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### Savings of Entrepreneurs

By

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## 1. INTRODUCTION

Entrepreneurs are central to many issues in economics. They are visualized as engines of growth that make innovations, create employment and wealth. Accordingly, economists have done a good deal of research on various aspects of entrepreneurship, such as on the process of entry or selection to entrepreneurship and on the characteristics of entrepreneurs. However, the literature on the saving behavior of entrepreneurs is surprisingly small. While some researchers have reported that entrepreneurs have a higher wealth accumulation rate than the rest of the population, a rigorous empirical analysis does not exist. Furthermore, assuming that these households do accumulate wealth faster, it is still not clear what part of wealth change gives us this result. Do entrepreneurial households save a higher percentage of their household income than others? Do they get rich by investing at the right time in some assets whose prices increase significantly? Or, do they inherit most of their wealth?

Given the important role of entrepreneurs in the accumulation of household wealth, answering such questions is important both for building realistic models of consumption and saving and for making informed policy decisions. A large class of calibrated models of consumption is known to be incapable of generating the extreme concentration of wealth observed in the data. Recently, it has been shown that a dynamic general equilibrium model of consumption with entrepreneurial choice can do a better job of generating a wealth distribution that is closer to reality (Quadrini 1997). Although this is a significant contribution, there is no consensus in the empirical literature on the validity of the underlying assumptions of such models, such as the assumption that the wealth of entrepreneurial households increases faster because they face liquidity constraints.

Certainly, a better understanding of the relationship between household wealth and entrepreneurship is key to understanding the role of public policy in entrepreneurship. First, financial constraints and imperfections in the capital markets are assumed to prevent some entrepreneurs with bright projects from starting a business. To alleviate these constraints, the U.S. government pays out billions of dollars annually in loans to entrepreneurs even though it is still not clear how deterrent these financial constraints are for potential entrepreneurs. Second, tax policy can have large effects both on the households' entrepreneurial choice and on the saving and investment behavior of entrepreneurs. High tax rates on the returns to entrepreneurial

activity can discourage entry and low rates can create an incentive for high-income households to establish a business. The stimulation caused by the low corporate tax rate may indeed increase entrepreneurial activity and wealth accumulation. But it may also cause high-income and high-wealth households to classify their earnings as entrepreneurial income instead of wage income, only to take advantage of tax differences (Gentry and Hubbard 2000b). Therefore, it is possible that the link between wealth and entrepreneurship is related to the tax schedule faced by workers versus entrepreneurs, and not related to any financial constraints.

In this paper, I start by verifying the finding that, in a cross-section, entrepreneurial households have both higher wealth and higher wealth-income ratios. I contribute to the literature by analyzing the saving behavior of these households in more detail. Specifically, I decompose wealth change into its active and passive components using wealth and saving data of U.S. households from the Panel Study of Income Dynamics (PSID) for the period between 1984 and 1994<sup>1</sup>. The passive part of wealth change is capital gains, whereas active saving is the amount of actual investment made. After making this decomposition, I compare the saving behavior of entrepreneurial households to that of others. Crucially, while comparing the saving rates, I control for the possible endogeneity of entrepreneurial choice to saving decision.

My findings indicate that entrepreneurial households save more out of their family income, even when investment in business assets are excluded from the saving rate definition. However, it is ambiguous if they have higher rate of wealth increase, a higher rate of return on capital or a higher ratio of inheritance to wealth. I show that the decision to own a business is endogenous to the saving rate and to the rate of capital gains on wealth, although the endogeneity is weak in some samples, especially for the capital gains regressions. Furthermore, I do not find any evidence for the claim that households save more to start a business. Finally, I do not detect endogeneity in the rate of return to wealth or in the inheritance rate regressions.

The rest of this paper is organized as follows: Section 2 reviews literature on entrepreneurship and wealth. Section 3 presents the decomposition of wealth change into its components. Section 4 defines the term “entrepreneur” and finds its empirical counterpart. Sections 5 and 6 report descriptive statistics on the income, wealth and demographic characteristics of entrepreneurial households. Section 7 tests whether entrepreneurs have higher wealth-income ratios. Longitudinal analyses are in section 8, which presents descriptive

statistics and regressions describing the saving behavior of entrepreneurs. Section 9 summarizes the results and concludes the paper.

## 2. BACKGROUND

Previous work on wealth and entrepreneurship has demonstrated that household wealth is correlated with the entrepreneurial status of that household. Several hypotheses have been built to explain why entrepreneurial households own more wealth. Many of them have the existence of liquidity constraints as their centerpiece. Inspired by the observation that personal savings and funds from friends and relatives play a crucial role in the formation of businesses, one hypothesis states that borrowing constraints select wealthy households into entrepreneurship (see Evans and Jovanovic (1989)). The idea is that starting a business requires an initial investment and external financing of this investment is limited. Therefore, only those households with sufficient internal funds are able to establish viable businesses. Businesses established by poor households will be under-capitalized; therefore they will have a lower chance of survival.

It has also been hypothesized that liquidity constraints encourage entrepreneurial households to save more. Anticipating entrepreneurial activity, households may be increasing their saving. Here, high costs of borrowing may be playing a role along with the limitations on the amount borrowed. When modeling entrepreneurial choice, Quadrini (1997) and Gentry and Hubbard (2000a) suppose that potential entrepreneurs face higher costs of external financing than for internal financing. If the business is financed completely by the household's internal funds, the cost of capital is only the opportunity cost. But when internal funds are not sufficient and external funding is required, the unit cost of debt is an increasing function of the ratio of debt to capital. In a dynamic setting, the higher cost of external finance may create an additional incentive to save for low initial wealth entrepreneurs by increasing their marginal return to saving. In fact, Quadrini (1997) shows that a calibrated model with entrepreneurs who face borrowing constraints and costly external financing does a better job than a standard life-cycle model of consumption and saving, of generating a highly skewed wealth distribution as observed in the data.

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<sup>1</sup> Although wealth data are available for the year 1999, the "Active Savings" file, which allows me to decompose

The notion that the existence of liquidity constraints is the reason behind the correlation between entrepreneurship and wealth has been challenged. Cressy (2000) demonstrates theoretically that decreasing absolute risk aversion alone can generate a positive correlation between wealth and business start-ups regardless of any borrowing constraints, in a world similar to that of Evans and Jovanovic (1989) but with uncertainty and risk aversion. Hurst and Lusardi (2001) argue that the positive correlation between wealth and entrepreneurship can be due to many reasons and “does not necessarily reflect only the fact that liquidity constraints exist and are binding.” They extend the model of Evans and Jovanovic (1989) by deriving the probability of becoming an entrepreneur implied by the model. They show that this probability, conditional on entrepreneurial ability, is an increasing and weakly concave function of wealth when the liquidity constraints are binding, but is independent of wealth when liquidity constraints are not binding. Their regression analyses based on the PSID data reveal that the effect of wealth on the probability of becoming an entrepreneur (business owner) is in fact very small for the majority of the wealth distribution. Surprisingly, only a small group of very wealthy households, namely the top 3% of the wealth distribution, drives the correlation between wealth and entrepreneurship. At lower levels of wealth, there is no effect of increasing wealth on the decision to become an entrepreneur. Their conclusion is that, entrepreneurs are wealthier because they are “different” from the rest of the population, probably in their preferences, attitudes toward risk or in their motives to save.

Meyer (1990) examines racial differences in self-employment rates and tries to explain the reasons behind the low self-employment rate among blacks. He examines liquidity constraints by estimating logit equations for who is self-employed in a cross-section and who becomes self-employed in a panel. His estimates suggest that net worth is not an important determinant of the racial differences in self-employment. He also uses the observation from small business starting capital data that little capital is needed to start most businesses. If financial constraints were decisive, one would see a greater relative representation of blacks in industries requiring less starting capital. However, the author does not see such a pattern in the data. Therefore, he concludes that there is no evidence that financial resources play a role in the transition into entrepreneurship. This is an important finding, since it goes against the perception that minority business owners are more likely to be financially constrained.

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the wealth change has not been released yet.

The empirical testing of these hypotheses on the relationship between wealth and entrepreneurship has been somewhat limited. Typically, to examine the role of initial assets on being or becoming an entrepreneur, these studies have made use of a probit type regression that expresses the probability of being or becoming an entrepreneur as a function of wealth and other individual and household variables. Using various data sources, these studies have reported a positive, large and statistically significant effect of wealth in these regressions. In their widely cited paper, Evans and Jovanovic (1989) build and test a model, in which candidates are restricted to borrow only up to a multiple of their own assets, by using data from the National Longitudinal Survey of Young Men (NLS) for 1966-81. Their model implies that there is a positive correlation between the probability of starting a business and assets if and only if there are liquidity constraints, and that entrepreneurial earnings and initial assets are positively correlated. Also, they reject an alternative hypothesis that wealthy individuals are high entrepreneurial ability individuals. Evans and Leighton (1989) examine the selection into self-employment using data from the NLS for years 1966-81 and the Current Population Survey (CPS) for years 1968-87. They find a robust relationship between the probability of switching into self-employment and net worth, which seem to support the findings of Evans and Jovanovic (1989). Another paper that reports a similar finding is Gentry and Hubbard (2000a), which uses the Survey of Consumer Finances (SCF) data in years 1983 and 1989.

One problem with these studies is that they assume household wealth is exogenous to entrepreneurial choice and therefore it is a good proxy for liquidity constraints, while in fact, wealth is an endogenous variable. A better idea would be to restrict the analysis to exogenous movements in wealth and check how the household's propensity to start a business is affected by exogenous wealth transfers. Holtz-Eakin, Joulfaian and Rosen (1994) use data on inheritances and showed that households that received such transfers were more likely to become an entrepreneur or to be more successful in entrepreneurship. They interpret their finding as an evidence of the importance of liquidity constraints, which may be true unless it merely reflects the intergenerational transfer of businesses or business ability as part of the inheritance received and not the existence of liquidity constraints.

Some authors, including Gentry and Hubbard (2000a) and Quadrini (1999), have claimed that causality not only runs from wealth to entrepreneurship, but also from entrepreneurship to wealth. They have noticed that, controlling for household characteristics,

business owners have higher wealth-income ratios than others. Based on this, they argue that entrepreneurial households must have higher saving rates. Gentry and Hubbard (2000a) report higher saving-income ratios for entrants and continuing entrepreneurs than those who leave or stay out of entrepreneurship, after controlling for all demographic variables. Although informative, these studies do not attempt to account for the possible endogeneity between the decisions to start a business and to save.

### 3. DEFINITION OF SAVING

I employ a wealth-accounting framework similar to the one used by Gittleman and Wolff (2001) in their analysis of racial differences in wealth. As in the standard two-period inter-temporal consumption choice problem, the agent chooses period one consumption to maximize the utility from consumption in periods one and two, subject to the 1<sup>st</sup>-period budget constraint

$$C_1 + I_1 = Y_1 + A_1 \quad (3.1)$$

and the wealth accumulation rule

$$A_2 = E_1[(1 + r_2)I_1 + T_{1,2}], \quad (3.2)$$

where  $C_t$ ,  $I_t$ ,  $Y_t$  and  $A_t$  are consumption, investment, income and wealth, respectively, in period  $t$ .  $T_{1,2}$  is the transfer of wealth such as inheritances, gifts and insurance settlements made to the household between periods one and two.  $E_1[\cdot]$  is the expectations operator as of period one. The average return to the portfolio of assets is represented by  $r_t$ . For simplicity, I assume that asset allocation remains unchanged from period one to two. The constraints in (3.1) and (3.2) can be combined into  $A_2 = E_1[(1 + r_2)(A_1 + Y_1 - C_1) + T_{1,2}]$ . (3.3)

Therefore, in period two, the value of wealth depends on the amount of investment made in period one, as well as on the expected values of the return to the investment and on the expected value of the wealth transfer. The change in wealth, or saving between the two periods can be written as

$$\Delta A_{1,2} \equiv A_2 - A_1 = (Y_1 - C_1) + E_1[T_{1,2}] + E_1[r_2(A_1 + Y_1 - C_1)]. \quad (3.4)$$

In this expression, the change in wealth is decomposed into three components: saving out of household income, wealth transfers and capital gains, represented by the first, second and the third terms in the above expression, respectively. The PSID collects data on various asset

holdings of households every five years. Also the amounts of investments made in major asset categories and the amount of inheritances and gifts received are asked. More information about the empirical specification of wealth components will be given later in the paper.

Using expression (3.4), the following (ex-post) rates can be defined: The rate of return on wealth is  $\Delta A_{1,2} / A_1$ , while the rate of return on capital is  $r_2(A_1 + Y_1 - C_1) / A_1$ . The rate of saving out of family income (or, shortly, the saving rate) is defined as  $(Y_1 - C_1) / Y_1$ . Finally, the inheritance-to-wealth ratio is defined as  $E_1[T_{1,2}] / A_1$ . Naturally, these rates are defined only when the denominators are positive.

#### 4. DEFINITION OF ENTREPRENEURSHIP

The term “entrepreneurship” can have quite different meanings in different contexts. Some people visualize an entrepreneur as someone who makes active business investments and creates jobs while others reserve the term for someone who is self-employed or has self-employment income. The choice of the definition of entrepreneurship is inherently linked to both the problem analyzed and the dataset used.

The PSID collects information on the business ownership as well as the employment status of the household head. Therefore, the term “entrepreneur” can be defined as someone who is self-employed or, alternatively, as someone who owns a business. In the data, business ownership and self-employment rates are very close and for the majority of the cases being a business owner corresponds to being self-employed. However, a non-negligible percentage of the population reports being one but not the other. For instance, in 1984, the business ownership rate is 13.30% while the self-employment rate is 12.36%. Among business owners, 65% report being self-employed (i.e. working for self only or working for both self and someone else), 26% report working only for someone else and the remaining 9% report being either unemployed or out of the labor force. Since the analysis in this paper is based on wealth and saving, I prefer to use the “business ownership” definition of entrepreneurship<sup>2</sup>.

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<sup>2</sup>I should mention that the PSID keeps track of households and not businesses. As a result, when a household reports being a business owner year after year, it does not necessarily mean that the household kept the same business in all those years.



## 5. WEALTH, INCOME AND ENTREPRENEURIAL STATUS

Previous work on entrepreneurship has already documented the high concentration of entrepreneurial households in the top wealth and income classes (Quadrini 1999, and Gentry and Hubbard 2000). These households own a substantial share of household wealth and income. Moreover, this share increases throughout both the wealth and the income distribution. I start my analyses by confirming this observation.

As shown in Table 1A, it is clear that business owners make up a much higher percentage of total net worth (NW) than their population share. Only 12% of the entire sample are business owners, but these households hold 42% of total net worth. The same pattern can be seen for the percentiles of wealth. For almost all wealth classes, and especially for the wealthiest, NW shares of business owners within that class exceed their population shares<sup>3</sup>. Among the richest one fifth, 30% are business owners and they own 48% of total NW in that class. Of the wealthiest 1%, 76% are business owners and their wealth makes up 84% of total NW in that percentile.

Table 1B displays a picture similar to that in Table 1A. It shows that households with businesses own a higher percentage of total income (19.9%) than their population share (12.2%). As in the previous table, a concentration of business owners in the upper income percentiles is noticeable. However, their concentration is higher in upper wealth classes than it is in upper income classes.

The high concentration of business owners in the upper wealth percentiles can not be explained only by their incomes. As shown in Table 2B, business owners have higher wealth-income ratios than others. This finding, reported also by other researchers, such as Gentry and Hubbard, and Quadrini, implies that business owners have a higher wealth accumulation rate compared to others. However, I must mention that under-reporting of income by business owners could be an issue here. Evans and Leighton (1989) caution against “taking reported self-employment earnings at face value.” Although they use a different data source, it can be a

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<sup>3</sup> The representation of business owners in total NW of the lowest wealth class really stands out. Within this class, business owners hold only 0.58% of the population, but 23% of total NW. We can attribute this to business losses since the lowest 20% of the wealth distribution hold negative NW. The same argument applies to Table 1B, in which the share of business owners in the lowest income class is notable. Within this class, total income is positive while business owners' total income is negative.

problem with entrepreneurial earnings in general. It is easy to guess that business owners under-report their income for tax evasion. But the reason could be more innocent: business owners could fail to report retained earnings.

Table 2A shows mean and median wealth and its components. As expected, households that own a business have a tremendous wealth advantage over those that do not own a business. According to the 1984 PSID data, business owners hold five times more wealth than others, in terms of both mean and median wealth. Even after taking away business wealth, the advantage of business owners remains. Asset ownership rates and asset holdings are higher among business owners, for all asset types.

In addition, portfolio compositions of entrepreneurial households and others are very different. As already mentioned in the literature (Gentry and Hubbard, 2000a), the former group holds 46% of its mean net worth in business assets, whereas the portfolio of the other group is concentrated in home equity. The poor diversification of business owners' portfolios has been related to capital market imperfections. It is possible that these portfolios remain undiversified due to a lack of complete information about other assets that the business owner would need to buy in order to diversify risk. It is also possible that their desire of control over their businesses is the cause.

## **6. CHARACTERISTICS OF ENTREPRENEURS**

Before turning to the analysis of the saving behavior of entrepreneurs, it is useful to gather some information about the characteristics of entrepreneurs. Are there any noteworthy distinctions between the entrepreneurs and others? Are entrepreneurs older and more educated than others? Are there any racial differences between the two groups?

Table 3 shows that the heads of entrepreneurial households are indeed whiter, more middle-aged and more educated relative to the heads of other households. As of 1984, an amazing 96.6% of business owners are white, therefore racial/ethnic minorities are definitely underrepresented among business owners. Household heads that are between 35 and 69 years of age make up 64% of entrepreneurs, but 39% of others.

Entrepreneurial households are mostly (83%) homeowners and almost 70% of them are made up of non-elderly married couples. Among non-entrepreneurial households, only 57% are

homeowners and 42% are non-elderly married couples. Roughly 90% of entrepreneurial household heads are employed, compared to 64% of others. Interestingly, a non-negligible percentage of entrepreneurs (9.4%) classify their labor market status as retired.

## 7. DO ENTREPRENEURS HAVE HIGHER WEALTH-INCOME RATIOS?

To test whether entrepreneurial households have higher wealth-income ratios, I estimate an equation of the following type for each of the three cross-sections, 1984, 1989 and 1994:

$$W / I_i = \alpha + \beta' E_i + \gamma' X_i + \varepsilon_i . \quad (7.1)$$

Here,  $W / I_i$  is the wealth-income ratio<sup>4</sup> of household  $i$ ,  $E_i$  is a dummy variable that is equal to one if household  $i$  is an entrepreneur and zero if not. I control for a number of household characteristics, which are collected in the vector  $X_i$ . Control variables include total household income<sup>5</sup> and its square, age of the household head and its square, the number of children in the household, as well as dummy variables for the education, sex, race and marital status of the head. Finally,  $\varepsilon_i$  is the error term.

Table 4 shows the coefficient estimates and the t-statistics for the business ownership dummy. I estimate equation (7.1) for each cross-section and for different sample selection rules. First, I include all households in the sample. The results are in column (1). Then, the sample is restricted to the households whose heads are between the ages of 22 and 65 and not retired. This is done with the purpose of eliminating the households that are not expected to be accumulating wealth. The estimates are reported in column (2). One can argue that the results of this regression are influenced by a number of households with very low or very high wealth-income

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<sup>4</sup> Theoretically, W/I ratio should be defined as the wealth-to-permanent income ratio, but with one cross-section, I have only annual income data. W/I is a noisy proxy for wealth-to-permanent income ratio since the variance of transitory income may differ across households.

<sup>5</sup> Total household income is defined as the sum of taxable and transfer incomes of Head, Wife and other family members. Some households report zero or negative total income. I assumed that their incomes are equal to one dollar when defining wealth-income ratios of such households. Zero or negative income is not very common in the data, mostly due to bottom coding of income in the PSID before 1994. For example, in 1983 only 1% of the population was in this category, of which one third were business owners. In 1994 and in later years, when the PSID accepts negative income as a legitimate value, the share of negative income is not very different. However, in those years the households that report negative income are mostly business owners (62%), as expected.

ratios. This is a possibility, since there are some households that report having negative wealth and there are also some households whose incomes are assumed to be one dollar (see footnote). In order to exclude such outliers, I truncate the top and bottom 1% of the wealth-income ratio distribution. The regression results based on this truncated sample are in column (3). From these regressions, comes a strong result: The coefficient on the entrepreneurship dummy is positive and highly significant, which means that entrepreneurs have higher wealth-income ratios than non-entrepreneurs.

## **8. DO ENTREPRENEURS SAVE MORE?**

### **a. Descriptive Statistics**

The next step of the analysis is to take a look at the changes in wealth. Tables 5A and 5B divide the sample of households into four groups, depending on their business ownership status in the beginning and end of the period for which the change in wealth is calculated, and report mean and median wealth changes for each category.<sup>6</sup> As seen in Table 5A, the group of households which started a business during the five years between 1984 and 1989 experienced the highest rate of increase in mean wealth, both in terms of the size and the percentage of the increase. Those who ended a business experienced a wealth decline. It is interesting that those who started a business are the group with the highest wealth increase, even when business assets are excluded from the wealth measure, shown in Table 5B.

Next, I analyze the components of saving. Following the method used by Gittleman and Wolff (2001), I decompose wealth change into its active saving and capital gains components. The capital gains component of wealth change accounts for the variations in the prices of assets held by the household. The active saving component, on the other hand, measures the additions to and withdrawals from the household's assets during the period of analysis. The PSID data includes active saving information for some assets, but not for all. For assets for which the amount of net inflows is known, the capital gain is calculated simply as the difference between the change in the value of the asset during the period and the net addition. For assets for which the amount of net inflows is unknown, an appropriate market-based rate of return is assigned to

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<sup>6</sup> Since wealth data are available every five years, we observe the asset ownership status of households only at a five-yearly frequency. We do not observe the transitions that took place during the period. Nor do we know exactly when the household changed its status.

capital gains. For such assets, active saving is calculated as the difference between the change in the value of the asset during the period and capital gains on the asset. Details of this procedure are given in the Appendix.

Of course, this measure of active saving does not correspond to the traditional measure of saving defined as the difference between income and consumption, since active savings can be funded by some other sources of wealth and not just family income. Inheritances, assets or debts brought into the family by persons joining the family and cashing in of annuities are possible sources of funds. In order to have a measure of saving out of one's family income, the amount of savings funded by sources other than family income need to be subtracted from active savings. This measure of saving is called "saving out of family income," or simply "savings."

Table 6 decomposes the total change in wealth (net worth) into capital gains, savings, inheritances, net inflows due to changes in family composition and net inflows from annuities. The mean and median values of each component for four categories of business ownership are reported. With the purpose of taking life-cycle factors into account and excluding the households that are expected not to accumulate wealth, the sample is restricted to households whose heads are between the ages of 22 and 65, and those whose heads are not retired. The top and bottom 1% of each saving distribution is truncated to eliminate extreme values.

According to the descriptive statistics in this table, business ownership seems to be an influential factor in determining wealth accumulation. Total change in wealth is the highest for those who start a business, followed by those who continue to have a business. Those who stay out of business ownership come next, and those who end a business are the last. Those who start a business have the highest capital gains and a quite high level of savings (out of income). Compared to the group that did not own a business in either the beginning or the end of the period, this group has considerably high levels of both capital gains and savings. Those who ended a business experienced capital losses and negative savings.

Comparing the "continue business" group to "stay out of business" group, I notice that the saving behaviors of these two groups are considerably different. Those who continue being a business owner have a higher overall wealth increase. In addition, they have the highest saving rate among all. But, surprisingly, they have experienced capital losses. Therefore, there is not

much support here for the argument that business owners get rich by earning capital gains on their business assets.

The last three items of wealth change are mostly small in magnitude in the sample, with zero median values in all of the four groups. There seems to be a difference, though, in the mean levels of inheritances received by those who stay out of business ownership and the other three groups. Those who stayed out received less in inheritances at the mean. This is because of both the smaller receipt rate and the smaller amount received. To clarify, in the 1984-89 panel, the receipt rates are 4.37% for those who stay out, compared to 9.71% for those who start a business, 12.18% for those who continue and 6.16% of those who end a business. The mean amounts of inheritances received, over those who received any inheritances, are \$65,000 for those who stay out, \$143,000 for those who start, \$142,000 for those who continue and \$85,000 for those who end a business. This link between business ownership and inheritances could be an evidence for intergenerational transmission of business ownership. As mentioned by Hurst and Lusardi (2001) and by others, many business families simply pass on their businesses to their children.

Table 7 presents the mean and median values of rates of wealth change and its components, using the same sample. All rates, except for the saving rate (out of family income), are defined as the level of the corresponding saving component divided by the initial value of wealth. The saving rate is defined as savings divided by total household income over the analysis period. Mean rates are calculated by dividing the sum of the numerator by the sum of the denominator, over all households. Median rates are based on the distribution of household rates. Naturally, household rates are defined only when the denominators are positive. Therefore, the calculation of median rates excludes households with negative initial wealth.

As in the analysis of levels of wealth changes, I detect some gaps between those who either started or continued a business and the other two groups. In general, households in the first two groups fared better than the others did. Their rates of wealth increase and their saving rates are higher, both at the mean and at the median. Those who continued a business mostly experienced quite low capital gains rates, or even capital losses. It is worth noting at this point that the business ownership classification here is based on the status in the beginning and the end of each analysis period. In other words, it is possible that the capital losses made by continuing business owners include business failures, if the households with failed businesses

opened up other businesses before the end of the period. This could also be the reason behind the low rates experienced by continuing business owners in the period 1989-94.

### **b. Regression Analyses**

To assess the effect of business ownership on wealth accumulation, I run regressions of various saving rate measures on a business ownership dummy variable and a number of demographic controls. As mentioned before, wealth data are available only every five years but business ownership indicator is available every year, therefore there are many ways in which a business ownership dummy can be defined.

In this paper, I use three different dummy variables, which I define in the following manner: The first one, “Dummy 1,” is equal to one if the household head is a business owner in all years of the analysis period and zero if he is not a business owner in any of those years. Using this definition effectively restricts the sample to households which are business owners in either all or in none of the years of the analysis period. The second one, “Dummy 2,” takes the value of one if the household did not own a business in the first year of the period but becomes a business owner sometime during the period and stays one until the end of the period, and it is set to zero otherwise. Those who report a transition into and out of business ownership during the period are assigned a zero value even if they make a transition into business ownership again before the end of the period. This definition creates a sample that is highly representative of “successful” businesses by including only the households that maintain their business ownership status over time. Another alternative is “Dummy 3,” which is equal to one if the household owns a business in any of the years of the analysis period and zero otherwise. Obviously, this definition of business ownership is the most inclusive one.

Having determined how to identify business ownership status of a household, I estimate the following equation by ordinary least squares for each definition of the dummy variable, for each saving component and for each period separately. The coefficient estimates of the business ownership dummies and their significance levels are shown in Tables 8, 9 and 10, columns I. The details of the estimation of the saving rate equation are shown in Table 14, section I.

$$Y_i = \beta' X_i + \delta' D_i + u_i . \quad (8.1)$$

Here,  $Y_i$  is the saving component, expressed as a percentage.  $X_i$  is the vector of covariates, which include age and its square, average income and its square, education and racial/ethnic dummies, number of children in the household and a new child dummy, dummies for the sex, homeownership and marital status of the household head and the employment status of the head and the wife. The value of initial wealth,  $w_i$ , is also included as a regressor. Furthermore, in the saving rate regression, I control for capital gains and the variability of household income. In the rate of wealth change regressions, I control for the variability of household income. (In the capital gains and inheritance rate regressions, none of these are controlled for.) I measure the variability of income by the log of the variance of the log of income. The argument for adding income variability as an additional regressor comes from the saving literature. The idea is that a non-negligible part of household wealth is held as a precaution against the uncertainty of income (see for instance, Carroll and Samwick (1998)). I control for capital gains in the saving rate and the rate of change in wealth regressions to account for the possibility that households adjust their savings up or down by monitoring the capital gains they are earning on their assets. Finally, in equation (8.1),  $D_i$  is the business ownership dummy as defined previously and  $u_i$  is the error term.

As the first columns in each section of Tables 8, 9 and 10 show, my estimates suggest that it is erroneous to argue that business owners have a higher rate of wealth increase than those who do not own a business. The effect of business ownership dummy is ambiguous. The coefficient estimate of the business ownership dummy variable takes different signs in different periods. Moreover, most of the estimates are not significantly different from zero. In fact, similar arguments can be made about the capital gains to wealth ratio regressions. In the case of inheritances, the coefficient estimates are indistinguishable from zero in most regressions. These findings are surprising, since previous evidence lead us to expect positive and significant coefficient estimates. Apparently, differences in saving components between business owners and others, indicated earlier by descriptive statistics, disappear once the effects of all other factors are accounted for.

What emerges from these regression analyses, though, is some evidence in support of the hypothesis that business owners save more out of their family income than others do. In almost



all regressions, I find positive and statistically significant effects for the business ownership dummy.

To summarize, multivariate analyses of saving differences between the households that are business owners and others show that the former save more out of their family income controlling for household characteristics, income, income variability and initial wealth, over the periods of analysis. However, in this sample, there is no strong evidence in favor of the hypothesis that they have higher rates of return on capital or higher rates of wealth increase<sup>7</sup>.

### *Controlling for Endogeneity*

The set of estimates that I have just reported measure the effect of starting a business on the saving behavior. However, it is possible that saving rates influence business ownership decisions. First of all, entrepreneurial households may increase their saving in anticipation of a business opportunity, which may require them to make a down payment. Second, it may be the case that households use unanticipated increases in wealth, such as capital gains on property or receipts of lump-sum money such as gifts or inheritances to pay for the cost of a business. Third, business investment is part of household saving by definition and entrepreneurial households may become richer than others via their businesses, all else remaining the same.

In any case, it is plausible that the decision to start a business is endogenous to the decision to save. From an econometric point of view, this can be considered as an omitted variable problem, which causes the business ownership decision to be correlated with the saving decision of the household. Therefore, a better way to express the relationship between the saving component and the business ownership decision is to write one equation for the saving component and another one for the possibly endogenous business ownership decision. The idea here is to treat the “starting business” dummy as an endogenous variable and control for its endogeneity in the regressions.

With this change, the system of equations takes the following form:

$$Y_i = \beta_1' X_i + \delta_1 D_i + u_i$$

$$D_i^* = \beta_2' X_i + \alpha_1 FATH_i + u_{2i} ,$$

$$D_i = \begin{cases} 1, & \text{if } D_i^* > 0 \\ 0, & \text{if } D_i^* \leq 0 \end{cases} .$$

Here, the decision to become a business owner is determined by the value that the latent variable  $D_i^*$  takes. Since all independent variables in the first equation also exist in the second equation, I add to the second equation  $FATH_i$ , a dummy variable that indicates whether the household head's father is a businessman, in order to identify the saving component equation.

There is one further complication here. Initial wealth is used in the  $D_i^*$  equation to control for any cash constraints that households face. Some people would argue rightfully that wealth is endogenous to the decision to start a business and that we need to use a more exogenous source of funding than household net worth in this equation. In response to this, I have decided to use either inheritances or insurance settlements (or their total) received by the households one year before the analysis period as an instrument for initial wealth. For instance, in the saving rate regression that covers the 1984-1989 period, I use the sum of inheritances and insurance settlements received in 1983 as an instrument for 1984 net worth. I make the choice between inheritances and insurance settlements based on the significance of these variables in the wealth regression.

Therefore, the system of equations to estimate can be written as the following<sup>8</sup>.

$$Y_i = \beta_1' X_i + \delta_1 D_i + u_{1i} \quad (8.2.a)$$

$$D_i^* = \beta_2' X_i + \alpha_1 FATH_i + u_{2i} , \quad (8.2.b)$$

---

<sup>7</sup> Clearly, these results hold for the mean household in each regression sample. Needless to say, the effects are not additive over samples, since the mean household in the rate of wealth increase regression is not necessarily the same household in the rate of return to capital regression or in the saving rate regression.

<sup>8</sup> Here, I show the specification for the saving rate regression only. For the other regressions, the specification is mainly the same, except for the income variability and capital gains variables, as mentioned before.

$$D_i = \begin{cases} 1, & \text{if } D_i^* > 0 \\ 0, & \text{if } D_i^* \leq 0 \end{cases} \quad (8.2.c)$$

$$w_i = \beta_3' X_i + \gamma_1 FATH_i + \gamma_2 INH_i + u_{3i} \quad (8.2.d)$$

In this system, equation (8.2.a) is the same as in (8.1). Equation (8.2.b) explains the “starting a business” latent variable,  $D_i^*$ , in terms of a set of factors, which contains all variables in  $X_i$ , initial household wealth and a dummy variable,  $FATH_i$ , that is equal to one if the household head’s father is a businessman and zero otherwise. I use  $FATH_i$  as an exclusion restriction to identify equation (8.2.a). The next equation, (8.2.c), represents the binary characteristic of the variable  $D_i$ . The last equation is the reduced form expression of initial wealth. As mentioned before, I use  $INH_i$  as an instrument for household wealth. Crucially, the error terms,  $u_1$ ,  $u_2$  and  $u_3$  are assumed to be jointly normally distributed with zero means and arbitrarily correlated among themselves.

What I am mainly interested in is the estimation of  $\delta_1$  in equation (8.2.a), which is complicated by the endogeneity bias introduced by the dummy variable,  $D_i$ . The parameter  $\delta_1$  measures the effect of starting a business on the saving component, however the ordinary least squares estimate of  $\delta_1$  will be biased since the error terms  $u_1$  and  $u_2$  are correlated. This happens when some unobservable characteristics of those who have a high saving component are correlated with the unobservable characteristics of those who start a business. For instance, there could be an unobservable “self-control” variable, which could make the household head more likely to save and to become a business owner. In this case,  $u_1$  and  $u_2$  would be positively correlated.

To estimate this system, I start by accounting for the endogeneity of initial wealth in equation (8.2.b). To do this, I run ordinary least squares regression on equation (8.2.d) and save the residuals,  $\hat{u}_3$ . Then, I estimate equation (8.2.b) by probit regression, using  $\hat{u}_3$  as an additional regressor. The estimates of equations (8.2.d) and (8.2.b-c) are shown in Table 13.

Following these, I estimate equation (8.2.a). To account for the endogeneity bias caused by the dummy variable  $D_i$ , I estimate this system by using the two-step estimation method pioneered by Heckman and later derived in the broader context of simultaneous models with

censored endogenous regressors by Vella (1993). The steps involved are: (1) Estimation of equations (8.2.b) and (8.2.c), with the additional regressor  $\hat{u}_3$ , by probit regression, and the derivation of the generalized residuals vector,  $\hat{u}_2$ .<sup>9</sup> (2) Addition of generalized residuals as a regressor to equation (8.2.a) to obtain equation (8.3) and the estimation of (8.3) by ordinary least squares.

$$Y_i = \beta' X_i + \delta_1 D_i + \lambda' \hat{u}_{2i} + u_{1i} \quad (8.3)$$

This procedure yields consistent estimates of  $\delta_2$  and  $\lambda$ . The estimate of  $\delta_2$  shows the effect of becoming a business owner on the saving behavior, controlling for the endogeneity of the business ownership decision. To illustrate the meaning of  $\lambda$ , let's proceed as follows. The equation I am estimating is the following:

$$E(Y_i | D_i) = \beta' X_i + \delta_1 D_i + E(u_{1i} | D_i).$$

When the two error terms are correlated, the value that  $u_1$  takes depends on the value that  $D_i$  takes. Furthermore, when  $u_1$  and  $u_2$  are jointly normally distributed, the expectation has a particular form:  $E(u_{1i} | D_i) = (\sigma_{1,2} / \sigma_2^2) E(u_{2i} | D_i) = \lambda' \hat{u}_{2i}$ , where  $\sigma_{1,2}$  is the correlation coefficient between  $u_1$  and  $u_2$ , and  $\sigma_2^2$  is the variance of  $u_2$ .<sup>10</sup> I can rewrite the above as:

$$E(Y_i | D_i) = \beta' X_i + \delta_1 D_i + \lambda' \hat{u}_{2i}$$

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<sup>9</sup> The generalized residual vector in the probit model takes the form  $\frac{[D_i - \Phi(\gamma' Z_i)]\phi(\gamma' Z_i)}{[1 - \Phi(\gamma' Z_i)]\Phi(\gamma' Z_i)}$ , where  $\phi(\cdot)$  and

$\Phi(\cdot)$  are the probability density function and the cumulative distribution function of the standard normal distribution evaluated at the probit estimates of  $\gamma$ , the matrix  $Z$  includes all regressors.

<sup>10</sup> Since the coefficient of the generalized residual is  $\sigma_{1,2} / \sigma_2^2$ , a t-test on this coefficient is equivalent to a test of correlation between the two error terms and therefore a test of endogeneity.

The estimates of  $\delta_1$  and  $\lambda$  are shown in Tables 8, 9 and 10, columns II. A comparison of the results in columns (I) and (II) of these tables yields some interesting findings. In the rate of return to wealth and the inheritance rate regressions the sign of the business ownership dummy is invariant to the addition of the generalized residual vector. Furthermore, the estimate of  $\lambda$  is not significant in most regressions. As a result, the addition of the generalized residual vector to these regressions is not fully warranted. A single-equation model, as in (8.2.a), is more justifiable than a two-equation model in these cases.

On the other hand, in the rate of return on capital regressions, the coefficient on  $D_i$  turns from positive to negative once the effect of endogeneity is controlled for. That is, households that become business owners have lower capital gains-to-wealth ratios, after correcting for the endogeneity bias. Although the correction factor is not statistically significant in all cases, its effect on the sign of business ownership dummy variable is persistent. That households use capital gains toward setting up their new businesses, or that the newly-established businesses experience capital appreciation can explain the endogeneity.

In the saving rate regressions, when endogeneity is taken into account the magnitude of the coefficient on  $D_i$  becomes larger, however the addition of the correction factor lowers the degree statistical significance of the estimates of  $\delta_1$  and  $\lambda$ . Therefore, the single-equation model is more appropriate. One also wonders if investing in businesses is what generates the positive and significant coefficient estimate for  $D_i$  in the saving rate regressions. To test this, I rerun these regressions after excluding investment in businesses from the saving rate definition and present my estimates in Table 11. As expected, the magnitude of  $\delta_1$  becomes smaller, since a major part of saving has been dropped. With the new definition of the saving rate, statistical significance of  $\delta_1$  estimate depends on the period of analysis and the definition of the business ownership dummy. In the longer period, 1984-1994, only one out of my three estimates are different from zero. This shows us that investment in business assets is an important part of saving for business owner households.

Another question that I would like to answer is whether the households that save more out of their income become business owners later. To answer this question, I run probit regressions that explain the probability of becoming a business owner. I restrict my sample to households that have no business experience during 1984-1989 period. In the two versions that I

tried, I estimate the probability of starting a business in 1990, and in 1990 or 1991. All variables previously mentioned in the text are included as regressors. As seen in Table 12, saving out of family income does not have an effect on the probability of starting a business. Controlling for capital gains, inheritances and other factors as shown in the table, or using saving rates instead of saving levels do not change the results. In all cases, I fail to find a link from saving to the likelihood of starting a business. Therefore, I conclude that households do not save more to become business owners as argued in the literature. Rather, it is the case that business owner households save more.

### *Specification Issues*

I would like to mention that my findings are quite robust to specification changes. My general finding is under different specifications, the positive sign and the high significance of the coefficient on business ownership dummy in the saving rate regression remain unaffected. In the other regressions, the signs of some coefficient estimates change but the significance levels stay the same.

It is striking how the coefficient estimates change when the sample is selected differently. The only difference in the samples used to estimate (8.1) with Dummy 1 and Dummy 2 is that in the first one, business ownership continues throughout the analysis period while in the second one, it starts sometime after the first year. Although this is not an enormous change, the estimates are considerably different, with the exception of those in the saving rate regressions. This makes the robustness of results in the rates of return on wealth and on capital regressions questionable, both here and in the literature. The reason is that there is substantial variation in these rates among households, even after truncating the highest and lowest 1% of each distribution. Therefore the estimates depend somewhat on the sample selection rule and on the period analyzed.

Finally, for better exposition, in Tables 13 and 14, I present detailed results of estimation of equations (8.1) through (8.5). I select saving rate as the dependent variable, since it is the variable of major interest in this paper. Many parameter estimates have the anticipated signs, but few of them are statistically significant. In the saving rate regressions, average income plays an important role in determining saving out of income. Also, the number of children has a significant effect. The negative coefficients on the number of school-age children seem to

support the conjecture that large families save less, rather than the conjecture that these families have higher saving rates due to increased incentives to save for kids' college. In the business ownership probit regressions, race, sex and marital status of the household head are the significant determining factors, along with the number of children in the household. Initial household wealth has a positive and highly significant effect on the probability of starting a business in all three probit regressions.

## **9. SUMMARY AND CONCLUSION**

The importance of understanding the saving behavior of entrepreneurs is clear. This group of households owns a substantial part of aggregate household wealth in the United States. Previous work in this area has reported that entrepreneurial households have higher wealth-income ratios and therefore they save more. The concept of saving in these studies has been the rate of wealth increase, but not much attention was paid on the components of the wealth change. As far as I know, this is the first paper that asks whether entrepreneurial households save more out of their income or their wealth increase is mostly due to capital gains or wealth transfers, such as inheritances.

In this paper, I compare the savings of entrepreneurs to others by testing whether business owner households have higher components of wealth change than other households. To do this, I decompose the total wealth change of a household into active savings and capital gains. Then, I derive a measure of saving out of family income by subtracting the wealth change components that do not originate from family income, such as inheritances and changes in wealth due to changes in family composition, from active savings. I perform the tests using data from the Panel Study of Income Dynamics for five and ten-year panels over the period from 1984 to 1994.

My analyses show that business owner households do save more out of their family income. This finding is robust to various definitions of business ownership and changes in specification. This is a new result. Although previous studies found that entrepreneurial households have higher saving rates, they defined saving as the change in wealth and not as saving out of family income.

Surprisingly, I do not find strong support for the hypothesis that business owner households have higher rates of wealth increase when compared to households that never own a business, which contradicts the results in the literature. Also, in these samples it is ambiguous whether business owners have higher rates of capital gains. These can be explained partly by the high variance in the data of rates of return on wealth and on capital, which causes the estimates of the effect of business ownership to depend on the sample selection rule. In the case of inheritances, I, once again, do not find any evidence for a higher inheritance-to-wealth ratio for business owner households. Inheritances are received in large amounts but by a small percentage of the households in the sample. Although many of the recipients are business owners (either at the time or about to become), the difference disappears in the regression analyses. It appears that, although business owners save more out of their income, there is substantial variation in capital gains (or losses) and wealth transfers, which ultimately produce substantial variation in the changes in wealth.

The literature on wealth and entrepreneurship claims that entrepreneurial households save more than other households because they have to overcome liquidity constraints to establish a business. However, in my analyses I do not find such evidence. Instead, the evidence favors the idea that households that are already business owners save more than others, either because they invest in their businesses or their businesses appreciate in value or both<sup>11</sup>.

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<sup>11</sup> I do not argue here that financing constraints are not important at all. In fact, they can be crucial for the establishment of large businesses. However, as mentioned by Meyer (1990), many households start entrepreneurship with a small business, which probably requires very little initial capital. If they become successful, they expand the business and sell it to acquire a more capital intensive business.



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Table 1A: Business owners' share in population and total wealth in 1984 by wealth percentiles:

			Business owners' share in	
			population (%)	total wealth (%)
Overall			12.20	42.26
Wealth Percentile	1-20		0.58	23.09
	20-40		1.08	2.74
	40-60		5.71	6.48
	60-80		9.39	9.01
	80-100		30.60	48.92
		80-90	18.02	16.68
		90-95	30.64	28.48
		95-99	50.36	48.87
	99-100	76.81	83.96	

Table 1B: Business owners' share in population and total income in 1984 by income percentiles:

			Business owners' share in	
			population (%)	total income (%)
Overall			12.20	19.94
Income Percentile	1-20		2.90	-38.84
	20-40		4.55	6.01
	40-60		7.81	9.51
	60-80		10.64	12.35
	80-100		21.42	29.18
		80-90	13.75	16.18
		90-95	22.54	23.92
		95-99	30.80	32.91
	99-100	55.07	60.85	

Source: Author's calculations using the 1984 PSID data.

Note: See the Appendix for the definition of household wealth.

Table 2A: Mean and Median Values of Wealth and its Components in 1984 and Asset Ownership Rates; Business Owners vs. Others (in thousand dollars):

	Business Owners				Others			
	Mean	Median	% with asset	Share in NW	Mean	Median	% with asset	Share in NW
Wealth (NW)	295.6	149.0	-		56.1	24.0	-	
House Value	72.6	60.0	83.25	24.54	35.1	20.0	56.79	62.55
Mortgage Principal	19.4	5.5	55.37	6.56	9.8	0.0	33.68	17.41
Real Estate	50.5	0.0	43.09	17.09	8.5	0.0	16.79	15.20
Business	136.1	40.0	100.00	46.03	0.0	0.0	0	0.00
Stocks	17.1	0.0	39.24	5.79	5.7	0.0	22.81	10.18
Checking/Saving	22.3	6.0	93.33	7.53	10.8	1.5	79.02	19.19
Debt	3.4	0.0	47.59	1.16	1.6	0.0	46.12	2.88
Other Savings	9.1	0.0	35.09	3.07	2.6	0.0	21.69	4.65
Wealth (excluding businesses)	159.6	83.0	-	53.97	56.1	24.0	-	

Source: Author's calculations using the 1984 PSID data.

Notes: Mean and median values are in thousand 1984 dollars, computed over the entire sample. "Share in NW" is the ratio of the sample mean of each portfolio item to the sample mean of NW.

Table 2B: Mean and Median Values of Household Wealth, Income and Wealth-Income ratio in 1984; Business Owners vs. Others (1984 dollars):

	Business Owners		Others	
	Mean	Median	Mean	Median
Wealth	\$295,627	\$149,000	\$56,095	\$24,000
Income	\$40,109	\$32,200	\$21,541	\$18,000
W / I	7.37	4.63	2.60	1.33

Source: Author's calculations using the 1984 PSID data.

Note: The mean (median) value of W/I is calculated as mean (median) household wealth in the sample divided by mean (median) household income in the sample.

Table 3: Composition of Business Owners versus Others, in percentages, and Mean and Median Household Incomes:

	1984		1989	
	Business Owners	Others	Business Owners	Others
<b>Race/Ethnicity</b>				
White	96.63	82.06	92.72	82.27
Black	1.41	14.38	2.39	14.58
Latin American	1.60	2.95	3.25	1.96
Others	0.36	0.61	1.64	1.18
<b>Age group</b>				
<25	2.64	9.52	1.96	4.72
25-34	19.20	26.62	16.66	22.77
35-49	40.42	22.99	46.95	36.37
50-61	24.12	16.16	18.25	13.91
62-69	6.89	9.48	9.57	9.36
70+	6.73	15.24	6.6	12.86
<b>Education</b>				
<High	17.66	30.86	13.9	22.18
High School	32.59	35.54	25.61	33.71
Some college	21.82	16.62	24.48	20.7
College Grad.	27.92	16.98	36.01	23.41
<b>Housing Tenure</b>				
Homeowner	83.25	56.81	84.16	62.6
Renter	16.75	43.19	15.84	37.4
<b>Family Type</b>				
<65 yrs, Married with Children	44.37	25.39	37.86	26.29
<65 yrs, Married, No Children	25.42	17.16	30.19	20.63
<65 yrs, Fem.Head with Children	2.03	9.19	1.09	7.3
65+ yrs, Married	7.74	8.33	9.24	8.62
65+ yrs, Female Head	1.60	10.26	3.28	8.33
65+ yrs, Male Head	1.02	2.03	0.8	1.89
Others	17.81	27.65	17.55	26.95
<b>Labor Market Status</b>				
Working	87.05	64.59	87.16	69.13
Unemployed <sup>(1)</sup>	1.02	5.41	0.72	4.1
Retired	9.42	17.71	9.86	19.08
Other	2.51	12.29	2.26	7.69

Source: Author's calculations using the 1984 and 1999 PSID data.

Notes: Classifications are made according to the characteristics of the household heads.

<sup>(1)</sup> "Unemployed" includes those who are looking for work and those who are temporarily laid off.

Table 4: Testing Whether Entrepreneurial Households Have Higher Wealth-Income Ratios; Estimation of Equation (7.1):

		(1)	(2)	(3)
<b>Year:</b> <b>1984</b>	Coefficient	12362	8086.9	4.05
	t-statistic	8.17	7.4	30.85
	N	6911	5594	5484
	R <sup>2</sup>	0.0279	0.0413	0.2834
<b>1989</b>	Coefficient	12914	12278	2.39
	t-statistic	5.95	4.75	27.32
	N	7112	5760	5646
	R <sup>2</sup>	0.0078	0.0063	0.3373
<b>1994</b>	Coefficient	12084	13967	3.53
	t-statistic	4.21	3.98	18.11
	N	6499	5188	5086
	R <sup>2</sup>	0.0035	0.0041	0.1567

Source: Author's calculations using the PSID data, years 1984, 1989 and 1994.

Notes: "Coefficient" and "t-statistic" are for the business ownership dummy variable. Samples in regressions (1) include all households. Samples in regressions (2) and (3) exclude the households whose heads are younger than 22 or older than 65. In regressions in columns (3) top and bottom 1% of the wealth distribution is truncated. All regressions include control variables, which are total household income and its square, age of the household head and its square, the number of children in the household, dummy variables for the education, sex, race and marital status of the head.

Table 5A: Mean and median change in wealth between 1984 and 1989  
(in 1994 dollars):

		1984 Wealth	1989 Wealth	Δ Wealth	Total % Change	Annual % Change
No business	Mean	71,809	99,159	27,350	38.09	0.07
	Median	32,807	43,623	3,994	32.97	0.06
Started business	Mean	95,397	189,268	93,871	98.40	0.15
	Median	57,055	138,639	45,383	142.99	0.19
Ended business	Mean	232,209	228,037	-4,173	-1.80	0.00
	Median	113,454	89,637	-13,418	-20.99	-0.05
Continued business	Mean	315,939	389,283	73,344	23.21	0.04
	Median	223,227	262,935	25,454	17.79	0.03

Table 5B: Mean and median change in wealth (excluding business assets) between 1984 and 1989 (in 1994 dollars):

		1984 Wealth	1989 Wealth	Δ Wealth	Total % Change	Annual % Change
No business	Mean	69,863	97,009	27,146	38.86	0.07
	Median	32,807	43,026	4,001	31.15	0.06
Started business	Mean	85,812	135,690	49,879	58.12	0.10
	Median	52,847	86,888	19,955	64.41	0.10
Ended business	Mean	115,958	152,032	36,073	31.11	0.06
	Median	81,145	89,637	14,434	10.47	0.02
Continued business	Mean	170,487	234,570	64,083	37.59	0.07
	Median	111,257	151,307	28,033	36.00	0.06

Source: Author's calculations using the 1984-1989 PSID data.

Note: The "business ownership" definition of entrepreneurship is used here. Trimmed longitudinal sample is used, see Appendix for details. "Annual % change" is the  $x$  in the formula  $(1 + x)^5 = 1 + z$ , where  $z$  is the "Total % change" in the period.

Table 6: Mean and Median Values of Saving Components, by Business Ownership Categories (in thousand 1994 dollars):

	1984-89			1989-94		
	Mean (\$)	Median (\$)	% of mean in total change (%)	Mean (\$)	Median (\$)	% of mean in total change (%)
<b>No Business Ownership</b>						
Total Change	31.2	5.2	100.0	24.0	4.8	100.0
Capital Gains	13.6	0.0	43.6	7.3	0.0	30.5
Savings out of Income	11.5	4.3	36.9	15.2	4.0	63.3
Inheritances	2.4	0.0	7.7	2.6	0.0	10.8
Net Inflows due to $\Delta$ Comp	4.5	0.0	14.4	-0.1	0.0	-0.4
Net Inflows from Annuities	-0.8	0.0	-2.5	-1.0	0.0	-4.3
<b>Start Business</b>						
Total Change	109.1	49.1	100.0	102.8	55.4	100.0
Capital Gains	70.4	14.9	64.5	59.6	34.1	57.9
Savings out of Income	37.0	27.8	33.9	34.3	25.1	33.4
Inheritances	6.8	0.0	6.2	6.1	0.0	5.9
Net Inflows due to $\Delta$ Comp	-1.8	0.0	-1.7	3.3	0.0	3.2
Net Inflows from Annuities	-3.2	0.0	-3.0	-0.4	0.0	-0.4
<b>End Business</b>						
Total Change	20.5	-12.7	100.0	6.2	-4.8	100.0
Capital Gains	-8.3	-14.3	-40.6	-16.3	-14.0	-263.1
Savings out of Income	-9.3	4.2	-45.6	15.4	12.4	249.1
Inheritances	6.9	0.0	33.6	5.2	0.0	83.9
Net Inflows due to $\Delta$ Comp	2.3	0.0	11.5	1.0	0.0	16.7
Net Inflows from Annuities	28.9	0.0	141.2	0.8	0.0	13.4
<b>Continue Business</b>						
Total Change	81.0	34.6	100.0	61.1	38.9	100.0
Capital Gains <sup>(1)</sup>	-8.6	-5.3	-10.6	-38.2	3.0	-62.6
Savings out of Income	86.1	38.0	106.4	99.5	30.4	163.0
Inheritances	6.4	0.0	7.8	4.3	0.0	7.1
Net Inflows due to $\Delta$ Comp	-1.1	0.0	-1.3	-0.2	0.0	-0.3
Net Inflows from Annuities	-1.8	0.0	-2.3	-4.4	0.0	-7.2

Source: Author's calculations using the 1984-1989 and 1989-1994 PSID data.

Notes: Categories are determined by the business ownership status of the household in the beginning and the end of the analysis period. Sample selection: Sample includes households whose heads remain the same over the analysis period. Households whose heads are younger than 22, older than 65 or retired are excluded from the sample. Top and bottom 1% of each saving distribution is truncated.

(1) For this group of households, mean and median capital gains are -22.3 and -7.1 thousand dollars, respectively, on business assets and 13.7 and 1.8 thousand dollars on other assets in the 1984-89 period. In the 1989-94 period, the mean and median capital gains on business assets are -2.5 and -4.9 thousand dollars, respectively, on business assets and -35.7 and 7.9 thousand dollars on other assets.

Table 7: Mean and Median Rates of Change in Wealth and Its Components, by Business Ownership Categories:

	1984-89		1989-94	
	Mean (%)	Median (%)	Mean (%)	Median (%)
<b>No Business Ownership</b>				
Rate of Wealth Increase	47.29	30.92	33.43	23.86
Rate of Return on Capital	23.62	0.00	11.03	0.00
Saving Rate	6.22	2.63	11.51	3.21
Inheritances-Wealth	3.23	0.00	2.47	0.00
Net Inflows from Family Comp.Changes-Wealth	-0.36	0.00	-0.34	0.00
Net Inflows from Annuities-Wealth	0.52	0.00	-0.76	0.00
<b>Start Business</b>				
Rate of Wealth Increase	150.65	118.43	109.92	124.95
Rate of Return on Capital	95.67	45.79	62.10	60.13
Saving Rate	14.67	10.61	20.99	8.32
Inheritances-Wealth	5.75	0.00	2.85	0.00
Net Inflows from Family Comp.Changes-Wealth	-1.62	0.00	0.05	0.00
Net Inflows from Annuities-Wealth	0.20	0.00	-0.33	0.00
<b>End Business</b>				
Rate of Wealth Increase	6.73	-22.77	-15.67	-14.31
Rate of Return on Capital	-4.29	-19.65	-25.78	-33.24
Saving Rate	-1.76	1.32	1.65	6.51
Inheritances-Wealth	1.32	0.00	1.20	0.00
Net Inflows from Family Comp.Changes-Wealth	-0.18	0.00	-0.31	0.00
Net Inflows from Annuities-Wealth	-9.74	0.00	0.03	0.00
<b>Continue Business</b>				
Rate of Wealth Increase	57.82	29.05	-2.17	18.53
Rate of Return on Capital	26.12	-0.23	-10.91	1.32
Saving Rate	20.72	13.25	8.31	9.32
Inheritances-Wealth	2.52	0.00	0.50	0.00
Net Inflows from Family Comp.Changes-Wealth	-0.75	0.00	-0.42	0.00
Net Inflows from Annuities-Wealth	0.35	0.00	-0.42	0.00

Source: Author's calculations using the 1984-1989 and 1989-1994 PSID data.

Notes: All rates are expressed as percentages. Saving rate is saving out of family income divided by average family income during the five-year period. All other rates are defined as the ratio to initial wealth. Mean values are computed as the total for the numerator divided by total for the denominator. Household rates (except for the saving rate) are defined only if initial wealth is positive. Categories are determined by the business ownership status of the household in the beginning and the end of the analysis period.

Sample selection: Sample includes households whose heads remain the same over the analysis period. Households whose heads are younger than 22, older than 65 or retired are excluded from the sample. Top and bottom 1% of each saving rate distribution is truncated.

(1) In this group, in the 1989-94 period, mean and median rates of capital gains on business assets (for those with positive business assets) were -25.28% and -16.99% respectively. Mean and median rates of capital gains on non-business assets were -1.03% and 1.85% respectively, in the same period.



Table 8: Estimation of equations (8.1) and (8.3), 1984-1989:

		Dummy 1				Dummy 2				Dummy 3			
		I		II		I		II		I		II	
		Eqn. (8.1)		Eqn. (8.3)		Eqn. (8.1)		Eqn. (8.3)		Eqn. (8.1)		Eqn. (8.3)	
		Coeff.	t	Coeff.	t	Coeff.	t	Coeff.	t	Coeff.	t	Coeff.	t
<b>Rate of Change in Wealth</b>	D	-36.89	-0.69	23.61	0.13	253.067	2.23	1517.706	1.70	88.8334	1.61	-608.938	-2.95
	v hat			-19.86	-0.19			-679.886	-1.54			443.816	3.27
	N	2054		2054		2048		2048		2780		2780	
	R <sup>2</sup>	0.06		0.06		0.0918		0.0942		0.0711		0.0795	
<b>Capital Gains to Wealth Ratio</b>	D	15.66	0.78	-34.86	-0.37	95.391	2.59	-195.067	-0.58	35.31807	1.69	-269.359	-2.76
	v hat			33.47	0.67			154.5861	0.87			192.963	2.84
	N	2068		2068		2055		2055		2780		2780	
	R <sup>2</sup>	0.04		0.04		0.0393		0.0396		0.0314		0.0413	
<b>Saving Rate</b>	D	12.80	4.79	37.10	2.99	11.00	5.33	36.12	2.92	5.38201	4.90	14.8213	2.01
	v hat			-13.12	-2.00			-13.34	-2.04			-5.7203	-1.31
	N	3049		3049		3086		3086		3899		3899	
	R <sup>2</sup>	0.09		0.10		0.09		0.10		0.0634		0.0658	
<b>Inheritance Rate</b>	D	-1.9E-03	-2.2E-03	2.16	0.96	5.1216	1.79	13.1688	0.68	1.471036	1.66	3.2865	1.19
	v hat			-1.31	-1.05			-4.3111	-0.44			-1.136	-0.72
	N	2086		2086		2081		2081		2808		2808	
	R <sup>2</sup>	0.012		0.011		0.0159		0.0157		0.0091		0.0087	

Source: Author's calculations using the 1984-89 panel of the PSID data, see the Appendix for a description.

Notes:

Sample selection: Samples are restricted to households whose heads are the same throughout the periods of analysis. Households whose heads are younger than 22, older than 65 or retired are excluded. Top and bottom 1% of each saving component distribution is truncated.

"Coeff." and "t" are coefficient estimates and t-statistics for the business ownership dummy variable and the generalized residual. All regressions include the demographic controls mentioned in the text.

Standard errors are adjusted for heteroskedasticity.

Table 9: Estimates of equations (8.1) and (8.3), 1989-1994:

		Dummy 1				Dummy 2				Dummy 3			
		I		II		I		II		I		II	
		Eqn. (8.1)		Eqn. (8.3)		Eqn. (8.1)		Eqn. (8.3)		Eqn. (8.1)		Eqn. (8.3)	
		Coeff.	t	Coeff.	t	Coeff.	t	Coeff.	t	Coeff.	t	Coeff.	t
<b>Rate of Change in Wealth</b>	D	-48.53	-0.98	-220.97	-1.62	172.03	1.79	1594.18	1.42	0.28578	0.01	-577.92	-3.03
	v hat			131.54	1.74			-717.59	-1.32			370.208	3.07
	N	2054		2054		1988		1988		2777		2777	
	R <sup>2</sup>	0.03		0.04		0.0512		0.0526		0.0338		0.041	
<b>Capital Gains to Wealth Ratio</b>	D	20.16	0.65	-176.11	-1.69	93.011	1.33	-285.359	-0.76	0.65107	0.03	-311.03	-3.10
	v hat			130.95	2.16			190.811	1.07			199.896	3.26
	N	2055		2055		1989		1989		2777		2777	
	R <sup>2</sup>	0.02		0.02		0.02		0.0198		0.0173		0.0222	
<b>Saving Rate</b>	D	4.25	1.57	9.17	0.74	7.19	2.37	51.55	2.66	3.2273	2.41	17.157	1.61
	v hat			-2.98	-0.45			-22.33	-2.30			-8.5711	-1.32
	N	3023		3023		2985		2985		3869		3869	
	R <sup>2</sup>	0.02		0.02		0.03		0.03		0.018		0.0174	
<b>Inheritance Rate</b>	D	-1.30	-1.61	-5.45	-1.85	-0.0743	-0.05	-7.9427	-0.50	-0.5458	-0.86	-4.9023	-2.22
	v hat			2.56	1.59			3.9808	0.52			2.77514	2.05
	N	2079		2079		2015		2015		2805		2805	
	R <sup>2</sup>	0.0016		0.0026		0.0023		0.002		0.0012		0.0023	

Source: Author's calculations using the 1989-94 panel of the PSID data, see the Appendix for a description.

Notes:

Sample selection: Samples are restricted to households whose heads are the same throughout the periods of analysis. Households whose heads are younger than 22, older than 65 or retired are excluded. Top and bottom 1% of each saving component distribution is truncated.

"Coeff." and "t" are coefficient estimates and t-statistics for the business ownership dummy variable and the generalized residual. All regressions include the demographic controls mentioned in the text.

Standard errors are adjusted for heteroskedasticity.

Table 10: Estimation of equations (8.1) and (8.3), 1984-1994.

		Dummy 1				Dummy 2				Dummy 3			
		I		II		I		II		I		II	
		Eqn. (8.1)		Eqn. (8.3)		Eqn. (8.1)		Eqn. (8.3)		Eqn. (8.1)		Eqn. (8.3)	
		Coeff.	t	Coeff.	t	Coeff.	t	Coeff.	t	Coeff.	t	Coeff.	t
<b>Rate of Change in Wealth</b>	D	165.46	0.98	-339.87	-0.82	286.675	0.90	198.187	0.12	51.3852	0.45	-1039	-2.39
	v hat			309.23	1.06			46.6596	0.06			703.01	2.37
	N	1272		1272		1282		1282		2044		2044	
	R <sup>2</sup>	0.09		0.09		0.0985		0.0978		0.0867		0.0905	
<b>Capital Gains to Wealth Ratio</b>	D	142.92	2.07	-154.34	-0.79	117.498	0.92	-735.42	-1.04	119.944	1.72	-348.3	-1.26
	v hat			170.95	1.45			449.281	1.15			302.62	1.62
	N	1269		1269		1278		1278		2044		2044	
	R <sup>2</sup>	0.01		0.01		0.0062		0.0062		0.0101		0.0124	
<b>Saving Rate</b>	D	12.64	4.45	19.35	2.35	2.60	1.26	10.80	1.05	2.63659	2.94	20.099	4.26
	v hat			-5.02	-1.20			-4.29	-0.84			-10.77	-3.64
	N	1854		1854		1880		1880		2783		2783	
	R <sup>2</sup>	0.09		0.11		0.06		0.06		0.0489		0.0642	
<b>Inheritance Rate</b>	D	0.70	0.15	-21.29	-1.36	2.8454	0.55	27.8968	1.01	1.9462	0.66	-26.2	-2.06
	v hat			13.43	1.20			-13.246	-1.04			17.867	2.01
	N	1282		1282		1297		1297		2064		2064	
	R <sup>2</sup>	0.0128		0.0159		0.0124		0.0121		0.011		0.014	

Source: Author's calculations using the 1984-94 panel of the PSID data, see the Appendix for a description.

Notes:

Sample selection: Samples are restricted to households whose heads are the same throughout the periods of analysis. Households whose heads are younger than 22, older than 65 or retired are excluded. Top and bottom 1% of each saving component distribution is truncated.

"Coeff." and "t" are coefficient estimates and t-statistics for the business ownership dummy variable and the generalized residual. All regressions include the demographic controls mentioned in the text.

Standard errors are adjusted for heteroskedasticity.

Table 11: Saving rate regressions; all three periods and three dummy definitions; saving rate excludes investment in business assets

		Dummy 1				Dummy 2				Dummy 3			
		I		II		I		II		I		II	
		Eqn. (8.2.a)		Eqn. (8.3)		Eqn. (8.2.a)		Eqn. (8.3)		Eqn. (8.2.a)		Eqn. (8.3)	
		Coeff.	t	Coeff.	t	Coeff.	t	Coeff.	t	Coeff.	t	Coeff.	t
<b>Saving Rate 1984-89</b>	D	7.79	3.23	26.95	2.31	4.30	2.61	28.26	2.64	2.1633	2.14	1.4949	0.25
	v hat			-10.61	-1.70			-12.73	-2.23			0.3856	0.11
	N	3049		3049		3081		3081		3900		3900	
	R <sup>2</sup>	0.06		0.07		0.07		0.08		0.0456		0.0452	
<b>Saving Rate 1989-94</b>	D	1.78	0.70	4.01	0.35	3.1848	1.23	50.692	2.52	1.996	1.54	13.499	1.30
	v hat			-1.54	-0.24			-23.92	-2.35			-7.0779	-1.11
	N	3022		3022		2986		2986		3869		3869	
	R <sup>2</sup>	0.02		0.02		0.0251		0.0283		0.0186		0.0163	
<b>Saving Rate 1984-94</b>	D	5.83	2.23	13.87	2.17	-0.16	-0.10	5.59	0.59	0.5462	0.67	11.757	1.73
	v hat			-5.78	-1.78			-3.02	-0.63			-7.138	-1.71
	N	1851		1851		1877		1877		2783		2783	
	R <sup>2</sup>	0.06		0.07		0.05		0.05		0.0532		0.0553	

Source: Author's calculations using PSID data, see the Appendix for a description.

Notes to Tables 11 and 12:

Sample selection: Samples are restricted to households whose heads are the same throughout the periods of analysis. Households whose heads are younger than 22, older than 65 or retired are excluded. Top and bottom 1% of each saving component distribution is truncated.

“Coeff.” and “t” are coefficient estimates and t-statistics for the business ownership dummy variable and the generalized residual. All regressions include the demographic controls mentioned in the text.

Standard errors are adjusted for heteroskedasticity.

Table 12: Probit estimates of becoming a businessman, effect of savings: 1984-1990 and 1984-1991.

<b>Became businessman in :</b> N = percent became businessman	<b>1990</b>		<b>1990 or 1991</b>	
	<b>Coeff.</b>	<b>t</b>	<b>Coeff.</b>	<b>t</b>
	2776 2.99%		2682 5.70%	
Saving out of family income	3.8E-05	0.10	0.00	-0.65
Log likelihood	-348.47		-539.82	
Saving out of family income	1.6E-04	0.31	-6.0E-05	-0.20
Capital gains	-1.7E-04	-0.43	7.8E-05	0.23
Inheritances	2.4E-03	1.30	3.0E-03	1.99
Log likelihood	-347.73		-537.98	
Saving out of family income / Income	4.3E-04	0.30	-2.3E-04	-0.28
Capital gains / Wealth	2.3E-16	0.02	2.5E-16	0.03
Inheritances / Wealth	-1.5E-03	-0.14	-4.9E-03	-0.18
Log likelihood	-348.38		-539.79	
Saving out of family income	-1.9E-04	-0.23	-9.6E-04	-1.44
Capital gains	-1.7E-04	-0.43	8.9E-05	0.25
Inheritances	2.0E-03	1.07	2.2E-03	1.35
Compositional changes	-5.1E-06	-0.93	-4.3E-06	-0.98
Annuities	-8.2E-07	-0.14	-2.7E-06	-0.51
Log likelihood	694.47		1072.84	
Saving out of family income	3.2E-05	0.08	-1.8E-04	-0.69
Capital gains	-6.0E-05	-0.15	9.7E-05	0.27
Insurance settlements in 1989	-0.01	-0.32	3.4E-04	0.83
Insurance settlements in 1990	-	-	4.8E-04	1.40
Log likelihood	-348.41		-538.21	

Source: Author's calculations using the 1984-90 and 1984-91 panels of the PSID.

Table 13: Wealth and probit regressions for the 1984-89 panel: Dummy 2

	I (w84) Eqn.(8.2.d)		II (Probit) Eqn.(8.2.b-c)	
	Coeff.	t	Coeff.	t
Intercept	-119.4531	-4.7800	-0.6367	0.5492
1984-89 Ave. Income	1.4260	10.8900	0.0074	0.0024
1984-89 Ave. Income squared	-0.0002	-0.3100	-1.0E-05	8.6E-06
1984 Age	2.7435	2.0900	-0.0391	0.0294
1984 Age squared	-0.0050	-0.3100	0.0004	0.0004
Dummy:Head High Sch. Grad.	11.8553	2.6500	-0.0444	0.1045
Dummy:Head Some College	4.5073	1.0000	0.0379	0.0944
Dummy:Head College Grad.	-6.5144	-1.2700	0.0136	0.1018
Head Black	-7.4833	-1.6000	-0.7356	0.1641
Head Latin	-18.5046	-1.9700	-0.6438	0.2730
# Children 1 to 5	-1.4694	-0.5200	0.0733	0.0587
# Children 6 to 13	-1.2702	-0.5500	0.1188	0.0485
# Children 14 to 17	-7.8775	-2.3800	-0.1008	0.0771
Dummy: new child 1984-89	-8.3165	-1.7400	-0.1037	0.1004
Dummy:Head employed 1984-89	-9.2351	-2.2900	0.0834	0.0931
Dummy:Wife employed 1984-89	-14.1440	-3.2100	-0.0258	0.0848
Dummy:Married in 1984	30.5531	5.0900	-0.3430	0.1180
Dummy:Married in 1989	-6.5341	-1.0900	0.2473	0.1204
Dummy:Head Female	18.5392	3.3300	-0.7686	0.1537
Businessman Father	-5.7625	-1.3000	0.1859	0.0909
Inheritance + Ins. Settlem in 1983	1.0438	2.7200		
1984 Net Worth			-0.0067	-0.8965
Generalized residual			1.1E-03	3.0E-04
N	3086		3086	
Adj. R-squared	0.3096			
loglik			-844.3505	

Source: Author's calculations using the 1984-89, 1989-94 and 1984-1994 panels of the PSID data.

Notes: See note to Table 9.

Table 14: Saving rate regressions for the 1984-89 panel: Dummy 2

	I		II	
	One-equation		Two-equation	
	Coeff.	t	Coeff.	t
Intercept	4.67	0.70	-1.54	-0.21
1984-89 Ave. Income	0.19	4.55	0.17	4.09
1984-89 Ave. Income squared	0.00	-0.85	0.00	-0.77
1984 Age	-0.30	-0.85	-0.12	-0.32
1984 Age squared	0.00	1.01	0.00	0.58
Dummy:Head High Sch. Grad.	-0.11	-0.10	0.17	0.15
Dummy:Head Some College	0.09	0.08	-0.02	-0.02
Dummy:Head College Grad.	1.80	1.14	1.73	1.09
Dummy:Head Black	-0.78	-0.71	0.55	0.41
Dummy:Head Latin	0.99	0.57	2.82	1.39
# Children 1 to 5	0.62	0.99	0.28	0.43
# Children 6 to 13	-0.69	-1.23	-1.19	-1.97
# Children 14 to 17	-2.19	-2.72	-1.91	-2.37
Dummy: new child 1984-89	0.16	0.15	0.46	0.42
Dummy:Head employed 1984-89	0.84	0.68	0.55	0.44
Dummy:Wife employed 1984-89	-0.63	-0.55	-0.53	-0.47
Dummy:Married in 1984	0.45	0.27	2.27	1.22
Dummy:Married in 1989	-0.99	-0.62	-2.24	-1.35
Dummy:Head Female	-0.66	-0.37	1.17	0.59
Variation in income	0.66	2.10	0.63	2.00
Capital gains	-0.03	-3.80	-0.03	-3.86
1984 Net Worth	-0.03	-4.02	-0.03	-4.49
Business Dummy (Dummy 2)	11.00	5.33	36.12	2.92
Correction factor			-13.34	-2.04
N	3086		3086	
Adj. R-squared	0.0943		0.0965	

Source: Author's calculations using the 1984-89, 1989-94 and 1984-1994 panels of the PSID data.

Notes: See note to Table 9.

## Appendix:

The data used in this study come from the Panel Study of Income Dynamics (PSID). Information on wealth was collected every five years, starting from 1984. The active saving supplement is available for the periods 1984-89 and for 1989-94. To the best of my knowledge, the PSID is the only dataset that contains information on the active savings and capital gains parts of household saving.

In this article, household wealth has the following components:

- (1) Main Home: The net value of home, which is house value minus the remaining mortgage principal.
- (2) Other Real Estate: The net value of any real estate other than main home, such as a second home, land, rental real estate, or money owed to you on a land contract.
- (3) Farm and Business: The net value of farm or business assets.
- (4) Stocks: Value of shares of stock of publicly held corporations, mutual funds or investment trusts, including stocks in IRAs (IRAs asked separately in 1999).
- (5) Checking and Saving Accounts: Value of checking or saving accounts, money market funds or investment trusts, savings bonds, Treasury bills, including IRAs (IRAs asked separately in 1999).
- (6) Other Savings: Any other savings or assets, such as bond funds, cash value in a life insurance policy, a valuable collection for investment purposes, or rights in a trust or estate.
- (7) Other Debts: Any other debt besides mortgage; such as credit card debt, student loans, medical or legal bills, loans from relatives.

The "Active Savings" supplement of the PSID asks questions about savings over the past five years. These files include information about the following:

- (1) Amount of money put aside in private annuities.
- (2) Value of pensions and annuities cashed in.
- (3) Amount of money invested in real estate other than main home.
- (4) Value of additions or improvements worth at least \$10,000 to main home or other real estate.
- (5) Amount of money invested in a farm or business.
- (6) Amount of money realized from the sale of farm or business.
- (7) Value of debt or assets, at least \$5,000, removed from the family by someone leaving the family.
- (8) Value of debt or assets, at least \$5,000, added to the family by someone joining the family.
- (9) Value of gifts or inheritances of money or property worth at least \$10,000.
- (10) Net value of stocks in publicly held corporations, mutual funds or investment trusts bought and sold.



### ***Sample Selection:***

Cross-sectional samples include all households. Longitudinal samples include only the households whose heads remain the same over the period in question. These samples are further restricted to households whose heads are between the ages of 22 and 65, with the purpose of taking life-cycle factor into account and excluding the households that are expected not to accumulate wealth. Households whose heads are retired are excluded for the same reason. In order to avoid the influence of extreme values, the top and bottom 1% of the wealth change or saving component distribution is truncated. The rate of return variables, except for the saving rate, are defined only when initial wealth is positive.

### ***Calculation of Active Savings and Capital Gains on Assets:***

- (1) Main Home: For each year in the period of study, capital gains and active savings are calculated and then summed. If the family does not move during a year, capital gains on main home in that year is the increase in the (gross) value of the house; active savings is the reduction in remaining mortgage principal. If the family moves during a year, capital gain is zero and active saving is the change in the net value of the house. The value of additions or improvements is also considered as part of active savings.
- (2) Other Real Estate: Active saving is the investment in real estate (from the "Active Savings" files). Capital gain is the change in the value of real estate during the period (from the wealth supplements) minus active savings.
- (3) Farm and Business: Active saving is the investment in farm and business. Capital gain is the change in the value of the asset during the period minus active savings.
- (4) Stocks: Active saving is the net value of stocks bought and sold. Capital gain is the change in the value of the asset during the period minus active savings.
- (5) Checking and Saving Accounts: Capital gain is assumed to be zero; active saving is the change in the value of the asset.
- (6) Other Savings: Capital gain is assumed to be 1%; active saving is the change in the value of the asset minus the capital gain.
- (7) Other Debts: Capital gain is assumed to be equal to the rate of inflation, which is based on CPI-U. Active saving is the change in the value of the asset minus the capital gain.

***Calculation of Savings out of Family Income:***

In order to find out the portion of savings made out of family income, the saving items that originate from outside the family must be deducted. These are:

- (1) inheritances received during the period,
- (2) the amount of money put into annuities or annuities cashed in,
- (3) wealth changes due to changes in family composition.

Information about these items is found in the "Active Savings" files.

“Saving out of family income” is active savings described above, minus the sum of these three items.