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Liquidity Constraints, Household Wealth, and Self-Employment

The Case of Older Workers

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LABOR AND POPULATION

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ABSTRACT

Evidence of liquidity constraints affecting entrepreneurship includes increasing rates of business formation with increases in household wealth and no relationship between the likelihood of business formation and wealth at high wealth levels. Using longitudinal data from the Health and Retirement Study on workers over age 50 and employing probit regressions with a non-linear specification of household wealth and liquid wealth, we find the relationship between wealth and business formation is consistent with this pattern. We also find wealth matters more for the formation of businesses requiring high starting capital. We employ the availability of a lump-sum distribution option (LSO) of an employer-provided pension plan as a new proxy for liquidity. The results show that workers with an LSO are more likely than workers with a pension and without an LSO to transition into self-employment providing further evidence of the existence and importance of liquidity constraints.

Keywords: entrepreneurship, self-employment, liquidity constraints, pensions

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I. INTRODUCTION

An efficient credit market is essential for entrepreneurial activities. For nascent and aspiring entrepreneurs, insufficient starting capital can be a substantial obstacle to starting a new business. The existence and importance of liquidity constraints are cited as justification for public intervention in the credit market for new businesses. Federal and state governments in the United States, for example, have implemented various programs to facilitate new business creation with loan provision being one of the primary services provided (Gu, Zissimopoulos, and Karoly 2008). The federally funded Small Business Administration is the largest single financial backer of small businesses in the United States with a business loan portfolio of tens of billions of dollars (Craig et al. 2007). Whether liquidity constraints bind and for whom, how important they are, and whether they justify public intervention are important policy questions.

Evidence that liquidity constraints affect entrepreneurship includes empirical findings that rates of business formation increase with household wealth up to a point but that there is no relationship between the likelihood of business formation and wealth at very high wealth levels. A substantial body of empirical literature has documented the positive relationship between household wealth and new business ownership or entry into self-employment, consistent with the hypothesis that liquidity constraints deter entrepreneurship (Evans and Jovanovic 1989; Evans and Leighton 1989; Holtz-Eakin, Joulfaian and Rosen 1994; Dunn and Holtz-Eakin 1995, 2000; Fairlie 1999; Bruce, Holtz-Eakin and Quinn 2000; Zissimopoulos and Karoly 2007, forthcoming).[1]

[1] Some of these studies define entrepreneurship by business ownerships while others define it in terms of self-employment.

However, a study by Hurst and Lusardi (2004) has challenged the long-standing belief about the existence and importance of liquidity constraints in entrepreneurial activities. Analyzing data from the Panel Study of Income Dynamics (PSID), they found a positive relationship between household wealth and becoming a business owner for households in the highest 5th percentile of the wealth distribution. They concluded that the lack of a positive relationship between wealth and entrepreneurship for the majority of the wealth distribution indicated that being liquidity constrained is not an empirically important deterrent for the majority of new business owners. Moreover, using census-region-level housing capital gains as a new instrument for household wealth, they found no effect of wealth on business entry.

More recently, Fairlie and Krashinsky (2006) questioned the conclusions of Hurst and Lusardi. They argued that separate analysis is needed for those who start new businesses after job loss and those who do so but are not job losers because of differences in the incentives faced by the two groups in a model of entrepreneurial choice (Evans and Jovanovic, 1989). Using the same PSID data (but different waves), Fairlie and Krashinsky first reproduced the empirical evidence presented by Hurst and Lusardi when job losers and non-job losers are pooled, but found that the relationship between wealth and business creation increases throughout the wealth distribution when the model is estimated separately for each group. To address the issue of potential endogeneity, they used matched data from the Current Population Survey from 1994 to 2004 and find a positive relationship between unanticipated housing appreciation at the MSA level and transitions to self-employment.

These recent studies, as well as most of the literature on liquidity constraints and entrepreneurship, are based on samples that include persons of all working ages with the exceptions of Bruce, Holtz-Eakin and Quinn (2000) and Zissimopoulos and Karoly (2007, forthcoming). Older workers have higher rates of self-employment than younger workers: rates of self-employment among workers over age 50 are 20 percent while the rates for all workers over age 16 peaked in 1994 at 12 percent (Zissimopoulos and Karoly forthcoming). Older workers are also different than younger workers in ways that affect both their likelihood of becoming business owners and their likelihood of facing liquidity constraints. For example, older workers have more wealth than younger workers, different types of wealth and more work experience. Thus they have less need for credit and, for those who need to borrow, may have more access to credit. On the other hand, older workers may be less willing to take on the risk of business ownership given that, compared to younger workers, they have fewer healthy work years remaining over which to recoup the losses of an unsuccessful business. Older workers may prefer the job flexibility and work conditions of being a business owner more than younger workers. On the other hand, compared with younger workers, they may be less willing to transition from a wage and salary job that offers health insurance to self-employment because of the increased likelihood of being in poor health or experiencing a health shock. Finally, compared with younger workers, older workers may be more likely to be pushed into self-employment following job loss because they have fewer options in the wage and salary sector (Fairlie and Krashinsky, 2006).

In this paper we add to the current debate on the importance of liquidity constraints for business formation by analyzing rich, longitudinal data, employing new

empirical methods, and studying a middle age and older population characterized by rates of self-employment and wealth that are substantially higher than a population of all workers. As we indicate in the next section, we use seven waves of panel data spanning 14 years from the Health and Retirement Study (HRS), a nationally representative sample of individuals over age 50 and their spouses, to study the relationship between wealth and self-employment. In the third section, we document our empirical approach and describe our findings. In brief, we estimate probit multivariate regression models of movements into self-employment from wage and salary work that include a non-linear specification of household wealth and liquid wealth and find a positive relationship between wealth and business formation over the entire wealth distribution, a pattern that is consistent with the existence of liquidity constraints. In addition, we find that wealth matters more for the formation of businesses requiring high starting capital, thereby providing further evidence of the importance of liquidity constraints.

Household wealth and business formation, however, may be correlated with third factors that cause households to accumulate wealth and be more likely to start a new business. Thus, in the fourth section, we propose an alternative method for studying the relationship between wealth and business formation, particularly relevant for older workers: the availability of a lump-sum distribution option (LSO) of an employer-provided pension plan as a proxy for liquidity. That is, in order to fund the start-up of a new business, people with an LSO can cash out their pension benefit when eligible, rather than receive an annuity. Compared with workers with no LSO in their pension plan, we find that workers with an LSO are 27 percent more likely to transitions from wage and

salary work to self-employment over a two-year period. A final section concludes the paper.

2. HRS DATA AND DESCRIPTIVE RESULTS

We analyze the relationship between household wealth and transitions into self-employment using data from the HRS, a nationally representative, longitudinal survey of the labor force behavior, health, income and wealth of middle-aged and older Americans. Since 1992, the HRS surveyed more than 22,000 Americans over age 50 and their spouses every two years. Besides the original HRS cohort (born 1931-1941), several additional birth cohorts were added in the subsequent survey years. This paper uses the first seven waves (1992 to 2004) of the HRS with data from the original HRS cohort, as well as the Children of the Depression Era (CODA) and War Babies cohorts added in 1998 (born 1924 to 1930 and 1942 to 1947, respectively).[2]

The HRS is well suited for this study. In each wave of the HRS, respondents who report that they are currently working are asked if they are self-employed or not in their main job. In this study, we begin with a sample of individuals working at a wage and salary job at time *T* and who continue to work at time *T+2*. A transition to self-employment is defined as those who move from being a wage-and-salary worker in one wave (time *T*) and to being self-employed at the next wave (time *T+2*).[3] This definition captures entrepreneurship through the class of worker on the main job and does not include other business ownership on the part of individuals who are wage and salary workers in their main job. This definition is consistent with other studies of liquidity constraints in entrepreneurship such as Evans and Jovanovic (1989), Evans and Leighton

[2] Data from the 2006 HRS wave is available only as a preliminary release.

[3] This definition excludes transitions to self-employment for those who are unemployed at time *T*. However, including unemployed people at time *T* does not change our analytical results.

(1989), and Fairlie and Krashinsky (2006), among others. While Hurst and Lusardi (2004) define entrepreneurship based on entry into business ownership, regardless of current class of worker, they report that their results are similar when they define entrepreneurship by entry into self-employment. Our total sample of wage and salary workers age 50 and above at time *T* who are working at time *T+2* has 22,363 observations (person waves), with 705 transitions to self-employment.

In addition, the HRS is known to provide high-quality information on wealth and its components (Juster and Smith 1997; Hurd, Juster, and Smith 2003), as well as information on pension characteristics including the availability of an LSO. The HRS is also extremely rich in terms of individual and household characteristics associated with self-employment transitions such as demographic characteristics, risk aversion, health status and health insurance availability, and characteristics of the wage and salary job at time *T* (e.g., occupation and industry) or the self-employment job at time *T+2*.

Before presenting the regression results for the relationship between self-employment entry and wealth in the next section, we first examine the characteristics at time *T* of wage and salary workers who become self-employed between survey waves (approximately a two-year period), a group we call self-employment entrants, compared to those who do not transition to self-employment, the non-entrants (i.e., those who remain wage and salary workers). In Table 1, we report summary statistics for the sub-samples of self-employment entrants and non-entrants. On average, compared to non-entrants, self-employment entrants are more likely to be older, white, male, married, college educated, and more likely to have a work-limiting health condition. A slightly higher proportion of entrants score on the lower range of the scale of risk aversion,

meaning that they are less risk averse, although the difference is not statistically significant at conventional levels (p=0.11).[4] Entrants also have higher family labor income and, on their wage and salary job, they are less likely to have a pension plan and be covered by employer-provided health insurance or any health insurance.[5]

The two sub-samples differ most strikingly in the level of mean and median net total wealth (or net worth), net housing wealth (based as the primary residence) and liquid wealth, all measured in 1996 dollars.[6] Total net wealth is defined as the sum of the value of the primary residence, other real estate, vehicles, businesses, individual retirement accounts, Keogh accounts, stocks, mutual funds, investment trusts, checking and saving accounts, certificates of deposit, bonds and other savings, less home mortgages and household debt.[7] Liquid wealth excludes the non-financial net assets (i.e., the net value of the primary residence, other real estate, vehicles, and businesses). For married couples, the wealth components are summed across the two spouses.

As seen in Table 1, mean and median net worth for entrants into self-employment are $384,783 and $169,440 respectively and are much higher than for non-entrants at the mean and median ($220,003 and $111,968 respectively). Notably, the median net worth of self-employment entrants in the HRS, where the sample age range is 51 to 78 is approximately three times the value reported by Hurst and Lusardi (2004) for the PSID sample of self-employment entrants aged 22 to 60. Likewise, HRS non-entrants have four

[4] Risk aversion in the HRS is measured on a 4-point scale, from 1 (least risk averse) to 4 (most risk averse). We classify individuals who score a 1 or 2 in the "less risk averse" group.

[5] The measure of any health insurance shown in Table 1 includes insurance from any source: government, employer, or other. Coverage rates by source are also shown in non-mutually exclusive categories. Because of dual coverage, the percentage of entrants or non-entrants covered by each source will sum to a total that exceeds the percentage covered by any health insurance.

[6] Dollar amounts are converted using the Consumer Price Index.

[7] This definition of wealth is the same as that used by Hurst and Lusardi (2004) and they also report amounts in 1996 dollars.

times the median net worth of the PSID non-entrants. This large difference in the wealth distribution between the HRS and PSID is expected given the age difference in the two samples and would suggest that liquidity constraints may be less binding in a sample of older workers assuming a non-trivial level of starting capital for a transition to self-employment.

3. HOUSEHOLD WEALTH AND THE TRANSITION TO SELF-EMPLOYMENT

In this section, we analyze the relationship between household wealth and transitions into self-employment from wage and salary work. As in previous studies, we use total net worth as the primary measure of household wealth.[8] We first estimate multivariate probit regression models of becoming self-employed in the main job at time *T+2*, conditional upon being a wage and salary worker at time *T*, as a function of household net wealth and several relevant controls (see Table 1). The covariates include a quadratic in age, the logarithm of family labor income, and categories for highest education degree received. Indicator variables are also included for being non-white, female, and married and for having low risk-aversion, a work-limiting health condition, and a pension in the wage and salary job at time *T*. Other categorical variables measure types of health insurance coverage and the industry and occupation on the wage and salary job.[9] Like Hurst and Lusardi (2004), we use two non-linear specifications for total net wealth to account for the fact that a few households have very large wealth values and a few have very low values. In the first specification, total net wealth enters as a series of wealth quintile dummies, with a separate category for the highest 5 percent, for a total of

[8] We exclude the net value of secondary residence because it is not available for all waves of the HRS.

[9] Because of the rich background information in HRS, we can control for a more extensive set of individual characteristics compared with previous studies.

six categories. In the second specification, we use a fifth-order polynomial in wealth. The wealth amount used in the fifth-order polynomial model is divided by $100,000.

Baseline Results

The first two columns in Table 2 report the regression coefficients and marginal effects for the wealth variables in the two specifications of the probit model of the probability of transitioning to self-employment.[10] Both models reveal an increasing likelihood of transitioning to self-employment as wealth increases, consistent with the existence of liquidity constraints. Estimates from the wealth quintile specification are given in column 1 (model 1) and indicate that, compared to the lowest 20th percentile wealth group, each successively higher wealth group is more likely to transition into self-employment between waves. The magnitude of the estimate for the 20th-40th is relatively small and not statistically different than the reference group. Relative to the workers in the lowest wealth quintile, wage and salary workers in the 40th-60th percentile of wealth are 25 percent more likely to become self-employed (a 0.8 percentage-point increase over the baseline transition rate of 3.2 percent). Worker in the 60th-80th percentile of wealth are 47 percent more likely than the reference group to become self-employed (a 1.5 percentage-point increase). Workers in the 80th-95th percentile of wealth are 84 percent more likely than the reference group to become self-employed (a 2.7 percentage-point increase) and the comparable figure for those in the highest 5th percentile of the wealth distribution is 131 percent (a 4.2 percentage-point increase).

Column 2 (model 2) of Table 2 reports the marginal effects of a fifth-order polynomial in wealth and confirms the finding of an increasing probability of becoming

[10] We report robust standard errors with clustering.

self-employed over the entire wealth distribution. All wealth terms in the polynomial model are statistically different from zero at the 5 percent significance level (and jointly significant at the 1 percent level). The marginal effect of wealth/100,000 is 0.003, indicating that a $100,000 increase in household net wealth would increase the probability of transitioning into self-employment by a 0.3 percentage points or by 10 percent.

To further illustrate the relationship between wealth and self-employment transitions, Figure 1 plots the predicted probability of transitioning into self-employment against wealth levels for the two specifications in models 1 and 2.[11] The first dotted vertical line indicates the location of the 80th percentile and the second line marks the 95th percentile. The graph clearly indicates the positive relationship between wealth and self-employment transitions across the entire wealth distribution. Although the increase in the self-employment transition probability in moving from the lowest wealth level to the 60th percentile in wealth is not as substantial as the increase thereafter, since the wealth distribution is highly skewed, a one percentile-point increase in wealth at higher wealth levels represents a substantially higher absolute change in wealth than a one percentile-point increase at lower wealth levels. The slope of the positive relationship between self-employment entry and wealth based on the fifth-order polynomial specification is fairly constant from the starting wealth level to around the 90th percentile of the wealth distribution. After the 90th percentile, the probability continues to increase, although at a modestly decreasing rate which is consistent with the hypothesis of binding liquidity

[11] When computing predicted probabilities, all covariates except the wealth variables are set to their sample mean.

constraints throughout the wealth distribution with the exception of extremely high levels of wealth where we would not expect liquidity constraints to be important.

Full regression results for models 1 and 2 in Table 2 are provided in Appendix Table A1. Estimates of the other covariates in the models are consistent with estimates from previous studies. For example, the likelihood of becoming self-employed increases with education, is higher for men than for women, is higher for workers with a work limiting health condition and those with no health insurance. There is no effect on self-employment transitions of age or of being non-white, less risk-averse or married. Occupation is a significant determinant of self-employment entry. Compared professionals and managers, workers in almost all other occupations (the exception is sales) at time *T* are less likely to be self-employed in time *T+2*, although the differences by occupation group are only significant for the administrative support occupations and the mechanic, construction, operator occupations.

Further Analyses Using An Alternative Wealth Measure and Accounting for Industry Starting Capital Costs

The amount of liquid wealth rather than total net wealth may be a more appropriate measure for assessing the relationship between wealth and self-employment transitions. Recall that liquid wealth includes individual retirement accounts, Keogh accounts, stocks, mutual funds, investment trusts, checking and saving accounts, certificates of deposit, bonds and other savings.[12] We re-estimate models 1 and 2 in Table 2 using liquid wealth instead of total net wealth and illustrate our estimates in Figure 2. Again we find a positive and significant relationship between liquid wealth and

[12] We did not subtract household debt from the liquid wealth because people are not required to pay off any of their debts before using their liquid wealth.

the probability of becoming self-employed, a relationship that becomes flatter only at the highest wealth levels.[13]

Following Hurst and Lusardi (2004), we further investigate the relationship between wealth and self-employment transitions by the industry type of the self-employment job, using a similar classification scheme to sort businesses into high- and low-starting capital requirements. If liquidity constraints are binding, then wealth should matter more for transitions to businesses with high capital start-up requirements. Based on Hurst and Lusardi (2004), we designate industries in our sample as low-starting capital industries (namely services), high-starting capital industries (namely manufacturing; transportation, communication, and other public utilities; wholesale and retail trade; and finance, insurance and real estate) and the professionals industry.[14] In our sample, 29 percent of older wage and salary workers that transition to self-employment start a business in a low-starting capital industry, 37 percent in a high-starting capital industry and 18 percent in the professionals industry. The remaining 16 percent start a business in agriculture or mining and construction, a group that is excluded for purposes of this analysis.[15]

[13] In the first model specification, there is a negative and insignificant coefficient on the dummy for the 20th to 40th percentile of the liquid wealth distribution relative to the reference group (0 to 20th percentile), hence the pattern plotted in Figure 2.

[14] Hurst and Lusardi (2004) determined the industry type using median starting capital of various industries from the 1987 National Survey of Small Business Finances (NSSBF). For the group of low-starting capital industries, the median and 75th percentile of start-up capital are $20,000 and $63,000, respectively. The comparable figures for the high-starting capital industries are $45,000 and $120,000. The professionals industry group is treated as a separate group because no information on required starting capital for professionals is available in the 1987 NSSBF (Hurst and Lusardi 2004).

[15] As with Hurst and Lusardi (2004), the agriculture industry is not included in our analysis. In addition the HRS data combine construction and mining industries which are classified respectively by Hurst and Lusardi (2004) in the low-starting and high-starting capital groups. For our main results, we exclude this combined industry group from the analysis. However, in a sensitivity analysis, we estimated models where the combined mining and construction sectors are assigned to either the high- or low-starting capital group. Our main results do not change with this assignment to either group.

Again, we estimate a multivariate model of self-employment entry on a fifth-order polynomial of total household wealth and covariates (same as before), now with the outcome successively defined as a transition to self-employment in a low-starting capital, high-starting capital, or professionals industry. The fifth-order polynomial of wealth is jointly significant at the 5 percent level for both high- and low-starting capital industry groups but not for the professionals industry. Figure 3 plots the predicted probability of self-employment entry against total household net wealth separately for low- and high-starting capital industries and the professionals industry.

In contrast to Hurst and Lusardi (2004), the pattern in Figure 3 is consistent with the importance of liquidity constraints. Notably, for both low- and high-starting capital industries, there is a positive relationship between wealth and self-employment entry at least to the 80th percentile of the wealth distribution. For low-starting capital industries, at high wealth levels (after the 80th percentile of wealth), the probability of a transition to self-employment increases at a decreasing rate and eventually begins to decline, while the probability of a transition to a high-starting capital industry continues to increase at high wealth levels. After the 95th percentile, the probability of self-employment transitions in a high-starting capital industry continues to increase. This analysis of the relationship between transitions to self-employment and wealth by industry group therefore provides further evidence supporting the existence and significance of liquidity constraints.

In contrast to our findings for other industry groups, we find no relationship between wealth and self-employment transitions into professional businesses (see Figure 3). The estimated coefficients on the wealth polynomial terms for transitions to the professionals industry are small and not jointly significant. Again, this result differs from

that reported by Hurst and Lusardi (2004). However, among older workers, the transition rate into self-employment in the professionals industry is lower than the transition rate into either the low- or high-starting capital industries. Thus, the lack of significance may result from low power.

4. SELF-EMPLOYMENT ENTRY AND PENSION CASH-OUT

Interpreting the relationship between wealth and movements into self-employment is complicated by the fact that the amount of household wealth may be influenced by unobservable factors that may also be correlated with the likelihood of becoming self-employed. Although the richness of the HRS data allows us to control for some of these confounding factors, such as the degree of risk aversion, we cannot rule out the possibility that wealth levels are endogenous. Previous studies have explored proxies for liquidity such as the receipt of an inheritance (e.g. Holtz-Eakin, Joulfaian and Rosen 1994; Blanchflower and Oswald 1998; Zissimopoulos and Karoly 2007) and instruments for household wealth such as house value appreciation (Hurst and Lusardi 2004; Fairlie and Krashinsky 2006). Hurst and Lusardi (2004) conclude that inheritance receipt is a poor instrument for changes in household liquidity because both past and future inheritances predict self-employment transitions. Using housing capital gains at the census region level as an instrument for wealth, they find no relationship between wealth and entrepreneurship entry. In contrast, Fairlie and Krashinsky (2006) use a similar sample and housing gains at the MSA level as an instrument for wealth and find a positive and significant relationship between wealth and entrepreneurship entry.

We analyze a new proxy for liquidity particularly relevant for older workers: the availability of a pension cash-out or LSO. Among older workers, pension wealth can be

an important component of total household wealth. For example, using data from the 1998 Survey of Consumer Finance, Jianakoplos and Bajtelsmit (2002) reported that private pension wealth accounts for 20 percent of total household wealth for people 51-59 years old. Although not all pension plans have the option to cash out the entire or partial balance, those with an LSO have access to a source of liquid wealth that could be used to finance a start-up business. For this to be a valid proxy, we must assume that the availability of a pension plan with an LSO is not correlated with the error term in the regression model after controlling for other observable differences.

We employ all seven waves (1992-2004) of the HRS to determine for each worker the availability of an LSO on their current wage and salary job.[16] In each wave, pension holders are asked a set of questions regarding the characteristics of their pension plan that vary by whether the pension is a defined benefit plan (DB), a defined contribution plan (DC) or a plan with both features (DB-DC). Depending on pension type, separate questions about LSO status are asked. For example, in survey wave 6 (year 2002), workers with a DB plan or a DB-DC plan are asked "Rather than regular retirement benefits, could you choose to receive a lump-sum settlement from this plan when you retire?" Respondents with a DC plan are asked, "Does this plan allow you to receive benefits in the form of a lump sum payment?" The answer to these questions could be: "Yes," "Yes, partial," or "No." We construct LSO status equal to 1 if the answer is "Yes" or "Yes, partial" and 0 otherwise.[17] Respondents may have multiple

[16] We exclude from this analysis the few workers from the AHEAD cohort (born in or before 1923) because of difficultly determining the LSO status of their pension plans.

[17] Not all respondents answer these questions in each wave. The LSO questions are asked for all new respondents to the HRS survey and those respondents that changed jobs between waves. Respondents who have the same job as the prior wave are asked whether the rules governing their pension plan on the current job have changed. If the rules change, respondents are asked the LSO questions. If the rules do not change, however, only a limited number of questions are asked about their pension plan and the LSO

pension plans on the current job. For the first 4 waves of the HRS, respondents are queried about up to 3 pension plans and up to 4 pension plans in subsequent waves. We determine the LSO status of each pension plan in each wave.

Pooling all waves together, the percentage of LSO availability in our sample of wage and salary workers at time *T* is 46 percent for DB plan participants, 81 percent for DC plan participants and 62 percent for participants in DB-DC plans.[18] By way of comparison, only a few studies report the rate of LSO availability by pension type. Using the Employee Benefit Supplements (EBS) to the Current Population Survey (CPS), Burman et al. (1999) found that LSO availability, as reported by individual workers, was 58 percent for DB plan holders and 79 percent for DC plan holders as of 1993 (excluding respondents who do not know whether they have such an option). Blostin (2003), based on the 2000 National Compensation Survey administered to employers in the private sector only, reported that 44 percent of people with a DB plan and 83 percent of people with a DC plan have an LSO.[19] Our estimates for the HRS sample fall in the middle of the range reported by these two studies.

Pension holders with either DC plans or DB-DC plans can cash out the pension balance any time if LSO is allowed, although cashing out before a certain age (specifically age 59 ½) is subject to a penalty. DB plans, however, typically do not allow cashing out before early or normal retirement age even if an LSO is allowed. If the age of the respondent is at or above the normal retirement age and the plan allows for an LSO,

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questions are skipped. In these cases, we carry over the LSO status in previous waves to the current wave. The exceptions are wave 1 and wave 7 when all respondents answered the same pension questions, including those pertaining to LSO.

[18] These percentage calculations are based on the primary pension plan only. Those with missing LSO status are excluded from the calculations.

[19] Cases with a missing LSO value were not excluded in the reported rates of LSO access. If missing cases are excluded, the corresponding percentages are 46 percent for DB plan holders and 94 percent for DC plan holders.

we characterize the respondent as having access to an LSO. In sum, those who we define as having no LSO access—in other words, they cannot cash out any part of their pension balance during the transition window—includes workers that have no LSO of any type on their primary pension plan, as well as those DB plan holders with an LSO on their primary pension but who are not yet eligible for pension benefits as of time *T+2* (the end point of the transition window). Thus, workers that have the option to cash out pension balances are those who have an LSO on a primary DC or DB-DC plan and those retirement age-eligible DB plan holders with an LSO. We use LSO availability and eligibility based on the primary pension plan from the current job under the assumption that most pension wealth from the current job is associated with the primary plan. The majority of respondents (77 percent) in our sample has only one pension plan on their current job (the primary plan).

As with the earlier models, we use a probit specification to estimate the effect of having an LSO—the option to cash-out a pension balance in the form of a lump sum—on self-employment entry. The model specification includes an LSO dummy, an indicator variable for more than one pension, six quantiles of net total household wealth as with model 2, and all other covariates included in the previous regression models (again, full results are provided in Appendix Table A1). As reported in Table 2 (see model 3), the estimates indicate that, compared to those with no pension cash-out option, workers with an LSO are 0.8 percentage points more likely to enter self-employment in the next wave than pension holders without an LSO, an effect that is significant at the 5 percent level. This is a substantial effect, representing a 25 percent increase from the base probability of transitioning to self-employment of 3.2 percent. A comparison of models 2 and 3 shows

that the estimated relationship of self-employment transitions and household wealth remains virtually unchanged from previous models. This significant and substantial marginal effect of an LSO among pension holder provides further evidence to the existence and importance of liquidity constraints. Workers with no pension on the current job are more likely to be self-employed than workers with a pension but no LSO. The positive estimated effect of not having a pension may indicate that workers with low quality jobs (in terms of compensation and stability) are pushed into self-employment as has been consistently found in other studies (Fuchs 1982; Zissimopoulos and Karoly 2007).

5. CONCLUSION

Insufficient starting capital to fund new businesses can be a significant obstacle for nascent entrepreneurs. Thus, a substantial research literature has emerged to investigate whether liquidity constraints bind and if they do, whether the existence of liquidity constraints is important enough to justify public intervention. Although past research has provided a strong empirical base confirming the importance of binding liquidity constraints, the issue is far from settled as recently demonstrated by the contrasting findings of Hurst and Lusardi (2004) and Fairlie and Krashinsky (2006).

However, just as Fairlie and Krashinsky demonstrate that pooling all workers together in models of business formation can obscure the relationship with wealth for important subgroups—in their case job losers vs. nonlosers—our study shows the relevance of examining the importance of liquidity constraints specifically for middle age and older workers. Older workers are known to have higher rates of self-employment than younger workers, and the HRS provides rich, longitudinal data, including high

quality measures of wealth. Indeed, our findings, specific to the population of workers over age 50 captured in the HRS, add further evidence in support of the existence of liquidity constraints for business formation.

First, we find a positive relationship between wealth and transitions to self-employment over the entire wealth distribution, one that weakens only at the highest wealth levels—a pattern consistent with the existence of liquidity constraints. This pattern holds whether we use a measure of total net worth or of liquid wealth. Second, we find that wealth matters more for transitions to self-employment in industries that require high levels of starting capital compared with those industries that have low starting-capital requirements, another pattern consistent with the importance of liquidity constraints.

Third, we find that the availability of an LSO—the option to cash out a pension benefit when eligible rather than receive an annuity—is also positively associated with transitions to self-employment among older workers. To the extent that third factors can cause households to accumulate wealth and be more likely to start a new business, we view access to an LSO as an alternative measure of liquidity, one that can be used to fund the start-up of a new business but one that is less subject to endogeneity bias. Compared with workers with no LSO in their pension plan, we find that workers with an LSO are 25 percent more likely to transition from wage and salary work to self-employment over a two-year period.

While the results of this paper confirm the importance of liquidity constraints in the decision for older workers to start a new business, other dimensions of the relationship between wealth and entrepreneurship at older ages are relevant for policy

analysis. For example, do liquidity constraints keep potential business owners with a low chance of success from putting their retirement assets at risk? More generally, what are the implications of starting a new business for income security at older ages? Answers to these questions are relevant for older and younger workers alike and will increase our understanding of the decision to become self-employed and the implications for the well-being of individuals and families.

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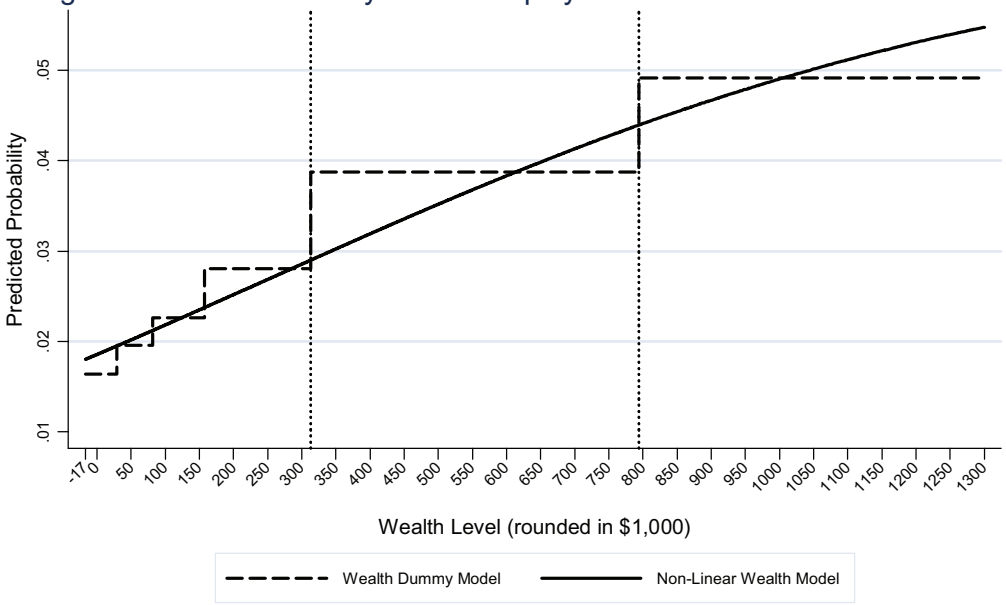
Fig.1 Predicted Probability of Self-Employment as a Function of Total Wealth

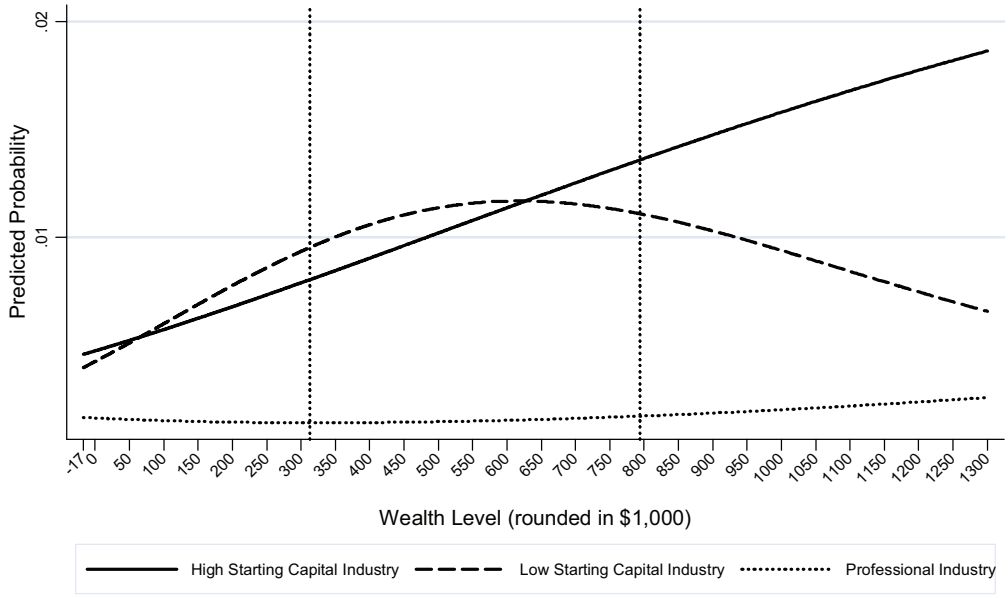


SOURCE: Authors' calculations using the HRS.
NOTE: The first and second dashed vertical lines mark the 80th and 95th percentiles of the wealth distribution, respectively.

Fig.2 Predicted Probability of Self-Employment as a Function of Liquid Wealth

SOURCE: Authors' calculations using the HRS.
NOTE: The first and second dashed vertical lines mark the 80th and 95th percentiles of the wealth distribution, respectively.

Fig.3 Predicted Probability of Self-Employment as a Function of Total Wealth by Industry



SOURCE: Authors' calculations using the HRS.
NOTE: The first and second dashed vertical lines mark the 80th and 95th percentiles of the wealth distribution, respectively.

Table 1: Descriptive Statistics of Self-Employment Entrants and Non-Entrants

Variable (measured at time *T*)	Entrants (N=705)	Non Entrants (N=21,658)	P-Value
Age	59.0	57.9	0.00
Education Level			
Less Than High School*	0.19	0.22	0.05
High School Graduate*	0.26	0.33	0.00
Some College*	0.24	0.22	0.28
College and Above*	0.30	0.23	0.00
Non-White*	0.13	0.19	0.00
Female*	0.38	0.52	0.00
Married*	0.83	0.78	0.00
Less Risk Averse*	0.24	0.22	0.11
Has Work-Limiting Health Condition*	0.12	0.08	0.00
Covered by Any Health Insurance*	0.86	0.93	0.00
Covered by Government Health Insurance*	0.18	0.13	0.00
Covered by EHI*	0.54	0.69	0.00
Covered by Spouse's EHI*	0.19	0.17	0.12
Covered by Other Health Insurance*	0.14	0.10	0.00
Has Pension Plan on Wage & Salary Job*	0.43	0.64	0.00
Occupation of Wage & Salary Job			
Professional and Managerial*	0.37	0.32	0.00
Sales*	0.14	0.08	0.00
Clerical and Administrative Support*	0.10	0.19	0.00
Services*	0.15	0.16	0.67
Farming, Forestry, Fisheries*	0.02	0.02	0.44
Mechanic, Construction, Operator*	0.21	0.24	0.04
Industry of Wage & Salary Job			
Agriculture, Forestry, Fishery*	0.02	0.02	0.76
Mining and Construction*	0.08	0.04	0.00
Manufacturing*	0.13	0.18	0.00
Transportation*	0.07	0.07	0.77
Wholesale and Retail*	0.17	0.15	0.17
Finance, Insurance, Real Estate*	0.08	0.06	0.08
Business/Repair Services*	0.08	0.05	0.01
Personal Services*	0.05	0.03	0.02
Entertainment/Recreation*	0.02	0.02	0.70
Professional/Related Services*	0.26	0.32	0.00
Public Administration*	0.04	0.06	0.03
Family Labor Income	$55,843	$47,032	0.00
Mean Value of Total Net Wealth (Net Worth)	$384,783	$220,003	0.00
Median Value of Total Net Wealth (Net Worth)	$169,440	$111,968	0.00
Mean Net Value of Primary Residence	$93,332	$75,143	0.00
Median Net Value of Primary Residence	$61,698	$55,000	0.04
Mean Value of Liquid Assets	$157,961	$85,873	0.00
Median Value of Liquid Assets	$31,800	$19,296	0.00

SOURCE: Authors' calculations using the HRS.

NOTE: Sample size is 22,363. The sample includes all respondents in the HRS who had a wage-and-salary job at time *T* and subsequently remain in the HRS and continue to work at time *T*+2, using the first seven wave of the HRS. Standard deviations are listed in parentheses. P-values of difference between entrants and non-entrants are listed in the last column. * indicates a dummy variable. EHI=employer-provided health insurance.

Table 2: Regression Coefficients and Marginal Effects of Probit Models

	Model 1	Model 2	Model 3
	Wealth Dummies	5th-order Polynomial	LSO Proxy
Control variables included	Yes	Yes	Yes
Total Net Wealth			
Wealth/100,000		0.070***	
		(0.015)	
(Wealth/100,000)^2		-0.003***	
		(0.001)	
(Wealth/100,000)^3		7.52E-5**	
		(3.21E-5)	
(Wealth/100,000)^4		-5.86E-7**	
		(2.71E-7)	
(Wealth/100,000)^5		1.11E-9**	
		(5.30E-10)	
Total Net Wealth [0th–20th Percentile]			
20th–40th Percentile	0.072		0.083
	(0.062)		(0.062)
40th–60th Percentile	0.132**		0.142**
	(0.065)		(0.065)
60th–80th Percentile	0.224***		0.230***
	(0.064)		(0.064)
80th–95th Percentile	0.369***		0.361***
	(0.068)		(0.068)
Above 95th Percentile	0.482***		0.491***
	(0.084)		(0.084)
LSO Available on Primary Pension Plan			0.135**
			(0.055)
Marginal Effects			
Wealth [0th–20th Percentile]			
20th–40th Percentile	0.004		0.005
40th–60th Percentile	0.008		0.009
60th–80th Percentile	0.015		0.015
80th–95th Percentile	0.027		0.026
Above 95th Percentile	0.042		0.043
LSO Available			0.008
Increase Wealth/100,000		0.003	
P-value of joint significance of all wealth variables	0.000	0.000	0.000
Pseudo R^2	0.069	0.071	0.070

SOURCE: Authors' calculations using the HRS.

NOTE: Sample size is 22,363. The sample includes all respondents in the HRS who had a wage-and-salary job at time *T* and subsequently remain in the HRS and continue to work at time *T+2*, using the first seven waves of the HRS. Robust standard errors are listed in parentheses. See Table A1 for results for control variables in all models. Marginal effect of the fifth-order polynomial is calculated for each observation and averaged across observations. The percentage of observations in the sample that transit into self-employment in the next wave is 0.03. Reference groups for polytomous covariates are shown in brackets. Statistically significant at the * 10 percent level, ** 5 percent level, *** 1 percent level.

Appendix Table A1: Marginal Effects for All Probit Regression Models

Covariate (measured at time *T*)	Model 1 Wealth Dummies	Model 2 5th-order Polynomial	Model 3 LSO Proxy
Age	0.005	0.005	0.005
	(0.004)	(0.003)	(0.004)
Age Squared	-4.05E-5	-4.21E-5	-3.78E-5
	(2.96E-5)	(2.88E-5)	(2.95E-5)
Education Level [Less Than High School]			
High School Graduate	0.002	0.002	0.002
	(0.003)	(0.003)	(0.003)
Some College	0.009**	0.010***	0.009**
	(0.004)	(0.004)	(0.004)
College and Above	0.013***	0.013***	0.013***
	(0.005)	(0.005)	(0.005)
Non-White	-0.004	-0.004	-0.003
	(0.003)	(0.003)	(0.003)
Female	-0.014***	-0.014***	-0.014***
	(0.003)	(0.002)	(0.003)
Married	1.82E-4	2.28E-4	2.86E-4
	(0.003)	(0.003)	(0.003)
Less Risk Averse	0.002	0.001	0.001
	(0.002)	(0.002)	(0.002)
Has Work-Limiting Health Condition	0.012***	0.012***	0.012***
	(0.004)	(0.004)	(0.004)
Covered by Any Health Insurance	-0.023***	-0.021***	-0.022***
	(0.008)	(0.008)	(0.008)
Covered by Government Health Insurance	-0.002	-0.001	-0.002
	(0.004)	(0.004)	(0.004)
Covered by EHI	-0.003	-0.003	-0.003
	(0.004)	(0.004)	(0.004)
Covered by Spouse's EHI	0.005	0.005	0.005
	(0.004)	(0.004)	(0.004)
Covered by Other Health Insurance	0.008**	0.008**	0.008**
	(0.004)	(0.004)	(0.004)
Has Pension Plan on Wage & Salary Job	-0.019***	-0.019***	-0.023***
	(0.003)	(0.003)	(0.004)
Occupation [Professional/Managerial]			
Sales	0.013***	0.013***	0.013***
	(0.006)	(0.006)	(0.006)
Administrative Support	-0.010***	-0.010***	-0.010***
	(0.003)	(0.003)	(0.003)
Services	-0.002	-0.002	-0.001
	(0.004)	(0.003)	(0.004)
Farming, Forestry, Fisheries	-0.003	-0.003	-0.002
	(0.010)	(0.010)	(0.011)
Mechanic, Construction, Operator	-0.008**	-0.008**	-0.008**
	(0.003)	(0.003)	(0.003)

Appendix Table A1: Marginal Effects for All Probit Regression Models, *Continued*

Covariate (measured at time *T*)	Model 1 Wealth Dummies	Model 2 5th-order Polynomial	Model 3 LSO Proxy
Industry [Agriculture, Forestry, Fishery]			
Mining and Construction	0.042**	0.041**	0.042**
	(0.026)	(0.026)	(0.026)
Manufacturing	0.009	0.009	0.009
	(0.014)	(0.014)	(0.014)
Transportation	0.015	0.016	0.016
	(0.017)	(0.017)	(0.018)
Whole Sale and Retail	0.005	0.005	0.005
	(0.013)	(0.013)	(0.013)
Finance, Insurance, Real Estate	0.018	0.017	0.018
	(0.018)	(0.018)	(0.018)
Business/Repair Services	0.019	0.019	0.019
	(0.019)	(0.019)	(0.019)
Personal Services	0.025	0.024	0.024
	(0.022)	(0.021)	(0.021)
Recreation/Entertainment Services	0.002	0.002	0.002
	(0.014)	(0.013)	(0.013)
Professional Services	0.006	0.006	0.006
	(0.013)	(0.012)	(0.013)
Public Administration	0.003	0.003	0.004
	(0.014)	(0.014)	(0.014)
Log of Family Labor Income	-0.001***	-0.001**	-0.001***
	(4.97E-4)	(4.85E-4)	(4.92E-4)
Total Net Wealth [0th–20th Percentile]			
20th–40th Percentile	0.004		0.005
	(0.004)		(0.004)
40th–60th Percentile	0.008**		0.009**
	(0.004)		(0.004)
60th–80th Percentile	0.015***		0.015***
	(0.005)		(0.005)
80th–95th Percentile	0.027***		0.026***
	(0.006)		(0.006)
Above 95th Percentile	0.042***		0.043***
	(0.010)		(0.010)
Net Total Wealth			
Wealth/100,000		0.004***	
		(0.001)	
$(\text{Wealth}/100{,}000)^2$		-1.90E-4***	
		(6.8E-5)	
$(\text{Wealth}/100{,}000)^3$		4.17E-6**	
		(1.72E-6)	
$(\text{Wealth}/100{,}000)^4$		-3.25E-8**	
		(1.45E-8)	
$(\text{Wealth}/100{,}000)^5$		6.14E-11**	
		(2.84E-11)	

Appendix Table A1: Marginal Effects for All Probit Regression Models, *Continued*

Covariate (measured at time *T*)	Model 1 Wealth Dummies	Model 2 5th-order Polynomial	Model 3 LSO Proxy
LSO Available on Primary Pension Plan			0.008**
			(0.004)
More Than One Pension Plan on Wage & Salary Job			-3.44E-4
			(0.003)
Pseudo R2	0.069	0.071	0.070
Base Probability	0.032	0.032	0.032
Sample Size	22,363	22,363	22,363

SOURCE: Authors' calculations using the HRS.

NOTE: The sample includes all respondents in the HRS who had a wage-and-salary job at time *T* and subsequently remain in the HRS and continue to work at time *T*+2, using the first seven waves of the HRS. Robust standard errors are listed in parentheses. Reference groups for polytomous covariates are shown in brackets. Statistically significant the * 10 percent level, ** 5 percent level, *** 1 percent level. EHI=employer-provided health insurance.