were started between 1992 and 1997 and were still in operation in 1997. Crisis refers to businesses that were started in 1998 and were still in operation in 2001. Post-crisis refers to businesses that were started between 1999 and 2001 and were still in operation in 2001. For dummy variables, dF/dx represents the change in probability when the dummy variable goes from zero to one. For all other variables, dF/dx is the change in probability from an infinitesimal change in the independent variable in question. Past wealth is made up of the value of household assets, agricultural assets, and land. The coefficient on past wealth in the table is the actual one $\times 10^{6}$. The coefficient on past wealth squared is the actual one $\times 10^{12}$. Sixteen geographic controls are also included (tambons).

these variables so that we can appropriately interpret the coefficient of the wealth variable. 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. The tambon controls are meant to capture geographic variations in the supply of credit along with other important characteristics, such as infrastructure and the size of the market. 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 businesses.

During the pre-crisis period, the likelihood that a household starts a business is positively related to preexisting wealth. In particular, the coefficients reported in the first set of results imply that a 1,000,000 baht ($40,000) increase in wealth would be associated with a 2.3 percentage point increase in the likelihood of starting a business.[20] This is an increase of 21 percent above the observed percentage of households that have started a business in the past five years. The coefficient on wealth squared is significant, although very small, suggesting that the impact of wealth on starting a business decreases as wealth increases.

In contrast to the pre-crisis findings, during the crisis and post-crisis periods, there is no statistically significant relationship between wealth and the likelihood of starting a business. This suggests that the importance of financial constraints declines during the crisis and post-crisis periods.

Table 3 estimates also reflect trends in the difference between the characteristics of business and nonbusiness households over the crisis period, described previously. Prior to the crisis, older household heads are significantly less likely to start a business. During and after the crisis, there is no significant relationship between the age of the household head and the likelihood of starting a business. More education is associated with a greater likelihood of starting a business prior to the crisis, but has no significant impact on business start-ups during the crisis. Larger households, as captured by the number of adult males and females, are more likely to start businesses during and after the crisis. These variables have no significant impact on the likelihood of starting a business prior to the crisis. Business talent appears to have been more important prior to the crisis than during the crisis, and the availability of household labor seems to be more important during the crisis than before the crisis.

In general, access to credit, as measured by past patronage of the various financial institutions, does not seem to play an important role in business start-ups before, during, or after the crisis. With one exception, the variables that control for access to credit are insignificant. During the crisis, however, households that had a prior relationship with the BAAC, in the form of a joint liability borrowing arrangement, are 7.5 percentage points more likely to start a business than those without prior ties to the BAAC. This corresponds to nearly a 30 percent increase in the likelihood of starting a business during the crisis period.

Wealth and initial business investment

In table 4, we examine the relationship between initial business investment and preexisting household wealth for pre-crisis, crisis, and post-crisis businesses. In these regressions, the log of initial business investment plus one is regressed on household wealth prior to the period when the business was started. In panel A, the sample includes only businesses with positive initial investment. In panel B, the sample is augmented with businesses that began with zero initial investment. When we restrict the sample to businesses with positive initial investment, as we do in panel A, it makes it more difficult to find *no* relationship between investment and wealth.

In addition to household wealth, these regressions also include the same household controls discussed earlier.[21] For businesses with positive initial investment, higher levels of wealth prior to starting a business are associated with greater initial business investment prior to the crisis and after the crisis but not during the crisis (see table 4, panel A). An increase in past wealth of 1,000,000 baht is associated with an increase in investment of 46 percent prior to the crisis. These

TABLE 4

Regression estimates of log initial Thai business investment

A. Businesses with initial investment greater than zero

	Pre-crisis		Crisis		Post-crisis	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Age of head	–0.0346	–0.37	0.0524	0.40	–0.2004	–1.58
Age of head squared	0.0000	0.06	–0.0007	–0.56	0.0018	1.55
Years of schooling—head	0.0914	1.54	0.2669	3.57	0.0278	0.41
No. of adult males in household	0.2145	0.96	–0.3217	–1.27	0.2084	0.70
No. of adult females in household	0.7075	2.57	0.8533	2.46	0.0865	0.24
No. of children (< 18 years) in household	–0.1862	–1.07	–0.1154	–0.50	0.1042	0.55
Lag wealth	0.3930	2.16	0.0754	0.46	0.2120	4.12
Lag wealth squared	–0.0156	–1.68	0.0007	0.11	–0.0000	–4.12
Constant	10.3572	4.28	6.4398	1.83	12.9643	3.82
Adjusted R-squared (%)	19.67		10.98		16.13	
No. of observations	69		131		95	

B. All businesses

	Pre-crisis		Crisis		Post-crisis	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Age of head	0.2688	1.07	0.0288	0.15	–0.3250	–1.68
Age of head squared	–0.0027	–1.15	–0.0005	–0.27	0.0028	1.63
Years of schooling—head	0.0198	0.12	0.2668	2.23	0.3569	3.18
No. of adult males in household	0.6307	1.02	0.2218	0.58	0.1204	0.33
No. of adult females in household	0.7356	0.99	0.2362	0.46	0.2049	0.40
No. of children (< 18 years) in household	–0.8216	–1.90	0.1276	0.42	0.4046	1.38
Lag wealth	–0.8890	–1.05	0.2720	1.03	0.0055	0.22
Lag wealth squared	0.0212	0.17	–0.1150	–0.11	–0.0000	–0.21
Constant	1.3736	0.22	3.3881	0.65	10.3189	1.97
Adjusted R-squared (%)	8.89		2.02		6.37	
No. of observations	99		206		214	

Notes: Pre-crisis refers to businesses that were started between 1992 and 1997 and were still in operation in 1997. Crisis refers to businesses that were started in 1998 and were still in operation in 2001. Post-crisis refers to businesses that were started between 1999 and 2001 and were still in operation in 2001. Lag wealth is made up of the value of household assets, agricultural assets, and land in the year prior to starting a business. The coefficient on lag wealth is the actual one $\times 10^{6}$. The coefficient on lag wealth squared is the actual one $\times 10^{12}$. The dependent variable is the natural log of initial investment plus one. In panel A, only businesses with non-zero initial investment are included. In panel B, all businesses, regardless of initial investment, are included.

findings suggest that financial market imperfections restrict investment levels prior to the crisis and after the crisis but not during the crisis itself.

After the height of the crisis in 1998, the importance of financial constraints on investment levels appears to return, at least for businesses with positive initial investment. For these businesses, an increase in past wealth of 1,000,000 baht is associated with an increase in investment of 26 percent. Interestingly, during the crisis more educated business household heads invest significantly more in their businesses. There is some evidence that this is also the case prior to the crisis, but the size and the significance of the coefficient on schooling is smaller.

When we include businesses that begin with zero initial investment (see table 4, panel B), we find no relationship between initial business investment and past wealth before, during, or after the crisis.[22] Education is a strong predictor of initial business investment during the crisis and post-crisis periods according to these estimates, although the magnitude of the effect is fairly small. An additional year of schooling is associated with an increase in initial investment of 1.3 to 1.4 baht. Keep in mind, however, that 37 percent of the crisis businesses and 56 percent of the post-crisis businesses had zero initial investment.

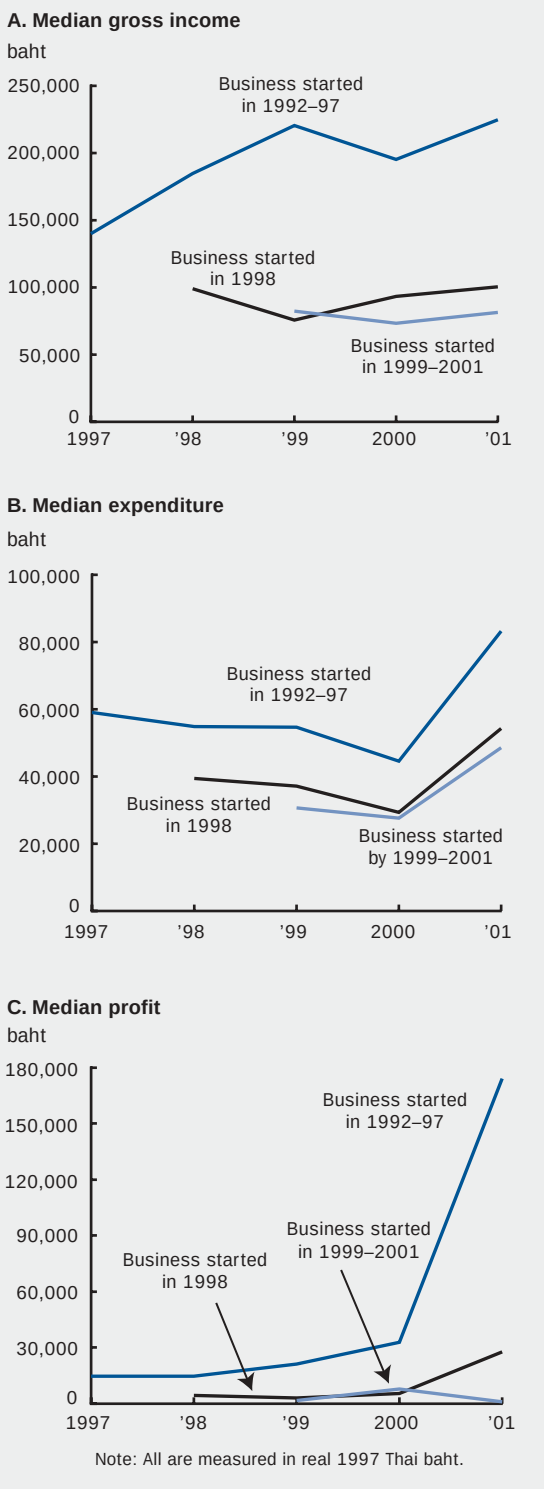
Overall, the relationship between investment and past wealth suggests that financial constraints led to underinvestment in existing businesses prior to the crisis, and possibly after the crisis, but did not place important restrictions on business investment during the crisis.

Business performance

In figure 3, we examine the performance of the three groups of business households from 1997 to 2001. We examine three indicators of business household success: gross income, expenditure, and profit (panels A, B, and C, respectively). Figure 3 underscores the emerging picture that households that start businesses during and after the crisis are different along important dimensions from households that were running businesses when the crisis hit. Gross income, expenditure, and profit are all much higher for households that were already running a business at the time of the crisis compared with households that started a business during or after the crisis. Businesses founded in the post-crisis period have notably lower profits (figure 3, panel C). One potential explanation for this finding is that households with more entrepreneurial talent started businesses earlier—either before the crisis or during the crisis. The businesses that were founded in the post-crisis period may be operated by

FIGURE 3

Performance of Thai business households



Note: All are measured in real 1997 Thai baht.

relatively untalented individuals, and hence have very low profits.

These patterns suggest that the narrowing gap between business and non-business households—in terms of wealth, net income, and expenditure (figure 2, panels A, E, and F, respectively)—is primarily due to the entry of new businesses with lower income and expenditure during and after the crisis rather than a weakening of the economic status of existing businesses. Note, in particular, that the income of households that had businesses at the time of the crisis went *up* from 1997 to 1999 at the height of the crisis (figure 3, panel A).

Conclusion

Beginning with the observation that the number of household businesses in rural and semi-urban Thailand nearly tripled in the wake of the Thai financial crisis, we describe and analyze a number of important features of pre-crisis, crisis, and post-crisis businesses. In particular, we show that businesses started during and after the Thai financial crisis are more similar to non-business households than households that started businesses prior to the crisis. Prior to the crisis, business start-ups and initial investment are significantly related to past household wealth. However, during the crisis, business start-ups and initial investment are unaffected by household wealth. In addition, crisis and post-crisis businesses are characterized by low initial investment.

During the post-crisis period, business start-ups are unaffected by wealth, but initial business investment (for businesses with non-zero investment) is increasing with wealth. Recall that the median business founded during the post-crisis period has zero initial investment. Profits are highest for businesses started prior to the crisis and lowest for businesses started during the post-crisis period. Compared with businesses started during and after the crisis, pre-crisis businesses appear to recover faster and more sharply.

Financial market imperfections seem to restrict business start-ups and investment prior to the crisis but not during the crisis. What might account for this finding? It seems plausible to rule out improvements in financial markets as an explanation, since the crisis itself suggests that Thai financial markets are (or at least were) quite fragile. The key to understanding the apparent lack of financial constraints during the crisis period in Thailand—and how financial constraints have an impact on entrepreneurial activity more generally—is to consider the alternative occupations available to households.

The model of Evans and Jovanovic (1989) provides a useful framework for understanding the increase in business activity during the Thai financial crisis and over the business cycle. Their model implies that when wages fall, more businesses will be started as the returns to entrepreneurial activity exceed wages for more households. In addition, this model implies that the new businesses will tend to be capitalized at lower levels and be run by less talented entrepreneurs. We see evidence of this in the data—crisis and post-crisis investment levels are very low, profits are also low, and the household heads that founded crisis and post-crisis businesses are also less educated than those that founded businesses prior to the crisis. We can reconcile the facts we have described above by understanding how falling wages affect both who finds entrepreneurial activity profitable and how much they invest in business activity.

As alternatives to business employment worsened during the Thai financial crisis, households began businesses because their wage employment options deteriorated. Low capital business opportunities that were unattractive prior to the crisis looked good during the crisis. Note that business investment during the crisis period generated lower profits than pre-crisis investment. Despite the finding that business start-ups and investment are insensitive to wealth during the crisis, there was no improvement in financial markets during this period. Instead, typical business investment during the financial crisis was so low that credit was not required.

This article's findings underscore the general importance of taking into account economic conditions at the time a business is founded in order to account for firm investment and profitability. This insight extends to both developed and developing countries, and applies to dramatic events like the Thai financial crisis, as well as to more modest business cycle type variation in economic conditions.

NOTES

[1]Small Business Administration (SBA) statistics are drawn from the U.S. Bureau of the Census and *Current Population Survey* data. According to the SBA, small firms are defined as manufacturing firms with fewer than 500 employees and non-manufacturing firms with less than $5 million in annual sales.

[2]APEC (Asia-Pacific Economic Cooperation) Center for Technology Exchange and Training for Small and Medium Enterprises. Small Thai firms include manufacturing and service firms with 50 or fewer employees; wholesale trade firms with 25 or fewer employees; and retail trading operations with 15 or fewer employees. Medium-sized firms may have up to 200, 50, and 30 employees in each of these categories, respectively.

[3]This is determined from Bitler, Robb, and Wolken (2001) and calculations from the authors' survey from Thailand.

[4]In the years leading up to the crisis, the Thai economy had grown rapidly. From 1980 to 1995, real per capita GDP had grown 8 percent per year. Following the crisis, the Thai economy recovered somewhat, and real per capita GDP growth averaged 3 percent per year from 1999 to 2001 (World Bank, World Development Indicators).

[5]Throughout this article, monetary values are reported in real 1997 Thai baht. Prior to the devaluation in July 1997, 25 Thai baht equaled 1 U.S. dollar (25 baht = $1).

[6]For example, these implications are shared by a model where there is no credit (Lloyd-Ellis and Bernhardt, 2000), a model where credit is exogenously limited to be a fixed multiple of household wealth (Evans and Jovanovic, 1989), and a model where credit is allocated as the optimal solution to an information-constrained moral hazard problem (Aghion and Bolton, 1997). They are also consistent with the asymmetric information framework emphasized by Fazzari, Hubbard, and Petersen (1988, 2000).

[7]Unemployed individuals are those who are currently not working but are actively looking for work (World Bank, World Development Indicators).

[8]See The World Bank Group (2000).

[9]Prior to the crisis, inflation in Thailand was determined by inflation in the currencies to which the Thai baht was pegged; this means that price increases in Thailand largely mimicked those of the U.S.

[10]All poverty rate figures are reported in Thailand Development Research Institute (2003) and are based on calculations from the Thai National Statistics Office, *Socio-Economic Survey* (SES) data. The poverty rate is defined as the percentage of people in a given region living below the poverty line for that region.

[11]This section is based on the authors' observations and discussions with BAAC officials as well as on data from the Community Development Department of the Thai Ministry of the Interior that cover 60,000 Thai villages every other year from 1988 through 1994.

[12]Each village is a distinct political entity with an elected headman or woman, very much like a mayor.

[13]For example, the *National Longitudinal Survey of Youth*, analyzed by Evans and Jovanovic (1989), has detailed information on the self-employed, but very sparse information on the businesses they run. The Small Business Administration (SBA) data analyzed by Petersen and Rajan (1994, 1995) provide a wealth of details about the firm but very little information about the entrepreneur.

[14]These are village-run savings institutions where members pledge to save a certain amount and interest earnings are determined by the profitability of the whole institution for the year. A sizable fraction of PCGs offer loans, which are secured by savings, as well.

[15]Four years of schooling was the statutory minimum at the time most of the sample's household heads were in school.

[16]In each survey year, households were asked to report on income and expenditure for the 12 months prior to the survey. Thus, for the survey year 1997, income and expenditure figures cover the period from the spring of 1996 to the spring of 1997.

[17]We explain why financial constraints generate these predictions in the Related literature section.

[18]Households with businesses that are operating in 1997 but were founded prior to 1992 are eliminated from the analysis.

[19]In table 2, these variables are summarized in panel A for non-business households, by year, and in panel B for business households, by the year the business was started.

[20]A 1,000,000 baht increase in wealth corresponds to doubling the current wealth of the median business household in 1997 and tripling the wealth of the median non-business household.

[21]Because the sample sizes are smaller here, we do not control for past use of financial institutions and geographic location.

[22]We have experimented with different statistical models and gotten qualitatively similar results. For example, we have estimated probit models where 0 corresponds to zero initial investment and 1 corresponds to positive initial investment and ordered probit models where 0 corresponds to zero initial investment, 1 corresponds to initial investment of less than 10,000 baht, and 2 corresponds to initial investment greater than 10,000 baht.

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