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Explaining preferences and actual involvement in self-employment: Gender and the entrepreneurial personality

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ABSTRACT

This paper investigates an essential aspect of the entrepreneurial personality: why women's self-employment rates are consistently lower than those of men. It has three focal points. It discriminates between the preference for self-employment and actual involvement in self-employment using a two (probit) equation model. It makes a systematic distinction between different ways in which gender influences the preference for and actual involvement in self-employment (mediation and moderation). It includes perceived ability as a potential driver of self-employment next to risk attitude, self-employed parents and other socio-demographic drivers. A representative data set of more than 8000 individuals from 29 countries (25 EU Member States, US, Norway, Iceland and Liechtenstein) is used (the 2004 Flash Eurobarometer survey). The findings show that women's lower preference for becoming self-employed plays an important role in explaining their lower involvement in self-employment and that a gender effect remains that may point at gender-based obstacles to entrepreneurship.

1. Introduction

Now that it is widely established that entrepreneurship is important for improving economic growth,[1] policy-makers have been searching for ways to encourage groups of individuals that are underrepresented in the entrepreneurial population to start-up businesses (European Commission, 2002). In this quest for the entrepreneurial personality gender issues play a central role. Women are seen as an important potential resource for communities and regions aiming to expand their economies. Globally, women are less likely than men to behave entrepreneurially, whether this is measured in terms of newly founded or established businesses (Minniti, Arenius, & Langowitz, 2005; Reynolds, Bygrave, Autio, Cox, & Hay, 2002).

Separating the different stages of entrepreneurship, such as the cognitive and behavioral stages, enables us to gain insight into the question of why some people become entrepreneurs and others do not (Baron, 2004). The decision to become an

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[1] See Carree and Thurik (2003) and Van Praag and Versloot (2007) for overviews of studies investigating the relationship between entrepreneurship and economic growth. See Thurik (2009) for a discussion of policy issues.

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entrepreneur is traditionally seen as an occupational decision with two outcomes: to engage in entrepreneurial activity or to refrain from it. This 'static' perspective is challenged by a 'dynamic' approach that views entrepreneurship as a process consisting of several stages (Reynolds, 1997). For example, one can discriminate between pre-birth, birth, and post-natal stages of formation, where pre-birth is often referred to as latent or nascent entrepreneurship (Blanchflower, Oswald, & Stutzer, 2001; Masuda, 2006; Van Gelderen, Thurik, & Bosma, 2005).[2] These stages of entrepreneurship may again have different antecedents (Davidsson & Honig, 2003; Grilo & Thurik, 2005b, 2008; Van der Zwan, Thurik, & Grilo, 2010).

To understand why women are less likely to engage in entrepreneurial activity, one should investigate how they perform at these different stages of the entrepreneurial process and determine at what stage women start to lag behind and why. Not only are women less likely to become involved in entrepreneurship, but they also appear less interested in entrepreneurship (Blanchflower et al., 2001; Grilo & Irigoyen, 2006; Grilo & Thurik, 2005a, 2008). This lower preference for entrepreneurship among women may partially explain their lower level of entrepreneurial activity, suggesting that fostering female entrepreneurship should focus not just on the action stages of entrepreneurship but also on earlier attitudinal and decision stages.

Hence, to establish to what extent women's relatively low level of participation in entrepreneurial activity is driven by their lower preferences for entrepreneurship or, alternatively, by other factors (such as those related to a lower ability to become an entrepreneur), we investigate the antecedents of entrepreneurial preferences and entrepreneurial activity for both women and men. We link latent to actual entrepreneurial activity and examine how gender influences the relationship between these two stages. The entrepreneurial process is treated as a two-step procedure: the cognitive stage of 'wanting it' and the behavioral stage of 'doing it'.

Most studies investigating gender effects on entrepreneurship include gender as a dummy variable. Although this approach has its merits, it does not provide us with information on the origin of gender differences. By distinguishing between mediation and moderation effects[3] on the decision and action stages of entrepreneurship, we aim to find out whether the lower female entrepreneurial activity rate can be attributed to a lower preference of women for becoming entrepreneurs or, alternatively, to the existence of gender differences with respect to other (ability) factors that influence engagement in entrepreneurial activity.

In sum, the contribution of the current paper consists of the distinction between a cognitive stage (latent entrepreneurship) and a behavioral stage (actual involvement in entrepreneurship) and the link between both stages. This distinction has largely been absent in current female entrepreneurship research. It provides us with new insight into whether women's lower level of activity in entrepreneurship is driven by a lower willingness and/or ability levels. Additionally, although distinguishing between mediation and moderation effects in the area of gender and entrepreneurship is not new (Collins-Dodd, Gordon, & Smart, 2004; Verheul & Thurik, 2001), testing for such effects is novel within the present context: that of the latent and active stages of the entrepreneurial process.

Our model for explaining entrepreneurial behavior is inspired by Ajzen's (1991) Theory of Planned Behavior (TPB), which links behavioral intentions to actual behavior. In the next section, we introduce our conceptual framework. We then discuss gender differences with respect to the variables in our framework. The aim is to establish whether the impact of a variable on self-employment is different for women and men (moderation effect) and/or whether a variable has a different value for women and men (mediation effect). Subsequently, we introduce our model and discuss how we test for these gender effects. Finally, we present and discuss the results of the analysis and give suggestions for further research and policy. Recent data from 28 European countries, benchmarked with US data, guarantees not just the wide applicability of the results but also to detect specific country differences. Throughout the present paper, we will use the terms entrepreneurship and self-employment interchangeably.[4]

2. Explaining entrepreneurial behavior

2.1. Linking preferences and perceived ability to actions

Our study focuses on the "immediate antecedents of choice" as proposed by Shaver and Scott (1991). Before engaging in entrepreneurial behavior, individuals will ask themselves two questions: "Can I do it?" and "Do I want to do it"? The answers to these questions ultimately determine an individual's commitment to starting a business. They represent willingness and ability to become an entrepreneur, both of which have been considered important in determining the 'supply of entrepreneurs' (Knight, 1921, 1971, pp. 282–283). For example, summarizing the literature on the interface between cognition and entrepreneurship, Baron and Ward (2004, p. 555) argue that in addition to arrangement cognitions (beliefs about the resources needed to engage in entrepreneurial activity), there are willingness cognitions (beliefs about commitment to new venture creation) and ability cognitions (beliefs about the knowledge, skills and capacities necessary to create a venture).[5]

[2] Latent and nascent entrepreneurship may be regarded as two different stages, where latent entrepreneurship (hidden or potentially existing but not yet realized) is visible in people who are willing and able to become entrepreneurs but have not yet decided to start a business, while nascent (emerging) entrepreneurship refers to individuals who have made a decision and are preparing and undertaking efforts to create a new venture.

[3] For a discussion of moderation and mediation effects, we refer to James and Brett (1984) and Baron and Kenny (1986).

[4] Self-employment does not preclude one's having employees.

[5] The role of willingness and perceived ability in the decision to become self-employed has been investigated empirically in several studies (Van Praag and Van Ophem, 1995; Krueger, Reilly, & Carsrud, 2000; Kolvereid & Isaksen, 2006).

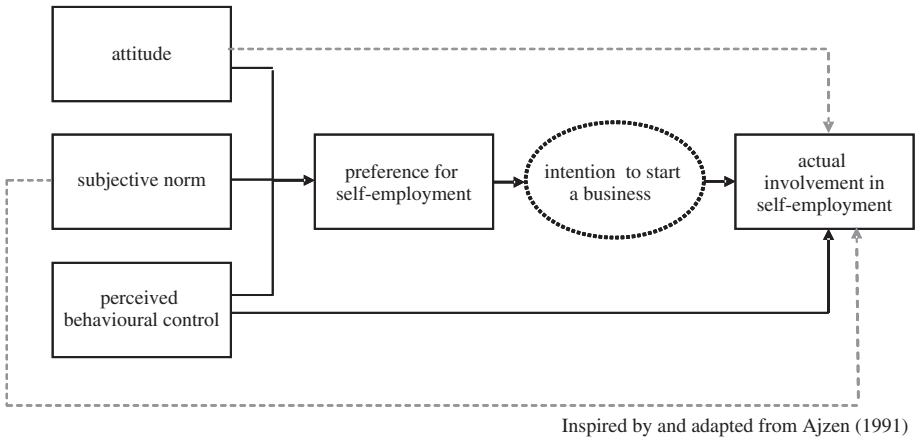

Fig. 1. Influence on preference for and actual self-employment.

Willingness and ability are interdependent: the willingness to perform a behavior is likely to be determined by the degree to which an individual believes that (s)he can perform the behavior.

Building on Ajzen's (1991) Theory of Planned Behavior (TPB), we explain actual self-employment status in the present study as related both to the willingness to engage in self-employment (i.e., *a preference for self-employment*) and the perceived ability to be involved in self-employment (i.e., *perceived behavioral control*), where the latter also influences the preference for self-employment. Unlike Ajzen (1991), we examine the relationship between preferences and actual behavior, rather than that between intentions and actual behavior. Preferences differ from intentions in that a preference for a behavior is a necessary but insufficient condition for actual involvement in the selected behavior. Preferences may not result in new venture creation if they merely represent a general opinion or a wish that is not acted upon. Intention, on the other hand, requires the willingness of an individual to commit him/herself to the start-up process and put effort into it. We therefore envisage the preference for self-employment as preceding the intention to engage in entrepreneurial behavior. In this way, our preference for self-employment reflects what Ajzen and Fishbein (1980) referred to as choice intentions, which can be distinguished from the intention to perform a behavior. Clearly, choice intentions precede behavioral intentions (Kolvereid, 1996a).

Our conceptual framework is presented in Fig. 1. Following Ajzen (1991), the preference for self-employment depends upon the attitude towards self-employment (personal evaluation of the behavior), the subjective norm (perceived social pressure (not) to perform the behavior) and perceived behavioral control (perceived ease or difficulty of performing the behavior). We depart from the TPB by allowing subjective norms and attitude to also *directly* affect actual involvement in self-employment, as indicated by the dotted lines. We want to find out whether the influence of these factors extends beyond the decision stage – i.e., whether they are also important for the continuation of self-employment.

Before we test whether the relationships in Fig. 1 apply equally across gender, we discuss and formulate hypotheses regarding the general effects portrayed in Fig. 1. We do the same for gender-specific effects. We neither expect that the impact of a factor on self-employment will be equal for men and women (moderation effect), nor do we expect that a factor will have an equal value for women and men (mediation effect). Hypotheses representing the influence of a factor on preferences and actual involvement are denoted by $H_{preference}$ and H_{actual}, respectively. The moderation hypotheses are denoted as $H_{gender(MOD)}$ and the mediation hypotheses as $H_{gender(MED)}$.

2.2. Preference for self-employment

Several studies indicate that the preference for self-employment is an important indicator of actual involvement in self-employment and that women have a lower preference for self-employment vis-à-vis wage employment than men (Blanchflower et al., 2001; Grilo & Irigoyen, 2006). Accordingly, the preference for self-employment may mediate the effect of gender on self-employment status. In addition, we investigate whether women and men with equal preferences for self-employment are equally likely to start a business. In other words, holding constant the preference for self-employment, are there gender-specific obstacles to business start-up activity? Because the literature is not conclusive on this matter, we refrain from formulating a hypothesis regarding the possible existence of such gender-specific obstacles but test for the existence of a moderating effect of gender on the relation between preferences and actual involvement in self-employment. We formulate and test the following hypotheses:

$H1_{actual}$: Individuals who have a preference for self-employment (vis-à-vis wage employment) are more likely to *engage in* self-employment than individuals without such a preference.

$H1_{gender(MED)}$: Women have a lower preference for self-employment than men.

The test of the mediated effect of gender on actual self-employment (through self-employment preferences) requires that both $H1_{actual}$ and $H1_{gender(MED)}$ be supported.

Note that $H1_{actual}$ suggests a specific direction of effect, that is, from preference for self-employment to actual engagement in self-employment. However, an individual's preference – as measured in the present study – could be influenced by his/her current entrepreneurial engagement. This would imply reverse causality, namely that self-employment partially drives latent entrepreneurship. To appropriately test $H1_{actual}$ and all other hypotheses we perform additional analyses that control for this endogeneity problem in Section 5.

2.3. Attitude: valuation of (relatively) risky rewards

The attitude towards entrepreneurial behavior is determined by the expected risks and rewards of starting a business. Douglas and Shepherd (2002) find that income is relatively important to evaluations of career alternatives. In the case of highly uncertain entrepreneurial income, the attitude towards such variability (risk tolerance) becomes a crucial element of the decision of whether or not to take the entrepreneurial path. Indeed, Kihlstrom and Lafont (1979, p. 745) argue that individuals make their occupational decisions by 'comparing the risky returns of entrepreneurship with the non-risky wage determined in the competitive labor market'. The authors find that risk-averse individuals choose to become workers, whereas less risk-averse individuals choose an entrepreneurial career. This is consistent with Knight's (1921) view that the entrepreneur is someone who bears the risk associated with production. Several studies find that the probability of self-employment increases with risk tolerance (Arenius & Minniti, 2005; Grilo & Irigoyen, 2006; Parker, 1996; Stewart & Roth, 2001). Nevertheless, Parker (2004) argues that the empirical relationship between risk aversion and entrepreneurship is ambiguous. Shane and Venkataraman (2000) note that risk tolerance may be more influential in the exploitation than in the early (decision) phases of entrepreneurship. In sum, a positive risk attitude will be important in determining preferences and actual involvement in self-employment. Kolvereid (1996b) rates 'security' among the top three reasons for individual occupational preferences. Hence, we allow the attitude towards self-employment to be influenced by the risk attitude of an individual, arguing that less risk-averse individuals have a more positive attitude towards entrepreneurship than those who are more risk-averse.

Several studies within the area of entrepreneurship (Masters & Meier, 1988; Sexton & Bowman-Upton, 1990; Verheul & Thurik, 2001) and that of financial decision-making (Powell & Ansic, 1997) show that women are less risk seeking than men, which may lead to lower self-employment preferences and activity rates for women. In other words, the relationship between gender and (a preference for) self-employment may be mediated by risk attitude. Furthermore, given a certain level of risk tolerance, do women and men differ regarding their preference for and engagement in self-employment? Women tend to be driven by different job values and work motivations than men. In their review of the literature, Brenner, Pringle, and Greenhaus (1991) argue that women value work that helps them to develop their knowledge and skills, that is intellectually stimulating, and that has agreeable working conditions, while men prefer high incomes, taking risks and supervising others. Because risk attitude is not the only job characteristic with respect to which women and men differ, it is expected that women and men who are risk-tolerant still differ in terms of their preference for and involvement in self-employment. We test for a possible moderating effect of gender but refrain from formulating a hypothesis because we lack information and intuition regarding the direction of such an effect. We formulate and test the following hypotheses[6]:

$H2_{preference}$: Risk-tolerant individuals are more likely to prefer self-employment over wage employment than are risk-averse individuals.
$H2_{actual}$: Risk-tolerant individuals are more likely to engage in self-employment than are risk-averse individuals.
$H2_{gender(MED)}$: Women are less risk-tolerant than men.[7]

We test for mediation and moderation effects on both the preference for self-employment and actual involvement in self-employment. This applies equally to all subsequent hypotheses.

2.4. Subjective norm: self-employed parents

Individuals are affected by what people close to them think about behavior such as entrepreneurship (Ajzen, 1991; Krueger & Brazeal, 1994). In particular, the opinion and perceived social pressure of family members may play an important role (Krueger et al., 2000). Self-employed parents are found to be a key predictor of self-employment (Dunn & Holtz-Eakin, 2000; Hout & Rosen, 2000; Krueger, 1993; Matthews & Moser, 1996; Sanders & Nee, 1996; Scherer, Adams, Carley, & Wiebe, 1989; Shapero & Sokol, 1982). The importance of self-employed parents may vary with the phase in the entrepreneurial process. Self-employed parents are said to be particularly important in shaping their children's preferences, whereas in later stages, support from outside the family (i.e., weak ties) is more important (Davidsson & Honig, 2003; Grilo & Thurik,

[6] Note that in this study, we measure attitude toward risk specific to the occupational choice of starting a business by asking respondents whether they believe that someone should start a business if there is a risk that it might fail.

[7] The test of the mediation effect requires that $H2_{preference}$ or $H2_{actual}$ and $H2_{gender(MED)}$ be supported.

2008; Matthews & Moser, 1996). Nevertheless, there may still be parental support at play in the form of advice and financial investment when the business is up and running, and we expect the influence of self-employed parents to extend beyond the decision stage.

In terms of gender, Matthews and Moser (1996) find that men with a family background in small business expressed greater interest in small business ownership than did women with such a background. Similarly, Hout and Rosen (2000) find that for both women and men, self-employment depends on whether the father is self-employed; for women, however, this relationship is weaker, indicating that gender moderates the relationship between self-employed parents and (preference for) self-employment.[8] We formulate and test the following hypotheses[9]:

$H3_{preference}$: Individuals with self-employed parents are more likely to prefer self-employment over wage employment than individuals without self-employed parents.
$H3_{actual}$: Individuals with self-employed parents are more likely to engage in self-employment than individuals without self-employed parents.
$H3_{gender(MOD)}$: Women with self-employed parents are less likely to prefer, and engage in, self-employment than men with self-employed parents.

2.5. Perceived behavioral control: locus of control and perception of the environment

Our measure of perceived behavioral control with respect to the act of starting up a business includes a personal component (locus of control regarding what determines a firm's success) and an environmental component (perceived barriers to entrepreneurship). This is in line with Ajzen (1991, p. 183), who argues that the *perception* of behavioral control extends beyond Rotter's (1966) concept of locus of control and takes into account variations across situations and actions.[10] Kolvereid and Isaksen (2006) propose that the degree to which individuals believe that they can be(come) successful entrepreneurs is also dependent upon environmental conditions.

Rotter's (1966) construct of locus of control can be seen as a continuum where, at one extreme, an individual believes that (s)he can influence events through his/her own ability or effort (internal locus of control) while, at the other extreme, a person believes that external forces determine outcomes (external locus of control). Generally, (successful) entrepreneurs are found to have an internal rather than an external locus of control (Beugelsdijk & Noorderhaven, 2005; Brockhaus & Horwitz, 1986; Gatewood, Shaver, & Gartner, 1995; Lee & Tsang, 2001; Perry, MacArthur, Meredith, & Cunnington, 1986). Furthermore, as compared to men, women more often have an external locus of control and less often an internal locus of control (Brandstätter, 1997; LaNoue & Curtis, 1985; Rosenthal, Guest, & Peccei, 1996; Semykina & Linz, 2007). They are less likely to take credit for their success and attribute their success more often to external sources or luck than to their own effort or ability. It can thus be expected that locus of control mediates the relationship between gender and (preference for) self-employment. Hansemark (2003) finds that whereas the locus of control has predictive power for men, it does not explain start-up activity among women. Accordingly, gender may moderate the relationship between locus of control and (preference for) self-employment. We formulate and test the following hypotheses[11]:

$H4_{preference}$: Individuals with an internal locus of control are more likely to prefer self-employment over wage employment than individuals with an external locus of control.
$H4_{actual}$: Individuals with an internal locus of control are more likely to engage in self-employment than individuals with an external locus of control.
$H4_{gender(MED)}$: Men are more likely to have an internal locus of control than women.[12]
$H4_{gender(MOD)}$: Men with an internal locus of control are more likely to prefer and engage in self-employment than are women with an internal locus of control.

With respect to the environmental component of perceived behavioral control, we investigate perceptions of the entrepreneurial environment. Subjective individual perceptions of the environment can be more influential for the start-up decision than the objective 'state' of this environment (Arenius & Minniti, 2005; Koellinger, Minniti, & Schade, 2007). This study focuses on the perceived presence or absence of four environmental factors: (i) *administrative complexities* that consume time

[8] There is no reason to believe that women are more likely to have self-employed parents. This would mean that self-employed parents are more likely to have girls than boys. Accordingly, we refrain from formulating a hypothesis regarding a mediated effect of gender on self-employment through self-employed parents.

[9] By using the variable 'self-employed parents' as a proxy for a subjective norm, we assume that parents have an important impact on the decision-making process of their children. Obviously, parents who have suffered hardship as a result of starting and running a business may not want their children to do the same. In addition, self-employed parents may be an indicator of several factors (in addition to perceived social pressure), including an inherited entrepreneurial personality, the availability of a role model, and parental support (e.g., psychological support, advice, financial contributions).

[10] According to Ajzen (1991, p. 183): "*... perceived behavioral control refers to people's perception of the ease or difficulty of performing the behavior of interest. Whereas locus of control is a generalized expectancy that remains stable across situations and forms of action, perceived behavioral control can, and usually does, vary across situations and actions*".

[11] We use a specific measure for locus of control: the perceived importance of internal or external success factors for running a business. See Table 1 for a description.

[12] Again, the test of the mediation effect requires that $H4_{preference}$ or $H4_{actual}$ and $H4_{gender(MED)}$ be supported.

and money and may discourage people from starting a business (World Bank, 2008; OECD, 1998)[13]; (ii) *access to information* through, for example, one-stop shops or information meetings at the Chamber(s) of Commerce that familiarize (potential) entrepreneurs with the activities involved in new venture creation; (iii) *access to finance*, often identified as an important barrier to entry to self-employment (Bates, 1995; Evans & Jovanovic, 1989), in particular because investors may be reluctant to invest in small and new firms due to the absence of a track record, the high risk and the fixed cost element of transactions (Berger & Udell, 1998; Chittenden, Hall, & Hutchinson, 1996; Cressy, 2006); and (iv) *general economic climate*, determining the opportunities available for entrepreneurial activity as well as the risks and rewards of setting up shop (Verheul, Wennekers, Audretsch, & Thurik, 2002).[14]

Arenius and Minniti (2005) find that the relationship between perceptual variables (e.g., opportunity perception, entrepreneurial self-efficacy) and entrepreneurship is not dependent upon gender. Hence, they do not find evidence of moderation effects. Nevertheless, women might anticipate problems – for example, with respect to access to finance – due to perceived gender-based discrimination by lenders and financial institutions. This would influence their perceptions regarding the available financial support. In such cases, gender would mediate the impact of financial constraints on entrepreneurship. Studies provide mixed evidence of such discrimination. Some studies show that acquiring financial capital is relatively difficult for women (Brush, 1992; Carter, 2000), whereas others find no evidence of gender differences (Buttner & Rosen, 1989; Fabowale, Orser, & Riding, 1995; Riding & Swift, 1990). In addition, women may have lower levels of experience with self-employment than men (Fischer, Reuber, & Dyke, 1993; Kalleberg & Leicht, 1991), which may influence their perception of the entrepreneurial environment. Hence, the relationship between gender and (preference for) self-employment may be mediated by perceptions of the environment.

How do women and men behave in the face of obstacles? Overcoming perceived challenges requires a high degree of self-confidence in one's own abilities (Markman, Baron, & Balkin, 2005). Generally, women are more likely to underrate their own skills and knowledge than are men (Lindeman, Sundvik, & Rouhiainen, 1995; Wohlers & London, 1989). This is true in particular for activities that are perceived as masculine (Beyer, 1998; Beyer & Bowden, 1997), such as management and entrepreneurship (Fagenson & Marcus, 1991; Powell & Butterfield, 1989). Women are found to display lower scores on entrepreneurial self-efficacy than men (Scherer, Brodzinski, & Wiebe, 1990; Verheul, Uhlaner, & Thurik, 2005). Therefore, it may be expected that women who perceive barriers are less likely to persist in fulfilling their wishes and starting up a business than are men who perceive such barriers (i.e., gender moderates the relation between the perception of barriers and self-employment). We formulate and test the following hypotheses:

$H5_{preference}$: Individuals who perceive barriers to entrepreneurship (administrative complexity, insufficient information, limited access to finance, an unfavorable economic climate) are less likely to *prefer* self-employment over wage employment than individuals who do not perceive such barriers.

$H5_{actual}$: Individuals who perceive barriers to entrepreneurship (...) are less likely to engage in self-employment than individuals who do not perceive such barriers.

$H5_{gender(MED)}$: Women are more likely to perceive barriers to entrepreneurship (...) than men.[15]

$H5_{gender(MOD)}$: Women who perceive barriers to entrepreneurship (...) are less likely to prefer and engage in self-employment than men who perceive such barriers.

3. Model and analysis

The basis for our model is the occupational choice between wage employment and self-employment. We use an equation-by-equation probit estimation. We estimate probit equations for the probability of revealing a preference for self-employment and for actually being self-employed given this preference (Grilo & Irigoyen, 2006). These equations can be formulated as follows:

$$Pr(y_1 = 1|X) = F(Xb_1), \tag{1}$$

where $y_1 = 1$ if the individual has a preference for self-employment, and $y_1 = 0$ if the individual prefers wage employment.

$$Pr(y_2 = 1|X, y_1) = F(Xb_2 + y_1 a), \tag{2}$$

where $y_2 = 1$ if the individual is self-employed, and $y_2 = 0$ if the individual is wage-employed. Actual self-employment status (y_2) is made dependent on preference for self-employment (y_1).

For both equations, the following applies: $X = (1$, gender, risk tolerance, self-employed parents, internal locus of control, perception of lack of financial support, perception of administrative complexities, perception of insufficient information, perception of economic climate, age, $(age/100)^2$, low education, high education, country dummies). A detailed description of the independent variables is provided in the next section.

[13] Coping with administrative regulations has been cited as the third most important constraint in the former EU-19 countries (KPMG/ENSR, 2002).

[14] Several studies have linked the level of unemployment (as an indicator of the general economic climate) to self-employment (Thurik, Carree, van Stel, & Audretsch, 2008; Carree, 2002; Storey, 1991).

[15] The test of the mediation effect requires that $H4_{preference}$ or $H4_{actual}$ and $H4_{gender(MED)}$ be supported.

Differences between women and men with respect to entrepreneurial preference and activity may be related to a gender difference in the values for X (see Eqs. (1) and (2)), including the preference for self-employment in Eq. (2), or differences with respect to the coefficients of the effects of X (a, b_1 and b_2), implying that the effects of the independent variables differ across gender.[16] These are *mediation* and *moderation* effects, respectively.

Eq. (2) poses a potential endogeneity problem that may bias the estimated coefficient of latent entrepreneurship. This is caused by the fact that individuals reveal their preference for entrepreneurship at the moment of the survey which deviates from the desired situation in which preferences are measured at the moment of engaging into entrepreneurship. Hence, reverse causality is an issue here. Instrumental variables regression (Angrist, Imbens, & Rubin, 1996) is appropriate when a variable is endogenous in nature, for example when one attempts to establish a causal effect of education on self-employment (Block, Hoogerheide, & Thurik, 2012). Instrumental variables are strongly correlated with the endogenous variables and should not correlate with the dependent variable. In Section 5, we control for the potentially endogenous nature of latent entrepreneurship by means of instrumental variables.

4. Data

We use data from the 2004 Flash Eurobarometer survey.[17] This survey, conducted on behalf of the Directorate-General Enterprise and Industry of the European Commission, interviewed a random sample of the general population from 29 countries, including the 'old' 25 EU member states,[18] the United States, Iceland, Liechtenstein and Norway. Each national sample is representative of the working-age population. Data were collected by 29 EOS (European Omnibus Survey) Gallup Europe institutes. In April 2004, a total of 21,051 people were interviewed by telephone for this survey, including 18,547 citizens from the European Union (25 EU countries), 1003 Americans, 501 Icelanders, 500 natives of Liechtenstein and 500 Norwegians. The sample sizes amount to approximately 500 or 1000 respondents in each country.

For this study, we use data for all 29 countries in the Eurobarometer survey.[19] The total number of observations for this study is 8545, of which 4694 are men and 3851 are women. We remove students, the unemployed, the retired, and those otherwise not active in the labor market, as well as those who left questions relevant for our analyses unanswered (responses used for constructing y_1, y_2 and X). The number of observations in the data set varies from 146 for Malta to 501 for the United States. The minimum number of women is 51 (Malta), and the maximum is 244 (Germany). The minimum number of men is 78 (Estonia), and the maximum is 280 (the United States).

Preference for self-employment is measured by way of the following question[20]: 'Suppose you could choose between different kinds of jobs; which one would you prefer: being an employee or being self-employed?' One characteristic of this measure is that an individual may choose self-employment as appealing due to favorable attributes (e.g., being your own boss, flexible working hours) without the actual intention to engage in this activity. This means that in fact, this variable is close to the concept of "wanting" but does not necessarily factor in the "can" element. See Blanchflower et al. (2001), Grilo and Irigoyen (2006), or Grilo and Thurik (2005a) for a detailed discussion of the merits and drawbacks of this type of measure. Actual entrepreneurship is measured using observations for the respondents who answered 'self-employed' to the following question[21]: 'As far as your current occupation is concerned, would you say that you are self-employed, an employee, or a manual worker, or alternatively, would you say that you are without a professional activity?'.

Of those who are professionally active, almost half of the respondents (49.6%) indicate to have a preference for self-employment, whereas only 20% are actually self-employed. This shows that there is a gap between preferences and their realizations. Furthermore, not all self-employed individuals report a preference for self-employment: about 20% of the self-employed indicate that they prefer wage employment over self-employment (if they have a choice). Hence, these self-employed individuals may be considered necessity-driven. In terms of gender differences, we find that 41.7% of women prefer self-employment versus 56.1% of the men. For actual self-employment, these percentages amount to 14.4% and 24.7%, respectively. A chi-square test shows that these differences are significant. See Table 3, which also presents the mean differences of the explanatory variables. On average, the women in the sample are less likely to show a preference for self-employment and are less likely to be self-employed.

As control factors for our analysis, we include an individual's age and education level. Several studies have shown that age plays a role in the decision to become self-employed (Georgellis, Sessions, & Tsitsianis, 2005; Grilo & Irigoyen, 2006; Matthews & Moser, 1996). Education can improve one's ability to solve problems during the start-up process, help individuals perceive lucrative business opportunities, and increase their self-confidence (Davidsson & Honig, 2003). Several studies find a positive relationship between education and nascent entrepreneurship or new venture creation (Bates, 1995; Delmar & Davidsson, 2000; Rotefoss & Kolvereid, 2005).[22] Other studies find evidence for a non-linear relationship (Evans &

[16] This will be tested by including in the X vector interaction terms between gender and each one of the explanatory variables enumerated above.

[17] Key findings are presented in Flash Eurobarometer 160 'Entrepreneurship', European Commission 2004, available at the following website: http://ec.europa.eu/public_opinion/flash/fl160_en.pdf.

[18] Romania and Bulgaria joined the European Union in 2007.

[19] Detailed cross-country comparisons are beyond the scope of the present paper. Tables including country dummies can be obtained from the authors. For a discussion of country effects in a similar setting, we refer to Grilo and Thurik (2005a).

[20] This question is answered by both self-employed and wage-employed individuals.

[21] Note that in this analysis, we only include the active population (wage- or self-employed).

[22] Blanchflower (2004) finds that while education is positively related to self-employment in the US, it is negatively related in Europe.

Leighton, 1989; Grilo & Irigoyen, 2006; Reynolds, 1997). Bates (1995) finds that in their decision to become self-employed, women rely more on advanced education than do men. However, Burke, Fitzroy, and Nolan (2002) find that post-compulsory education has a negative effect on the probability of male self-employment and no effect on female self-employment. Because there is no consistent evidence of the significance and direction of the general and gender-specific effects of age and education on self-employment, we refrain from formulating hypotheses.[23]

Our analysis is constrained by the single item measurement of the Eurobarometer method. This is not necessarily a drawback. Several advantages of using single-item measures over multiple-item measures can be identified, including the minimization of respondent refusal and the reduction of common method bias (Bergkvist & Rossiter, 2007). Furthermore, and related to our essential variable 'preference for self-employment', it can be argued that single-item measures need not lead to distorted results, particularly if the construct measured is concrete and singular: that is, it consists of one object that is easily and uniformly imagined (Bergkvist & Rossiter, 2007, p. 176). To measure 'preference for self-employment' in our study, respondents are clearly asked to express their preference for one of two occupations: working for a boss or running one's own company. This is independent of whether people are able to become self-employed or actually (plan to) engage in this activity. Therefore, we believe that the concept of 'preference for self-employment' lends itself better to using a single-item measure than the more complex concept of 'entrepreneurial intentions' (in Ajzen's TPB), which combines elements of willingness and ability and implicitly includes an action element.[24] Lastly, in our specific case, it provides room to compare the results with those of other studies using similar single-item measures, including those by Blanchflower et al. (2001), Grilo and Irigoyen (2006) and Grilo and Thurik (2008).

Table 1 provides a description of the independent and control variables used in the analysis to explain (preference for) self-employment as well as their mean values and corresponding standard errors.

5. Results

As expected, women in our sample are less likely to show a preference for self-employment and are less likely to be self-employed. To explain this gender gap we start by investigating the effect of all variables, including gender as a dummy variable, on the preference for and on actual involvement in self-employment. Subsequently, mediating and moderating effects are examined.

5.1. Determinants of self-employment preferences and actual involvement

Table 2 presents the results of the probit analyses for Eqs. (1) and (2),[25] explaining the preference for self-employment and actual self-employment.[26] We see that after controlling for the influence of the other factors, gender (male) influences both the preference for self-employment and actual self-employment. On average, being a man increases the probability of preferring self-employment by 13.6% and that of preferring self-employment by 5.9%. A preference for self-employment increases the likelihood of self-employment by 22.2%.[27] $H1_{actual}$ is supported. Note that country dummies are included in the analysis (with the United States as the base country) but that their coefficients are not reported in Table 2.

Risk tolerance appears important only for preferences and not for actual involvement. Indeed, in the decision phase, risks are perceived and calculated, whereas in the action phase, individuals proceed and start up the firm with an understanding of these risks. There is clear support for $H2_{preference}$ and no support for $H2_{actual}$.

We find that having at least one self-employed parent positively influences not just an individual's preference for self-employment but also his or her self-employment status. We find support for both $H3_{preference}$ and $H3_{actual}$. Not only do entrepreneurial parents appear to inspire their children, but the influence also materializes in their choice to become self-employed, suggesting that there is parental start-up pressure and/or support.

Concerning the internal component of perceived behavioral control, it appears from Table 2 that internal locus of control is only important during the decision stage. This finding suggests that there may be other, more action-oriented personality

[23] There is no reason to assume that women and men differ in terms of the level of education they attain. Accordingly, we do not expect a mediated effect of gender on self-employment through education level.

[24] Indeed, Ajzen and Fishbein (1980) make a distinction between choice intentions and intentions to perform a behavior. To measure choice intentions, which are similar to our proposed concept of 'preference for self-employment', Kolvereid (1996b) uses a single-item measure asking respondents, "If you were to choose between running your own business and being employed by someone, what would you prefer? (1 = Would prefer to run my own business; 7 = Would prefer to be employed by someone). That is why, in our conceptual framework, we consider preferences to be a determinant of behavioral intentions (as supported by the aforementioned distinction between choice intentions and intention to perform the behavior).

[25] Given the recursive nature of the model, the procedure provides consistent estimators if the error terms are not correlated across equations. We find that it is justified to estimate the two equations separately. The correlation is estimated at −0.013 (with standard error 0.307). We test whether this correlation equals zero by way of a likelihood ratio test. The likelihood ratio amounts to 0.002 (with p-value 0.966).

[26] We also include interaction terms between a dummy variable that represents the distinction between self-employment and wage employment and the explanatory variables used to capture the possibility of a differential impact on preferences among self-employed and wage-employed individuals. Coefficients of two interaction terms are significant: that of low education (at 1%) and that of risk tolerance (at 10%). Wald tests show that low education does not have a significant effect (at 10%) for the wage-employed, while it is of significant importance for the self-employed (with a negative coefficient at 5%). Risk tolerance has a significant positive coefficient for both groups, but the coefficient is larger for the self-employed.

[27] Omitting the preference variable from the equation explaining actual self-employment generally does not alter the results: only risk tolerance becomes significant at the 1% level and the linear age term at the 5% level.

Table 1
Description of explanatory variables.

Name of variable	Description of variable	Mean	St. error
Male	Is the respondent male or female? (male = 1)	0.549	0.498
Risk tolerance	To what extent do you (dis)agree with the statement, "*One should not start a business if there is a risk it might fail.*"? Dummy variable with 'strongly disagree' or 'disagree' = 1 and 'strongly agree' or 'agree' = 0.	0.503	0.500
Self-employed parents	Dummy variable with the value of 1 if the mother, father or both are self-employed and value 0 if neither of the parents is self-employed.	0.278	0.448
Internal locus of control	When one runs a business, what do you think is most likely to determine its success? Max. of two answers. Answer categories: (a) director's personality; (b) general management of the business; (c) overall economy; (d) political context; (e) outside entities. (a) and (b) = internal factors. (c), (d) and (e) = external factors. This variable has a value of −1 if only external factors are chosen, a value of 1 if only internal factors are chosen, and a value of 0 in all other cases.	0.164	0.753
Perception lack of financial support	To what extent do you (dis)agree with the statement "*It is difficult to start one's own business due to a lack of available financial support.*"? Dummy variable with 'strongly agree' or 'agree' = 1 and 'disagree' or 'strongly disagree' = 0.	0.748	0.434
Perception administrative complexity	To what extent do you (dis)agree with the statement "*It is difficult to start one's own business due to the complex administrative procedures* involved."? Dummy variable with 'strongly agree' or 'agree' = 1 and 'disagree' or 'strongly disagree' = 0.	0.696	0.460
Perception insufficient info	To what extent do you (dis)agree with the statement "*It is difficult to obtain sufficient information on how to start a business.*"? Dummy variable with 'strongly agree' or 'agree' = 1 and 'disagree' or 'strongly disagree' = 0.	0.439	0.496
Perception unfavorable economic climate	To what extent do you (dis)agree with the statement "*The current economic climate is not favorable for people who want to start their own business.*"? Dummy variable with 'strongly agree' or 'agree' = 1 and 'disagree' or 'strongly disagree' = 0.	0.673	0.469
Age	Age of the respondent in years	40.62	11.66
Low education	Dummy variable with a value of 1 if age when finished full-time education <15 or if respondent never engaged in full-time education and 0 otherwise.	0.113	0.317
High education	Dummy variable with a value of 1 if age when finished full-time education >21 and 0 otherwise.	0.389	0.488

Table 2
Explaining preference for self-employment and actual self-employment.

	Preference for self-employment			Actual self-employment		
	Coeff.	*P*-value	d*F*/d*x*	Coeff.	*P*-value	dF/dx
Constant	0.495***	0.003		−2.777***	0.000	
Male	0.363***	0.000	0.136	0.259***	0.000	0.059
Preference for self-employment				0.947***	0.000	0.222
Risk tolerance	0.262***	0.000	0.098	0.055	0.134	0.013
Self-employed parents	0.280***	0.000	0.104	0.453***	0.000	0.113
Internal locus of control	0.081***	0.000	0.030	0.010	0.676	0.002
Perc. lack of financial support	0.137***	0.000	0.051	−0.043	0.314	−0.010
Perc. administrative complexity	−0.095***	0.003	−0.035	−0.177***	0.000	−0.042
Perc. insufficient info	0.053*	0.085	0.020	0.091**	0.015	0.021
Perc. unfavorable econ. climate	−0.132***	0.001	−0.049	0.019	0.631	0.004
Age	−0.024***	0.001	−0.009	0.026***	0.003	0.006
Age/100 (squared)	2.558***	0.002	0.949	−0.561	0.566	−0.129
Low education	0.014	0.778	0.005	0.149***	0.009	0.036
High education	−0.029	0.360	−0.011	−0.051	0.188	−0.012
N	8545			8545		
LR chi^2/degrees of freedom	769.64	40		1542.46	41	
Log likelihood	−5537.889			−3511.630		
Pseudo R^2	0.065			0.180		

The marginal effect d*F*/d*x* of each variable represents the change in the probability of (preference for) self-employment due to a one-unit change in that variable (or a discrete change from zero to one in the case of dummy variables). For each observation, the effect of a one-unit change on the probability is calculated, and the average of these changes is used to obtain an average marginal effect for each variable. *P*-values are the same for these average marginal effects as for the coefficients. Note that country effects are controlled for but not presented in this table. Medium education level is the omitted (i.e., base) education variable.

* Refer to significance levels of 10%.
** Refer to significance levels of 5%.
*** Refer to significance levels of 1%.

characteristics, such as persistence or decisiveness, that explain active involvement in entrepreneurship (for which we do not have information in the survey). We find support for $H4_{preference}$ but not for $H4_{actual}$.

With respect to the environmental component of perceived behavioral control, we find that the 'perception of administrative complexity' negatively affects both preferences and actual involvement, while the 'perception of an unfavorable

climate' only negatively affects preferences. The surprising positive effect of 'perception of a lack of financial support' on preferences may indicate a situation wherein individuals feel that there is generally a lack of financial support but personally do not have problems acquiring the necessary funding. Alternatively, a form of reverse causality may be at play with those who are more likely to engage in entrepreneurship and are also more aware of the difficulty of obtaining financial support. The 'perception of insufficient information' positively influences actual status. This may be an experience effect, where entrepreneurs realize in hindsight (while gathering information) that there is a lack of information. $H5_{preference}$ is supported only for the perception of administrative complexity and a perceived unfavorable economic climate. $H5_{actual}$ is supported only for perceived administrative complexities. In summary, of the four perceived obstacles, administrative complexities are the only one that acts as a barrier to both preferences and actual engagement in self-employment.

In terms of the control variables, we find a U-shaped relationship between preference and age, with a negative relationship up to the age of 46 and a positive relationship afterwards. We also find a positive relationship between age and actual self-employment. People with a low level of education have a higher probability of being self-employed than those with a medium level of education, perhaps indicating a lack of other employment opportunities. The insignificance of higher education suggests that the difference between medium and higher education levels plays no role in determining self-employment status.

Explaining the preference for self-employment, we find that the coefficients of 22 out of 28 country dummies are negative and significant at the 5% level. By replacing the 25 EU country dummies with two dummies – one for the ten countries that joined the EU in 2004,[28] and one for the 15 older members – we find that new member state residents are 11.3% less likely than US residents to prefer self-employment to wage employment. Residents of the old EU member states are even 18.1% less likely than US residents to have a preference for self-employment. At first glance, the picture of actual self-employment seems more varied. Country dummy coefficients are negative in 8 cases (of which France's and Luxembourg's are significant) and positive in 20 cases (of which 9 are significant). Replacing country dummies with old and new member state dummies, we find that living in the new member states increases one's probability of being self-employed by 6.9% over that of US residents, while residents of old member states are 3.7% more likely to be self-employed than US residents. Hence, there is a greater preference for self-employment in the US than in the EU, and within the EU, the preference is higher in new member states than in old ones. However, once preferences are controlled for, belonging to a European country (rather than to the US) increases the probability of being self-employed. Further analysis and interpretation of these results is beyond the scope of this paper.

5.2. Mediation effects

As a basis for investigating the extent to which gender effects are mediated by other variables, we start by looking at the means for the explanatory variables for women and men, as displayed in Table 3. Besides a lower preference for self-employment and lower involvement in self-employment, women in the sample appear to be less tolerant of risk, less likely to have an internal locus of control, and more likely to feel that (a) there is a lack of financial support, (b) there are administrative complexities, and (c) the economic climate for business start-ups is unfavorable. Women in the sample are also somewhat younger, and there is a tendency for women to be better educated than men (the gender difference is significant at the 10-percent level).

The results in Table 2 show that several of these variables influence the preference for self-employment and actual self-employment. This suggests that the relationship between gender and the (preference for) self-employment is mediated by these variables.

Mediation effects are further investigated using the approach of Sobel (1982). Consider the following two equations:

$$Y = a_1 + b_1X + b_2Z + b_3W + e_1 \quad \text{and}$$

$$Z = a_2 + cX + e_2,$$

where Y represents the *preference* for self-employment or *actual* self-employment, X is gender, Z is a selected explanatory variable, and W represents the other explanatory variables. Following Sobel (1982), we calculate the coefficient for the mediation effect and its t-value as follows:

$$b_{mediation} = b_2 * c,\ t_{mediation} = b_{mediation}/s_{mediation} \quad \text{and } s_{mediation} = \sqrt{c^2 s_{b2}^2 + (b_2)^2 s_c^2}$$

where b_2 and c refer to the coefficients of the effects of Z on Y and those of X on Z, respectively, and where s_{b2} and s_c are the standard errors that belong to the coefficients b_2 and c.[29] Note that the values of b_2 correspond to the coefficients in Table 2.[30]

Table 4 presents the coefficients of the mediation effects and their significance for the probit model. There is evidence of several mediation effects. Being a man has a positive effect on *preferences* because men differ from women in terms of their

[28] These ten countries joined the European Union in 2004. Eight can be considered post-communist nations that were either constituent parts of the Soviet Union or member nations of the Warsaw Pact until 1989.

[29] The Sobel (1982) method is regularly applied in psychology (Calvete & Cardenoso, 2005; Gil, Rico, Alcover, & Barrasa, 2005) but is also used in management and entrepreneurship (Van Dick et al., 2004; Rauch, Frese, & Utsch, 2005). Alternative methods are proposed by Baron and Kenny (1986) and Goodman (1960). These include a squared term of the two standard errors for b_2 and c, which is small in the case of small standard errors, and a large sample size.

[30] The Sobel method is usually applied to linear model specifications instead of non-linear ones. When estimating the coefficients and their significance using a linear probability model, we find that the signs and significance are similar to those of the probit model.

Table 3
Mean differences between women and men for the explanatory variables.

Variable	Male average	Female average	Chi-square
Preference for self-employment	0.561	0.417	175.103***
Actual self-employment	0.247	0.144	138.119***
Risk tolerance	0.517	0.485	8.626***
Self-employed parents	0.284	0.271	2.014
Internal locus of control	0.169	0.159	14.314***
Perc. lack of financial support	0.728	0.773	22.778***
Perc. administrative complexity	0.685	0.708	5.187**
Perc. insufficient info	0.439	0.438	0.019
Perc. unfavorable econ. climate	0.654	0.695	16.449***
Low education	0.118	0.108	1.825
High education	0.380	0.401	3.782*
			T-statistic
Age	41.08	40.05	−4.096***

* Refer to significance levels of 10%.
** Refer to significance levels of 5%.
*** Refer to significance levels of 1%.

risk attitude and perception of an unfavorable climate. To a lesser extent, the perception of administrative complexities is a channel through which gender affects the preference for self-employment (this effect is significant only at 10%). Men are less likely than women to feel that there is an unfavorable economic climate or that there are administrative complexities involved, and these perceptions have a negative effect on preferences in Table 2. Therefore, there is some support for $H5_{gender(MED)}$ for the preference model. Men also tend to be more risk-tolerant, and risk tolerance leads to a greater preference for self-employment. This supports $H2_{gender(MED)}$ for the preference model. Being a man has a negative effect on preferences through the perception of a lack of financial support[31] and age. Men in the sample are older and less likely to feel that there is a lack of available financial support (see Table 3), whereas these factors have a negative and positive effect, respectively, on preferences (see Table 2).

From the results in Table 4 it appears that being a man has a positive influence on *actual involvement* in self-employment because these men are older, have a greater preference for self-employment, and do not perceive administrative complexities as being as great a barrier as women do. Apparently, because women have a lower preference for self-employment, and because greater preferences in turn have a positive effect on self-employment, women have lower self-employment rates than men. This provides support for $H1_{gender(MED)}$. Women are also more likely to feel that there are administrative complexities involved, and this diminishes their odds of self-employment. There is support for $H5_{gender(MED)}$ regarding the perception of administrative complexities in the actual involvement model. The fact that men are older is specific to the sample used.

5.3. Moderation effects

To test for possible moderation effects of gender, we estimate probit Eqs. (1) and (2), including interaction terms for all variables with gender (male). We find significant interaction effects for risk tolerance, self-employed parents, and low education in the preference model and for the perception of an unfavorable economic climate in the actual self-employment model. Table 5 presents the probit results for the regression analyses including *only* the interactions that were found to be significant during a first step in which we included all interactions.[32]

First, we do not find evidence for a moderating effect of gender on the relationship between preferences and actual self-employment. The preference for self-employment has a similar positive effect on male and female self-employment, indicating that women and men who are inclined to start up their own firms do not differ with respect to the impact of this preference on its materialization.

From Table 5, we see that in the preference equation, the interaction effect of gender (male) with risk tolerance is positive at the 10% significance level. This lends some support to the idea of risk tolerance being more important in determining the preferences of men than those of women. Self-employed parents appear to be important in shaping female and male preferences, although the effect is stronger for men, which suggests that men are more willing to follow in their parents' footsteps. This is consistent with Matthews and Moser (1996) and implies support for $H3_{gender(MOD)}$.

In terms of perceived behavioral control, we see that there is no interaction effect of locus of control and gender (male) on preferences regarding self-employment, and there is no effect on actual involvement. Hence, there is no support for $H4_{gender(MOD)}$. The only perceived obstacle for which we find evidence of a significant interaction effect with gender is that of an unfavorable economic climate for the actual self-employment model. Table 5 suggests a positive effect of this perception on women's self-employment, while for men, the effect is close to zero because the coefficient of the variable cancels out

[31] Note that women are more likely to perceive a lack of financial support but that the effect of this barrier is reversed.
[32] Separate regressions for females and males will not be discussed here. The tables are available from the authors upon request.

Table 4
Mediation effects on preferences and actual self-employment.

Variable	Preference for self-employment		Actual self-employment		Value of *c*
	$b_{mediation}$	$t_{mediation}$	$b_{mediation}$	$t_{mediation}$	
Preference for self-employment			0.344***	11.732	0.363***
Risk tolerance	0.021***	2.783	0.004	1.336	0.080***
Self-employed parents	0.012	1.401	0.019	1.410	0.041
Internal locus of control	0.001	0.972	0.0001	0.385	0.010
Perc. lack of financial support	−0.019***	−3.001	0.006	0.985	−0.142***
Perc. administrative complexity	0.006*	1.797	0.012**	2.036	−0.065**
Perc. insufficient info	0.000	0.136	0.0003	0.137	0.004
Perc. unfavorable econ. climate	0.015***	2.871	−0.002	−0.477	−0.115***
Age	−0.025***	−2.556	0.027**	2.406	1.038***
Low education	0.001	0.276	0.007	1.201	0.049
High education	0.002	0.828	0.003	1.090	−0.054*

* Refer to significance levels of 10%.
** Refer to significance levels of 5%.
*** Refer to significance levels of 1%.

Table 5
Explaining preferences and actual involvement with *significant* interactions.

	Preference for self-employment			Actual self-employment		
	Coeff.	*P*-value	d*F*/d*x*	Coeff.	*P*-value	d*F*/d*x*
Constant	0.533***	0.001		−2.840***	0.000	
Male	0.302***	0.000	0.113	0.357***	0.000	0.081
Preference for self-employment				0.949***	0.000	0.222
Risk tolerance	0.208***	0.000	0.078	0.055	0.139	0.013
Self-employed parents	0.212***	0.000	0.079	0.453***	0.000	0.113
Internal locus of control	0.081***	0.000	0.030	0.010	0.682	0.002
Perc. lack of financial support	0.139***	0.000	0.051	−0.044	0.305	−0.010
Perc. administrative complexity	−0.094***	0.004	−0.035	−0.177***	0.000	−0.042
Perc. insufficient info	0.052*	0.088	0.019	0.090**	0.017	0.021
Perc. unfavorable econ. climate	−0.131***	0.000	−0.049	0.110*	0.075	0.025
Age	−0.024***	0.001	−0.009	0.026***	0.003	0.006
Age/100 (squared)	2.599***	0.002	0.963	−0.556	0.569	−0.128
Low education	0.133**	0.056	0.049	0.149***	0.009	0.035
High education	−0.027	0.390	−0.010	−0.052	0.182	−0.012
Risk tolerance * male	0.100*	0.077	0.037			
Self-employed parents * male	0.127**	0.043	0.047			
Perc. unfav. econ climate * male				−0.145**	0.054	−0.033
Low education * male	−0.216**	0.015	−0.079			
N	8545			8545		
LR chi^2/degrees of freedom	783.61	43		1546.19	42	
Log likelihood	−5530.907			−3509.769		
Pseudo R^2	0.066			0.181		

See the note for Table 2. Marginal effects are based on the average of all observations. Note that the interaction effect of gender with preference is not significant and hence is not included here.
* Refer to significance levels of 10%.
** Refer to significance levels of 5%.
*** Refer to significance levels of 1%.

that of the interaction effect.[33] The positive effect for women can be attributed to reverse causality. Women who are involved in self-employment may be more convinced than men that the economic climate is unfavorable – for example, because they experience more problems or are more pessimistic than men (Niederle & Vesterlund, 2007). We do not find support for $H5_{gender(MOD)}$ stating that women who perceive barriers are less likely to prefer or engage in self-employment than men. However, particularly regarding the effect of the perception of an unfavorable economic climate on actual self-employment, we find a statistically significant interaction effect.

Finally, it appears that the effect of low education on preferences differs across gender. Moving from low to medium education has no impact on men's preferences, while it lowers the preferences of women.[34] For women with a lower level of education, there may be fewer employment opportunities available, so that they will prefer self-employment over wage employment out of necessity.

[33] A Wald test shows that the sum of the coefficients of the perception of an unfavorable climate and the interaction term with gender in Table 5 (0.110–0.145) is not significantly different from zero ($p = 0.48$), indicating that for men, the effect of this variable is equal to zero.
[34] A Wald test shows that the sum of the coefficients of low education and the interaction term with gender in Table 5 (0.133–0.216) is not significantly different from zero ($p = 0.18$), indicating that for men, the effect of this variable is equal to zero.

5.4. Does gender matter beyond mediation and moderation effects?

Even when we take into account other explanatory variables (related to gender and self-employment) and including the interaction terms of these variables with gender in the analysis, there remains a significant gender effect. In Table 5, we see that, in explaining self-employment preference, the coefficient of the gender dummy (male) is significant at the 1% level. This coefficient does not, however, represent the complete gender effect because the interaction effects of gender with several variables (risk tolerance, self-employed parents and low education) are included in the model. The coefficient of the gender dummy (and its marginal effect) can only be interpreted under the condition that these three variables equal to zero. We can calculate the gender coefficient for seven different profiles.[35] We find that three profiles are associated with a significant gender effect at 1%, two profiles at 5% (risk tolerance = 0, self-employed parents = 1, low education = 1; and risk tolerance = 1, self-employed parents = 0, low education = 1), and one which is not significant at 10% (risk tolerance = 0, self-employed parents = 0, low education = 1). Altogether, this indicates that for all profiles except the last one (low education, risk-averse and without self-employed parents), there remains a gender effect over and above the effect through the moderation effects we could control for.

Focusing on actual self-employment, the coefficient of the gender dummy (male) again does not capture the whole gender effect, this time because we included the interaction term between gender and perception of an unfavorable economic climate in the model. The coefficient of the gender dummy can thus only be interpreted under the condition that this perception equals zero. We find that a gender effect persists after controlling for moderation effects.[36]

5.5. Endogenous nature of latent entrepreneurship

Preferences for entrepreneurship – as measured in the present paper – may suffer from reverse causality. In this subsection we attempt to control for this endogeneity issue with an adjusted regression including instrumental variables. That is, we estimate Eqs. (1) and (2) as a system of equations (see also footnote 25) in which the disturbance terms of both equations are allowed to be correlated. To correct for the endogenous character of latent entrepreneurship, we need variables that are correlated with latent, but uncorrelated with actual entrepreneurship. The present dataset does not provide such candidates with the exception of two variables in Table 2. That is, internal locus of control and the perception of an unfavorable economic climate have the largest p-values in the regression explaining actual self-employment (last column of Table 2) whereas they are strongly related (p-values < 0.001) to latent entrepreneurship (first column of Table 2).

When both variables are used as instrumental variables in the two-equation setting, we find that the results for latent and actual entrepreneurship remain largely unchanged. That is, coefficients that are significant at 1%, 5%, or 10% in Table 2 are still significant at these significance levels in the new situation. For example, the coefficients of the gender dummies are again significant at 1% while their coefficients increase slightly. The comparable findings between the old and the new situation are related to the fact that the correlation between both equations is estimated as 0.125. Hence, the null hypothesis of zero correlation between the disturbance terms cannot be rejected (p-value = 0.584).

However, there is an exception: the impact of latent entrepreneurship on actual entrepreneurship is somewhat overestimated in Table 2 as its coefficient reduces from 0.947 to 0.739 and it is significant at 5% instead of at 1%. Hence, once endogeneity is controlled for, the coefficient of latent entrepreneurship becomes slightly smaller, but it is still significant. However, given the unchanged significant impacts of all other variables in both equations (such as the gender dummies), we are convinced that our current findings are still valid when controlling for reverse causality. In addition, when performing this additional analysis with instrumental variables, the interaction terms in Table 5 are again found to have significant coefficients.

6. Discussion and conclusions

Motivated by relatively low self-employment preferences combined with a low self-employment prevalence rate for women, this study investigates the underlying mechanisms of this pervasive gender gap. Linking self-employment status to the preference for self-employment and using a representative data set of more than 8000 individuals across 29 countries, we examine different ways in which the gender dimension of the entrepreneurial personality influences the preference for and actual self-employment. These different ways relate to the inclusion of a cognitive stage (latent entrepreneurship), a behavioral stage (actual entrepreneurship) and the (perceived) ability to start a business in our model. Together, they offer a new way to contribute to the understanding of the origin of gender differences in entrepreneurial activity. We find a strong effect of gender on self-employment status through preferences: while the influence of preferences on actual involvement appears to be independent of gender (we find no interaction effect), women generally have a lower preference for self-employment. Next to this mediated effect through preferences, there is a significant 'direct' gender effect on actual self-employment (after controlling for preferences), indicating that, ceteris paribus, women have a lower chance of becoming self-employed than

[35] We perform Wald tests for linear combinations of the coefficient of the gender dummy (male) and the coefficients of the interaction terms. The sums of the coefficients of the gender dummy (male) and the three interaction terms for gender in Table 5 range from 0.086 (0.302–0.216) to 0.529 (0.302 + 0.100 + 0.127).

[36] A Wald test shows that the sum of the coefficients of the gender dummy and the interaction term for gender in Table 5 (0.357–0.145) is significantly different from zero (p = 0.00), indicating that there is also a gender difference when perception equals one.

men. Lastly, looking at other factors included in the analysis, we find some support for moderation effects (interaction effects with gender). Taken together, our findings suggest that the relatively low self-employment rate of women is explained by both a relative lack of willingness and the existence of gender-specific obstacles, while these obstacles are felt more in the preference than in the action stage.

The persistent and independent effect of gender (as measured by the coefficient of the gender dummy) on the preference for self-employment and particularly on actual involvement in self-employment suggests that there are other factors (than those included in the analysis) that are related to both self-employment and gender. For example, industry and entrepreneurial experience may have an important influence on the preference for and involvement in self-employment (Kolvereid, 1996a), but they are not included in this study as control variables. In addition, household and family responsibilities may play a role, where women simply feel that they lack the time to start a business. Moreover, women may feel that they lack the appropriate skills and knowledge for self-employment because they experience lower entrepreneurial self-perception (Ogbor, 2000; Verheul et al., 2005). Thus, although preferences appear to be a key driver of the low self-employment rate among women, gender-specific obstacles may still exist.

If their lower preferences keep women from starting up a business, it is important to understand where these preferences come from. We find several hints in our study. First, there is the mediating role of perceived behavioral control in the relationship between gender and entrepreneurial preferences. We see that women are less likely than men to believe that the economic climate is favorable for starting up a business and that they are more likely to believe that there are administrative complexities. Both perceptions lower women's preferences for self-employment and, subsequently, their participation rate. In addition, the relatively low risk tolerance of women makes them less willing to become self-employed. The latter finding is consistent with Minniti et al. (2005), who find that fear of failure is important in explaining the lack of interest of women in self-employment. In terms of moderating effects, we find that assuming that an individual has self-employed parents, this has a smaller impact on women's preferences than on those of men. It may be that men are more likely than women to be persuaded by parental role models when choosing a career. Alternatively, this may point at persisting traditional roles within families, where men are expected to take over the family business.

The lower perceived behavioral control (or ability) of women, which underlies their lower preferences, is *not* driven by the belief that they are unable to control their own lives (an external locus of control)[37] but rather by a certain degree of pessimism regarding the outside environment and the extent to which it offers opportunities to start a business. In particular, the effect of perceived administrative complexity seems persistent for women, not only reducing their preferences but also (directly) discouraging them from taking action. This may be explained in terms of either real barriers or the perception of such barriers. Women may experience more administrative problems than men, for example, because they have less entrepreneurial experience or because they are active in industries characterized by high levels of red tape. It may also refer to a greater awareness of administrative procedures on the part of women. In this respect, it has been suggested that women are more realistic or less optimistic than men (Niederle & Vesterlund, 2007). Nevertheless, when administrative complexity is perceived, this perception appears to have the same power to hinder women and men (i.e., there is no moderation effect). Thus, although women more often feel that there are administrative complexities than men, the hindering impact of this barrier is the same across gender.

Despite the richness of the Eurobarometer data set, some drawbacks must be mentioned. First, we are unable to test for reverse causality. Particularly for perceptions, this may play a role because perceptions can be formed on the basis of experience with self-employment. Also, because both wage-employed and self-employed individuals expressed their preferences, this variable captures both the desire to *be* self-employed, for people who already run a business, and the desire to *become* self-employed, for people who do not run a business and desire to do so. Even though it is reasonable to assume that preferences influence actual self-employment status, as modeled in Eq. (2), we should be cautious in interpreting the relationship between preferences and actual self-employment. Indeed, an additional analysis controlling for reverse causality shows that latent entrepreneurship is partially endogenous (see Section 5.5). However, we argue that our conclusions are still valid once this reverse causality is controlled for.[38] Second, our data set covers a wide range of developed countries, and the results cannot be translated immediately to developing countries, particularly because it can be expected that preferences regarding self-employment (vis-à-vis wage employment) will differ between developed and developing countries (Thurik, 2011). Third, as already stated above, industry and occupational experience, household and family responsibilities and detailed educational histories may contribute to the explanation of both preferences and actual self-employment. Other variables may relate to the different sector distribution of female entrepreneurial activities, geographical location (Santarelli & Vivarelli, 2007) or the presence of actual (instead of preferred) financial constraints (Alesina, Lotti, & Mistrulli, 2008).

Given the untapped female entrepreneurial potential, it is important for policymakers to understand from where the gender differences in the perception of the entrepreneurial environment originate. This is a well-known gap in our understanding of the entrepreneurial personality. For example, is the greater perceived administrative complexity by women due to a *real* barrier – which would imply that a solution should be found to the red tape problem that women experience – or an *awareness* barrier – suggesting that women should be better informed of existing procedures and how to cope with them. In this respect, van Stel and Stunnenberg (2006) argue that governments should not only reduce the administrative burden

[37] We find that although women tend to have a weaker internal locus of control, this does not appear to affect their involvement in self-employment.

[38] This is inspired by the fact the coefficient of latent entrepreneurship is still large and significant (at 5%) and the qualitatively unchanged results for all other variables (such as the gender dummy).

but also communicate more clearly administrative procedures to potential entrepreneurs. Furthermore, it is possible that women are simply more pessimistic about environmental conditions and their own abilities. In this respect, Mitchell et al. (2002) pose that cognitive differences between women and men may be responsible for some of the unexplained gender differences. In general, government policy that is aimed at encouraging women to become entrepreneurs should not only focus on removing barriers but also address women's preferences for and attitudes towards self-employment more directly. This may be done by providing information regarding the different type of risks involved in starting a business and how to cope with these risks or even offset some of them by acquiring relevant knowledge and skills. Also, paying attention to female role models may positively influence women's self-employment preferences.

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