

The Importance of Entrepreneurship for Wealth Concentration and Mobility

Vincenzo Quadrini*

Department of Economics and Fuqua School of Business

Duke University

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Abstract

The paper conducts an empirical analysis of the importance of entrepreneurship for wealth concentration and mobility using data from the Panel Study of Income Dynamics. The data shows a marked concentration of wealth in the hands of entrepreneurs which is not merely a consequence of their higher incomes. The higher saving rates among entrepreneurs is one of the possible explanations for their higher asset holdings and this hypothesis is supported by the statistical tests conducted in the paper. The data also shows that entrepreneurs experience greater upward mobility in that they have a greater probability of moving to higher wealth classes and, as for the higher asset holdings, this is not only a consequence of their higher incomes.

Key words: Wealth concentration; socio-economic mobility; entrepreneurship;
entrepreneurial duration and persistence

JEL classification: D12; D31; J60

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Introduction

As is well known, household wealth is highly concentrated, even more concentrated than income. For example Wolff (1995), using data from the Survey of Consumer Finances, reports that in 1989 the top one percent of households owned 39 percent of total wealth. Yet the reason why some families—those at the top of the distribution—accumulate such a high level of wealth is at present unknown and it constitutes a puzzle that a large class of calibrated models is not able to capture as discussed in Quadrini and Ríos-Rull (1997). The question addressed in this paper is whether entrepreneurship plays an important role in generating such a high concentration of wealth.

Using data from the Panel Study of Income Dynamics, the paper documents the main differences in asset holdings and wealth mobility between entrepreneurs and workers, where "entrepreneurs" are defined as families owning their own business and "workers" are defined as all other families. The data analysis shows that there is a marked concentration of wealth in the hands of entrepreneurs and that entrepreneurs experience greater upward mobility than workers. These differences in asset holdings and mobility are not merely accounted for by higher entrepreneurial incomes, as entrepreneurs have higher wealth-income ratios than workers, and they experience greater upward mobility in the wealth-income ratio as well.

The fact that business families own more wealth has been interpreted as evidence of the existence of borrowing constraints: that is, the ownership of a business can only in part be financed with external funds, and therefore, only those having enough wealth are in the position to start a profitable business.¹ According to this interpretation, there is a causal link between the endowment of wealth and the entrepreneurial choice. However, an inverse causation can also be hypothesized: business families own more wealth because they save more. There are several factors which may account for this. For instance, the presence of liquidity constraints may induce those families with higher entrepreneurial ability to accumulate the capital required to start a business. Another reason may stem from the fact that agents are risk averse and, in order to face the entrepreneurial risk, they accumulate more assets. Finally, the higher saving rate of

business families may be a consequence of intermediation costs that make external financing more expensive; thereby implying that entrepreneurs with a lower level of wealth have a higher marginal return from saving. In other words, while it is possible that the presence of liquidity constraints has the effect of selecting entrepreneurs among richer families, it is equally plausible that these families have higher levels of wealth relative to income, because their members have more incentives to save.

If business families were to own more wealth only because they were selected among richer families, then entrepreneurship would not have any implications for wealth inequality, being the inequality in asset holdings that discriminates between workers and entrepreneurs and not vice-versa. In other words, entrepreneurship has positive implications for wealth concentration—in addition to the concentration induced by higher asset holdings as a consequence of higher business incomes—only if entrepreneurs accumulate more wealth than workers. In order to exploit this possibility, I estimate a dynamic accumulation equation on a sample of U.S. families, and I test the hypothesis that workers and entrepreneurs have different saving behaviors. The result of this test supports the hypothesis that enterprising households have a higher targeted wealth-income ratio than workers, and therefore, higher saving rates.

By looking at the "accumulation" of wealth, rather than at its "holding", the analysis is shifted from the static aspects of the wealth distribution to its dynamics, namely, the movement of the agents inside the distribution or socio-economic mobility. There are several empirical studies analyzing income and earnings mobility. Some studies document intergenerational mobility, such as Behrman and Taubman (1990), Solon (1992) and Zimmerman (1992); while others concentrate on the mobility of the same individual or family, notably Duncan and Morgan (1984), Sawhill and Condon (1992) and Hungerford (1993). These studies, however, do not distinguish among different types of individuals or households and do not extend the analysis to the study of mobility within wealth classes, other than income and earnings. In contrast, this study is primarily interested in analyzing the mobility properties experienced by different economic agents within one generation—namely enterprising households as compared to other households—where the

position in the social ladder is identified with wealth.

In the data analysis of section 2, I show that enterprising households experience greater upward-mobility than other households, that is, they face greater probabilities of moving to a higher wealth class. Moreover, this upward mobility is not merely a consequence of their higher incomes, since enterprising households also experience greater upward mobility in the ratio of wealth to income as well. This wealth mobility property is consistent with the observation of higher asset holdings of entrepreneurs in the sense that entrepreneurs own more wealth because they tend to move to higher positions in the distribution of wealth. At the same time, the higher upward mobility of entrepreneurs can be interpreted as evidence of the hypothesis that their higher asset holdings is not only a consequence of borrowing constraints that select entrepreneurs among richer families—as pointed out by Evans and Jovanovic (1989)—but also a consequence of their higher rates of savings.

The different saving patterns of workers and entrepreneurs generate higher asset holdings in the hands of the latter and, as a result, a higher concentration in the whole distribution of wealth. A relevant factor that determines the importance of this mechanism in generating wealth concentration, is the persistence and turnover of households in the business group. Accepting the hypothesis that entrepreneurs save more, the amount of wealth accumulated depends on the business duration, that is the time spent owning a business. Therefore, in section 4, I analyze the persistence and turnover of households in the business group and I show that despite the high exit rates from entrepreneurship, the turnover rate in the business group is low and a limited percentage of households tend to alternate in the position of entrepreneur. The finding is confirmed by the estimation of a probit model for entrance and exit to and from entrepreneurship. This low turnover allows a restricted group of households to accumulate consistent amounts of wealth (due to their higher saving rates) which in turn generates higher concentration of wealth.

1 Entrepreneurship and wealth concentration

The main source of data comes from the Panel Study of Income Dynamics (henceforth PSID) which is a national survey conducted annually on a sample of U.S. families since 1968. The original sample included 4,800 families. Over time the sample composition has changed due to the addition of new family units, descending from the previous ones, and the removal of others. Although the survey was taken annually, the main variable of interest for this study—family wealth²—is available for only few years and the main analysis is based upon the 1984 and 1989 wealth data.³ Accordingly, the sample analyzed in this and the next sections consists of families interviewed in all years from 1984 through 1990 and headed by the same person.⁴

The first step of this analysis is to identify business families or entrepreneurs. I adopt two criteria. According to the first criterion, entrepreneurs are families that own a business or have a financial interest in some business enterprise and workers are identified as all other families.⁵ In the second criterion, entrepreneurs are identified as families in which the head is self-employed, in his or her main job, while workers are identified as families in which the head is a dependent worker.⁶ Implicit in the second definition of entrepreneurs is the exclusion from the analysis of those families in which the head is not an active worker. Henceforth, I will call "business owners" enterprising families identified using the first definition of entrepreneurs, and "self-employed" enterprising families identified using the second definition of entrepreneurs.

Figure 1 reports the fraction of business families in different wealth classes, and for the two definitions of entrepreneurs, with each class including five percent of all families. Given the similarity of the 1984 and 1989 data, this graph and the main analysis of the remaining part of this section are based on the average of these two years. Figure 1 shows that business families tend to be concentrated in the higher wealth classes and more than half of the families located in the top class are business families.

[Place figure 1 here]

The fact that business families own more wealth than worker families would not be of par-

ticular interest if business families also earn more income (in proportion to the ownership of wealth) and a better evaluation requires the analysis of the joint distribution of income and wealth among these two categories of families. Based on this consideration, figure 2 reports the average per-family wealth of worker and business families located in each income⁷ decile, as a fraction of total per-family wealth: the top graph for the first definition of entrepreneurs and the bottom graph for the second definition of entrepreneurs. The decile thresholds are determined with respect to the total sample, and therefore, worker and business families located in the same income decile dispose, approximately and with the exception of the first and last decile, of the same income. More detailed information is provided by tables 9 and 10 in the appendix.

[Place figure 2 here]

Figure 2 shows that business families own on average higher levels of wealth, relative to their incomes, than worker families. If we consider the total sample of business and worker families, the ratio of wealth to income is more than twice as big as it is for business families. In terms of total distribution, we observe that in 1989, and for the first definition of entrepreneurs, 14.9 percent of all families are business families; they earn 25 percent of the total income and they own 46 percent of the total wealth. If the second definition of entrepreneurs is adopted, then 17.9 percent of all families are business families; they earn 25 percent of the total income and they own 56 percent of the total wealth. Therefore, there is a concentration of wealth among business families which is not purely explained by the concentration of income among these families.

In order to test the statistical significance of the differences in the ratio of wealth to income of workers and entrepreneurs shown by figure 2, I estimate a regression equation in which the wealth-to-income ratio is regressed on several variables. Among the regressors I include a constant, a dummy variable taking the value of one for business families, the income of the family, the age of the family head and its square. The age variables are included to capture the dependence of the wealth-income ratio on the life cycle stage of the family. The estimation is repeated using the two definitions of entrepreneurs and the 1984 and 1989 data. Given the similarity of the results

using the 1984 and 1989 data, sections a) and b) of table 1 only report the results for the 1989 sample.⁸

[Place table 1 here]

In all regressions the business dummy variable is positive and highly significant. Moreover, the significance of the business dummy does not change using different specifications of the regression equation. In order to show that this result is not only a features of the PSID data, the same regression equation is estimated using data from the 1989 and 1992 Survey of Consumer Finances adopting similar definitions of family income, wealth and entrepreneurs. Given the similarity of the estimates using the 1989 and the 1992 data, sections c) and d) of table 1 only report the regression results using the 1992 data. These estimates confirm the statistical significance of the higher wealth-income ratio of business families.

2 Entrepreneurship and social mobility

After analyzing the static aspects of the distribution of wealth between workers and entrepreneurs, this section analyzes its dynamics, that is, the movement of these families inside the distribution or socio-economic mobility. Table 2 reports net wealth transition matrices⁹ of four sub-samples of families in the period 1984-89 classified according to the second definition of entrepreneurs (business owners).¹⁰ The first sub-sample, "staying workers", is composed of families that do not own a business in both years 1984 and 1989. The second sub-sample, "switching workers", is composed of families that own a business in 1989 but not in 1984. The third and fourth sub-samples cover the other two cases: "switching entrepreneurs", that is families that own a business in 1984 but not in 1989, and "staying entrepreneurs", that is families that own a business in both the starting and final years. The selected sub-samples have been divided into three classes according to the 1984 family wealth (starting class) and 1989 family wealth (ending class), where the class thresholds are determined by dividing the total sample in three wealth groups, with each group including one third of all families.¹¹ Each row of the matrices specifies

the class position in 1989 of the families located in the particular 1984 class of wealth.

[Place table 2 here]

Looking at the top section of table 2, which reports the transition matrices for families that at the beginning of the period do not own a business (worker families), we observe:

- i) In the lower class, the percentage of families moving to a higher class is greater for the sub-sample of workers that acquire a business (switching workers) than for the sub-sample of staying workers.
- ii) In the middle class, for the sub-sample of workers that become entrepreneurs, the percentage of families that are upwardly-mobile is higher than the percentage of downwardly-mobile families. The reverse is observed for staying workers.
- iii) In the upper class, the percentage of families falling to lower classes is smaller for switching workers than for the other worker families.

Looking now at the bottom section of table 2, which reports data for families that at the beginning of the period own a business (entrepreneurs), we observe:

- i) In the lower class, the percentage of families moving to a higher class is greater for the sub-sample of staying entrepreneurs.
- ii) In the middle class, for the sub-sample of staying entrepreneurs, the percentage of upwardly-mobile families is higher than the percentage of downwardly-mobile families. The reverse is observed for switching entrepreneurs.
- iii) In the upper class, the percentage of families falling to a lower class is smaller for staying entrepreneurs than for switching entrepreneurs.

The observations listed above point out substantial differences in the mobility patterns of workers and entrepreneurs. While worker families (both new and old), tend to stay in or move to

lower positions of wealth, both new and old business families tend to stay in or move to higher positions. Therefore, the undertaking of an entrepreneurial activity is an important way through which families switch to higher wealth classes.

In order to test the significance of the differences in wealth mobility between workers and entrepreneurs, the last column of table 2 reports the value of the χ^2 statistic for each starting class of wealth. This statistic tests the null hypothesis that the probability distribution of families across wealth classes is not affected by the switch to or from entrepreneurship. More specifically, it tests whether each row of the transition matrix of staying workers (entrepreneurs) is statistically different from the corresponding row of the transition matrix for switching workers (entrepreneurs). The statistic is distributed as a χ^2 with 4 degrees of freedom, and the hypothesis of independence can be rejected at a 5 percent significance level in five cases out of six.¹²

The different wealth mobility may reflect differences in earned incomes. It can be argued, in fact, that the upward mobility experienced by entrepreneurs, as opposed to the downward mobility experienced by workers, is a consequence of higher incomes earned by entrepreneurs. In order to verify this hypothesis, table 3 reports the transition matrices for the ratio of wealth to income, constructed following the same methodology used in the construction of table 2. As shown by this table, business families experience greater upward mobility than worker families, also in the ratio of wealth to income, and therefore, the tendency of business families to be upwardly mobile is not merely a consequence of their higher incomes.¹³

[Place table 3 here]

3 Testing the different wealth-to-income ratio of workers and entrepreneurs

The mobility properties shown by tables 2 and 3, and the analysis conducted in section 1 suggest the idea that the accumulation behavior of entrepreneurs differ from the accumulation behavior of workers, with the former accumulating higher levels of wealth relative to income. According to this hypothesis, if we compare workers and business families earning the same income and

owning the same level of wealth, the latter should save on average more. Or, said in a different way, entrepreneurs have a higher long-run target in the ratio of wealth to income than workers. It is this difference in saving behavior or wealth-to-income target that contributes to generate higher concentration of wealth.

In order to further investigate this hypothesis, I consider the following dynamic equation:

$$(1) \quad \Delta k_{it} = \alpha_k(k_{it} - \bar{k}_i) + \alpha_y(y_{it} - \bar{y}_i) + \epsilon_{it}$$

where k_{it} and y_{it} are the logarithm of wealth and income of family i at time t and \bar{k}_i and \bar{y}_i are the optimal long-run level of wealth and the permanent level of income. The hypothesis underlying this equation is that the change in the value of wealth depends on: *a*) how much the current value of wealth diverges from its long run target \bar{k}_i ; *b*) how much the current level of income (or temporary income) diverges from its permanent level \bar{y}_i ; and *c*) other factors captured by the residual variable ϵ_i . Equation (1) can be rewritten as:

$$(2) \quad \Delta k_{it} = -(\alpha_k + \alpha_y)\bar{y}_i - \alpha_k(\bar{k}_i - \bar{y}_i) + \alpha_k k_{it} + \alpha_y y_{it} + \epsilon_{it}$$

In the above equation the term $\bar{k}_i - \bar{y}_i \equiv \kappa_i$ represents the long-run wealth-income ratio of family i . If we assume that $\kappa_i = \phi_0 + \phi_1 b_i$, where b_i is the entrepreneurial propensity of family i , then equation (2) can be rewritten as:

$$(3) \quad \Delta k_{it} = c + \alpha_{\bar{y}}\bar{y}_i + \alpha_b b_i + \alpha_k k_{it} + \alpha_y y_{it} + \epsilon_{it}$$

where $c = -\alpha_k \phi_0$, $\alpha_{\bar{y}} = -(\alpha_k + \alpha_y)$, $\alpha_b = -\alpha_k \phi_1$. This equation can be used to test the dependence of the long-run wealth-income ratio on the entrepreneurial propensity of the family.

Before estimating equation (3), we need an estimate of the permanent component of income \bar{y}_i . The estimation of \bar{y}_i is based on the assumption that the current log-level of income is given

by the permanent component \bar{y}_i plus a transitory and time dependent component \tilde{y}_{it} , that is:

$$(4) \quad y_{it} = \bar{y}_i + \tilde{y}_{it}$$

The transitory component is in turn decomposed in an age-dependent component—which is approximated with a cubic polynomial in age—and a stochastic element η_{it} which follows a first order autoregressive process. Specifically:

$$(5) \quad \tilde{y}_{it} = \psi_1 A_{it} + \psi_2 A_{it}^2 + \psi_3 A_{it}^3 + \eta_{it} \quad \text{with} \quad \eta_{it} = \rho \eta_{it-1} + v_{it}$$

where A_{it} denotes the age of the head of family i at time t . Using equation (4) and (5) at two different dates, it is possible to express the current log-level of income as:

$$(6) \quad y_{it} = c_i + \rho y_{it-1} + \gamma_1 A_{it} + \gamma_2 A_{it}^2 + \gamma_3 A_{it}^3 + v_{it}$$

where $c_i = \psi_1 + \psi_2 + \psi_3 + (1 - \rho)\bar{y}_i$; $\gamma_1 = (1 - \rho)\psi_1 + 2\psi_2 + 3\psi_3$; $\gamma_2 = (1 - \rho)\psi_2 + 3\psi_3$; $\gamma_3 = (1 - \rho)\psi_3$.

Equation (6) is a fixed effect regression model which is estimated on the PSID sample composed of families interviewed in all years from 1980 through 1993. Therefore, the estimation uses the fourteen observations of family incomes from 1979 through 1992. The estimation results are reported in table 4.

[Place table 4 here]

The estimates of the fixed effect c_i are then used to derive estimates of the permanent component of income \bar{y}_i in the estimation of equation (3). Several specifications of equation (3) are estimated using data from the same sample of families used to estimate equation (6) and the results are reported in table 5.¹⁴

[Place table 5 here]

The results reported in sections a.1 and b.1 of table 5 are for the basic formulation of equation

(3). In these two regressions the business propensity of the family is measured by the number of years in which the family has been in the business group during the sample period 1980-92. All the coefficient estimates have the expected size—with α_b and α_y greater than zero and α_k smaller than zero—and they are statistically significant at the 5 percent level. The only exception is the coefficient for income in regression b.1, which however becomes significant at the 10 percent level. Of particular interest is the coefficient estimates for the business variable b_i which is equal to $-\alpha_k\phi_1$. Given the negative sign of α_k , the positive sign of this parameter implies a positive value of ϕ_1 , and therefore, a higher long-run wealth-income ratio of families with higher entrepreneurial propensity. Hence, the result of the regression exercise supports the hypothesis that business families have a higher long-run wealth-to-income ratio than worker families.

Regressions a.2 and b.2 replace the entrepreneurial propensity variable used in a.1 and b.1 with two dummies. The first dummy takes the value of one for those families that have been in the business group for only one year during the sample period; the second dummy takes the value of one for those families that have been in the business group for more than one year. Only the second dummy is statistically significant, suggesting the existence of non-linearities in the impact of the entrepreneurial propensity of the family on its long-run wealth-income ratio. The sign and significance of the other key variables do not change.

In order to separate out family dynastic effects, I re-estimate a new version of equation (3) extended to include dynasty-specific dummies. The number of dummies added to the equation is equal to the number of 1968 families from which the current sample originates. Therefore, each dummy identifies a particular dynasty. As can be seen from the results of regressions a.3-a.4 and b.3-b.4, the dynasty-specific dummies do not affect the basic results obtained in the previous estimations. The only relevant difference is that in regression b.4 the dummy variable b_{1i} is now statistically significant.¹⁵

4 Entrepreneurial persistence and turnover

The analysis conducted thus far supports the hypothesis that the household's saving behavior changes with the current and future prospect of being an entrepreneur. As a consequence of the different saving behavior, business families accumulate more wealth than worker families and rapidly move to higher wealth classes (upward mobility). In that way, the higher saving behavior of entrepreneurs contributes to generate more concentration of wealth. In this dynamics, an important role is played by entrepreneurial persistence and duration: the longer the business life is, the greater the wealth accumulated by a restricted group of business families, which in turn generates greater concentration in the whole distribution of wealth.

One way of looking at entrepreneurial persistence is to look at the exit and entrance rates from and to entrepreneurship. However, these are only general indicators and, in several respects, incomplete. In fact, it is not only important to look at the entrance and exit rates, but also at the turnover rates of families in the business group. As an extreme example, suppose that in each period ten percent of all families are entrepreneurs but, in the next period, they are all replaced by a different group of families. Moreover, assume that it is always the same two groups of families, both counting ten percent of the population, that alternate in each period. In this example, despite the 100 percent exit rate from entrepreneurship, the turnover of families in the business group is low and the entrepreneurial persistence is high. Hence, the exit and entrance rates are good indicators of business persistence, only if all families face the same probability of engaging in entrepreneurial activities—or in this example, only if all families were to alternate into the position of entrepreneur. However, there are reasons which may prevent this from occurring. Experience is certainly an important aspect of entrepreneurship, due to the existence of learning processes through which successful entrepreneurs improve their ability, as theorized in Hopenhayn (1992), or improve the knowledge of their ability, as in Jovanovic (1982). This implies that the longer the entrepreneurial tenure is, the higher the expected duration.

The top section of table 6 reports the average annual exit rates from entrepreneurship for the whole sample of business families and for three sub-samples: families with one year of business

tenure, families with two years of business tenure, and families with three or more years of business tenure. The table distinguishes between the two definitions of entrepreneurs specified before and the numbers reported are averages over the sample period 1973 through 1992.¹⁶ As can be seen from the table, the exit rate is high for new entrants (one year of business tenure) but declines quickly for surviving entrepreneurs.

[Place table 6 here]

Experience also plays an important role in affecting the probability of entering entrepreneurship. The bottom section of table 6 reports the entrance rates to entrepreneurship for the sample of all worker families and for two sub-samples: worker families without business experience in all three years prior to initiating an entrepreneurial activity, and worker families which engaged in an entrepreneurial activity during at least one of these years. As for the exit rates, the numbers reported are annual averages over the sample period 1973 through 1992.¹⁷

The analysis of table 6 reveals that, despite the high exit rates from entrepreneurship for the total sample of entrepreneurs, there is a sub-group of families—those with entrepreneurial experience—that face low probability of exiting and high probability of re-entering. Consequently, the turnover in the business group is low and the entrepreneurial persistence high. It is this persistence that allows a restricted group of business families to accumulate higher levels of wealth relative to workers which, in turn, generates higher concentration of wealth.

Two hypotheses can be proposed to explain the low turnover of families in the business group. The first hypothesis is related to business experience. Even if the termination of an entrepreneurial activity is usually dictated by poor performance, the acquisition of entrepreneurial skills does not depend entirely on the success or failure of the business undertaken. Furthermore, the experience gained is not immediately lost after terminating the business. The second hypothesis is related to the existence of borrowing constraints. Financial constraints select entrepreneurs among richer families, while at the same time, richer families are those which engaged in business activities in previous periods. Because the wealth accumulated during the business period is not

immediately depleted, these families have greater resources to restart a business.

In order to analyzing the importance of these two hypothesis—namely, the existence of a learning process in the ability to manage a business, and the existence of borrowing constraints—I estimate a probit model in which the probability to enter entrepreneurship is related to several variables. The existence of a learning process is captured by three dummy variables: the first dummy takes the value of one for families that were entrepreneurs three years before the entrance to entrepreneurship; the second dummy takes the value of one for families that were entrepreneurs two years before the entrance (but not three years before); the third dummy, instead, takes the value of one for families that were in the business group two and three years before the entrance to entrepreneurship. The importance of borrowing constraints or other financial factors is captured by the variable families wealth. The entrance probability also depends on two dummy variables capturing the educational achievement of the head of the family—one for high school diploma and one for college degree—and on a cubic polynomial in the age of the head. The estimation is repeated for the two definitions of entrepreneurs and for the years 1985 and 1990. Given the similarity of the estimation results for the two years, table 7 only reports the estimates for 1990.¹⁸

[Place table 7 here]

The first important result is relative to the coefficient estimates for the experience dummies. All three variables have a positive and significant effect on the probability of entering entrepreneurship. Moreover, it is interesting to note that the coefficient estimate for the first variable is smaller than the estimate for the second variable which, in turn, is smaller than the coefficient estimate for the third variable. If we interpret the positive effect of business experience as a consequence of a learning process in the ability to manage a business, then this result reveals two important facts. First, the learned ability is subject to depreciation. This is because the effect of old experiences (first dummy variable) on the probability of entering entrepreneurship is smaller than the effect of recent experiences (second dummy variable). Second, the ability to manage a business is accumulated along time (learning by doing). This is because the coefficient estimates for the third dummy variable, that is for families with two years of business experi-

ence, is greater than for the other two dummy variables, that is for families with only one year of business experience. The second important result is that the value of wealth has a positive and significant coefficient—even after controlling for business experience—which supports the hypothesis of the existence of borrowing constraints.

The educational attainment of the head of the family is positive but not significantly different from zero and therefore the level of education does not seem to have an influence in the probability to enter entrepreneurship. Similarly for the age of the head: the coefficient estimates are not different from zero at a 5 percent significant level. This results may seem at odd with the observation that in lower age classes the fraction of entrepreneurs is smaller. However, the result of the probit estimation suggests that the smaller fraction of entrepreneurs in younger families is the consequence of the lower asset holdings and experience of these families.

A similar model is also estimated for the exit probability. The model considers the same explanatory variables considered in the entrance model with the exception of the experience dummies. The three experience dummies of the previous model has now been replaced by two dummies variables: the first variable assume a value of one for business families with one year of business experience and the second for families with two or more years of business experience. The estimation results are presented in table 8 and they parallel the results previously obtained in the estimation of the entrance probability. It is important to point out the negative effect of experience that confirms the existence of a learning process that reduces the probability of exiting from entrepreneurship. The effect of wealth is to reduce the probability of exit: the sign of the coefficient estimation for wealth (the linear component) is negative even though significant only for the first definition of entrepreneurs. The other variables, that is education and age, are not statistically significant.

[Place table 8 here]

In summary, the estimation results of the probability model presented in table 7 points out the importance of two factors in explaining the entrance rate to entrepreneurship: the asset holdings

of the household and its experience. At the same time the results reported by table 8 shows that the same factors have a positive effect on the probability of remaining entrepreneur. These two factors explain the high persistence and low turnover of business families which, associated with their higher saving rates, constitutes an important mechanism allowing the concentration of assets in the hands of entrepreneurs, and generates a more unequal distribution of wealth.

5 Conclusion

The object of this paper is to study the importance of entrepreneurship for wealth concentration and mobility using data from the Panel Study of Income Dynamics. The analysis shows a significant concentration of wealth within enterprising households which, at least in part, is responsible for the high concentration of wealth observed in the data. The higher saving rates of entrepreneurs could be one of the explanation for this concentration and the statistical test conducted in section 3 is supportive of the hypothesis that entrepreneurs have higher saving rates than workers. Consequently, the study of the different accumulation behavior of workers and entrepreneurs represents an important step toward the understanding of wealth concentration and inequality.

The importance of entrepreneurship for wealth concentration—through the different accumulation behavior of workers and entrepreneurs—depends on the turnover rate and persistence of families in the business group. Due to the low turnover in the business group, business families spend a long time with the ownership of a business during which they accumulate consistent amounts of wealth, and this generates higher concentration of wealth.

The paper also analyzes socio-economic mobility and shows that workers and entrepreneurs experience different mobility properties, with the former tending to stay or move to lower wealth classes and the latter to stay or move to higher wealth classes. Therefore, the undertaking of an entrepreneurial activity increases the household's probability of moving to a higher wealth class and the mobility properties of the whole society depends on the breadth and easy of access to the business activities. However, the low turnover of enterprising families—due to the existence

of borrowing constraints and/or to the existence of processes of learning—limits the accessibility of the business activity to a restricted group families.

The analysis of social mobility have relevant policy implications for government wishing to alter existing patterns of socio-economic mobility which, however, is beyond the purpose of this paper.

A Data appendix

This appendix provides data on the average asset holdings of worker and business families, sorted in ten income groups, as well as the percentage of workers and entrepreneurs in each income group. Table 9 adopts the first definition of entrepreneurs which is based on the family ownership of a business. Table 10, instead, adopts the second definition of entrepreneurs which is based on the main occupation of the head of the family (self-employed as opposed to dependent worker).

[Place table 9 here]

[Place table 10 here]

Notes

¹ See, for example, Evans and Jovanovic (1989), Evans and Leighton (1989) and Holtz-Eakin *et al.* (1994). Another interpretation is based on the selection mechanism through which only successful entrepreneurs survive and we only observe the upper tail of the distribution.

² "Family wealth" is defined as the sum of net worths of all family members and results from the aggregation of the following components: house (main home), other real estates, vehicles, farms and businesses, stocks, cash accounts and other assets.

³ Although wealth data for the 1994 is also available, the paper does not extend the analysis to the 1994 year because other variables which are needed for the analysis are not currently available.

⁴ The requirement that the family is headed by the same person is a way of identifying the same family over time, and to link single years data. This link is crucial for the analysis conducted in sections 2-4.

⁵ The identification of enterprising families is based on the PSID variable "Whether Business" which is based on the following interview question: "*Did you (Head) or anyone else in the family own a business at any time during the previous year or have a financial interest in any business enterprise?*"

⁶ The classification is based on the following PSID interview question: "*In your main job, are you (Head) self-employed or do you work for someone else?*"

⁷ "Family income" is defined as the sum of incomes coming from all sources plus transfers of all family members.

⁸ The sample does not include families with negative or zero incomes. In order to include also these families we have to impute positive values to this variable. One possibility is to assume that the incomes of these families are all equal to one dollar. Extending the sample in this way, however, does not change the general results as demonstrated by the values of the t -statistics for the business dummy, which become: a) 10.26; b) 12.17; c) 6.03; d) 4.94.

⁹ These matrices do not take into account changes in family size and composition, which are

important sources of family wealth dynamics. However, if we assume that all families have the same probabilities of facing a structural change, these changes should not have any impact in differentiating the income and wealth dynamics of workers and entrepreneurs.

¹⁰ The transition matrices constructed using the second definition of entrepreneurs (self-employed) are very similar to the matrices constructed using the first definition.

¹¹ The thresholds for the starting classes are determined using the 1984 wealth data, while the thresholds for the ending classes are determined using the 1989 wealth data. The matrices provide information only on the relative mobility of the families rather than on the absolute changes in the value of wealth.

¹² The critical value at 5 percent significance level is 9.49.

¹³ For families reporting negative or zero values of incomes, the wealth-to-income ratio is computed by imputing the value of one dollar to their incomes. The alternative is to remove these families from the sample. The results, however, are not affected and the hypothesis of independence is also rejected at a 5 percent significance level in four cases out of six.

¹⁴ Because the model is specified in log-levels and the logarithm is defined only for positive values, families reporting negative or zero income and wealth in at least one year during the period 1979-92, are eliminated from the sample. Equation (3) is also estimated on the full sample by imputing the value of one dollar to income and wealth when they take negative or zero values. The significance of the business variable(s), however, is not affected.

¹⁵ The regression estimations discussed above do not take into consideration the parameter restriction $\alpha_{\bar{y}} = -(\alpha_k + \alpha_y)$, implicit in the derivation of equation (3). However, the imposition of this restriction does not change the basic results.

¹⁶ The procedure followed to compute these rates is as follows: Suppose we want to determine the exit rate in 1973. First I select families that are business families in 1972 from the sample of families interviewed in all years from 1970 through 1973 and headed by the same person. The sub-sample of families with one year of business tenure, then, is the sub-group of families that was not in the business group in 1971. The sub-sample of families with two years of business

tenure is given by those families that were in the business group in 1971 but not in 1970. Finally, the sub-sample of families with three or more years of business tenure is given by those families that were in the business group in both years 1970 and in 1971 (other than in 1972).

¹⁷ The procedure followed to determine these rates is the following: Suppose we want to determine the entrance rate in 1973. First I select families that are not business families in 1972 from the sample of families interviewed in all years from 1970 through 1973 and headed by the same person. The sub-sample of inexperienced families, then, is given by the sub-group of families that were not in the business group in 1970 and 1971. The experienced entrants, instead, are the sub-group of families that in 1970 and/or 1971 were in the business group.

¹⁸ In each estimation the sample is composed of families interviewed in all relevant years and headed by the same person.

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Table 1: Wealth-to-income ratio regression. Regressions a) and b) use data from the Panel Study of Income Dynamics; regressions c) and d) use data from the Survey of Consumer Finances.

	Const	BusDum	Income	Age	Age ²	Obs.	R ²
a) PSID data - Business owners							
- Coefficient	-1.733	3.341	0.006	0.073	0.001	5,053	0.24
- <i>t-Statistic</i>	-1.911	10.59	2.626	1.811	1.245		
b) PSID data - Self-employed							
- Coefficient	2.230	4.897	0.005	-0.130	0.003	3,636	0.20
- <i>t-Statistic</i>	1.692	13.99	1.977	-2.003	3.715		
c) SCF data - Business owners							
- Coefficient	-4.436	4.598	-0.002	0.195	-0.000	3,857	0.17
- <i>t-Statistic</i>	-5.905	16.11	-4.086	6.242	-0.966		
d) SCF data - Self-employed							
- Coefficient	1.776	3.424	-0.001	-0.100	0.003	2,771	0.18
- <i>t-Statistic</i>	2.376	17.94	-1.444	-2.887	6.833		

Table 2: Five-year transition matrices for net family wealth. Sample period 1984-89.

	Class I	Class II	Class III	Class I	Class II	Class III	χ^2 -test
	Staying Workers			Switching Workers			
Class I	<u>0.81</u>	0.18	0.01	<u>0.54</u>	0.30	0.16	100.3
Class II	0.21	<u>0.65</u>	0.14	0.12	<u>0.53</u>	0.35	34.8
Class III	0.02	0.21	<u>0.77</u>	0.00	0.15	<u>0.85</u>	5.1
	Switching Entrepreneurs			Staying Entrepreneurs			
Class I	<u>0.86</u>	0.11	0.03	<u>0.24</u>	0.51	0.25	34.3
Class II	0.23	<u>0.60</u>	0.18	0.20	<u>0.38</u>	0.42	13.2
Class III	0.02	0.22	<u>0.76</u>	0.02	0.09	<u>0.89</u>	14.4

Table 3: Five-year transition matrices for family wealth-income ratio. Sample period 1984-89.

	Class I	Class II	Class III	Class I	Class II	Class III	χ^2 -test
	Staying Workers			Switching Workers			
Class I	<u>0.79</u>	0.19	0.02	<u>0.56</u>	0.28	0.16	69.2
Class II	0.21	<u>0.61</u>	0.18	0.16	<u>0.49</u>	0.35	21.0
Class III	0.05	0.21	<u>0.74</u>	0.00	0.31	<u>0.69</u>	9.1
	Switching Entrepreneurs			Staying Entrepreneurs			
Class I	<u>0.75</u>	0.23	0.02	<u>0.42</u>	0.42	0.16	14.2
Class II	0.19	<u>0.54</u>	0.27	0.16	<u>0.47</u>	0.37	2.8
Class III	0.07	0.26	<u>0.67</u>	0.02	0.14	<u>0.84</u>	13.9

Table 4: Fixed effect estimation of equation (6).

	y_{it-1}	A_{it}	A_{it}^2	A_{it}^3	Obs.	R^2
a) Business owners						
- Coefficient	0.424	12.75	-19.80	8.929	2,740	0.24
- <i>t-Statistic</i>	82.23	20.79	-17.67	13.80		
b) Self-employed						
- Coefficient	0.437	4.743	-3.274	-1.142	1,436	0.27
- <i>t-Statistic</i>	62.70	4.165	-1.354	-0.686		

y_{it-1} : log-value of family income at time $t - 1$ at 1979 prices
 A_{it} : age of the head of the family at time t divided by 100

Table 5: Estimation of equation (3). Dependent variable Δk_{it} .

	c	\bar{y}_i	b_i	b_{1i}	b_{2i}	k_{it}	y_{it}	Obs.	R^2
a) Business owners									
a.1) Coefficients	-5.562	-0.010	0.025	—	—	-0.356	0.522	2,740	0.23
<i>t-Statistic</i>	-0.182	-0.145	4.768	—	—	-26.98	4.339		
a.2) Coefficients	-9.383	-0.019	—	-0.023	0.155	-0.350	0.544	2,740	0.23
<i>t-Statistic</i>	-0.307	-0.265	—	-0.357	3.540	-26.75	4.516		
a.3) Coefficients	—	-0.149	0.022	—	—	-0.375	0.740	2,740	0.27
<i>t-Statistic</i>	—	-3.447	7.141	—	—	-48.83	10.28		
a.4) Coefficients	—	-0.156	—	0.004	0.107	-0.370	0.766	2,740	0.27
<i>t-Statistic</i>	—	-3.594	—	0.100	4.379	-48.10	10.64		
b) Self-employed									
b.1) Coefficients	-0.757	0.326	0.044	—	—	-0.479	0.258	1,436	0.27
<i>t-Statistic</i>	-0.888	2.869	7.289	—	—	-22.55	1.383		
b.2) Coefficients	-1.040	0.297	—	-0.079	0.319	-0.458	0.295	1,436	0.26
<i>t-Statistic</i>	-1.214	2.598	—	-0.627	5.548	-21.90	1.570		
b.3) Coefficients	—	0.087	0.016	—	—	-0.475	0.617	1,436	0.23
<i>t-Statistic</i>	—	1.190	4.495	—	—	-34.04	5.024		
b.4) Coefficients	—	0.079	—	0.238	0.117	-0.466	0.631	1,436	0.23
<i>t-Statistic</i>	—	1.073	—	3.678	3.586	-34.45	5.150		

k_{it}, k_{it+1} : log-values of 1984 and 1989 family wealth at 1979 prices

\bar{y}_i : fix effect estimates of equation (6).

b_i : number of years in entrepreneurship during the period 1980-92

b_{1i} : dummy for families with one year of entrepreneurial experience during the period 1980-92

b_{1i} : dummy for families with more than one year of entrepreneurial experience during the period 1980-92

y_{it} : log-sum of 1984 through 1988 family incomes at 1979 prices divided by 5

Table 6: Exit rates form entrepreneurship (top section) and entrance rates to entrepreneurship (bottom section). Annual values averaged over the sample period 1973-92.

	Exit rate	N. of families*
a) Business owners		
- All business families	24.2	522
- With one year of entrepreneurial tenure	44.7	151
- With two years of entrepreneurial tenure	30.8	80
- With three or more years of entr. tenure	13.4	291
b) Self-employed		
- All business families	13.6	384
- With one year of entrepreneurial tenure	35.2	75
- With two years of entrepreneurial tenure	19.1	48
- With three or more years of entr. tenure	7.2	261
	Entrance rate	N. of families*
a) Business owners		
- All worker families	3.7	4,722
- Without entrepreneurial experience	2.6	4,506
- With entrepreneurial experience	23.1	216
b) Self-employed		
- All worker families	2.9	2,837
- Without entrepreneurial experience	2.0	2,556
- With entrepreneurial experience	27.2	281

* The number of families is the average sample size in each year, from 1973 through 1992.

Table 7: Probit estimation of entering entrepreneurship in the year 1990. Sample composed of 1989 workers.

a) First definition of entrepreneurs (business owners)

Variable	Coefficient	Std.Error	<i>t</i> -Stat
Constant	0.552	1.188	0.465
ExpDum1	0.686	0.135	5.091
ExpDum2	0.809	0.183	4.430
ExpDum3	1.444	0.134	10.740
Wealth	0.774	0.327	2.369
Wealth ²	0.055	0.183	0.298
High School	0.051	0.097	0.530
College Degree	0.040	0.117	0.349
Age	-1.440	0.801	-1.797
Age ²	0.281	0.170	1.653
Age ³	-0.020	0.011	-1.718
Observations = 4872			
Likelihood ratio = 191.41			

b) Second definition of entrepreneurs (self-employed)

Variable	Coefficient	Std.Error	<i>t</i> -Stat
Constant	-2.548	1.859	-1.371
ExpDum1	1.026	0.270	3.799
ExpDum2	1.045	0.274	3.814
ExpDum3	1.522	0.237	6.413
Wealth	0.187	0.059	3.151
Wealth ²	-0.969	0.521	-1.859
High School	0.228	0.185	1.234
College Degree	0.100	0.208	0.480
Age	0.472	1.189	0.397
Age ²	-0.181	0.242	-0.749
Age ³	0.017	0.016	1.102
Observations = 2874			
Likelihood ratio = 57.74			

ExpDum1: business families in 1987 but not in 1988

ExpDum2: business families in 1988 but not in 1987

ExpDum3: business families in 1987 and 1988

Wealth: 1989 family wealth divided by 1,000,000

Age: age of the head of the family divided by 10

Table 8: Probit estimation of exiting entrepreneurship in the year 1990. Sample composed of 1989 entrepreneurs.

a) First definition of entrepreneurs (business owners)

Variable	Coefficient	Std.Error	t-Stat
Constant	0.058	2.365	0.024
ExpDum1	-0.155	0.173	-0.893
ExpDum2	-0.991	0.130	-7.634
Wealth	-0.432	0.188	-2.298
Wealth ²	0.004	0.002	1.757
High School	-0.032	0.187	-0.173
College Degree	-0.098	0.203	-0.485
Age	0.140	1.491	0.093
Age ²	-0.072	0.298	-0.240
Age ³	0.007	0.019	0.363

Observations = 723

Likelihood ratio = 115.63

b) Second definition of entrepreneurs (self-employed)

Variable	Coefficient	Std.Error	t-Stat
Constant	4.860	3.857	1.260
ExpDum1	-0.429	0.287	-1.497
ExpDum2	-0.755	0.200	-3.783
Wealth	-0.245	0.191	-1.283
Wealth ²	0.003	0.004	0.650
High School	0.063	0.254	0.247
College Degree	0.263	0.268	0.981
Age	-3.779	2.603	-1.459
Age ²	0.873	0.563	1.487
Age ³	-0.059	0.039	-1.513

Observations = 494

Likelihood ratio = 29.00

ExpDum1: business families in 1988 but not in 1987

ExpDum2: business families in 1988 and 1987

Wealth: 1989 family wealth divided by 1,000,000

Age: age of the head of the family divided by 10

Table 9: Income and wealth distribution averages based on the first definition of entrepreneurs (business owners) - Decile thresholds based on Total Family Money Income.

A) 1984 PSID data

	Workers			Entrepreneurs		
	Percent	Income	Wealth	Percent	Income	Wealth
Dec 1	9.4	3,739	20,962	0.5	-19,653	83,095
Dec 2	9.5	9,185	29,065	0.5	9,323	53,559
Dec 3	9.2	13,890	43,200	0.8	14,300	64,772
Dec 4	9.0	18,736	47,865	1.0	18,673	78,602
Dec 5	9.1	23,658	93,264	0.9	23,847	125,254
Dec 6	8.8	28,916	80,689	1.2	29,045	133,246
Dec 7	8.6	34,645	77,770	1.4	34,678	139,807
Dec 8	8.2	41,737	79,552	1.7	41,720	188,605
Dec 9	7.8	52,261	113,962	2.2	53,159	235,878
Dec 10	6.2	83,411	240,543	3.8	115,906	533,508
Total	85.9	28,610	76,515	14.1	53,890	251,735

B) 1989 PSID data

	Workers			Entrepreneurs		
	Percent	Income	Wealth	Percent	Income	Wealth
Dec 1	9.6	4,848	17,476	0.3	-6,876	240,091
Dec 2	9.6	10,197	43,512	0.5	11,251	30,241
Dec 3	9.3	16,381	55,176	0.7	16,873	143,362
Dec 4	8.9	22,600	76,462	1.2	22,672	108,653
Dec 5	8.7	28,578	88,870	1.2	28,704	138,094
Dec 6	8.6	35,168	98,378	1.4	35,776	163,320
Dec 7	8.7	43,049	102,318	1.3	43,211	197,054
Dec 8	8.0	52,084	116,551	2.0	52,664	219,134
Dec 9	7.7	67,434	189,626	2.3	67,688	384,083
Dec 10	6.0	116,356	338,844	4.0	150,442	1,301,010
Total	85.1	35,940	102,414	14.9	70,160	503,971

Table 10: Income and wealth distribution averages based on the second definition of entrepreneurs (self-employed) - Decile thresholds based on Total Family Money Income.

A) 1984 PSID data

	Workers			Entrepreneurs		
	Percent	Income	Wealth	Percent	Income	Wealth
Dec 1	8.5	8,542	10,243	1.9	-5,489	98,115
Dec 2	8.3	14,564	19,387	1.3	14,464	115,868
Dec 3	8.9	19,637	23,823	1.0	19,763	113,796
Dec 4	9.2	24,394	88,077	0.8	24,649	179,020
Dec 5	9.0	29,154	42,075	1.0	29,234	361,668
Dec 6	8.9	34,253	57,778	1.0	33,568	155,762
Dec 7	9.0	39,870	61,904	1.2	40,511	250,532
Dec 8	8.6	47,039	72,756	1.4	47,592	196,638
Dec 9	8.3	58,228	128,408	1.5	59,678	374,484
Dec 10	7.0	90,212	210,720	3.0	136,767	705,361
Total	85.8	35,473	68,754	14.2	51,086	307,921

B) 1989 PSID data

	Workers			Entrepreneurs		
	Percent	Income	Wealth	Percent	Income	Wealth
Dec 1	8.2	9,611	20,810	1.7	4,549	139,916
Dec 2	8.3	18,442	38,212	1.7	18,739	82,359
Dec 3	8.7	25,014	38,071	1.3	25,108	145,096
Dec 4	8.7	30,889	52,508	1.2	30,941	210,203
Dec 5	8.5	37,203	60,312	1.6	36,720	227,838
Dec 6	9.0	43,752	70,949	1.3	43,781	260,006
Dec 7	8.2	50,967	82,125	1.5	51,151	209,569
Dec 8	8.0	60,990	108,649	2.0	61,428	405,976
Dec 9	8.0	77,856	173,848	2.0	78,624	527,635
Dec 10	6.4	128,936	381,755	3.6	182,782	1,785,796
Total	82.1	46,139	95,228	17.9	69,111	565,240

Figure 1: Fraction of business families in each wealth class as average of 1984 and 1989 PSID data.

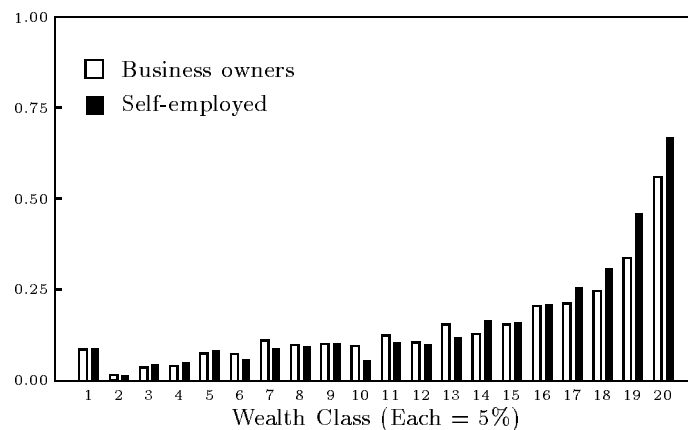


Figure 2: Average per-family wealth of workers and business families in each income decile as average of 1984 and 1989 PSID data. The top graph adopts the first definition of entrepreneurs while the bottom graph adopts the second definition of entrepreneurs.

