

Liquidity Constraints, Household Wealth and Entrepreneurship

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Abstract

The propensity to become a business owner is a non-linear function of wealth. The relationship between wealth and entry into entrepreneurship is essentially flat over the majority of the wealth distribution. It is only at the top of the wealth distribution—after the 95th percentile—that a positive relationship can be found. Segmenting businesses into industries with high and low starting capital requirements, we find no evidence that wealth matters more for businesses requiring higher initial capital. When using inheritances as an instrument for wealth, we find that both past and future inheritances predict current business entry showing that inheritances capture more than simply liquidity. We further exploit the regional variation in house prices and find that households who lived in regions where housing prices appreciated strongly were no more likely to start a business than households in other regions.

I. Introduction

Debate has been ongoing about how various factors, including lending practices, tax policy, and legal impediments, adversely affect entrepreneurial activity. Perhaps the most frequently cited obstacle to new business formation is the inability of would-be entrepreneurs to acquire the capital necessary to start a business. If credit availability is limited and initial capital requirements are sizeable, then low wealth households will be constrained from starting their own businesses. Indeed, a large literature has documented a positive relationship between initial wealth and subsequent business entry (Evans and Jovanovic (1989), Evans and Leighton (1989), Fairlie (1999), Quadrini (1999), and Gentry and Hubbard (2001)).

Using data from the Panel Study of Income Dynamics (*PSID*), we find that the relationship between initial household wealth and the propensity to start a business is highly nonlinear. Throughout most of the wealth distribution, there is no discernible relationship between household wealth and the probability of starting a business. Only for households in the top 5% of the wealth distribution can a positive relationship be found. Thus, for most of the population, the positive wealth-business entry relationship that is frequently cited as evidence of the existence of liquidity constraints fails to hold.

Data from the National Survey of Small Business Finances (*NSSBF*) allow us to segment industries in the *PSID* by required starting capital. If liquidity constraints are important, low wealth households should be less likely to start businesses in industries requiring high initial capital investments. In fact, the relationship between initial wealth and the propensity to start a business in a low starting capital industry is nearly identical to the relationship between initial wealth and the propensity to start a business in a high starting capital industry. Similarly, if households were limited in their ability to borrow the capital needed to finance a new business, we would expect households to accumulate more wealth in the period prior to starting a business. We show, however, that changes in wealth in the recent past are unrelated to subsequent business entry.

Most importantly, household wealth proxies for more than household liquidity; the traits that render some households more likely to accumulate wealth in non-business forms may also make these households more likely to start a business. To avoid this potential endogeneity problem, we instrumented household wealth with proxies for changes in liquidity. Several authors have found that the propensity to start a business responds strongly to inheritances received in the recent past (Holtz-Eakin, Joulfaian, and Rosen (1994b); Blanchflower and Oswald (1998)). Given that the receipt of an inheritance is not a random event, inheritances likely proxy for more than just liquidity. If inheritances proxy solely for liquidity, inheritances received in the past should predict current business entry, while future inheritances should not. We find that inheritances received in the future predict current business formation equally as well as inheritances received in the recent past. Thus, inheritances are a rather poor instrument for changes in household liquidity.

We propose an alternative instrument for changes in liquidity: housing capital gains. During the late 1980s, house prices varied a lot across regions of the United States, delivering capital gains (or losses) to homeowners in different regions. Unlike inheritances, which are concentrated among those at the top of the wealth distribution, housing capital gains affect households throughout the entire wealth distribution. Households who lived in regions where there was strong housing appreciation were no more likely to start a business than households in other regions.

Although we find no relationship between wealth and business entry over most of the wealth distribution, we do find that very wealthy households are much more likely to start a business. The final section of the paper offers explanations for this finding. Given that small business ownership is a risky venture (Moskowitz and Vissing-Jorgensen (2002)), households with a higher tolerance for risk should be more likely to become business owners, all else being equal. We present evidence that high wealth households display a higher propensity to take on risk. Additionally, we find that high wealth households are much more likely to start professional businesses (i.e., law firms and medical practices). The organizational hierarchies of professional firms can result in a positive correlation between wealth and business ownership. Successful lawyers, for example, are more likely to accumulate large amounts of

wealth and are also more likely to assume an ownership position in their law firm. Lastly, we discuss how business ownership has a luxury good component. As households become wealthier, they are more likely to purchase the benefits associated with owning a business (power over decision-making, a flexible time schedule, etc.).

Our results do not imply that any given household wanting to start a small business has unlimited access to credit at reasonable borrowing rates. Given optimal lender behavior, and common sense, such results would be implausible. We do conclude, however, that even if some households that want to start small businesses are currently constrained in their borrowing, such constraints are not empirically important in deterring the majority of small business formation in the United States. This may simply reflect the fact that the starting capital required for most businesses is sufficiently small. We provide evidence to this effect throughout the paper. Alternatively, even if the required starting capital for some small businesses is high, existing institutions and lending markets in the United States appear to work sufficiently well at funneling funds to households with worthy entrepreneurial projects.

II. Household Wealth and the Transition into Entrepreneurship

We begin by examining the relationship between household wealth and the transition into business ownership using data from the *PSID*, a large-scale panel survey that has followed families since 1968. The distribution of household wealth in the *PSID* closely matches the wealth data from other household surveys, such as the Survey of Consumer Finances (*SCF*) (Hurst, Luoh and Stafford (1998) and Juster, Smith and Stafford (1999)). In 1984, the *PSID* began asking detailed questions about household wealth at five year intervals. Additionally, in every survey year respondents are asked whether or not they own a business. Given that the *PSID* did not start asking information on wealth prior to 1984 and that *PSID* data is not yet available beyond 1999, our analysis is focused on the time period spanning from 1984 to 1994.

Empirically testing the effects of liquidity constraints on entrepreneurship requires us to define both of these terms. We view liquidity constraints as the inability of households to borrow to finance their

entrepreneurial projects. If starting capital is non-trivial, this inability to borrow constrains low wealth households from starting a business, implying that the likelihood of small business formation should increase with household wealth. Furthermore, if liquidity constraints are driving the positive correlation between household wealth and starting a business, then this relationship should vanish at high levels of wealth as the constraint ceases to bind. While many empirical papers have found a positive relationship between wealth and starting a business (Evans and Jovanovic (1989), Evans and Leighton (1989), Fairlie (1999), Quadrini (1999) and Gentry and Hubbard (2001)), we are aware of no papers, which test the latter prediction.

Theory provides little guidance on how to classify ‘entrepreneurs.’ Given our focus on wealth, we concentrate on households that report owning at least one business and define entrepreneurs essentially as business owners, similar to what has been done in several other studies.¹ Specifically, we utilize responses from *PSID* questions, including: “Did you (or anyone else in the family) own a business at any time (in year X) or have a financial interest in any business enterprise?” After that, respondents are asked the type of business, who in the family owned it, whether the owner worked in the business, and whether the business was incorporated. As part of the *PSID* wealth supplement, households were asked to report the value of the business if all assets were sold and debts were paid off. As a robustness check, we also defined entrepreneurs as being ‘self-employed,’ which is distinct from owning a business. The main results of this paper are unaffected by whether we classify entrepreneurs as business owners or as self-employed. Below, we report only the results for the first definition of entrepreneurship.

To examine the role of initial wealth in the business formation decision, we create a pooled sample of non-business owners from the 1989 and 1994 waves of the *PSID*. A household is defined to enter entrepreneurship if either the household head or the spouse became a business owner in the subsequent one-year period (either 1990 for the 1989 non-business owners, or 1995 for the 1994 non-business

¹ Hubbard and Gentry (2001) and Cagetti and De Nardi (2001) use business ownership to define entrepreneurs. Evans and Leighton (1989), Evans and Jovanovic (1989), Blanchflower and Oswald (1998), and Fairlie (1999) use self-employment. Meyer (1990) and Quadrini (1999) use both business ownership and self-employment status, while Holtz-Eakin, Joulfaian and Rosen (1994a,b) use schedule C in federal income tax returns to define entrepreneurs. Some authors restrict entrepreneurs to have at least \$5,000 of equity in their business. Given the results of the *NSSBF* data discussed below, we made no such restriction.

owners). To eliminate households in which the head is still in school or close to retirement, we restrict our sample to non-retired household heads between the ages of 22 and 60. Our total sample has 7,645 observations.

In Table 1, we report descriptive statistics about the sub-sample of households that transitioned into entrepreneurship during the following year and compare those statistics to the sub-sample of households who remained non-business owners. On average, those transitioning into entrepreneurship were more likely to be white, male, married, and have high education and high income. New business owners also held substantially higher amounts of wealth.

A. *Household Wealth and the Transition into Entrepreneurship, Base Results*

In this sub-section, we explore the relationship between household wealth and the probability of starting a business. We begin by estimating a probit model of the transition into business ownership in the subsequent year as a function of household wealth and several other controls. These controls include a quadratic in age, a series of education, race and family structure dummies, a quadratic in household labor income, dummies for whether the household head is currently unemployed or had been unemployed anytime in the prior 5-years, and a dummy for whether the household had been a business owner anytime in the prior 5 years.² Household wealth is defined as the sum of savings and checking accounts, bonds, stocks, IRAs, housing equity, other real estate, and vehicles, minus all debt.³ All values in the text and tables are expressed in 1996 dollars unless otherwise indicated.

In Table 2, we report probit estimates of the effect of household wealth on the transition into entrepreneurship using two specifications for wealth. In the first column, we consider the current level of household wealth, similar to what previous studies have done. We refer to this specification as the ‘linear’ wealth model. In the second column, we use a fifth order polynomial in wealth, referring to this specification as the ‘non-linear’ wealth model. The coefficient on wealth in the linear model is positive

² These controls are similar to those included by others in the literature. See, for example, Evans and Jovanovic (1989), Evans and Leighton (1989), Meyer (1990), Fairlie (1999), Quadrini (1999) and Gentry and Hubbard (2001). We experimented with other controls, including changes in marital status and family size, a vector of region dummies, and state economic controls. None of the additional controls we tried affected our main results.

and statistically significant, indicating that wealthier households are more likely to become entrepreneurs. The marginal effect of an incremental change in wealth, however, is small. Increasing household wealth by \$100,000 increases the probability of starting a business by less than ½ of one percentage point.⁴ Given that the base probability of becoming an entrepreneur in the subsequent year is 4.5%, an increase in wealth of \$100,000 would increase the probability of business ownership by only 10%, from roughly 4.5% to 5%. Relative to both the mean and the median values of wealth for this sample (Table 1), a \$100,000 increase in wealth represents a very large change in wealth. However, the sign, significance, and magnitude are all similar to the results reported by other authors who have used different data sets, different sample periods, or different definitions of entrepreneurship.

The second column of Table 2 reports the coefficients of a fifth order polynomial in wealth. Including a fifth order polynomial fits the data better than including either a quadratic or a cubic in wealth because the data includes a handful of households with very large wealth values (in excess of \$1 million) or very low wealth values (below -\$100,000). Relative to the fifth order polynomial specification, a likelihood ratio test rejects the specification where wealth is included linearly (p -value = 0.05).⁵ Column II of Table 2 shows that all the wealth terms in the non-linear specification are jointly significant (p -value = 0.09). The average marginal effect estimated from the non-linear model is much smaller than the average marginal effect estimated from the linear wealth model (0.0029 vs. 0.0048, per \$100,000 changes in wealth).⁶

To better interpret these marginal effects, we graph the relationship between wealth and the predicted probability of becoming an entrepreneur using the coefficient estimates in Table 2. In computing the predicted probabilities, we evaluated all other controls, except household wealth, at their sample means. The solid line in Figure 1 represents the predicted probabilities of starting a business estimated from the linear wealth model. The dotted line in Figure 1 represents the predicted probabilities estimated from the

³ See Hurst, Luoh and Stafford (1998) for a full description of the *PSID* wealth data and each wealth component.

⁴ All reported marginal effects in this paper were computed for each individual and averaged across individuals.

⁵ We also experimented with wealth specifications that included higher order polynomials in wealth, but results were similar.

⁶ This decline in the marginal effect is not surprising given that, as we show below, there is no relationship between wealth and starting a business for households with wealth levels lower than \$200,000.

non-linear model. The predicted probability of starting a business estimated from the non-linear model does not vary with wealth over most of the wealth distribution. The estimated probability of starting a business for someone with \$20,000 in wealth is nearly identical to the estimated probability of starting a business for someone with \$200,000 in wealth (the estimates are 0.029 and 0.031 with standard errors of 0.003 and 0.005, respectively).⁷ It is only at the very top of the wealth distribution – above the 95th percentile (approximately \$300,000 of wealth) – that the probability of starting a business becomes large. The positive association between wealth and business entry found in the linear model is thus driven solely by households at the top of the wealth distribution.

To more precisely document the non-linear relationship between wealth and starting a business, we re-estimate the probit model displayed in Table 2 by including wealth dummies instead of including wealth levels directly. We group households into 3 groups: those residing below the 80th percentile of the wealth distribution, those between the 80th and the 95th percentile, and those above the 95th percentile.⁸ Estimates from this specification are also plotted in Figure 1 (dashed line). The estimated probability of starting a business for households in the bottom 80% of the wealth distribution is 2.9%. Residing in a higher wealth percentile—from 80 to 95th percentile—increases the probability only by 0.7 percentage points and the difference was not statistically different from those in the bottom 80 percent. However, the probability increases sharply for those in the top 5% of the wealth distribution; these households are 3.8 percentage points *more* likely to start a business and differences between those at the top of the wealth distribution and the rest of the population are statistically significant at standard levels.

Taken together, the evidence thus far shows that 1) over most of the wealth distribution, there exists no empirical relationship between wealth and entry into entrepreneurship, and 2) the positive relationship between wealth and entry into entrepreneurship in the linear specification is driven by households at the top of the wealth distribution.

⁷ Bootstrapped estimates of the probabilities were computed by re-estimating the model in Table 2 five-hundred times, computing the predicted probability at each percentile point after each iteration, and taking the means of estimated probabilities.

⁸ We also estimated a specification with dummies for each following wealth quintiles: 40th–60th, 60th–80th, 80th–95th, and the top 5 percent. Estimates using this specification were similar to a specification using only the three wealth categories described

B. *Household Wealth and the Transition into Entrepreneurship, By Industry Type*

Our findings thus far reflect that over most of the wealth distribution the probability of starting a business is about 3%, and that wealth appears to matter only for those households at the top of the wealth distribution. One possible explanation for this pattern is that little wealth is required to enter most entrepreneurial activities, but high capital requirements may render other activities accessible only to the very wealthy. In the presence of liquidity constraints, wealth should matter more for starting a business that requires a large initial capital investment than for a business that requires a small amount of starting capital. Using data from the National Survey of Small Business Finances (*NSSBF*), we segment industries in the *PSID* by the amount of capital needed to start a business.

The 1987 *NSSBF*, a survey of small business firms conducted by the Board of Governors of the Federal Reserve System and the Small Business Administration (*SBA*), provides information on the use of financial services and institutions for a nationally representative sample of small firms. The target population for the sample is non-financial, non-professional, non-farm businesses in operation as of December 1987 with fewer than 500 employees. The sample was selected from the Dun's Market Identifiers file. To compute the amount of capital needed to start a business in different industries, we restrict the sample to include all firms in the survey that were established, inherited, or acquired since 1980. This restriction leaves 1,099 firms in the *NSSBF* sample.

Respondents in the 1987 *NSSBF* were asked to report the amount of capital that was used to start or purchase their business.⁹ According to *NSSBF* data, between 1980 and 1988, the median amount of capital used by those starting or acquiring a business was \$34,600 (in 1996 dollars). Close to 25% of small businesses were started with less than \$8,000, and 75% of them were started with less than \$95,000. Figures are smaller if we focus on newly created businesses only (i.e., excluding those firms that were

above. Relative to being in the first wealth quintile, the probability of starting a business in the subsequent year was no different if the household resided in the 2nd, 3rd or 4th wealth quintile.

⁹ The *NSSBF* question reads: "How much owner's capital was used to start/purchase the business? Owner's capital is the amount of personal capital the owner used to start/purchase the business, including savings and money borrowed against personal assets."

inherited or purchased); 25% started with less than \$5,000, and the median starting capital provided by the founder(s) was \$22,700.

Table A1 in the appendix summarizes the 25th percentile, the median, and the 75th percentile of the distribution of starting capital across industries in the 1987 *NSSBF*. We use these figures to designate industries in the *PSID* as either low starting capital industries (Construction and Services) or high starting capital industries (Mining, Manufacturing, Transportation, Communication and Public Utilities, Wholesale and Retail Trade, and Finance, Insurance and Real Estate). For businesses in the former, the median starting capital is under \$20,000 and the 75th percentile is under \$63,000, while businesses in the latter have median starting capital requirements that exceed \$45,000 and the 75th percentile is over \$120,000.

The *PSID* has two additional small business industry categories not covered by *NSSBF* data - agriculture (farms) and professionals (law practices, medical practices, consulting firms, etc.). Because we have no information to guide us on the starting capital requirements for these types of firms, we experimented with the inclusion of these two industries in each of the two starting capital categories. Our results are not sensitive to the inclusion of agriculture in either the low or the high starting capital industries. However, as we show in Section V, high wealth individuals are much more likely to start a business in the professional industry. As a result, we study the transition into professional industries separately.

To examine if wealth is more important for entry into a high rather than a low starting capital business, we restrict our sample to those not owning a business in 1989. Since the *PSID* has not yet made available the industry of the household's business beyond 1993, this sample restriction is necessary. Our sample now includes 3,467 distinct households. The relationship between wealth and starting a business in any industry in the 1989 sample is very similar to the relationship found in the pooled 1989/1994 sample described in Figure 1.

Figure 2 presents the relationship between wealth and starting a business in three different types of industries: high starting capital industries, low starting capital industries, and professional industries.

Approximately 35% of new business owners between 1989 and 1990 started a business in a low starting capital industry, 32% in a high starting capital industry, and 19% in professional industries; the remainder started a business in the agriculture industry. While we present the results excluding firms in the agriculture industry from any of the three industry classifications defined above, our results are not affected by this exclusion. To compute the estimated probabilities reported in Figure 2, we regressed starting a business in a given industry classification on a fifth order polynomial in wealth and a series of income and demographic controls using a probit model. The income and demographic controls were identical to those used in the regressions reported in Table 2.

If liquidity constraints are a deterrent to small business formation, we would expect a positive and stronger relationship between wealth and business entry for those in a high starting capital industry than those in a low starting capital industry. Figure 2 shows this not to be the case. The probability of starting a business in a high starting capital industry, as a function of wealth, is strikingly similar to the probability of starting a business in a low starting capital industry. In the 1989 data, the probability of starting a business in either of the two industries actually declines slightly through the 90th percentile of the wealth distribution. This decline, however, is not statistically significant for either group. The probability of starting a business in either high capital requirement industries or low capital requirement industries does not increase until wealth reaches the top 5% of the distribution (above \$280,000 in household wealth). Additionally, the marginal effect of wealth on the probability of starting a business in either the high starting capital industry or the low starting capital industry, estimated from the non-linear model, is nearly identical. A \$10,000 increase in wealth decreases the probability of starting a business in a high starting capital industry, on average, by 0.04 percentage points (with a bootstrapped standard error of 0.08), whereas the comparable marginal effect for starting a business in the low starting capital industry is -0.06 percentage points (with a bootstrapped standard error of 0.10).

The pattern of business entry displayed in Figure 2 is consistent with the results of Evans and Leighton (1989). They find that individuals with low wages, short job tenures, or frequent or long unemployment spells are more likely to switch into self-employment, even after controlling for wealth

and education. In other words, households who do not face good opportunities in the labor market are more likely to start a business. We control for income (and income squared) and unemployment status in our regressions. As for wealth, we find some evidence of a U-shaped relationship between income and business entry. Low income families are more likely to start a business. It should be stressed, however, that the decline in the predicted probability as a function of income is not statistically significant.

Also evident from Figure 2 is that the relationship between wealth and starting a business in professional industries is strictly increasing with respect to household wealth. The probability of becoming a partner in a law firm, accounting firm, or medical practice is small if household wealth is low. As wealth increases, the probability increases sharply; for a household with \$200,000 of wealth, the probability of starting a business in a professional industry is eight times higher than for a household with \$20,000 of wealth (0.004 vs. 0.0005). In Section V, we return to the issue of starting businesses in professional industries.

III. Wealth, Sample Selection, and the Transition into Entrepreneurship

Our analysis above ignores potential issues arising from the self-selection of individuals into entrepreneurship. By construction, high wealth households in our sample of non-business owners are households that have chosen not to become business owners during earlier periods. As a result, these households may not be representative of high wealth households in general, perhaps because they have lower entrepreneurial propensities. Such selection could lead us to underestimate the importance of liquidity constraints, even in a world where liquidity constraints bind. Suppose, for example, that low wealth households cannot become business owners because of imperfect capital markets, while high wealth households are not business owners because they have less of a preference for owning a business (evidenced by their recurring decision not to become business owners). In such a case, wealth would appear to have little or no effect on entrepreneurial propensities while, in fact, liquidity constraints exist and bind. In this section, we discuss how we address potential issues in our analysis arising from the self-selection of individuals into entrepreneurship.

Restricting our pooled 1989/1994 sample to include only young households (households where the head is less than 35) helps mitigate the self-selection problem. Because young non-business owners have had fewer opportunities to select out and become entrepreneurs, selection issues should be less severe for this sample. Furthermore, in the presence of upward sloping age-earnings profiles and asymmetric information about individual ability, young households should be more likely to face binding liquidity constraints. To estimate whether liquidity constraints bind in this sub-sample of young households, we use the same empirical specification as in Table 2.

Results for this sub-sample of the population mirror the results in the total sample, as presented in Figure 1.¹⁰ The effect of wealth on the probability of becoming an entrepreneur is approximately flat up until the 90th percentile of the young household's wealth distribution (around \$100,000). Again, it is only at the very top of the young household's wealth distribution (top 5%) that wealth displays a strong, positive relationship with the transition into business ownership. Thus, even for young households, an increase in wealth does not affect the probability to start a business over the majority of the wealth distribution.

To further address the selection issues associated with using the level of wealth, we consider whether changes in wealth predict entry into entrepreneurship. Buera (2003) develops a dynamic version of the Evans and Jovanovic (1989) entrepreneurial choice model, in which would-be entrepreneurs face liquidity constraints. Simply, if liquidity constraints bind, we should observe households accumulating wealth in advance of starting a business.

We rerun the probit model presented in Table 2, replacing household wealth levels with household changes in wealth during the previous five years, using our pooled 1989/1994 sample. Given the frequency with which the *PSID* collects wealth data, our analysis is limited to studying five-year changes in wealth. Since the distribution of wealth changes is very wide, we limit the influence of outliers by

¹⁰ For brevity, the results for the young sample are not presented. Our results are not sensitive to the age cutoff. Restricting our sample to households where the head is younger than 30 yields the same pattern of results.

truncating the top and bottom 1% of the change in wealth distribution. Compared with the sample used for the regressions in Table 2, these restrictions reduce the sample size to 6,952 observations.

When the change in wealth is entered linearly, the coefficient on the change in wealth is negative, although not statistically different from zero. The corresponding marginal effect of increasing changes in wealth (in \$100,000 units) is -0.174 percentage points. In other words, if households accumulated an additional \$100,000 in wealth during the prior five years, their probability of becoming an entrepreneur would actually decline by 3.8% ($-0.00174/0.045$, where 0.045 is the average probability of becoming an entrepreneur for this sample).

As before, we also examine if there are non-linearities in the relationship between households' changes in wealth and their subsequent probability of becoming business owners. As in Table 2, we include a fifth order polynomial in changes in wealth. The probability of starting a business is not much different between households who had positive and negative changes in wealth (Figure 3). Essentially, the probability of starting a business is identical between those households who had a \$10,000 decline in wealth (30th percentile of the change in wealth distribution) and those households had a \$80,000 increase in wealth (90th percentile of the change in wealth distribution).

One could argue that exploring the relationship between changes in wealth and business entry is troublesome because changes in wealth are dominated by measurement error. Additionally, individual characteristics (such as risk aversion, patience, and financial sophistication) can drive both the propensity to accumulate wealth and the propensity to start a business. Given that we find no effect of wealth changes on business entry over most of the change in wealth distribution, we are less susceptible to the latter criticism. However, in the next section, we explore more exogenous measures of liquidity than simply changes in wealth. Doing so will allow us to address both selection and measurement issues associated with these empirical tests.

IV. Inheritances, Housing Capital Gains, and the Transition to Entrepreneurship

Previous studies have used inheritances to proxy for household liquidity. Blanchflower and Oswald (1998) show that young individuals who received an inheritance are more likely to be self-employed. Holtz-Eakin, Joulfaian and Rosen (1994a,b) report that those who received an inheritance are more likely to start a business and to succeed in entrepreneurship.

In both the 1989 and 1994 *PSID* wealth supplements, households were asked to report whether they received inheritances greater than \$10,000, the values of these inheritances, and the years in which they were received. In our 1989 *PSID* sample, almost 5% of non-business owners received an inheritance between 1985 and 1988. The average value of inheritances, conditional on receipt, was over \$60,000. Regressing the level of household wealth in 1989 on the controls used in the regressions presented in Table 2 and the value of inheritances received between 1985 and 1988 yields a coefficient on the value of inheritances of 0.66 (s.e. = 0.20; *F* statistic for the inclusion of the inheritance variable = 13.11). In other words, current wealth is higher by \$0.66 for each dollar of inheritance received in the previous five years.

Panel A of Table 3 reports the results of our instrumental variables (IV) regression of starting a business between 1989 and 1990 where inheritances received between 1985 and 1988 were used as an instrument. This regression was estimated on the 1989 sample of *PSID* non-business owners and included as independent variables all the income and demographic controls discussed with Table 2. For this IV regression, we assume a linear probability model of business entry. Household net worth in 1989, instrumented with past inheritances, is positively and significantly related to business entry in the subsequent year (from 1989 to 1990).

Although using inheritances as an instrument for wealth provides a clever and more convincing way to assess the importance of liquidity constraints, it still suffers from shortcomings. First, many small and mid-size businesses are transferred to heirs upon the death of the owner. Estimates from the 1993 *NSSBF* indicate that over 6.5% of business owners inherited their business. Thus, the correlation between the recent receipt of inheritances and entrepreneurship may simply reflect the fact that businesses are being

transferred across generations.¹¹ Second, the inheritance variable may be vulnerable to the same endogeneity concerns as the wealth variable. The receipt of an inheritance is not a random event; households that receive inheritances are much more likely to come from wealthy or otherwise “successful” families. Given the strong intergenerational correlation in occupation, education, wealth, and saving preferences (Charles and Hurst (2003), Altonji and Dunn (2000)), households receiving inheritances may have different entrepreneurial propensities – conditional on wealth – than households that do not receive inheritances.

This latter argument suggests that inheritances are likely to predict entrepreneurship above and beyond simple liquidity effects. By exploiting differences in the timing of inheritances, we can directly test whether the receipt of an inheritance is proxying for liquidity or for other factors such as household human capital, preferences, or “entrepreneurial spirit.” If inheritances proxy simply for liquidity constraints, only past inheritances should matter for current business entry decisions. Future inheritances should not be important, as liquidity constrained households are limited in their ability to borrow against future resources. Conversely, if inheritances proxy for other factors that determine the probability of starting a business, inheritances received in both the recent past and the distant future should predict current business entry. Using the information on inheritances available in the *PSID*, we examine whether the receipt of inheritances between 1991 and 1994 (i.e., after the household started the business) is related to entry into entrepreneurship between 1989 and 1990, and compare it with the results using past inheritances.

The effect of net worth – instrumented with inheritances – on the probability of starting a business is almost identical regardless of whether past inheritances (Panel A of Table 3) or future inheritances (Panel B of Table 3) are used. These results cast severe doubt on the claim that the positive relationship between

¹¹ Holtz-Eakin, Joulfaian, and Rosen (1994a,b) attempt to control for whether the business was transferred intergenerationally in their empirical work.

inheritances and business entry serves as evidence that liquidity constraints are an important deterrent to new business creation.¹²

It is also possible that inheritances are simply proxying for the recipient household already being wealthy. As illustrated in Figure 2, very wealthy households are much more likely to start a business. Likewise, very wealthy households are much more likely to receive inheritances. That is, inheritances are extremely concentrated among households in the top of the wealth distribution. Using our *PSID* pooled sample, we find that households in the top 10% of the wealth distribution are over four times more likely to receive an inheritance compared with households in the bottom 90% of the wealth distribution. Furthermore, the value of inheritances, conditional on receipt, is twice as large for households in the top 10% of the wealth distribution, as compared with other households.

A. *A Different Instrument for Liquidity: Capital Gains on Housing*

Instead of relying on inheritances, we propose an alternate instrument for liquidity that is less likely to display an underlying correlation with other factors that determine entrepreneurial propensities: capital gains on housing. During the mid 1980s, U.S. house prices increased considerably and delivered capital gains to many households. In Appendix Table A2, we report the variation in house price appreciation across US Census regions between 1985 and 1988, as measured by the Office of Federal Housing Enterprise Oversight. House prices in New England appreciated by over 68% between 1985 and 1988, while house prices in the West South Central region fell by over 10%. To capture changes in wealth experienced by most households, not simply those at the top of the wealth distribution, we exploit regional changes in house prices as an instrument for household wealth.

Changes in house prices are not purely exogenous. For example, economic conditions could be more favorable in one region than in another. If this were the case, we would expect both house prices in that region to increase (as households migrate into that region) and households to be more likely to start a

¹² Given the findings on the timing of inheritances discussed above, wealthy families do not appear to provide children with otherwise unattainable liquidity. However, these families may minimize the downside risk of starting a business in that wealthy parents may be more likely to support children who started a business and failed.

business (as economic conditions are more favorable). To account for the endogeneity of house prices, we create a measure of house price changes after controlling for both state and regional economic conditions. The use of micro data (as opposed to regional data) allows us to control for household demographics and initial house size, which may be correlated with house price appreciation.

In each wave of the *PSID*, households self-report the value of their home. To calculate the regional appreciation in house prices net of household demographics and regional economic activity, we regress changes in the self-reported value of homes for non-moving *PSID* homeowners during 1985 to 1988 on household demographic variables (household age, education, race, gender, marital status, family size, income, employment status, and initial house value), region dummies, and state economic controls. The state economic controls included the level of state GDP per capita in 1985, the growth rate of state GDP per capita between 1985 and 1988, and the state unemployment rate from 1985 to 1988.¹³ The variation captured by the region dummies is thus the regional variation in house prices net of changes in economic conditions in the states comprising the region. The coefficients on the region dummies from this regression are then assigned to each household in our 1989 sample of non-business owners. We use the variation in house price appreciation across regions as an instrument for household wealth. If liquidity is important, we predict that households who lived in areas in which housing capital gains were larger should be more likely to start a business, holding everything else equal.

Two considerations with respect to this instrument are particularly noteworthy. First, if potential entrepreneurs intend to use home equity to surmount liquidity constraints, it is not important whether households perceive these changes in house prices to be transitory or permanent. As long as lenders are willing to lend to households based on their housing equity, households can borrow against their increased housing equity to relax any liquidity constraints they face. This notion is supported by empirical evidence that lenders are willing to lend (and households are willing to borrow) when households receive large capital gains on housing (Hurst and Stafford (2003)). Second, regional

¹³ We use nine region dummies defined as US Census Regions. See Appendix Table A2 for the US states included in each Census Region.

movements in business conditions, not proxied by our economic controls, could cause both changes in house prices and changes in the desire of households in a given region to become business owners. If this latent unobserved variable results in a positive correlation between house prices and the propensity to start a business, our instrumental variable procedure will be biased toward finding an effect of wealth on business creation.

The first stage regression for our sample indicates that our instruments have predictive power for household net wealth. Regressing the level of household wealth in 1989 on the controls used in the regressions presented in Table 2 and our predicted regional house price appreciation controls leads to a coefficient on the regional variation in house prices of 0.94 (standard error = 0.27; *F* statistic on the inclusion of the inheritance variable = 12.6). Thus, households save approximately 94% of their housing capital gains (and we cannot reject the hypothesis that households save 100% of the gain). Results for this first stage regression are consistent with other work (Hurst and Stafford (2003); Engelhardt (1996); and Skinner (1996)).

The instrumental variable estimates in Panel C of Table 3 show that the coefficient on wealth – instrumented with regional house price appreciations – is negative but not statistically different from zero. Thus, when considering a more exogenous measure of liquidity than simply net wealth, our estimates again offer little support in favor of liquidity constraints.

V. Interpreting the Non-Linear Relationship between Wealth and Entrepreneurship

The above results show that wealth is not an important predictor of entry into entrepreneurship for the majority of households. In this section, we provide explanations for this finding. Additionally, we discuss why there exists a strong correlation between wealth and business entry for household with very high wealth.

One reason why wealth is not important for starting a business in the United States is that the capital required to start most businesses is relatively low. As summarized above, the 1987 *NSSBF* data show that the median amount of capital used by households founding their own business was \$22,700. Close to

25% of small businesses were started with less than \$5,000. Meyer (1990) examines the amount of starting capital using the 1982 Characteristics of Business Owners data and reports even smaller figures. In that data set, 63% of non-minority males and 78% of black business owners indicated that they required less than \$5,000 to start their businesses (approximately \$8,700 in 1996 dollars). Similar results are reported by Bhidé (2000), who analyzed a sample of firms tracked by *Inc. Magazine* as the 500 fastest growing companies in the United States. Most of the firms in his sample started with little capital, and 26% of them started with less than \$5,000 in up-front capital.

Close to 38% of business owners in the 1989 *PSID* sample report business equity below \$5,000, and approximately 30% report zero business equity.¹⁴ Restricting our attention to new business owners, the findings are similar. Of those households not owning a business in 1989, but owning one in 1994, 61% had less than \$5,000 in business equity in 1994 and over 75% had less than \$25,000 in business equity. Only 8% of new business owners had business equity greater than \$100,000. Not only are the numbers very similar when considering earlier periods in the *PSID*, but they also are similar to numbers computed using different data sets, such as the 1995 *SCF*, the 1992 Health and Retirement Study, and the 1997 National Longitudinal Survey of Youth.¹⁵ Even though the data sets mentioned above report data on business equity, it would be more informative to have data on business assets. As long as business owners can borrow, they do not have to hold large amounts of equity. To address this issue, we look at the borrowing opportunities of entrepreneurs in the United States.

The balance sheets of firms surveyed by *NSSBF* in 1987 and 1993 show that the large majority of firms report borrowing from several different sources and in several different forms (line of credits, mortgages on businesses, equipment loans, motor vehicle loans, loans from partners, credit card loans, and other types of loans). For example, 72% and 79% of firms report some form of borrowing in the 1987 and 1993 *NSBBF*, respectively. Another reason why wealth is not important for starting a business is that, in the United States, institutions are available to provide funds to entrepreneurs. In 1953, the *SBA*

¹⁴ The *PSID* data does not separately record the asset and liabilities of the households' businesses. The *PSID* only asks its respondents to report their net position in their businesses.

was established to monitor and promote business ownership. With a primary focus on channeling funds to entrepreneurs with worthy projects, the *SBA* has made over twenty million loans and loan guarantees to entrepreneurs since 1953.¹⁶ In 1997 alone, the *SBA* issued over \$9.5 billion in loans to small businesses through its loan guarantee program.

Given the evidence that initial capital investments are small and that many small businesses are loan recipients, it is perhaps not surprising to find little or no relationship between wealth and the probability of starting a business over most of the wealth distribution. We want to stress, however, that our results do not suggest that any household who wants to start a small business has unlimited access to credit at the risk-free rate. Rather, the results indicate that even if some households are constrained from borrowing, such constraints are not empirically important in deterring the majority of small business formation in the United States.

Although wealth has little effect on business start-up throughout most of the wealth distribution, there does exist a strong relationship between wealth and entrepreneurship for high wealth households. Because this relationship occurs at very high levels of wealth, in excess of \$200,000 to \$300,000, it is unlikely to be the result of binding liquidity constraints. Several pieces of evidence confirm that the behaviors of wealthy households who start businesses, along with the types of businesses started, are very different from the behavior of households who start businesses in the rest of the wealth distribution.

First, evidence that wealthy households have different preferences for risk than less wealthy households, coupled with the inherently high risk of new businesses ventures, suggests that households with higher tolerances for risk should be more likely to own a business, all else equal. Examining household portfolios in the *SCF*, Carroll (2002) finds that those at the very top of the wealth distribution are substantially more willing to take risk. Charles and Hurst (2003) draw similar conclusions after analyzing survey measures of risk aversion in the *PSID*, finding that only households in the top quartile of the wealth distribution are much more likely to report a willingness to take very risky gambles. The fact

¹⁵ Authors' calculations.

¹⁶ See Small Business Administration (1997).

that very wealthy households are much more likely to take risk may explain why the probability of starting a business increases only for households at the top of the wealth distribution.

Households at the top of the wealth distribution are also much more likely to start businesses in the professional industry. Table 4 shows the distribution of industries for new business owners between 1989 and 1990 by wealth category. In that time period, 19% of new business owners started a business in the professional industry, the majority of which were firms in the medical, legal, accounting or management consulting industries. The probability of starting a business in the professional industry differs across wealth holdings. As reflected in the second column of Table 4, of new business owners with initial wealth in the top twenty percent of the wealth distribution, over one-third started their business in a professional industry. For new business owners in the bottom eighty percent of distribution, on the other hand, the comparable figure was 13%. Thus, a disproportionately large number of wealthy households start businesses in the professional industry.

How much of the relationship between wealth and business entry found at the upper end of the wealth distribution is the result of wealthy households entering professional industries? Using the non-linear specification discussed in Figure 2, we estimate the probability of starting a ‘non-professional’ business. As expected, the effect of wealth on starting a business in a non-professional industry is not as strong as when including professionals. Essentially, half of the correlation between wealth and the propensity to start a business found among households in the top 10% of the wealth distribution can be attributed to such households starting businesses in the professional industry.

Why is it, then, that high wealth households are much more likely to start a business in a professional industry? Households working in the professional industry are likely to have accumulated large amounts of human capital, which also fosters wealth accumulation (because of higher patience (Lawrance (1991)) or higher financial sophistication). Moreover, the traditional organizational structure of firms in the professional industry is such that successful employees assume ownership positions in the firm (i.e., a successful lawyer will eventually be promoted to firm partner). Given that successful professionals

likely earn higher incomes and accumulate higher amounts of wealth, it is not unexpected to observe high wealth households disproportionately becoming business owners in the professional industry.¹⁷

Another reason why business entry is prominent among the wealthy is that business ownership is a luxury good. Many authors have demonstrated there exists a large personal consumption component to business ownership. Moskowitz and Vissing-Jorgensen (2002), for example, conclude that the large non-pecuniary benefits from owning a business reconcile the fact that returns to small business ownership (private equity) are no higher than returns to public equity, despite the additional risk associated with small business ownership. Additionally, Hamilton (2000) finds that most entrepreneurs enter and persist in business ownership despite having both lower initial earnings and lower earnings growth than in paid employment. Like Moskowitz and Vissing-Jorgensen, Hamilton (2000, page 604) asserts that “the empirical results suggest that the non-pecuniary benefits of self-employment are substantial.” If these non-pecuniary benefits from business ownership – such as the ability to control one’s own schedule, the ability to make all decisions, and the utility derived from being considered an entrepreneur – are large and are luxury goods, we would again expect wealthy individuals to be more willing to start a business than less wealthy individuals, all else equal.

The above claim is difficult to evaluate because most micro panel data sets do not ask households about their consumption of luxury goods. The *PSID*, however, does ask about additional real estate ownership (aside from the household’s primary home), which includes vacation and second homes. While this measure may be imperfect, we expect the ownership of “second homes” to have a large luxury consumption component. In fact, the effect of wealth on the probability of acquiring a second home is very similar to the effect of wealth on the probability of starting a business. The probability is flat up through the 80th percentile of the wealth distribution. Again, it is only at the top of the wealth distribution that the probability of acquiring a second home starts to increase sharply.

¹⁷ Businesses can also serve as tax shelters. According to the *Statistics of Income* data on partnerships, a large percentage of partners were ‘limited partners,’ that is, investors who played no role in the daily activity of their enterprises. For a related discussion, see also Holtz-Eakin, Joulfaian, and Rosen (1994a).

VI. Concluding Remarks

Several studies have documented the positive relationship between wealth and the likelihood of starting a business. This association has been translated into evidence that liquidity constraints are a deterrent to new business formation. This conclusion is premature. Throughout most of the wealth distribution (up through \$200,000 in household wealth), there is no discernible relationship between household wealth and the probability of starting a business. Only for households at the very top of the wealth distribution is there a strong and positive relationship between household wealth and business entry. This shows that liquidity constraints, while possibly important for some households, are not a major deterrent to small business formation in the United States.

Data on capital requirements for start-ups in different industries, the timing of inheritances, and the experience of households who enjoyed capital gains on their homes from the mid-1980s through the mid-1990s provide further evidence that high levels of liquidity are not essential for starting a small business. Given that almost all micro data surveys of business ownership show that most business owners start with very little initial capital, it is not surprising that wealth does not matter for starting a business. Additionally, even when the upfront costs of starting businesses are large, existing lending markets appear to work well at funneling resources to would-be-entrepreneurs.

While the results in this paper address the decision to start a business, other dimensions of the entrepreneurial process could be affected by liquidity constraints. For example, the inability to borrow may prevent households from starting businesses at their optimal scale. Thus, while liquidity constraints do not prevent entrepreneurs from starting a business, entrepreneurs may have to start smaller than when constraints are not present. Given the limits of the *PSID* data, testing this claim is difficult; nevertheless, it is a fruitful area for future research.

In future work, the role of family background on the probability of starting a business, along with the survival rate of that business, should be more fully explored. Children who receive inheritances are much more likely to start a business, regardless of when inheritances were received. While children who receive inheritances are likely to come from relatively wealthy families, it is unclear whether wealthy

parents teach their children about either investment behavior, in general, or small business investment, in particular. Furthermore, do wealthy parents provide an implicit insurance to their children, thereby limiting their downside risk in case the business fails? Understanding these questions may shed much needed light on the decision of households to start small businesses.

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**Table 1: Descriptive Statistics of New Business Owners and Non-Business Owners
Pooled 1989/1994 Sample**

Variable	Subsequent Non- Business Owners	Subsequent Business Owners	<i>p</i> -value of difference
Age of Head	38.2	38.6	0.36
Education Dummy (Head): Less than High School	0.17	0.08	< 0.01
Education Dummy (Head): High School	0.34	0.25	< 0.01
Education Dummy (Head): Some College	0.23	0.25	0.40
Education Dummy (Head): College or More	0.26	0.42	< 0.01
Dummy: African American Head	0.18	0.07	< 0.01
Dummy: Female Head	0.28	0.07	< 0.01
Dummy: Household Head is Married	0.50	0.66	< 0.01
Average Family Labor Income, previous 5 years	\$38,927	\$51,700	< 0.01
Dummy: Household Experience Unemployment, previous 5 years	0.22	0.19	0.15
Dummy: Household Own a Business, previous 5 years	0.16	0.51	< 0.01
Household Net Worth (mean)	\$72,700	\$144,800	< 0.01
Household Net Worth (median)	\$26,900	\$53,500	< 0.01
Sample Size	7,341	304	

Note – The sample includes all households in the *PSID* between the ages of 22 and 60, who did not own a business in either 1989 or 1994 and who subsequently remained in the *PSID* for one additional year. Dollar values are expressed in 1996 dollars. All statistics presented in Table 1 are means, unless otherwise indicated. The weighted percentage of households who become business owners in the subsequent year is 0.045.

**Table 2: Probit Estimates of Household Business Entry Decision
Pooled 1989/1994 Sample**

	Model I Probit Coefficients (Linear in Wealth)	Model II Probit Coefficients (5 th Order Polynomial in Wealth)
<i>Income/Demographic Controls Included?</i>	Yes	Yes
<u>Wealth Levels</u>		
Wealth /100,000	0.056 (0.027)	0.018 (0.014)
(Wealth/100,000) Squared		-0.028 (0.106)
(Wealth/100,000) Cubed		0.019 (0.033)
(Wealth/100,000) to the 4 th power		-0.003 (0.004)
(Wealth/100,000) to the 5 th power		1.11 E-4 (1.83 E-4)
Marginal Effect of Increasing Wealth/\$100,000	0.0048	0.0029
<i>p</i> -value of joint significance of all wealth variables	0.037	0.092
Pseudo R ²	0.118	0.125
Sample Size	7,645	7,645

Note – This table reports probit estimates of the transition into business ownership in the subsequent year. The sample is composed of non-business owners in either the 1989 or 1994 *PSID*. Regressions include controls for demographics (age, education, family composition), current and past income and employment status, and past business ownership. In Model I, wealth is entered linearly. In Model II, a 5th order polynomial in wealth is used. Huber-White standard errors are reported in parentheses. Marginal effects for the sample are computed for each household and averaged over households. The weighted percentage of households in the sample becoming business owners in the subsequent year is 0.045.

Table 3: Instrumental Variables Estimates of Effect of Net Worth on Business Entry Between 1989 and 1990

Regression Predicting Becoming a New Business Owner Between 1989 and 1990 (Sample: Non-Business Owners in 1989)	Coefficient on Net Worth/ \$100,000
Panel A	
Instrument = Value of Inheritances Received in 1985-1988	0.146 (0.035)
Panel B	
Instrument = Value of Inheritances Received in 1991-1994	0.168 (0.009)
Panel C	
Instrument = Regional Difference in Housing Appreciation in 1985-1988	-0.019 (0.042)

Note – Sample is restricted to non-retired, non-business owning households in the 1989 *PSID* (3,467 households). All three regressions are estimated using a linear probability model. In Panel A, the value of recently received inheritances is used as an instrument for net worth. In Panel B, the value of future inheritances received is used as an instrument for current net worth. In Panel C, the value of recent housing appreciation in the household's region is used as an instrument for current net worth. All regressions include the same set of controls as in Table 2. Huber-White standard errors are reported in parentheses.

**Table 4: Industry Breakdown of New Entrepreneurs by Initial Wealth
1989 Sample**

Industry in Which the Entrepreneur Entered	I	II	III	IV
	Full 1989 Sample	Top 20% of Wealth Distribution	Bottom 80% of Wealth Distribution	<i>p</i> -value of difference in means between II and III
Agriculture	0.128	0.131	0.127	0.955
Construction	0.124	0.088	0.138	0.404
Manufacturing	0.034	0.048	0.028	0.549
Transportation	0.038	0.003	0.052	0.159
Sales (Wholesale or Retail)	0.148	0.050	0.188	0.034
Finance, Insurance or Real Estate	0.092	0.197	0.051	0.006
Professional (Medical, Law, Accounting)	0.191	0.336	0.132	0.006
Service	0.228	0.113	0.274	0.034

Note – Sample includes all non-business owning households in the *PSID* in 1989 between the ages of 22 and 60 who remained in the sample through 1990 (3,467 households). New entrepreneurs are defined as not owning a business in 1989 and subsequently owning a business in 1990. Column IV provides the *p*-value of a *t*-test of the difference in means between new entrepreneurs in the top 20% of the wealth distribution (column II) and new entrepreneurs in the bottom 80% of the wealth distribution (column III).

**Table A1 - Starting Capital for New Business Owners
Between 1980 and 1987**

<i>Industry</i>	<i>Starting Capital Value</i>			<i>Percent of Firms in Industry Category</i>
	<i>1st Quartile</i>	<i>Median</i>	<i>3rd Quartile</i>	
<i><u>Low Starting Capital Industries</u></i>				
Construction	\$2,860	\$9,500	\$30,100	10.9%
Services	\$3,450	\$19,400	\$62,719	30.3%
<i><u>High Starting Capital Industries</u></i>				
Mining	\$1,730	\$37,800	\$394,375	1.2%
Transportation, Communication and Public Utilities	\$15,120	\$47,300	\$143,300	3.0%
Finance, Insurance and Real Estate	\$7,900	\$36,500	\$173,260	4.8%
Manufacturing	\$16,165	\$47,300	\$151,200	7.9%
Wholesale Trade	\$11,010	\$41,400	\$145,860	8.5%
Retail Trade	\$21,880	\$55,200	\$118,150	33.3%

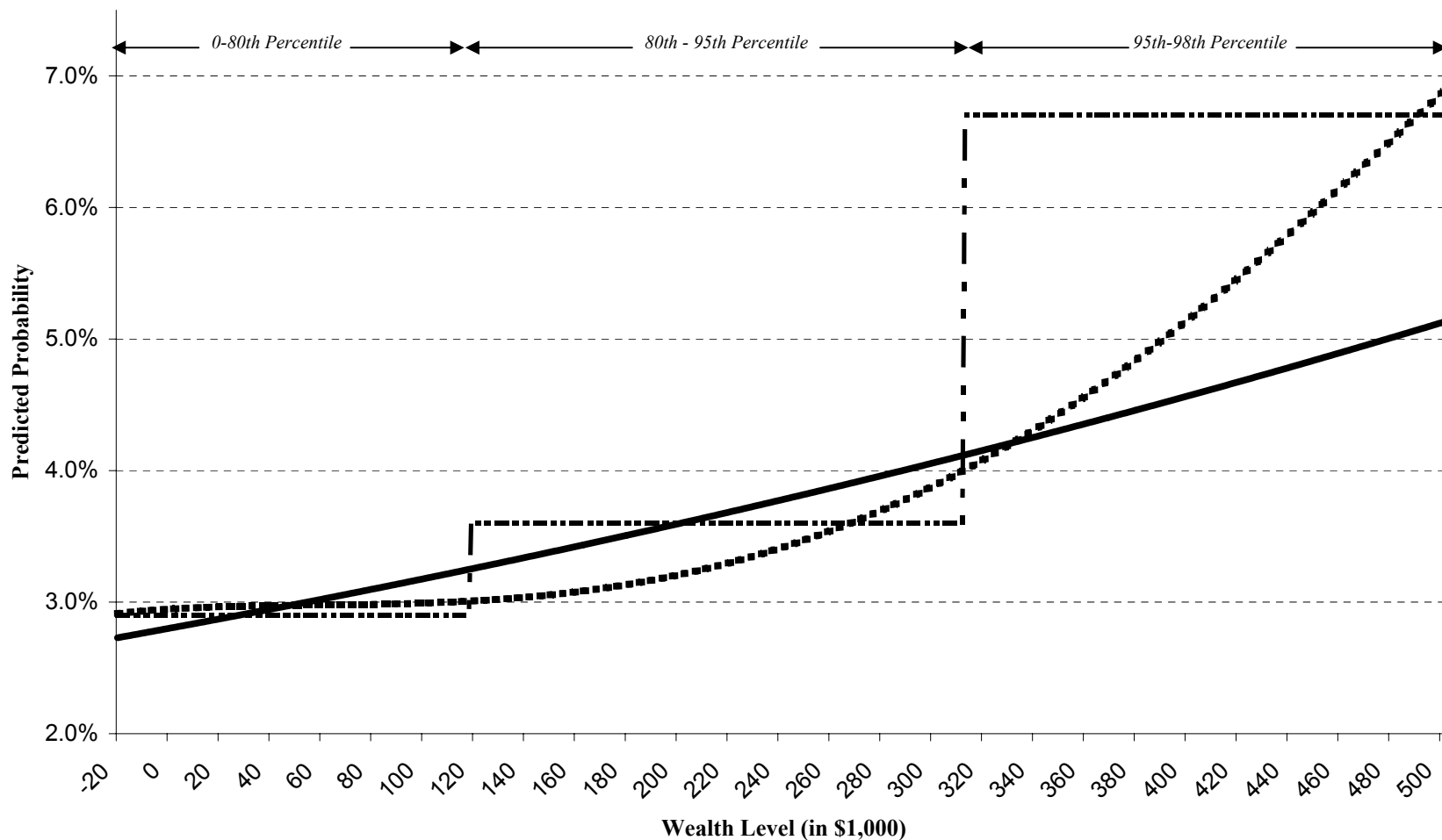
Note – Data are from the 1987 National Survey of Small Business Finances. All values are reported in 1996 dollars. The sample includes 1,099 small businesses.

Appendix Table A2: Regional House Price Appreciation Between 1985 and 1988

United States Census Region	1985Q1 OFHEO Repeat Housing Sales Index	1988Q4 OFHEO Repeat Housing Sales Index	Percent House Price Appreciation Between 1985Q1 and 1988Q4
New England	170.7	287.1	68.2%
Mid Atlantic	142.7	227.8	59.6%
Pacific	123.5	169.4	37.2%
East North Central	104.4	136.0	30.3%
South Atlantic	127.4	155.9	22.4%
East South Central	116.7	136.1	16.6%
West North Central	113.8	128.3	12.7%
Mountain	121.8	124.1	1.8%
West South Central	124.3	110.0	-11.5%
All Regions	124.0	160.8	29.7%

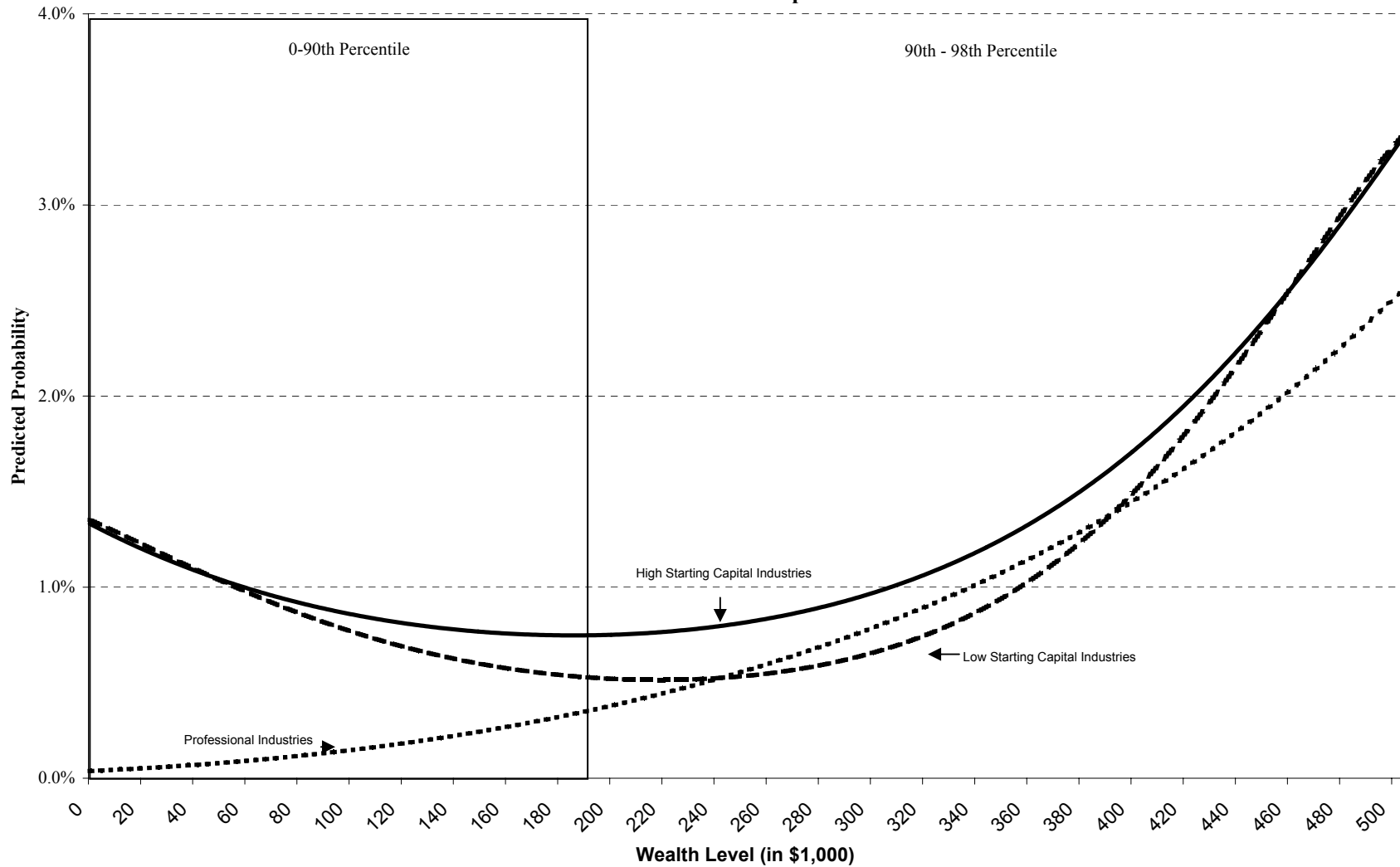
Note - Data are from the Office of Federal Housing Enterprise Oversight (OFHE) repeat residential housing price index (Base year: 1980Q1 = 100). New England region includes Connecticut, Massachusetts, Maine, New Hampshire, Rhode Island, and Vermont. Mid Atlantic region includes New Jersey, New York, and Pennsylvania. Pacific region includes Alaska, California, Hawaii, Oregon, and Washington. East North Central includes Illinois, Indiana, Michigan, Ohio and Wisconsin. South Atlantic region includes District of Columbia, Delaware, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, and West Virginia. East South Central region includes Alabama, Kentucky, Mississippi and Tennessee. West North Central region includes Iowa, Kansas, Minnesota, Missouri, North Dakota, South Dakota and Nebraska. Mountain region includes Arizona, Colorado, Idaho, Montana, New Mexico, Nevada, Utah, and Wyoming. West South Central includes Arkansas, Louisiana, Oklahoma, and Texas.

Figure 1: The Predicted Probability of Entrepreneurship as a Function of Wealth, Linear Wealth Model (Solid Line), Non-Linear Wealth Model (Dotted Line), and Wealth Dummy Model (Dashed Line)



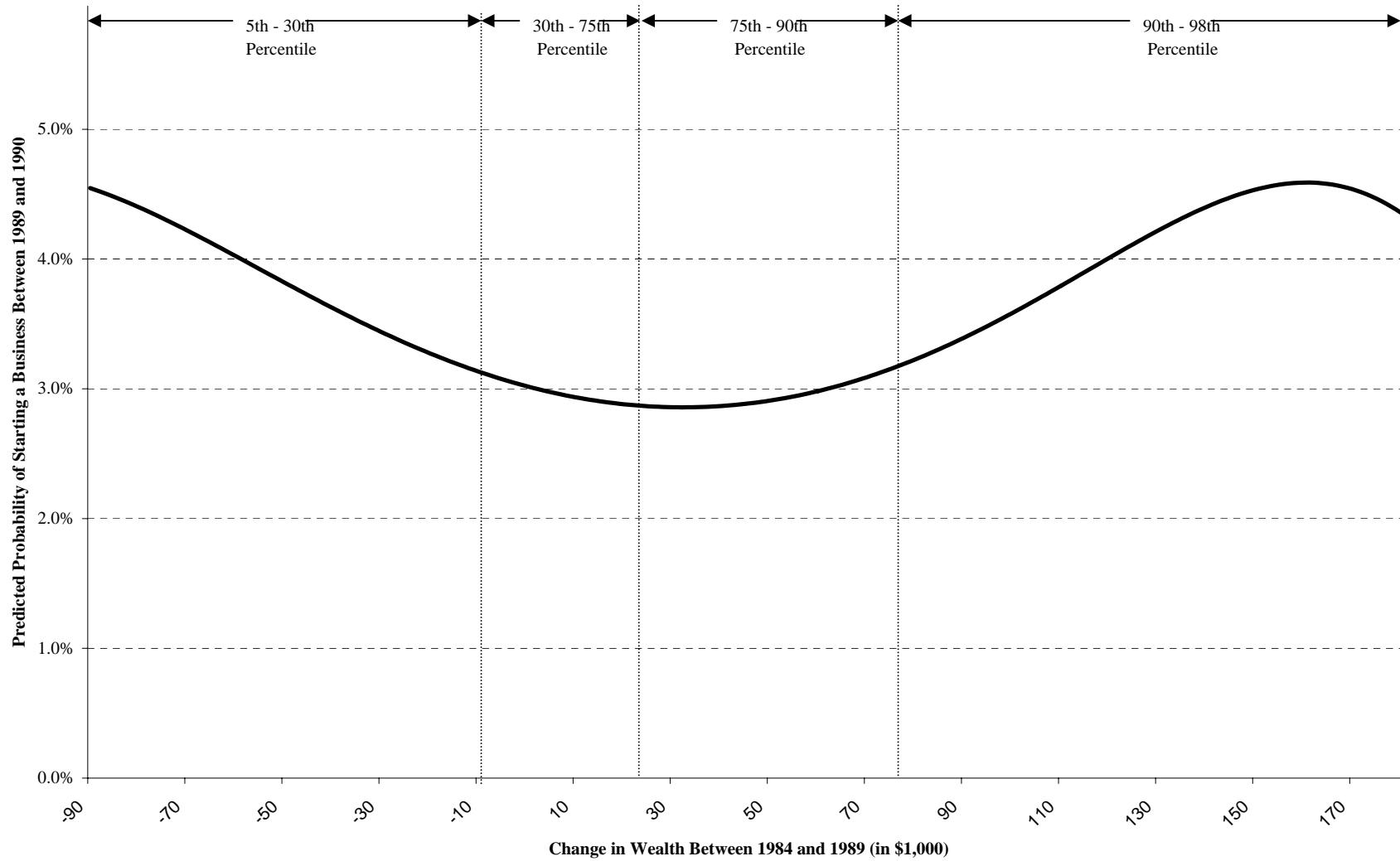
Note: Sample includes all PSID non-business owning households in the pooled 1989/1994 sample. This figure displays the predicted probability of starting a business using the linear wealth model (solid line), the non-linear wealth model (dotted line), and the wealth dummy model (dashed step function). The wealth dummy model includes dummies for whether the household had wealth in the 80th - 95th percentile of the wealth distribution and whether the household had wealth above the 95th percentile. Below the 80th percentile was the omitted category in the regression. For ease of display, the figure only reports up through the 98th percentile of the wealth distribution.

**Figure 2: The Predicted Probability of Entrepreneurship as a Function of Wealth, By Industry:
1989 PSID Sample**



Note - This figure displays the predicted probability of starting a business in high starting capital, low starting capital, and professional industries using the non-linear wealth model. Sample was restricted to 1989 non-business owning *PSID* households. High and low starting capital industries are defined in Table A1 of the appendix. For ease of display, the figure only reports wealth levels up through the 98th percentile of the wealth distribution.

**Figure 3: The Predicted Probability of Entrepreneurship as a Function of Five Year Wealth Change:
1989 PSID Sample**



Note - This figure displays the predicted probability of starting a business between 1989 and 1990 as a function of a 5th order polynomial in the change in wealth between 1984 and 1989. Sample was restricted to 1989 non-business owning *PSID* households. For ease of display, the figure only reports the change in wealth between the 5th and the 98th percentile of the change in wealth distribution.