

A reestimation of the Evans–Jovanovic entrepreneurial choice model

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Abstract

The Evans–Jovanovic finding that entrepreneurial ability and wealth are negatively correlated is puzzling. We show that this may result from a downward bias in their wealth data. Using less-biased wealth data, we find a positive correlation, which is theoretically more justifiable. © 1998 Elsevier Science S.A.

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1. Introduction

In an analysis of entrepreneurial choice among young white males in the U.S., Evans and Jovanovic, 1989 found a negative correlation between net family assets and (unobserved) entrepreneurial ability. This finding was used to support their conclusion that entrepreneurs, especially those with high ability, face binding financial constraints.

The negative correlation is theoretically implausible. By extending the EJ model so that wealth is endogenized, we show that if entrepreneurs know that they are able and expect to face financial constraints, they will accumulate wealth before making the entrepreneurial choice decision.

Then why did EJ find a negative correlation? An examination of their wealth data shows that wealth is downward biased. The net family assets variable used by EJ was drawn from the National Longitudinal Surveys (NLS), which was measured as the sum of net residential assets, savings, bonds, stocks, and other investment assets. Many individuals did not report full assets information, however, which caused a downward bias of wealth and an upward bias of estimated entrepreneurial ability. These biases may explain why a negative correlation was found.

The availability of new NLS data allows us to exclude individuals who failed to report complete asset information yet still have a sample of a size comparable to that of EJ. The reestimation yields a positive correlation between ability and wealth.

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2. Theoretical issue

This section shows that a negative correlation between entrepreneurial ability and wealth is theoretically implausible. We extend EJ's one-period entrepreneurial choice model to a two-period model in which wealth is endogenously determined. As in EJ, individuals differ in entrepreneurial ability (θ) and they know their own ability. We assume zero wealth endowments so that all individuals are wage workers in period 1. Each individual receives wage income (w) at the end of period 1, which is divided into consumption (c_1) and savings (z). Entrepreneurial choice occurs in period 2. All individuals are risk neutral and the occupational choice decision is made to maximize life-time consumption.¹

The period-2 income for a wage worker is $w + rz$, where r is the (gross) safe interest rate. The period-2 income for an entrepreneur equals $y + r(z - k)$, where y denotes entrepreneurial earnings and k is the amount he invested in his own business. Entrepreneurial earnings depend on both ability and investment, $y = \theta k^\alpha$, where $\alpha < 1$. Following EJ, assume that an individual can borrow no more than $(\lambda - 1)z$, where $\lambda > 1$ measures the tightness of financial constraints. An entrepreneur's desired investment can be solved from maximizing $\theta k^\alpha + r(z - k)$. The solution is $k^* = (\theta\alpha/r)^{\frac{1}{1-\alpha}}$. Thus, an entrepreneur is financial constrained if $k^* > \lambda z$.

The present value of the life-time consumption of an entrepreneur is given by

$$I_e = c_1 + \frac{y + r(z - k)}{r}. \quad (1)$$

For an entrepreneur who is financially constrained, $k = \lambda z$. Using $c_1 = w - z$ and $y = \theta k^\alpha$, we can rewrite (1) as

$$I_e = w + \frac{\theta(\lambda z)^\alpha}{r} - \lambda z. \quad (2)$$

The first-order condition of maximizing I_e with respect to z yields

$$z = \frac{1}{\lambda} \left(\frac{\theta\alpha}{r} \right)^{\frac{1}{1-\alpha}}, \quad (3)$$

which implies that wealth and ability are positively correlated for financially-constrained entrepreneurs. It can be easily shown that for entrepreneurs who are not financially constrained, there is no correlation between ability and wealth. Thus, EJ's finding of a negative correlation between ability and wealth lacks theoretical justification.²

3. Data issue

Since the EJ result is theoretically implausible, why was it obtained? The reason may be due to a downward bias in their wealth data. EJ drew data from the National Longitudinal Surveys (NLS),

¹The attitude towards risk may play an important role in entrepreneurial choice, as shown by Kihlstrom and Laffont (1979).

²These results are based on a model in which individuals know their ability before making the entrepreneurial choice decision. In the literature, Lucas (1978) adopts this assumption while Jovanovic (1982) assumes that ability is known only after an individual becomes an entrepreneur.

1966–1981. The provider of the NLS data, the Center for Human Resource Research, calculated “net family assets” in 1971, 1976, and 1981 based on asset information from the surveys. Net family assets in 1976 were used in EJ’s estimation.

The net assets variable constructed by the Center, however, is likely to be downward biased. The Center uses the following formula: Net Assets = Net Residential Assets + Savings + Bonds + Stocks + Net Investment in Farm/Business/Real Estate – Other Debts. If an individual reported all asset information, this formula would give a good estimation of his net wealth. The fact is, however, that many individuals did not provide full asset information. For example, the individual with the identification code 1416 reported net residential assets of \$20 000 and bond assets of \$25 but did not report any other assets. His net assets were calculated to be \$20 025.³

When wealth is biased downward, the estimated entrepreneurial ability is biased upward because of the ability–wealth trade-off in entrepreneurial choice. These biases may cause individuals with (underestimated) low wealth to have (overestimated) high ability, leading to a negative estimated correlation between ability and wealth.

In our reestimation of the EJ model, we include only the individuals who reported full asset information. While this alleviates greatly the downward bias in wealth, the sample size is significantly reduced. Fortunately, new National Longitudinal Surveys of Youth (NLSY) have been conducted since 1979, and assets information were surveyed in 1985, 1986, 1987, 1988, 1989, and 1990. Although the number of individuals who reported complete asset information in each year is small,⁴ the total number in the six years is not. Specifically, we combine six subsamples of 1985–86, 1986–87, 1987–88, 1988–89, 1989–90, and 1990–91. The first year in each subsample period is the base year when individuals were wage workers, and the second year is the selection year when entrepreneurial choice took place. This yields a sample of 2555 white males; 76 of whom entered self-employment in the selection year. The sample is of a size compatible to that of EJ (1949 white males; 89 of whom entered self-employment), but wealth in our data set is less biased than that in EJ’s data set. Table 1 displays the summary statistics of variables in our sample and in EJ’s sample.

4. Results

The correlation between wealth and (unobserved) ability is estimated using maximum likelihood method. Following EJ, we assume that wage earnings depend on work experience, education, and an iid variable that follows a lognormal distribution, $\log \xi \sim N(-\sigma_\xi^2/2, \sigma_\xi^2)$, and entrepreneurial earnings depend on an iid variable that follows a lognormal distribution, $\log \varepsilon \sim N(-\sigma_\varepsilon^2/2, \sigma_\varepsilon^2)$. Ability and wealth are assumed to follow $\ln \theta = \delta_0 + \delta_1 \ln z + \eta$, where $\eta \sim N(0, \sigma_\eta^2)$. The interest rate is chosen to be 10 percent, as in EJ.

Table 2 compares results from our estimation and EJ’s estimation.⁵ In sharp contrast to EJ, we find that ability and assets are positively correlated. This finding is theoretically more justifiable, as shown in Section 2, and is estimated from less-biased wealth data, as indicated in Section 3.

³It is worth noting that the Center for Human Resource Research is no longer calculating net family assets, probably because of this downward bias problem.

⁴The number is 246, 304, 384, 415, 556, and 650 respectively for the six years between 1985 and 1990.

⁵The sample size is reduced from 2555 to 1443 because of missing data on wage, experience, and education, and the exclusion of individuals with negative net wealth. Details of the sample are available from the author.

Table 1
Summary statistics of variables

| Variable | Current Sample | EJ's Sample |
|-------------------|----------------------|----------------------|
| SelfEmployed | .0201 (.1404) | .0409 (.2022) |
| Net Family Assets | 27.5559 (28.4256) | 20.0092 (50.0533) |
| Income | 27.9846 (22.1826) | 17.6553 (19.1731) |
| Work Experience | 9.4142 (2.1457) | 11.9959 (12.5343) |
| Education | 13.3950 (2.1927) | 13.9390 (14.1546) |

Notes: Means are reported and standard errors are in parentheses. Assets and income in the current sample is in thousands of 1985 dollars. Assets in EJ's sample is in thousands of 1976 dollars, and income in EJ's sample is in thousands of 1978 dollars.

Our estimation also yields more plausible estimates concerning the riskiness of entrepreneurial career. We find that the standard deviation for entrepreneurial earnings is significantly larger than that for wage earnings, which is consistent with the general belief that entrepreneurial career is riskier; EJ

Table 2
Maximum likelihood estimates

| Coefficient | Name | Current Sample | EJ's Sample |
|--|--------------|-------------------|-------------------|
| Log entrepreneurial ability (correlation with assets) | δ_1 | .1413 (.0383) | -.1160 (.0343) |
| Log entrepreneurial ability (constant term) | δ_0 | .3498 (.0793) | 2.3388 (.0498) |
| Financial constraint | λ | 2.0089 (.0832) | 1.7263 (.0782) |
| Capital returns | α | .2294 (.0734) | .3862 (.0822) |
| Experience returns | γ_1 | .0385 (.0832) | .3225 (.0390) |
| Education returns | γ_2 | .0310 (.0831) | .7200 (?) |
| Standard deviations for: | | | |
| Entrepreneurial ability | σ_n | .0298 (.0831) | .2682 (.0139) |
| Entrepreneurial earnings | σ_e | .6893 (.0510) | .2666 (.0222) |
| Wage Earnings | σ_ξ | .0395 (.0831) | .4114 (.0043) |
| Log likelihood | | -34.1601 | -954.0183 |
| Observations | | 1443 | 1443 |

Notes: Estimation performed with the MAXLIK procedure in GAUSS. Asymptotic standard errors are in parentheses. EJ refers to Evans and Jovanovic (1989). The standard error for education returns in the EJ estimation is missing in the original paper. The number of observations being the same in the two samples is a coincidence.

found the opposite. Our result on financial constraints is similar to that of EJ. The point estimate of the tightness of the financial constraint is 2.01, which is slightly higher than EJ's estimate of 1.73.

5. Conclusion

The Evans–Jovanovic finding of a negative correlation between entrepreneurial ability and wealth is puzzling. We show that this may result from a downward bias in their wealth data. Using less-biased wealth data to reestimate the EJ model, we find a positive correlation between wealth and ability, which is theoretically more justifiable.

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