Gender, Risk and Venture Creation Intentions

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Abstract

This paper is concerned with whether women are less likely to express business start-up intentions because of a less favourable attitude to risk. Previous research suggests that attitude to risk differs significantly between genders, but has not addressed the question of whether this contributes to lower levels of female interest in venture creation. This paper describes a conceptual basis for this question, and investigates it using a survey of business start-up intention from across a sample of European universities. A large proportion of the difference in average levels of intention between genders appears to be associated with attitude to risk.

1. Introduction

In almost all countries rates of early stage entrepreneurial activity are higher for men than for women, and in many cases substantially higher (Bosma and Levie, 2010). Scholars have reported a variety of factors responsible for the formation of venture creation intentions. These factors can be grouped into two broad categories (Shane, 2003), namely individual characteristics (Carroll and Mosakowski, 1987; Cooper, Woo and Dunkleberg, 1988; Evans and Leighton, 1989; Bates, 1995; Kolvereid, 1996a and 1996b; Delmar and Davidsson, 2000) and contextual factors related to the presence of opportunity (Morris and Lewis, 1995; Wiklund and Shepherd, 2003). Overlaid on this landscape is the question of gender, and the different constraints and access to opportunity that women face as entrepreneurs (Brush, 1990, 1992; Taylor and Newcomer, 2005; Parker, 2009). Supporting the headline findings of international surveys such as the Global Entrepreneurship Monitor, various studies identify that young males are more likely to hold venture creation intentions then their female counterparts (Wang and Wong, 2004; Ulla *et al.*, 2005). However, to understand why women are less likely to aspire and subsequently engage in entrepreneurial activity, it is critical to determine how the factors that are thought to shape entrepreneurial intent operate across gender.

One important, yet in this context, under-researched question concerns attitude to risk. A large body of psychological research does suggest that women in general may be more risk averse than men (Byrnes et al., 1999). The importance of risk-taking as an entrepreneurial function has long been recognised (Knight, 1921). Subsequent research, aside from any consideration of gender, has sought to identify a possible association between risk aversion and entrepreneurial choice (Shaver and Scott, 1991; Stewart and Roth, 2001; Segal et al., 2005; Puri

and Robinson, 2007). However the importance of gender to this association has not been addressed.

The present paper addresses the extent to which differences in attitude towards risk can explain differences in the level of intention of students to start a new business venture within three years of graduation. Developed from an appropriate conceptual framework, a multivariate analysis is conducted using survey data on undergraduate students from a sample of European countries. This approach suggests that a large proportion of the difference in the likelihood that a male is more likely to express intention to start a business can be attributed to difference in attitude towards risk, and that other factors such as differences in background, exposure to entrepreneurial training or experience and differences in subjects of study contribute little to the overall difference. However the estimated strength of the contribution of attitude to risk in explaining the different levels of entrepreneurial intention between men and women, depends critically on controlling for other well-researched cognitive traits, notably self-efficacy.

2. Background and hypotheses

If a key characteristic of entrepreneurship is the bearing of risk (Knight, 1921) then heterogeneity in attitude towards risk, or risk aversion, may have an important association with who progresses towards new venture establishment (Kihlstrom and Laffont, 1979). Research on cognitive influences on entrepreneurship recognises that attitude to risk may play an important role of the formation of entrepreneurial intention (Shaver and Scott, 1991; Krueger and Dickson 1994; Segal et al. 2005). Researchers have extensively investigated the association between entrepreneurial activity or self-employment and attitude towards risk. A range of empirical

strategies have been followed (Parker, 2009). These can be broadly categorised as those based on responses to hypothetical scenarios - for example, "how would you behave in response to the following gamble ..." - and those based on revealed preference - for example, based on observed behaviour towards risky activity such as buying lottery tickets, buying insurance or participation in harmful activity such as smoking (Lindh and Ohlsson, 1996; Van Praag and Cramer, 2001; Brown et al., 2006). One recent study has analysed experimental data obtained from the self-employed and from non-business owners (Masclet et al., 2009).

Each approach may present different problems for interpretation of findings. Studies which correlate self-employment status, and therefore some past decision to launch a new venture, with self-reported risk aversion may suffer from a reverse causality problem. Is it because a respondent has previous experience of entrepreneurial activity that they report lower aversion to risk? Longitudinal data, if available, may resolve this (Brown et al., 2011). However, risk aversion may be lower in both experienced and novice entrepreneurs, compared to non-entrepreneurs (Ekelund et al., 2005). While revealed preference measures may avoid this, they may conflate lower risk aversion with over-optimism, although some authors (for example Puri and Robinson, 2005) suggest little correlation in practice between the two. A range of other factors may be correlated with and therefore explain apparent lower risk aversion, including bounded rationality, cognitive bias associated with short-termism and reduced counter-factual thinking and stronger subjective sense of control (Parker, 2009; Sarasvarthy et al. 1998). The Global Entrepreneurship Monitor employs a "fear of failure" question to capture risk aversion – however this may also conflate risk aversion with other factors, in particular degree of social stigma (Parker, 2009).

Univariate analyses, which compare mean risk attitude scores for entrepreneurs and non-entrepreneurs, suggest little relationship (Brockhaus, 1980; Shaver and Scott, 1991), or even that entrepreneurs may be more risk averse (Lüthje and Franke, 2003, Miner and Raju, 2004). Recent meta-analyses suggest a balance in favour of lower risk aversion amongst entrepreneurs (Stewart and Roth, 2001). Evidence from multivariate regression analyses, which attempt to control for a range of demographic and other co-varying characteristics, provides much stronger support that entrepreneurs are less risk averse (Hartog et al., 2002; Ekelund et al. 2005; Brown et al, 2006; Brown et al, 2011). In addition to the use of longitudinal data, the issue of causality has also been addressed by examining the relationship between risk aversion and prior entrepreneurial intention. This certainly accords with the psychological perspective that attitude to risk may inform intention as much as action. Intentions are regarded as an important predictor of subsequent action (Krueger et al. 2000), although that link may also require further consideration of motivation (Carsrud and Bräanback, 2011).

Latent entrepreneurship is generally higher amongst men compared to women (Grilo and Irigoyen, 2006), and corresponds to the gap between actual rates of self-employed business ownership for men and women. A robust conclusion to emerge from the limited literature on venture creation intentions of students is that males show higher levels of interest in entrepreneurship then females (Wang and Wong, 2004; Ulla et al., 2005).

Figure 1 summarises the conceptual model underlying the present analysis. The underlying model is derived from Shapero's model of the entrepreneurial event (Shapero, 1982) and the theory of planned behaviour (Azjen, 1991), which identify perceived self-efficacy and perceived locus of control as key cognitive antecedents of entrepreneurial intention (Tkachev and Kolvereid, 1999; Krueger et al., 2000). The model, in addition, proposes that attitude to risk is a

further key cognitive trait in this process, but that, in the light of the existing literature discussed below, this is moderated by gender. Gender in turn may also have a direct mediating effect on intention, since the lower level of women in the population of entrepreneurs in many economies may serve as a direct cultural discouragement. So the analysis starts from the following hypothesis:

H1: Business start-up intention is higher amongst males than females.

The reasons for this may relate to a number of factors, such as personal background and experience and reduced perceptions of skill and self-efficacy. Gender may relate to such factors as "need for achievement" (McClelland, 1961), confidence or over-confidence (Busenitz and Barney, 1997) and propensity to take risk (Van Praag and Cramer, 2001, Franke and Luthje, 2004). Evidence from psychology implies that females have higher risk aversion tendencies than males (Arch, 1993; Byrnes *et al.*, 1999). More specific to entrepreneurship, other authors report that women display greater financial risk aversion than men (Jianakopolos and Bernasek, 1998; DiMauro and Musumeci, 2011). To date however, there are few studies that have specifically focused upon the risk attributes of female entrepreneurs, and little or no empirical support that the relationship between attitudes to risk and entrepreneurial intentions may be gendered, and may in part explain the commonly observed differences in rates of intention between men and women. Among that which does exist, evidence shows that female entrepreneurs have lower risk propensity scores then male entrepreneurs (Sexton and Bowman-Upton, 1990). Similarly, there is robust evidence that male entrepreneurs are less likely to prefer low-risk/low-return ventures then female entrepreneurs (Kepler and Shane, 2007). Given this discussion it is hypothesised that:

H2: Those with a more positive attitude to risk report higher levels of business start-up intention.

H3: Females have a less positive attitude to risk and this is associated with lower levels of business start-up intention.

Both hypotheses are shown in Figure 1.

A number of other background factors are explored in the literature for potential association with the level of interest in entrepreneurship. Some researchers however suggest that background influences add little explanatory power to entrepreneurial intention over and above cognitive antecedents (Tkachev and Kolvereid, 1999). These are also shown in Figure 1 as providing a potential mediating influence, which is open to examination, and therefore informing the choice of control covariates in the investigation of the main hypotheses. These include parental and social background (Scott and Twomey, 1988; Stanworth et al., 1989; Davidsson, 1995; Crant, 1996).) Parental role models may be stronger for male graduate entrepreneurs than for female ones (Kirkwood, 2007). Parental self-employment status is more strongly associated with male entrepreneurial preference than female preference (Verheul et al., 2008). Beyond family inter-generation role models, social networking and friendship groups may play a role in forming entrepreneurial intention (Davidsson and Honig, 2003). The span of "entrepreneurial exposure" may include the influence of friends or wider relatives who have started a business, or exposure to entrepreneurial intent through work experience in a friend's small business (Krueger, 1993). However, other research suggests that having entrepreneurial friends increases the likelihood of nascent entrepreneurship, although an association with the number of family relatives who are business owners is not found (Kim et al., 2003). As far as graduate

entrepreneurs are concerned, entrepreneurial education and training (Shane, 2003; Gibb, 2008) as well as small business work experience (Matthews and Moser, 1996) may be influential.

3. Data source and preliminary analysis

The data used in this study are obtained from a questionnaire survey of students in a number of UK and European universities. The original purpose of the questionnaire was to provide data to support an independent report to the regional government in Wales on student entrepreneurial intentions. The questionnaire was distributed as an internet survey and questionnaires were emailed to particular populations of students in seven universities over the period December 2007 to April 2008. Three universities were in the UK of which two were in Wales and one in England, and one each in Ireland, Sweden, Finland and Switzerland. A total of 628 completed questionnaires were obtained. The design of the questionnaire was informed by a prior review of the literature to identify the range of issues and hypotheses addressed, and subject to preliminary review by a small number of recent graduate entrepreneurs.

Business start-up intention is measured using a binary variable coded from the question: "If you think that you will set up a business within the first three years of finishing your course, what type of business would that be?" Respondents may then indicate that they are not intending to set up a business, or provide a description of their intended business. Almost one in five intend to launch a venture in retailing or distribution, often as an on-line business. The next most popular category (16%) is a leisure or hospitality-related venture. Manufacturing or technology-related activity is also popular. However, almost one in ten respondents are unsure or unable to specify a particular line of business.

Table 1 provides some descriptive information on the sample, based on background and moderating influences on entrepreneurial intention that have been discussed in previous literature. There is a large difference between the level of business start-up intention between men (41%) and women (24%), confirming H1. It is the reasons for this difference that the remainder of the paper seeks to explain. Although the sample is very evenly split between men and women, female students who completed the questionnaire are slightly older. They are also slightly more likely to be British and studying at a British university. This suggests some response bias towards women at the British universities at which the survey was conducted. It is however noticeable that around 13% of responses are from international (i.e. non-European) students studying away from home at a European university. Table 1 also provides information about the subject area of study – the sample is skewed towards business/ economics and engineering students. To some extent this resulted from asking business school professors and professors who teach supporting business courses to engineering students to promote completion of the survey. However, because universities do not typically release detailed subject enrolment data into the public domain, the extent to which the survey is biased away from a representative sample of the general population in the universities in question is unclear.

80% of the sample are single. Of those who are married or co-habiting with a partner, half (10%) of partners are economically active. However female respondents are three times as likely to have an economically active partner. Further information about family background is also provided in response to questions about parental entrepreneurial activity. Two-thirds of respondents do not have a parent who has business ownership experience. Of those who do, it is much more common for the father to be a business owner than the mother. This is particularly so for male students. A further 7% of respondents have a sibling who is a business owner, and this

proportion is higher for women. Reference to peer group business experience however is much more likely to arise from friends rather than siblings, as shown in the much higher proportions who report that they have a close friend who is a business owner. The proportion of male students here is higher. A third of respondents, with a slightly higher proportion of men than women, have had some exposure to entrepreneurship education or training, either at school, university or as a "stand-alone" activity. The final row of the table reports data on experience of informal entrepreneurial activity: for example internet auction trading, managing a personal asset portfolio, part-time business activity while studying. Almost 15% of respondents report some activity of this nature, with little difference in the proportions for men and women.

[Insert Table 1 here]

The questionnaire instrument contained a number of items concerning attitude to risk (see Table 2). Previous research measures attitude to risk in a number of ways (Parker, 2009). Ideally a revealed preference measure such as observed participation in risky activities or gambling behaviour might be preferred. However the survey here addresses attitude to risk through seven questionnaire items which ask about reaction to risk and invite respondents to assess their behaviour in hypothetical situations (see appendix). Items were chosen on the basis of their use in previous research. The level of internal consistency across the items appears to be high: Cronbach's alpha is 0.73.

[Insert Table 2 here]

Table 3 reports the mean values of the attitude to risk scale. A higher score indicates a more favourable attitude to risk. The table shows that men who report intent to start a business have the highest mean score. Women generally have lower scores, and the mean score is

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particularly low for those with no intent to become self-employed. T-test statistics are reported for difference in means between gender and difference in means between those with and without start-up intention. In both cases the statistics are highly significant confirming the differences in each case (H1 and H2). A MANOVA analysis also shows that these group differences are jointly important. This provides *prima facie* evidence that difference in attitude to risk is an important factor in explaining why men and women report significantly different levels of interest in business start-up (H3).

[Insert Table 3 here]

4. Multivariate regression results

This section reports results from a multivariate analysis of start-up intention. The regression models include the range of covariates described in Table 1, covering age, country of residence, spousal status, subject area (coefficients not reported), parental and peer-group exposure to entrepreneurship, exposure to entrepreneurship training and current experience with informal entrepreneurial activity. In addition to these it was also considered important to control for variation in other cognitive influences which may be associated with entrepreneurial intent, since these may correlate with attitude to risk, and their omission may bias upwards any estimate of the association between intent and risk attitude. The survey instrument included a set of six items concerned with perceived locus of control, and five concerned with perceived self-efficacy drawn from previous research and subjected to pre-testing with pilot samples. These are combined into two scales: perceived locus of control scale (Cronbach alpha: 0.71), and perceived self-efficacy scale (Cronbach alpha: 0.64).

Table 4 reports logistic regression results for the likelihood of start-up intention, for male and female sub-samples. Coefficients are reported as marginal effects, providing estimates of the impact of a change in a particular variable on the probability that a student will express start-up intent. Two models are reported in each case – the first, model (a), excludes the other cognitive traits of locus of control and self-efficacy which are typically associated with entrepreneurial intent. The second, model (b), includes them, and this is the preferred specification. In model (a) the association between attitude to risk and start-up intention is very high, particularly for men, with marginal effects of 38 and 22 percentage points for men and women respectively. In model (b) the association between start-up intent and attitude to risk is seen to be mediated by the effects of the other cognitive traits. Here the marginal effects are 17 and 11 percentage points for men and women respectively. However, even controlling for these effects there is a significant association, confirming H2.

[Insert Table 4 here]

The associations between start-up intent and other covariates are now discussed for model (b). For men there is a negative association with age. Male students over the age of 25 are 21 percentage points less likely to report self-employment intention. However for women the effect is reversed: women over 25 are 24 percentage points more likely. Country of origin and university of study effects are not statistically significant, suggesting no significant cross-cultural effects. For men having an economically active spouse increases the likelihood of start-up intent by 26 percentage points, although the coefficient is only weakly significant. This is consistent with spousal income providing some sense of security against the income risk which might be associated with business start-up (Davidsson and Honig, 2003; Werbel and Danes, 2010). For women there is no such effect. Having an economically inactive spouse lowers the likelihood of

start-up intent by 13 percentage points for women. However this may be indicative of the same economic effect, in that for women the risk associated with a volatile own business income is greater if that income needs to support a spouse as well.

Parental and peer background effects are strong for men, but not for women. For men having a father in business increases the likelihood of start-up intent by 16 percentage points. Having a mother (but not a father) increases it by 34 percentage points. However the latter, as seen in Table 1, is unusual. For men having a sibling who owns a business also raises the likelihood quite significantly – in this case by 51 percentage points. For women no such significant effects are found. No significant background effects are found for women. Having a close friend who owns a business is not significantly associated with start-up intent. Entrepreneurial training and experience is important in increasing the likelihood of start-up intent for men but not for women. Male marginal effects are 12 percentage points for training (although only weakly significant) and 22 percentage points for informal experience. Overall these results show some important differences between men and women in the strength of any association between background and start-up intent, confirming and extending earlier research.

5. Decomposing the difference in the level of male and female entrepreneurial intention

In order to provide further understanding of the differences between men and women in the strength of the various factors in the regression model, decomposition analysis is used. This is undertaken in preference to a moderated regression strategy, since it allows for an entirely distinct regression model process for men and women, and investigates the relative contributions of all the model covariates. When outcomes of interest are continuous and modelled using linear

regression (e.g. wages) the Blinder-Oaxaca (Blinder, 1973; Oaxaca, 1973) decomposition technique has been widely used. Thus, the Blinder-Oaxaca decomposition for the male/female gap in the average value of an outcome variable, Y, can be expressed as:

$$\bar{Y}^M - \bar{Y}^F = \left[(\bar{X}^M - \bar{X}^F)\hat{\beta}^M \right] + \left[\bar{X}^F (\hat{\beta}^M - \hat{\beta}^F) \right] \qquad (1)$$

where $\bar{Y}^M - \bar{Y}^F$ is the difference between the average outcome of the male sample and the average outcome of the female sample. $\bar{X}^j$ is a row vector of average values of the independent variables and $\hat{\beta}^j$ is a vector of coefficient estimates for gender j. The difference in the outcome due to characteristics is captured by the first term on the right hand side of equation 1, while the second term shows the differential due to differences in the estimated coefficients.

However this technique cannot be used directly when the outcome of interest is dichotomous, such as here. For this purpose an alternative is proposed (Fairlie, 2005):

$$\bar{Y}^M - \bar{Y}^F = \left[\sum_{i=1}^{N^M} \frac{F(X_i^M \hat{\beta}^M)}{N^M} - \sum_{i=1}^{N^F} \frac{F(X_i^F \hat{\beta}^M)}{N^F} \right] + \left[\sum_{i=1}^{N^F} \frac{F(X_i^F \hat{\beta}^M)}{N^F} - \sum_{i=1}^{N^F} \frac{F(X_i^F \hat{\beta}^F)}{N^F} \right] \qquad (2)$$

with N^j being the sample size for gender j. To calculate the decomposition, $\bar{Y}^j$ is the average probability of start-up intent for gender j and F is the cumulative distribution function from the logistic distribution. Equation (2) will thus hold exactly for a logistic model that includes a constant term, because the average value of the outcome variable must equal the average value of the predicted probabilities in the sample (Fairlie, 2005). In this case the male coefficient estimates, $\hat{\beta}^M$ are used as weights for the differences in the outcome due to characteristics, with

$\hat{}^{F}$ being used as a weight for deriving the differences in coefficients capturing the contribution of the characteristics.

Equation (2) gives us the total contribution of all independent variables in explaining the gap in mean start-up intent probabilities between males and females. Individual independent variable contributions can also be calculated. Assuming that $N_F = N_M$ and that there is one-to-one matching of female and male observations, the independent contribution of X_1 to the gender gap (using coefficient estimates from a logistic regression for a pooled sample, $\hat{}^{*}$) can be expressed as:

$$\frac{1}{N^F} \sum_{i=1}^{N^F} F(\hat{}^{*} + X_{1i}^{M} \hat{}_{1}^{*} + X_{2i}^{M} \hat{}_{2}^{*}) \quad F(\hat{}^{*} + X_{1i}^{F} \hat{}_{1}^{*} + X_{2i}^{M} \hat{}_{2}^{*})$$

(3)

Thus the change in the average predicted probability from replacing the female distribution with the male distribution of that variable holding the other variables constant gives the contribution of each variable to the gender gap. However, unlike in the linear case, the independent contributions of X_1 and X_2 depend on the value of the other variables, which implies that inference about the contribution of a particular variable will be conditional on the properties of the sample used.[1]

In most cases however the samples for males and female will not be exactly equal; in the present case 316 males and 312 females. In such instances a one-to-one matching of observations, obtained through repeated replications of random sub-sampling is done in order to compute the contribution of single independent variables. Here, a random sub-sample of males equal in size to the full female sample (N_F) is drawn. Each observation in the male sub-sample

and female full-sample is then separately ranked by the predicted probabilities and matched by their respective rankings (Fairlie 2005). The decomposition estimates will depend on the randomly chosen sub-sample of males (the larger group), and therefore to obtain estimates for the hypothetical decomposition repeated random sub-samples are drawn (1000 times) and the mean value of the estimates are used to provide decomposition results.

Table 5 provides results for this analysis. The upper panel of the table shows the mean probability of business start-up intent for both the male and female samples (41 and 24 percent respectively, as shown in Table 1). The differences in these average intentions are then shown, followed by the total explained proportion of the difference explained by the choice of explanatory variables. In this model the gender gap in start-up intent is 16.8%. Of this gap, 104% (17.4 percentage points) is explained by the model and the choice of covariates, with the remaining small offsetting difference of -4% (-0.6 percentage points) being due to differences in the coefficients in the male and female models.[2] The coefficient differences suggest that if females had identical background characteristics and cognitive traits to males then there would in fact be a very slightly higher level of average female start-up intention. The lower panel provides contributions to the gender gap from each independent variable, along with indicators of statistical significance and the contribution in percentage terms.

[Insert Table 5 here]

Only a small number of factors provide a statistically significant contribution to the difference in the average level of start-up intent between male and female students. Some of the difference can be explained by the different subject group composition of male and female students, and in particular the lower likelihood that women are study science and engineering

subjects in the sample, which explains 26% of the gap. This is offset by more women studying other subjects, notably social sciences which have a lower association with self-employment intent. The greater proportion of older female students in the sample also explains about 4 per cent of the gap. The other individually statistically significant component is that of the difference, shown in Table 1, between male and female students having a sibling business owner (-5 per cent of the gap). However the most significant components of the intention gap arise from differences in the cognitive traits, and in particular differences between men and women in average levels of perceived self-efficacy and attitude to risk. The higher average male attitude to risk in the sample explains almost a third (32%) of the gap. Difference in average perceived self-efficacy explains 55% of the gap. This provides strong support for *H3*. If model (a) had been used to perform the decomposition analysis the contribution of differences in attitude to risk is 82% of the overall gap, illustrating the extent to which attitude to risk and self-efficacy are collinear factors, and that failure to control for the latter biases the contribution of the former.

6. Discussion and limitations

The results here suggest strong associations between venture creation intention, gender and attitude to risk. A more positive attitude to risk appears to make a significant contribution in explaining why levels of intention are significantly higher for men compared to women. However these conclusions are subject to a number of caveats.

A first limitation concerns the survey instrument itself. The approach adopted here was to survey enrolled students in a small number of European universities. Students may not be typical of the wider population of young adults. The nature of university study and life may provide

them with greater exposure to entrepreneurial thinking and ideas, than experienced by others of the same age profile who are not in education. For example, it seems unlikely that around a third of the general population of young adults will have had exposure to entrepreneurial training, as in this sample. Furthermore there is some suggestion that the sample may have achieved a higher proportion of older female students than male ones, such that the contribution of age to the difference in intention levels between males and females, reported in Table 5, may be an artefact of sample structure. In general it is not possible to rule out that those students with an interest in entrepreneurship may have been better disposed to complete the survey. However, providing that this self-selection bias is the same for men and women, this should not affect conclusions about the difference in the level of intent between men and women. However cross-sectional surveys typically uncover intention, but intention may fail to result in action without sufficient individual entrepreneurial motivation (Carsrud and Bräanback, 2011).

A second limitation concerns the use of data indicating level of agreement with hypothetical statements to provide a measure of revealed attitude to risk. As previously noted, some researchers (Parker, 2009) are critical of whether such data capture genuine attitude to risk, and indicate that revealed preference information (lifestyle choice) is preferable. One criticism of "hypothetical" questions is that reverse causality may apply: subjects report that they like risk because they have become used to it in past entrepreneurial activity. However this criticism is difficult to sustain in a sample of young adults, the majority of whom have not yet completed full-time education. Nevertheless a sizeable minority of the sample are engaged in informal entrepreneurial activity and this may have already coloured their attitudes towards risk.

A third limitation also concerns whether an attitude to risk construct is actually measuring risk preference or some other cognitive trait which is highly correlated. The fact that

attitude to risk is correlated with other traits is demonstrated in the result reported, is so far as the marginal effect of the risk scale is significantly lower once other entrepreneurial traits are included, notably perceived self-efficacy. This finding points to the potential pitfall from drawing conclusions about the strength of any association between attitude to risk and entrepreneurial intention from a univariate analysis. However it is not possible, given the survey limitations, to rule out that other unobservable characteristics may be correlated with attitude to risk. In particular the favourability of the external business environment may influence entrepreneurial intention, but may in turn be associated with attitude to risk. In the present analysis it must be assumed that any variation in the external business environment is captured by country of origin and country of residence controls. These variables are not statistically significant in the analysis.

7. Conclusions

This paper has been concerned with the extent to which the difference between men and women in reported levels of interest in business venturing can be explained by differences between the genders in attitude to risk. The relationship between entrepreneurial intention and attitude to risk has been explored in some detail in previous research. However the important question of difference between males and females has not addressed. This is surprising given that a parallel literature has also examined, aside from questions of entrepreneurial intent, the proposition that men tend to view risk more positively than women. By analysing survey data on 628 student respondents drawn from a number of UK and European universities, the paper finds evidence to support previous established findings that the level of venture creation intent is

higher amongst male students than female ones, and that female students do view risk less positively. However the paper also finds that that the strength of the positive association between attitude to risk and intention is higher for men than for women. This finding, in turn, appears to explain a very significant proportion of the difference in intentions between men and women. The paper also finds that simple univariate analyses of the risk-intention relationship may be subject to considerable omitted variable bias, and that the impact of attitude to risk is mediated by other traits which are antecedents of venture creation intention.

However, if it can be assumed that various other potential, but unobservable factors influence men and women to the same degree, then the difference between men and women in the strength of the association between attitude to risk and venture creation intention should be robust. This is the key contribution in the paper. The implication of this finding is that it offers further strength to the widely accepted argument that female venture creation needs additional support. Nevertheless it is far from clear how public policy might shift the level of risk aversion of one population group. Indeed, insofar as women may choose to venture a business for family-work balance motives rather than financial or market opportunity motives typically reported by men (Hughes, 2006), then even if such a shift in attitude could be engineered, then it may have limited impact. Actions to mitigate risk or perceived risk, such as business start-up income support schemes specifically for women, may yield some benefits, but would need to be subject to rigorous *ex post* evaluation.

Footnotes

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[1] In most cases however the sample size of both groups will not be exactly equal. In this case there are observations on 316 males and 312 females. In such instances a one-to-one matching of observations, obtained through repeated replications of random sub-sampling is done in order to compute the contribution of single independent variables. Here, a random sub-sample of males equal in size to the full female sample (N_F) is drawn. Each observation in the male sub-sample and female full-sample is then separately ranked by the predicted probabilities and matched by their respective rankings (Fairlie 2005). The decomposition estimates will depend on the randomly chosen sub-sample of males (the larger group), and therefore to obtain estimates for the hypothetical decomposition 1000 random sub-samples are drawn and the mean value of the estimates are used to provide decomposition results. Because the male sample is larger than that for females, the decomposition is evaluated at the male coefficient levels (see equation 2). In principle it is possible to reverse this.

[2] This proportion of the decomposition may, in part, be attributable to the larger marginal effects (coefficients) in the association between parental role models and male start-up intentions, compared to those for females. However, estimates of the separate contributions of particular coefficient differences are not attempted due to the identification problem (Jones, 1983), and because the overall proportion is small.

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Table 1: Sample Descriptive Information

	Male	*Female*	*All*
Likely to start a business within 3 years of graduation	41.1%	24.4%	32.8%
Demographics:			
Female	-	-	49.7%
Aged over 25	7.9%	12.2%	10.0%
Country of origin: (reference: UK)			
Other European	38.6%	29.5%	34.1%
Non-European	14.9%	10.6%	12.7%
University: (reference: UK university)			
Non-UK university	43.7%	26.3%	35.0%
Subject of study: (reference: Arts)			
Business/Economics	38.9%	29.5%	34.2%
Law	4.7%	9.9%	7.3%
Other social science	4.1%	12.2%	8.1%
Science/Engineering	38.9%	17.0%	28.0%
Medicine/Health	1.9%	6.4%	4.1%
Spousal status: (reference: single)			
Partner active	5.4%	15.1%	10.2%
Partner inactive/education	12.0%	6.7%	9.3%
Entrepreneurial background: (reference: neither parent a business owner)			
Father business owner	25.6%	18.9%	22.2%
Mother business owner	5.1%	6.7%	5.9%
Both parents business owners	8.2%	4.2%	6.2%
Sibling business owner	5.7%	8.7%	7.2%
Close friend business owner	36.7%	25.3%	31.1%
Own experience:			
Entrepreneurship training	35.8%	31.4%	33.6%
Informal entrepreneurship activity	14.9%	14.1%	14.5%
N	316	312	628

Table 2: Attitude to risk questionnaire items

	Questionnaire item	*Scaling*
1	How easily do you adapt when things go wrong financially?	1: very uneasily to 4: very easily
2	When you think of the word 'risk' in a financial context, which of the following words come to mind first?	1: danger, 2: uncertainty, 3: opportunity, 4: thrill
3	If you had to choose between more job security with a small pay rise and less security with a big pay rise, which would you pick?	1: definitely more job security to 5: definitely less job security
4	Imagine you were in a job where you could choose whether to be paid a salary, commission or a mix of both. Which would you pick?	1: all salary to 5: all commission
5	How much confidence do you have in your ability to make good financial decisions?	1: none to 5: complete
6	How would you assess your willingness to take financial risks?	1: very low risk taker to 4: high risk taker
7	If you received 100,000 Euros that could only be used in three year's time how would you invest the money?	1: savings with guaranteed yield of 3%; 2: portfolio of shares in large companies with yield range +10% to -2%; 3: new company shares with yield range +30% to -20%

Table 3: MANOVA analysis of attitude to risk, business start-up intent and gender

	Male		Female	
	Start-up intent	No Start-up intent	Start-up intent	No Start-up intent
N	130	186	76	236
Mean attitude to risk (standardised)	0.556	0.067	0.0013	-0.361
T-test (626) Males v Females:	11.97 (0.000)			
T-test (626) Intent v No intent:	10.63 (0.000)			
MANOVA R-sqrd:	0.288			
Wilks' Lambda:	0.405	F(2, 625) = 126.5 (p-value 0.000)		

Table 4: Logistic Regressions for Business Start-up Intent by Gender

	(a)		(b)		(a)		(b)	
	Male		Male		Female		Female	
	Marginal effect	*P>|z|*	*Marginal effect*	*P>|z|*	*Marginal effect*	*P>|z|*	*Marginal effect*	*P>|z|*
Demographics: Aged over 25	-0.180	*0.083*	-0.211	***0.024***	0.261	*0.052*	0.242	*0.073*
Country of origin: (reference: UK) Other European Non-European	0.215 0.187	0.152 0.175	0.225 0.141	0.143 0.313	0.008 0.089	0.166 0.922	0.013 0.086	0.874 0.407
University: (reference: UK university) Non-UK university	-0.083	0.542	-0.071	0.611	-0.093	0.383	-0.092	0.169
Spousal status: (reference: single) Partner active Partner inactive/education	0.259 -0.048	*0.092* 0.618	0.264 -0.050	*0.096* 0.604	-0.031 -0.152	0.630 ***0.007***	-0.026 -0.128	0.686 *0.055*
Entrepreneurial background: (reference: neither parent a business owner) Father business owner Mother business owner Both parents business owners	0.190 0.377 0.111	***0.019*** ***0.003*** 0.382	0.164 0.343 0.091	***0.049*** ***0.017*** 0.477	0.046 0.090 0.266	0.481 0.430 *0.099*	0.040 0.085 0.222	0.539 0.464 0.169
Sibling business owner Close friend business owner	0.424 0.082	***0.004*** 0.261	0.505 0.056	***0.000*** 0.450	0.128 0.033	0.203 0.563	0.107 0.037	0.292 0.519

Own experience:								
Entrepreneurship training	0.148	*0.042*	0.124	*0.098*	0.053	0.344	0.058	0.303
Informal entrepreneurship activity	0.324	*0.000*	0.220	*0.032*	0.030	0.658	0.009	0.881
Locus of control scale			0.073	0.244			-0.069	0.130
Perceived self-efficacy scale			0.286	*0.000*			0.192	*0.001*
Attitude to risk scale	0.376	*0.000*	0.166	*0.047*	0.223	*0.000*	0.107	*0.092*
Log-likelihood	-157.09		-148.92		-139.3		-133.13	
Pseudo R-squared	0.266		0.304		0.196		0.231	
N	316		316		312		312	

Notes: Regressions also include subject area of study – marginal effects not reported. **Bold italic** denotes marginal effect significant at 5% of less, *italic* at 10% or less.

Table 5: Fairlie Decomposition of Difference in Levels of Business Start-up Intent between Genders

	Coefficient	P>|z|	% of gap explained
Mean intent – males	0.411		
Mean intent – females	0.244		
Difference	0.168		
Total explained by model	0.174		103.9%
Unobserved factors	-0.006		-3.9%
Demographics:			
Aged over 25	0.007	*0.030*	4.29%
Country of origin: (reference: UK)			
Other European	0.013	0.249	7.65%
Non-European	0.003	0.291	1.70%
University: (reference: UK university)			
Non-UK university	-0.009	0.617	-5.31%
Subject of study (sum of coefficients)	0.009	-	5.39%
Spousal status: (reference: single)			
Partner active	-0.015	0.114	-8.80%
Partner inactive/education	-0.002	0.616	1.11%
Entrepreneurial background: (reference: neither parent a business owner)			
Father business owner	0.004	0.119	2.65%
Mother business owner	0.0006	0.720	0.36%
Both parents business owners	0.002	0.458	1.10%
Sibling business owner	-0.009	*0.003*	5.22%
Close friend business owner	0.004	0.451	2.41%
Own experience:			
Entrepreneurship training	0.005	0.103	2.72%
Informal entrepreneurship activity	-0.0003	0.838	-0.16%
Locus of control scale	0.014	0.237	8.46%
Self-efficacy scale	0.093	*0.000*	55.28%
Attitude to risk scale	0.054	*0.049*	32.47%

Entrepreneurial
background

Gender

Figure 1: Conceptual Model

H3

Attitude to risk

H2

...urial
...ion

Perceived locus of
control

H1

Gender

Perceived self-
efficacy