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ABSTRACT

The adverse selection problem that is created because of asymmetry of information about entrepreneurs' attributes and abilities in turning ideas into viable businesses makes it difficult for venture capitalists or corporate executives to identify would-be successful entrepreneurs in advance. To mitigate this, and the related moral-hazard problem, we focus on an individual's motive to become an entrepreneur in the context of an individual's demographic and personal characteristics. We distinguish between two types of entrepreneurs based on their motivation to engage in entrepreneurial activity: "Push" entrepreneurs are those whose dissatisfaction with their positions, for reasons unrelated to their entrepreneurial characteristics, pushes them to start a venture. "Pull" entrepreneurs are those who are lured by their new venture idea and initiate venture activity because of the attractiveness of the business idea and its personal implications. Statistical analysis of data obtained from a questionnaire we recently mailed to Canadian enterprises reveals that "pull" entrepreneurs are more successful than "push" entrepreneurs.

SOMMAIRE

Les investisseurs en capital-risque et les dirigeants d'entreprise ont de la difficulté à déterminer à l'avance les personnes qui pourraient devenir de bons entrepreneurs à cause de l'asymétrie des renseignements sur les attributs des entrepreneurs et leur capacité de commercialiser leurs idées avec succès. Pour atténuer cette difficulté et le problème d'éthique connexe, nous nous sommes attardés sur les motifs qui poussent une personne à devenir entrepreneur, compte tenu de ses caractéristiques démographiques et personnelles. Nous avons défini deux types d'entrepreneurs en fonction de leur motivation à se lancer en affaires. Les entrepreneurs par défaut sont ceux qui, insatisfaits de leurs fonctions actuelles pour des motifs n'ayant rien à voir avec leur profil d'entrepreneur, décident de créer une entreprise. Les entrepreneurs par choix sont ceux qui se lancent en affaires pour réaliser une idée attrayante. Une analyse statistique des réponses à un questionnaire que nous avons posté récemment à des entreprises canadiennes révèle que les entrepreneurs par choix ont plus de succès que les entrepreneurs par défaut.

INTRODUCTION

One of the most difficult tasks of venture capitalists is to evaluate the ability of an entrepreneur to turn an idea into a viable business. It is widely believed that

entrepreneurial ability is one of the key factors that determines the outcome of the venturing activity. Yet, that ability is difficult to assess ex ante, and to measure. Further, there is no normative or predictive theory that identifies a unique set of traits that are likely to lead to more successful entrepreneurial activity, so the issue of "what to look for" remains open. The same problem is faced by corporate executives. When an employee proposes a venture idea, the executives need to address two main questions: (a) Is the venture idea appropriate for the corporation? (see Block and MacMillan, 1993) and (b) Is the employee suitable to develop this internal new venture? Indeed, entrepreneurship scholars have recognized the importance of examining the essential set of entrepreneurial characteristics. Such attributes as need for achievement, locus of control, risk taking propensity, tolerance for ambiguity, family background and demographic variables have most commonly been investigated (see for example, Brockhaus, 1982; Sexton and Bowman, 1985; Begley and Boyd, 1986; Cooper, Dunkelberg and Woo, 1986; Cooper and Dunkelberg, 1987; Dubini and MacMillan, 1988; Bellu, 1988; Reynolds and Miller, 1988; Bird, 1993).

While this literature is interesting and useful, it seems rather inconclusive. In this pilot study, we focus on an individual's characteristics in the context of the motive to become an entrepreneur. Specifically, we distinguish between two types of entrepreneurs: "Push" entrepreneurs are those whose dissatisfaction with their current position, for various reasons unrelated to their entrepreneurial characteristics, pushes them to start a venture. The second type of entrepreneur is "Pull" entrepreneurs who are lured by their new venture idea and initiate venture activity because of the attractiveness of the business idea and its personal implications. In a study of spinoffs, Knight (1988) has surveyed the reasons individuals become entrepreneurs, but has not distinguished between "push" and "pull" entrepreneurs. The terms "push" and "pull" were, however, used in relation to entrepreneurial motives by Shapero and Sokol (1982), by Cooper and Dunkelberg (1986), and by Feeser and Dugan (1989). Brockhaus (1982) observed that a large number of entrepreneurs wish to start a business before they have a concrete product idea. This finding supports his conclusion that some entrepreneurs are being pushed out of their present employment. Our study is consistent with the emerging stream of research that shifts the emphasis from the comparison of entrepreneurs and non-entrepreneurs to studying differences among various types of entrepreneurs (see for example, Gartner, 1985 and Smeltz, 1990).

The organization of the paper is as follows: We begin in the next section with a review of the theoretical issues and the specification of the hypotheses. This is followed by a detailed methods section in which we describe the survey we conducted and the sample used in this study. The results section links the hypotheses with the empirical results and discusses the findings. Implications for research and practice are addressed in the summary section of the paper.

THEORY

The asymmetry of information between an entrepreneur and a venture capitalist about entrepreneurs' attributes, abilities and skills in turning venture ideas into viable businesses, raises the problem of adverse selection. This, in turn, makes it difficult for the venture capitalist or the corporate executive to distinguish between entrepreneurs who will eventually be successful and those who may not perform well. Given that the venture capitalist cannot make the distinction between high and low ability entrepreneurs, they offer capital, risk sharing, and consulting services at a price that reflects the distribution of high and low ability entrepreneurs in the population. Since this price incorporates an assessment of the "average" ability, those

entrepreneurs with high ability will find the prices offered by venture capitalists unacceptable and seek financing elsewhere. The venture capitalists will, therefore, be left with relatively low ability entrepreneurs, and thus many of the ventures they back are more likely to fail. A specific scheme of pricing ventures designed to separate the two types of entrepreneurs has a high cost associated with it and, moreover, this cost is borne by the high ability entrepreneurs (see Amit, Glosten and Muller, 1994).

An analogous issue faces the corporate executive who is approached by an employee with a new venture idea. *Ceteris paribus*, an adverse selection problem similar to the one described above exists in the corporate setting. It is, therefore, imperative for the potential backer of the venture, in either an independent or in a corporate setting, to know *ex ante* who is more likely to exhibit superior entrepreneurial performance.

The performance of an entrepreneur is often viewed as a function of demographic variables, attributes and characteristics of individuals and their motivation to engage in entrepreneurial activity (see, for example, Bird, 1993). While there is no theory to suggest a particular functional form, we examine in this study the role of each of these components in predicting successful entrepreneurial activity. We highlight the role of motivational factors as a way to segment entrepreneurs into types according to their motivation to become entrepreneurs. Clearly, the outcome of the venture activity also depends on the firm's products and on the characteristics of the markets in which the firm operates. However, capable entrepreneurs can be expected to make better product/market choices and hence the focus on the entrepreneurial team.

Specifically, we distinguish between: "push" and "pull" entrepreneurs. The terms "push" and "pull" distinguish among entrepreneurs based upon their initial motivation to start a business, and were used earlier in relation to entrepreneurial motives by Shapero and Sokol (1982) and by Feeser and Dugan (1989).

According to goal setting theory, if some people perform better than others despite being equal in ability and knowledge, then the cause must be motivational (Latham and Locke, 1991). Two main goal attributes — specificity and difficulty — have been linked to performance. The higher the specificity and the higher the difficulty of the goal, the higher the level of an individual's performance (see, for example, Locke, 1968; Mossholder, 1980). The relationship of goal commitment to performance is not clear cut and is harder to study (Latham and Locke, 1991). Thus the instruments we used to distinguish between the two types reflect these observations.

"Push" entrepreneurs are being pushed out of their current employment. They are not doing well in their current job for reasons that may have nothing to do with their entrepreneurial inclination. Coincidental factors may adversely affect their performance in the corporation and they may thus decide to switch into self-employment.

"Pull" entrepreneurs are being pulled out of their current position by the challenge and the potential rewards (monetary and others) related to a new successful venture. It is their entrepreneurial abilities and attributes that are such that they find themselves being more comfortable professionally outside the corporate setting.

The idea that underlies the above classification is that it reduces the severity of the adverse selection problem. In addition, the relationship between entrepreneurs and venture capitalists (or between intrapreneurs and corporate executives) is characterized by the moral hazard problem: The entrepreneurs (agents) are likely to optimize their own objectives which may be different from those of the venture capitalists' (principals). The moral hazard problem arises because of the principals' inability to observe the agents' efforts. (Amit, Glosten and Muller, 1990, elaborate on the implications of this issue on the ability-type of entrepreneurs that will be backed

by venture capitalists.) The classification above, which is based on the entrepreneurs' motivation to engage in entrepreneurial activity, diminishes the magnitude of the moral hazard problem. Therefore, one can expect "pull" entrepreneurs to perform better than "push" entrepreneurs.

With these observations in mind, we empirically verify the following hypothesis:

Hypothesis: "Pull" entrepreneurs are more successful in creating and managing their venture than "Push" entrepreneurs.

When both forces ("pull" and "push") are at work one might expect superior performance. While our data did not permit us to test such a hypothesis, we note that Brockhaus (1982) reports that successful entrepreneurs were more dissatisfied with their previous jobs than unsuccessful entrepreneurs. He suggests that dissatisfaction motivated entrepreneurs into extra efforts. Our findings about relative performance differences among types of entrepreneurs highlight the role of motivational factors, and builds on Brockhaus (1982).

Attempting to study entrepreneurial motivation is a challenging task with several limitations. As the data is collected by using questionnaires, it is subject to self-reporting biases. Individuals may not recognize their "true" characteristics and their "true" motives for starting a business. They may also report strong goals which they perceive as socially desirable, and not report undesirable ones. Further, objective and reliable measurements of goals and motivation are difficult to achieve. It is even harder to measure differences among individuals in the strength of various motives. Motives may also change over time with age, experience, and after accomplishing initial goals (Bird, 1993). In light of these limitations, this study should be perceived as a preliminary attempt to examine the theory, inviting more comprehensive studies to follow.

METHODS

The survey was conducted by mailing a questionnaire to 3,803 individuals drawn from the following two sources:

- The Science Council of B.C. provided its list of individuals who had applied for innovation commercialization grants from the Council. These are all innovators who are potential entrepreneurs.
- Bachelor of Commerce and MBA Graduates of the Faculty of Commerce at the University of British Columbia in the years 1974, 1979, 1984, and 1989.

While the majority of the 822 respondents (which represents a 24% response rate) reside in western Canada, a sizable minority live in Pacific Rim countries, the U.S. and Europe. See Table 1 for details on respondents' distribution.

The questionnaire was devised to extract information about the business/entrepreneurial experience of respondents, their educational background, demographics, personal attributes, and attitude towards risk taking.

Specifically, the questionnaire included sections dealing with formal education, extracurricular activities during different education periods, number of siblings and their involvement in entrepreneurial activity, family business, and the financial status of their family during childhood. The questionnaire also included questions about parents' and spouse's education, occupation, and involvement in entrepreneurial activity, the respondent's past career and current position. In addition, respondents

were asked to rank 5 of 13 given attributes that they consider most important in creating and managing an entrepreneurial business, as well as the 5 attributes that are most characteristic of themselves. All respondents who had ever contributed to the formation of a new business were asked, in more detail about their reasons for becoming entrepreneurs, their career prior to the decision to become entrepreneurs, their financing sources and their performance as entrepreneurs. Lastly, all respondents were asked to answer a set of questions which was designed to measure their attitude towards risk taking and thereby facilitate the formal evaluation of the respondent's extent of risk aversion. Statistical analyses were performed using the most recent SPSS/PC + software, including the SPSS Tables, Discriminant Analysis, Multivariate Regression Analysis, and Logistic Regression procedures.

Table 1
Summary of Response Results

	UBC Graduates	Science Council	Total
Mailed	1288	2515	3803
Returned to sender	76	289	365
Received by addressee	1212 100%	2226 100%	3438 100%
Responses received	346 28.6%	476 21.4%	822 23.9%

RESULTS

Motivation: "Push" and "Pull" Entrepreneurship

In their study Amit, Muller and Cockburn (1995), observed that the lower the opportunity costs of individuals, the more likely they are to undertake entrepreneurial activities. Specifically, they established that the wages of paid workers who remained paid workers throughout the time interval of the survey (1988-1990), were on average 12% higher than the wages of paid workers who switched into self-employment.

The causality in these results has not been established. It is possible that would-be entrepreneurs are not doing well in their current jobs for reasons that are unrelated to their entrepreneurial attributes or inclination. Their performance may be adversely affected by some coincidental factors. Given that their wages are relatively low, some of these individuals may be seriously considering the development of their own business.

Conversely, it is possible that their entrepreneurial abilities and attitudes are such that they do not fit into a corporate setting. These behavioural dimensions may have contributed to their poor job performance, relative to their peers. Thus, it is the very fact that they are independent entrepreneurs that causes the compensation differential.

With this background in mind, we attempted to discriminate between those entrepreneurs who are pushed out of their organizations and those entrepreneurs who are pulled out of their firms. There were four questions in our questionnaire that dealt with the motivation for starting or joining a new venture. Respondents were asked to indicate their agreement with the following statements on a five-point Likert scale ranging from "strongly agree" to "strongly disagree":

- (1) *I felt frustrated at my previous employment since my employer was not doing things the "right" way.*
- (2) *There wasn't enough challenge and stimulation at my most recent job.*
- (3) *I felt I could make much more money by starting or joining a new venture.*
- (4) *My new venture idea was rejected by my employer and I wanted to realize my business concept.*

An entrepreneur who agreed (or strongly agreed) with the first two statements was "pushed" out of employment to become self-employed because of frustrations and lack of challenge, while an individual agreeing with the last two statements was "pulled" out of employment because of the lure of becoming self-employed, making more money and/or realizing his venture idea.

We used a five-point Likert scale: the scale of (-2, -1, 0, +1, +2) was applied for the "push" statements while (+2, +1, 0, -1, -2) was used for the "pull" statements. For example, an individual who strongly agreed with the third statement received the score of +2 for this statement, while "agreeing" on the first statement would yield the score of -1. Thus, a negative average for the four questions for an individual signifies the fact that he is of a "push" type while a positive average score implies a "pull" type individual. We labeled these individuals "push" and "pull" entrepreneurs, respectively. Out of 356 entrepreneurs in the sample (see the **Demographics** section below for full description), 151 responded to all of the four questions above, 94 of which were categorized as "push" entrepreneurs and 57 as "pull" entrepreneurs. The average of the scores of the "push" entrepreneurs was -0.52, while the average of the "pull" entrepreneurs was +0.47. The difference was significant at the 99% level.

Table 2 summarizes the success measures, both business and personal, of the two types of entrepreneurs. The table clearly indicates that "pull" entrepreneurs are more successful both in business and personally (with significance levels above 93%), and thus the main hypothesis in this study is confirmed.

Table 2
Performance Measures of "Push" and "Pull" Entrepreneurs

	"Push" Entrepreneur	"Pull" Entrepreneur	2-tail t-test
Push/Pull Score	-0.52	+0.47	0.000
Venture Success: sales per employee	\$100,471	\$174,963	0.058
Personal Success: personal income	\$85,652	\$100,741	0.069

While these results indicate that entrepreneurial motivation is a predictor of successful activity, the outcome may be strengthened when demographics and entrepreneurial characteristics are included in the model to predict who is more likely to become a successful entrepreneur. In the following sections we discuss the contribution of these variables to predicting entrepreneurial performance.

DEMOGRAPHICS

The 822 respondents were broken into two groups, Entrepreneurs (356, 43.3%) and Non-Entrepreneurs (466, 56.7%). Entrepreneurs were defined as those who had participated in the formation of a new business and owned some part of the business they helped form. The 151 entrepreneurs who responded to all 4 motivational questions described above were divided into Pull-entrepreneurs (57, 37.7%) and Push-entrepreneurs (94, 62.3%), as described above.

The demographic profile of these 151 entrepreneurs is described below:

- The median age category of both “pull” and “push” groups is 35 to 44.
- While 91.9% of all entrepreneurs in the sample are male, and only 8.1% are female, women represent 10.9% of “pull” entrepreneurs and 6.5% of “push” entrepreneurs.
- 89.3% of “pull” entrepreneurs are married in comparison to 81.3% of “push” entrepreneurs. 70.2% of “pull” entrepreneurs have children, while 77.2% of “push” entrepreneurs have children. The average number of children in each of the two groups was not significantly different.
- There is no significant difference in the average number of cars owned by members of the “pull” and “push” groups.
- No significant differences were found between the two groups in the level of education, or in the major areas of study at any level.
- No significant differences were found between “pull” and “push” entrepreneurs in the education of both parents and spouse, or in the size of the firms parents and spouses worked for. Among “pull” entrepreneurs, there is a higher percentage of spouses who are entrepreneurs as well (Pearson; $p < 0.07$).
- No significant differences were found in the family size of respondents in the two groups and in the number of siblings who have started a business. No differences were found among respondents who reported having had a business in the family, in terms of involvement in the family business.
- No significant differences were found in terms of the financial status of the family while respondents were growing up, and in their families’ current financial status.
- A higher percentage of “push” entrepreneurs report neutral attitude towards entrepreneurship from their parents, while more “pull” entrepreneurs were either encouraged or discouraged to perform entrepreneurial activity during childhood (Pearson; $p < 0.03$).
- More “pull” entrepreneurs come from immigrant families (Pearson; $p < 0.07$).
- No significant differences were found in terms of the average number of extracurricular activities and part-time jobs the two groups were involved in during any of the three periods of education.

- More “push” entrepreneurs claim their present job does not fit their past career, while more “pull” entrepreneurs claim their job represents a significant promotion (Pearson; $p < 0.056$).
- No significant differences were found between “pull” and “push” entrepreneurs in the type of industries their firms are involved in.
- Before launching their current business, more “pull” entrepreneurs were involved in another venture (28.6% vs. 14.1%) or had been students (12.5% vs. 2.2%), while more “push” entrepreneurs were employed elsewhere (77.2% vs. 50.0%) or unemployed (3.3% vs. 0). These differences were significant (Pearson; $p < 0.0015$). “Push” entrepreneurs were employed elsewhere before launching their business for a significantly longer period of time when compared to “pull” entrepreneurs (average of 3.3 years vs. 2.75 years; Pearson; $p < 0.07$).

When our findings are compared with profiles of samples used in similar studies, it seems that the population studied here is quite typical. However, many demographic variables (such as proportion of women and age, for example) differ among different samples, making it difficult to generalize. As we find here, there is a consensus that there are fewer female than male entrepreneurs. Yet, the proportion of women out of practising entrepreneurs varied from 1.2% to 21% over numerous studies (Bird, 1993), and so it is difficult to relate the proportion of women entrepreneurs in our sample (8.1%) to findings of other studies.

In order to determine whether “pull” and “push” entrepreneurs can be distinguished by their demographic profiles, we analyzed the data using a logistic regression model. Categorical variables representing age, gender, sex, education, entrepreneurial parents or spouse, having had a business in the family, involvement in the family business, capacity of involvement, and encouragement during childhood to engage in entrepreneurial activity, were tested for their predictive power of entrepreneurial type. The model has the following form:

$$(1) \text{ Probability (Pull-entrepreneur) } = 1 / (1 + e^{-z})$$

where:

$$(2) \quad Z = \alpha + \beta_{1,i} \text{Age}_i + \beta_{2,j} \text{Educ}_j + \beta_{3,k} \text{Gender}_k + \beta_{4,m} \text{Family-business}_m + \beta_{5,n} \text{Involve}_n + \beta_{6,o} \text{Capacity-involved}_o + \beta_{7,p} \text{Encourage}_p + \epsilon$$

$$i = 1, \dots, 5$$

$$j = 1, \dots, 3$$

$$k = 1, 2$$

$$m = 1, 2$$

$$n = 1, 2$$

$$o = 1, \dots, 5$$

$$p = 1, \dots, 5$$

In the analysis above, the coefficients of most variables were not statistically significant. However, we found that: (a) The odds of being a “pull” entrepreneur are higher when having a spouse who is also an entrepreneur ($p < 0.0069$). (b) The odds of being a “push” entrepreneur are higher for those who reported a neutral attitude of parents towards entrepreneurial activity during childhood ($p < 0.0151$).

Demographic variables, together with the entrepreneurial type categorization, were used to analyze their effect on entrepreneurial performance, as measured by

personal income*, in the following multivariate least-squares regression model with indicator variables:

$$(3) \quad (\text{Income}) = \alpha + \beta_{1,i}\text{Age}_i + \beta_{2,j}\text{Educ}_j + \beta_{3,k}\text{Gender}_k + \beta_{4,m}\text{Family-business}_m + \beta_{5,n}\text{Involve}_n + \beta_{6,o}\text{Capacity-involved}_o + \beta_{7,p}\text{Encourage}_p + \beta_{8,q}\text{Entrepreneurial-type}_q + \epsilon$$

$i = 1, \dots, 5$
 $j = 1, \dots, 3$
 $k = 1, 2$
 $m = 1, 2$
 $n = 1, 2$
 $o = 1, \dots, 5$
 $p = 1, \dots, 5$
 $q = 1, 2$

With the demographic variables described above included in the model, the “pull” entrepreneurial type had a significant positive effect on income ($p < 0.0228$). In addition the following demographic variables were found to have a positive and statistically significant effect on income: Male ($p < 0.0012$); serving on the board of directors ($p < 0.0009$), and serving as a president or vice-president, of a family business ($p < 0.0041$). However, the age group of 34 years or younger was found to have a significant negative effect on income ($p < 0.0011$). The model had an R-sq (adj) of 12% and was statistically significant ($p < 0.0001$).

ENTREPRENEURIAL ATTRIBUTES

As explained earlier, we attempted to test whether personality attributes of entrepreneurs contribute to predicting entrepreneurial performance. Questionnaire respondents were asked to rank, out of a list of 13 attributes (see Table 3), the five attributes they consider most characteristic of themselves.

Table 4 depicts the differences (unweighed) in self-reported attributes between “pull” and “push” entrepreneurs in our sample. The only significant differences observed were that “push” entrepreneurs see themselves as better able to handle ambiguity, and feel luckier than do “pull” entrepreneurs (17% vs. 7%, t-test $p < 0.055$; 16% vs. 4%, t-test $p < 0.007$; respectively).

To determine whether “pull” and “push” entrepreneurs could be distinguished according to their self-reported characteristics. We formulated a logistic regression model of the form:

$$(4) \quad \text{Probability(Pull-entrepreneur)} = 1 / 1 + e^{-z}$$

where:

$$(5) \quad Z = \alpha + \beta_i \text{Attribute}_i + \epsilon$$

$i = 1, \dots, 13$ (see Table 3)

Each of the 13 attributes was transformed into an indicator variable, which was given the value of “1” if the respondent chose it among the five most characteristic attributes, and “0” otherwise. The only statistically significant predictors were found to be luck and ability to handle ambiguity ($p < 0.0128$, $p < 0.0360$, respectively).

*We used personal income as a measure of entrepreneurial performance because other economic, market-based, measures were not available. We acknowledge the potential limitations of the measure we used, including incentives to under-report personal income for tax reasons, and more.

Table 3
Entrepreneurial Attributes

- a. Ability to adapt to new situations, self direct, and act in rapidly changing environments.
- b. Ability to build and lead a team of committed employees.
- c. Ability to communicate.
- d. Ability to handle ambiguity.
- e. Ability to handle sustained periods of intense effort (high energy level)
- f. Ability to maintain good working relationships with buyers and suppliers
- g. Ability to negotiate
- h. Ability to organize, control, focus and execute (“make it happen”)
- i. Experience and familiarity with the industry; good track record
- j. Luck (*define luck as being at the “right place” at the “right time” with the “right stuff”*)
- k. Personal integrity, commitment, persistence, and resourcefulness
- l. Vision, creativity and innovativeness
- m. Willingness to take risks

Table 4
“Push” versus “Pull” Entrepreneurship: Differences in Attributes Most Characteristic of Sample Respondents (Frequencies)

Attribute	Pull-Ent. (n = 57)	Push-Ent. (n = 94)	2-tail t-test
h - ability to organize, control execute	70%	62%	.287
k - personal integrity	58%	49%	.288
a - adapt to new situations and act rapidly	54%	43%	.162
l - vision, creativity, innovativeness	49%	54%	.545
c - ability to communicate	47%	48%	.952
b - ability to build and lead a team	42%	48%	.493
e - handle sustained periods of intense effort	37%	36%	.934
m - willingness to take risk	35%	35%	.998
i - experience and familiarity with industry	32%	34%	.757
g - ability to negotiate	28%	24%	.631
f - working relationship with buyers and suppliers	18%	17%	.935
d - ability to handle ambiguity	7%	17%	.055
j - luck	4%	16%	.007

Note: Table entries depict the frequencies in which attributes were mentioned by respondents as one of the five most characteristic of themselves (unweighed).

In order to test whether self-reported attributes, together with entrepreneurial-type, contribute to explaining entrepreneurial performance (as measured by personal income), we ran the following multivariate least-squares regression model:

$$(6) \quad (\text{Income}) = \alpha + \beta_i \text{Attribute}_i + \beta_{14} \text{Entrepreneurial-type}_j + \epsilon$$

$i = 1, \dots, 13$ (see Table 3)
 $j = 1, 2$

Each attribute was transformed into an indicator variable as described above. The entrepreneurial-type variable was transformed into two (0, 1) indicator variables. The first represents the “pull” entrepreneur ($j = 1$), while the other represents the “push” entrepreneur ($j = 2$). For example, an individual who was classified as a “pull” entrepreneur had a value of 1 for the Entrepreneurial-type₁ indicator variable, and a value of 0 for the Entrepreneurial-type₂ indicator variable.

The effect of being a “pull” entrepreneur on income was still positive, yet non-significant ($p < 0.1680$). The only significant effect on income was found for ability to maintain good working relationships with buyers and suppliers ($p < 0.0276$). Entrepreneurs who chose this attribute as one of their five most important characteristics had, on average, lower income, all else equal. It is interesting to note that the R-sq (adj) of the model amounted to less than 0.1%, and that the model as a whole was not significant. This observation reinforces the need to look beyond personal attributes in attempting to explain entrepreneurial performance.

ATTITUDES TOWARDS RISK

In the preceding section, we examined the self-reported attributes of individuals including the “willingness to take risk”. Because of the importance of this attribute, we sought to measure it more precisely and directly in order to validate the respondents’ response. Respondents were asked to answer a series of questions about their willingness to invest in risky situations. We followed, with some modifications, the methodology used by MacCrimmon and Wehrung (1986). Each question described a situation in which the person had to invest a quarter (25%) of his/her personal net worth in a new venture, with different probabilities of success. Respondents were asked for the smallest multiplier of their initial net worth they would require, in the event of a successful outcome, in order to make the investment in each setting. The same questions were repeated for a situation in which the respondents were asked about their willingness to venture: invest a quarter of their net worth and actively participate in the venture.

Each wealth multiplier given by respondents was then transformed into a risk measurement called **probability premium** (PP) according to the following formula:

$$(7) \quad PP = (1-p) - (1-p^*) = (1-p) - 1/(4k-3)$$

where:

- (1-p) = gamble’s probability of gain (given in the question)
- (1-p*) = the actuarially fair probability of success (based on the respondent’s multiplier)⁷
- k = wealth multiplier given by the respondent.

⁷ Let P = probability of loss, W = initial wealth, and consider the following gamble: you may obtain $(3/4 \times W)$ with probability P and $(k \times W)$ with probability $(1-P)$, or you may not wish to take the risks and obtain W with probability 1. When $W = 1$, the actuarially fair probability of gain $(1-P^*)$ is: $P^* \times 3/4 + (1-P^*) \times k = 1 \Rightarrow (1-P^*) = 1 / (4k-3)$.

Thus, $PP > 0$ indicates risk aversion, $PP = 0$ indicates risk neutrality, and $PP < 0$ indicates risk seeking.

Respondents that would not participate in the new venture under any terms were excluded from the analysis. If respondents were unwilling to participate at a certain setting, an infinite wealth multiplier was assumed for that setting.

Table 5 summarizes some statistical information about wealth multipliers and probability premiums of the entire sample. As expected, the mean of the required wealth multiplier decreases as probability of success increases, in any successive setting, in both investing and in venturing (2-tail t-test; $p < 0.001$ for all levels). The fact that the probability premium measure does not follow that same pattern as the wealth multiplier, has already been observed by MacCrimmon and Wehrung (1986), and is an artifact of the construct.

Table 5
Statistical Information About Risk Variables (Entire Sample)

	Mean	Std Dev	Minimum	Maximum	Cases
Wealth Multiplier - Investing:					
Probability of success = 50%	3.12	2.45	1.15	30.0	557
Probability of success = 60%	2.74	2.02	1.15	28.0	578
Probability of success = 70%	2.23	1.55	1.12	25.0	578
Probability of success = 90%	1.62	.70	1.05	10.0	583
Wealth Multiplier - Venturing:					
Probability of success = 50%	3.28	2.48	1.10	30.0	563
Probability of success = 60%	2.85	1.98	1.09	28.0	574
Probability of success = 70%	2.36	1.62	1.06	25.0	576
Probability of success = 90%	1.78	1.08	1.03	20.0	582
Probability Premium - Investing:					
Probability of success = 50%	.34	.09	-.13	.49	583
Probability of success = 60%	.41	.10	-.03	.59	583
Probability of success = 70%	.46	.12	.02	.70	583
Probability of success = 90%	.54	.14	.07	.87	583
Average for Investing	.44	.11	.03	.66	583
Probability Premium - Venturing:					
Probability of success = 50%	.34	.10	-0.21	.49	583
Probability of success = 60%	.42	.11	-0.14	.59	583
Probability of success = 70%	.47	.13	-0.11	.69	583
Probability of success = 90%	.57	.16	0.01	.89	583
Average for Venturing	.45	.12	-0.06	.66	583

Table 6 reveals that for each risk level, the return demanded for venturing is significantly higher than the return demanded for investing (2-tail t-test; $p < 0.03$). Hence, respondents want to be compensated for their time and talent when actively participating in a new venture, and thus require a higher wealth multiplier. No illusion

of control seems to emerge from our analysis. Interestingly, the trend of a higher wealth multiplier for active participation is stronger, the higher the probability of success.

Table 6
Wealth Multiplier Differences Between Investing and Venturing

A. Entire Sample

	Investing			Venturing			2-tail t-test Prob.
	Cases	Mean	Std Dev	Cases	Mean	Std Dev	
Probability of success 50%	550	3.11	2.44	550	3.27	2.49	.019
Probability of success 60%	574	2.75	2.03	574	2.85	1.98	.022
Probability of success 70%	576	2.23	1.56	576	2.36	1.62	.001
Probability of success 90%	582	1.62	0.70	582	1.78	1.08	.000
Averages	548	2.41	1.63	548	2.56	1.67	.000

B. Entrepreneurs

	Investing			Venturing			2-tail t-test Prob.
	Cases	Mean	Std Dev	Cases	Mean	Std Dev	
Probability of success 50%	227	3.12	3.02	227	3.23	3.04	.365
Probability of success 60%	233	2.73	2.54	233	2.80	2.39	.348
Probability of success 70%	234	2.23	2.00	234	2.36	2.02	.055
Probability of success 90%	237	1.60	0.80	237	1.81	1.45	.014
Averages	225	2.43	2.083	235	2.56	2.09	.083

As depicted in Table 7, there are no significant differences in probability premiums for any of the settings between “pull” and “push” entrepreneurs. Both groups are risk averse, to a very similar degree. Thus, it may be concluded that “pull” and “push” entrepreneurs are similar in their risk attitudes.

Since we were interested in isolating risk-attitude differences between “pull” entrepreneurs and “push” entrepreneurs, and because of the potential effect of the demographic variables, a further analysis of the data was carried out, using multivariate least square regression models with indicator (dummy) variables. The models included a dependent variable (the risk variable to be tested), a predictor variable representing “pull” vs. “push” entrepreneurs and control variables for age, education, and gender. The regression equation was of the form:

$$(8) \quad (\text{RISK VAR}) = \alpha + \beta_{1,i}\text{Age}_i + \beta_{2,j}\text{Educ}_j + \beta_{3,k}\text{Gender}_k + \beta_{4,m}\text{Pull}_m + \epsilon$$

- i = 1, . . . ,5
- j = 1, . . . ,3
- k = 1, 2
- m = 1, 2

Table 7
“Push” Versus “Pull” Entrepreneurship:
Probability Premium Differences

	Pull-Entrep		Push-Entrep		2-tail t-test
	Cases	Mean	Cases	Mean	
Investing:					
Probability of success = 50%	47	0.30	74	0.30	.836
Probability of success = 60%	49	0.38	77	0.38	.796
Probability of success = 70%	49	0.43	77	0.44	.702
Probability of success = 90%	49	0.53	78	0.55	.553
Average Investing	47	0.42	73	0.42	.978
Venturing:					
Probability of success = 50%	48	0.31	76	0.29	.369
Probability of success = 60%	51	0.40	74	0.38	.312
Probability of success = 70%	51	0.46	74	0.44	.462
Probability of success = 90%	51	0.59	76	0.57	.648
Average Venturing	48	0.44	74	0.42	.471

The term ϵ is a random error term which captures variables that affect risk attitude, which were not included in the model, plus errors of measurement. The term ϵ is assumed to have the usual desirable properties (independent, identically distributed, mean 0). Each categorical variable was transformed into q binary sub-variables (q equals the number of categories of each variable). One of the q categories of each variable was omitted from the equation. Hence, the constant α in the regression equation represents the base-case risk variable of the group of individuals whose profile is: over 55 years old, male, “push” entrepreneur, with high school or diploma education (the omitted categories). The different coefficients of each sub-variable can be interpreted as the incremental wealth multiplier or risk premium, over and above the base case, required by individuals belonging to that category. For example, for the “pull” variable, the base case reflects the mean risk premium of “push” entrepreneurs. Thus, the coefficient of “pull” in the regression equation ($\beta_{4,2}$) represents the incremental risk premium required by “pull” entrepreneurs, over and above “push” entrepreneurs, *ceteris paribus*.

The regression results show that in all but three of the 10 regression models, the coefficient of “pull” entrepreneurs is positive, indicating that “pull” entrepreneurs tend to require slightly higher wealth multipliers, and thus are a little more risk averse. Yet, none of these 10 results are statistically significant, and thus **it is safe to say that the two groups do not differ in their risk aversion when controlling for gender, age, and education.**

SYNTHESIS

Our main objective in this paper is to test the hypothesis that “pull” entrepreneurs are more successful in creating new ventures than “push” entrepreneurs. Thus, we

attempted to test the effect of belonging to the “pull” group on entrepreneurial success, as measured by personal income, while controlling for demographic variables, and personal attributes, including attitudes towards risk. We used a multivariate least-squares regression model with income as the dependent variable. Indicator variables included age, education, gender, existence of a family business, the 13 personal attributes, and entrepreneurial-type. In addition, a continuous predictor variable representing the average probability premium for venturing is included in the regression model. The regression equation has the form:

$$(9) \quad (\text{Income}) = \alpha + \beta_{1,i}\text{Age}_i + \beta_{2,j}\text{Educ}_j + \beta_{3,k}\text{Gender}_k \\ + \beta_{4,m}\text{Family-business}_m + \beta_{5,n}\text{Involve}_n + \beta_{6,o}\text{Attribute}_o \\ + \beta_{7,p}\text{Entrepreneurial-type}_p + \beta_8\text{Avg.-venturing-PP} + \epsilon$$

$i = 1, \dots, 5$
 $j = 1, \dots, 3$
 $k = 1, 2$
 $m = 1, 2$
 $n = 1, 2$
 $o = 1, \dots, 13$
 $p = 1, 2$

Even after correcting for all of the factors above, “pull” entrepreneurs still exhibit a significantly higher income, on average, relative to “push” entrepreneurs, all else equal ($\beta_7 = \$13,817$, $p < 0.0781$), supporting the main hypothesis of this paper. The only two other factors which had significant effect on income in the above model were gender and age. Males reported, on average, a significantly higher income, all else equal ($\beta_3 = \$20,340$, $p < 0.0280$). Entrepreneurs who were 34 years old or younger earned, on average, significantly less, relative to the base case of entrepreneurs 55 or older ($-\$40,989$, $p < 0.0005$). The model is significant at 99.5% ($p < 0.0049$). Thus, it may be concluded, with some reservations regarding the preliminary nature of the study, that “pull” entrepreneurs are indeed more successful than “push” entrepreneurs. Combining all our observations suggests that the search for the unique attributes of entrepreneurs may be fruitless. Rather, by focusing on the motives to become an entrepreneur, we were able to identify a type of entrepreneur whose performance is significantly superior. These findings reinforce the suggestion (see for example, Gartner, 1985) that contrasting entrepreneurs with non-entrepreneurs is too broad, and that a search for types of entrepreneurs may be a more fruitful avenue for further research.

The implication of our preliminary study for venture capitalists is that by focusing on an entrepreneur’s motivation in the context of an individual’s personal attributes rather than on characteristics alone, they are likely to improve their ability to pick winners.

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