

THE IMPACT OF OVERCONFIDENCE ON ENTREPRENEURIAL INTENTIONS

Jason R. Fitzsimmons and Evan J. Douglas
Brisbane Graduate School of Business
Queensland University of Technology



CONTACT: Dr Jason Fitzsimmons, Lecturer, Brisbane Graduate School of Business, Queensland University of Technology, 2 George Street, Brisbane, Qld 4001. Tel: 61-7-38642036, Email: j.fitzsimmons@qut.edu.au

ABSTRACT

Researchers have found that the determinants of entrepreneurial intention (or action) include general, specific, and social aspects of human capital as well as the possession of entrepreneurial attitudes toward income, independence, perquisites, risk and hard work. Recently the cognitive bias of overconfidence has been associated with entrepreneurship, with research showing that entrepreneurs exhibit greater overconfidence than do other managers. Accordingly it is useful to investigate the role of overconfidence in the decision to form an intention to become self-employed. This paper finds that overconfidence significantly drives the intention to behave entrepreneurially, and moreover has significant interaction effects with ownership motivation of nascent entrepreneurs. Interestingly, self-efficacy, and attitudes towards income, autonomy and risk were not significant determinant of intentions in this study, contrary to earlier studies.

INTRODUCTION

Entrepreneurs commonly underestimate the chances of new venture failure, the time to become cash-flow positive, the profit the firm will earn, the reactions of rivals, and so on. Palich & Bagby (1995) and Busenitz & Barney (1997) have shown that while most managers are overconfident, entrepreneurs can exhibit greater overconfidence than managers of established firms. Such overconfidence causes new ventures to be launched that may not have been launched in the absence of overconfidence. At the same time, overconfidence may be at least partially responsible for the relatively high incidence of new venture failures, since overconfident entrepreneurs are likely to overestimate their ability to make correct decisions in establishing and growing their new businesses.

It follows that if entrepreneurs typically exhibit overconfidence, nascent entrepreneurs probably also exhibit overconfidence when forming their intention to start their own businesses. The intention to become self-employed has been shown to depend on the individual's attitudes to independence, ownership, and risk (Douglas & Shepherd 2002; Fitzsimmons, Douglas and Shepherd, 2005). Thus the question arises, is overconfidence a separate independent variable impacting entrepreneurial intentions, or does it moderate the attitudes that underlie entrepreneurial intentions?

The intention to behave entrepreneurially has been examined from three main viewpoints, which focus, respectively, on the individual's human capital, individual cognitions and motivations, and perceived self-efficacy. Human capital is characterised as general or specific (to the intention under review). General human capital is commonly measured by age, experience, education, and gender. (see, for example, Becker, 1964; Gifford, 1993; Gimeno, Folta, Cooper, & Woo, 1997; Shane, 2000; Davidsson & Honig, 2003). Specific human capital, such as prior business experience, prior self-employment, and having relatives who have been self-employed, is also argued to be a determinant of the intention to behave entrepreneurially (see, for example, Shane, 2000; Davidsson & Honig, 2003; Dimov & Shepherd, 2005). Social capital, such as networks of people and membership of organisations, is also associated with individuals forming a predilection for entrepreneurship. (see for example, Coleman, 1990; Birley, 1985; Greene & Brown, 1997; Aldrich, 1999; Shane, 2000).

The underlying premise of the human capital view is that some individuals possess the knowledge, skills, and contacts that should allow them to be 'good' at entrepreneurship, and after recognising this they form the intention to become an entrepreneur. In effect they form the impression that they possess the human resources and can gain access to the other resources needed to behave entrepreneurially. In general there are three necessary conditions for entrepreneurship, and having access to resources is only one of them. The other two are the innate desire to be an entrepreneur rather than to be someone's employee, and access to what appears to be a viable market opportunity.

A stream of research incorporating individual cognitions and motivating factors has examined entrepreneurship as a utility-maximizing response (Eisenhauer 1995, Douglas & Shepherd, 2000). This literature argues that an individual will form an intention to become an entrepreneur based on his/her 'entrepreneurial attitudes' these being the attitudes held towards the greater decision-making autonomy, income, firm ownership, risk, hard work, and perquisites that tend to be associated with entrepreneurship (as compared to employment within a firm). Empirical studies have demonstrated that some entrepreneurial attitudes (preference for autonomy and ownership and tolerance for risk) are typically related to entrepreneurial intentions but that other supposed entrepreneurial attitudes (preference for income, perquisites, and tolerance for hard work) are typically not significant determinants of entrepreneurial intentions, also being possessed by those who intend a corporate career (Douglas & Shepherd, 2002; Fitzsimmons & Douglas, 2005).

Finally, entrepreneurial intentions have been shown to depend on perceived self-efficacy (Boyd & Vozikis, 1994; Chen, Greene & Crick, 1998; de Noble, Jung & Erlich, 1999; Markman, Balkin & Baron, 2002). Self-efficacy is measured by the strength of an individual's belief that he/she can accomplish a specific task or series of related tasks. It is related to self-confidence and individual capabilities (human capital), and these are dependent on prior experience, vicarious learning, social encouragement, and physiological issues (Bandura, 1982). The stronger a person's self-efficacy in relation to a specific task or series of tasks, such as those involved in starting a new venture, the greater the probability that the individual will subsequently engage in that specified behaviour (Chen, Greene & Crick, 1998).

THEORY

Entrepreneurial Intentions

Previous research has investigated the various economic and psychological motivations of individuals to seek self-employment. (Baumol, 1990; Eisenhauer, 1995; Douglas & Shepherd, 2000). The motivation to engage in entrepreneurial behaviour has generally been investigated in terms of entrepreneurial intentions, with intentions conceptualised as being a function of beliefs that in turn can lead to subsequent behaviour (Fishbein & Ajzen, 1975). In general, the greater the intention, the stronger is the motivation to engage in entrepreneurial behaviour (Ajzen, 1991).

A number of models have been proposed to explain the relationship between an individual's personal characteristics and subsequent intentions (eg. Shapero, 1982; Ajzen, 1987; Bird, 1988; Boyd & Vozikis, 1994; Krueger & Brazeal, 1994;). Ajzen's theory of planned behaviour (Ajzen, 1991) suggests three key attitudes that predict intentions, these being attitudes towards the act, social norms and perceived behavioural control. Krueger & Brazeal (1994) suggest that the perceived behavioural control construct overlaps with the self-efficacy construct of Bandura (1986), and outlined a model of potential entrepreneurship that incorporated entrepreneurial intentions. Basing their model on Ajzen's theory of planned behaviour and Shapero's model of the entrepreneurial event (Shapero, 1982), their model included potential for both enterprise development and corporate ventures and was comprised of three constructs being: perceived desirability, perceived feasibility and propensity to act. Perceived desirability was seen to be related to intrinsic rewards associated with entrepreneurship and includes the 'attitude towards the act' and 'social norms' (Krueger & Brazeal, 1994). Perceived desirability is related to the motivational factors to engage in entrepreneurial behaviour and can therefore be considered a function of entrepreneurial attitudes held by the individual. Perceived feasibility on the other hand, is related individuals perceptions of their ability to implement the required behaviour. Krueger (1993) cites persuasive evidence that perceived credibility, perceived desirability and propensity to act explain over half the variance in intentions towards entrepreneurship, with feasibility perceptions being the most influential.

An alternative model of entrepreneurial intentions was proposed by Bird (1988). Based on established theory in cognitive psychology, the model suggests that an individual's entrepreneurial intention is based on a combination of personal and contextual factors. Personal factors include prior experience as an entrepreneur, personality characteristics and abilities while contextual factors consist of social, political and economic variables (Bird, 1988). An individual's intention is further structured by both rational or analytic thinking (goal-directed behaviour) and intuitive or holistic thinking (vision). Boyd and Vozikis (1994) expand on this model to incorporate the perceived behavioural control aspect of Ajzen's theory of planned behaviour through the inclusion of the concept of self-efficacy. Perceived behavioural control describes the perceived ease or difficulty of performing a behaviour and as pointed out by Ajzen (1991) is closely related to the concept of self-efficacy. Boyd and Vozikis (1994) proposed self-efficacy as an important explanatory variable in determining the strength of entrepreneurial intentions and the likelihood that those intentions will result in entrepreneurial actions. The revised model of Boyd and Vozikis (1994) based on Bird's (1988) model suggests that intentions are a function of self-efficacy in addition to attitudes and perceptions regarding the creation of a new venture through rational and intuitive thought processes.

Entrepreneurial Attitudes

The motivation to behave entrepreneurially is related to the perceived desirability of behaving entrepreneurially and can be explained by the utility-maximizing theory of entrepreneurial behaviour where an individual is motivated to become self-employed (or otherwise behave entrepreneurially) because that course of action promises the greatest psychic utility (Eisenhauer, 1995; Douglas & Shepherd, 2000). Underlying this motivation is the strength of the individual's abilities (human capital) and their attitudes to elements provided by entrepreneurship, which include autonomy, risk, work effort, income, and net perquisites. In general, individuals desiring more income, more independence, and more net perquisites are more likely to want to engage in entrepreneurial behaviour. Likewise, an individual with a higher tolerance for risk and less aversion to work effort should be expected to be more likely to want to engage in entrepreneurial behaviour (Douglas & Shepherd, 2000). Shepherd and Douglas (2004) distinguish between an individual's attitude towards decision-making autonomy (reflecting need for independence) and the individual's attitude toward ownership (reflecting need for achievement and/or need for recognition) and find that attitude to ownership is a better predictor of entrepreneurial intentions than is independence.

Empirical evidence has shown that the above mentioned attitudes impact to varying extents when individuals form the intention to be self-employed. Substantial research indicates that entrepreneurial individuals are generally more risk tolerant and desire more independence than less entrepreneurial individuals (e.g. Caird, 1991; Begley, 1995; Sexton and Bowman, 1984). Douglas and Shepherd (2002) found that attitudes to independence, risk and income are related to the individual's intention to be self-employed. Similarly, Fitzsimmons and Douglas (2005) found evidence that attitudes to ownership, independence and income were related to the individual's intention to engage in entrepreneurial behaviour with the attitude to ownership having the greatest impact on entrepreneurial intentions.

The foregoing suggests the following hypotheses:

H1: Entrepreneurial attitudes are positively related to entrepreneurial intentions:

- a) The stronger the preference for income, the stronger the intention;*
- b) The stronger the preference for independence, the stronger the intention;*
- c) The stronger the preference for ownership, the stronger the intention;*
- d) The greater the tolerance for risk, the stronger the intention;*
- e) The greater the tolerance for work, the stronger the intention;*

Entrepreneurial Self-Efficacy (ESE)

There is increasing agreement that self-efficacy has a role to play in the development of an individuals entrepreneurial intentions, with a number of studies demonstrating that entrepreneurs have greater self-efficacy than other managers (eg. Baron and Markman, 1999; Chen, Green & Crick, 1998). Self-efficacy refers to an individual's belief in their ability to perform a given task (Bandura, 1977). Task-specific ability in relation to entrepreneurship is captured in the construct

of entrepreneurial self-efficacy (ESE) which was seen by Boyd & Vozikis (1994) as a key antecedent of entrepreneurial intentions. Later, Chen, Greene and Crick (1998) developed a scale to measure tasks specific to entrepreneurship and found that their entrepreneurial self-efficacy scale was positively correlated with a scale measuring the person's intention to set up their own business.

Entrepreneurial self-efficacy refers to an individual's belief that they have the abilities to perform the tasks associated with entrepreneurship and is a cognitive belief about these abilities. Individuals with greater entrepreneurial self-efficacy therefore will be more likely to form the intention to act entrepreneurially which suggests that:

H2: Entrepreneurial self-efficacy is positively related to entrepreneurial intentions

Overconfidence

Prior research has demonstrated that entrepreneurs are prone to cognitive biases in their decision making (e.g. Palich & Bagby, 1995). This observation has raised a question of interest in entrepreneurship research as to whether entrepreneurial individuals are more prone to cognitive biases than non-entrepreneurs. (Buzenitz & Barney, 1997). While a number of cognitive biases have been explored, several in particular have received much attention in the literature. One of these has been the overconfidence bias where decision makers are somewhat over optimistic about their initial assessment of a situation and often do not incorporate new information in their decision making as it becomes available (Fischhoff, Slovic & Lichtenstein, 1977).

As noted by Simon et al (1999), there is some evidence that the overconfidence bias plays an important role in entrepreneurship with studies such as Busenitz & Barney (1997) finding that entrepreneurs display greater overconfidence than managers. Of particular interest is whether an overconfidence bias can influence an individual's intention to behave entrepreneurially. If overconfident individuals perceive less risk in a new venture then this cognitive bias might subsequently lead to increased tendency for individuals to start ventures, whereas a less overconfident individual may not form this intention. Some evidence for this has been found by Simon & Houghton (2003) where they found managers who exhibited higher levels of overconfidence were more likely to make product introductions that were more risky and less likely to succeed.

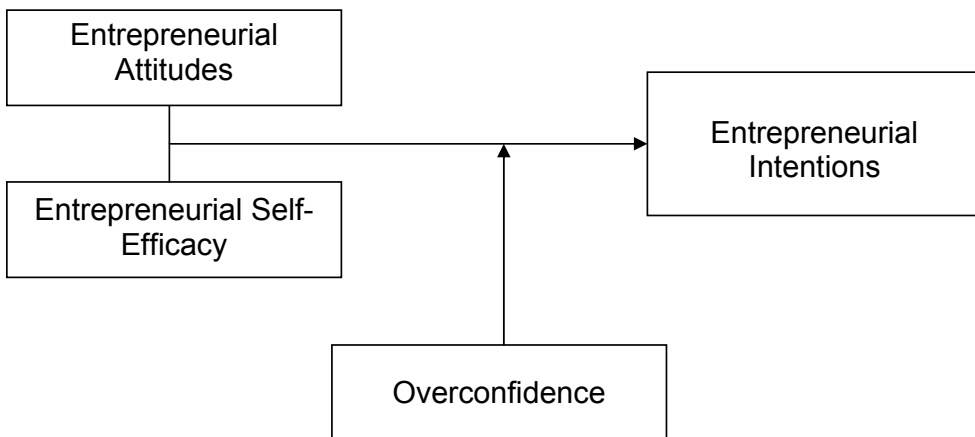
It is also appropriate to consider the relationship between overconfidence and entrepreneurial self-efficacy. While the two concepts appear closely related, there are distinct differences between the two constructs. Forbes (2005) suggested that overconfidence measures the accuracy of an individual's ability whereas entrepreneurial self-efficacy measures the individual's perception of their abilities. More importantly, overconfidence tends to be a subconscious phenomenon whereas entrepreneurial self-efficacy tends to be a consciously held belief. Forbes (2005) further suggests that an individual's entrepreneurial self-efficacy may vary, with some individuals having over-inflated opinions about their abilities. In such situations, an individual is more likely to demonstrate overconfidence in their abilities. Similarly, experienced entrepreneurs may have a high entrepreneurial self-efficacy based on previous business success that subsequently leads to greater overconfidence. As such we suspect that overconfidence is a separate variable that moderates the relationship between entrepreneurial self-efficacy and entrepreneurial intentions.

Similarly, previous results have shown a significant positive relationship between an individual's attitude to ownership and their entrepreneurial intentions (Douglas & Fitzsimmons, 2005). We suspect that overconfidence will moderate this relationship in that this relationship will be more positive for overconfident individuals. Given this, we suggest the following hypotheses:

- H3: Individuals with higher levels of overconfidence will have greater entrepreneurial intentions.*
- H4: The relationship between entrepreneurial self-efficacy and entrepreneurial intentions will be more positive for more overconfident individuals.*
- H5: The relationship between an individual's entrepreneurial attitudes and entrepreneurial intentions will be more positive for more overconfident individuals.*

Based on the preceding arguments, our final model is shown in Figure 1. Consistent with the entrepreneurial intentions model of Boyd & Vozikis (1994), entrepreneurial intentions are seen to be driven by entrepreneurial attitudes and entrepreneurial self-efficacy. The overconfidence bias is also seen to impact on entrepreneurial intentions and acts as a moderator of the relationship between entrepreneurial self-efficacy, entrepreneurial attitudes and entrepreneurial intentions.

Figure 1. Entrepreneurial Intentions Model



Control Variables

In addition to the attitudes and perceived abilities in explaining entrepreneurial intentions, other individual level characteristics have also been shown to be associated with the decision to engage in entrepreneurial behaviour. An individual's human capital for example has been shown to be associated with the decision to exploit an entrepreneurial opportunity with individuals having greater human capital being more likely to have the intention and to exploit an entrepreneurial opportunity (Becker 1964; Davidsson & Honig 1993; Dimov & Shepherd, 2005). At an individual level, human capital factors such as age, education and career experience have been shown to be associated with the decision to exploit an opportunity (Shane, 2003). Studies have shown

that individuals with more education than the general population are more likely to exploit entrepreneurial opportunities (Story, 1994; Reynolds, 1997). Education, for example, can increase the individuals' stock of knowledge and can improve entrepreneurial judgement given the increased understanding of the entrepreneurial process (Casson, 1995). Faced with a new venture opportunity this can lead to less uncertainty in evaluating the value of an opportunity and hence lead to increased likelihood that the individual will have the intention to pursue self-employment.

METHOD

Sample

The sample consists of 90 students surveyed during an entrepreneurship class in an MBA program in Thailand. These individuals may be considered potential entrepreneurs, since they are approaching a career decision point at which they might either enter into employment or seek self-employment. The survey was undertaken in October 2005 by one of the co-authors.

Variables and Measures

Entrepreneurial Intentions. We used a scale based on Davidsson (1995) to measure an individuals entrepreneurial intentions. The scale consisted of three items measured on a 7-point scale: "Have you ever thought about starting your own business", "Estimate the likelihood that you will start your own business in the next five years" and "Estimate the likelihood that you will start your own business in the next ten years. The items were averaged to arrive at a measure of entrepreneurial intentions with the resulting index having a Cronbach's Alpha of 0.88.

Overconfidence. Our measure of overconfidence was based on Simon, Houghton & Aquino (1999), which used a well-established format to measure overconfidence requiring the students to answer 10 questions. For each of these questions the individuals were asked to provide a confidence interval (by providing a low and high estimate) in which they were 90% certain that the interval provided contained the correct answer. Following Simon et al. (1999), if more than 10% of the correct answers fell outside the confidence interval provided by a particular individual the respondent was considered overconfident as the ranges developed were too narrow. To arrive at the overconfidence measure, each correct answer that fell outside of the range provided was scored as one, with the sum of the scores for the ten questions being the measure of overconfidence. The questions used to measure overconfidence were based on general knowledge on economic variables (Appendix 1).

Entrepreneurial Attitudes. We employed conjoint analysis to obtain measures for the entrepreneurial attitudes of individuals in the sample. The individuals were asked to evaluate a series of hypothetical career profiles and decide on the attractiveness of each profile presented. Based on a career scenario provided, respondents were asked to rate the attractiveness of that career alternative (assumed to be available within two years of graduation) on a seven point Likert scale anchored by very low attractiveness ('1') to very high attractiveness ('7'). The hypothetical scenarios presented were based on five attributes, these being income, risk, work effort, independence and ownership. Further details on the experimental method can be found in Douglas and Shepherd (2002).

Entrepreneurial Self-Efficacy. The entrepreneurial self-efficacy scale developed by Chen, Greene and Crick (1998) was used for the present study. This scale consists of 22 items measuring an individual's abilities in performing entrepreneurial tasks with each item measured on a 5 point Likert scale ranging from completely unsure ('1') to completely sure ('5'). Following Chen et. al. (1998), we calculated the total entrepreneurial self-efficacy score by taking the average of the 22 items. The Cronbach's Alpha for the 22 items in the scale was 0.82.

Control Variables. As individual-level characteristics have previously been shown to impact on entrepreneurial intentions we included demographic characteristics such as age and gender as well as general human capital variables measuring education, income, GMAT score and work experience as control variables. A dummy variable was also included for those individuals who were currently self-employed.

RESULTS

The descriptive statistics and inter-correlations for the sample are given in Table 1. The mean level of entrepreneurial intentions was 6.06 (s.d. 1.21). The mean score for the overconfidence variable was 6.86 (s.d. 2.12) while the mean score for the entrepreneurial self-efficacy variable was 3.84 (s.d. 0.41). A significant positive relationship was found between overconfidence and entrepreneurial self-efficacy indicating that individuals with higher entrepreneurial self-efficacy were more likely to be overconfident. Several of the control variables were also found to be significantly correlated to the overconfidence variable including gender ($r=-0.24$, $p=0.04$), GMAT score ($r=-0.55$, $p=0.00$) and income ($r=-0.27$, $p=0.02$).

Table 1. Descriptive statistics and correlations

| | Mean | s.d. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-------------------|-------|------|-------|--------|-------|-------|-------|-------|-------|
| 1. Intentions | 6.06 | 1.21 | | | | | | | |
| 2. Ownership | 0.31 | 0.50 | 0.23* | | | | | | |
| 3. Income | 3.19 | 0.88 | -0.00 | -0.09 | | | | | |
| 4. Work Effort | -0.50 | 0.61 | 0.20 | 0.04 | 0.04 | | | | |
| 5. Independence | 0.71 | 0.55 | -0.10 | 0.14 | -0.12 | 0.17 | | | |
| 6. Risk Tolerance | -0.63 | 0.60 | -0.10 | 0.03 | 0.19 | -0.02 | -0.04 | | |
| 7. ESE | 3.84 | 0.41 | 0.18 | -0.04 | 0.09 | 0.09 | 0.10 | -0.02 | |
| 8. Overconfidence | 6.86 | 2.12 | 0.26* | -0.25* | 0.05 | 0.07 | -0.04 | -0.01 | 0.25* |

* $p < 0.05$

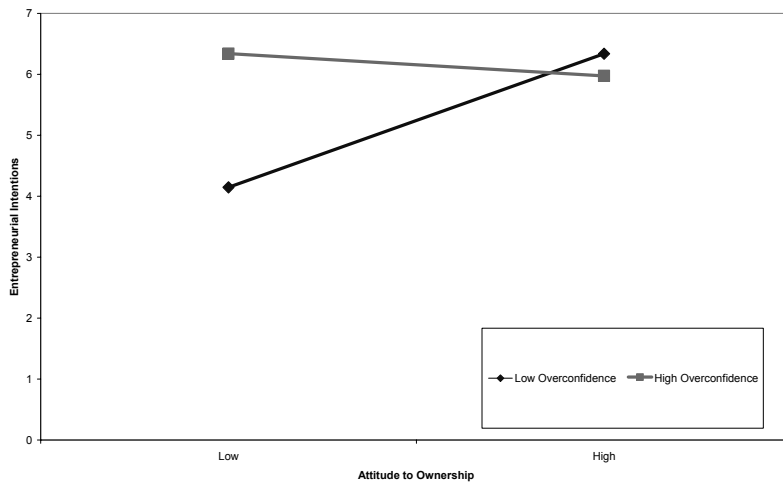
The regression analysis results are shown in Table 2. The control variables of age, education, income and self-employment were first entered into the base model. Of the control variables, only self employment was significant ($p = 0.02$) although there was some evidence that age and income impact on entrepreneurial intentions ($p=0.06$ and $p=0.07$ respectively). In the following step, we added the main effects variables of entrepreneurial attitudes and entrepreneurial self-efficacy (Model 2). We found no evidence of entrepreneurial self-efficacy being related to intentions

while there was some evidence that the entrepreneurial attitude of ownership was related to intentions ($p=0.08$). In the next model we added the overconfidence variable. With this variable added we find significant relationship between the entrepreneurial attitude of ownership and overconfidence and entrepreneurial intentions. As for the previous model, entrepreneurial self-efficacy was not significant. In the final model we included the interaction term for the attitude to ownership and overconfidence and the interaction term for entrepreneurial self-efficacy and overconfidence. We found the attitude to ownership and overconfidence interaction term to be significant. Overall, we find evidence for H1a in that the attitude to ownership is significantly related to entrepreneurial intentions, but no evidence for H1b,c,d,e. While we find no evidence of a relationship between entrepreneurial self-efficacy and entrepreneurial intentions (H2), we did find support for H3 with a positive relationship being found between the overconfidence variable and entrepreneurial intentions. In addition, we find no evidence of an interaction effect between ESE and overconfidence (H4). Finally, in considering the relationship between the interaction term of ownership and overconfidence and entrepreneurial intentions, we find a significant relationship although this relationship is negative rather than positive as suggested by H5. In other words, we find that the relationship between an individual's attitude to ownership and entrepreneurial intentions to be positive but to a lesser extent than for more overconfident individuals. This interaction effect is illustrated in Figure 2.

Table 2. Regression Results. Dependent Variable: Entrepreneurial Intentions

| | Model 1 | Model 2 | Model 3 | Model 4 |
|--------------------------|---------|---------|---------|---------|
| | B | B | B | B |
| Age | -0.06 | -0.05 | -0.05 | -0.03 |
| Education | 0.45 | 0.35 | 0.41 | 0.35 |
| Income | 0.11 | 0.08 | 0.12 | 0.06 |
| Self-Employed | 0.95* | 0.91* | 0.83* | 0.71 |
| Ownership | | 0.52 | 0.64* | 0.82** |
| Income | | 0.04 | 0.07 | -0.02 |
| Work Effort | | 0.29 | 0.28 | 0.40 |
| Independence | | -0.42 | -0.36 | -0.42 |
| Risk Tolerance | | -0.18 | -0.20 | -0.18 |
| ESE | | 0.27 | 0.02 | 0.02 |
| Overconfidence | | | 0.17* | 0.17* |
| ESExOC | | | | 0.42 |
| OWNxOC | | | | -0.38** |
| R ² | 0.17 | 0.26 | 0.32 | 0.40 |
| Adjusted R ² | 0.12 | 0.13 | 0.19 | 0.26 |
| Change in R ² | 0.17 | 0.09 | 0.06 | 0.08 |

$p < 0.05$, ** $p < 0.01$

Figure 2. Attitude to Ownership x Overconfidence Interaction

IMPLICATIONS FOR RESEARCH

This study investigated the role of entrepreneurial attitudes, entrepreneurial self-efficacy and overconfidence on an individual's intention to engage in entrepreneurial behaviour. Basing our arguments on existing models of entrepreneurial intentions, we find evidence that aspects of an individual's entrepreneurial attitudes influences their intention act entrepreneurially. We also find evidence that the overconfidence variable can influence an individual's entrepreneurial intentions. In addition, we find evidence that the overconfidence variable interacts in the relationship between entrepreneurial attitudes and intentions. As such, exploring the overconfidence bias might contribute to a better understanding of an individual's intention to engage in entrepreneurial behaviour. Consistent with previous studies (e.g. Douglas & Fitzsimmons, 2005), we find a significant positive main effect relationship between an individuals attitude to ownership and entrepreneurial intentions suggesting that this attitude is important in determining an individuals career choice. While other entrepreneurial attitudes may play a role in determining the strength of an individual's entrepreneurial intentions we found limited support for this.

Of particular interest in this study was the relationship between entrepreneurial self-efficacy, overconfidence and entrepreneurial intentions. With the overconfidence variable included in the model, we find a significant positive relationship between an individual's measure of overconfidence and their entrepreneurial intentions in that more overconfident individual's indicated greater entrepreneurial intentions. In contrast, we find no evidence of entrepreneurial self-efficacy impacting an individual's entrepreneurial intentions. While this finding is inconsistent with previous studies that have clearly demonstrated a positive relationship between entrepreneurial self-efficacy and intentions, we suspect that this is a consequence of including the overconfidence variable into the model. One possibility might be that overconfidence acts as a mediator in the relationship between entrepreneurial self-efficacy and entrepreneurial intentions, that is, there is a relationship between entrepreneurial self-efficacy and entrepreneurial intentions but not once overconfidence is taken into account. Preliminary examination of the partial correlations between these variables provides some evidence for this.

We also find evidence that overconfidence moderates the relationship between an individual's attitude to ownership and their entrepreneurial intentions, with individuals having higher attitudes to ownership having greater individual entrepreneurial intentions but a more positive relationship for those with lower overconfidence. The results suggested that a less overconfident individual may have low entrepreneurial intentions if they do not have a strong attitude to ownership, however their entrepreneurial intentions rise sharply when their attitude to ownership is high. In contrast, we found that individuals with high overconfidence will have high entrepreneurial intentions regardless of their attitude to ownership. Given the recent literature related to the 'overconfidence' of entrepreneurs we suggest that further studies investigate this relationship.

While we did not find human capital variables to be significant in explaining entrepreneurial intentions, significant correlations were found between the overconfidence variable and human capital variables. Significant negative relationships were found between gender, GMAT score and income and our measure of overconfidence. While only about half of the individuals in the sample had a GMAT score, the relationship suggested that individuals with higher general management abilities are less overconfident than those with lower general management abilities. Furthermore, it suggests that individual's with greater general management abilities are less likely to form the intention to act entrepreneurially.

LIMITATIONS

Some limitations must be noted in the research, particularly in relation to the relatively small sample size of 90 individuals. Given that some individuals did not answer all the questionnaire items also limited the usable responses. In addition, the research questionnaire was undertaken in a country where the native language was not English, which may have introduced additional errors in the responses of some individuals. Other limitations might be related to our measures of entrepreneurial intentions and our measures of an individual's overconfidence.

CONCLUDING REMARKS

In this paper we examined the attitudinal antecedents of the intention to behave entrepreneurially. Using human capital measures as control variables, we investigated the relationship between entrepreneurial attitudes, measures of overconfidence and entrepreneurial self-efficacy on an individual's intention to act entrepreneurially. We found an individual's attitude to ownership of a firm and their measure of overconfidence to be significantly positively related to their entrepreneurial intention. While we did not find evidence that entrepreneurial self-efficacy was related to entrepreneurial intentions, we find that this is due to the inclusion of the overconfidence variable into the intentions model. Finally, we find evidence of interaction effects between an individual's entrepreneurial attitudes and overconfidence in determining the strength of their entrepreneurial intentions.

REFERENCES

- Ajzen, I. (1987), "Attitudes, Traits and Actions: Dispositional Prediction of Behaviour in Personality and Social Psychology", *Advances in Experimental Social Psychology*, 20: 1-63
- Ajzen, I. (1991) "The theory of planned behaviour." *Organisational Behaviour and Human Decision Processes* 50(2):1-63.
- Aldrich, H. (1999), *Organizations Evolving*, London, Sage.
- Bandura, A. (1982), "Self-efficacy mechanism in human agency", *American Psychologist*, 37:122-147.
- Bandura, A. (1986), *The social foundations of thought and action*, Englewood Cliffs, NJ, Prentice Hall
- Baron, R., Markman, G. (1999), *"The role of entrepreneur's behaviour in their financial success: Evidence for the benefits of effective social skills"*, paper presented at Babson Conference on Entrepreneurship, Babson Park, MA, US.
- Baumol, W.J. (1990), "Entrepreneurship: Productive, unproductive, and destructive", *Journal of Political Economy*, 98(5), 893-921.
- Becker, G.S. (1964). *Human capital: A theoretical and empirical analysis, with special reference to education*. Chicago; University of Chicago Press.
- Begley, T. (1995), "Using founder status, age of firm and company growth rate as the basis for distinguishing entrepreneurs from managers of smaller businesses, *Journal of Business Venturing*, 10(3):249-263
- Bird, B. (1988), "Implementing Entrepreneurial Ideas: The case for intention, *Academy of Management Review*, 13(3): 442-453
- Birley, S. (1985). "The Role of Networks in the Entrepreneurial Process". *Journal of Business Venturing*. 18(1): 107-118.
- Boyd, N.G., Vozikis, G.S. (1994), "The Influence of Self-Efficacy on the Development of Entrepreneurial Intentions and Actions", *Entrepreneurship Theory and Practice*, Summer, 1994.
- Busenitz, L.W., Barney, J.B. (1997), "Differences between entrepreneurs and managers in large organisations: biases and heuristics in strategic decision-making", *Journal of Business Venturing*, 12, 9-30.
- Caird, S. (1991), "The enterprising tendency of occupational groups", *International Small Business Journal*, 9: 75-81
- Casson, M. (1995), *"Entrepreneurship and Business Culture"*, Aldershot, UK and Brookfield, US: Edward Elgar.
- Chen C.C., Greene, P.G., Crick, A. (1998) "Does Self-Efficacy Distinguish Entrepreneurs from Managers?" *Journal of Business Venturing* 13: 295-316.
- Coleman, J. (1990). "Social Capital and the Creation of Human Capital". *American Journal of Sociology*. 94: 94-120.
- Davidsson, P. (1995), *"Determinants of Entrepreneurial Intentions"*, Jönköping International Business School (JIBS), Sweden
- Davidsson, P. and Honig, B. (2003). "The role of social and human capital among nascent entrepreneurs". *Journal of Business Venturing*. 18(3), 301-331.

- Dimov, D.P., Shepherd, D.A. (2005) "Human capital theory and venture capital firms: exploring "home runs" and "strike outs"" *Journal of Business Venturing* 20: 1-21.
- Douglas, E.J., Fitzsimmons, J.R. (2005), "Entrepreneurial Intentions towards Individual versus Corporate Entrepreneurship", paper presented at SEAANZ conference, Armidale, NSW.
- Douglas, E.J. and Shepherd, D.A. (2000) "Entrepreneurship as a Utility-Maximizing Response" *Journal of Business Venturing* 15(3): 231-251.
- Douglas, E.J., Shepherd, D.A. (2002) "Self-Employment as a Career Choice: Attitudes, Entrepreneurial Intentions, and Utility Maximization" *Entrepreneurship Theory and Practice*, Spring: 81-90.
- Eisenhauer, J.G. (1995). "The entrepreneurial decision: Economic theory and empirical evidence", *Entrepreneurship Theory and Practice*, Summer, 67-79.
- Fishbein, M., Ajzen, I. (1975), "Belief, Attitude, Intention and Behaviour: An Introduction to theory and Research", Reading, MA: Addison-Wesley
- Fitzsimmons, J.R. & Douglas, E.J. (2005), "Entrepreneurial Intentions: A Cross-Cultural Study of Potential Entrepreneurs in India, China, Thailand and Australia", paper presented at the Babson Kauffman Entrepreneurial Research Conference, Wellesley, MA.
- Fischhoff, B, Slovic, P, Lichtenstein, S. (1977), "Knowing with certainty: The appropriateness of extreme confidence", *Journal of Experimental Psychology: Human Perception and Performance*, 3, 552-564.
- Forbes, D., P. (2005), "Are some entrepreneurs more overconfident than others?", *Journal of Business Venturing*, 20, 623-640.
- Gifford, S. (1993). "Heterogeneous Ability, Career Choice, and Firm Size", *Small Business Economics*, 5, 249-59.
- Gimeno, J., Folta, T.B., Cooper, A.C. & Woo, C.Y. 1997. Survival of the fittest? Entrepreneurial human capital and the persistence of underperforming firms. *Administrative Science Quarterly*, 42: 750-783.
- Greene, P.G. & Brown, T. 1997. Resource needs and the dynamic capitalism typology. *Journal of Business Venturing*. 12, 161-173
- Krueger, N.F. Jr. (1993) "The impact of prior entrepreneurial exposure on perceptions of new venture feasibility and desirability", *Entrepreneurial Theory & Practice*, 18(1), 5-21.
- Krueger, N.F. Jr. & Brazeal, D.V., (1994) "Entrepreneurial Potential and Potential Entrepreneurs" *Entrepreneurial Theory & Practice*, Spring, 91-104.
- Palich, L.E., Bagby, D.R. (1995), "Using Cognitive Theory to Explain Entrepreneurial Risk-Taking: Challenging Conventional Wisdom", *Journal of Business Venturing*, 10, 6, 405-417.
- Reynolds, P. (1997), "Who starts new firms?", *Small Business Economics*, 9, 449-62.
- Sexton D., Bowman, N. (1984), "Personality Inventory for potential Entrepreneurs: Evaluation of a modified JPI/PRF-E test instrument", In J. Hornady, F. Trpley, J. Timmons and K Vesper, *Frontiers of Entrepreneurship Research*, Babson Park, US: Babson College, pp. 513-28.
- Shane, S. (2000), *A General Theory of Entrepreneurship: The Individual-Opportunity Nexus*, Edward Elgar, Cheltenham, UK.
- Simon, M., Houghton, S.M. (2003), "The relationship between overconfidence and the introduction of risky products: evidence from a field study", *Academy of Management Journal*, 46 (2), 139-150.

- Simon, M., Houghton, S.M., Aquino, K. (1999), "Cognitive Biases, Risk Perception, and Venture Formation: How Individuals Decide to Start Companies", *Journal of Business Venturing*, 15, 113-134.
- Shane, S. (2003), "A General Theory of Entrepreneurship: The Individual-Opportunity Nexus", Edward Elgar, Cheltenham, UK.
- Shapero, A. (1982), "Social Dimensions of Entrepreneurship", In C Kent, D Sexton, & K Vesper (Eds), *The Encyclopedia of Entrepreneurship*, pp 72-90, Englewood Cliffs, NY: Prentice Hall.
- Shepherd, D., Douglas, E.J. (2004), Unpublished work.
- Simon, M., Houghton, S.M., Aquino, K. (1999), "Cognitive Biases, Risk Perceptions, and Venture Formation: How Individuals Decide to Start Companies", 15, 113-134.
- Storey, D. (1994) "New Firm Growth and Bank Financing", *Small Business Economics*, 6, 139-50.

APPENDIX 1

Overconfidence Questions

For each of the following questions, please provide a low and high estimate such that you are 90% certain that the correct answer falls within those limits.

1. What is the average weekly income of Australian workers (US\$)?
2. What proportion of new cars sold in Australia are four wheel drives?
3. What is the GDP per capita in Singapore (US\$)?
4. What proportion of US trade in 2004 was with China?
5. What was the inflation rate in the US in 2004?
6. What was the size of the total labor force in the US in 2004 (in millions)?
7. What percentage of total income did the top 10% of US households consume in 1994?
8. What proportion of the labor force in Great Britain was employed in the services industry in 2004?
9. What is the unemployment rate in South Korea (%)?
10. What percentage of the population in Vietnam lives below the poverty line?