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Why Do Entreprenuers Have Higher Longevity Expectations?

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Abstract. The health and lifespan of entrepreneurs not only affect their private decisions such as consumption and savings, assets transfer, life insurance and labor supply, but also their business decisions. Based on a large longitudinal data set of individuals in the United States, we find in our sample of business owners that they expect to live much longer (7.47% higher) than non business owners. Moreover, these entrepreneurs have better self-rated health, better health endowment, and are more likely to exercise frequently. In future work we will further disentangle the effects of these observable characteristics from those of unobserved heterogeneity.

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The health and lifespan of entrepreneurs not only affect their individual decisions such as consumption and savings, assets transfer, life insurance and labor supply, but also their decision making process regarding their company; for example they could be more aggressive or conservative when they run the company. Previous literature (Hurd et al., 1999; Smith et al., 2001; Hurd and McGarry, 2002; Siegel, 2003) has found that expected longevity is a good indicator of actual mortality; so it is important to understand how they form their expectations of longevity.

Using a sample from the Health and Retirement Study (HRS), one interesting observation on individual expected longevity is that entrepreneurs on average have self-reported probabilities of surviving to age 75 that are statistically higher by 7.8%. Since longevity expectation could be considered to be a function of an individual's health trajectory, this could indicate that entrepreneurs have better health than their peers. Is this just because of their entrepreneurship? Or is there any individual observed and unobserved heterogeneity that leads to this result? Intuitively, at least four underlying reasons could be considered.

Firstly, entrepreneurs are a selected sample and those in better health status may be more likely to become entrepreneurs, ceteris paribus.

Secondly, entrepreneurs could be more willing to invest in health and longer life, as part of their human capital accumulation, to reap the fruits of their efforts over a longer time period. These health investments could include better living habits, frequent exercises, and regular preventive care or routine health screening test.

Thirdly, we also observe in the data that parents of entrepreneurs tend to live longer, which indicates that entrepreneurs have better health endowment. Better health endowment will not only affect individual's health but also affect their beliefs towards their own longevity.

Finally, they could have reported a higher expected longevity because of their optimism. They might be more optimistic in general with expected longevity being one reflection of it. Although previous researchers (Ehrlich, 2000; Benítez-Silva and Ni, 2008) have made efforts to learn how to explain individual expected longevity, none has investigated which factors are the main ones that result in higher expectations on longevity for entrepreneurs compared to their peers.

This study is part of a project, which is perhaps the first empirical attempt, to disentangle the effects of different factors in explaining why entrepreneurs have higher self-reported expected longevities. Using data from the HRS, which is a biennial survey on older Americans around retirement age, we are able to perform a time-series analysis with not only observed but also unobserved heterogeneity being taken into account. Our results show that entrepreneurship alone could not explain higher expected longevity. Their better health endowment plays a more important role. Frequent exercises and optimism also have some effects on their higher expected longevity.

The rest of the paper is organized as follows: Section 1 reviews previous literature. Section 2 presents the data, which also discusses how three factors mentioned above are measured. Section 3 describes the empirical methodology we have used in this paper. Section 4 presents the results from both cross-sectional and panel analysis and Section 5 concludes our analysis.

LITERATURE REVIEW

Expected longevity has been found to be a good predictor of actual mortality (see Hurd and McGarry, 1995, 2002; Hurd et al., 1999), which not only affects individual labor supply decisions (Benítez-Silva and Dwyer, 2005, 2006; Benítez-Silva et al., 2006), but also influences their spending and savings. For entrepreneurs, their longevity expectation might affect their business decisions as well. It is therefore paramount to understand what affects older entrepreneurs' longevity expectation.

Based on our observation from the data, entrepreneurs have on average reported higher expected longevities compared to non-entrepreneurs. Why entrepreneurs have higher expected longevities could be because they have better health, or are willing to invest more in their health, or have better health endowment, which makes them believe they could live longer as their parents, or are just more optimistic, or a combination of any of these factors. In the previous literature, Blau (1987), De Witt and Van Winden (1990), Blanchflower and Meyer (1994), and Blanchflower and Oswald (1998) using data from different countries have found that economic reasons such as earnings differentials, tax, social security benefits and liquidity constraint (request for initial capital) are the driving incentives that makes an entrepreneur. IQ test scores and father's employment have been found to have positive effects on the probability of becoming an entrepreneur as well. However, there are no findings regarding whether or not better intrinsic health affects the likelihood of becoming an entrepreneur. In this study, we do not answer that question due to data limitation. Instead, we will investigate whether better intrinsic health will explain why entrepreneurs have a longer expected life.

Since Grossman (1972), health investment has been considered as part of human capital investment in the literature. It could slowdown the depreciation of health due to aging. In general, health investment includes: 1) individual living habits, such as diet, smoking and drinking; 2) frequent exercises; 3) utilization of preventive care such as flu shot, cholesterol test, routine health screening test and mammogram; 4) utilization of other health care. The last two usually depend on individual's health insurance coverage. Perry and Rosen (2001) have compared health care utilization of the self-employed and wage earners controlling for their different health insurance coverage. They find that for a number of health cares, these two groups have similar rates of utilization. Moreover, even if self-employed have a lower utilization rate for some other health cares than wage earners, the difference in their health care utilization is smaller than what could be caused by the lack of health insurance coverage. Their study suggests that self-employed individuals are able to finance their health care through ways other than health insurance. This could indicate that self-employed individuals utilize health care no less than their wage-earning peers do.

In general, the cost of health investment includes not only pecuniary costs but also time costs. Somewhat surprisingly, entrepreneurs have been found to spend much longer time working compared to their peers (see Hyytinen and Ruuskanen, 2007). This actually results in a lower time cost of health investments for entrepreneurs (Hamilton, 2000) and this could serve as an incentive for them to do more health investment. In our sample, we have noticed that entrepreneurs are more likely to do frequent exercises.

Another factor that could influence entrepreneurs' self-reported expected longevity is their optimism. Entrepreneurs have always been considered as an intrinsically optimistic group. As early as 1805, Adam Smith has pointed out that entrepreneurs are a group full of "the presumptuous hope of success ." De Meza and Southey (1996) have found that optimism could lead to a high incidence of failure among new ventures. Through comparison of entrepreneurs' expectation on their future profit with realization, Arabsheibani et al. (2000) have found that the self-employed tend to be an over-optimistic group. It would be intuitive to think that the optimism could affect entrepreneurs' expectations not only of the potential profit, but also their expectations of their current and future health. However, this optimistic bias could diminish over time with an increase in experience. Fraser and Greene (2006) use British data from 1980s to 1990s to perform their empirical analysis, and discover that although in principle entrepreneurs are more optimistic than employees are, with experience, they become less so. If this is true, the effects of optimism on older entrepreneurs' longevity expectation could be smaller than for younger entrepreneurs.

DATA

The Health and Retirement Study is a nationally representative longitudinal survey of 7,700 households as of the first wave of interviews, headed by an individual aged 51 to 61 as of 1992-93. The primary purpose of the HRS is to study the labor force transitions between work and retirement with particular emphasis on sources of retirement income and health care needs. It is a survey conducted by the Survey Research Center (SRC) at the University of Michigan and funded by the National Institute on Aging. Starting from wave 2, the data were conducted by phone using the computer-assisted technology (CATI) which allows for much better control of the skip patterns and reduces recall errors.

In the empirical work, we use the first six available waves of the HRS, which is an unbalanced panel. We construct a set of consistent variables on expected survival probability, status of entrepreneurship, financial and non-financial wealth, health, and socio-demographic characteristics, and individual attitudes which will be assigned to each decision maker appropriately. In this study, we attempt to disentangle the effect of different factors that affect individual's reported longevity expectation and discuss the factor (or factors) driving an entrepreneur's reportedly higher expected longevity. We have included measures on those factors from mainly three perspectives: health endowment, health investments, and optimism. We have restricted our sample to those individuals who are no older than 65, because the expected longevity question that we focus on in this study was only asked to them.

VARIABLES OF INTEREST

Individual expected longevities are measured by individuals' self-reports on their probability of living up to age 75 or more. In our study, entrepreneurship is defined as a dummy by individual self-reports on whether they own business, which was asked in the asset section of HRS. One reason why we define entrepreneurship this way is because we would like to exclude those who have actually retired or been unemployed but still claim they are self-employed. Farmers are excluded from the current stage of the study.

HRS has collected a large amount of information on individual health, including both subjective and objective ones. Bound (1991), Bowling (1991), and Baker et al. (2004) have demonstrated and compared different measures of health, both subjective and objective ones. We follow their suggestions to construct our health measures in this study. For example, we have measures on self-rated health and self-report on health changes, diagnosed chronic disease, Activity of Daily Living (ADLs), and self-reported health limitation. To be more specific, self-rated health is constructed as a categorical variable with value from 1 to 5, where 1 represents poor health and 5 represents excellent health respectively. Self-reported health changes are constructed in a similar pattern, with range from -2 to 2, where -2 (-1) means health getting much (little) worse, and 2 (1) represents health getting much (little) better. Our ADL indexes are constructed following the suggestion made by Wallace and Herzog (1995) and we only include questions asked consistently across waves. We have ADL indexes on mobility, use of large muscles, ADLs and IADLs. Each of these indexes takes the value 1 if the individual has difficulties in doing all that type of activities, and 0 if he or she has no difficulty performing any of them. For example, the ADL index-Mobility includes six different activities, such as running a mile, walking one block, walking multiple blocks, walk across the room, climb multiple flights of stairs, and climb one flight of stairs. Each of these activities contributes 1/6 to the index (detailed description could be found in Benítez-Silva and Ni, 2008).

In order to measure the difference in individual health investment behavior, we have constructed indicators for health insurance coverage, and dummies for whether individuals have smoking, drinking habits and whether they exercise frequently. Individual utilizations of health care, including hospital stay and doctor visits, are also incorporated in the empirical analysis, which are used as a proxy for individual demands for both treatment and preventive care. Two specific measures on individual utilization of preventive care are built as well. One of the measures is an indicator for whether the respondent took flu shot in the past two years, the other is an indicator to show whether the person had cholesterol test during the same two year period.

Individual's health endowment is measured through parents' information. We have taken into account the number of years of formal education their parents received (see discussion by Doyle et al., 2005 for parents' education effects on children's health), and whether their parents have survived until age 75 (85).

In this study, we have also used a widely used measure of individual optimism, which is asking respondents about the likelihood of being a sunny day tomorrow (as used in Lillard and Willis, 2001). However, this survey question was asked to all the interviewees only in wave 3 and wave 5. The question was not asked in earlier waves (wave 1 to 2). In wave 4 and wave 6, it was asked only to a small proportion of the HRS sample.

Summary Statistics

We have only included those who are age eligible to answer the expected survival probability question in our sample, which leads to a sample size of more than 34,000 observations. The data come from the first six waves of HRS, covering a period from year 1992 to 2002. A summary of sample statistics are shown in Table 1.

Based on the sample, entrepreneurs reported higher (7.47% higher) expected survival probability compared to their non-entrepreneur peers. This difference is tested to be statistically significant at the 1% significance level.

The sample has an average age of 57, and received 12 years of education. 34% of the sample is male, 80% are white and 74% are married at the time of interview. We have some interesting observations on the difference between entrepreneurs and their peers in mainly three different respects: their health (and expectation), health investment and optimistic attitudes.

QUALITATIVE ANALYSIS

Many researchers have addressed the effects of socio-economic gradients on individual health. Consistent with what previous literature has found (that wealthier people are usually healthier), we observe in the HRS data that entrepreneurs on average reported better health than their peers. Table 2 represents the comparison on individual health (and longevity expectation) between the sample of entrepreneurs and the sample of non-entrepreneurs. Means test results are shown in the second column.

It is clear to see that on average entrepreneurs tend to have better health than non-entrepreneurs with similar age range have. They self-rated themselves in better health, and they are less likely to have health limitations. *Chronic Disease Index* is constructed based on whether individuals have been diagnosed with any of the following eight chronic diseases: high blood pressure, diabetes, cancer, lung disease, heart disease, stroke, psychological problem, and arthritis. It takes the value one if the individual reported having been diagnosed all of the chronic disease, and takes value zero if none of the diseases was diagnosed. Its value will be increase by 1/8 if one more disease is diagnosed. The table shows that entrepreneurs have fewer diagnosed diseases. All these ADL indexes indicate that entrepreneurs have less difficulty in performing activities of daily living.

Table 1
Summary Statistics (Standard Deviation in braclets)

	Whole Sample		Entrepreneurs		Non-entreprenuers	
Observation	34,246		5,080		29,166	
Pliv75	0.650	(0.292)	0.691	(0.265)	0.643	(0.296)
Pliv85	0.458	(0.319)	0.484	(0.306)	0.454	(0.320)
Social Economic Status						
Entrepreneurship	0 148	(0 355)	1 000	(0 000)	0 000	(0 000)
Age	57 275	(5 337)	56 500	(5 707)	57 410	(5 259)
Male	0 337	(0 473)	0 366	(0 482)	0 332	(0 471)
Years of Education	12 232	(3 111)	13 147	(2 540)	12 072	(3 173)
White	0 799	(0 401)	0 918	(0 275)	0 778	(0 416)
Marry	0 739	(0 439)	0 886	(0 318)	0 714	(0 452)
Total Wealth in(1,000,000)	0 342	(1 273)	0 620	(1 365)	0 293	(1 250)
Health						
Self rated Health	3 375	(1 163)	3 722	(1 043)	3 315	(1 172)
Self reported Health Change	0 041	(0 749)	0 019	(0 675)	0 052	(0 760)
High Blood Pressure	0 419	(0 493)	0 342	(0 474)	0 432	(0 495)
Diabetes	0 128	(0 334)	0 087	(0 281)	0 135	(0 342)
Cancer	0 071	(0 257)	0 061	(0 240)	0 073	(0 260)
Lung Disease	0 086	(0 281)	0 066	(0 248)	0 090	(0 286)
Heart Disease	0 137	(0 344)	0 111	(0 315)	0 141	(0 348)
Stroke	0 035	(0 185)	0 018	(0 133)	0 038	(0 192)
Psychological Problem	0 151	(0 358)	0 107	(0 310)	0 158	(0 365)
Arthritis	0 466	(0 499)	0 416	(0 493)	0 474	(0 499)
ADL Index Mobility	0 184	(0 243)	0 133	(0 190)	0 193	(0 250)
ADL Index Muscle	0 175	(0 270)	0 114	(0 209)	0 185	(0 277)
ADL Index ADL	0 026	(0 114)	0 010	(0 070)	0 029	(0 119)
IADL	0 040	(0 107)	0 021	(0 074)	0 043	(0 111)
Self reported Health Limitation	0 241	(0 428)	0 162	(0 368)	0 255	(0 436)
Hospital Stay	0 472	(2 824)	0 317	(2 350)	0 499	(2 898)
Doctor Visit	7 511	(14 085)	5 762	(10 337)	7 815	(14 618)
Health Behaviors						
Daily Smoking	3 553	(8 087)	3 362	(8 461)	3 587	(8 020)
Daily Drinking	0 826	(1 027)	0 937	(1 000)	0 806	(1 031)
No Health Insurance	0 223	(0 416)	0 229	(0 420)	0 222	(0 416)
Frequent Exercise	0 327	(0 469)	0 374	(0 484)	0 319	(0 466)
Preventive care flu shot	0 399	(0 490)	0 366	(0 482)	0 404	(0 491)
Preventive care cholesterol test	0 708	(0 455)	0 676	(0 468)	0 712	(0 453)
Parents Information and Optimism						
Probability of Sunny Day	0 691	(0 298)	0 703	(0 285)	0 689	(0 300)
Father's Year of Education	9 133	(3 945)	10 011	(3 639)	8 972	(4 026)
Mother's Year of Education	9 410	(3 609)	10 381	(3 245)	9 234	(3 694)
Whether father survived to 75	0 423	(0 495)	0 431	(0 495)	0 421	(0 494)
Whether mother survived to 75	0 512	(0 500)	0 548	(0 498)	0 506	(0 500)

Table 2

Comparisons on Longevity Expectations and Health between Entrepreneurs and Non-entrepreneurs

Variable	T test	Entrepreneurs (1)		Non Entrepreneurs(2)	
Pliv75	(1)>(2)	0.692	(0.260)	0.644	(0.290)
Pliv85	(1)>(2)	0.485	(0.302)	0.457	(0.314)
Self-rated Health	(1)>(2)	3.719	(1.030)	3.321	(1.144)
Chronic Disease Index	(1)<(2)	0.155	(0.149)	0.198	(0.173)
Self reported Health Limitation	(1)<(2)	0.168	(0.374)	0.255	(0.436)
ADL Index-Mobility	(1)<(2)	0.124	(0.187)	0.182	(0.244)
ADL Index-Muscle	(1)<(2)	0.102	(0.203)	0.174	(0.274)
ADL Index-ADL	(1)<(2)	0.008	(0.060)	0.023	(0.106)
IADL	(1)<(2)	0.017	(0.063)	0.035	(0.096)

However, just from this table, we find it is difficult to conclude that only because of better health entrepreneurs could report a higher probability of survival. It is reasonable to think that they know they will be more likely to survive to age 75 since they invest more in their health to make it become true.

Table 3

Comparisons on Health Behaviors between Entrepreneurs and Their Peers

Variable ***Health Behaviors***	**T-test**	**Entrepreneurs(1)**		**Non-Entrepreneurs(2)**	
Daily Smoking Amount	(1)>(2)	2.919	(8.086)	2.851	(7.283)
Daily Drinking Amount	(1)>(2)	0.967	(1.056)	0.780	(1.070)
Indicator for Frequent Exercise	(1)>(2)	0.435	(0.496)	0.356	(0.479)
Health Care					
Num of Days in Hospital	(1)<(2)	0.462	(2.554)	0.825	(3.891)
Num of Doctor Visits	(1)<(2)	6.635	(12.378)	9.099	(17.082)
Indicator for Taking Flu Shot Indicator for Taking	(1)<(2)	0.463	(0.499)	0.535	(0.499)
Cholesterol Test	(1)<(2)	0.713	(0.452)	0.745	(0.436)
No Health Insurance	(1)>(2)	0.147	(0.354)	0.119	(0.323)

Table 3 compares the health investment behaviors of different group of individuals. Entrepreneurs on average smoke a little less amount of cigarettes than non-entrepreneurs do, but they drink a bit more. Besides, we do observe a statistically significant difference in whether they frequently participate in exercises. Specifically, entrepreneurs are more likely to exercise frequently. Entrepreneurs spent fewer days in hospital and visited doctors fewer times than their peers did. The last two measures could capture individual health care utilization in a mix of treatment and preventive care. Further detailed measures on preventive care (flu shot and cholesterol test) show that entrepreneurs were less likely to take preventive care than non-entrepreneurs were. No Health Insurance could measure both lack of access to health care and individual attitude towards health investment. It is interesting that we observe entrepreneurs have very similar health insurance coverage to the rest of the population. In fact, although entrepreneurs lack employer-provided or government-provided health insurance (compared to their peers), they are (twice) more likely to purchase private health insurance.

Expected survival probability is one of the individual beliefs which will undoubtedly be influenced by her (his) optimistic attitude. Table 4 below presents the comparison on individual health endowment and optimistic attitudes. In the sample, we observe that entrepreneurs' reports on the probability of sunny day tomorrow, which has been considered as a measure of optimism, are not statistically significantly different from that of their peers. However, we do find an obvious better health endowment for entrepreneurs given a higher (8% higher) proportion of their mothers have survived to at least age 75. It might be rather intuitive to believe that parents' mortality results will affect individual's belief in her or his own longevity besides affecting individual's health evolvement. On average, parents of entrepreneurs also have received higher education (refer to Table 1).

Table 4

Comparisons on Optimism and Health Endowment between Enterpreneurs and Their Peers

Variables	T-test	Entrepreneurs		Non-entrepreneurs	
Probability of Sunny Day	(1)=(2)	0.703	(0.285)	0.689	(0.300)
Whether father survived to 75	(1)>(2)	0.431	(0.495)	0.421	(0.494)
Whether mother survived to 75	(1)>(2)	0.548	(0.498)	0.506	(0.500)

In short, we have observed and tested that entrepreneurs on average have better health endowment, are healthier and more likely to exercise frequently. Further study is currently being conducted by us to disentangle the effects of these observable characteristics from those of unobserved heterogeneity.

CONCLUSION

Expected longevity of business owners is an important factor in many decision-making processes that could influence the performance and development of the business. We find in the data that entrepreneurs on average report higher (7.47%) probabilities of surviving to an older age compared to their peers who do not own business. This study is one of the first that attempts to analyze how the difference in health, health investment, health endowment, and optimism relate to higher expectancies reported by entrepreneurs.

We use a panel data set from the Health and Retirement Study, which provides us with rich information on entrepreneurs, such as their health, wealth, preference and expectations on longevity. The sample includes more than 34,000 observations at the individual level. We have discovered and statistically tested the difference in health, health endowment, and health behaviors between entrepreneurs and their peers. However, we do not observe a statistically significant difference in optimistic attitudes between the above groups of individuals. Current and future work by us will attempt to further disentangle the effects of these different factors on individual expected longevity.

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