

WHO ARE ENTREPRENEURS AND WHY DO THEY BEHAVE THAT WAY?

MANJU PURI AND DAVID T. ROBINSON

ABSTRACT. This paper uses the Survey of Consumer Finance to study how the attitudes of entrepreneurs differ from others in the economy. By using a measure of optimism based on life expectancy miscalibration we can separately identify optimism from risk-taking and non-pecuniary benefits. Entrepreneurs are more optimistic, more risk loving and choose to work more than wage earners. However, the correlation between these is low, suggesting that these attitudes explain different aspects of decision making. These findings shed light on existing puzzles but also raise new questions.

Date: November 19, 2006.

Duke University and NBER (Puri) and Duke University (Robinson). We would like to thank seminar participants at Michigan State and the LBS Entrepreneurship conference for helpful comments. Comments and suggestions by Simon Gervais, Ahmed Khwaja, Rick Larrick, Cade Massey, David de Meza, Toby Moskowitz, John Payne, N.R. Prabhala, and Luca Rigotti are gratefully acknowledged. The usual disclaimer applies.

1. INTRODUCTION

Entrepreneurs make peculiar financial choices. They hold poorly diversified portfolios, concentrating their wealth in their own private business far more than what is prescribed by financial theory (Gentry and Hubbard, 2001; Moskowitz and Vissing-Jorgensen, 2002; Heaton and Lucas, 2000). They bear excessive risk for the returns they earn; indeed, Moskowitz and Vissing-Jorgensen (2002) show that they earn low risk-adjusted returns, documenting a private equity premium puzzle. In addition, they accept lower median life-time earnings than similarly skilled wage-earners (Hamilton, 2000).

Why do entrepreneurs make these choices? Why do entrepreneurs prefer an income stream that offers lower median lifetime earnings than what they could earn working in a larger organization? Why do they concentrate their wealth in their own businesses? In this paper, we attempt to answer these questions by focusing on the attitudes of entrepreneurs and how they differ from others in the economy.

As previous scholars have noted, these decisions are consistent with a range of explanations. Perhaps entrepreneurs are risk-takers. Perhaps entrepreneurs either derive substantial non-pecuniary benefits from self-employment, or some of their pecuniary benefits are unobserved. Or perhaps they are optimistic about their entrepreneurial prospects.

We focus on each of these three explanations to resolve the entrepreneurship puzzle. In particular, we ask two main questions. First, we ask how attitudes differ between entrepreneurs and non-entrepreneurs. Second, we ask if these attitudes are important for the actions that entrepreneurs take.

Optimism, attitudes toward risk, and the nonpecuniary benefits of self-employment are difficult to isolate empirically. We use data from the Survey of Consumer Finances (SCF) to distinguish them from one another.

To measure optimism, we compare a respondent's beliefs about their life expectancy with their expected life span from a statistical table. We label this measure of optimism *life expectancy miscalibration*. Puri and Robinson (2005) develop the life expectancy miscalibration measure and show that it not only correlates with subjective beliefs about future income growth and overall future macroeconomic conditions, but also a wide range of economic choices. Life expectancy

miscalibration also correlates with standard psychometric tests of optimism (Puri and Robinson, 2006).¹ For example, optimists work more, are more likely to remarry, save more, intend to postpone retirement longer, and hold a greater fraction of their investment income in individual stocks (Puri and Robinson, 2005).

In this paper, we show that entrepreneurs are significantly more optimistic in terms of life expectancy miscalibration than non-entrepreneurs. This optimism is also reflected in other beliefs. For example, they are also more likely to be optimistic about the general state of the economy.

To relate optimism to risk preferences we make use of survey questions that elicit the respondent's self-perceptions about the amount of financial risk they are willing to bear for a commensurate level of return. This question provides striking evidence that entrepreneurs are more risk-loving than the rest of the population, and yet the correlation between risk tolerance and optimism is low. Moreover, attitudes toward risk and optimism explain different aspects of entrepreneurial decision-making. Further, we find that entrepreneurs have longer planning horizons, are less likely to smoke, and are more likely to be married, and on average have a larger number of children than others. Thus, entrepreneurs are risk-lovers, but this willingness to take risk is tempered by strong family ties, good health practices, and long planning horizons.

Finally, to capture the non-pecuniary benefits of self-employment, we make use of questions in the SCF that elicit attitudes towards retirement. The SCF asks respondents when they expect to stop working. Mostly people report an answer that indicates they intend to stop on or around their 65th birthday, however some respondents report that they never intend to stop working at all. We use this as an indication that the respondent derives non-pecuniary benefits from work.

Entrepreneurs are almost three times more likely to indicate that they never intend to retire. This difference is highly statistically significant and present across all age categories; it is not driven by the extreme views of the very young or the very old. Thus, entrepreneurs seem to derive considerably greater non-pecuniary benefits from work than non-self-employed individuals. This difference is compounded by the fact that respondents who never intend to retire also work

¹In other related work, Puri and Robinson (2006) use survey evidence to compare life expectancy miscalibration with psychometric tests of optimism well known from the psychology literature (Scheier, Carver, and Bridges, 1994; Scheier and Carver, 1985). Comparing life expectancy miscalibration to the Life Orientation Test-Revised (LOT-R), Puri and Robinson (2006) find a raw correlation of over 40% and a robust, highly statistically significant correlation in a multivariate regression setting, controlling for health status, family longevity, and a variety of issues related to sample selection.

about three percent longer per week, therefore the total time they spend at work over their age-adjusted work lives is considerably longer. Coupling this with existing evidence on the comparison of wage earnings to entrepreneurship further amplifies the fact that non-pecuniary benefits of self-employment are an important component of entrepreneurship.

Many papers that study self-employment stress the importance of wealth constraints and the role of liquidity in new business creation (see Blanchflower and Oswald (1998), Evans and Leighton (1989), Evans and Jovanovic (1989), Fairlie (1999), Gentry and Hubbard (2001) and others). Recent work by Hurst and Lusardi (2004), however, demonstrates that the relation between entrepreneurship and wealth is highly nonlinear. To control for the fact that our optimistic entrepreneurs may simply be much wealthier (or face better liquidity) than their wage-earning counterparts, we split the data at the 90th percentile of the wealth distribution and compare entrepreneurs to non-entrepreneurs within groups. Entrepreneurs are more optimistic, more risk tolerant, and appear to value nonpecuniary benefits of work more than other respondents in the upper tail of the wealth distribution. The same distinctions hold when we contrast entrepreneurs and wage earners based on whether they have received past inheritances, or expect to receive inheritances in the future.

Entrepreneurs may have different attitudes than similarly wealthy wage-earners, but do these attitudes translate into actions? To take up this question we explore how optimism, risk tolerance, and nonpecuniary benefits affect allocation of time to work among entrepreneurs. Focusing on those entrepreneurs who have started or bought their own business, we find that more optimism is associated with working longer hours. (This result does not hold among those who inherit their business.) In light of the findings of Bitler, Moskowitz, and Vissing-Jorgensen (2004), who relate entrepreneurial effort to firm performance, this evidence suggests that increased optimism may be associated with better performance.

Interestingly, our results linking optimism and risk-taking to entrepreneurship vary considerably based on how the respondent became self-employed. The link between optimism and actions is strongest for individuals who have started or bought their own businesses. Those who have inherited businesses from prior generations of family members do not display the same characteristics. As we discuss below, this complicates the predictions of policy-making based on evidence drawn from samples of self-employed.

Our work draws on a large literature in psychology, economics and entrepreneurship. Most prior work linking optimism to entrepreneurship focuses on miscalibrated beliefs about the success of a particular entrepreneurial venture.² Life expectancy miscalibration is intended to measure a broader, personality-based optimism that captures positive general expectations about the future. The distinction between our measure of optimism and prior work in this area is related to the schism in the psychology literature between dispositional optimism (Scheier and Carver, 1985), which views optimism as a positive personality trait associated with positive generalized expectations of the future, and optimistic bias (Weinstein, 1980), a negative, domain-specific miscalibration in expectations. The type of optimism we study complements prior work in the area but is distinct from past studies.

Our findings have important implications for the study of entrepreneurship, self-employment, and the distinction between the two. In particular, we help to explain part of the private equity premium puzzle identified by Moskowitz and Vissing-Jorgensen (2002). Our evidence, based on the same sample frame they use to establish this puzzle, shows that attitudinal differences between entrepreneurs and wage earners that helps to explain why they engage in seemingly peculiar behavior.

Given the importance of small businesses for economic growth in the U.S., understanding the determinants of entrepreneurial decision-making is also critical for policy. The important differences between types of entrepreneurs that we uncover illustrate the problems with trying to draw policy implications from work based on a sample of self-employed individuals. Our evidence indicates that the ramifications of policy initiatives to spur entrepreneurship will vary considerably based on whether the initiatives target new business creation or existing small business.

The remainder of the paper is structured as follows. In Section 2, we describe the data. In Section 3, we provide a univariate analysis of optimism, non-pecuniary benefits, and risk tolerance. This involves measurement issues associated with each dimension of entrepreneurship as well as correlations between the dimensions. In Section 4, we present the main multivariate analysis linking optimism, risk-taking and non-pecuniary benefits to the entrepreneurship decision. We explore the role of wealth and liquidity constraints in Section 5, while we relate attitudes to entrepreneurial actions in Section 6. Section 7 concludes.

²For examples of prior work linking entrepreneurship and distorted perceptions of the future, see Arabsheibani, de Meza, Maloney, and Pearson (2000), de Meza and Southey (1996), or Landier and Thesmar (2005).

2. DATA AND ECONOMETRIC ISSUES

2.1. The Survey of Consumer Finances. For this research we use data from the 1995, 1998, and 2001 Survey of Consumer Finances (SCF). Since the main goal of the survey is to develop a picture of the economic health of a wide spectrum of the U.S. economy, it naturally consists of a sizeable number of both entrepreneurs and non-entrepreneurs.

To provide the most complete data possible to the research community, the SCF employs a statistical technique called multiple imputation to correct for missing or sensitive data. The exact multiple imputation procedures used by the Federal Reserve in the design of the SCF are described in great detail in a series of articles by Arthur Kineckell and other economists at the Federal Reserve. In particular, the interested reader should refer to Kinneckell (2000) and the references therein. Correctly accounting for the effect of multiple imputation is often overlooked, but is critical for making appropriate statistical inference. In this paper we follow the adjustments detailed in Puri and Robinson (2005) and the references therein for correcting standard errors.³

2.2. Defining Entrepreneurship. Our first empirical challenge is to identify entrepreneurs in the SCF. Our aim is to provide a definition of entrepreneurship that facilitates a ready comparison of our results with extant research across the disciplines of management, economics and finance. Therefore we focus attention on those respondents who are both self-employed and owners of private equity.

More specifically, we require a respondent to meet two criteria: the respondent must own some or all of at least one privately owned business, and the respondent must be full-time self-employed. This definition excludes a number of types of individuals who might justifiably be considered self-employed, but it also includes people who may have been overlooked in discussions of entrepreneurship. For example, it excludes consultants who work out of their home and bill their time to companies (so-called 1099 employees). It excludes individuals who work in publicly owned firms but own side businesses that they run out of their home. It excludes those who work part-time at a business they own. On the other hand, it includes individuals like professionals in private practice—doctors, lawyers, architects—who are not typically considered entrepreneurs, but who nevertheless bear the risks of private equity ownership and work in the firms that they own.

³STATA code for producing multiple imputation-corrected standard errors following code available on the Federal Reserve website is available from the authors. See also Montalto and Sung (1996).

This definition facilitates a ready comparison to the work of Heaton and Lucas (2000), Moskowitz and Vissing-Jorgensen (2002), and Gentry and Hubbard (2001), who focus on portfolio holdings of private equity owners, as well to the work of Dunn and Holtz-Eakin (2000) and Hamilton (2000), whose primary focus is the self-employment decision. None of our main findings, however, hinge on the fact that respondents must satisfy both criteria to be called entrepreneurs. All of findings hold on both larger samples of private equity owners and self-employed individuals.

Panel A of Table 1 provides a break-down of how the SCF data match our definition of entrepreneurship. We have 13,046 survey respondents over the three survey years, of which 70% are full-time employed. Of these, 3,245 (36%) report being self-employed. This fraction could well be higher than the rate of self-employment in the overall population; this is a reflection of the fact that the survey over-samples high net-worth individuals. As Moskowitz and Vissing-Jorgensen (2002) have shown using the same data, weighting the raw respondents by the sample weights provided by the SCF makes the data representative of the U.S. population as a whole. However, since our focus is on the behavior of individuals, and not their aggregate role in the macro-economy, we focus on the unweighted data throughout the paper.

Thirty percent, or 3,930 respondents, report owning some or all of at least one privately owned business. (Some individuals report owning part of more than one business.) Combining these criteria, we arrive at 2,578 entrepreneurs in the data, roughly evenly distributed across the three sample years. This represents a little more than one quarter of the full-time employed sample, and a little better than one-sixth of the entire survey.

In Panel B we report the personal demographic characteristics of entrepreneurs. Panel C reports family characteristics. Relative to the typical respondent in the SCF, entrepreneurs are much more likely to be college-educated white males. In fact, they are almost twice as likely to have completed college than non-entrepreneurs. While the publicly available data do not have detailed information on occupational choice, we believe this reflects the fact that many of the entrepreneurs in our sample are the owners of professional service organizations in which they work.

Regardless of the outcome, it seems clear that race and gender are exogenous factors affecting the labor market choices of survey respondents. And while not completely exogenous to the labor market participation decision, educational decisions are likely to have been partly made prior to the vocational choice decision, thereby affecting the set of vocational choices available to a respondent

when they chose to enter the labor market. Although we do not observe individuals as they are about to make the decision to become entrepreneurs, it is nonetheless important to control for these exogenous factors that affect the opportunity set individuals face.

As Panel C demonstrates, the family composition of entrepreneurial households is also different than non-entrepreneurial households. Entrepreneurs are much more likely to be married than non-entrepreneurs: 83% of entrepreneurs are married, whereas only 56% of non-entrepreneurs are married. Conditional on marriage, entrepreneurs have statistically larger families than non-entrepreneurs.⁴ The spouses of entrepreneurs, however, are less likely to work in the home: the rate of employment is about three percentage points higher for the spouses of entrepreneurs than non-entrepreneurs. Twenty-eight percent of spouses of entrepreneurs report being self-employed; only 8% of the spouses of non-entrepreneurs report self-employment. As we show below, this partly reflects the fact that many small businesses are family run.

3. UNIVARIATE ANALYSIS

In this section we develop the variables that we use to measure the attitudes of entrepreneurs. We start by developing a measure of optimism and exploring its correlation with other forward-looking variables in the SCF. Then we develop a measure of non-pecuniary benefits by exploring retirement plans. Next, we examine risk tolerance. As a final step, we analyze the correlations between these three dimensions of entrepreneurship.

3.1. Measuring optimism. Our main measure of optimism involves comparing respondents' self-reported life expectancy to that implied by actuarial tables. Beginning in 1995, survey participants were asked the question "About how long do you think you will live?" The answer to this question provides one of the two key inputs to our calculation. The second key input is obtained by consulting actuarial tables known as 'life tables,' in forensic economics or demography. We discuss each of these inputs in this subsection.

⁴Conditioning on marriage makes this result more difficult to establish, since the average number of children for unmarried respondents is low.

3.1.1. *Subjective life-span.* Panel A of Table 2 tabulates responses to this question. This panel shows that entrepreneurs think they will live longer. This difference is highly statistically significant.⁵

The remainder of Panel A reports common responses for each group of respondents. Respondents were allowed to report any positive integer, but there is a great deal of clustering in the data around ages that are evenly divisible by five. The top five responses, in order of prevalence, are living to ages 80, 85, 90, 75, and 70. The rank-ordering for the responses is the same across entrepreneurs and non-entrepreneurs; entrepreneurs are just more likely to report higher values. For example, 20.29% of entrepreneurs report living until 80; only 17.6% of non-entrepreneurs report living to age 80. The fact that entrepreneurs think they will live longer across the board can be seen by comparing the t-statistic and accompanying p-value across the age spectrum. A statistically larger fraction of non-entrepreneurs reports living until 70, there is no difference in the fractions reporting death at age 75. But a greater fraction of entrepreneurs expect to live until age 80, 85, and 90.

Living to exactly 100 years old is also a fairly common response: about 7% of the sample expects to die in their centenary year. The odds of a randomly chosen working age male living to age 100 are tiny. Thus, we view this response as some combination of apathy, lack of attention, or fanciful thinking on the part of the respondent. Interestingly, entrepreneurs are less likely to report living to 100 than non-entrepreneurs; only about 6% of entrepreneurs give this response, and a t-test for the difference in proportions across groups has a value of over 3.3. We use unwindsorized values of this variable throughout our analysis, but windsorizing at 1% and 99% has no effect on our results.

3.1.2. *Statistical life-span.* We draw estimates of statistical life expectancy from a number of sources to create the most accurate possible estimate of a respondent's lifespan. These are reported in Panel B of Table 2. The third column in Panel B, labelled statistical life expectancy, summarizes the mean life expectancy for respondents based on age, gender, and race-specific life tables obtained from the National Institutes of Health. Taking the difference between this and the respondent's self report results in a level of optimism recorded in column (4). Under this measure, entrepreneurs

⁵We inspected the data by hand to ensure that this difference is not being driven by peculiar interpretations of the question. For example, if one group was disproportionately prone to respond in remaining years of life, rather than age at death, this would impart a difference in recorded life expectancies for no real reason. For instance, if all 50-year old respondents expected to live to age 80, but non-entrepreneurs answered with 30 and entrepreneurs answered with 80, then this would impart a difference where no difference existed. This does not appear to be the case.

expect to live 3.65 years longer than predicted by the life tables, whereas other individuals only expect to live 1.76 years longer than the tables. This difference is highly statistically significant.

Using age, gender and race specific life tables helps to account for the exogenous differences between entrepreneurs and other individuals, but it still leaves this optimism measure open to potential alternative interpretations. One alternative is that entrepreneurs take better care of themselves, which is reflected in their self-assessments. To account for this, we make further corrections for whether a person smokes, and what their level of education is. Our smoking and education corrections follow Richards (1999).

First we adjust the previous calculation for the differential impact of smoking on mortality. As column (5) indicates, entrepreneurs are far less likely to smoke than other individuals. About one quarter of non-entrepreneurs in the SCF report that they smoke; only 13% of entrepreneurs do. The smoking-corrected life expectancy is reported in column (6). It still demonstrates a statistically significant difference between the two groups.

We also know that education affects mortality risk (Richards, 1999). Highly educated individuals tend to hold jobs with fewer occupational hazards; this translates into longer life expectancies. To control for this effect, we made adjustments for a person's level of schooling following the tables in Richards (1999). The effect of education differs across race and gender categories: in general, it has a stronger effect for blacks and hispanics than for whites, and a stronger effect for men than women, because the former groups are more likely to find themselves in more dangerous jobs absent higher education.

The education-, smoking-, gender-, and age-corrected optimism measure is presented in the final column of Panel B. It shows that entrepreneurs expect to live about eight months longer than those who are not entrepreneurs. This difference is statistically significant.

3.2. Alternative measures of optimism. If we accept that optimism is captured by life expectancy miscalibration, the preceding analysis indicates that entrepreneurs are more optimistic than others. But before we accept this, it is useful to see how entrepreneurs compare along alternative measures of optimism.

We take this up in Table 3 by exploring two questions in the SCF that gauge attitudes toward future economic conditions. Question X301 asks "Which statement describes how you feel about

economic conditions over the next five years?” Candidate responses are “improve,” “stay the same,” or “get worse.” Panel A tabulates the fraction of entrepreneurs and non-entrepreneurs who report each of these three answers, along with a t-test of the difference in proportions across the groups. Entrepreneurs are slightly more likely to think that the economy will improve, but significantly less likely to think that economic conditions will get worse.

In contrast, Panel B reports responses to questions about expected real income growth. Specifically, question X7364 asks “Over the next year, do you expect your total income to go up more than prices, less than prices, or about the same as prices?” A similar question is asked about income growth over the last five years.

In conclusion, Table 3 helps to cement the idea that entrepreneurs are more likely to be optimistic by providing alternative measures of optimism. The evidence indicates that regarding both general economic conditions and more personal economic conditions, entrepreneurs see a brighter future than non-entrepreneurs. This holds even for those who did not experience recent gains in wealth, suggesting that it is not driven by serial correlation in income growth, or more generally, by past success.

Table 3 also helps us to understand what life expectancy miscalibration is capturing. Many psychologists when asked about optimism would hasten to respond, “Optimistic about what?” This reflects the schism in the psychology literature between dispositional optimism, which reflects healthy, positive generalized expectations of the future (Scheier, Carver, and Bridges (1994), Scheier and Carver (1985)), and optimistic bias (Weinstein, 1980), which views optimism as potentially unhealthy miscalibration in beliefs that varies from one domain to another. The results in Table 3 support the idea that life expectancy miscalibration is a proxy for dispositional optimism, which is a more generalized positive outlook. In addition, Puri and Robinson (2006) have conducted survey experiments that correlated life expectancy miscalibration to the LOT-R, which is often used in the psychology literature to assess dispositional optimism.⁶ They find that the correlation between LOT-R and life expectancy miscalibration is high, over 40%. In addition, they employ selection-corrected regression techniques to control for a variety of alternative explanations for this correlation. The correlation is robust to controls for health, demographic characteristics, genetic

⁶For some recent work using the LOT-R, see Friedman, Weinberg, Webb, Cooper, and Bruce (1995), Goodman, Chesney, and Tipton (1995), or Litt, Tennen, Affleck, and Klock (1992).

longevity, and endogenous survey participation (i.e., the fact that perhaps respondents in the survey are more optimistic than non-respondents).

3.3. Non-pecuniary benefits. Many observers have noted that entrepreneurs enjoy substantial non-pecuniary benefits from the autonomy and freedom associated with self-employment. In this section we develop a measure of non-pecuniary benefits that allows us to compare entrepreneurs to others in the economy along this dimension.

Our measure is based on respondent’s beliefs about retirement plans. As we noted earlier, the SCF asks respondents when they expect to stop working altogether. Respondents report a year in the future that typically coincides with stopping on or around their 65th birthday, however the survey allows respondents to answer “Never Stop.” About 18% of all respondents offer this as an answer. We use this as an indication that the respondent derives non-pecuniary benefits from work.

Of course, the working hypothesis here is that a respondent who intends to never retire is someone who enjoys their work. An alternative view would be that such an individual is someone who wishes to retire but cannot because of financial hardship or other obligations. However, as we show in Section 5, never intending to retire is more prevalent among the wealthy. This finding speaks against such an alternative.

Table 4 provides details on this response. First we report the overall proportion of respondents reporting they never intend to retire broken down by entrepreneurial status. A little over thirty-two percent of entrepreneurs expect to never retire, while only slightly less than fourteen percent of non-entrepreneurs expect the same. This difference is highly statistically significant. Thus, entrepreneurs are about three times as likely to report non-pecuniary benefits of employment by this measure.

Because retirement plans may be confounded by age, we also provide a breakdown by age category that allows us to test whether the sharp difference between entrepreneurs and others is driven by one age category in particular. For example, perhaps those respondents who are furthest from the retirement decision are least able to predict their retirement plans, and thus their unwillingness to retire implicitly reflects expected success in their venture. Or perhaps older respondents equate retirement with being dormant and this drives the response pattern we observe.

The breakdown reported in the remaining columns of Table 4 indicates that this is not the case. In every age category, entrepreneurs are much more likely than others to think they will never retire. While there is a significant drop off at around age 65 in the number of non-entrepreneurs expecting to never retire, this group is too small to have much affect on the overall results. Indeed, if we exclude all individuals who are at or above retirement age (statistics not reported in table), we find that 32% of entrepreneurs and 17% of non-entrepreneurs expect to not retire; this difference carries a t-statistic of over 15. Thus, taken as a whole, the results of Table 4 indicate that not only do entrepreneurs derive substantial non-pecuniary benefits from work, but that they derive substantially more non-pecuniary benefits than non-entrepreneurs.⁷

3.4. Attitudes toward risk. Differences in risk tolerance have also been offered as a potential explanation for the puzzling choices entrepreneurs make. Indeed, there is a natural connection between risk and optimism. Optimism involves forming distributions over future events based on current facts. Risk-taking involves taking actions based on these perceived distributions. The social scientist typically observes only the set of actions and the set of incomplete facts available prior to those actions. Thus, observationally, risk-taking and optimism are difficult to disentangle. However, we are able to disentangle these using questions from the SCF specifically aimed at gauging risk tolerance.

Each year respondents were asked to gauge their attitudes toward financial risk. The exact wording of the question is as follows: Which of the statements on this page comes closest to the amount of financial risk that you and your (spouse/partner) are willing to take when you save or make investments? Respondents were allowed to choose between the following four answers: Take substantial financial risks expecting to earn substantial returns; Take above average financial risks expecting to earn above average returns; Take average financial risks expecting to earn average returns; Not willing to take any financial risks. Table 5 records responses to this question according to whether or not the respondent was an entrepreneur.

Panel A reports the fraction of each type of respondent that provided each of the four possible responses to the question of perceived risk tolerance. For both categories of respondents, the

⁷We provide a crude calibration of the potential dollar value of this non-pecuniary benefit in Section 6.

median respondent reports being willing to take average risk for average returns. However, considerably more entrepreneurs perceive themselves to be risk-takers, and considerably fewer consider themselves unwilling to take risk.

Roughly twice the number of entrepreneurs as non-entrepreneurs report a willingness to take substantial or above average risk for substantial or above average return. (9.86% versus 4.46% for substantial risk, 32.28% versus 17.45% for above average risk.) At the other extreme, non-entrepreneurs are three times more likely to report being unwilling to take any financial risk: 38.7% of non-entrepreneurs report being unwilling to take any financial risk, while only 12.94% of entrepreneurs report this response.

The percentages reported in Panel A are obtained by averaging across the five implicates recorded in the SCF. (This is the appropriate procedure for obtaining point estimates from multiply imputed data.) To obtain a measure of the statistical difference between the two distributions, we compute a χ^2 test of the independence of columns and rows for each implicate. The minimum χ^2 value is 991, which is highly statistically significant. If knowing that a respondent was an entrepreneur provided no information about their risk tolerance, then the rows and columns would be independent of one another and a χ^2 test would fail to reject. A value of 991 for the χ^2 test indicates a high degree of dependence in the rows and columns. Thus, there is considerable difference in the self-assessment of risk-taking for entrepreneurs and non-entrepreneurs.

Of course, the idea entrepreneurs are risk-takers may come as little surprise. Many accounts of entrepreneurs in the popular press portray them as risk-takers, obsessively and single-mindedly pursuing the success of their company, willing to lay it all on the line for the success of their venture.

Is this portrait accurate? Panel B suggests not. It provides evidence that entrepreneurs are longer-range planners. When we combine this with the evidence from Table 1 showing that entrepreneurs have more family commitments than non-entrepreneurs, we see that this risk-taking profile is somewhat more nuanced than commonly thought.

To see this, Panel B reports the response to a survey question that asks about planning horizon. This question occurs immediately before the question on attitudes toward risk. As it shows, over 63% of entrepreneurs have planning horizons longer than five years, whereas fewer than 44% of non-entrepreneurs do. Entrepreneurs are roughly half as likely to have planning horizons of one

year or less: a total of 16.5% of entrepreneurs have such planning horizons, compared with 31.8% of non-entrepreneurs. The minimum χ^2 value obtained from the five implicates is highly significant at a value of 467, indicating that the difference in distributions across types of respondents is statistically significant.

This result speaks for the idea that entrepreneurs are not simply tolerant toward risk; they approach risk with prudence. This prudence is borne out in their longer planning horizons. The link between risk tolerance and planning horizon speaks against the notion of entrepreneurs as foolhardy risk-takers.

3.5. How are the dimensions related? To explore the potential for risk tolerance, optimism, and the enjoyment of non-pecuniary benefits to capture similar attitudes in individuals, we present evidence in Table 6 on the link between our measures of these dimensions of entrepreneurship.

In Panel A, we report the mean level of optimism for entrepreneurs and non-entrepreneurs broken down by the response to the question that elicits risk preferences. The mean optimism is roughly the same across respondents who answered “above average” and “substantial,” but differs considerably within these categories across entrepreneurship. Entrepreneurs report slightly more than 3.7 years of optimism in these two categories, while non-entrepreneurs report between 2.15 and 2.86 years of optimism.

Optimism declines as risk-tolerance falls, but the difference across entrepreneurship categories remains present. For respondents reporting a willingness to take only “average” risk, entrepreneurs report slightly less than three years of optimism, while non-entrepreneurs report 1.34 years of optimism. Non-entrepreneurs who are not willing to bear any financial risk are more pessimistic about their life expectancy than the statistical tables indicate they should be: they have a mean optimism of negative four months. On the other hand, entrepreneurs who report being unwilling to bear any financial risk are about as optimistic (1.34 years) as non-entrepreneurs who report being willing to bear average risk for average returns.

Panel B repeats Panel A but replaces optimism with non-pecuniary benefits. For each risk category, we report the proportion of respondents of each type who never intend to retire. For both entrepreneurs and non-entrepreneurs, the proportion is highest for those most comfortable

with risk. But the difference between entrepreneurs and others is consistently strong across the categories of risk tolerance.

In Panel C, we report correlations between the three variables according to entrepreneurial status. The simple correlation between risk tolerance and optimism is about 0.06 for entrepreneurs and 0.09 for non-entrepreneurs. As expected from Panel B, non-pecuniary benefits are also positively related to risk tolerance. Non-pecuniary benefits are also positively related to optimism. This effect is about three times stronger for entrepreneurs than for non-entrepreneurs.

The significance tests are suppressed for brevity, but all correlations are significantly different from zero at the 1% level. Since the units are years for optimism, a numerical score ranging from one to four for risk tolerance, and a sample proportion for non-pecuniary benefits, it is difficult to translate these correlations into economic magnitudes. Nevertheless, they do indicate that in a simple regression, variation in one of the variables would explain almost none of the variation in any one of the others.

In sum, optimism, risk tolerance and the enjoyment of non-pecuniary benefits are statistically correlated in a manner that squares with intuition. People who perceive themselves to be risk takers are more optimistic than those who perceive themselves to be averse to risk. Or, since we can make no claims on causation, we could equally well say that more optimistic people are more likely to think of themselves as risk-takers than are less optimistic people. Likewise, people who love their jobs are optimistic about the future and not afraid to take prudent financial risks. But this statistical correlation does not seem to translate into an economically meaningful relation between the two variables. Our measures of risk tolerance and optimism seem to be capturing different facets of attitudes.

4. MULTIVARIATE ANALYSIS

In the previous tables we have presented univariate evidence that entrepreneurs display greater tolerance toward risk and are more optimistic than non-entrepreneurs. In this section, we explore these issues deeper, and consider how optimism and risk tolerance explain entrepreneurship controlling for other factors.

Table 7 presents results from a Probit analysis, correcting for multiple imputation. The dependent variable is a dummy for whether the respondent is an entrepreneur. The key independent variables are measures of optimism and risk tolerance, but we also include demographic controls as well as other control variables. Point estimates are reported as the change in the probability of being an entrepreneur associated with a small change in an independent variable.

The table illustrates that optimism and risk tolerance have a statistically significant effect on whether a respondent is an entrepreneur, even controlling for a range of possible correlated factors. The coefficient on risk-loving suggests that responding “willing to take substantial risk ...” is associated with a ten to fifteen per cent greater likelihood of being an entrepreneur, all else equal.

Table 7 includes two measures of optimism. The first is simply life expectancy miscalibration, as described above. In model (1), without demographic controls, a one standard deviation increase in optimism is associated with a roughly three per cent increase in the probability of being an entrepreneur. The point estimates drop with the inclusion of additional control variables, but always remain significant. The largest p-value is .07, significant at the ten per cent level.

The second measure of optimism is labelled ‘extreme optimist.’ This is a dummy variable that takes on the value one if the respondent’s life expectancy miscalibration is two standard deviations from the mean or greater. In Puri and Robinson (2006) optimism is shown to exhibit a pronounced non-monotonic effect on many behaviors of economic interest, such as work choice, portfolio choice, and family choice. The findings indicate that in general, modest amounts of optimism are associated with prudent decision-making, while extreme optimism is associated with imprudent decisions. For example, optimists are more likely to pay off their credit card balances each month, and more likely to save because they report that they think ‘saving is a good thing to do.’ Therefore we ask here whether the optimism that we observe in entrepreneurs is more likely to be associated with prudent or foolish decisions.

Table 7 suggests that modest amounts of optimism increase the likelihood of being an entrepreneur, while extreme optimism makes it much less likely. Since the extreme optimism dummy equals one for respondents that are two standard deviations from the mean amount of optimism in the sample, the appropriate way to interpret the coefficients to obtain the total effect of being an extreme optimist is to take double the magnitude of the optimism coefficient and add the coefficient

on the extreme optimist dummy.⁸ Doing this indicates that extreme optimists are about as likely to be entrepreneurs as a randomly chosen respondent with no optimism, perhaps a little less likely, depending on the preferred specification. This echoes evidence in Table 2 that fewer entrepreneurs report extreme values of life expectancy.

Note too that including the dummy for extreme optimism magnifies the loading on the main optimism variable. In going from column (1) to (2), the point estimate on optimism jumps from 2.6% to 4.2%, a more than 50% increase.

One possible alternative explanation for these findings is that entrepreneurs are objectively healthier than others, and that this is being captured by our life expectancy miscalibration measure. To control for this, we include a dummy in columns (3) and (4) for whether the respondent reported being in excellent health. This diminishes the significance of optimism but does not drive it out.

Another possible interpretation is that optimism is driven by past success. To account for this possibility, columns (3) and (4) also include controls for net worth as well as a dummy for whether income has grown over the last five years. Each is important for explaining entrepreneurship, which indeed illustrates that success plays an important conditioning role here. But even with these controls present, entrepreneurs appear statistically more optimistic and more risk loving than others in the SCF.

Another attitude that may be important for the entrepreneurship decision is the consumption of non-pecuniary benefits. To proxy for this, we use information in the SCF on retirement plans. In particular, the SCF asks respondents when they expect to retire. One valid response is to answer “I never plan to retire.” The variable ‘never retire’ is a dummy for whether the respondent provided this response.⁹ As expected, entrepreneurship loads heavily on this dummy. Going from a 0 to a 1 increases the probability of entrepreneurship by about 15%. But even accounting for the possibility that the motivation for entrepreneurship is the consumption of private benefits, we still find that optimism and risk-taking are statistically important.

⁸While this specification may seem cumbersome, it facilitates comparison between regression specifications. By comparing columns (1) and (2) of Table 7 we see that the effect of optimism on entrepreneurship goes up once we control for the countervailing effects of extreme optimists.

⁹We obtain qualitatively identical findings using hours worked instead of expected future retirement.

The demographic controls illustrate the fact that entrepreneurs are largely white, male, college-educated respondents. Being white as opposed to black or Hispanic raises the probability of being an entrepreneur by roughly twelve percent, being male, fifteen percent. The effect of college education is smaller at about six percent, but still statistically significant. Age is statistically important, but its actual economic significance seems small.

In sum, Table 7 illustrates that risk tolerance, optimism and non-pecuniary benefits are important determinants of entrepreneurship, even controlling for a range of family, demographic, and wealth characteristics.

5. WEALTH, INHERITANCE AND ENTREPRENEURSHIP

Table 7 illustrates a relation between entrepreneurship and net worth that is consistent with the findings of many previous scholars who have noted a positive relation between wealth and entry into self-employment. However, recent work by Hurst and Lusardi (2004) has shown that this relation is highly non-linear: wealth affects entry into self-employment at high wealth levels, but at lower wealth levels, the relation is mostly flat.

Thus, one potential explanation for our findings in Table 7 is that our optimism measure is simply picking up a nonlinearity in the relation between wealth and entrepreneurship. We control for this possibility in Table 8, where we segment respondents by various wealth and liquidity measures.

First we divide respondents into two categories based on whether or not their total household net worth placed them in the upper ten percent of the wealth distribution within each survey year.¹⁰ Then within each group, we compare entrepreneurs to non-entrepreneurs. Entrepreneurs are statistically more optimistic than non-entrepreneurs in both wealth categories.

Hurst and Lusardi (2004), Blanchflower and Oswald (1998), Holtz-Eakin, Joulfaian, and Rosen (1994) and others have related inheritances to the inception and survival rates of new businesses. We also consider differences between entrepreneurs and wage earners based on whether they have received inheritances. Among both inheritance categories, entrepreneurs are more optimistic than wage earners. Perhaps surprisingly, entrepreneurs are more optimistic when they have not received a prior inheritance. This further suggests that our optimism measure is not merely capturing past

¹⁰We obtain similar differences if we divide respondents according to a wealth threshold, such as the \$300,000 suggested by Hurst and Lusardi (2004).

wealth. Finally, Hurst and Lusardi (2004) show that expected future inheritances work as well or better than past inheritances for instrumenting wealth.¹¹ When we condition on whether respondents expect to receive future inheritances, we still find that entrepreneurs are more optimistic than wage earners.

In Panels B and C of Table 8, we repeat this breakdown, but instead focus on attitudes toward risk and non-pecuniary benefits. Across wealth deciles, past and future inheritances, we see that optimists are more risk loving than others. They also appear to enjoy nonpecuniary benefits of work more than wage earners. In particular, the retirement expectations gap is strongest for wealthy entrepreneurs. This speaks against the possibility that entrepreneurs expect to retire later because they anticipate future financial hardships.

Another way to examine the role that liquidity constraints may play in business formation is to draw a distinction between those entrepreneurs who have formed businesses of their own and those who have inherited family businesses. In this section we repeat the basic multivariate analysis of Table 7 but isolate these distinct paths to entrepreneurship. This is reported in Table 9.

In the first two columns, we restrict the definition of entrepreneurship to include only those who bought or started businesses. Thus, the dependent variable is one if a respondent is an entrepreneur who bought or started a business, zero otherwise. The two columns report alternative specifications of attitudes and demographic controls.

In the third and fourth column, we focus our attention on only those entrepreneurs who inherited their businesses. Thus, the dependent variable is one if a respondent is an entrepreneur who inherited their business, zero otherwise. The two columns repeat the specifications used for bought/started a business.

The difference in the two sets of regressions is striking. In regressions that omit demographic controls, the loading on optimism is about twenty times larger for entrepreneurs who started or bought businesses than for those who inherited businesses. Optimism fades into insignificance for the inherited group when we control for demographics.

¹¹Their results are obtained on a panel of respondents in the PSID. In unreported tables, we obtain similar findings for the SCF.

The group who inherited businesses differ considerably in terms of risk tolerance as well. In general, business starters embrace risk, while business inheritors shun it. The magnitudes of the relation between risk and business inheritance is much smaller in absolute value than those for business starters, but for both groups the coefficient estimates are highly statistically significant.

As a result, business inheritance is much harder to explain with the same set of covariates that explain starting or buying businesses. The same regression model that fits about 15 per cent of the variation in starting or buying a business fits only about six per cent of the variation for business inheritance. Models without demographic controls explain only minute amounts of the variation in business inheritance. This fact, along with the differences in coefficient estimates, indicate that entrepreneurs who inherit their businesses hold vastly different attitudes than those who start businesses, and inherited self-employment is not well understood by the same vector of characteristics that explain new business inception.

6. FROM ATTITUDES TO ACTIONS

The results thus far demonstrate that the attitudes of entrepreneurs differ from wage-earners, and that these differing attitudes are especially salient for entrepreneurs who have started or bought their own businesses. In this section we ask whether these differences translate into actions.

In a recent paper, Bitler, Moskowitz, and Vissing-Jorgensen (2004) explore entrepreneurial effort and find a link between effort and firm value. In Table 10, we explore how the attitudes we have uncovered affect a respondent's allocation of time to work. To do this, we regress the reported average hours worked over the last year on the same variables used in Tables 7 and 9. We do this first focusing on all entrepreneurs, then we examine the sub-samples of business starters and inheritors.

When we focus on the entire group of entrepreneurs, we find little evidence that optimism is related to extra time spent at work. The parameter estimates for the optimism coefficients are indistinguishable from zero and flip sign depending on whether we add an extreme optimism dummy and the nonpecuniary benefits dummy. Belonging to the group that is willing to take substantial risk for substantial reward has little bearing on hours worked either.

Nonpecuniary benefits are important, however. Entrepreneurs who report that they never intend to retire work about 1.5 hours per week longer than other entrepreneurs, holding gender, race, age, wealth, education, past success, and other attitudes constant. This amounts to about a three percent increase over the mean hours worked for entrepreneurs.

To further gauge the economic significance of this number, consider a crude calibration exercise to approximate the total capitalized value of this additional work over the entrepreneur's expected work life. Assume that those entrepreneurs never intending to retire are not reimbursed for the extra 1.5 hours of work per week indicated by Table 9. The average entrepreneur is about 52 years old according to Table 2. If we consult statistical tables from Richards (1999) to obtain an estimate of expected work life, a 52 year-old worker is expected to have anywhere from 10-15 years of remaining work life, while a person at retirement age who is still working expects to work an additional 5 years—since someone who never intends to retire would presumably be working at retirement age, this provides an approximation to the appropriate number of additional years of work for such a person. The median worker in Hamilton (2000) earns \$6.84 per hour in 1984 dollars, or about \$13.40 per hour in 2006 dollars adjusting by CPI data provided by the Bureau of Labor Statistics. Annuitizing this stream of incremental income for 20 years at a discount rate of 10% produces a value of \$6563. While this is a crude calculation that probably understates the value of the non-pecuniary benefit, it is 3% of annual income for a respondent at the 90th percentile of the wealth distribution. This figure jumps to \$47,245 if we instead add in the 51 hours per week from Table 9 that the average entrepreneur works for the five extra years of expected employment. This would be appropriate if, for instance, the entrepreneur stopped drawing a salary at retirement, or if instead of salary most of the entrepreneur's income came through equity ownership in the business. These calculations, however crude, indicate that nonpecuniary benefits are likely a sizeable fraction of the median entrepreneur's total compensation from work.

Separating entrepreneurs according to whether or not they inherited their business reveals why we uncover nothing in the main regressions. Entrepreneurs who inherit their businesses show no greater propensity to work as their optimism, risk tolerance, or enjoyment of nonpecuniary benefits grow. This suggests that they do not possess the same motivations for work that are possessed by entrepreneurs who start or purchase businesses. Perhaps they enjoy their work less. While this evidence is only tangential, it supports work by Perez-Gonzalez (2006) and others who find underperformance among businesses passed down from one generation to the next.

In contrast, optimism is important for determining time spent at work among those who have founded or purchased their own businesses. Depending on the specification, a one-standard-deviation shift in optimism increases hours worked by as much as an hour per week, which is the same order of magnitude as the loading on risk tolerance (those who are willing to take substantial risk also work longer hours). Interestingly, we see a large negative loading on extreme optimism: being two standard deviations more optimistic than the average respondent in the SCF reduces hours worked by over three hours per week for business starters, all else equal. Thus, while there are relatively few extreme optimists among business starters, their actions differ substantially from others in their group.

Finally, the relation between hours worked and nonpecuniary benefits is strong for business starters as well. Respondents who report that they never intend to retire work more than five hours longer per week; this is highly statistically significant and amounts to a ten percent increase over the conditional average hours of work for business starters. Nonpecuniary benefits are clearly the strongest force driving time spent at work, but attitudes towards risk and optimism are also important.

7. CONCLUSION

Entrepreneurship is widely understood to be a key engine of growth in the U.S. economy. Yet the determinants and impediments to entrepreneurship are not well understood. In particular, the private equity premium puzzle documented by Moskowitz and Vissing-Jorgensen (2002) along with other puzzling evidence surrounding entrepreneurship raises the question, “Who are entrepreneurs?”

We address this question by examining the attitudes of entrepreneurs and the actions that are associated with these attitudes. Using the same basic data sources that Moskowitz and Vissing-Jorgensen (2002) have used to document the returns to private equity, we explore optimism, risk-taking, and other attitudes which are important components of entrepreneurial decisions. We develop a novel way of measuring optimism by comparing a survey respondent’s self-reported life expectancy to their actuarial life expectancy, controlling for factors that are known to affect a person’s lifespan. This measure allows us to relate optimism to key economic choices across a large sample of individuals in the Survey of Consumer Finances.

Entrepreneurs are more optimistic than others with similar demographic characteristics. Differences in optimism hold not only for our measure of optimism, but also for differences rooted in specific beliefs about future economic conditions. Even controlling for exogenous demographic characteristics, education, wealth, and income growth, entrepreneurs are more optimistic and more tolerant toward risk than others.

Entrepreneurs also differ from the rest of the population in terms of their attitudes toward risk and their enjoyment of private benefits. They are significantly more tolerant of risk, however this is attenuated by longer planning horizons and perhaps a greater commitment to family and life outside work. Therefore, it is hardly fitting to think of them as foolhardy risk-takers.

At the same time, entrepreneurs appear to derive substantial private benefits from self-employment, and this in turn is important for how they choose to allocate their time towards work. They are much more likely to report that they never intend to quit working than are other people with similar wealth and liquidity characteristics. Moreover, entrepreneurs who intend to never stop working work longer hours per week. This is especially true for those entrepreneurs who bought or started their own business. The fact that they never intend to stop working, and at the same time work harder today, indicates substantial satisfaction from self-employment which may not be reflected in their monetary earnings.

These findings help put issues like the private equity premium puzzle into perspective. A paternalistic policy oriented towards increasing the diversification of private equity holder's portfolios is perhaps unwarranted in light of our findings, since we show that entrepreneurs are more comfortable with risk and are generally optimistic about the future. In view of the tenuous link between wealth and business inception, policies that increase access to capital may also be unwarranted, since they are unlikely to change the core beliefs of the individuals choosing to start businesses.

The optimism that we find among entrepreneurs is difficult to characterize as foolhardy, excessive optimism. Indeed, entrepreneurs have longer planning horizons, and often have family arrangements which speak to extensive responsibilities outside the workplace. Moreover, extreme optimism, which has been linked to a wide range of imprudent decision-making, is significantly less likely to be seen among entrepreneurs.

By focusing on the very same individuals that Moskowitz and Vissing-Jorgensen (2002) and others have used to identify the private equity premium puzzle, our study sheds some light on the seemingly peculiar choices that entrepreneurs make. In that regard, our work complements, but is distinct from prior work of Arabsheibani, de Meza, Maloney, and Pearson (2000) and others that points to miscalibrated beliefs about success as a cause of excessive entry into self-employment.

Moreover, our analysis points to sharp differences between types of entrepreneurs. Entrepreneurs who start or buy businesses are considerably more optimistic and risk loving than those who have inherited businesses from their family elders. This suggests that attempts to inform policy making with empirical evidence on self-employment should take great care to control for the source of business inception when drawing conclusions about the role that various policy measures might take in changing attitudes and risk preferences.

These differences enrich our understanding of entrepreneurs but raise important policy considerations. Our findings suggest that a one-size-fits-all approach towards fostering entrepreneurship is likely to have unpredictable results, since attitudes and preferences vary widely across different types of entrepreneurs. Understanding these issues more fully may help to address important questions about the determinants of family businesses and the supply and demand for entrepreneurial organizations more generally.

REFERENCES

- Arabsheibani, G.D., David de Meza, R.J. Maloney, and B. Pearson, 2000, And a vision appeared unto them of a great profit: Evidence of self-deception among the self-employed, *Economic Letters* 67, 35–41.
- Bitler, Marianne, Toby Moskowitz, and Annette Vissing-Jorgensen, 2004, Testing Agency Theory With Entrepreneur Effort and Wealth, *Journal of Finance* 60, 539–576.
- Blanchflower, David, and Andrew Oswald, 1998, What Makes an Entrepreneur?, *Journal of Labor Economics* 16, 26–60.
- de Meza, David, and Clive Southey, 1996, The Borrower's Curse: Optimism, Finance, and Entrepreneurship, *Economic Journal* 106, 375–386.
- Dunn, Thomas, and Douglas Holtz-Eakin, 2000, Financial Capital, Human Capital, and the Transition to Self-Employment: Evidence from Inter-generational Links, *Journal of Labor Economics* 18, 282–305.
- Evans, David, and Boyon Jovanovic, 1989, An Estimated Model of Entrepreneurial Choice under Liquidity Constraints, *Journal of Political Economy* 97, 808–827.
- Evans, David, and Linda Leighton, 1989, Some Empirical Aspects of Entrepreneurship, *American Economic Review* 79, 519–535.
- Fairlie, Robert, 1999, The Absence of African-American Owned Business: An Analysis of the Dynamics of Self-Employment, *Journal of Labor Economics* 17, 80–108.
- Friedman, L.C., A.D. Weinberg, J.A. Webb, H.P. Cooper, and S. Bruce, 1995, Skin cancer prevention and early detection intentions and behavior, *American Journal of Preventive Medicine* 11, 59–65.
- Gentry, William, and Glenn Hubbard, 2001, Entrepreneurship and Household Saving, NBER Working Paper No. 7894.
- Goodman, E., M.A. Chesney, and A.C. Tipton, 1995, Relationship of optimism, knowledge, attitudes, and beliefs to use of HIV antibody testing by at-risk female adolescents, *Psychosomatic Medicine* 57, 541–546.
- Hamilton, Barton, 2000, Does Entrepreneurship Pay? An Empirical Analysis of the Returns to Self-Employment, *Journal of Political Economy* 108, 604–631.
- Heaton, John, and Deborah Lucas, 2000, Asset pricing and portfolio choice: the importance of entrepreneurial risk, *Journal of Finance* 55, 1163–1198.
- Holtz-Eakin, Douglas, David Joulfaian, and Harvey Rosen, 1994, Sticking it out: Entrepreneurial Survival and Liquidity Constraints, *Journal of Political Economy* 102, 53–75.
- Hurst, Erik, and Annamaria Lusardi, 2004, Liquidity Constraints, Household Wealth, and Entrepreneurship, *Journal of Political Economy* 112, 319–347.
- Kinneckell, Arthur B., 2000, Wealth Measurement in the Survey of Consumer Finances: Methodology and Directions for Future Research, Working paper Federal Reserve Board of Governors Federal Reserve Board, Washington, DC.
- Landier, Augustin, and David Thesmar, 2005, Financial contracting with optimistic entrepreneurs: theory and evidence, Working Paper, NYU.
- Litt, M.D., H. Tennen, G. Affleck, and S. Klock, 1992, Coping and cognitive factors in adaptation to in vitro fertilization failure, *Journal of Behavioral Medicine* 15.
- Montalto, Catherine Phillips, and Jaimie Sung, 1996, SAS Code for RII Scalar Estimation, Computer program Ohio State University <http://hec.osu.edu/people/shanna/scf/riiq.htm>.
- Moskowitz, Tobias, and Annette Vissing-Jorgensen, 2002, The Returns to Entrepreneurial Investment: A Private Equity Premium Puzzle?, *American Economic Review* 92, 745–778.

- Perez-Gonzalez, Francisco, 2006, Inherited Control and Firm Performance, *American Economic Review* forthcoming.
- Puri, Manju, and David T. Robinson, 2005, Optimism and Economic Choice, NBER Working Paper #11361.
- Puri, Manju, and David T. Robinson, 2006, Dispositional Optimism and Life Expectancy Miscalibration, Working Paper, Duke University.
- Richards, Hugh, 1999, *Life and worklife expectancies*. (Lawyers & Judges Publishing Company Tucson, AZ).
- Scheier, M. F., and C.S. Carver, 1985, Optimism, coping and health: Assessment and implications of generalized outcome expectancies, *Health Psychology* 4, 219–247.
- Scheier, M. F., C. S. Carver, and M. W. Bridges, 1994, Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A re-evaluation of the Life Orientation Test, *Journal of Personality and Social Psychology* 67, 1063–1078.
- Weinstein, Neil, 1980, Unrealistic optimism about future life events, *Journal of Personality and Social Psychology* 39, 806–820.

TABLE 1. Defining entrepreneurship in the SCF

The first row counts the total number of respondents in each year of the survey. The second row counts those whose work status is full-time employee. The third row counts those answering ‘Yes’ to the question “Do you own or share ownership in any privately-held businesses, farms, professional practices, limited partnerships or any other types of partnerships?” (Survey question x3103.) The fourth row counts appropriate responses to the question “Do you work for someone else, are you self-employed, or what?” (Survey question x4106.) The final row counts the intersection of these responses.

Panel A: Response profile				
Response	1995	1998	2001	Total
Total respondents	4,299	4,305	4,442	13,046
Full-time employed	2,936	2,982	3,159	9,077
% of total respondents	68%	69%	71%	70%
Self-employed	1,038	1,088	1,119	3,245
% of FT employed	35%	36%	35%	36%
Owens privately held businesses	1,299	1,277	1,354	3,930
% of total respondents	30%	30%	30%	30%
Owens & full-time self-employed	824	860	894	2,578
% of FT employed	28%	29%	28%	28%
Panel B: Demographics of entrepreneurship				
Non-entrepreneurs:	1995	1998	2001	Total
White	80%	78%	77.28%	78%
Male	75%	73%	74.52%	74%
Completed college	34%	34%	36.22%	35%
Entrepreneurs:	1995	1998	2001	Total
White	93%	93%	93.62%	93%
Male	96%	96%	94.29%	96%
Completed college	60%	65%	68.52%	65%
Panel C: Family characteristics of entrepreneurs				
Characteristics	Entrepreneur:			p-value
	No	Yes	$ t(diff) $	
% Married	0.55	0.82	30.18	0.00
# Kids, if married	1.01	1.17	5.66	0.00
Spouse works	37.95	40.72	3.81	0.00
Spouse self-employed	8.14	27.99	21.94	0.00

TABLE 2. Life expectancy and optimism

Self-reported life expectancy is the answer to question x7381, "About how old do you think you will live to be?" Statistical life expectancy is remaining life expectancy based on standard life table calculations available from the NIH, adjusted for gender, race, and age. (Answers are in years of age at death.) Optimism in life expectancy is the difference between the self-report and the statistical calculation, expressed in years. The final columns use mortality adjustments for smoking based on Abele and Richards, which control for differential smoking mortality rates across gender and education categories, to produce a smoking-corrected estimate of optimism. The absolute value of the t-statistic of the difference in means is reported in the third row, along with a p-value below. All statistics are corrected for multiple imputation.

Panel A: Self-reported life expectancy:							
Percentage of each group reporting age at death of x :							
	Mean	$x = 70$	$x = 75$	$x = 80$	$x = 85$	$x = 90$	$x = 100$
Non-entrepreneurs:	81.65	8.97	9.36	17.60	11.15	10.58	8.20
Entrepreneurs:	82.91	7.72	10.12	20.29	13.11	12.41	6.25
T-(difference)	5.21	2.30	0.92	2.30	2.61	2.41	3.31
p-value	0.00	0.02	0.35	0.02	0.01	0.02	0.00

Panel B: Calculating optimism:						
Life Expectancy, based on age, gender, race:						
	Age	Self-Report	Statistical	Optimism	Smoking Correction: % who smoke	Education- corrected:
Non-entrepreneurs:	49.53	81.65	80.15	1.76	25%	1.31
Entrepreneurs:	51.68	82.91	79.34	3.65	13%	2.03
T-(difference)	8.63	5.21	13.60	7.71	15.61	2.99
p-value	0.00	0.00	0.00	0.00	0.00	0.00

TABLE 3. Entrepreneurship and economic outlook

Panel A of this table reports responses to the question “Which statement describes how you feel about economic conditions over the next five years?” (X301). The three available choices are “Will improve,” “Will stay the same,” and “Will get worse”. The cell values report the fraction of entrepreneurs and non-entrepreneurs who reported each response. (Thus, the columns sum to 100%.) The final column reports a t-statistic for equality of proportions, corrected for multiple imputation. Proportions are expressed as percent.

Panel B similarly reports responses to the question “Over the next year, do you expect your total income to go up more than prices, less than prices, or about the same as prices?” (X7364). Available choices were ‘up more,’ ‘up less,’ and ‘about the same.’ We also subdivide this answer according to the answer to question X304, “Over the past five years, did your total income go up more than prices, less than prices, or about the same as prices?”

Panel A: General economic conditions				Panel B: Individual economic conditions			
Percent who think		Respondent is entrepreneur:		Percent who think		Respondent is entrepreneur:	
economic conditions:		No	Yes	that next year:		No	Yes
				t(No – Yes)		t(No – Yes)	
will improve		27.29	26.33	1.03	real income will grow	23.43	35.49
will stay the same		27.07	30.10	3.08	real income will grow if grew last five years	51.27	55.98
will get worse		45.81	43.56	2.05	real income will grow if did not grow last five years	14.45	17.54

WHO ARE ENTREPRENEURS?

TABLE 4. Retirement plans and nonpecuniary benefits of entrepreneurship

This table reports the fraction of respondents who answer the question “When do you expect to stop working altogether?” with the response, “Never retire.” The responses are broken down first by entrepreneurial status, then by age category. For each group, we first report the proportion of respondents of each category believing they will never retire, along with the standard error and the cell count. The column labelled Overall is the sample proportion across all age categories. Proportions are expressed as percent. Tests of the null hypothesis that the proportion of non-entrepreneurs is equal to the proportion of entrepreneurs is reported below.

Entrepreneur?	Stat:	Head of Household's age, x , is:						
		Overall	Below 35	$35 < x < 44$	$45 < x < 54$	$55 < x < 64$	$65 < x < 74$	Above 74
No	Mean	13.94	15.99	19.30	17.56	13.82	4.94	2.70
	se	0.339	0.750	0.844	0.839	0.908	0.598	0.495
	N	10468	2389	2186	2056	1447	1316	1074
Yes	Mean	32.20	25.95	28.92	30.62	36.13	37.68	33.68
	se	0.920	3.844	1.882	1.562	1.914	2.966	4.87
	N	2578	131	581	872	631	268	95
H_0 : Yes=No	t-stat	22.24	2.99	5.05	7.95	11.95	17.40	14.06
	p-value	0.000	0.003	0.000	0.000	0.000	0.000	0.000

TABLE 5. Attitudes toward risk

In Panel A, the first set of numbers report responses to the question “In planning your saving and spending, which of the time periods listed on this page is most important to you?” Attitudes towards risk are solicited by question x3014, “Which of the following statements comes closest to the amount of financial risk you are willing to take when you save or make investments.” Responses are of the form, “TAKE X FINANCIAL RISKS EXPECTING TO EARN X RETURNS,” where X is either ‘substantial,’ ‘above average,’ ‘average;’ a fourth alternative is ‘Not Willing to take any financial risks.’ Minimum χ^2 reports the minimum value across the five implicates of a χ^2 test for independence of rows and columns of the table.

Willing to take X financial risk:					
Entrepreneur:	Substantial	Above Avg.	Average	Not willing	Total
No	4.46	17.45	39.39	38.7	100
Yes	9.85	32.28	44.93	12.94	100
Minimum χ^2 : 991					
Which Planning Period Most Important?					
Entrepreneur:	Next Few Mos.	Next Year	Next Few Yrs.	More than 5 yrs.	Total
No	18.65	13.23	24.64	43.48	100
Yes	8.44	8.1	20.37	63.1	100
Minimum χ^2 : 467					

TABLE 6. The link between risk, optimism, and non-pecuniary benefits

Panel A presents tabulations of mean optimism according to the how much risk a respondent was willing to take for a commensurate amount of return. Panel B repeats Panel A but replaces optimism with the proportion of respondents in each category that do not intend to retire. In Panel C, correlations are presented, broken down by whether the respondent was an entrepreneur. All of the correlations presented are statistically significant from zero at the 1% level. In Panel C, “Benefits” refers to the indicator variable equalling one if the respondent never intends to retire.

Panel A: Mean optimism if willing to take X financial risk:				
Entrepreneur	Substantial	Above Avg.	Average	Not willing
No	2.15	2.86	1.34	-0.33
Yes	3.72	3.76	2.96	1.34

Panel B: Proportion never intending to retire if willing to take X financial risk:				
Entrepreneur	Substantial	Above Avg.	Average	Not willing
No	17.54	15.40	13.54	13.44
Yes	38.43	35.09	28.87	32.98

Panel C: Correlations						
	Risk	Entrepreneur:		Risk	Non-entrepreneur:	
		Optimism	Benefits		Optimism	Benefits
Risk	1.0	-	-	1.0	-	-
Optimism	.063	1.0	-	.093	1.0	-
Benefits	0.053	.067	1.0	.027	.022	1.0

TABLE 7. Who are entrepreneurs?

The table reports Probit analysis in which the dependent variable is a dummy equal to one if the respondent was full-time self-employed and owned equity in at least one privately held business. Loves risk is a dummy for whether the respondent is willing to take substantial risk for substantial return, as described in the response to the question discussed in Table 6. Optimism is the smoking-corrected bias in life expectancy as described in Table 3. Never retire is a dummy that equals one if the respondent answered “never retire” to the question, “When do you plan to retire?” This is our proxy for non-pecuniary benefits. White is a dummy for whether the respondent self-reports as Caucasian; College, a dummy for whether the respondent is a college graduate; and Married, a dummy variable for whether the respondent is currently married. Income grew is a dummy for whether the respondent reported that their income grew over the last five years. Excellent health is a dummy for whether the respondent reported being in excellent health. Net worth is measured in millions of dollars. Point estimates and p-values (reported beneath point estimates in brackets) are corrected for multiple imputation.

Explanatory variable:	Point estimates are dProb/dx, in percent			
	(1)	(2)	(3)	(4)
Optimism	0.0263 [0.0000]	0.0427 [0.0000]	0.0127 [0.0010]	0.0057 [0.0716]
Extreme optimist		-0.1179 [0.0000]	-0.0791 [0.0000]	-0.0299 [0.0313]
Loves risk	0.1614 [0.0000]	0.1597 [0.0000]	0.0954 [0.0000]	0.0814 [0.0000]
Income grew			0.1215 [0.0000]	0.0646 [0.0000]
Net worth			0.0016 [0.0000]	0.0010 [0.0000]
Never retire			0.1677 [0.0000]	0.1498 [0.0000]
Excellent health			0.1005 [0.0000]	0.0721 [0.0000]
Male				0.1531 [0.0000]
White				0.1282 [0.0000]
College				0.0591 [0.0000]
Age				0.0010 [0.0000]
Constant	-0.8651 [0.0000]	-0.8419 [0.0000]	-1.2536 [0.0000]	-2.9799 [0.0000]
R-squared	0.0111	0.0154	0.0974	0.1656

TABLE 8. Inheritance, Wealth and Attitudes

This table focuses on differences in attitudes between entrepreneurs and non-entrepreneurs controlling for past inheritance, expected inheritance, and the wealth distribution. Panel A reports mean optimism. Panel B reports the fraction of respondents who are willing to take substantial financial risk for substantial reward. Panel C reports the fraction of respondents who do not intend to retire.

Panel A: Mean Optimism						
Entrepreneur:	Top wealth decile:		Has prior		Expects	
	No	Yes	<u>inherited wealth:</u>	<u>inherited wealth:</u>	<u>inherited wealth:</u>	<u>inherited wealth:</u>
Yes	0.084	0.334	No	Yes	No	Yes
No	-0.05	0.076	-0.05	-0.06	-0.06	0.01
t(Entre-Not)	6.552	4.08	7.07	4.28	7.74	2.13

Panel B: Fraction willing to take substantial risk						
Entrepreneur:	Top wealth decile:		Has prior		Expects	
	No	Yes	<u>inherited wealth:</u>	<u>inherited wealth:</u>	<u>inherited wealth:</u>	<u>inherited wealth:</u>
Yes	0.09	0.17	No	Yes	No	Yes
No	0.04	0.10	0.04	0.04	0.04	0.05
t(Entre-Not)	12.38	2.67	11.31	8.96	13.00	5.51

Panel C: Fraction never intending to retire						
Entrepreneur:	Top wealth decile:		Has prior		Expects	
	No	Yes	<u>inherited wealth:</u>	<u>inherited wealth:</u>	<u>inherited wealth:</u>	<u>inherited wealth:</u>
Yes	0.23	0.34	No	Yes	No	Yes
No	0.11	0.15	0.11	0.09	0.11	0.11
t(Entre-Not)	19.33	5.04	17.95	12.55	20.81	6.61

TABLE 9. Starting, buying, and inheriting businesses

In columns (1) and (2) the dependent variable is a dummy equal to one if the respondent started or bought the business they operate. The dependent variable equals zero if the respondent did not start or buy, or was not an entrepreneur. In columns (3) and (4) the dependent variable equals one if the respondent inherited the business. Likewise, zero includes those who were not entrepreneurs. The independent variables are exactly as defined in Table 7. Point estimates and p-values (reported beneath point estimates in brackets) are corrected for multiple imputation.

Explanatory variable:	Entrepreneurship is defined as:			
	Bought or started		Inherited business	
	(1)	(2)	(3)	(4)
Optimism	0.0481 [0.0000]	0.0107 [0.0136]	0.0022 [0.0371]	-0.0000 [0.4842]
Extreme optimist	-0.1361 [0.0000]	-0.0316 [0.0470]	-0.0077 [0.0460]	-0.0001 [0.4937]
Loves risk	0.1641 [0.0000]	0.0978 [0.0000]	-0.0069 [0.0514]	-0.0069 [0.0060]
Never retire	0.1856 [0.0000]	0.1446 [0.0000]	0.0098 [0.0008]	0.0043 [0.0252]
Age		0.0018 [0.0000]		0.0001 [0.0179]
College		0.0645 [0.0000]		0.0024 [0.0052]
Income grew		0.0761 [0.0000]		0.0057 [0.0006]
Male		0.1955 [0.0000]		0.0112 [0.0000]
Net worth		0.0015 [0.0000]		0.0001 [0.0001]
White		0.1492 [0.0000]		0.0131 [0.0009]
Excellent health		0.0873 [0.0000]		0.0027 [0.0490]
Constant	-0.7428 [0.0000]	-2.7631 [0.0000]	-2.1434 [0.0000]	-3.8783 [0.0000]
R-squared	0.0322	0.1582	0.0055	0.0606

TABLE 10. Optimism and entrepreneurial actions

This table reports ordinary least squares regressions in which the dependent variable is the number of hours worked in a typical week over the last year. In the first three columns the sample of all entrepreneurs is used. In the second three columns, the sample is only entrepreneurs who started or bought their business. In the final three columns, the sample is entrepreneurs who inherited their businesses. Controls include age, net worth, and dummies for: college, excellent health, past income growth, male gender, and white race.

Variable:	All entrepreneurs			Started/bought business			Inherited		
Optimism	-0.0442 [0.3659]	0.0259 [0.4301]	-0.0288 [0.4222]	0.5460 [0.0132]	0.9480 [0.0004]	0.7650 [0.0032]	0.4062 [0.1803]	0.4191 [0.2103]	0.3471 [0.2530]
Extreme optimism		-0.6385 [0.1634]	-0.5922 [0.1816]		-3.7427 [0.0015]	-3.3180 [0.0040]		-0.0970 [0.4801]	-0.1567 [0.4678]
Never retire			1.5245 [0.0000]			5.0301 [0.0000]			0.9296 [0.1465]
Loves risk	0.2582 [0.2603]	0.2507 [0.2785]	0.1758 [0.3296]	1.0709 [0.0743]	1.0299 [0.0823]	0.7848 [0.1419]	1.4231 [0.2090]	1.4244 [0.2097]	1.3889 [0.2154]
Controls		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	51.7472 [0.0000]	51.8651 [0.0000]	51.8248 [0.0000]	52.0947 [0.0000]	52.2718 [0.0000]	52.2338 [0.0000]	51.4051 [0.0000]	51.4230 [0.0000]	51.3188 [0.0000]
R-squared	0.0085	0.0088	0.0112	0.0083	0.0091	0.0106	0.1013	0.1014	0.1071