LIQUIDITY CONSTRAINTS, HOUSEHOLD WEALTH, AND ENTREPRENEURSHIP REVISITED

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The existence of liquidity constraints for entrepreneurs has been challenged by the finding that business entry rates are invariant throughout most of the asset distribution and increase dramatically only at the top of this distribution. We reexamine the liquidity constraint hypothesis in three ways. First, we separately examine those who do and those who do not experience a job loss to reveal generally increasing entry rates through the wealth distribution for both groups, and show why these groups should be separately analyzed. Second, we use a two-period simulation of the Evans and Jovanovic model to shows how exogenous wealth shocks can accurately identify the presence of liquidity constraints. Third, we provide new evidence from matched Current Population Survey data to show that housing appreciation measured at the MSA-level is a significantly positive determinant of entry into self-employment, after controlling for changes in local economic conditions.

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Introduction

The relationship between wealth and business creation is one of the most important and well-studied questions in the rapidly expanding literature on entrepreneurship. Many studies document the positive relationship that exists between personal assets and the propensity to start a business, and interpret this result as providing evidence of the existence and importance of liquidity constraints.[1] The interpretation of the finding is important because of its implications for justifying the provision of government loans and guarantees, the long-standing debate over the nature of entrepreneurship, and the potential economic inefficiencies created

[1]See Evans and Jovanovic (1989), Evans and Leighton (1989), Meyer (1990), Holtz-Eakin *et al.* (1994), Lindh and Ohlsson (1996, 1998), Blanchflower and Oswald (1998), Dunn and Holtz-Eakin (2000), Fairlie (1999), Johansson (2000), Taylor (2001), Zissimopoulos and Karoly (2007), Zissimopoulos *et al.* (2010), Holtz-Eakin and Rosen (2005), Giannetti and Simonov (2004), Nykvist (2008), and Bates and Lofstrom (2012).

by liquidity constraints.[2] The current financial crisis has also brought the issue to the forefront because of the large and rapid decline in personal wealth and venture capital funding, and the severe tightening of credit to small businesses by banks.[3]

Recent evidence from the Panel Study of Income Dynamics (PSID), however, challenges the liquidity constraint interpretation. The positive relationship between asset levels and business entry rates is found to be driven almost entirely by extremely wealthy individuals (Hurst and Lusardi, 2004). Entry rates are virtually constant for individuals between the 1st and 95th percentiles of the asset distribution, but increase drastically for individuals above the 95th percentile. The constancy of entry rates for the majority of the asset distribution is inconsistent with the emphasis placed in the previous literature on the importance on liquidity constraints. Hurst and Lusardi (2004) conclude 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."

In this paper, we reexamine the liquidity constraint hypothesis in three ways. Motivated by the finding in Farber (1999) of high entry rates by displaced workers into "alternative" work arrangements such as self-employment, we examine the relationship between wealth and business creation separately for job losers and non-job losers. Although we find that the flat relationship between wealth and entrepreneurship throughout most of the wealth distribution is evident for the pooled sample of individuals, the result is not as well supported for the separate subsamples of job losers and non-job losers. Using the theoretical model of entrepreneurial choice by Evans and Jovanovic (1989), we demonstrate that the two groups face different incentives, and thus have different solutions to the entrepreneurial decision. This is due to the fact that some job losers would not have otherwise become self-employed had they not lost their jobs, opting for self-employment because of a negative shock to their career paths, wages, and wealth.[4] Alternatively, non-displaced entrants into self-employment are those who planned to ultimately own their own business, and become self-employed at a time that accords with this plan. Estimating separate equations by job displacement status implicitly controls for unobservable differences, and the possibility of reverse causation in which workers quit jobs to start businesses is ruled out by focusing only on involuntary job loss. When we examine the two subsamples separately, we find evidence of generally increasing rates of entry into self-employment throughout the asset distribution.

Further investigation reveals that the constant business entry rates through most of the asset distribution documented in Hurst and Lusardi (2004) are due to

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[2]Knight (1921) argues that entrepreneurs generally self-finance and bear all of the risks because capital markets provide too little capital, whereas Schumpeter (1934) argues that modern capital markets generally allow the entrepreneur to find a capitalist to bear the risks (Evans and Jovanovic, 1989).

[3]See PricewaterhouseCoopers and the National Venture Capital Association (2009) and Federal Reserve, Board of Governors (2009).

[4]Farber (1999) has noted that alternative or contingent work arrangements are quite prevalent among displaced workers. One such "alternative" work arrangement is self-employment, which sees disproportionately high entry rates for many workers after job loss. In fact, Krashinsky (2004) shows that entry rates into self-employment for workers who lost their jobs are two or three times higher than entry rates for non-job losers.

the changing proportion of job losers at each asset level. In particular, we find that job losers who have high entry rates are disproportionately located at the bottom of the wealth distribution and non-job losers who have low entry rates are disproportionately located near the top of the wealth distribution. Another interesting finding is that the positive relationship between entry rates and wealth in the two subsamples is stronger and more significant when we expand the sample size by focusing on net housing equity as the measure of wealth. These results are more consistent with the existence of liquidity constraints.

Addressing concerns about endogeneity in examining the relationship between wealth and entrepreneurship, previous studies have explored more exogenous measures of wealth such as inheritances and lottery winnings (e.g. Holtz-Eakin *et al.*, 1994; Lindh and Ohlsson, 1996; Blanchflower and Oswald, 1998). To examine the potential for this approach to identify causal effects, we simulate a two-period extension of the Evans and Jovanovic (1989) model that allows for correlation in ability and endogenous saving. Estimates from the simulations indicate that instrumental variable models accurately identify the presence of liquidity constraints even in the presence of this type of endogeneity and using sample sizes that are roughly similar to those available in large, publicly-available datasets.

The third contribution to the literature is to use a relatively unexplored source of exogenous variation in wealth to test the liquidity constraint hypothesis— Metropolitan Statistical Area (MSA)-level and time-series differences in unanticipated changes in housing equity. The approach improves on previous research that relies on broad regional differences in housing equity as an instrument for household wealth in the business entry equation in the PSID (Hurst and Lusardi, 2004). We analyze the unanticipated housing instrument with data from matched Current Population Surveys (CPS) from 1993 to 2004, which include variation in unanticipated housing appreciation across a large number of metropolitan areas over a long period of time. The use of changes in net housing equity are also less subject to the LATE criticism for small samples of the population affected by the instrument (as discussed by Oreopoulos, 2006) than the use of inheritance amounts or lottery winnings because of the relatively large fraction of the overall U.S. population that owns a home. Estimates from the CPS provide a different result than those from the PSID, which are based on less geographical variation and only one year. Housing appreciation is found to be a positive and statistically significant determinant of self-employment entry after controlling for changes in local economic conditions and the effect is not concentrated at the upper tail of the distribution. We also find that the estimates are not sensitive to controlling for pre-existing trends in housing prices, suggesting that the results are not being driven by expected changes in local economic conditions.

A Model of Entrepreneurship

A theoretical analysis of the choice to become self-employed has generally been based upon a comparison of potential income from wage and salary work and self-employment. A model by Evans and Jovanovic (1989) relies upon a framework where an individual can obtain the following income, Y^W, from the wage and salary sector: $Y^W = w + rA$, where w is the wage earned in the market, r

is the interest rate, and A represents the individual's assets. Earnings in the self-employment sector, Y^{SE}, are defined as: $Y^{SE} = \theta f(k)\varepsilon + r(A - k)$, where θ is entrepreneurial ability, $f(.)$ is a production function whose only input is capital, ε is a random component to the production process, and k is the amount of capital purchased by the worker. Three general solutions to the question of how the individual chooses to purchase capital exist. First, the individual purchases the profit maximizing level of capital, k^*, which satisfies the first-order condition $\theta f'(k^*) = r$. Second, if k^* is unattainable due to liquidity constraints, instead of choosing k^* the worker chooses k' such that $k' = L(A)$, where $L(.)$ is a function that determines the maximum amount of liquidity the worker can obtain given his or her assets, A. In this case, $k' < k^*$, resulting in a suboptimal level of Y^{SE}. Finally, if θ is sufficiently small the individual purchases no capital.

There are two key observations from this model that are relevant to this paper. The first is that because capital is purchased with assets, then the presence of liquidity constraints can discourage low-asset workers from entering self-employment. If liquidity-constrained individuals can only obtain suboptimal earnings in self-employment, then many of these individuals will not enter self-employment (even though they might do so if their maximized earnings were available to them). Thus, the existence of increasing self-employment entry rates as assets rise is consistent with the existence of liquidity constraints.

To see this relationship, we follow Evans and Jovanovic (1989) by assuming that $f(k) = k^\alpha$, resulting in self-employment income, $Y^{SE} = \theta k^\alpha \varepsilon + r(A - k)$. The individual chooses self-employment if this income level is higher than income from the wage and salary sector. For individuals who are not liquidity constrained, the term rA cancels from both types of income, and the decision to become self-employed does not depend on wealth. Solving for the optimal level of capital, the unconstrained individual chooses self-employment if:

$$(1) \qquad \theta^{1/(1-\alpha)}\left(\frac{\alpha}{r}\right)^{\alpha/(1-\alpha)} - r\left(\frac{\alpha}{r}\right)^{1/(1-\alpha)} \theta^{1/(1-\alpha)} \geq w.$$

The solution for the liquidity constrained individual is:

$$(2) \qquad \theta L(A)^\alpha - rL(A) > w.$$

In this equation, individuals with higher levels of assets are more likely to choose self-employment, holding everything else constant and assuming large enough values of θ and α compared with r. Combing these conditions, the general conditions for selection into self-employment can be derived as in Evans and Jovanovic (1989). An individual chooses self-employment if:

$$(3) \qquad w^{1-\alpha}\left(\frac{r}{\alpha}\right)^\alpha (1-\alpha)^{\alpha-1} \leq \theta \leq L(A)^{1-\alpha}\left(\frac{r}{\alpha}\right), \text{ or}$$

$$(4) \qquad \theta > \max\left\{L(A)^{1-\alpha}\left(\frac{r}{\alpha}\right), wL(A)^{-\alpha} + rL(A)^{1-\alpha}\right\}.$$

Evans and Jovanovic show that these general selection conditions imply a positive relationship between assets and self-employment.

The second observation to be made from this model is that although these selection conditions for entrepreneurship hold for individuals employed in the wage and salary sector, they need to be reinvestigated for individuals experiencing a job displacement. In particular, job losers are likely to face lower wages, w, than similar non-job losers if they seek re-employment in the wage and salary sector because of lost seniority, firm-specific human capital, and other job-related characteristics that raise his or her wage. An extensive literature indicates sizeable wage and earnings losses associated with job displacement.[5] Lower potential wages among job losers increase the likelihood of choosing self-employment, all else being equal. Also, because job losers are at least temporarily unemployed, displacement will alter their assets. Job losers may also react differently given the same wealth level because of their unwillingness to use their equity to finance business creation instead of for consumption and may face more difficulties in obtaining loans. Taken together, job loss alters the available wage and salary sector wage rate, w, and assets, A, which changes the conditions under which originally equivalent workers make the self-employment entry decision. It may also alter the relationship between these variables and the self-employment decision. Empirically, it is difficult to measure potential wages and self-employment earnings. Job loss may also be correlated with other unobservables affecting the self-employment decision. Given these concerns, separate regressions for the self-employment entry decision will be estimated for job losers and non-job losers.

DATA

We use data from the Panel Study of Income Dynamics (PSID) and matched Current Population Surveys (CPS) to explore the liquidity constraint hypothesis. The PSID provides a large, nationally representative panel dataset that allows for the identification of entrants into self-employment. The PSID is one of the few nationally representative, panel datasets that contains detailed wealth information for the individual. The use of the PSID also makes it easier to compare results to the recent findings of Hurst and Lusardi (2004).[6] We also use panel data created by matching consecutive years of the Current Population Survey (CPS) Outgoing Rotation Group (ORG) files from 1994 to 2004.[7] The CPS panel data allow us to exploit the variation in housing equity across a large number of metropolitan areas over a long period of time.

To reexamine the relationship between wealth and entrepreneurship through the wealth distribution based on Hurst and Lusardi's (2004) findings, we use one similar wave and one different wave because of the availability of information on

[5]See Jacobsen *et al*. (1993) and Farber (2004) for reviews of the literature.

[6]The PSID has been used in previous research to answer a diverse set of questions about self-employment and business ownership. See Holtz-Eakin *et al*. (1996), Fairlie (1999), Bruce (2000), Bradford (2003), Holtz-Eakin and Rosen (2005), and Parker (2008) for a few examples.

[7]Households in the CPS are interviewed each month over a four-month period and eight months later they are re-interviewed in each month of a second four-month period. This rotation panel makes it possible to create a one-year panel for up to half of the respondents.

job loss. Hurst and Lusardi (2004) use the 1989 and 1994 waves of the PSID, whereas we use the 1984 and 1989 waves. The 1994 wave does not contain information on job loss. The only difference between the 1984 and 1989 waves is the way in which uncertainty over precise values of assets is approximated.[8] In addition to collecting very detailed asset information in five-year intervals (the 1984, 1989, 1994, and 1999 waves), the 1984, 1989, and 1999 waves of the PSID also contain information on job loss. Since we analyze the subsamples of respondents who enter self-employment after a job loss and not after a job loss, the 1984 and 1989 waves are well-suited for our work. Unfortunately, the 1999 wave of the survey is not ideal for our analysis of one-year transitions into self-employment, since the PSID did not survey its respondents in 2000.[9] We conduct several additional analyses, however, that include more years of the PSID and different measures of assets.

Table 1 displays some summary statistics for our sample. As previously mentioned, we use the 1984 and 1989 waves of the PSID, and we consider two types of individuals not self-employed in 1984 and 1989: those who become self-employed business owners in the following year, and those who do not become self-employed business owners. We follow the more common approach in the literature of analyzing entrants into self-employment instead of using household business ownership as in Hurst and Lusardi (2004).[10] Household business ownership captures ownership of businesses by any household member and includes side or small-scale businesses owned by wage/salary workers. Self-employed business owners are defined by their main job activity and not by the activity of others in the household. We also focus on self-employment for consistency with our analysis of the CPS, which is restricted to examining self-employment entry. Nevertheless, we replicate our results using the PSID by analyzing entry into household business ownership and find similar results.[11]

We begin by pooling the entire sample in the first two columns of the table, and the results attest to the general differences between the two groups. Clearly, the age and a general measure of education for the two subsamples are quite similar, but they differ in their net worth. We also consider two different measures for net worth: the first is the household's total assets, defined as sum of savings and checking accounts, bonds, stocks, IRAs, housing equity (defined as the reported house value minus the remaining mortgage), other real estate, and vehicles minus all debt.[12] The second measure considers only housing equity, which is defined as the difference between the self-reported house value and the remaining principal on the mortgage. Unlike the other asset measures, this variable is collected every year in the PSID, and is useful because it constitutes a large proportion of the

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[8]In both the 1984 and 1989 waves, if the value of a particular asset (such as a house, other real estate, or the value of a savings account) is unknown to the respondent, the survey then asks ". . . would it be worth more than $X?," where X is an arbitrary amount. This amount changed during the two surveys (it was adjusted upwards for 1989), but this change does not have an impact on our results.

[9]The PSID began collecting its information in two-year intervals, starting in 1997.

[10]See Fairlie and Robb (2008) for a review of empirical studies focusing on self-employment.

[11]Hurst and Lusardi (2004) also note similar results for models of self-employment and household business entry.

[12]This is the same definition of net worth used by Hurst and Lusardi (2004).

TABLE 1

SAMPLE MEANS FOR NON-SELF-EMPLOYED WORKERS IN 1984 AND 1989 WAVES OF THE PSID

	Pooled Sample of Workers in 1984 and 1989		Subsample of Workers who Experience Job Loss Prior to Entry		Subsample of Workers who Do Not Experience Job Loss Prior to Entry	
	Enter Self-Employment	Non-Entrant	Enter Self-Employment	Non-Entrant	Enter Self-Employment	Non-Entrant
Age	37.94	37.93	36.38	33.65	38.85	38.64
	(11.38)	(11.65)	(10.30)	(9.91)	(11.89)	(11.81)
High school graduate	0.642	0.640	0.679	0.713	0.620	0.628
or less education	(0.480)	(0.480)	(0.469)	(0.453)	(0.486)	(0.483)
Assets	$69,104	$47,142	$53,392	$15,725	$78,298	$52,366
	(187,133)	(171,443)	(137,833)	(144,706)	(210,446)	(174,956)
Net house value	$31,564	$25,681	$27,424	$13,981	$33,987	$27,627
	(67,477)	(52,061)	(54,002)	(36,939)	(74,242)	(53,924)
Hourly wage	$13.97	$12.77	$12.42	$10.51	$14.56	$13.06
	(10.64)	(7.68)	(11.10)	(6.55)	(10.44)	(7.76)
Sample size	363	9,714	134	1,385	229	8,329

Notes: Standard deviations are listed in parentheses.

The sample is constructed from respondents between the age of 21 and 64 in the 1984, 1985, 1989, and 1990 years of the PSID. A respondent is considered to have entered self-employment if he or she is working in the wage and salary sector or is unemployed in 1984 and is self-employed in 1985. A similar procedure is used for 1989 and 1990. See text and Data Appendix for more details.

Assets are calculated using the definition of Hurst and Lusardi (2004); they are the sum of savings and checking accounts, bonds, stocks, IRAs, housing equity (defined as the reported house value minus the remaining mortgage), other real estate, and vehicles minus all debt.

respondent's net worth.[13] Thus, it permits the analysis of the relationship between entry rates and a rough proxy for overall wealth in a larger sample. Both asset variables are measured prior to job loss to insure that they were not negatively impacted by the loss of jobs.

Both measures are significantly higher for the sample that enters self-employment, which is a standard finding that has been pointed to in previous research as providing evidence of liquidity constraints. In the next four columns, we make the same comparison for the two subsamples discussed earlier: columns 3 and 4 compare entrants and non-entrants who did not experience job loss prior to entry, and columns 5 and 6 examine workers who experienced a job loss before entry. When comparing entrants to non-entrants, both subsamples demonstrate that entrants into self-employment have higher assets than non-entrants, and the job loss sample's entrants tend to be slightly older and better-educated than non-entrants. But, there are other important issues to note when examining the two subsamples. A primary point is that each subsample contains a significant number of entrants into self-employment, so both groups represent large constituencies in this sector. Also, there are significant differences in the characteristics of the two groups: job losers tend to be younger, less-educated, and less wealthy in comparison with non-job losers. Lastly, the entry rate for job losers is approximately 9 percent, whereas only 3 percent for the non-job loser sample enters self-employment. These differences suggest that a separate analysis of the relationship between assets and entry into self-employment is warranted for each group.

WEALTH AND ENTREPRENEURSHIP

Numerous previous studies using various methodologies, measures of assets, and international microdata explore the relationship between wealth and entrepreneurship. Most of these studies estimate the relationship by modeling the decision of non-business owners to switch into self-employment over a fixed period of time and generally find that wealth (e.g. net worth or asset income) measured in a given year is associated with a higher probability of entering self-employment by the following year. Previous research has examined the relationship between wealth and entrepreneurship using data from the United States (e.g. Evans and Jovanovic, 1989; Evans and Leighton, 1989; Meyer, 1990; Holtz-Eakin *et al.*, 1994; Fairlie, 1999; Holtz-Eakin and Rosen, 2005; Hurst and Lusardi, 2004; Kan and Tsai, 2006; Zissimopoulos and Karoly, 2007; Bates and Lofstrom, 2012; Demiralp and Francis, 2008; Zissimopoulos *et al.*, 2010), Europe (e.g. Blanchflower and Oswald, 1998; Lindh and Ohlsson, 1996, 1998; Johansson, 2000; Taylor, 2001; Giannetti and Simonov, 2004; Holtz-Eakin and Rosen, 2005; Nykvist, 2008; Schafer *et al.*, 2010) and developing countries (e.g. Paulson and Townsend, 2004; Yu, 2010).[14]

Using the PSID, we reexamine the relationship between wealth and business entry. Figure 1 displays average entry rates for each asset category for the pooled

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[13]Specifically, 60 percent of the average homeowner's (and 64 percent of the median homeowner's) assets are captured by net housing equity.

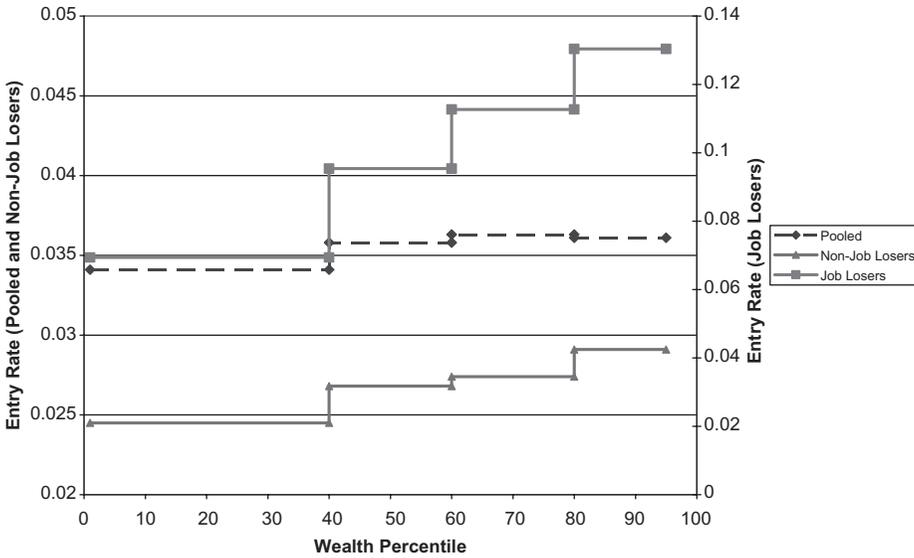[14]Also, see Parker (2009) and Kerr and Nanda (2011).

Figure 1. Self-Employment Entry Rates by Pre-Entry Net House Values

sample, and both subsamples of workers. We do not display entry rates for individuals whose assets are in the 95th percentile or higher because of much higher rates of entry, which would make it difficult to visually detect a relationship below these levels (see Appendix Figure A1). The plotted relationship for the pooled sample is similar to the finding in Hurst and Lusardi (2004) that entry into self-employment is almost identical across asset categories. Similar to Hurst and Lusardi (2004), we also find a large increase in entry rates for individuals whose assets are in the 95th percentile or above. We see a jump of nearly 2.5 percentage points in entry rates when we compare this category to the 80–95th percentile group.

The constant pattern of entry rates disappears, however, when we consider the two subsamples independently as displayed in Figure 1. Both the non-job loss sample and the job loss sample exhibit increasing entry rates as wealth increases. We also find a much larger increase in entry rates at the 95th percentile for the job loss sample (0.22) than for the non-job loss sample (0.01). These results indicate that the jump in entry rates found for the pooled sample is being primarily driven by the job loss sample. This also speaks to the earlier issue of entry dynamics for those who do and do not lose their jobs prior to becoming self-employed. We find that self-employment entrants who lost their jobs in the two wealthiest categories (80–95th and above 95th percentile) have average hours of 48.75 and 45 hours per week, respectively, suggesting that especially high rates of entry are not a form of "disguised unemployment." Furthermore, we find that for all wealth/job loss groups, average hours worked among self-employment entrants are high, suggesting that a large share of reported self-employment is by unemployed workers. Appendix Table A2 also shows that after entering self-employment, job losers and non-job losers have significantly different industry concentrations. Finally, as presented below, we find that the impact of wealth on entry into self-employment

is relatively greater for job losers. These results, together with the theoretical motivation provided by our model, suggest that it is appropriate to treat the two groups separately given their significantly different behaviors.

The estimates displayed in Figure 1 also suggest that the unchanging entry rates for individuals at or below the 95th percentile in the pooled sample are due to the changing frequencies of job losers as assets increase. About 60 percent of the job loss sample has assets that are at or below the 40th percentile in the distribution for the pooled sample, which is not surprising because the job loss group was found to have lower assets overall (see Table 1). Job losers are less likely to fall into all of the higher wealth categories, and the relative frequency of job losers compared with non-job losers decreases significantly moving up the wealth distribution. For example, only 6 percent of job losers are in the 80–95th percentile in the overall wealth distribution compared to 14 percent of non-job losers. This is important because it is this changing relative frequency between the two samples that causes the pooled sample to exhibit a constant entry rate over this asset range, even though each subsample exhibits increasing entry rates as assets rise.[15] Higher entry rates for the job loss sample than for the non-job loss sample and generally increasing entry rates with wealth for both groups implies that a relative decrease in the frequency of job losers as assets rise causes the pooled entry rate to remain constant over the wealth distribution. Overall, this evidence has important implications for an interpretation of the entry rate dynamics in the pooled sample. Although it is clear that there are unchanging entry rates in the pooled sample for most of the asset distribution, this is not true for the two subsamples we analyze. Thus, unchanging entry rates in the pooled sample may be misleading evidence against the significance of liquidity constraints.[16]

As supporting evidence, Figure 2 also displays evidence on entry rates, but instead of using assets as the determinant of wealth, we use net house values.[17] This is a reasonably good measure of wealth because net house values accounts for 60 percent of total assets, on average, for homeowners. The advantage of this measure is that this information is collected in almost all years of the PSID before 1993 (when job loss information is no longer collected).[18] A disadvantage, however, is that there are wealthy non-homeowners in the sample. Using this measure of wealth, we now find a positive relationship even in the pooled sample. But, more importantly, we find stronger positive relationships between entry rates and net house values for both subsamples than when we used net worth as the measure of wealth. For non-job losers, the entry rate increases from 1.8 to 2.8 percent when net house values increase from the less than 20th percentile group to the 80–95th percentile group. For job losers, the entry rate increases from 5.7 to 12.4 percent. The estimates also indicate the large jump in entry occurring at the 95th percentile,

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[15]Additionally, the lack of finding of a strong positive relationship between wealth and business entry for the pooled sample may be partly due to measurement error.

[16]Cagetti and De Nardi (2006) also show that the relatively flat relationship between entrepreneurship and wealth throughout most of the wealth distribution can be generated from a model of entrepreneurial choice with borrowing constraints. See also Fonseca et al. (2007).

[17]Entry rates for the full distribution are reported in the Appendix, Figure A2.

[18]The previous results are somewhat sensitive to changes in the sample. For example, removing a few self-employment entrants or non-entrants from various cells can impact the pattern on entry rates over the wealth distribution. Larger sample sizes remove this problem.
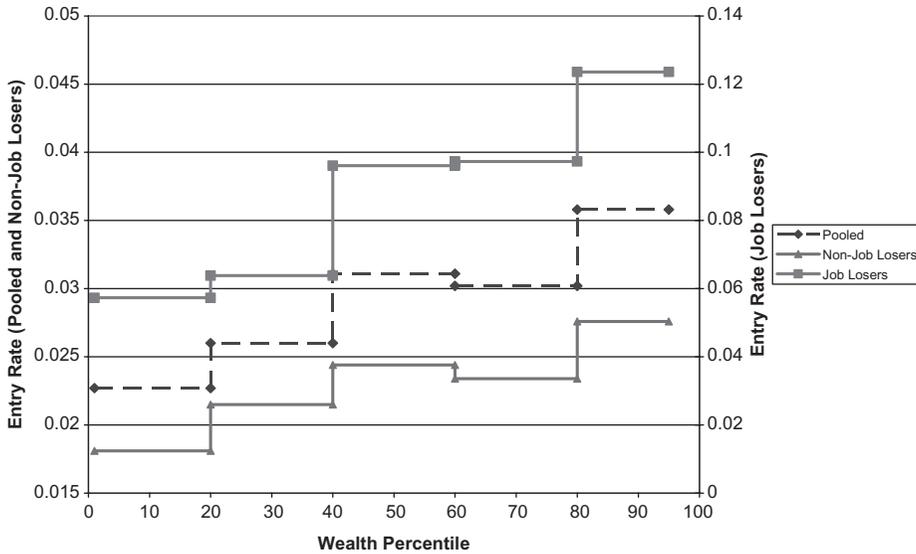
Figure 2. Self-Employment Entry Rates by Pre-Entry Asset Levels

but the jump is smaller. Overall, the estimates for net house values provide stronger evidence of a positive relationship between self-employment entry and wealth among non-job losers and job losers.[19]

To consider the findings in a regression context, Table 2 estimates logit entry regressions and uses different approaches to document the relationship between wealth and entry rates in the pooled, job loser and non-job loser samples.[20] First, in columns 1, 4, and 7, we regress an entry indicator variable on overall wealth for the pooled sample, and both subsamples. In all three cases, there is a significant linear relationship between asset wealth and propensity to become self-employed, which is consistent with the previous literature. In columns 2, 5, and 8, self-employment entry is regressed on a set of indicator variables that account for the asset percentile categories displayed in Figure 1. The findings for the non-job loser and job loser samples are consistent with the results reported in Figure 1.[21] We generally find that the probability of self-employment entry increases throughout the asset distribution for the two subsamples, but relatively small sample sizes make our coefficient estimates somewhat imprecise. However, this imprecision is unavoidable with total net worth data from the PSID—given the relatively low

[19]We compared the relationship between entry rates and total net worth to the relationship between entry rates and net house values using the same survey years (1984 and 1989) and find similar entry patterns over the wealth distribution. These results are consistent with net housing equity representing a good proxy for net total net worth.
[20]Job loss may be correlated with unobservables affecting the self-employment decision. Estimating separate regressions removes any potential bias due to the correlation between job loss and unobservables. Separate regressions also allow the determinants of self-employment to differ between job losers and non-job losers. We find that the null hypothesis of similar job loser and non-job loser coefficients is easily rejected.
[21]We also find roughly similar patterns when we estimate specifications that also include 1994 data. The PSID does not include a measure of job loss in 1994, so we approximate it by examining employment information.

TABLE 2

LOGIT ANALYSIS OF SELF-EMPLOYMENT ENTRY, USING VARIOUS ASSET MEASURES

	Pooled Sample		Subsample of Job Losers		Subsample of Non-Job Losers	
	Assets	House	Assets	House	Assets	House
Assets/$100,000	0.117***	...	0.164**	...	0.116**	...
	(0.040)		(0.080)		(0.051)	
	[0.003]		[0.040]		[0.023]	
40–60th percentile	0.229	0.272***	0.241	0.443**	0.237	0.228**
	(0.162)	(0.098)	(0.279)	(0.187)	(0.200)	(0.113)
	[0.157]	[0.006]	[0.388]	[0.018]	[0.236]	[0.044]
60–80th percentile	0.321*	0.264***	0.442	0.487**	0.302	0.187
	(0.179)	(0.106)	(0.295)	(0.199)	(0.221)	(0.118)
	[0.073]	[0.013]	[0.134]	[0.014]	[0.172]	[0.113]
80–95th percentile	0.377*	0.441***	0.736*	0.725***	0.382	0.358***
	(0.222)	(0.116)	(0.409)	(0.217)	(0.264)	(0.128)
	[0.089]	[0.000]	[0.072]	[0.001]	[0.148]	[0.005]
Above 95th percentile	0.832***	0.818***	1.882***	1.427***	0.591*	0.621***
	(0.285)	(0.168)	(0.570)	(0.320)	(0.359)	(0.191)
	[0.004]	[0.003]	[0.001]	[0.000]	[0.100]	[0.001]
N	10,077	67,414	1,519	9,775	8,558; 8,765	57,639

Notes: Marginal effects, their standard errors (in parentheses), and their p-values (in square brackets) are reported. ***Significant at the 1% level, **significant at the 5% level, *significant at the 10% level.

The regressions in this table include all of the standard demographic controls (age, age squared, marital status, gender, gender interacted with marital status, and three educational dummy variables), an indicator variable equal to one if the individual had been unemployed in the prior five years, and hourly wage prior to entry. The samples for the regression results in columns 1, 2, 4, and 5 are comprised from the 1984 and 1989 waves of the PSID, while the samples in columns 3, 6, and 9 are comprised from the 1979–93 waves of the PSID (excluding 1982, when house value is not reported). In all nine regressions, the analysis is restricted to individuals who are not self-employed in the survey year, and the dependent variable representing entry into self-employment is equal to one if the individual becomes self-employed in the following year, and zero otherwise. See text and Data Appendix for more details. The regressions in columns 2, 3, 5, 6, 8 and 9 contain more than four indicators for net worth, but for brevity's sake, only the highest four categories are included; specifically, the excluded comparison group in columns 2,5, and 8 are individuals whose assets are in the 1st to 40th percentile of the asset distribution, and the comparison group in columns 3,6, and 9 are individuals whose house value is in the 1st to 20th percentile.

entry rates into self-employment (about 3 percent in the overall sample). To deal with this sample size constraint, we also use net house values as the measure of assets in columns 3, 6, and 9. As noted above, net housing equity is a good measure of wealth, comprising approximately 60 percent of an average homeowner's net worth, and it is collected in almost every year of the PSID. This new measure addresses the main weakness of the results using total assets—the large standard errors on the coefficient estimates.

Using net house values as the measure of assets, we find two important results.[22] The first set of important findings is the increasing entry rates throughout the wealth distribution even for the pooled sample. More importantly, the larger sample sizes associated with this measure of wealth also results in the probability of becoming self-employed being significantly higher than the excluded category (1st–40th percentile) for virtually every asset category displayed in the table. For both the job loser and non-job loser subsamples, entry rates gradually increase as net house values rise. These rates are significantly higher than the excluded group (net house value is below the 40th percentile) for almost all categories, and this runs counter to the hypothesis that entry rates are unchanging from the 1st to the 80th or 95th percentiles of the asset distribution. In fact, these results are consistent with the existence of liquidity constraints. The use of net house values also confirms the finding that the jump in entry rates at the 95th percentile in wealth is much larger for job losers than for non-job losers. The second important finding from Table 2 is that the estimation results which use asset and housing data generate very similar coefficient estimates on the indicator variables representing different quantiles in the asset distribution. This similarity suggests that both measures are effective at representing net worth, and that increased precision resulting from larger sample sizes allows for a more accurate analysis of the relationship between wealth and self-employment.

The analysis of the relationship between net house equity and entry rates is further explored in Table 3. We estimate three sets of entry regressions using different wealth groupings and sample years from the PSID as robustness checks. In columns 1, 4, and 7, the 1979–93 sample is used to consider entry rates for respondents in the 40–80th percentiles, 80–95th percentiles, and above the 95th percentiles. The 40–60th and 60–80th percentiles are collapsed to increase estimation precision. For all three samples, respondents in the 40–80th percentile category exhibit statistically significantly higher entry rates than those in the 0–40th percentile group. These findings differ from those presented in Hurst and Lusardi (2004), indicating no significant variation in entry rates below the 80th percentile.

The remaining columns of Table 3 report estimates from expanded samples of the PSID to check the sensitivity of results. First, in columns 2, 5, and 8, we expand our sample to include the years 1979–96. From 1994 to 1996, the PSID did not collect information on job loss, but does contain information on spells of unemployment. Although this is not a perfect measure of involuntary job loss, it will capture some displaced workers. The sample used in columns 3, 6, and 9 further

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[22]We also find a significant linear relationship between net house equity and the propensity to become self-employed for all three samples, and find a significantly larger positive relationship for the job loser sample than the non-job loser sample.

TABLE 3

LOGIT ANALYSIS OF SELF-EMPLOYMENT ENTRY, USING ONLY NET HOUSING EQUITY

	Pooled Sample			Subsample of Job Losers			Subsample of Non-Job Losers		
	1979–93	1979–96	1979–2001	1979–93	1979–96	1979–2001	1979–93	1979–96	1979–2001
40–80th percentile	0.269*** (0.086) [0.002]	...	...	0.464*** (0.161) [0.004]	...	...	0.258*** (0.096) [0.007]	...	...
40–60th percentile	...	0.290*** (0.089) [0.001]	0.273*** (0.078) [0.000]	...	0.343** (0.172) [0.046]	0.430*** (0.163) [0.008]	...	0.333*** (0.100) [0.001]	0.289*** (0.087) [0.001]
60–80th percentile	...	0.290*** (0.095) [0.002]	0.344*** (0.082) [0.000]	...	0.414** (0.184) [0.024]	0.389** (0.180) [0.031]	...	0.301*** (0.103) [0.003]	0.323*** (0.085) [0.000]
80–95th percentile	0.441*** (0.116) [0.000]	0.501*** (0.103) [0.000]	0.670*** (0.087) [0.000]	0.724*** (0.216) [0.001]	0.772*** (0.191) [0.000]	0.774*** (0.187) [0.000]	0.385*** (0.125) [0.002]	0.428*** (0.112) [0.000]	0.578*** (0.092) [0.000]
Above 95th percentile	0.818*** (0.168) [0.000]	0.879*** (0.151) [0.000]	0.934*** (0.131) [0.000]	1.426*** (0.320) [0.000]	1.349*** (0.298) [0.000]	1.244*** (0.291) [0.000]	0.482*** (0.182) [0.008]	0.621*** (0.160) [0.000]	0.675*** (0.131) [0.000]
N	67,414	82,147	89,958	9,775	11,265	12,023	57,639	70,882	77,935

Notes: Marginal effects, their standard errors (in parentheses), and their p-values (in square brackets) are reported. ***Significant at the 1% level, **significant at the 5% level, *significant at the 10% level.

The regressions in this table include all of the standard demographic controls (age, age squared, marital status, gender, gender interacted with marital status, and three educational dummy variables), an indicator variable equal to one if the individual had been unemployed in the prior five years, and hourly wage prior to entry, and a dummy variable equal to one if the individual does not own a house, and zero otherwise. The samples for the regression results in columns 1, 4, and 7 are comprised from the 1979 to 1993 waves of the PSID; the samples for the results in columns 2, 5, and 8 are comprised from the 1979 to 1996 waves of the PSID; and the samples in columns 3, 6, and 9 are comprised from the 1979–2001 waves of the PSID. The expanded years include inconsistent definitions of some key variables over time. Samples for all nine columns exclude data from 1982, when house value is not reported. In all nine regressions, the analysis is restricted to individuals who are not self-employed in the survey year, and the dependent variable representing entry into self-employment is equal to one if the individual becomes self-employed in the following year, and zero otherwise. See text and Data Appendix for more details. The excluded comparison group consists of individuals whose net house equity is in the 1st to 40th percentile of the net house equity distribution.

expands the sample by including the years 1997–2001, for which the PSID conducted interviews only every other year. We define entrants as those who become self-employed in the following interview. Results using these larger sample sizes, continue to display generally increasing entry rates throughout the housing equity distribution for all three samples, consistent with the liquidity constraint hypothesis.

A significant finding in the results that we have not directly addressed is the sharp rise in entry rates above the 95th percentile in the asset distribution. Two potential reasons may account for this entry spike. First, extremely wealthy households have a much higher tolerance for risk than lower asset households (Hurst and Lusardi, 2004). Because self-employment is riskier than employment in the wage and salary sector, high-asset households should be more likely to become self-employed. Self-employment may also be regarded as a kind of luxury good; therefore, as assets rise, there should be a corresponding (and disproportionately higher) increase in the propensity to become self-employed (Hurst and Lusardi, 2004).

An alternative explanation for this finding exits, however. Our evidence demonstrates that the job loser sample exhibits a much larger increase in entry rates than the non-job loser sample at the 95th percentile of wealth. We investigate this further by comparing the average age of each subsample by asset category in Table 4 to determine the characteristics of these wealthier job losers. The first column demonstrates that average age of all workers is increasing in our sample as assets increase, and the second column shows that this is also true for workers who entered self-employment in either 1985 or 1990. This is not surprising, because it takes time to accumulate assets, and the same pattern is evident for both job losers and non-job losers. For both job losers and non-job losers, the average age is roughly 50 years old for the highest asset level, which is considerably higher than for lower asset categories.

This result provides insight into the rationale for the entry spike among wealthier job losers. Many authors have written about the negative consequences of job loss for older workers (see, e.g. McCall, 1997; Chan and Stevens, 1999, 2001; Farber, 2004). In particular, Chan and Stevens have analyzed the increased propensity of older workers who suffer job loss to become retired, since they face worsened employment prospects in many respects after involuntary job loss. Specifically, older workers who search for a job in the wage and salary sector require significant search time. Also, if they are re-employed in this sector, their earnings losses (in comparison to the pre-displacement job) are quite large, and they tend to have a decreased attachment to the labor market due to fewer hours worked per week, and a greater likelihood of working at a part-time job. As a result, the spike in entry rates may be attributable to the fact that with severely worsened wage-and-salary options, relatively older displaced workers may need to create employment for themselves, which can be accomplished in the self-employment sector.

SELF-EMPLOYMENT ENTRY AND THE ENDOGENEITY OF WEALTH

Although the largest source of startup capital by firms is personal and family savings and the majority of small business loans require personal commitments by

TABLE 4

AVERAGE AGE FOR NON-SELF-EMPLOYED WORKERS IN 1984 AND 1989 BY ASSET LEVELS

Asset Percentile	Pooled Sample of Workers		Subsample of Job Losers		Subsample of Non-Job Losers	
	Whole Sample	Entrants Only	Whole Subsample	Entrants Only	Whole Subsample	Entrants Only
Below 40th percentile	34.28 (11.01)	34.26 (10.73)	31.18 (8.61) [0.5978]	33.70 (10.29)	35.13 (11.44) [0.3970]	34.70 (11.10)
40–60th percentile	35.80 (10.42)	34.78 (9.64)	33.76 (9.01) [0.1863]	32.37 (6.20)	36.11 (10.59) [0.2180]	36.08 (10.90)
60–80th percentile	40.83 (10.81)	41.12 (10.68)	39.63 (10.01) [0.1402]	40.21 (9.99)	40.97 (10.89) [0.2135]	41.56 (11.07)
80–95th percentile	45.54 (10.69)	44.15 (11.03)	44.04 (10.41) [0.0606]	43.75 (8.50)	45.65 (10.71) [0.1402]	44.28 (11.86)
Above 95th percentile	49.51 (9.84)	49.85 (7.74)	48.87 (7.98) [0.0151]	48.50 (7.56)	49.55 (9.97) [0.0367]	50.75 (8.06)
N	10,077	363	1,519	134	8,765	243

Notes: Standard deviations are listed in parentheses, and column frequencies are listed in square brackets. The sample is constructed from respondents between the age of 21 and 64 in the 1984, 1985, 1989, and 1990 years of the PSID. A respondent is considered to have entered self-employment if he or she is working in the wage and salary sector or is unemployed in 1984 and is self-employed in 1985. A similar procedure is used for 1989 and 1990. Columns 1, 3, and 5 analyze the age of respondents by asset category for all workers in the sample or subsample, whereas columns 2, 4, and 6 only consider workers who enter self-employment. See text and Data Appendix for more details. Assets are calculated using the definition of Hurst and Lusardi (2004); they are the sum of savings and checking accounts, bonds, stocks, IRAs, housing equity (defined as the reported house value minus the remaining mortgage), other real estate, and vehicles minus all debt.

owners (Avery *et al.*, 1998; U.S. Census Bureau, 2006), there remains the concern that the finding of a positive relationship between wealth and entrepreneurship captures correlated unobservables instead of causal effects.[23] In particular, the positive correlation between initial asset levels and self-employment entry may be the result of a household's asset accumulation being related to its underlying entrepreneurial ability or saving in anticipation of starting a business.[24]

One manner in which it is possible to illustrate this endogeneity problem is with a Monte Carlo exercise. We do so by relying upon the Evans and Jovanovic (1989) model, and extend it to a two-period model in which individuals are assumed to be risk-averse, and utility is determined by consumption in both periods:

$$
(5) \qquad U(C_1, C_2) = C_1^{1/2} + \frac{1}{1+r} C_2^{1/2},
$$

where C_t represents consumption in period t, where $t = 1,2$. Individuals maximize utility subject to the following budget constraint:

$$
(6) \qquad C_1 + \frac{1}{1+r} C_2 = Y_1 + \frac{1}{1+r} Y_2,
$$

where Y_t represents income in period t. Following Evans and Jovanovic (1989), income from the wage and salary sector in period 1, Y_1^W, is determined by a draw from a cumulative gamma distribution.[25] Period 2 income from the wage and salary sector, Y_2^W is determined by an AR(1) process. Specifically, $Y_2^W = (1.1)Y_1^W + u$, where u is a normally distributed error term.[26] In period 1, individuals are unaware of the value of u, and as such are acting to maximize their expected utility. Individuals are also assigned an amount of assets, A, which is determined by a random draw from a gamma distribution, and are available to the individual in period 1.[27]

Income in the self-employment sector, Y^{SE}, is determined using a production function for unconstrained and constrained entrepreneurs, respectively:

$$
(7) \qquad Y^{SE} = \theta k^\alpha \varepsilon + (A - k) \; if \; A > k, \text{and}
$$

$$
(8) \qquad Y^{SE} = \theta k^\alpha \varepsilon \; if \; A \le k,
$$

[23]Additionally, family resources are found to be positively correlated with startup capital controlling for other owner and business characteristics (Astebro and Bernhardt, 2004).

[24]Previous research indicates that entrepreneurs have higher savings rates than non-entrepreneurs (Quadrini, 1999, 2000; Bradford, 2003; Gentry and Hubbard, 2004; Buera, 2006).

[25]The gamma distribution has a shape parameter of 2, and is multiplied by a constant term in order to give it a mean of approximately $25,000, which is reasonably close to actual values within the PSID data.

[26]The error term has a mean of 0 and variance of 500, which is consistent with characteristics of our data.

[27]The gamma distribution has a shape parameter of 2. The distribution function is multiplied by a constant term in order to give it a mean of approximately $40,000, which is reasonably close to actual values in the PSID data.

where θ represents entrepreneurial skill, k represents the amount of capital invested in the firm, and ε is a randomly-distributed error component for the production function.[28] Liquidity constraints result from the assigned combinations of θ and A across individuals. Capital is purchased at a price normalized to one, and whatever assets are not used to purchase capital are available as income. As before, individuals do not know the period 2 value of ε in period 1, so they will act to maximize expected utility.

To address one source of potential endogeneity, we allow θ to be correlated with wage and salary income, implying that more skilled workers in that sector are also more skilled in the self-employment sector.[29] Another endogeneity concern is that individuals may save more or less depending on their draw of θ. Thus, it is important to consider how exogenous changes in assets affect the propensity to become self-employed. As a result, exogenous shocks to assets are included in this model by randomly assigning an additional $20,000 in assets to 10 percent of the sample.[30]

To investigate whether the empirical approach that we take below can identify the presence of liquidity constraints, we estimate several regressions with simulated data. We focus on the self-employment entry decision, although individuals are free to choose to situate themselves in the wage and salary or self-employment sectors in both periods. Entry is captured by an indicator variable equal to one if the individual is in the wage and salary sector in the first period and the self-employment sector in the second period. The entry variable equals zero if the individual is in the wage and salary sector in both periods. Table 5 reports 2SLS estimates for regressions of self-employment entry on wealth using the simulated data with sample sizes ranging from 1,500 to 50,000 observations and α ranging from 0.15 to 0.4.[31] The instrumental variable for the 2SLS model is an indicator variable equal to one if the individual received the random asset shock. For all combinations of sample sizes and α, the 2SLS estimates indicate a positive and statistically significant relationship between self-employment entry and the wealth shock.[32] As expected, the relationship strengthens as the returns to capital increase, and the precision of estimates increases with the sample size.

Although the results of these simulations are only suggestive, they provide a couple of useful insights for the empirical strategy that follows. First, the simulations demonstrate that the 2SLS estimation strategy accurately identifies the presences of liquidity constraints even with endogenous saving and correlated abilities. The exogenous shock to wealth results in a higher estimated entry rate into self-employment when liquidity constraints exist in the simulated data, and this evidence differs from the case in which liquidity constraints do not exist and there

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[28]ε is normally distributed with a mean equal to 1 and a variance equal to 0.1.

[29]The correlation between θ and wage and salary earnings is achieved by setting $\theta = (0.01)Y^{WS} + 400 + \omega$, where ω is an error term with mean zero and variance of 400. Simulations are also run without the correlation between θ and Y^{WS}, and the results are generally similar to those in Table 6, with somewhat smaller standard errors.

[30]The $20,000 inheritance was generally equivalent to the average value of inheritances received by individuals in our PSID sample in 1984 and 1989.

[31]Various articles in the literature on production functions suggest that α is within this range.

[32]OLS estimates from simulated data that do not include the exogenous wealth shock also indicate a positive relationship between self-employment entry and wealth.

TABLE 5

Simulations for the Effects of Assets/$100,000 on Self-Employment Entry

α	1,500 Observations	5,000 Observations	10,000 Observations	15,000 Observations	50,000 Observations
0.15	0.517***	0.513***	0.570***	0.515***	0.531***
	(0.149)	(0.090)	(0.074)	(0.055)	(0.030)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
0.2	0.538***	0.504***	0.595***	0.538***	0.548***
	(0.144)	(0.090)	(0.076)	(0.058)	(0.031)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
0.25	0.491***	0.542***	0.675***	0.571***	0.572***
	(0.139)	(0.094)	(0.083)	(0.060)	(0.032)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
0.3	0.643***	0.645***	0.723***	0.655***	0.649***
	(0.163)	(0.104)	(0.087)	(0.066)	(0.035)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
0.35	0.901***	0.899***	0.952***	0.891***	0.981***
	(0.204)	(0.130)	(0.104)	(0.081)	(0.046)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
0.4	2.03***	2.15***	2.18***	2.07***	2.23***
	(0.310)	(0.212)	(0.169)	(0.129)	(0.075)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]

Notes: The table reports results from a simulation of a two-period model in which individuals can choose between the wage and salary sector and the self-employment sector in either period.

***Significant at the 1% level, **significant at the 5% level, *significant at the 10% level. Standard errors are reported in parentheses, and p-values are reported in square brackets.

The table's regressions use a dependent variable equal to one if the individual "enters" self-employment, and zero otherwise, and an independent variable equal to the individual's assets. Entry is defined as being employed in the wage and salary sector in period one, and the self-employment sector in period two, while non-entry is defined as being employed in the wage and salary sector in both periods. The reported estimates are from two-stage least squares regressions in which an indicator equal to one if the individual has been assigned a randomly generated increase in their assets (this random increase was generated for 10 percent of the sample) is used as an instrumental variable. The rows of the table display results from simulations that assign a particular value to α, the coefficient on capital in the production function for the self-employment sector. See text for more details.

is no relationship between entry and unexpected wealth shocks. Second, the results indicate that even with smaller sample sizes identification of the presence of liquidity constraints is possible. The lowest reported sample size in the table is equivalent to the job loser sample size when the analysis uses total net worth.[33] Taken together these results give credence to the empirical approach taken in the remainder of the paper of using exogenous changes in wealth to identify liquidity constraints.

INHERITANCES

Several previous studies address concerns over the endogeneity of assets by attempting to find suitable instrumental variables or other proxies for wealth, such

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[33]In addition to the simulations reported in Table 6, we perform simulations that assign job loser and non-job loser status to various observations based on their values of θ. In particular, "job losers" were defined to be individuals with relatively low values of θ within narrowly defined asset categories. The simulation results show significantly different effects of assets on entry for the two subsamples consistent with the empirical approach of bifurcating the sample. Results are available upon request.

as inheritances, gifts, lottery winnings, or insurance settlements that are otherwise unrelated to the decision to become self-employed.[34] Because inheritances and other unanticipated (or at least less-anticipated) lump sum payments are highly correlated with overall net worth, they have become popular in the analysis of entry into self-employment. They are also generally found to have a positive association with the probability of entering or being self-employed, which has been interpreted as providing evidence supporting the liquidity constraint hypothesis.

Using our sample from the PSID, we find a similar result that inheritances increase the probability of self-employment entry. We find positive and statistically significant coefficients on net worth instrumented by inheritances for the pooled, job loser, and non-job loser samples.[35] Thus, our main finding holds in the instrumental variables context. Hurst and Lusardi (2004), however, point out that an inheritance may not be a random event, since the receipt of an inheritance may simply signal that the household comes from a wealthy family, which may be correlated with entrepreneurial ability.[36] Consistent with this argument, they find that both past and future inheritances yield similar instrumental variable results, weakening the credibility of using inheritances as an instrument for wealth. But, it should be noted that this finding does not necessarily rule out the presence of liquidity constraints if family members serve as lenders of last resort to the entrepreneur. A potential business owner may be liquidity constrained in the absence of family assistance, but not constrained with it. This may be especially important in the case where a business owner could only become self-employed if a wealthy family member co-signed for a business loan. If this wealthy family member is also more likely to leave an inheritance, then the finding of a positive coefficient on future inheritances would be consistent with the presence of liquidity constraints.

Housing Capital Gains

In either case, we want to explore alternative exogenous measures of wealth. We present more comprehensive evidence than the previous literature on using a relatively new instrument—gains in housing equity.[37] The efficacy of this new approach is due to the fact that housing equity represents well over half of net worth for homeowners, and gains in this variable would represent a substantial change in net worth for individuals. The importance of personal commitments in

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[34]See, for example, Holtz-Eakin *et al.* (1994), Lindh and Ohlsson (1996), Blanchflower and Oswald (1998), Fairlie (1999), Taylor (2001), and Schafer *et al.* (2010).

[35]Similar to previous studies, we find that the first-stage net worth regressions yield very high F-values for the inheritance variable.

[36]Entrepreneurs may also simply inherit their businesses from previous family members. Estimates from the CBO, SSBF, and SCF, however, indicate that very few businesses are inherited (1.6 percent to less than 4.0 percent) suggesting that this is not driving the positive relationship between future inheritances and entrepreneurship (Fairlie and Robb, 2006).

[37]Hurst and Lusardi (2004) use a cross-section of broad regional differences in housing equity as an instrument for household wealth in the business entry equation in the PSID. See also Black *et al.* (1996) for an earlier study finding a positive relationship between net housing equity and business starts using aggregate U.K. data. They use time-series data combined with cross-sectional data for 11 regions in the U.K. Home ownership is also found to be associated with entrepreneurship and obtaining business loans (see, for example, Johansson, 2000; Cavalluzzo and Wolken, 2005).

obtaining loans for small businesses (Avery *et al.*, 1998), and the finding that personal wealth, primarily through home ownership, decreases the probability of loan denials (Cavalluzzo and Wolken, 2005), suggests that home equity may be important for obtaining credit. We also find, examining microdata from the 2002 Survey of Small Business Finances, that 50 percent of small businesses applying for loans report that collateral was required to secure the loan. Furthermore, prior instruments for exogenous changes in wealth, such as lottery winnings or non-negligible sized inheritances, affect only a relatively small proportion of the overall population, which can be problematic for an instrumental variables approach (see Oreopoulos (2006) for a discussion of this problem). Whereas two-thirds of U.S. families own houses, exogenous changes in housing equity can represent a large-scale change in net worth that is important to consider when analyzing self-employment entry.

We approach the housing equity variable in a novel way, with two notable aspects. First, identification in recent research relies on variation in housing equity gains across only nine Census divisions in one year in the PSID.[38] Because analysis at this level may obscure underlying trends in smaller geographic regions, we further investigate the relationship between housing appreciation and entrepreneurship by using panel data created by matching consecutive years of the CPS from 1994 to 2004. The CPS panel data allow us to exploit the variation in housing equity across a large number of metropolitan areas over a long period of time. One limitation of these data, however, is that the CPS does not include a measure of net worth. Instead, we include housing appreciation directly into the regressions, explaining entry into self-employment. Households save almost 100 percent of their unanticipated gains in housing equity (Hurst and Lusardi, 2004), suggesting that this may not be a serious problem for the analysis. Another limitation of the CPS data is that we cannot identify individuals who were wage/salary workers at the first survey date, then suffered a job loss and became self-employed by the second survey date. Thus, we only report estimates for the full sample.[39]

Second, because the ideal instrument would capture only changes in housing values that are completely unanticipated by the individual in addition to being uncorrelated with local economic growth, we consider whether housing appreciation is explained by any additional information. For instance, it may be the case that there are persistent trends in regional housing prices that pre-date the

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[38]Hurst and Lusardi (2004) estimate housing equity gains from a regression of changes in house prices from 1985Q1 to 1988Q4 on nine region dummies, initial levels and changes in economic indicators (state GDP per capita and unemployment rates), and demographic characteristics. The inclusion of growth rates in state GDP per capita and unemployment rates controls for differences in local economic growth which may be correlated with entrepreneurship. The regional dummies resulting from this regression therefore capture unaccounted for changes in household wealth and are used as an instrument for 1989 household wealth. Hurst and Lusardi find a highly significant coefficient estimate on the regional dummy in a regression determining household wealth. Their estimate implies that households save 94 percent of their housing capital gains, which is consistent with previous findings (Engelhardt, 1996; Skinner, 1996; Hurst and Stafford, 2004). In the second-stage regression for business entry, they find a negative and statistically insignificant coefficient estimate on the instrumented level of household wealth.

[39]Removing the 2 percent of the sample that is initially unemployed provides similar results—increases in housing prices lead to higher rates of self-employment entry.

four-year period before the entrepreneurial decision is made.[40] In this case, the housing price changes would not be unanticipated by the individual, but would still be captured by the regional dummies. To address this issue, we estimate a second set of regressions to also include MSA growth rates in housing prices over the previous four-year period. An unanticipated shock to wealth in this form is similar to the type of exogenous shock that we introduced in our simulation model.

To create a measure of housing appreciation net of changes in local economic conditions and other factors, we use three different approaches. First, we regress four-year housing appreciation values by MSA and year on initial levels and growth rates or changes in economic indicators (state-level GDP per capital, MSA-level unemployment rates, and MSA-level family income distributions), detailed demographic characteristics by MSA (race, gender, age, marital status, family size, education, family income, labor force participation), and year dummies. MSA-level housing price data are obtained from the Office of Federal Housing Enterprise Oversight (OFHEO). Our second measure of unanticipated housing appreciation is created with a first-stage regression that includes the previous four-year housing appreciation as an additional control. With our third measure, we estimate an additional specification for one-year unanticipated housing appreciation that includes previous housing appreciation and sums the one-year residuals over a four-year period.[41] The residuals for each MSA/year from these first-stage regressions (which have been stripped of any explanatory power related to these various economic indicators) are then included in logit regressions for the probability of becoming a self-employed business owner.

Table 6 reports marginal effects estimates from the second-stage entrepreneurship logits from all three approaches we use to capture unanticipated housing appreciation. In the first row, the results from our first approach show that the coefficient on housing appreciation is positive and statistically significant.[42] The point estimate implies that a 10 percent annual increase in housing equity leads to a 0.43 percentage point increase in the probability that an individual starts a business in the following year.[43] This effect is large, representing 17 percent of the mean probability of entrepreneurship. Furthermore, when we switch to including housing appreciation that is unanticipated by the individual, we find a very similar coefficient estimate, which is also statistically significant. Results from our second and third approaches are reported in the second and third columns of the table, where we estimated second-stage entrepreneurship logits including the four-year sum of residuals from first-stage regressions for one-year housing appreciation.

[40]We choose a four-year period to correspond to Hurst and Lusardi's use of regional house price appreciation between 1985Q1 to 1988Q4, but check the sensitivity of the results to alternative period lengths.

[41]The two first-stage specifications that include controls for previous housing appreciation attempt to control for households expecting serially correlated housing prices (Case and Shiller, 1989).

[42]We estimate specifications that include residuals for housing appreciation across nine regions and find small, statistically insignificant estimates in the second-stage entrepreneurship logits.

[43]These results are not sensitive to the length of the time period used to measure housing capital gains. The coefficient estimates for three-year housing appreciation imply larger annual effects, and the coefficient estimates for five-year housing appreciation imply very similar annual effects.

TABLE 6

LOGIT ANALYSIS OF SELF-EMPLOYMENT ENTRY WITH HOUSING APPRECIATION, CURRENT POPULATION SURVEY, OUTGOING ROTATION GROUP FILES (1993–2004)

Housing appreciation	0.0093***	0.0093***	0.0172***
	(0.0028)	(0.0028)	(0.0056)
	[0.001]	[0.001]	[0.002]
Controls for previous four-year housing appreciation	No	Yes	No
Uses sum of one-year unanticipated housing appreciation residuals	No	No	Yes

Notes: ***Significant at the 1% level, **significant at the 5% level, *significant at the 10% level. Marginal effects, their standard errors (in parentheses), and their p-values (in square brackets) are reported.

The regressions in this table include all of the standard demographic controls (age, age squared, marital status, gender, gender interacted with marital status, education, central city status region, and year dummies). The samples for the regressions are comprised from the 1993 to 2004 matched CPS ORG files (excluding 1994–95 and 1995–96). In all regressions, the analysis is restricted to individuals who are not self-employed in the first survey year, and the dependent variable representing entry into self-employment is equal to one if the individual becomes self-employed in the following year, and zero otherwise. Standard errors are adjusted for clustering at the MSA level. Housing appreciation is the residual from a regression of four-year MSA-level housing appreciation on MSA averages of race, gender, age, marital status, family size, education, family income, labor force participation, and unemployment, year dummies, state GDP per capita, and growth rates in MSA unemployment rates, state GDP per capita and family income distributions. The second column uses previous four-year housing appreciation as an additional control in estimating the housing appreciation residual. Housing price data are from the Office of Federal Housing Enterprise Oversight (OFHEO). The third column uses residuals from one-year housing appreciation regressions with all controls and previous housing appreciation. The residuals are summed to create four-year unanticipated housing appreciation.

This captures the cumulative unanticipated housing appreciation over the four-year period experienced by individuals net of changes in economic conditions. The coefficient on housing appreciation is positive and statistically significant.

An important concern with these results is that the positive linear relationship may be driven by the upper tail of the distribution in gains in housing equity. To examine this question, we first estimate regressions with a 5th order polynomial in housing equity gains. Instead of a convex relationship, we find an s-shaped relationship with the upper tail of the distribution flattening out and declining slightly. Furthermore, we find a stronger relationship between housing equity gains and entrepreneurship in the middle of the distribution than for the linear specification. At the middle of the distribution, we find an average derivative of 0.0136 compared to 0.0093 in the linear specification, suggesting that the effects of housing equity gains are not concentrated at the upper tail of the distribution.

To investigate this question more directly, Table 7 reports estimates from regressions that include dummy variables for the main percentile categories in the unanticipated housing equity gains distribution. The coefficients generally provide evidence of a positive relationship when moving up through the percentile categories for housing appreciation. These patterns are consistent with the findings of positive linear and quintic (evaluated at the mean) relationships. The estimates also do not provide evidence of a substantial increase in the probability of entrepreneurship at the 95th percentile in the housing appreciation distribution. In fact, the point estimates are smaller for the 95th percentile than the estimates for the 80–95th percentile.

TABLE 7

LOGIT ANALYSIS OF SELF-EMPLOYMENT ENTRY WITH THE HOUSING APPRECIATION DISTRIBUTION
CURRENT POPULATION SURVEY, OUTGOING ROTATION GROUP FILES (1993–2004)

	Housing Appreciation	Housing Appreciation (unanticipated, controls for previous four-year housing appreciation)	Housing Appreciation (using sum of one-year unanticipated housing appreciation residuals)
20–40th percentile	−0.0001 (0.0009) [0.9115]	0.0000 (0.0009) [0.9999]	0.0008 (0.0009) [0.3741]
40–60th percentile	0.0032*** (0.0009) [0.0004]	0.0032*** (0.0010) [0.0014]	0.0015* (0.0008) [0.0608]
60–80th percentile	0.0007 (0.0010) [0.4839]	0.0008 (0.0010) [0.4237]	0.0013 (0.0008) [0.1042]
80–95th percentile	0.0035*** (0.0008) [0.0000]	0.0037*** (0.0009) [0.0000]	0.0036*** (0.0010) [0.0003]
Above 95th percentile	0.0028 (0.0017) [0.0995]	0.0025 (0.0017) [0.1414]	0.0029 (0.0016) [0.0699]
Sample size	476,033	472,844	475,747

Notes: ***Significant at the 1% level, **significant at the 5% level, *significant at the 10% level. Marginal effects, their standard errors (in parentheses), and their p-values (in square brackets) are reported.

The regressions in this table include all of the standard demographic controls (age, age squared, marital status, gender, gender interacted with marital status, education, central city status region, and year dummies). The left out category for housing appreciation is the less than 20th percentile. The samples for the regressions are comprised from the 1993 to 2004 matched CPS ORG files (excluding 1994–95 and 1995–96). In all regressions, the analysis is restricted to individuals who are not self-employed in the first survey year, and the dependent variable representing entry into self-employment is equal to one if the individual becomes self-employed in the following year, and zero otherwise. Standard errors are adjusted for clustering at the MSA level. Housing appreciation is the residual from a regression of four-year MSA-level housing appreciation on MSA averages of race, gender, age, marital status, family size, education, family income, labor force participation, and unemployment, year dummies, state GDP per capita, and growth rates in MSA unemployment rates, state GDP per capita, and family income distributions. The second column uses previous four-year housing appreciation as an additional control in estimating the housing appreciation residual. Housing price data are from the Office of Federal Housing Enterprise Oversight (OFHEO). The third column uses residuals from one-year housing appreciation regressions with all controls and previous housing appreciation. The residuals are summed to create four-year unanticipated housing appreciation.

CONCLUSION

The well-established positive relationship between assets and self-employment entry rates has been traditionally interpreted as evidence in favor of liquidity constraints, but recently this evidence has been challenged. Using PSID data, Hurst and Lusardi (2004) find that the positive relationship often cited in the data is actually due to a relatively unchanging entry rate for individuals with assets at or below the 95th percentile, and then a large increase in entry rates for individuals above this point. The finding is inconsistent with the existence of liquidity constraints, because liquidity constraints should cause entry rates to be rising over the entire asset distribution. We find different results, however, when we separate the sample into job losers and non-job losers. The standard theoretical

model of entry into self-employment implies that these two groups face different incentives, and thus different entrepreneurial choices. In particular, involuntary job loss can cause some displaced workers to enter self-employment who otherwise would have remained in the wage and salary sector. We find that entry rates generally increase as wealth rises for each subsample; the result of a constant entry rate in the pooled sample is only due to the changing frequency of job losers (in comparison with non-job losers) as assets rise. The positive relationship in the two subsamples is even stronger when we focus on net house values as a measure of net worth, which is available in more survey years. Furthermore, the spike in entry rates is due to a sharp increase in entry rates for wealthy job losers, who are on average 50 years old. Given the literature on the adverse consequences of job loss for older workers, the rise in entry rates for this group is attributable to the lack of attractive options in the wage and salary sector. Overall, these findings for the entry rate/wealth relationships in the two subsamples are consistent with liquidity constraints deterring potential entrepreneurs from starting businesses.

We also address the issue of the endogeneity of wealth with two approaches. First, we simulate a two-period variant of the Evans and Jovanovic (1989) model and find significant positive effects of unanticipated shocks to wealth on self-employment entry even in the presence of endogenous saving and correlated abilities. Second, we improve upon the existing literature by using more detailed geographic and time variation of housing prices available in the CPS, and by using an exogenous source of variation in wealth that affects a broader range of the population than previously-used instruments. We find new evidence suggesting that MSA-level unanticipated gains in housing prices—while controlling for local economic conditions—are positively associated with self-employment entry. Our estimates from 254 MSAs and nine time periods indicate that a 10 percent annual increase in housing prices leads to an increase in self-employment entry rates of 17 percent. We also find that the positive relationship is not being driven by the upper tail of the housing appreciation distribution. These new findings on the relationship between housing appreciation and entrepreneurship from the CPS and those from the reinvestigation of the PSID data are consistent with the liquidity constraint hypothesis and suggest that more research is needed on this important topic.

Data Appendix

The datasets from the PSID are constructed to observe individuals as they move (or did not move) from a state outside of self-employment (either in unemployment or in wage-and-salary employment) into self-employment. Individuals are identified as "self-employed" based upon their self-reports within the "class of worker" variable. As discussed in the text, using different definitions of business ownership and hours restrictions does not affect the main results. There are five main datasets from the PSID used in the analysis. Similar definitions for self-employment entry are created from matched CPS data. One main sample is used for this analysis.

Data from 1984–85 and 1989–90

The PSID collects very detailed data on household assets every five years, including 1984 and 1989. As such, we prepared a dataset with these years in order

to analyze the entry patterns of individuals who are observed in the year in which they reported their assets as well as the following year. These data include 10,077 observations.

Data from 1979–93

The PSID collects information on net housing equity (the value of the respondent's house minus the remaining mortgage(s) on the house) from 1979 forward (excluding 1982). We use respondents who reported their net house value from 1979 to 1993 and then determined whether or not they became self-employed in the following period. We use the period 1979 to 1993 because job loss is no longer collected by the PSID after 1993. These data include 67,414 observations.

Data from 1979–96

As noted above, the PSID collects information on net housing equity every year from 1979 to 1995. After 1995, the PSID no longer collected information about net housing equity, only the value of a respondent's house. As such, we limit the sample to this period to use an internally consistent measure of net worth (which was net house value). For the last two years of this period we do not have a measure of job loss and instead use unemployment as a proxy. These data include 82,147 observations.

Data from 1979–2001

In 1995 and thereafter, the PSID collects information on the value of a respondent's house every other year. As such, it is only possible to compute two-year entry rates over this period. We examine this period separately because of these changes. These data include 89,958 observations.

CPS Data

Panel data are created by matching consecutive years of the Current Population Survey (CPS) Outgoing Rotation Group (ORG) files from 1994 to 2004. The CPS panel microdata include information on 254 MSAs. MSA-level housing price data are obtained from the Office of Federal Housing Enterprise Oversight (OFHEO) and merged to the CPS microdata. These data include 476,033 observations.

REFERENCES

Astebro, Tom, and I. Bernhardt, "The Winners Curse of Human Capital," *Small Business Economics*, 24(1), 63–78, 2004.
Avery, Robert B., Raphael W. Bostic, and Katherine A. Samolyk, "The Role of Personal Wealth in Small Business Finance," *Journal of Banking and Finance*, 22, 1019–61, 1998.
Bates, Timothy and Magnus Lofstrom, "African American Pursuit of Self-Employment," *Small Business Economics*, forthcoming , 2012.
Black, Jane, David de Meza, and David Jeffreys, "House Prices, the Supply of Collateral and the Enterprise Economy," *Economic Journal*, 106(434), 60–75, 1996.
Blanchflower, David G. and Andrew J. Oswald, "What Makes an Entrepreneur?" *Journal of Labor Economics*, 16(1), 26–60, 1998.

Bradford, William D., "The Wealth Dynamics of Entrepreneurship for Black and White Families in the U.S.," *Review of Income and Wealth*, 49, 89–116, 2003.

Bruce, Donald, "Effects of the United States Tax System on Transitions into Self-Employment," *Labour Economics*, 7, 545–74, 2000.

Buera, Francisco, "Persistency of Poverty, Financial Frictions, and Entrepreneurship," Mimeo, Northwestern University Department of Economics, 2006.

Cagetti, Marco and Mariacristina De Nardi, "Entrepreneurship, Frictions and Wealth," *Journal of Political Economy*, 114, 835–70, 2006.

Case, Karl E. and Robert J. Shiller, "The Efficiency of the Market for Single-Family Homes," *American Economic Review*, 79(1), 125–37, 1989.

Cavalluzzo, Ken and John Wolken, "Small Business Loan Turndowns, Personal Wealth and Discrimination," *Journal of Business*, 78, 2153–77, 2005.

Chan, Sewin and Ann Huff Stevens, "Employment and Retirement Following a Late-Career Job Loss," *American Economic Review*, 89, 211–16, 1999.

———, "Job Loss and Employment Patterns of Older Workers," *Journal of Labor Economics*, 19, 484–521, 2001.

Demiralp, Berna and Johanna Francis, "Wealth, Human Capital, and the Transition to Entrepreneurship," Fordham University, Department of Economics Discussion Paper No. 2008-09, 2008.

Dunn, Thomas and Douglas Holtz-Eakin, "Financial Capital, Human Capital and the Transition to Self-Employment: Evidence from Intergenerational Links," *Journal of Labor Economics*, 18, 282–305, 2000.

Engelhardt, Gary V., "House Prices and Home Owner Saving Behavior," *Regional Science and Urban Economics*, 26, 313–36, 1996.

Evans, David S. and Boyan Jovanovic, "An Estimated Model of Entrepreneurial Choice under Liquidity Constraints," *Journal of Political Economy*, 97, 808–27, 1989.

Evans, David S. and Linda S. Leighton, "Some Empirical Aspects of Entrepreneurship," *American Economic Review*, 79, 519–35, 1989.

Fairlie, Robert W., "The Absence of the African-American Owned Business: An Analysis of the Dynamics of Self-Employment," *Journal of Labor Economics*, 17(1), 80–108, 1999.

Fairlie, Robert W. and Alicia Robb, "Families, Human Capital, and Small Businesses: Evidence from the Characteristics of Business Owners Survey," *Industrial and Labor Relations Review*, 60, 225–45, 2006.

———, "*Race and Entrepreneurial Success: Black-, Asian-, and White-Owned Businesses in the United States*, MIT Press, Cambridge, MA, 2008.

Farber, Henry S., "Alternative and Part-Time Employment Arrangements as a Response to Job Loss," *Journal of Labor Economics*, 17(4), Part 2, S142–S169, 1999.

———, "Job Loss in the United States, 1981–2001." *Research in Labor Economics*, 23, 69–117, 2004.

Federal Reserve, Board of Governors, The April 2009 Senior Loan Officer Opinion Survey on Bank Lending Practices," Federal Reserve, Board of Governors, 2009.

Fonseca, Raquel, Pierre-Carl Michaud, and Thepthida Sopraseuth, "Entrepreneurship, Wealth, Liquidity Constraints and Start-up Costs," Mimeo, RAND, 2007.

Gentry, William M. and R. Glenn Hubbard, "Entrepreneurship and Household Saving," *Advances in Economic Analysis & Policy*, 4, 1053, 2004.

Giannetti, M. and A. Simonov, "On the Determinants of Entrepreneurial Activity: Social Norms, Economic Environment and Individual Characteristics," *Swedish Economic Policy Review*, 11, 271–313, 2004.

Holtz-Eakin, Douglas and Harvey S. Rosen, "Cash Constraints and Business Start-Ups: Deutschmarks Versus Dollars," *Contributions to Economic Analysis & Policy*, 4(1), 1–26, 2005.

Holtz-Eakin, Douglas, David Joulfaian, and Harvey S. Rosen, "Entrepreneurial Decisions and Liquidity Constraints," *RAND Journal of Economics*, 25, 334–47, 1994.

Holtz-Eakin, Douglas, John R. Penrod, and Harvey S. Rosen, "Health Insurance and the Supply of Entrepreneurs," *Journal of Public Economics*, 62, 209–35, 1996.

Hurst, Erik and Annamaria Lusardi, "Liquidity Constraints, Household Wealth, and Entrepreneurship," *Journal of Political Economy*, 112, 319–47, 2004.

Hurst, Erik and Frank P. Stafford, "Home Is Where the Equity Is: Liquidity Constraints, Mortgage Refinancing and Consumption," *Journal of Money, Credit and Banking*, 36, 985–1014, 2004.

Jacobsen, Louis, Robert Lalonde, and Daniel Sullivan, "Earnings Losses of Displaced Workers," *American Economic Review*, 83, 685–709, 1993.

Johansson, Edvard, "Self-Employment and Liquidity Constraints: Evidence from Finland," *Scandinavian Journal of Economics*, 102(1), 123–34, 2000.

Kan, Kamhon and Wei-Der Tsai, "Entrepreneurship and Risk Aversion," *Small Business Economics*, 26, 465–74, 2006.

Kerr, William R. and Ramana Nanda, "Financing Constraints and Entrepreneurship," in David Audretsch, Oliver Falck, and Stephan Heblich (eds), *Handbook on Research on Innovation and Entrepreneurship*, Edward Elgar Publishing, Cheltenham, 88–103, 2011.

Knight, Frank, *Risk Uncertainty, and Profit*, Houghton Mifflin, New York, 1921.

Krashinsky, Harry A., "Self-Employment for Less-Educated Men," Mimeo, University of Toronto, 2004.

Lindh, Thomas and Henry Ohlsson, "Self-Employment and Windfall Gains: Evidence from the Swedish Lottery," *Economic Journal*, 106, 1515–26, 1996.

———, "Self-Employment and Wealth Inequality," *Review of Income and Wealth*, 44, 25–41, 1998.

McCall, Brian P., "The Determinants of Full-Time versus Part-Time Reemployment Following Job Displacement," *Journal of Labor Economics*, 15, 714–34, 1997.

Meyer, Bruce, "Why Are There So Few Black Entrepreneurs?" National Bureau of Economic Research, Working Paper No. 3537, 1990.

Nykvist, Jenny, "Entrepreneurship and Liquidity Constraints: Evidence from Sweden," *Scandinavian Journal of Economics*, 110(1), 23–43, 2008.

Oreopoulos, Phil, "Estimating Average and Local Average Treatment Effects of Education when Compulsory School Laws Really Matter," *American Economics Review*, 96(1), 152–77, 2006.

Parker, Simon, "Entrepreneurship among Married Couples in the United States: A Simultaneous Probit Approach", *Labour Economics*, 15, 515–37, 2008.

———, "*The Economics of Entrepreneurship*, Cambridge University Press, Cambridge, 2009.

Paulson, A. L. and R. Townsend, "Entrepreneurship and Financial Constraints in Thailand," *Journal of Corporate Finance*, 10, 229–62, 2004.

PricewaterhouseCoopers and the National Venture Capital Association, MoneyTree™ Report, based on data provided by Thomson Reuters (www.pwcmoneytree.com), 2009.

Quadrini, V., "The Importance of Entrepreneurship for Wealth Concentration and Mobility," *Review of Income and Wealth*, 45, 1–19, 1999.

———, "Entrepreneurship, Saving, and Social Mobility," *Review of Economic Dynamics*, 3, 1–40, 2000.

Schafer, Dorothea, Oleksandr Talavera, and Charlie Weir, "Entrepreneurship, Windfall Gains and Financial Constraints: Evidence from Germany," Mimeo, DIW, 2010.

Schumpeter, J. A., *The Theory of Economic Development*, Harvard University Press, Cambridge, MA, 1934.

Skinner, Jonathan, "Is Housing Wealth a Sideshow?" in David Wise (ed.), *Advances in the Economics of Aging*, University of Chicago Press (for NBER), Chicago, IL, 1996.

Taylor, Mark P., "Self-Employment and Windfall Gains in Britain: Evidence from Panel Data," *Economica*, 68, 539–65, 2001.

U.S. Census Bureau, *Characteristics of Businesses: 2002: 2002 Economic Census, Survey of Business Owners Company Statistics Series*, U.S. Government Printing Office, Washington, DC, 2006.

Yu, Cheng, "Entrepreneurship and Credit Constraints: Evidence from Rural Households in China," Mimeo, Chinese Academy of Science, 2010.

Zissimopoulos, Julie and Lynn Karoly, "Transitions to Self-Employment at Older Ages the Role of Wealth, Health, Health Insurance, and Other Factors," *Labour Economics*, 14, 269–95, 2007.

Zissimopoulos, Julie, Lynn Karoly, and Qian Gu, "Liquidity Constraints, Household Wealth, and Self-Employment: The Case of Older Workers," RAND Working Paper No. WR725, 2010.

SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article:

Table A1. Sample Means for Non-Self-Employed Workers in the 1979 to 1993 Waves of the PSID

Table A2. Post-Entry Major Industry Categories Proportions for Entrants into Self-Employment by Job-Loss Status

Figure A1. Self-Employment Entry Rates by Pre-Entry Asset Levels

Figure A2. Self-Employment Entry Rates by Pre-Entry Net House Values

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