HOW PATIENT ARE ENTREPRENEURS?

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ABSTRACT

This paper investigates the time preferences of entrepreneurs using U.S. cross section data from the 2001 Survey of Consumer Finances. The findings indicate that there is a statistically significant relationship between the rate of time preference of entrepreneurs and their age, years of education, and their degree of risk aversion. No statistically significant relationship was found between the rate of time preference of entrepreneurs and their networth and being female.

INTRODUCTION

According to the 2001 Survey of Consumer Finances, the wealth distribution of U.S. households is highly skewed. While households in the top 5 percent of the wealth distribution hold more than 50 percent of the total wealth in the economy, households in the lower half of the wealth distribution hold about 2.8 percent of total wealth.[1] At the same time, entrepreneurs[2] account for about 12.4 percent of the household population and hold 41.9 percent of total wealth. In addition, entrepreneurs account for about 51 percent of the households in the top 5 percent of the wealth distribution and about 57 percent of the wealth held by that top fifth percentile. Entrepreneurs, therefore, constitute a relatively large fraction of the very wealthy and consideration of their saving behavior is increasingly viewed as an important ingredient in models of wealth accumulation and wealth inequality (Cagetti and De Nardi, 2003).

Economic theory suggests that individuals who value the future more highly than others are more likely to make certain types of decisions today (e.g. the saving/consumption allocation problem) which ultimately involves forfeiting additional goods in the present to enjoy goods in the future. The rate of time preference measures whether individuals value current events more than future events, with a value of zero indicating indifference between present and future consumption, and larger values suggesting that individuals place less value on future consumption. Thus, as individuals save more in the current period (that is, forego present consumption), they increase their chance of higher future consumption and provide a signal about their time preference.

The frequently used assumption of a direct relationship between savings and wealth accumulation in economic theory suggests that there is an inverse relationship between the rate of time preference and the wealth of individuals. Since U.S. entrepreneurs on average, are in the upper end of the wealth distribution, the implication is that on average, these individuals have lower rates of time preference than others in the population. Moreover, based on evidence of substantial concentration in the wealth distribution of entrepreneurs (Quadraini and Rios-Rull, 1997), there is the added implication of heterogeneity among entrepreneurs with regard to their time preferences. Given these considerations, the objectives of this paper are to investigate choices by entrepreneurs that provide insights

[1] Calculations based on the 2001 Survey of Consumer Finances. The survey is publicly available from the Federal Reserve Board website at http://www.federalreserve.gov/pubs/oss/oss2/scfindex.html.

[2] In this paper, entrepreneurs are defined as those who own or share ownership in a business and have an active management role.

about they value current versus future satisfaction and to explore the relationship between indicators of time preference and the concentration of wealth.

These issues are examined based on heads of households' responses to questions about their willingness to spend when there is change in their wealth. A major focus of the empirical analysis is to test a number of hypotheses proposed by Becker and Mulligan (1997) in their theory of endogenous time preferences: (1) Age and Education reduce the rate of time preference; (2) Female gender reduces the rate of time preference; (3) Individuals with more immediate time preference are more likely to exhibit behavior that represents immediate gratification (e.g. unhealthy versus healthy activity).

The rest of the paper proceeds as follows. Section 2 discusses some results from the literature about the rate of time preference as a key concept underlying inter-temporal choices. Section 3 discusses the data and methods used in the study. Section 4 presents summary statistics on demographic, behavioral, and future-oriented variables for entrepreneurs and other households. Statistical tests and the results of econometric modeling are also discussed in this section. The paper concludes with a discussion of the implications of the results and direction for future research.

LITERATURE REVIEW AND PROPOSITIONS

The importance of intertemporal choice was recognized by Adam Smith in his argument that a nation's wealth was determined by the amount of labor allocated to the production of capital. Rae (1834) subsequently developed the time preference concept to incorporate the influence of multiple psychological motives such as the bequest and self-restraint motives as well as the influence of factors such as the uncertainty of human life. Two perspectives emerged in relation to these joint determinants of time preference. One view is that individuals care only about their immediate satisfaction and far sighted behavior is explained by the utility to be derived form future consumption, while the other view is that individuals start with equal weighting of present and future satisfaction and the preference for present satisfaction over future satisfaction reflects the relatively higher cost (pain) of abstinence compared to the benefits of future gratification.

While both perspectives highlight the role of immediate feelings in explaining intertemporal choices, they represent distinct attributes as the sources of heterogeneity in the time preferences of individuals. In the anticipation-of- pleasure approach, an individual's ability to imagine the future is critical while in the abstinence approach the discomfort of self-restraint is emphasized. A shift in focus occurred when intertemporal choice was treated as a technical decision involving the allocation of consumption over different points in time. Subsequently, Fisher (1930) formalized this analysis and identified factors such as projected wealth, risk, and foresight as important influences on the rate of time preference and the distribution of wealth.

A major shift in perspective occurred with Samuelson's (1934) formulation of the discounted utility (DU) model. In this model, one parameter---the discount rate---is used to represent the varied motives behind intertemporal choice. Thus, an individual's intertemporal utility function is specified as:

$$U^t(c_t,\ldots,c_T) = \sum_{k=0}^{T-t}\left(\frac{1}{1+\rho}\right)^k u(c_{t+k}) \quad (1)$$

where $u(c_{t+k})$ represents the individual's well-being in period $t+k$, $\left(\frac{1}{1+\rho}\right)^k$, represents the individual's discount function, that is, the relative weight attached in period t, to well-being in period $t+k$, and ρ, represents the individual's rate of time preference (discount rate).

A number of key features underlie the discounted utility model. First, the discount function is assumed to be invariant across all forms of consumption, which implies that the same rate of time preference applies to all forms of consumption. Second, the discount rate, ρ, is often assumed to be positive, suggesting that individuals are motivated to accelerate consumption towards the present. Third, it is assumed that there is consumption independence, that is, an individual's well being in period $t + k$ is independent of consumption in any other period. Fourth, it is assumed that new options are evaluated in the context of existing plans. Thus, if an individual has formed plans about future consumption streams, the evaluation of a new intertemporal choice prospect is based on a recomputed optimal plan that incorporates the new prospect.

Results from decades of empirical research on intertemporal choice have raised doubts about the validity of the key assumptions and therefore the adequacy of the discounted utility model in describing the time preference of individuals. First, there is considerable variability in estimates of the implicit annual discount rate, ranging from – 6 percent to infinity (Frederick et al., 2002). Explanation of this variability is often linked to confounding factors such as uncertainty. Second, a number of studies show that the discount rate tends to decline over time (Chapman, 1996; Pender, 1996; Thaler, 1981). Third, discount rates vary across different types of intertemporal choices. For example, gains tend to be discounted more than losses (Loewenstein, 1987; Redelmeier and Heller, 1993), and small amounts tend to be discounted more that large amounts (Fry and Myerson, 1994; Kirby and Marakovic, 1995).

Not surprisingly, these doubts about the discounted utility model have led to a resurgence of interest in the behavioral aspects of time preferences with an emphasis on the connection impatience and wealth. In particular, within the Becker and Mulligan (1977) framework, wealthier households have more to look forward to and will spend more resources looking to the future. Alternatively, impatience makes skills accumulation, savings, and other investments often associated with wealthy households less attractive. Qualitatively, then, there are reasons to believe that entrepreneurs are likely to be more patient than the median individual.

The starting hypothesis is the null hypothesis that entrepreneurs are not different from each other in relation to their rates of time preference. In addition, the following specific hypotheses will be investigated:

(A) There is no significant relationship between the wealth of entrepreneurs and their time preference rates.

(B) There is no significant relationship between the age of entrepreneurs' age and their time preferences.

(C) There is no significant relationship between entrepreneurs' years of schooling and their time preference rates.

(D) There is no significant relationship between entrepreneurs being female and their time preference rates.

(E) There is no significant relationship between the willingness of entrepreneurs to incur financial risk and their time preferences.

DATA AND METHODS

The dataset used is obtained from the 2001 Survey of Consumer Finances (SCF). The SCF is recognized as a comprehensive source of household-level balance sheet, income, and socio-economic information for a representative sample[3] of the U.S. population.

[3] A total of 4,449 households were interviewed in the 2001 SCF – 2,917 from the area probability sample and 1,532 from a special list sample. The special list sample over-samples high networth households in

Since 1983, the Federal Reserve Board, in cooperation with the Statistics of Income Division of the Internal Revenue Service, has conducted the SCF every three years. A total of 4,449 households were interviewed in 2001, but for purposes of disclosure avoidance seven observations were deleted for the public version of the data set. As a result, the final dataset consisted of 4442 households comprised of 1,188 entrepreneurs and 3,254 non-entrepreneurs. Sample weights are provided with the database to adjust each household to an estimate of its representation in the set of all U.S. households. Based on these weights the 1,188 entrepreneurs represent about 12.4 percent of the 106.5 million U.S. households in 2001.

DESCRIPTIVE STATISTICS AND STATISTICAL TESTS

Based on the sample results, entrepreneurs accounted for approximately 12.4 percent of 106.5 million U.S. households in 2001. Within the group of entrepreneurs 91.8 percent were males and 8.2 percent female. As Table 2 shows, the average age of entrepreneurs was 48.7 years and the average year of schooling was 15.2 years. In addition, a relatively high proportion of entrepreneurs is married and has college degrees. Entrepreneurs were involved in the same firm for about 17.5 years on average compared to workers, who average 8.79 years with their current firm. An average annual pre-tax income of 147,101 dollars for entrepreneurs is above the average of 62,848 dollars for workers.

Key differences between entrepreneurs and other households are evident with regard to monetary and financial variables. For example, entrepreneurs have on average more than six times the value of the nonfinancial assets and more than the debt of other households. Entrepreneurs' networth is more than five times that of workers even though the average earnings of entrepreneurs is just over twice that of workers.

Table I contains the Spearman correlations between the rate of time preference and a number of demographic and financial variables. Networth is positively related to the rate of time preference but is not statistically significant which is supportive of hypothesis A. Age is negatively and significantly related to the rate of time preference which rejects hypothesis B and is consistent with our expectation. Education is positively and significantly related to the rate of time preference which rejects hypothesis C. This finding is not consistent with our expectation. Being female is positively related to the rate of time preference of entrepreneurs but not statistically significant and is supportive of hypothesis D. Risk aversion is negatively and significantly related to the rate of time preference which rejects hypothesis E and is consistent with our expectation.

Due to the qualitative nature of the proxy for the rate of time preference variable, the chi-square test of homogeneity (or independence) was also utilized to test hypotheses C, D, and E. We believe that a cross-tabulation presents a much clearer examination of the data than a correlation coefficient would. The chi-square test of homogeneity operates under the null hypothesis of no relationship (or "independence") between the two variables of interest. Concomitantly, rejecting the null hypothesis is evidence that the two variables are significantly related. The test is one sided, with an upper bound, so that larger chi-square tests statistic values (and hence probability values below .05) would lead us to reject the null hypothesis (at a 95% level of confidence). The results of Chi-square tests of homogeneity between the rate of time preference variable and the list of variables identified in hypotheses C, D, and E were consistent with the results of the correlation analysis.

order to provide a larger basis for estimates of assets held by such households since they tend to underreport compared to other households.

CONCLUSION

Most major economic decisions are made under conditions of uncertainty and affect the future as well as the present. Optimal decisions, therefore, typically depend on a number of preference factors such as risk attitudes, exposure to uncertainty, relative tastes for work and leisure, and time preferences. A key consideration is how these types of influences on decision making are interrelated. For example, does risk aversion coincide with impatience or are they independent of each other? The findings of this paper indicate that age and risk aversion are negatively correlated with the time preference rates of entrepreneurs.

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TABLE 1: Bivariate Spearman (Nonparametric) Correlations between Entrepreneurs' Willingness to Defer Consumption and Selected Demographic and Financial Variables

	Variable	Spearman Correlation	Significant (5 %)
Time Preference	Networth	0.018	No
Time Preferance	Age	- 0.118	Yes
Time Preference	Years of Education	0.092	Yes
Time Preferance	Female	- 0.024	No
Time Preferance	Risk Aversion	- 0.075	Yes

TABLE 2: Summary Statistics of Characteristics for Heads of Households: Entrepreneurs, Non-Entrepreneurs, and Working for Others

	Non-Entrepreneurs			Entrepreneurs			Working Households		
Variable Definition		Mean	Standard Deviation		Mean	Standard Deviation	Median	Mean	Standard Deviation
Age (years)		49.0	8.67		48.7	12.74	42	42.11	11.89
Education (years of schooling)		13.31	3.33		15.21	2.7	14	13.58	2.62
Years working for current firm		6.59	9.78		17.47	13.25	5	8.79	9.48
Income ($)		58,239	186,769		147,101	402,042	48,000	62,848	101,721
Nonfinancial Assets ($)		154,332	611,581		1,007,590	3,605,922	104,200	173,750	516,470
Net Worth ($)		263,499	2,264,815		1,340,526	4,706,367	81,860	251,825	985,999
Debt ($)		45,853	85,666		118,180	224,488	33,900	65,088	106,355

%	Non-Entrepreneurs	Entrepreneurs	Working Households
Male	70.7	91.8	77.5
Married	49.6	78.2	56.3
Filed for Bankruptcy	10.4	07.1	11.0