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Moonlighting Entrepreneurs

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Abstract

When ability complements effort, we would expect effort to increase with variables that proxy for ability. For example, we show that the hours worked by entrepreneurs should increase in experience, a proxy for ability. Yet, even if education is positively correlated with entrepreneurial ability, it is shown that the relationship between education and hours worked is ambiguous. This is because education allows small business owners to work outside the venture (moonlight) at higher wages. These predictions are supported by existing empirical work.

In schools and in the workplace the popular opinion is the idea of 'specialization.' That is, in order to make more money or get promoted, you need to 'specialize'... My educated dad believed in the same dogma. That is why he was thrilled when he eventually achieved his doctorate. He often admitted that schools reward people who study more and more about less and less. Rich dad encouraged me to do exactly the opposite. 'You want to know a little about a lot' was his suggestion. That is why for years I worked in different areas of his companies.
        Kiyosaki and Lechter (2000, p. 134)

1. **Introduction**

        The quote from the popular non-fiction book above argues that experience—not education—will lead budding "rich dads" to entrepreneurial success. This paper derives comparative statics for entrepreneurial hours worked based on observable characteristics. This paper argues that the more hours worked (effort expended) the more likely will the small business venture succeed. Since at least Mirlees (1971) it has been recognized in the economics literature that ability is an unobservable characteristic. We demonstrate that while experience may serve as a proxy for a small business woman's ability, years of education completed may lead to puzzling empirical results. The reason for this is that the experienced but less educated have a lower opportunity cost in non-entrepreneurial ventures, relative to the more educated labor market participants. For this reason, education may not be associated with more hours worked (or ultimately entrepreneurial success) in small business data sets. Yet, we should expect hours worked to be positively associated with the small business owner's experience.

        One of the greatest contributions that small business owners put into their firm is their time. This note considers how entrepreneurs of small ventures divide their time. It presents a simple model that captures some of the empirical regularities that emerge from the data in the Survey of Consumer Finances and the Survey of Small Business Finances. The former survey is conducted by the Federal Reserve and the U.S. Treasury every three years, and the latter is conducted by the Federal Reserve every five years. Since most of the business owners are small entrepreneurs, any statistical analysis of this data is going to be driven by these small business owners with firms of very modest sales and annual profits. Bitler *et al.* (2005) reports that the entrepreneurs in their sample of the firms in the Survey of Consumer Finances from 1989 to 2001 had a firm with median sales of $90,000 and median sum of entrepreneurial salary and profits of $39,000. The median firm in that sample had three employees, including the entrepreneur.

        The primary distinction between this paper and a more standard model on entrepreneurial agency such as the one in Bitler *et. al* (2005) or Wu (2008) is the entrepreneur's tendency to pursue money-making opportunities outside of her venture. Both these studies present theoretical and empirical models of entrepreneurial effort. They both use hours worked by the entrepreneur in her business as a proxy for the owner's effort. Because most ventures are so small in the data sets of Bitler *et al.* (2005) and Wu (2008), many of these small business owners are likely to supplement their income with outside employment. Neither Bitler *et al.* (2005) or Wu (2008) addresses how the potential for moonlighting affects the entrepreneur's hours worked. In contrast, this paper does model how moonlighting affects the business owner's hours worked. This paper's predictions are consistent the results in both the aforementioned papers.

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There is also some similarity between the jack-of-all-trades theory of entrepreneurship proposed by Lazear (2004) and Lazear (2005) and the thesis of this paper. That theory says that entrepreneurs are most effective when they acquire skills in many areas instead of specializing in one area of education or human capital. The aforementioned studies by Lazear, Wagner (2003), and Wagner (2006) find that entrepreneurs have more eclectic educational backgrounds and work histories than other survey participants who have never run their own businesses. This paper too argues that years of education completed will be a poor predictor of entrepreneurial success. Yet, in contrast to the jack-of-all-trades theory, the opportunity cost (or moonlighting) theory of the present paper is silent about how entrepreneurial ability is best acquired. Instead, it argues that observed years of experience will be correlated with entrepreneurial success and hours devoted to the enterprise. The jack-of-all trades theory is more concerned with who becomes an entrepreneur while this paper focuses on what entrepreneurs do after they have started their venture.

2. Model

2.1 Exogenous Capital Structure

The standard approach in the agency literature would be to treat capital structure, the choice of outside debt and equity, as an endogenous decision made by the entrepreneur. Nevertheless, it is very hard to sell outside equity for anything close to the value of the discounted cash flows it generates. Indeed, Bitler *et al.* (2005) report that about sixty percent of the firms in their sample have a 100 percent equity owner. This seems most consistent with the case that entrepreneurs face financial constraints that prevent them from fine-tuning their equity stakes. The other most likely outcome that Bitler *et al.* (2005) found was that the owner-manager has one partner with about a 50 percent stake. This is the case with about 20 percent of the firms in their sample. Therefore, it is likely the that the entrepreneur feels that he or she holds too much equity and what little equity she has sold was not the amount she wanted to sell, but brought about by an unrepeatable chain of events. Perhaps the entrepreneur has sold an equity stake s to an amicable auntie perhaps, where $s \in [0, 1)$.

In addition, it is hard to borrow unsecured against anything but real assets and salable machines. Yet, depending on the business cycle and the venture manager's ability to impress a stingy banker about her inevitable success, she will likely borrow too little for her liking when things are going well. When things are going poorly, her firm will be drowning in debt, and even her family members will refuse to put up equity stakes to pay down those liabilities. The credit constraints when prospects are good and debt overhang when times are bad will mean most small business owners will believe their current debt level has been thrust upon them. It certainly is not some rational calculation revisited every year or season.

Suppose that the entrepreneur has promised $D \geq 0$ to her bankers. Equity investors, including the entrepreneur, are residual claimants receiving all the profits after the debt is paid. If D is not paid, bond holders receive all the firm's profits until the debt is paid.

2.2 Time Allocation

We will assume that the entrepreneur has utility that is linearly increasing in consumption, $U(c) = c$. Let us have U denote utility and c denote consumption. In this simple

model, the business owner consumes all her earnings. There are two possible profit realizations R and r, where $R > r$. The probability of the high returns are $p(h) = \ln(1 + \alpha h)$, and the probability of low returns are $1 - p(h) = 1 - \ln(1 + \alpha h)$. $h \in [0,1]$ is the fraction of her working hours that the business owner devotes to her small business. The exogenous parameter alpha, α, measures the entrepreneur's ability to generate high returns. To constrain the probability of high returns to be between zero and one, we will define $\alpha \in (0, e - 1]$, where e is the exponential number. The probability of high returns is increasing in hours worked, $\dfrac{\partial p(h)}{\partial h} = \dfrac{\alpha}{1 + \alpha h} > 0$. Yet, the chances of success are increasing at a decreasing rate when the entrepreneur increases her hours worked, $\dfrac{\partial^2 p(h)}{\partial h^2} = -\dfrac{\alpha^2}{(1 + \alpha h)^2} < 0$.

We will abstract away from the whole labor-leisure tradeoff and wealth effects that bedevil labor economists. (It is often ambiguous whether hours worked rises or falls with wealth or income.) We will assume that the entrepreneur's total working hours are fixed. Moreover, the entrepreneur has linear utility in income. Given the puzzling low monetary returns to entrepreneurship reported in Moskowitz and Vissing-Jørgensen (2002), assuming risk neutrality is not too far off the mark. That paper argues that the expected returns to entrepreneurship are on the order of 10 percent lower than what economic theory says they should accept for taking on such undiversified risk.

The time spent moonlighting is $1 - h$. This outside employment pays a wage w per fraction of the time spent moonlighting, where $w \in [0, +\infty)$. Total wages from moonlighting are $w(1 - h)$.

Finally, let us consider the case in which the debt is risky, $R > D > r$. In this case, the entrepreneur only gets to consume the profits from her venture in the case of high returns.

2.3 Observable Indicators of Ability

This note is primarily concerned with how observable indicators of entrepreneurial ability will affect the hours worked by the entrepreneur. Two indicators of higher than average ability are education and experience. Let us use "E" to denote years of education and "X" to denote years of experience. Let us assume that ability and outside wages will increase in education. Further, let us assume that ability increases in experience. In summary, we are assuming the following about the relationship between ability and moonlighting wages when education and experience, respectively increase:

$$(i) \quad \frac{\partial \alpha}{\partial E} > 0$$

$$(ii) \quad \frac{\partial w}{\partial E} > 0$$

$$(iii) \quad \frac{\partial \alpha}{\partial X} > 0$$

$$(iv) \quad \frac{\partial w}{\partial X} = 0$$

For all other exogenous parameters we will assume that there will be no effect to increasing either education or experience.

There is evidence that educational achievement is better correlated with labor market success, a high w, than previous work experience. Addison (1989) for example shows that unemployment duration increases in experience but decreases in years of education. Kletzer (1996) finds that the reemployment wages of previously unemployed workers are significantly higher in almost all industry sectors when they have more years of schooling. Yet, a worker's tenure at a previous employer usually has no significant relationship between that worker's wages in his or her new job.

3. Analysis

The entrepreneur will want to maximize the following utility function, U:

$$\max_{w.r.t.\ h} U = (1-s)[\ln(1+\alpha h)](R-D) + (1-h)w \qquad (1)$$

The first order condition is the following when the small business owner engages in some moonlighting and spends some time working at her own business, $0 < h' < 1$:

$$\frac{\partial U}{\partial h} = \frac{\alpha(1-s)(R-D)}{1+\alpha h'} - w = 0$$
$$\Rightarrow h' = \frac{(1-s)(R-D)}{w} - \frac{1}{\alpha} \qquad (2)$$

$h' > 0$ only if the marginal returns when the entrepreneur works zero hours at her venture exceeds the wage rate from moonlighting. That is $h' > 0$ iff $\alpha(1-s)(R-D) > w$. If this were not the case, then the entrepreneur would be better off devoting all her time to her outside employment and not spending any time managing her venture.

The second order condition is clearly negative, indicating a maximum point at h'.

$$\frac{\partial^2 U}{\partial h^2} = -\frac{\alpha(1-s)(R-D)}{(1+h\alpha)^2} < 0 \qquad (3)$$

Proposition 1
The entrepreneur will only work a non-zero number of hours in her venture if and only if her returns in the case of success, $(1 – s)(R – D)$, exceed the ratio of the entrepreneur's opportunity cost, w, to entrepreneurial ability, α. That is,

$$h' > 0 \quad \text{iff} \quad (1-s)(R-D) > \frac{w}{\alpha}$$

This follows from h' in equation (2).

When $h' \le 0$ in (2), then the business will fail with a probability equal to 1.

The entrepreneur's hours worked are declining in the amount shares sold to outside investors and the amount of risky debt issued:

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$$\frac{\partial h'}{\partial D} = -\frac{1-s}{w} < 0 \quad \&$$

$$\frac{\partial h'}{\partial s} = -\frac{R-D}{w} < 0, \qquad\qquad (4)$$

when $0 < h' < 1$.

Risky debt, D, and outside equity, s, reduce the entrepreneur's hours worked in the venture. This point was made by Jensen and Meckling (1976). Wu (2008) finds that both the level of debt and percentage of outside equity have a negative and significant sign when the entrepreneur's hours worked is the dependent variable.

This paper is more interested in the next two comparative statics. More able entrepreneurs, with a higher α, who are better able to ensure that the firm reaches the high returns, will work more hours in their business. This former relationship is the ability effect. Entrepreneurs who have higher outside option wages, w, will also work more hours moonlighting. This latter relationship is the outside opportunities (moonlighting) effect. When the entrepreneur splits his time between working in the venture and moonlighting, $0 < h' < 1$, the comparative statics for these exogenous changes are the following:

$$\frac{\partial h'}{\partial \alpha} = \frac{1}{\alpha^2} > 0 \qquad\qquad (5)$$

$$\frac{\partial h'}{\partial w} = -\frac{(1-s)(R-D)}{w^2} < 0 \qquad\qquad (6)$$

Let us differentiate hours worked, h', with respect to the entrepreneur's level of education. Education affects the hours worked through both the ability parameter and the outside option wage parameter according to assumptions (*i*) and (*ii*).

$$\frac{\partial h'}{\partial E} = -\frac{(1-s)(R-D)}{(w^2)}\frac{\partial w}{\partial E} + \frac{1}{(\alpha^2)}\frac{\partial \alpha}{\partial E} \qquad\qquad (7)$$

In equation (7), the first term is unambiguously negative and the second term is unambiguously positive. Without knowing the relative magnitude of both terms, the overall sign of equation (7) is ambiguous.

Herein lies the ambiguity between the relationship between the entrepreneur's education attainment and the hours worked in her business. On one hand, we would expect educational attainment to be a proxy for ability. Therefore, highly educated entrepreneurs would be more able and have a high α. On the other hand, we would expect highly educated entrepreneurs to have a high outside option wage. More educated people would have a higher market wage from moonlighting. Which effect dominates is an empirical question. Wu (2008) finds that the entrepreneur's hours worked declines with his or her years of education. This effect is

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statistically significant, but not strongly significant. This evidence from Wu (2008) is consistent with the outside option (moonlighting) effect dominating.

In contrast, the hours worked are unambiguously increasing in the entrepreneur's experience. To show this, we can differentiate equation (2) with respect to experience, *X*, and use the signs in assumptions (*iii*) and (*iv*) to sign the equation below:

$$\frac{\partial h\,'}{\partial X} = \frac{1}{(\alpha^2)}\frac{\partial \alpha}{\partial X} > 0 \tag{8}$$

Proposition 2
   (a) There is an ambiguous theoretical relationship between an entrepreneur's education level and the hours that she devotes to her business.
   (b) The number of hours that the entrepreneur devotes to her venture is increasing in her experience.

This proposition follows from equations (7) and (8).

4. Conclusion

Small business owners have a choice between devoting time to their venture and working for wages as an employee of another firm. Indeed, if the ratio of wages from external employment over entrepreneurial ability gets too high, then the business owner will close down her venture. This paper has presented a simple theoretical model that argues that a small business owner's effort (hours) will increase in the entrepreneur's experience. Yet, when the entrepreneur can moonlight in other employment, there is no clear theoretical relationship between hours worked and the business owner's level of education.

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