

Gender, Risk and Entrepreneurial Intention

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Abstract

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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). This is mirrored in self-employment rates, which, while being an imperfect indicator of entrepreneurial activity, show rates in many countries that are substantially higher for men than for women. [footnote].

Scholars have reported a variety of factors responsible for the formation of entrepreneurial aspirations or intentions. These factors can be grouped into two broad categories, namely individual characteristics and contextual factors related to the presence of opportunity (Shane, 2003). On the first of these, the literature suggests that entrepreneurs differ from non-entrepreneurs in terms of a range of demographics, motivations, social ties and networks, personal traits and psychological characteristics (Carroll and Mosakowski, 1987; Cooper, Woo and Dunkleberg, 1988; Evans and Leighton, 1989; Bates, 1995; Kolvereid, 1996a and 1996b; Delmar and Davidsson, 2000). On the second, researchers have identified the impact of the external environment on influencing the formation of entrepreneurial intentions (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 entrepreneurial aspirations than 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 the differential impact on entrepreneurial intentions between men and women of 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), and the role of risk aversion is formalised by Kihlstrom and Laffont (1979). 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 is concerned with the question of 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. The analysis is conducted using survey data on undergraduate students from a sample of European countries. A multivariate modelling approach is employed which computes the contribution of difference in risk aversion to overall difference in the likelihood that a male is more likely to express intention to start a business than a female. This approach suggests that a very large proportion of the difference 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). Psychological research and 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 (Masclot et al., 2009).

Each approach may present different problems with interpretation of results. 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. It is 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, Ekelund et al (2005) show that risk aversion is lower in both experienced and novice entrepreneurs, compared to non-entrepreneurs. 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, often 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 that the evidence is in favour of lower risk aversion amongst entrepreneurs (Stewart and Roth, 2001). Econometric 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 question of endogeneity has also been addressed by examining the relationship between risk aversion and prior entrepreneurial intention. This certainly accords with the psychologists 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).

Latent entrepreneurship is generally higher amongst men compared to women (Blanchflower et al. 2001; Grilo and Irigoyen, 2006), and corresponds to the gap between actual rates of self-employment amongst men and women. A robust conclusion to emerge from the limited literature on entrepreneurial intentions of students is that males show higher levels of interest in entrepreneurship than females (Wang and Wong, 2004; Ulla *et al.*, 2005). Our analysis starts from the following hypothesis:

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

The reasons for lower female interest in entrepreneurship 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, Jianakopulos and Bernasek (1998) and DiMauro and Musumeci (2011) report that women display greater financial risk aversion than men. 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. Amongst the evidence that does exist, Sexton and Bowman-Upton (1990) show that female entrepreneurs have lower risk propensity scores than male entrepreneurs. Similarly, Kepler and Shane (2007) find robust evidence that male entrepreneurs are less likely to prefer low-risk/low-return businesses than female entrepreneurs. Given the above 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.

Figure 1 summarises the conceptual model underlying the analysis, and identifies the hypotheses described above. The underlying model is derived from Shapero’s (1982) model of the entrepreneurial event and Azjen’s (1991) theory of planned behaviour, 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 above, 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.

A number of other background factors have been explored in the literature as having potential association with the level of interest in entrepreneurship. Some researchers have however suggested that background influences add little explanatory power to student 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). Kirkwood (2007) suggests that

parental role models may be more for male graduate entrepreneurs than for female ones. Verheul et al. (2008) report that parental self-employment status is more strongly associated with male entrepreneurial preference than female preference. Beyond family inter-generation role models, it has been suggested that social networking and friendship groups may play a role in forming entrepreneurial intention. Krueger (1993) suggest that 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. However Kim et al. (2003) find no evidence that having entrepreneurial friends increases the likelihood of nascent entrepreneurship, although an association with the number of family relatives who are business owners is found. As far as graduate entrepreneurs are concerned, entrepreneurial education and training may be influential (Shane, 2003; Gibb, 2008), as well as small business work experience (Matthews and Moser, 1995).

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 the analysis of a independent report to the Welsh Government on student entrepreneurial intentions in Wales. 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 response to 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. 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. It shows that there is a large difference between the level of business start-up intention between men (38%) and women (18%), 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 the use of business 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, it is unclear to what extent the survey is bias away from a representative sample of the general population in the universities in question.

Comment [G1]: Should these percentages not be 41.1 and 24.4 as in the top of table 5? If this is the case table 1 will have to be edited as well.

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. Close to 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 used contained a number of individual 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 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 regression 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 estimates of logistic regression models 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 clearly 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 clearly 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. 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 point to 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, a decomposition analysis was undertaken. 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 is widely used. Thus for a linear regression, the standard Blinder-Oaxaca decomposition for the male/female gap in the average value of the outcome variable, Y , can be expressed as:

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

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. Let \bar{X}^j be a row vector of average values of the independent variables and $\hat{\beta}^j$ 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 that is due to differences in the estimated coefficients.

However this technique cannot be used directly when the outcome of interest is not continuous but binary, such as here. For this purpose Fairlie (2005) proposes an alternative decomposition technique:

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

with N^j being the sample size for gender j . To calculate the decomposition, \bar{Y}^j is defined as the average probability of start-up intent for gender j and F as 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 dependent 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 $\hat{\beta}^F$ 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 male and females. Individual independent variable contributions can also be calculated. Assuming that $N_F = N_M$ and that there is natural 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, $\hat{\beta}^*$) can be expressed as:

$$\frac{1}{N^F} \sum_{i=1}^{N^F} F(\hat{\alpha}^* + X_{1i}^M \hat{\beta}_1^* + X_{2i}^M \hat{\beta}_2^*) - F(\hat{\alpha}^* + X_{1i}^F \hat{\beta}_1^* + X_{2i}^M \hat{\beta}_2^*) \quad (3)$$

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 any inference about the contribution of a particular variable will be conditional on the properties of the sample used.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.

Table 5 provides the results of this decomposition analysis for the business start-up intention gap between female and male students. The upper panel of the table shows the mean probability of intent for both the male and female samples (41 and 24 percent respectively). 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) can be explained by the model and the choice of covariates, with the remaining offsetting difference of -4% (-0.6 percentage points) being down to differences in the coefficients in the male and female models.² The coefficient differences contribute only a very small offsetting component of the gap, but 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]

The table shows that 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 who is a 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 business start-up intention, gender and attitude to risk. A more positive attitude to risk appears to make a significant contribution in explaining why levels of start-up 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.

A second limitation concerns the use of data indicating level of agreement concerning hypothetical statements concerning risk 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 limitations of the survey data available 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 the level of entrepreneurial intention, but may in turn be associated with attitude to risk. In the present analysis it has to 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.

However, if it can be assumed that these various potential 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 entrepreneurial 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.

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 this research has not addressed the important question of difference between males and female. 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 entrepreneurial 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 business start-up 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 entrepreneurial intention.

Footnotes

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 described by Jones (1983), and because the overall proportion is small.

Bibliography

- Arch, E. (1993), Risk-taking: a motivational basis for sex differences, *Psychological reports*, 73(3): 6-11.
- Azjen, I. 1991 The theory of planned behaviour, *Organizational Behaviour and Human Decision Processes*, 50: 179–211.
- Bates, T. (1995), Self-employment entry across industry groups. *Journal of Business Venturing* 10: 143-156.
- Blanchflower, D.G., Oswald, A. and Stutzer, A. (2001), Latent entrepreneurship across nations, *European Economic Review*, 45: 680-691.
- Blinder, A. (1973), Wage discrimination: reduced form and structural estimates, *Journal of Human Resources*, 8: 436-455.
- Bosma, N. and J. Levie (2010), *Global Entrepreneurship Monitor 2009 Global Report*, Babson College, Universidad del Desarrollo, Reykjavik University and London Business School.
- Brockhaus, R.H, (1980), Risk-taking propensity of entrepreneurs, *Academy of Management Journal*, 23: 509-520.
- Brown, S., Farrell, L., Harris, M., & Sessions, J. (2006). Risk preference and employment contract type. *Journal of the Royal Statistical Society Series A*, 169(4): 849–863.
- Brown, S, Dietrich, M., Ortiz-Nuñez, A. and Taylor, K. (2011), Self-employment and attitudes towards risk: timing and unobserved heterogeneity, *Journal of Economic Psychology*, 32: 425-433.
- Brush, C.G. (1990), Women and enterprise creation, in OECD (ed) *Enterprising Women: Local initiatives for job creation*, Paris, OECD.
- Brush, C.G. (1992), Research on women business owners: past trends, a new perspective and future directions, *Entrepreneurship Theory and Practice*, 16(4): 5-30
- Busenitz, L.W. and J.B. Barney (1997), Differences between entrepreneurs and managers in large organizations: biases and heuristics in strategic decision-making, *Journal of Business Venturing*, 12(1): 9–30.
- Byrnes, J., Miller, D. and W. Schafer (1999), Gender differences in risk taking: A Meta-Analysis, *Psychological Bulletin*, 125(3): 367-383.
- Carroll, G.R. and Mosakowski, E. (1987), The career dynamics of self-employment. *Administrative Science Quarterly* 32(4): 570-589.
- Cooper, A.C., C.Y. Woo and W.C. Dunkelberg (1988), Entrepreneurs' perceived chances for success, *Journal of Business Venturing*, Elsevier, 3(2): 97-108.
- Crant, M. (1996), The proactive personality scale as a predictor of entrepreneurial intentions, *Journal of Small Business Management*, 34(3): 42-49.

- Davidsson, P. (1995), Culture, structure and regional levels of entrepreneurship, *Entrepreneurship and Regional Development*, 7:41-62
- DiMauro, C. and Musumeci, R. (2011), Linking risk aversion and type of employment, *Journal of Socio-Economics*, 40: 490-495.
- Evans D.S. and L.S. Leighton (1989), Some empirical aspects of entrepreneurship, *The American Economic Review*, 79(3): 519-535.
- Ekelund, J., Johansson, E., Jarvelin, M., & Lichtermann, D. (2005). Self-employment and risk aversion – evidence from psychological test data. *Labour Economics*, 12, 649–659.
- Fairlie, R. (2005), An extension of the Blinder-Oaxaca decomposition technique to logit and probit models, *Journal of Economic and Social Measurement*, 30(4): 305-316.
- Franke, N. and Lüthje (2004), Entrepreneurial intentions of business students: a benchmarking study, *International Journal of Innovation and Technology Management*, 1(3): 269-288.
- Gibb, A. (2008), Entrepreneurship and enterprise education in schools and colleges: insights from UK practice, *International Journal of Entrepreneurship Education*, 6: 101-144.
- Grilo, I. and Irigoyen, J-M. (2006), Entrepreneurship in the EU: to wish and not to be, *Small Business Economics*, 26: 305-318.
- Hartog, J., Ferrer-i-Carbonell, A., & Jonker, N. (2002). Linking measured risk aversion to individual characteristics. *Kyklos*, 55, 3–26.
- Hughes, K. (2006) “Exploring motivation and success among Canadian women entrepreneurs”, *Journal of Small Business and Entrepreneurship*, 19(2): 107-120.
- Jianakoplos, N. and A. Bernasek (1998), Are women more risk averse? *Economic Inquiry*, 36(4): 620-630.
- Jones, F.L. (1983), On Decomposing the Wage Gap: A Critical Comment on Blinder’s Method, *Journal of Human Resources*, 18(1): 126-130.
- Kepler, E. and S. Shane (2007), Are male and female entrepreneurs really that different? *US Small Business Administration Office of Advocacy Working Paper*, No.309.
- Kihlstrom, R.E. and Laffont, J.J (1979), A general equilibrium entrepreneurial theory of form formation based on risk aversion, *Journal of Political Economy*, 87: 719-749.
- Kim, P.H., Aldrich, H.E. and L.A. Keister (2003), If I were rich? Financial and human capital’s impact on becoming a nascent entrepreneur, Paper presented at the annual meeting of the American Sociological Association, Atlanta Hilton Hotel, Atlanta, GA, Aug 16, 2003.
- Kirkwood, J. (2007), Igniting the entrepreneurial spirit: is the role parents play gendered?, *International Journal of Entrepreneurial Behaviour and Research*, 13(1): 39-59.
- Knight, F.H. (1921), *Risk, Uncertainty and Profit*, New York: Houghton Mifflin.

- Kolvereid, L. (1996a), Organizational employment versus self-employment: reasons for career choice intentions. *Entrepreneurship Theory and Practice*, 20:23-31.
- Kolvereid, L. (1996b), Prediction of employment status choice intentions. *Entrepreneurship Theory and Practice*, 21:47-57.
- Krueger, N.F. (1993), The impact of prior entrepreneurial exposure on perceptions of new venture feasibility and desirability, *Entrepreneurship Theory and Practice*, 18(1): 5-21.
- Krueger, N., and Dickson, P. (1994), How believing in ourselves increases risk taking: Self-efficacy and perceptions of opportunity and threat. *Decision Sciences* 25:385-400.
- Krueger, N.F., Reilly, M.D., and Carsrud, A.L. (2000) Competing models of entrepreneurial intentions. *Journal of Business Venturing* 15: 411-432.
- Lindh, T. and Ohlsson, H. (1996), Self-employment and windfall gains: evidence from the Swedish lottery, *Economic Journal*, 106: 1515-1526.
- Lüthje, N. and Franke, N. (2003), The ‘making’ of an entrepreneur: testing a model of entrepreneurial intent among engineering students at MIT, *R&D Management*, 33(2): 135-147.
- Masclet, D., Colombier, N., Denant-Boemont, L., & Loheac, Y. (2009). Group and individual risk preferences: A lottery-choice experiment with self-employed and salaried workers. *Journal of Economic Behavior and Organization*, 70(3), 470-484.
- Matthews, C.H. and S.B. Moser (1996), A longitudinal investigation of the impact of family background and gender on interest in small firm ownership, *Journal of Small Business Management*, 34(2): 29-43.
- McClelland, D. C. (1961), *The Achieving Society*. Princeton: Van Nostrand.
- Miner, J.B. and Raju, N.S. (2004), Risk propensity differences between managers and entrepreneurs and between low- and high-growth entrepreneurs: a reply in a more conservative vein, *Journal of Applied Psychology*, 89(1): 3-13.
- Morris, M. and P. Lewis (1995), The determinants of entrepreneurial activity, *European Journal of Marketing*, 29(7): 31-48.
- Oaxaca, R. (1973), Male-female wage differentials in urban labour markets, *International Economic Review*, 14: 693-709.
- Parker, S.C. (2009), *The Economics of Entrepreneurship*, Cambridge: Cambridge University Press.
- Puri, M. and D.T. Robinson (2007), Optimism and economic choice, *Journal of Financial Economics*, 86(1): 71-99.
- Sarasvarthy, D.K., Simon, H.A. and Lave, L. (1998), Perceiving and managing business risks: differences between entrepreneurs and bankers, *Journal of Economic Behavior and Organization*, 33: 207-225.

- Segal, G., Borgia, D. and Schoenfeld, J. (2005), "The motivation to become and entrepreneur", *International Journal of Entrepreneurial Behaviour and Research*, 11(1): 42-57.
- Sexton, D.L. and N. Bowman-Upton (1990), Female and male entrepreneurs: psychological characteristics and their role in gender-related discrimination, *Journal of Business Venturing*, 5(1): 29-36.
- Scott, M.G. and Twomey, D.F. (1988), The long-term supply of entrepreneurs: students' career aspirations in relation to entrepreneurship, *Journal of Small Business Management* 26(4): 5-13.
- Shane, S. (2003), *A General Theory of Entrepreneurship: The Individual-Opportunity Nexus*, Cheltenham: Edward Elgar.
- Shapiro, A. 1982 Social dimensions of entrepreneurship in C. Kent, D. Sexton and K. Vesper, eds., *The Encyclopaedia of Entrepreneurship*. (Prentice-Hall: Englewood Cliffs), 72-90.
- Shaver, K.G. and Scott, L.R. (1991), Person, process, choice: the psychology of new venture creation, *Entrepreneurship Theory and Practice*, 16(2): 23-45.
- Stanworth, J., Blythe, S., Granger, B. and Stanworth, C. (1989), Who becomes an entrepreneur? *International Small Business Journal*, 8: 11-22.
- Stewart, W.H. Jr and Roth, P.L. (2001), Risk propensity differences between entrepreneurs and managers: a meta-analytic review, *Journal of Applied Psychology*, 86(1): 145-153.
- Taylor, S.R. and Newcomer, J.D. (2005), "Characteristics of women small business owners", in S.L. Fielden and M.J. Davidson (eds.) *International Handbook of Women and Small Business Entrepreneurship*, Cheltenham: Edward Elgar Publishing, pp. 17-31.
- Tkachev, A. and Kolvereid, L. 1999 Self-employment intentions among Russian students. *Entrepreneurship and Regional Development*, 11:247-268.
- Ulla, H., Paasio, K. and T. Pukkinen (2005), Entrepreneurial Intentions of University Students and Graduates: A Finnish Perspective, Paper presented at the ICSB 2005 World Conference, Washington DC, USA, 15-18.6.2005.
- Van Praag, C.M. and J.S. Cramer (2001), The roots of entrepreneurship and labour demand: individual ability and low risk aversion, *Economica*, 68(269): 45-62.
- Verheul, I., Thurik, A. R. and I. Grilo (2008), Explaining Preferences and Actual Involvement in Self-Employment: New Insights into the Role of Gender, *ERIM Report Series*, Reference No. ERS-2008-03-ORG. Available at SSRN: <http://ssrn.com/abstract=1265429>
- Wang, C.K. and Wong, P-K (2004), Entrepreneurial interest of university students in Singapore, *Technovation* 24: 163-172.

Wiklund, J. and D. Shepherd (2003), Knowledge-based resources, entrepreneurial orientation, and the performance of small and medium-sized businesses, *Strategic Management Journal*, 24: 1307-1314.

Table 1: Sample Descriptive Information

	<i>Male</i>	<i>Female</i>	<i>All</i>
Likely to start a business within 3 years of graduation	37.9%	18.3%	28.3%
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

	<i>Questionnaire item</i>	<i>Scaling</i>
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 (descriptives need to be checked!)

	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

	<i>(a)</i>		<i>(b)</i>		<i>(a)</i>		<i>(b)</i>	
	<i>Male</i>		<i>Male</i>		<i>Female</i>		<i>Female</i>	
	<i>Marginal effect</i>	<i>P> z </i>	<i>Marginal effect</i>	<i>P> z </i>	<i>Marginal effect</i>	<i>P> z </i>	<i>Marginal effect</i>	<i>P> z </i>
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	0.215	0.152	0.225	0.143	0.008	0.166	0.013	0.874
Non-European	0.187	0.175	0.141	0.313	0.089	0.922	0.086	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	0.259	0.092	0.264	0.096	-0.031	0.630	-0.026	0.686
Partner inactive/education	-0.048	0.618	-0.050	0.604	-0.152	0.007	-0.128	0.055
Entrepreneurial background: (reference: neither parent a business owner)								
Father business owner	0.190	0.019	0.164	0.049	0.046	0.481	0.040	0.539
Mother business owner	0.377	0.003	0.343	0.017	0.090	0.430	0.085	0.464
Both parents business owners	0.111	0.382	0.091	0.477	0.266	0.099	0.222	0.169
Sibling business owner	0.424	0.004	0.505	0.000	0.128	0.203	0.107	0.292
Close friend business owner	0.082	0.261	0.056	0.450	0.033	0.563	0.037	0.519

Own experience:								
Entrepreneurship training	0.148	<i>0.042</i>	0.124	<i>0.098</i>	0.053	0.344	0.058	0.303
Informal entrepreneurship activity	0.324	<i>0.000</i>	0.220	<i>0.032</i>	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	<i>0.000</i>			0.192	<i>0.001</i>
Attitude to risk scale	0.376	<i>0.000</i>	0.166	<i>0.047</i>	0.223	<i>0.000</i>	0.107	<i>0.092</i>
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			
Locus of control scale	0.014	0.237	8.46%
Self-efficacy scale			
Self-efficacy scale	0.093	0.000	55.28%
Attitude to risk scale			
Attitude to risk scale	0.054	0.049	32.47%

Figure 1: Conceptual Model

