Small Business Economics (2007) 28:223–238
DOI 10.1007/s11187-006-9017-y

Being in Someone Else's Shoes: the Role of Gender in Nascent Entrepreneurship

Maria Minniti
Carlo Nardone

ABSTRACT. Several studies have shown the existence of significant differences in the rate of new business creation between men and women. Specifically, it has been shown that women are much less likely to be involved in entrepreneurship than men worldwide. It is not yet understood, however, if such differences are the result of personal characteristics of the individual and of her economic environment or are, instead, the result of universal and, perhaps, evolutionary phenomena. Our empirical analysis is conducted using representative samples of population for 37 countries and a special form of bootstrapping that allows us to equalize individuals' conditions and, as a result, analyze the choices of men and women put in identical economic environments and socio-economic circumstances.

KEY WORDS: bootstrap, entrepreneurship, female entrepreneurship, gender, nascent entrepreneurship, perceptions, stochastic process simulation.

JEL CLASSIFICATIONS: J10, L26, M13, O10.

1. Introduction

Although the absolute number of women in self-employment has increased in recent years (Devine, 1994; CWBR, 2004), empirical studies show that significant differences still exist in the levels of new firm creation across genders, and that the number of women involved in starting a business is significantly and systematically lower than that of men (Minniti et al., 2005).

Final version accepted on October 2006

Maria Minniti
Economics Division
Babson College
Babson Park, MA 02457, USA
E-mail: minniti@babson.edu

Carlo Nardone
CMNexus
Piazza R. Malatesta 36, 00176, Roma, Italy
E-mail: c.nardone@computer.org

Traditionally, gender differences in entrepreneurial activity have been attributed to differences in human and social capital (Greene, 2000), differences in risk tolerance (Jianakoplos and Bernasek, 1998) and management styles (Brush, 1990, 1992), and to the fact that women tend to be more sensitive than men to a variety of non-monetary factors (Boden, 1999; Lombard, 2001; Burke et al., 2002). On the other hand, Lefkowitz (1994) has shown that men and women tend to react to the same set of incentives and that much of the difference across genders disappears after correcting for some socio-economic conditions. Along similar lines, Langowitz and Minniti (forthcoming) suggest that men and women involved in early stage entrepreneurial activity tend to react to the same set of entrepreneurial drivers.

We use individual level survey data collected in 2002 for the Global Entrepreneurship Monitor (GEM) Project. GEM is an ongoing large-scale academic project designed to study the causes and implications of entrepreneurial behavior across countries. The main purpose of the survey was to identify individuals who, at the time of the survey, were owning and managing a business or were in the process of starting one. Data consists of a stratified representative sample of at least 2000 individuals per country in 37 countries. Our dependent variable describes whether individuals are involved in starting a business of which they are at least part owners. Our independent variables include socio-economic characteristics, perceptual characteristics, and the economic environment. Using an equalization process and a bootstrapping procedure, we test what variables explain gender differences with regard to entrepreneurial activity.

Men and women may possess different distributions of the variables related to entrepreneurship. Thus, the equalization procedure is

aimed at weighting the distribution of characteristics equally for both male and female populations. From our total number of observations, we consider all possible combinations and filter sub-samples of individuals who all have identical characteristics but are of different genders. For each group we then calculate the probability to start businesses and, by combining all groups, we derive the aggregate probability to start businesses. Of course, in order to take into account the relative importance of each group, the aggregate probability is calculated using the weighted sum of the probability to start businesses corresponding to each cell. The same set of weights is then applied to both genders.

The aggregate propensity to start a business or, analogously, the odds ratio between men's and women's propensities obtained with the equalization procedure are then compared to the corresponding original (unequalized) propensities by means bootstrapping. Although not yet widely used in social studies, bootstrapping is a powerful non-parametric method capable of avoiding some of the limitations inherent in standard regression models. Specifically, we generate by simulation a large number of bootstrap replicates and, among them, select the smallest and the highest 2.5 percentiles for the variable of interest. Such percentiles correspond to the left and right points of the 95% confidence interval. A simple example will illustrate clearly our procedure.

Let us consider a population of 200 individuals, 100 men and 100 women. Let us assume that they differ only because of the color of their hair which can be blond, black or red. We find that among men, 40 have blond hair, 30 have red hair and 30 have black hair. Among the women, instead, 80 have blond hair, while only 10 have black hair and 10 red hair. We also find that there are 40 women entrepreneurs, and that all of them have blond hair. Does this mean that being a blond woman increases the propensity to starting a business? Since the focus of the paper is on gender differences, we want to isolate the gender status from all other characteristics, in this case being blond. In order to do so, we assume the distribution of women across hair colors to follow that of men, in other words that there are 40 women with blond hair, 30 with red hair and 30 with black hair. We then apply to this "gender equalized" distribution, the actual probabilities of being entrepreneurs measured for the original distribution of women across hair colors. That is, since we assumed to have 80 blond women, 40 (or 50%) of whom are entrepreneurs, we now claim to have only 40 blond women, that is as many as there are blond men, and we calculate what 50% of 40 is. We then compare the resulting number (20) with the number of blond men who are actually entrepreneurs. If the number of men entrepreneurs with blond hair is more than 20, it means that being a man increases the propensity to starting a business and vice versa. In other words, we have eliminated the possible effect of "being blond" on entrepreneurial propensity and we are comparing individuals who, except for gender, are now completely identical.

Of course this result is influenced by the fact that our original distribution of men shows that there are 40 of them with blond hair, 30 with red hair and 30 with black hair. However, we could have had, for example, 20 men with blond hair, 50 with red hair and 30 with black hair. In fact, many different distributions are possible. Thus, for robustness, we use bootstrapping to replicate the original distribution a large number of times. For each bootstrap distribution we then create a corresponding equalized distribution following the method outlined above. This allows us to derive robust estimates of the variability of entrepreneurial propensity between genders and of its statistical significance taking into account all relevant characteristics of the population.

To summarize, we devised a method to disentangle interdependencies between categorical variables based on the complete enumeration of all possible combinations. We then exploit the availability of inexpensive computational resources and avoid the use of regression techniques, which require strong linearity assumptions and model interdependencies that cannot always be justified. Our contribution to the literature is twofold. First, we present a new way to study differences across populations with complex sets of attributes. Second, we provide origi-

nal empirical evidence on the causes of gender differences with respect to entrepreneurship.

2. Theoretical background

All over the world, and throughout history, people have created businesses. Thus, entrepreneurship is a cross-country phenomenon with country-specific aspects, and understanding it requires two different, though related, components. First, there are factors that influence entrepreneurship across all countries. These factors are universal determinants of entrepreneurial behavior. Second, there are aspects of entrepreneurship that are culture specific.

A significant amount of research in various fields has investigated what variables are universally correlated to the decision to start a business. Although much more work is needed in this area, most scholars now agree that the decision to start a business is a complex one and is influenced by a wide variety of socio-economic and perceptual characteristics of the individual. Among socio-economic characteristics, employment status, income, age, education and gender have all been shown to be crucial determinants of an individuals' decision to become an entrepreneur and to have a systematic effect on entrepreneurial decisions regardless of environmental circumstances.[1]

Existing literature shows that, although the probability of being an entrepreneur is highest among older individuals, the likelihood of being a nascent entrepreneur is maximized among young individuals (Blanchflower, 2004). Also, the relationship between age and the likelihood of starting a business picks at a relatively early age and decreases thereafter (Levesque and Minniti, 2006). Surprisingly, the relationship between education and new firm formation is uncertain, except for richer countries where postgraduate training has been shown to have positive effects on high-tech start-up rates (Blanchflower, 2004). On the other hand, financial resources are among the main constraints faced by potential entrepreneurs (Evans and Jovanovic, 1989; Carter and Rosa, 1998; Verheul and Thurik, 2001), especially in poorer countries and among women. Finally, entrepreneurial decisions are shown to be positively related to individuals' incomes and employment status. In fact, employed individuals, both men and women, are more likely to start businesses (Minniti et al., 2005). However, it is not clear whether high unemployment discourages entrepreneurship by reducing its potential markets or increases it by providing an income producing activity for otherwise displaced workers (Blanchflower, 2004; Clain, 2000).

Perceptual variables represent another group of factors that exercises universal influence on the decision to start a business. An increasing number of scholars agree that opportunity recognition, self-confidence, fear of failure, and knowing other entrepreneurs are, in fact, among the most important drivers of entrepreneurial behavior (Arenius and Minniti, 2005; Koellinger et al., 2005a). Among perceptual variables, opportunity recognition represents the most distinctive and fundamental expression of entrepreneurial behavior. Entrepreneurs are individuals who are more likely than others to be alert to the existence of profit opportunities (Kirzner, 1973, 1979; Venkataraman, 1997). Also, role models, whether positive or negative, are important because of their ability to enhance self-efficacy. They also provide information thereby reducing the ambiguity associated with starting a business (Minniti, 2004, 2005). Starting a new firm is an intentional act. Thus, self-confidence plays a crucial role in the decision to start a business. An internal locus of control increases entrepreneurial alertness and leads to the creation of more new firms (Gartner, 1985; Harper, 1998). Finally, since individuals are risk averse, the perceived (rather than objective) possibility of failure is an important component of an individual's decision to start a business. What matters is not the respondents' fear of failure. Rather, it is the degree to which fear of failure affects the behavior of individuals. Women are usually described as being more risk averse than men but no agreement exists on this topic (Jianakoplos and Bernasek, 1998; Schubert et al., 1999).

The second crucial component of entrepreneurial decisions includes aspects of entrepreneurial behavior that are country-specific. Unfortunately, there is no simple way to approximate a country's economic environment.

Nonetheless, it has been shown that the quality and quantity of entrepreneurship varies when countries characterized by different levels of *per capita* income, growth potential, and economic freedom are considered (Baumol, 1990; Acs et al., 2005). New firm creation is an economic process embedded in a specific environment (Jack and Anderson, 2002). Technology, level of economic development, culture, and institutions all influence the demand for entrepreneurship by creating opportunities available for start-ups (Acs et al., 1999, Thurik et al., 2002). Significant differences exist in the levels of new firm creation across countries and over time and country effects may be quite important for entrepreneurial decisions.

At low levels of national *per capita* income, the entrepreneurial sector provides job opportunities and potential for the creation of new markets. As *per capita* income increases, the emergence of new technologies and economies of scale allows larger and more established firms to satisfy the increasing demand of growing markets and to increase their relative role in the economy. Thus, the numbers of business start-ups decrease as a growing number of people are able to find stable employment. Finally, as further increases in *per capita* income are considered, the role played by the entrepreneurial sector increases again, as more individuals have the resources to exploit opportunities in propitious economic environments. These trends, of course, may be disturbed by the absence of economic freedom that reduces individuals' ability and incentives to start businesses and, regardless of the initial level of *per capita* GDP, by the absence of growth potential, which also reduces entrepreneurial opportunities and incentives.

Noticeably, since women's employment choices are more sensitive to the local environment than those of men, variations in entrepreneurial activity due to macroeconomic conditions are more pronounced when women's entrepreneurship is considered. In fact, recent studies have shown that the choice to start a business is far more complex for women then men, and that women tend to be more sensitive than men to a variety of non-monetary incentives (Burke et al. 2002). For example, for women more than for men, the choice to start a business is often linked to necessity or to time and location flexibility; that is, to the type of independence that can accommodate family needs and child rearing. Within this context, our bootstrapping method is particularly appropriate exactly because, through equalization, it allows local influences to be eliminated when trying to determine the existence and nature of gender specific variations with respect to entrepreneurial behavior.

3. Data

Data used in the paper are from the Global Entrepreneurship Monitor (GEM) project.[2] Using surveys of a representative sample of individuals in each participating country, the GEM project estimates the prevalence rates of early stage entrepreneurial activity. Data used in this paper were collected in 2002. For our purposes, complete data were available for 37 countries, namely: Argentina, Australia, Belgium, Brazil, Canada, Chile, China, Chinese Taipei, Croatia, Denmark, Finland, France, Germany, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, Japan, Korea, Mexico, Netherlands, New Zealand, Norway, Poland, Russia, Singapore, Slovenia, Spain, South Africa, Sweden, Switzerland, Thailand, United Kingdom, and United States. In each country, a standardized survey was administered to a representative sample of at least 2000 adults, except for Mexico and Thailand whose samples included 1002 and 1048 individuals, respectively, yielding a cross-country total of 116,776 individuals.[3] Our data are original and exceptionally well suited for our purpose since they record individuals who are in the process of starting a business and are not the results of ex post evaluations of past decisions. In other words, our data does not suffer from hindsight bias.

Consistently with the theoretical underpinning of our argument, variables incorporated in the study include socio-economic characteristics of the individual such as age, gender, education, work status, and income, as well as perceptual characteristics such as confidence in one's own skills and abilities, opportunity perception, and fear of failure. Table I provides a list and descriptions of all variables in the study,

TABLE I
Details for all variables included in the study

Variables	Code	Description
Nascent entrepreneur	*SUBOANW*	Respondents who, at the time of the survey, were trying alone, with others, or as part of normal work, to start a business to which they had already committed resources, and that they expected to own entirely or in part YES/NO Answers
Gender	*GENDER*	Respondents were asked to provide their gender
Age	*AGE*	Respondents were asked to provide their year of birth and divided into six age cohorts Six categories: 18–24 yrs; 25–34 yrs; 35–44 yrs; 45–54 yrs; 55–64 yrs; 65–74 yrs
Education	*GEMEDUC*	Respondents were asked to provide the highest degree they had earned. Responses were then harmonized across all countries into a five-category variable Five categories: Some secondary school; Secondary degree; Post-secondary degree; Grad exp; No education
Household income	*GEMHHINC*	Respondents were asked to provide information about their household income and divided into three categories based on the income distribution of their country of origin Three categories: Lower 33%; Middle 33%; Upper 33%
Work status	*GEMWORK*	Respondents were asked to provide their occupational status at the time of the survey Six categories: Full/Full or part time; Part time only; Retired/disabled; Homemaker; Student; Not working.
Knowing entrepreneurs	*KNOWENT*	Respondents were asked whether they knew someone personally who had started a business in the 24 months preceding the survey YES/NO Answers
Opportunity perception	*OPPORT*	Respondents were asked if they believed that, in the 6 months following the survey, good business opportunities would exist in the area where they lived YES/NO Answers
Self-confidence	*SUSKILL*	Respondents were asked whether they believed to have the knowledge, skill and experience required to start a business YES/NO Answers
Fear of failure	*FEARFAIL*	Respondents were asked whether fear of failure would prevent them from starting a business YES/NO Answers
Real *per capita* GDP	*GDPPC02*	Countries were classified into nine groups based on their 2002 real *per capita* GDP
Real *per capita* GDP growth	*GDPPCCH02*	Countries were classified into nine groups based on their 2002 real *per capita* GDP growth
Index of economic freedom	*IEF02*	Countries were classified into nine groups based on their 2002 index of economic freedom

including their codes and sources. Noticeably, all variables are either dichotomic or categorical in nature, except age which was aggregated into six classes. This allows the use of the proposed bootstrap method highlighted in the introduction and described in details in Section 4.

The purpose of our study is to establish the existence of universal gender effects on the decision to start a business independently from country specific circumstances. Thus, we wish to eliminate country effects as much as possible. In other words, we need to average away differences in macroeconomic conditions and place individuals in identical situations. To this end, we classify each of the countries in our sample in one of five general groups, each characterized by a different type of economic environment. The classification is executed on the basis of three parameters: real *per capita* GDP (*GDPPC02*), real *per capita* GDP growth (*GDPCCH02*), and

an index of economic freedom (*IEF02*).[4] The distinction into five groups and the boundaries for each group were determined by looking at the distribution of the countries represented as points in the 3D scatter plot for the three parameters under consideration. For simplicity, we sub-divided the cloud of points in this space slicing it in two parts for each axis and choosing threshold values so as to preserve clusters of countries emerged on the basis of the selected parameters. Figure 1 is a composite diagram including all possible 2D scatter plots resulting from the six ordered pairs of the three parameters considered.[5]

Within this framework, a country is classified as poor (P) or rich (R) if its real *per capita* GDP is below or above US$20,000.[6] A country is classified as stagnant (S) or growing (G) if its real *per capita* GDP growth is below or above 1%.[7] Finally, a country is classified as economically free (F) or not economically free (N) if its index of economic freedom is below or above 2.5.[8] As a result, our 37 countries could be divided into 5 groups: rich and stagnant countries (RS); rich and growing countries (RG); poor and stagnant countries (PS); poor, growing and economically free countries (PGF); poor, growing and not economically free countries (PGN).[9] Table II shows the distribution of observation across country groups.

As it will be described in Section 4, our bootstrap method consists in considering the space of all combinations of variables. Thus, we removed all observations which included a

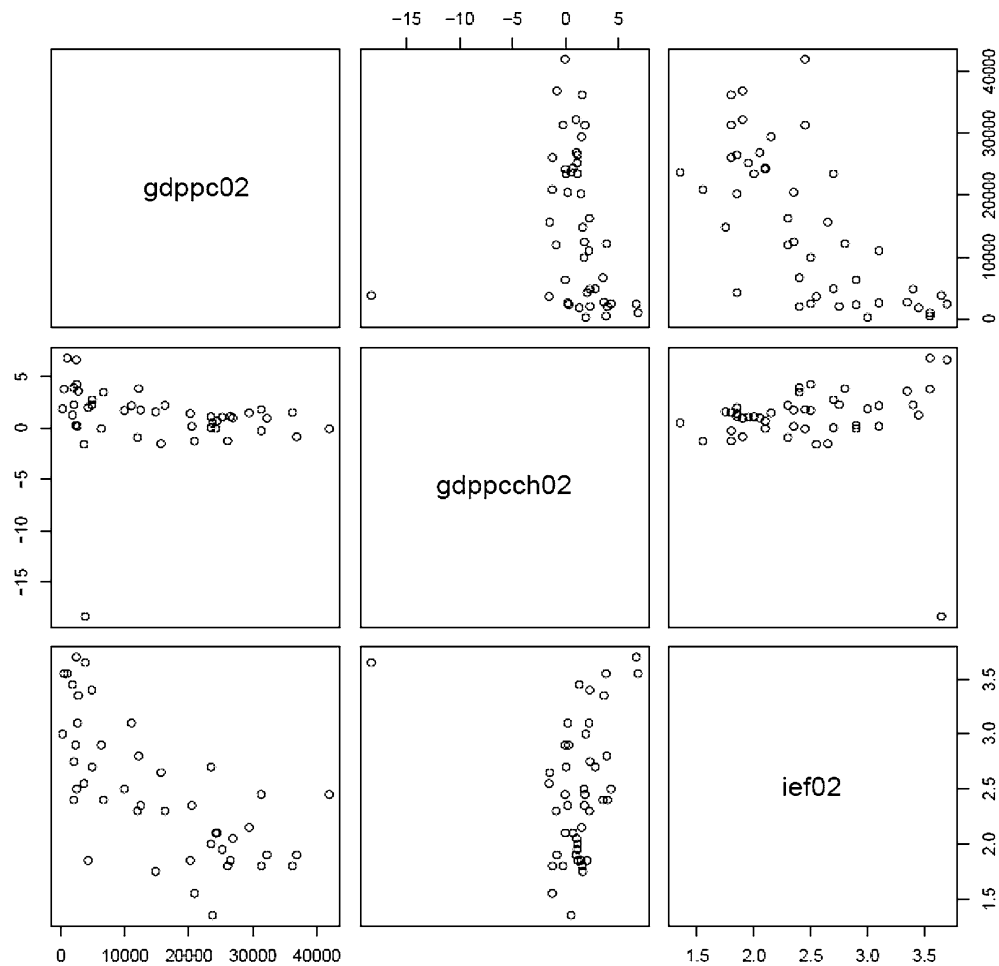

Figure 1. 3D scatter plots of three economy indicators where *gdppc02* is Real *per capita* GDP (2002), *GDPPCCH02* is Real *per capita* GDP Growth (2002), and *IEF02* is the Index of Economic Freedom (2002).

TABLE II
Summary of countries' economic classification

Economic classification	Number of observations	% of total observations	Countries included
PS	11999	10.28%	Brazil, Israel, Mexico, South Africa
PGN	17336	14.85%	Argentina, China, Croatia, India, Korea, Poland, Russia, Slovenia
PGF	11295	9.67%	Chile, Chinese Taipei, Hungary, New Zealand, Spain, Thailand
RS	38690	33.13%	Belgium, Denmark, France, Germany, Hong Kong, Ireland, Italy, Netherlands, Norway, Singapore, Switzerland
RG	37456	32.08%	Australia, Canada, Finland, Iceland, Japan, Sweden, UK, USA

"NA" or "NOT KNOW" answer for any of the variables considered. As a result, across all countries in our sample, the total number of observations with complete information about socio-economic characteristics only is 73813, the total number of observations with complete information about perceptual characteristics only is 92647, and the total number of observations with complete information about both socio-economic and perceptual characteristics is 59304.

Table III shows the number of respondents coded as nascent entrepreneurs divided by gender, as well as the confidence interval for the corresponding probabilities expressed as percentages. Since confidence intervals do not overlap, the table clearly shows that significant gender differences exist in the rate of new venture creation and that men are more frequently involved in start-up activities than women.

Of course, because of possible hidden relationships between other variables included in the data, contingency tables cannot determine unequivocally the relationship between the dependent and the independent variables. In other words, when building contingency tables, not all conditions are kept equal. This equalization is achieved by the simulation method that we propose and develop in the next section.

TABLE III
Propensity to start a business by gender – Percentage of YES responses (%p-avg) with 95% confidence interval (%p-low, %p-high)

	Yes	No	%p-low	%p-avg	%p-high
Men	1784	33845	4.78	5.01	5.24
Women	1035	37149	2.55	2.71	2.88

4. Method of analysis

4.1. *Equalization procedure*

Given the results of our preliminary data analysis, we investigate behavioral differences between men and women put in identical situations. An "identical situation" is defined as one in which men and women possess identical values for a given set of characteristics except, of course, gender. In the case of our study, we test for various specifications of "identical situations" by considering first only external economic conditions, then only perceptual variables, and finally, all independent variables included in Table I. This method allows us to assess separately the influence of individual characteristics and of groups of homogenous characteristics on an individual's decision to start a business. That is, we compare men and women with identical age, work status, education, income, etc.

Clearly, most characteristics present a variety of possible realizations (e.g., the way in which different ages, work status, education levels, etc. may combine creates quite a variety of "individuals") and it is necessary to take into account all possible combinations of categorical values for all the characteristics considered. Thus, the relationship between men and women

probabilities to start a business has to be assessed not only for a specific situation, but averaged over all possible situations. Each particular situation is defined by a specific combination of categorical values, and its relative importance is measured by a weight which takes into account the number of individuals (men or women or both) who find themselves in that very situation. Some or most combinations may be scarcely populated, or with no records at all. In each combination, our bootstrap simulation needs at least one record per gender. All other combinations are dropped from the analysis.

Let's consider a group in which each individual is characterized by a certain number of attributes such as age, income, level of education, etc. Depending on the number of attributes, there exists a finite set of possible combinations of those attributes that determines how many types of individuals exist. Formally, our population of n individuals covers a finite, discrete space $\{1,2,...,L\}$ where L is the space multiplicity, i.e., the total number of different combinations of attributes. In other words, each individual can be placed in one of L cells. For example, Table IV shows that $L = 16$ when only the four perceptual factors are considered, whereas $L = 2700$ when all socio-economic variables are considered.

Each individual in the population can be found in one of the L cells according to a probability distribution function (PDF) which can be denoted, for men or women, as $\boldsymbol{f} = (f_1,f_2,...,f_L)$, where $f_k = \text{Prob}(X = k)$, namely the probability to find a random individual X in the k-th cell of the discrete space. For each cell k in the sample space $\{1,2,...,L\}$ (i.e., for each discrete condition), a specific probability of being a nascent entrepreneur exists, depending on gender, and we denote this by p_k^{male} and p_k^{female}. Thus, the aggregate probability of being a nascent entrepreneur is given by the weighted sum

$$p^{\text{male}} = p^{\text{male}}(f) = \sum\nolimits_{k=1,L} p_k^{\text{male}} f_k^{\text{male}}$$

Similarly,

$$p^{\text{female}} = p^{\text{female}}(f) = \sum\nolimits_{k=1,L} p_k^{\text{female}} f_k^{\text{female}}$$

The procedure for equalizing conditions between men and women consists of selecting a suitable reference distribution $\boldsymbol{f}^{\text{ref}}$ (for example, the average $\boldsymbol{f}$ of all pooled survey respondents) and calculating a re-weighted sum where the new weights consist of the men's (or women's) probabilities of being nascent entrepreneurs. That is,

$$p_{\text{eq}}^{\text{male}} = p^{\text{male}}(f^{\text{ref}}) = \sum\nolimits_{k=1,L} p_k^{\text{male}} f_k^{\text{ref}}$$

or, analogously,

$$p_{\text{eq}}^{\text{female}} = p^{\text{female}}(f^{\text{ref}}) = \sum\nolimits_{k=1,L} p_k^{\text{female}} f_k^{\text{ref}}$$

An alternative way to equalize conditions is asking what the overall probability of being a nascent entrepreneur is for women given a distribution of conditions that follow the men's population distribution. This can be done by setting $\boldsymbol{f}^{\text{ref}} = \boldsymbol{f}^{\text{male}}$. In this case we can compare $p^{\text{female}}(\boldsymbol{f}^{\text{male}})$ with $p^{\text{male}}(\boldsymbol{f}^{\text{male}})$. Of course, men and women roles can be reversed. Also, all equalization methods require, for each category k, $f_k > 0$.

Table IV shows the 'multiplicity,' that is the number of possible combinations associated with various variables. The multiplicities correspond to the number of required sets of equalizations. In the first equalization only socio-economic variables are considered obtaining 2700 combinations. In the second subset only perceptual variables have been

TABLE IV
Factors defining the categories in the bootstrap procedure and their corresponding multiplicities

Socio-economic factors	Multiplicity
COUNTRY ECONOMY	5
GEMWORK	6
HHINC	3
EDUC	5
AGE	6
Total socio-economic factors multiplicity ($5 \times 6 \times 3 \times 5 \times 6$)	2700
Perceptual Factors	**Multiplicity**
KNOWENT	2
FEARFAIL	2
OPPORT	2
SUSKILL	2
Total perceptual factors multiplicity ($2 \times 2 \times 2 \times 2$)	16
Total multiplicity (2700×16)	43,200

TABLE V
Combinations of variables and records included in the equalization study

	No. of combinations	Total no. of combinations	Percentage included	No. of records included	Total no. of records	Percentage included
Socio-economic variables	1064	2700	39.4%	57,074	59,304	96.2%
Perceptual variables	16	16	100.0%	59,304	59,304	100.0%
All variables	4500	43,200	10.4%	48,578	59,304	81.9%
All variables except *SUSKILL*	3477	21,600	16.1%	52,119	59,304	87.9%

equalized, obtaining 16 combinations. Finally, all variables have been equalized, obtaining 43,200 combinations. As discussed in the previous section, the procedure of equalization requires that, for each combination, at least one record per gender must be present and, as a result, a number of potential combinations are eliminated. This also implied the elimination of the records corresponding to men (or women) being in one of the eliminated cells (combinations). As shown in Table V, while this pruning procedure may eliminate a large portion of combinations, most of the records are kept, suggesting that we are still able to capture the most relevant features of the data. More importantly, we are interested in comparing rates of nascent entrepreneurship across genders by comparing individuals with equalized conditions to individuals without equalized conditions. Characteristics exceptionally peculiar to one gender only are of not interest for the sake of comparison and the potential loss of such individuals is of no consequence to our analysis.

We now use the data to obtain two different estimates. Namely, an estimate for $\{f_k\}$ and an estimate for $\{p_k\}$. In both cases the maximum likelihood estimation (MLE) is given exactly by the observed $\{f_k\}$ and $\{p_k\}$. In the first case, the observed $\{f_k^{\text{obs}}\}$ is distributed as a rescaled multinomial with L categories, n draws and true probability vector $\{f_k\}$. In the second case, the observed $\{p_k{}^{\text{obs}}\}$ are distributed as binomials with $n\{f_k{}^{\text{obs}}\}$ draws and true probability $\{p_k\}$.

4.2. *Bootstrap procedure*

Initially introduced by Efron (1979, 1982), bootstrapping is the simplest technique based on "re-sampling plans" with the goal of producing non-parametric estimates of bias, variance and other measures of error. A re-sampling plan is any method that evaluates a statistics using samples drawn from the empirical probability distribution of the original data.[10] Given a statistic $\hat{\theta}(X_1,X_2,...,X_n)$ defined symmetrically in $X_1,X_2,...,X_n$ random variables independent and identically distributed (i.i.d.) according to the probability distribution function (PDF) f, we can consider a quantity describing the error of the statistic $\hat{\theta}$ compared to the real value θ, for example the standard deviation or the confidence interval. This error quantity, for concreteness σ, is a function of the probability distribution function $\boldsymbol{f}$, therefore $\sigma = \sigma(f)$. Re-sampling plans in general make use of the empirical probability distribution (EDF) $\hat{f}$, defined as $1/n$ at the observed values $x_1,x_2,...,x_n$. The bootstrap estimate of σ is simply $\hat{\sigma} = \sigma(\hat{f})$. Since usually the function $\sigma(f)$ cannot be written down explicitly, it is necessary to use a Monte Carlo algorithm to:

1. Determine and maybe smooth the empirical probability distribution $\hat{f}$.
2. Draw a "bootstrap sample" with replacement from $\hat{f}$, i.e., $X_1{}^*,X_2{}^*,...,X_n{}^*$ i.i.d. $\sim \hat{f}$.
3. Repeat step 2 a large number of times, obtaining "bootstrap replications" $\hat{\theta}_1^*, \ldots, \hat{\theta}_n^*$ and over their distribution calculate the error quantity of interest, $\hat{\sigma}$ or others.

In our case, the statistics θ are either the aggregate equalized probabilities to be a nascent entrepreneur for men and women, or simply the odds ratio between the two. The statistical quantity which we want to obtain with bootstrap as a measure of error is the confidence interval (typically at the 95% level). In comparison with simpler error quantities such as the standard deviation, to obtain confidence

intervals, bootstrap methods require bootstrap replicates of the order 1000. However, this is not a problem for today's computational capabilities. We use 2000 iterations per each equalization procedure and the percentile method to extract confidence interval from bootstrap replications distribution (Efron 1982, Ch. 10; Davison and Hinkley 1997, Ch. 5). Finally, we apply our bootstrap method to GEM 2002 data, including only observations for which values for all categorical variables are available. That is, to a sub-sample of 59,304 individuals.

5. Bootstrapping results

After completing the equalization and bootstrapping procedures, we now ask: Does the difference in probability to start a business between genders remain or disappear when men and women are placed, on average, in ''identical situations'' for any given set of characteristics? If the difference stays the same, it means that those characteristics say nothing about the phenomenon under study. In contrast, if the difference disappears or is significantly reduced, it means that the characteristics considered ''explain'' at least part of the phenomenon.

Table VI shows the results of the equalization procedure applied to the socio-economic variables and macroeconomic conditions. There is a difference in propensity to start a business between men and women which is statistically the same compared to the original data without equalization. In fact, the 95% confidence intervals corresponding to the odds ratios of men to women propensity with and without equalization are (1.788,1.882) and (1.788,1.962), respectively. They clearly overlap. This suggests that the socio-economic conditions, as described by the categorical variables considered, do not explain the gender difference in nascent entrepreneurship.

Table VII shows the results of the equalization procedure applied to the perceptual variables. Results are completely different from the previous situation. In fact, the difference in propensity to start a business between men and women almost disappears, since the odds ratio of men to women propensity with equalization is included in the bracket (1.135,1.240) at the 95% confidence level, while the corresponding confidence interval without equalization is (1.791,1.963). Also, the odds ratio for the equalized distribution is significantly closer to 1, with 1 indicate complete equality. These results suggest that perceptual variables are very important in explaining gender differences with respect to entrepreneurial behavior.

Table VIII shows the results of the equalization procedure applied to three of the four

TABLE VI
Propensity to start a business by gender with and without equalization of the socioeconomic variables for a subset of 59,304 useful records

	Gender	%*p*-low	%*p*-avg	%*p*-high
Observed frequencies	Men		5.29%	
	Women		2.90%	
	Odds ratio		1.873	
Observed frequencies under an equalizing distribution	Men		5.34%	
	Women		3.03%	
	Odds ratio		1.804	
Bootstrap simulation	Men	5.16%	5.30%	5.44%
	Women	2.79%	2.90%	3.00%
	Odds ratio	1.788	1.874	1.962
Bootstrap simulation under an equalizing distribution	Men	5.20%	5.34%	5.49%
	Women	2.93%	3.03%	3.13%
	Odds ratio	1.728	1.805	1.886

The subset includes 1064 combinations out of 2700 possible and 96.2% of the records considered. Percentage of YES respondents (%*p*-avg) with 95% confidence interval (%*p*-low, %*p*-high) for the bootstrap simulation (2000 replications of 100,000 records each). Odds ratios between men and women propensity with 95% confidence interval for the bootstrap simulation.

TABLE VII
Propensity to start a business by gender with and without equalization of the perceptual variables for a subset of 59,304 useful records

	Gender	%*p*-low	%*p*-avg	%*p*-high
Observed frequencies	Men		5.32%	
	Women		2.91%	
	Odds ratio		1.874	
Observed frequencies under an equalizing distribution	Men		4.38%	
	Women		3.72%	
	Odds ratio		1.185	
Bootstrap simulation	Men	5.19%	5.32%	5.46%
	Women	2.81%	2.91%	3.02%
	Odds ratio	1.791	1.874	1.963
Bootstrap simulation under an equalizing distribution	Men	4.26%	4.38%	4.52%
	Women	3.61%	3.72%	3.84%
	Odds ratio	1.135	1.185	1.240

The subset includes 16 combinations out of 16 with 100% of the records considered. Percentage of YES respondents (%*p*-avg) with 95% confidence interval (%*p*-low, %*p*-high) for the bootstrap simulation (2000 replications of 100,000 records each). Odds ratios between male and female propensity with 95% confidence interval for the bootstrap simulation.

TABLE VIII
Propensity to start a business by gender with and without equalization of the variables (*FEARFAIL, OPPORT, SUSKILL*) for a subset of 59,304 useful records

	Gender	%*p*-low	%*p*-avg	%*p*-high
Observed frequencies	Men		5.32%	
	Women		2.91%	
	Odds ratio		1.874	
Observed frequencies under an equalizing distribution	Men		4.48%	
	Women		3.62%	
	Odds ratio		1.249	
Bootstrap simulation	Men	5.18%	5.32%	5.46%
	Women	2.81%	2.91%	3.02%
	Odds ratio	1.794	1.875	1.963
Bootstrap simulation under an equalizing distribution	Men	4.35%	4.48%	4.61%
	Women	3.50%	3.62%	3.73%
	Odds ratio	1.194	1.249	1.305

The subset includes eight combinations out of eight with 100% of the records considered. Percentage of YES respondents (%*p*-avg) with 95% confidence interval (%*p*-low, %*p*-high) for the bootstrap simulation (2000 replications of 100,000 records each). Odds ratios between men and women propensity with 95% confidence interval for the bootstrap simulation.

perceptual variables, namely *SUSKILL*, *OPPORT*, and *FEARFAIL*. In this case also, the difference in propensity to start a business between men and women almost disappears, since the odds ratio of men to women propensity with equalization is included in the bracket (1.194,1.305) at the 95% confidence level compared to the bracket (1.794,1.305) without equalization. The fact that the confidence interval found in this case overlaps with the one found when all perceptual variables are equalized (as in Table VII) suggests that knowing other entrepreneurs (*KNOWENT)* is less important in explaining gender differences toward entrepreneurial behavior in comparison to the other variables in that group.

Table IX shows the results of the equalization procedure applied only to *SUSKILL* and *FEARFAIL*. In this case the odds ratio of men to women propensity to start a business with equalization is included in the bracket (1.262,1.378) at the 95% confidence level.

TABLE IX
Propensity to start a business by gender with and without equalization of the variables (*FEARFAIL, SUSKILL*) for a subset of 59,304 useful records

	Gender	%*p*-low	%*p*-avg	%*p*-high
Observed frequencies	Men		5.32%	
	Women		2.91%	
	Odds ratio		1.874	
Observed frequencies under an equalizing distribution	Men		4.57%	
	Women		3.51%	
	Odds ratio		1.317	
Bootstrap simulation	Men	5.19%	5.32%	5.47%
	Women	2.81%	2.91%	3.02%
	Odds ratio	1.790	1.873	1.963
Bootstrap simulation under an equalizing distribution	Men	4.44%	4.57%	4.70%
	Women	3.40%	3.51%	3.62%
	Odds ratio	1.262	1.317	1.378

The subset includes four combinations out of four with 100% of the records considered. Percentage of YES respondents (%*p*-avg) with 95% confidence interval (%*p*-low, %*p*-high) for the bootstrap simulation (2000 replications of 100,000 records each). Odds ratios between men and women propensity with 95% confidence interval for the bootstrap simulation.

Although there is still a significant large drop in gender differences, the odds ratio of men to women propensity is slightly higher than in the case of equalization of all perceptual variables. This suggests that opportunity perception (*OPPORT*) is an important factor in explaining gender differences, though *SUSKILL* and *FEARFAIL* seem to have the dominant effects.

Table X shows the results of the equalization procedure applied to all the variables considered in the study. In this case the odds ratio of men to women propensity to start a business with equalization is included in the bracket (1.140,1.240) at the 95% confidence level. This confidence interval is statistically compatible with the corresponding odds ratio confidence bracket obtained by equalizing perceptual variables only. This supports the evidence presented by Koellinger et al. (2005b) who also use GEM data to show that gender differences in propensity to start a business are almost completely explained by perceptual variables.

TABLE X
Propensity to start a business by gender with and without equalization of all variables for a subset of 59,304 useful records

	Gender	%*p*-low	%*p*-avg	%*p*-high
Observed frequencies	Men		5.02%	
	Women		2.92%	
	Odds ratio		1.759	
Observed frequencies under an equalizing distribution	Men		4.26%	
	Women		3.61%	
	Odds ratio		1.188	
Bootstrap simulation	Men	4.89%	5.03%	5.15%
	Women	2.82%	2.92%	3.02%
	Odds ratio	1.681	1.759	1.843
Bootstrap simulation under an equalizing distribution	Men	4.14%	4.26%	4.38%
	Women	3.49%	3.61%	3.72%
	Odds ratio	1.140	1.188	1.240

The subset includes 4500 combinations out of 43,200 and 81.9% of the records considered Percentage of YES respondents (%*p*-avg) with 95% confidence interval (%*p*-low, %*p*-high) for the bootstrap simulation (2000 replications of 100,000 records each). Odds ratios between men and women propensity with 95% confidence interval for the bootstrap simulation.

TABLE XI
Propensity to start a business by gender with and without equalization of all variables except *SUSKILL* for a subset of 59,304 useful records

	Gender	%*p*-low	%*p*-avg	%*p*-high
Observed frequencies	Men		5.16%	
	Women		2.89%	
	Odds ratio		1.826	
Observed frequencies under an equalizing distribution	Men		4.73%	
	Women		3.31%	
	Odds ratio		1.452	
Bootstrap simulation	Men	5.03%	5.16%	5.29%
	Women	2.79%	2.89%	3.00%
	Odds ratio	1.743	1.828	1.910
Bootstrap simulation under an equalizing distribution	Men	4.59%	4.73%	4.86%
	Women	3.20%	3.31%	3.42%
	Odds ratio	1.388	1.452	1.518

The subset includes 3477 combinations out of 21,600 and 87.9% of the records considered. Percentage of YES respondents (%*p*-avg) with 95% confidence interval (%*p*-low, %*p*-high) for the bootstrap simulation (2000 replications of 100,000 records each). Odds ratios between men and women propensity with 95% confidence interval for the bootstrap simulation.

Finally, Table XI shows the results of the equalization procedure applied to all the variables considered in the study, with the exception of SUSKILL, that is, the perception of having the skills necessary to start a business. In this case the odds ratio of men to women propensity to start a business with equalization is included in the bracket (1.388,1.518) at the 95% confidence level. This confidence interval is intermediate between the one corresponding to odds ratio obtained by equalization of all variables only, and the one corresponding to odds ratio obtained with no equalization at all, confirming that the subjective (and possibly biased) perception of having skills suitable for successful entrepreneurship is a major factor behind gender differences in the propensity to start a business.

Noticeably, when all variables are equalized, the odds ratio is associated to the confidence interval (1.140,1.240). When all variables except the type of country are equalized, the average odds ratio is 1.226 and falls within the confidence interval. This confirms that country effects have been successfully eliminated.

6. Discussion and further extensions

The purpose of this study is to investigate what variables cause differences in entrepreneurial behavior across genders and whether those differences are independent from country effects. Much work has been done on the differences between men's and women's behavior with respect to employment choice. However, it is clearly possible for these differences not to depend on work conditions but, rather, to be the effect of factors that co-vary systematically with gender. In fact, our analyses show that, although work status and education have some minor gender specific impact, the relationships between the likelihood of starting a business and age, household income, work status, and education do not depend on gender. This is consistent with Lefkowitz (1994) who shows that men and women react similarly to the work environment when one controls for spurious effects caused by systematic differences in types of job and job payments. Of course, the conclusion on the impact of socio-economic and contextual circumstances needs qualifications. In fact, our study only includes age, education, household income, work status, GDP, GDP growth and economic freedom. Other economic and contextual circumstances not accounted for may be at work, such as the role attributed to women in a society.

On the other hand, our results support those presented by Koellinger et al. (2005a, b) according to which perceptual variables play a

crucial role in explaining differences across genders with respect to entrepreneurial behavior. The emphasis on information and perceptions is not new in economic theories of entrepreneurship. Kirzner (1973, 1979) argued that entrepreneurship is "alertness." That is, the ability to perceive unexploited opportunities. Along similar lines, Harper (1998) argued that attention is always directed to things that we are on the lookout for and that, as a result, we are able to perceive more clearly. This means that entrepreneurial discovery is not a pure bolt from the blue but it is based on an individual's ability to perceive an unexploited opportunity and act upon it.

Attitudes toward entrepreneurship (or anything else for that matter) reflect, to a large extent, subjective perceptions rather than objective conditions. Regardless of the macroeconomic context, a very strong dependency exists between self-confidence, fear of failure and, to a less extent, opportunity perceptions. In fact, the perception of having sufficient skills is a dominant variable that seems to have an effect regardless of institutional settings, culture and overall level of entrepreneurial activity. Clearly, individual perceptions may differ from actual abilities and risk levels and are likely to be biased. There exists some evidence that distortions in perceptions are common among individuals in general, and among entrepreneurs in particular (Busenitz and Barney 1997; Cooper et al. 1988). This, of course, does not mean that entrepreneurs make wrong or irrational choices. An individual may perceive her own entrepreneurial adeptness as a signal of potential success, and, as a result, be more receptive to entrepreneurial opportunities (Koellinger et al. 2005a).

Overall, our findings confirm the importance of cognitive processes within the context of specific market processes. Clearly our results are suggestive and more work in the area is required. In fact, at least two ways to interpret our findings: The one suggested in this paper argues that there may be indeed an inherent difference in the propensity to start a business across genders, and that such differences have primarily perceptual causes, are universal, and do not result from socio-economic and contextual circumstances. In an alternative, it can be argued that there are no gender differences, and that the observed variations between gender and the probability of starting a business can be eliminated by the addition of variables we have not included in our study. Some issues of endogeneity are also possible when factors that influence perceptions are considered. Thus, our study lends itself to several extensions.

First, our findings call for a formal test of expectancy theory. Expectancy theory suggests that an individual's belief that he or she can perform the task (i.e., start a business) and his or her belief about the consequences or outcomes influence whether the individual undertakes the task to begin with. In fact, our results suggest that if women feel they have the skills and knowledge to engage in entrepreneurship, and believe that their abilities will lead to success, they will be more likely to start their own businesses (Baron et al. 2001).

Second, with respect to the old standing debate on whether women tend to be less risk tolerant than men, our results suggest that although risk tolerance may play some role in gender differences, what matters is not the respondents' fear of failure. Rather, it is the degree to which fear of failure affects the behavior of individuals. Noticeably, perceptions and risk tolerance are both subjective characteristics of the individual. They cannot be easily changed by exogenous interventions such as, for example, government programs. While policy can alter an individual's incentives, the cultural factors that mold perceptions and risk profiles depend on the specific history of the place. They are path-dependent and, as a result, do not change or change very slowly. Although perceptions do change over time, to alter the way in which individuals think about themselves and their role in society takes a long time.

Finally, our results are suggestive and more work in the area is required. In principle, an individual's perception of skills could be based on objective skills not captured in our data set. Moreover, our data set may not include all the relevant variables and may not capture the true direction of the causal relationship between dependent and independent variables. Hopefully, the availability of recent cross-country

data set suitable for the study of entrepreneurial behavioral will encourage further research in this important area.

Acknowledgements

The authors thank two anonymous referees, Valdemar Smith, and all participants in the 2005 GEM Research Conference in Budapest, Hungary, for helpful comments and suggestions. Financial support from Babson's Board of Research is gratefully acknowledged. All errors are ours.

Notes

[1] For a comprehensive survey of this literature see Blanchflower (2004) and Minniti (2003).

[2] More details about the Global Entrepreneurship Monitor project may be found at www.gemconsortium.org

[3] Details about the procedures used to collect and harmonize GEM data can be found in Reynolds et al. (2005).

[4] *GDPPC02* and *GDPCCH02* are from the IMF – World Economic Outlook Database and are available at http://www.imf.org/external/pubs/ft/weo/2002/02/data/index.htm *IEF02* is from the 2003 Index of Economic Freedom.

[5] The outlier point with *GDPCCH02* < −18% corresponds to Venezuela.

[6] Alternative distinctions based on moving averages of GDP across 3 and 5 years where also performed and yielded identical results.

[7] The 1% threshold is somewhat arbitrary and based solely on the natural distinction emerging from the data.

[8] The Index of Economic Freedom is an annual report published by The Wall Street Journal and the Heritage Foundation. The index measures countries performances based on a list of 50 independent variables divided into 10 broad indicators of economic freedom. The indicators considered are trade policy, fiscal burden, government intervention, monetary policy, capital flows and foreign investment, banking and finance, wages and prices, property rights, regulation, and informal market activity. The higher a country's score, the greater the level of government intervention in the economy and the lower the country's economic freedom. Depending on their score, countries are classified as free, mostly free, mostly unfree, and repressed.

[9] Although eight combinations are possible for the three parameters, three of the groups are eliminated. In fact, the group RGN is empty, the group PSF includes Portugal alone, and the group RSN includes France only. As a result, Portugal is reassigned to the PS group and France is reassigned to the RS group.

[10] Our brief description of the bootstrap technique follows Efron (1982, ch.5) and uses notation from Davison and Hinkley (1997).

References

Acs, Z., P. Arenius, M. Hay and M. Minniti, 2005, *2004 Global Entrepreneurship Monitor Report*, London, U.K., and Babson Park, MA: London Business School and Babson College.

Acs, Z. J., B. Carlsson and C. Karlsson, 1999, 'The Linkages among Entrepreneurship, SMEs and the Macroeconomy', in Z. J. Acs, B. Carlsson and C. Karlsson (eds.), *Entrepreneurship, Small and Medium-sized Enterprises and the Macroeconomy,* Cambridge, UK: Cambridge University Press.

Arenius, P. and M. Minniti, 2005, 'Perceptual Variables and Nascent Entrepreneurship', *Small Business Economics* **24**, 233–247.

Baron, R., G. Markman and A. Hirza, 2001, 'Perceptions of Women and Men as Entrepreneurs: Evidence for Differential Effects of Attributional Augmenting', *Journal of Applied Psychology* **86**(5), 923–929.

Baumol, W. J., 1990, 'Entrepreneurship: Productive, Unproductive, and Destructive', *Journal of Political Economy* **98**, 893–921.

Blanchflower, D. G., 2004, Self-Employment: More May Not be Better. NBER Working Paper No. 10286.

Boden, R. J., Jr, 1999, 'Gender Inequality in Wage Earnings and Female Self-Employment Selection', *Journal of Socio-Economics* **28**, 351–364.

Brush, C. G., 1992, 'Research on Women Business Owners: Past Trends, a New Perspective and Future Directions', *Entrepreneurship Theory and Practice* **16**, 5–30.

Brush, C. G., 1990, 'Women and Enterprise Creation: Barriers and Opportunities', in S. Gould and J. Parzen (eds.), *Enterprising Women: Local initiatives for job creation*, OECD, Paris.

Burke, A. E., F. R. FitzRoy and M. A. Nolan, 2002, 'Self-employment Wealth and Job Creation: the Roles of Gender, Non-Pecuniary Motivation and Entrepreneurial Ability', *Small Business Economics* **19**, 255–270.

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**, 9–30.

Carter, N. M. and P. Rosa, 1998, 'The Financing of Male and Female Owned-business', *Entrepreneurship and Regional Development* **10**(3), 225–241.

Center for Women's Business Research (CWBR), 2004, Women Owned Businesses in 2004: Trends in the U.S. and 50 States, Washington, D.C.

Clain, S. H., 2000, 'Gender Differences in Full-Time Self-employment', *Journal of Economics and Business* **52**, 499–513.

Cooper, A. C., C. Y. Woo and W. C. Dunkelberg, 1988, 'Entrepreneurs' Perceived Chances for Success', *Journal of Business Venturing* **3**, 97–108.

Davison, A. C. and D. V. Hinkley, 1997, *Bootstrap Methods and their Applications*, Cambridge University Press.

Devine, T. J., 1994, 'Changes in Wage-and-Salary Returns to Skill and the Recent Rise in Female Self-employment', *American Economic Review* **84**(2), 108–113.

Efron, B., 1979, 'Bootstrap Methods: Another Look at the Jackknife', *Annals of Statistics* **7**, 1–26.

Efron, B., 1982, *The Jackknife, the Bootstrap and Other Resampling Plans*, Philadelphia: SIAM.

Evans, D. and B. Jovanovic, 1989, 'An Estimated Model of Entrepreneurial Choice under Liquidity Constraints', *Journal of Political Economy* **97**, 808–827.

Gartner, W. B., 1985, 'A Conceptual Framework for Describing the Phenomenon of New Venture Creation', *Academy of Management Review* **10**, 696–706.

Greene, P., 2000, 'Self-Employment as an Economic Behavior: an Analysis of Self-Employed Women's Human and Social Capital', *National Journal of Sociology* **12**(1), 1–55.

Harper, D., 1998, 'Institutional Conditions for Entrepreneurship', *Advances in Austrian Economics* **5**, 241–275.

Heritage Foundation, 2003, *Index of Economic Freedom 2002*, Washington D.C.: Heritage Foundation and New York: The Wall Street Journal.

IMF – World Economic Outlook Database http://www.imf.org/external/pubs/ft/weo/2002/02/data/index.htm.

Jack, S. L. and A. R. Anderson, 2002, 'The Effects of Embeddedness on the Entrepreneurial Process', *Journal of Business Venturing* **17**, 467–487.

Jianakoplos, N. A. and A. Bernasek, 1998, 'Are Women More Risk Averse?', *Economic Inquiry* **36**(4), 620–630.

Kirzner, I. M., 1979, *Perception, Opportunity, and Profit*, Chicago, IL: University of Chicago Press.

Kirzner, I. M., 1973, *Competition and Entrepreneurship*, Chicago, IL: University of Chicago Press.

Koellinger, P., M. Minniti and C. Schade, 2005a, I Think I Can, I Think I Can: a Cross-Country Study of Entrepreneurial Motivation. DIW Discussion Paper No. 501. Berlin, Germany.

Koellinger, P., M. Minniti, and C. Schade, 2005b, It's All in Your Head: A Study of Gender and Entrepreneurial Behavior. Manuscript.

Lefkowitz, J., 1994, 'Sex Related Differences in Job Attitudes and Dispositional Variables: Now You See Them..', *Academy of Management Journal* **37**(2), 323–349.

Langowitz, N. and M. Minniti, Forthcoming, 'Gender Differences and Early-Stage Entrepreneurship', *Entrepreneurship Theory and Practice*.

Levesque, M. and M. Minniti, 2006, 'The Effect of Aging on Entrepreneurial Behavior', *The Journal of Business Venturing* **21**(2), 177–194.

Lombard, K., 2001, 'Female Self-Employment and Demand for Flexible, Nonstandard Work Schedules', *Economic Inquiry* **39**(2), 214–237.

Minniti, M., 2005, 'Entrepreneurship and Network Externalities', *Journal of Economic Behavior and Organization* **57**(1), 1–27.

Minniti, M., 2004, 'Organization Alertness and Asymmetric Information in a Spin-Glass Model', *Journal of Business Venturing* **19**(5), 637–658.

Minniti, M., 2003, 'Entrepreneurship Studies: A Stock Taking', *Advances in Austrian Economics* **6**, 9–37.

Minniti, M., P. Arenius and N. Langowitz, 2005, *2004 Global Entrepreneurship Monitor Special Topic Report: Women and Entrepreneurship*. Center for Women's Leadership at Babson College, Babson Park, MA.

Reynolds, P. D., N. S. Bosma and E. Autio, 2005, 'Global Entrepreneurship Monitor: Data Collection Design and Implementation 1998–2003', *Small Business Economics* **24**(3), 205–231.

Schubert, R., M. Brown, M. Gysler and H. W. Brachinger, 1999, 'Gender and Economic Transactions – Financial Decision-Making: are Women Really More Risk-Adverse?', *American Economic Review* **89**(2), 381–385.

Thurik, A. R., L. M. Uhlaner and S. Wennekers, 2002, 'Entrepreneurship and its Conditions: a Macro Perspective', *International Journal of Entrepreneurship Education* **1**(1), 25–64.

Venkataraman, S., 1997, 'The Distinctive Domain of Entrepreneurship Research: an Editor's Perspective', in J. Katz and R. Brockhaus (eds.), *Advances in Entrepreneurship, Firm Emergence and Growth*, Vol. 3, Greenwich, CT: JAI Press, pp. 119–138.

Verheul, I. and R. Thurik, 2001, 'Start-up Capital: Does Gender Matter?', *Small Business Economics* **16**, 329–345.