Balanced Skills and Entrepreneurship

Author(s): Edward P. Lazear

Source: *The American Economic Review*, May, 2004, Vol. 94, No. 2, Papers and Proceedings of the One Hundred Sixteenth Annual Meeting of the American Economic Association San Diego, CA, January 3-5, 2004 (May, 2004), pp. 208-211

Published by: American Economic Association

Stable URL: https://www.jstor.org/stable/3592884

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at https://about.jstor.org/terms

is collaborating with JSTOR to digitize, preserve and extend access to *The American Economic Review*

This content downloaded from 81.204.63.90 on Tue, 23 Jan 2024 12:29:09 +00:00
All use subject to https://about.jstor.org/terms

Balanced Skills and Entrepreneurship

By EDWARD P. LAZEAR*

Entrepreneurs perform many tasks. Consider the founder of a new small restaurant. In addition to being a good cook, the founder must be able to obtain funds, hire workers, choose location and decor, obtain food supplies at a reasonable cost, keep books, and market the restaurant. Being a good cook is insufficient for success. In order to hire someone to perform the other tasks, it is necessary to have at least some basic knowledge of the outsourced area so that the right vendor decisions are made.

As a consequence, entrepreneurs must be jacks-of-all-trades to some extent. Although they need not be expert in any single skill, they must be sufficiently good at a wide variety to make sure that the business does not fail.[1] There is a "weakest link" feature to running a successful business, which means that entrepreneurs must be multi-skilled.

Even if individuals are not endowed with the complete set of skills necessary to start a business, they can acquire those skills. The theory, which predicts that entrepreneurs should be generalists and that those who work for others should be specialists, implies that human-capital investment patterns should differ between those who end up being entrepreneurs and those who end up working for others.

Using data from Stanford Master of Business Administration (MBA) alumni, it is found that those who end up being entrepreneurs study a more varied curriculum when they are in the program than do those who end up working for others. That result, coupled with other findings on on-the-job training patterns reported in Lazear (2003), provides support for the following notions: first, that entrepreneurs are generalists, and second, that they make their skills more general by following a particular investment profile.[2]

This view of entrepreneurship is at odds with the intuition of those who believe that entrepreneurs are technical specialists who base their new companies on innovation. The Stanford data and other information from the Current Population Survey (CPS) and the German Socio-Economic Panel (GSOEP) strongly reject this view. To the extent that entrepreneurs are innovators, for the most part they are business innovators. The innovation may be as seemingly minor as recognizing that a particular street corner would be a good location for a dry cleaner. Most entrepreneurs are nontechnical people who form businesses in nontechnical fields.

I. Theory

The production function contemplated for the analysis is the following. Those who work for others can specialize in one skill, but entrepreneurs are limited by their weakest skill. Let there be two skills, x_1 and x_2. To make this concrete, albeit extreme, let income of specialists be given by

$$\text{(1)} \quad \text{income of specialists} = \max[x_1, x_2]$$

and

$$\text{(2)} \quad \text{income of entrepreneurs} = \lambda \min[x_1, x_2]$$

where λ is a market determined parameter that sets the price of entrepreneurial talent so as to equate supply and demand.[3] This formulation captures the point that entrepreneurs must be good at a number of different skills to put a business together.

Individuals are endowed with some basic talent, but they also can augment those skills by acquiring certain types of human capital. Define x_1^0 as the

* Hoover Institution and Graduate School of Business, Stanford University, Stanford, CA 94305-6010.

[1] The theory and empirical analysis that is summarized in this paper is based on Lazear (2003).

[2] Joachim Wagner (2003), using data from Germany, finds exactly the same effect, as does Uschi Backes-Gellner and Lazear (2003), which provides even more general support for the hypothesis.

[3] The λ parameter, as well as the income functions in (1) and (2) can be derived from a generalized production function that would be expected to prevail in the overall economy. This is shown in Lazear (2003). Thus, (1) and (2) are not as restrictive as they may appear.

This content downloaded from
81.204.63.90 on Tue, 23 Jan 2024 12:29:09 +00:00
All use subject to https://about.jstor.org/terms

initial stock of skill x_1, x_2^0 as the initial stock of skill x_2, and x_1 and x_2 as the (final) attained level. Let the individual obtain levels of x_1 and x_2, given the initial stock according to the cost function

$$C(x_1, x_2, x_1^0, x_2^0)$$

with $C_1, C_2 > 0$, $C_{ii} > 0$.

Let x_1 be the skill with which the individual is endowed in the largest amount. Although it is not necessarily the case, as long as C_1 is not too much larger than C_2 at the endowment points, the individual who plans to specialize will augment his investment by investing in x_1 so as to obtain

$$\max_{x_1}[x_1 - C(x_1, x_2)]$$

with first-order condition

$$1 - C_1(x_1, x_2) = 0.$$

Someone who is going to specialize will only invest in one of the two skills. There is no value to augmenting a skill that will not be used. It is possible that C_2 is sufficiently low relative to C_1 that the individual will ignore his higher endowment of x_1 and instead specialize in x_2. This is of little importance. Essential here, is that the specialist invests in one or the other, but not both.

Now consider an individual who is going to become an entrepreneur. His constraint is the minimum skill, defined to be x_2. Should the aspiring entrepreneur invest in x_1, in x_2, or in both?

Since the constraint is x_2, there is no point in investing in x_1 unless x_2 is brought up at least to the level of x_1. If there is an interior solution for x_2, then it satisfies

$$\lambda - C_2(x_1, x_2) = 0.$$

There are three possibilities, but they can be dealt with quickly. If $C_2(x_1^0, x_2^0) > \lambda$, then it does not pay for the individual to increase his stock of x_2, and so no investment occurs. (It surely does not pay to increase x_1 since there is already an excess of x_1 at x_1^0.) If $C_2(x_1^0, x_2^0) < \lambda$, but $C_2(x_1^0, x_1^0) > \lambda$, the individual will invest only in x_2 because it does not pay even to bring x_2 up to the endowed level of x_1. (There is no advantage to augmenting x_1 until x_2 has reached the level of x_1.) In this case, the individual specializes in investment in x_2 and behaves identically to a specialist, except that he invests in the skill in which he is weak instead of the skill in which he is strong, which is the more common case for the specialist. Finally, if $C_2(x_1^0, x_1^0) < \lambda$, then it pays for the individual to exceed x_1^0 in attained x_2. But now x_1 becomes the constraint. As long as $C_1(x_1^0, x_1^0) < \lambda$, the individual benefits by increasing his investment in x_1 as well and continues to do so, but the optimum must have $x_1 = x_2$ in this case. What is important, however, is that, in this situation, the individual does not look like a specialist; he invests in more than one skill.

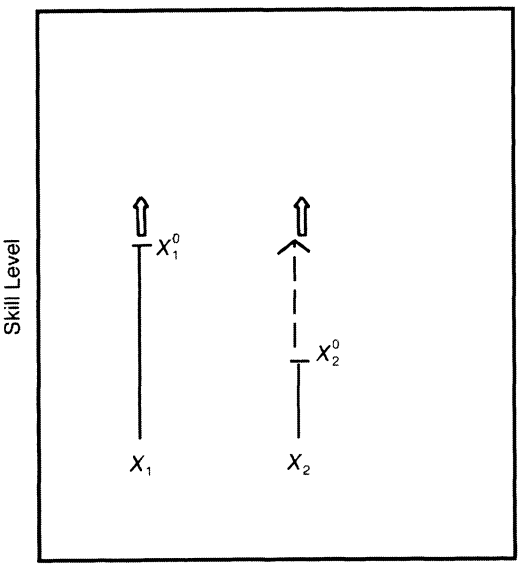

FIGURE 1. INVESTMENT IN x_1 AND x_2 BY ENTREPRENEURS AND SPECIALISTS

Figure 1 illustrates the point. An aspiring entrepreneur who starts out with (x_1^0, x_2^0) starts moving x_2 up to the level of x_1 (dashed arrow). He may stop short of that level, if investing in x_2 becomes too expensive. But once x_2 is brought up to x_1^0, any investment beyond x_1^0 raises x_1 and x_2 by the same amount.

To summarize, those who are going to specialize invest in only one skill. Those who become entrepreneurs may invest in one skill, but if they do so, it will be the skill in which they are weak. But entrepreneurs are the only individuals who may invest in more than one skill. To put this in somewhat less stark terms, individuals who become entrepreneurs should have a more balanced investment strategy on average than those who end up specializing as wage and salary workers.

This content downloaded from
81.204.63.90 on Tue, 23 Jan 2024 12:29:09 +00:00
All use subject to https://about.jstor.org/terms

TABLE 1—INDUSTRIAL AND OCCUPATIONAL BREAKDOWN OF ENTREPRENEURS IN THE 2002 CPS

Detailed occupation	Percent
Other executive, administrative and managerial	32.97
Supervisors and proprietors, sales occupations	12.44
Construction trades	6.09
Health diagnosing occupations	5.38
Management-related occupations	4.92
Detailed industry	**Percentage of total**
Construction	13.48
Other retail trade	12.98
Other professional services	11.02
Business services	8.10
Insurance and real estate	6.72

TABLE 2—MEANS AND STANDARD DEVIATIONS OF RELEVANT VARIABLES

Variable	Whole sample	Specialists	Entrepreneurs
Ever an entrepreneur?	0.24	0	1
Number of business started?	0.34 (0.71)	0 (0)	1.4 0.78
SPECIAL	2.48 (1.12)	2.51 (1.14)	2.35 (1.04)
EXPERIENCE	17.0 (10.1)	16.2 (10.0)	19.7 (10.2)
MALE	0.83	0.82	0.89
MBA year	74.2 (14.2)	74.3 (14.3)	73.2 (13.6)
Age	50.2 (13.6)	50.2 (13.6)	51.1 (12.7)
Number of observations:	27,283	25,482	1,801

Note: Standard deviations are reported in parentheses.

II. Empirical Analysis

A quick look at the 2002 CPS data reveals that entrepreneurs, defined as the incorporated self-employed, are found primarily in nontechnical occupations and not in high-tech industries. Table 1 reports the top five categories for industry and occupation. It is executives and other administrative personnel who form the bulk of entrepreneurs, and they are found primarily in construction, retail trade, and professional services. These occupations and industries are consistent with the idea that entrepreneurs are generalists, rather than the technical specialists who often come to mind.

The Stanford alumni data provide more direct evidence on generalized educational investment patterns. In the late 1990's, Stanford surveyed its Graduate School of Business alumni (from all prior years). The primary focus of the survey was compiling a job history for each of the graduates, with special emphasis on information about starting businesses.[4] This resulted in a sample of about 5000 respondents. These data were matched with the student transcripts so that it is possible to see which courses were taken by those who went on to be entrepreneurs and which by those who became specialists.

For the purposes here, the key variable is the degree of specialization in a student's study program. Define "SPECIAL," the measure of specialization, as the difference between the number of courses taken in the student's field of specialty and the average number of courses taken in other fields. "Field of specialty" is defined simply as the field in which the student took the largest number of courses. For example, suppose a student took eight courses in finance, two in economics, four in organizational behavior, two in statistics, and four in accounting. SPECIAL would equal 5, because there are eight courses in the specialty and three, on average, in other fields. The larger is SPECIAL, the less general is the curriculum and the less likely the student is to be an entrepreneur. Table 2 provides summary statistics on variables used in the analysis.

Simple correlations can be picked up by examining Table 2. Specifically, the degree of specialization in courses as measured by SPECIAL is 0.16 (with a standard error of 0.009) smaller among those who at some point in their careers become entrepreneurs than among those who do not. This is consistent with the idea that those who become entrepreneurs adopt a more general investment profile.

Table 3 provides a more systematic look. A logit, where the dependent variable is whether the individual was ever an entrepreneur, and a tobit, counting the number of businesses started where the lower bound is zero, were run. Since not all have finished their careers, the analyses correct for experience at the time that the observation truncates (either the end of the career or the last year before the survey).

[4] The response rate was 40 percent. Some individuals were very old, and others were no longer alive, which accounts for some of the nonresponses.

This content downloaded from
81.204.63.90 on Tue, 23 Jan 2024 12:29:09 +00:00
All use subject to https://about.jstor.org/terms

TABLE 3—TOBIT AND LOGITS WITH STANFORD COURSE DATA: NUMBER OF BUSINESSES STARTED (TOBIT) AND EVER STARTED A BUSINESS (LOGIT)

Variable	Logit	Tobit
EXPERIENCE	0.0259	0.0266
	(0.0185)	(0.0196)
SPECIAL	−0.1458	−0.1452
	(0.0581)	(0.0592)
MALE	0.6025	0.6305
	(0.1511)	(0.1531)
MBA year	−0.0318	−0.0384
	(0.0215)	(0.0224)
AGE	0.0250	0.0264
	(0.0179)	(0.1531)
Constant	0.0202	0.3243
	(2.4182)	(2.4897)
Log likelihood:	−841	−1,181
Number of observations:	1,952	1,950

Note: Standard errors are reported in parentheses.

The SPECIAL variable enters negatively and significantly. The effect is substantial. In the logit, a one-standard-deviation decrease in SPECIAL results in an increase in the probability of ever being an entrepreneur of about 3 percentage points, which is about one-eighth the probability for the full sample that an individual becomes an entrepreneur. Among Stanford alumni, those individuals who go on to start businesses took a more general course curriculum when they were at Stanford than those who never start a business.[5]

[5] It is possible that individuals generalize their curriculum by sequential specialization. For example, an entrepreneur could study engineering as an undergraduate and specialize in human resources as an MBA student, thereby obtaining a general curriculum over the lifetime. If true, this would imply measurement error in SPECIAL as a proxy for true specialization and would bias the coefficient toward zero, making the observed effect weaker than the true effect.

In other related work, Lazear (2003) finds that those who become entrepreneurs also take on a variety of roles after they enter the labor market. It is also shown that this is consistent primarily with an investment view, where aspiring entrepreneurs do different jobs in the firm in order to gain general experience. These results supplement those on curriculum reported herein.

III. Conclusion

It is hypothesized that entrepreneurs are generalists who are good at a variety of skills, although not necessarily excellent at any one. Data from the CPS and elsewhere back up this conjecture. The hypothesis implies that individuals who go on to become entrepreneurs should have a more generalized human-capital investment strategy. Using data from the Stanford MBA alumni, this hypothesis is found to hold.

REFERENCES

Backes-Gellner, Uschi and Lazear, Edward P. "Entrepreneurs and Specialists: Jack-of-all-Trades or Master of One?" Unpublished manuscript, University of Zurich, Switzerland, May 2003.

Lazear, Edward P. "Entrepreneurship." Unpublished manuscript, Stanford University, September 2003; revision of National Bureau of Economic Research (Cambridge, MA) Working Paper No. W9109, August 2002.

Wagner, Joachim. "Testing Lazear's Jack-of-All-Trades View of Entrepreneurship with German Micro Data." *Applied Economics Letters*, 15 September 2003, *10*(11), pp. 687–89.

This content downloaded from
81.204.63.90 on Tue, 23 Jan 2024 12:29:09 +00:00
All use subject to https://about.jstor.org/terms