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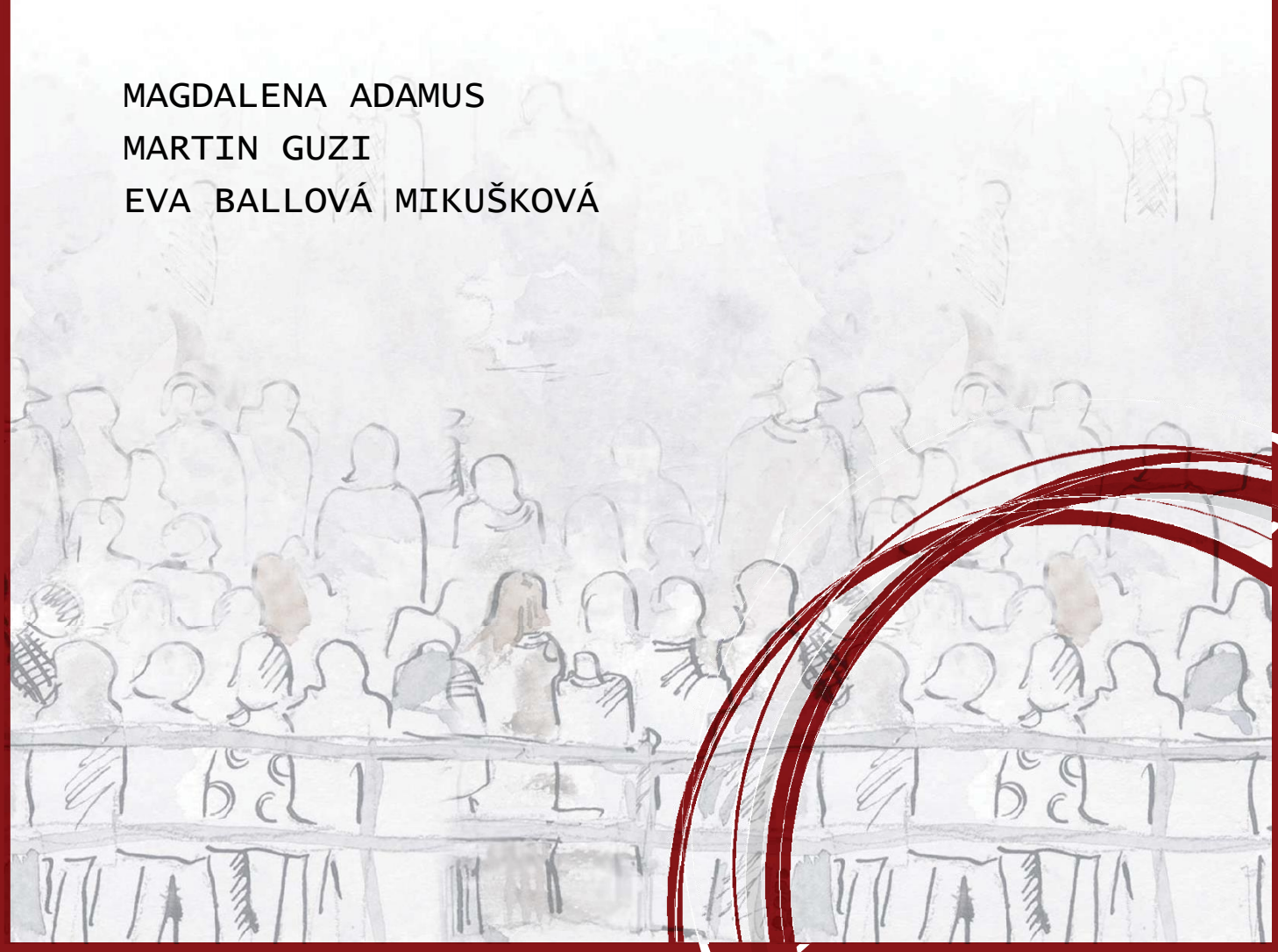

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Evaluators' masculine gender identity may drive gender biases in peer evaluation of business plans

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Abstract

The paper investigates gender biases and differential treatment of women and men in the business start-up phase. A sample of 498 entrepreneurs from Slovakia participated in an online experiment and evaluated three fictitious business plans in terms of the applicants' competence, likeability, and business ability. The start-ups were positioned in three different sectors—cosmetics production, services provision, and software development—where men's and women's chances of success may be viewed differently. Following Goldberg's paradigm, half of the evaluators received business plans presented as written by female and half by male applicants; otherwise the plans were identical. Results imply that female applicants are assessed similarly to male applicants, but more masculine evaluators assess women's business plans and their potential in entrepreneurship more critically. The study advises caution in recommending more female evaluators in the business plan assessment. If women who become involved in entrepreneurship are excessively masculine and masculinity is associated with a less favourable evaluation of potential female entrepreneurs, such policies could backfire against women, putting them in a more disadvantaged position.

Keywords: gender identity; masculinity; entrepreneurship; start-up; Goldberg paradigm; gender-role theory

JEL Classification: J16, M13, L26

Introduction[1]

Although the proportion of women in entrepreneurship worldwide is growing, compared to men, women still less often consider entrepreneurship as a potential career (GEM, 2022). Ultimately, women less often express intentions to become entrepreneurs and, in most countries, are less likely to start a business. According to the literature, one of the obstacles that could slow down women's progress in entrepreneurship is the fact that women tend to be disadvantaged from the early phases of business development (Malmström et al., 2017). Obstacles instituted by society and formal institutions, as well as cultural and economic conditions, make it more challenging for women to gather the capital necessary to start and grow their businesses (Bullough et al., 2022; Raghuvanshi et al., 2017).

Reflecting on these findings, we identify the mechanisms that could drive the differential evaluation of male and female entrepreneurs and show that evaluators' gender identity may distort the process of evaluating business plans. Following Goldberg's paradigm (Goldberg, 1968), we experimentally investigate whether the assessments of business plans differ depending on the applicant's ostensible biological sex. The method assumes that all participants are presented with identical materials for evaluation. The only difference involved is that half of them receive the materials ostensibly prepared by men and the other half by women - with all other characteristics being equal. By comparing results between the two conditions, this experimental method allows us to disentangle the sole effect of applicants' biological sex on over- or under-estimations and detect potential tacit biases against women in gender-typed domains. Consequently, at the cost of certain simplification, the method facilitates causal inferences about the role of biological sex on prejudices in

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hiring, promotion (Eagly & Karau, 2002) or, as in this study, evaluation of business plans. We thus use a set of three fictitious business plans (containing fictional personal data) in different sectors where men's and women's chances of success may be evaluated differently: cosmetics production, services provision, and software development (IT sector) (Gupta et al., 2014; Gupta & Turban, 2012; Wynn & Correll, 2017). Informed by gender-role theory (Eagly, 1987; Eagly & Karau, 2002), the study explores how the evaluators' biological sex and gender identity (operationalised as the endorsement of gender-typed characteristics stereotypically associated with masculinity and femininity) may interfere with the assessment of business plans in the start-up phase. Evaluations by peers who have similar experience may be crucial in boosting the confidence and self-efficacy of aspiring entrepreneurs (Laguía et al., 2022). Particularly for women, the presence and support of other female entrepreneurs may become key in shaping their entrepreneurial intentions (Balachandra & Dublish, 2019). However, gender biases and stereotypes within the entrepreneurial community may result in unfavourable evaluations by peers and lower support for women and their business plans, as well as fewer mentoring and networking opportunities. Consequently, the lack of support has the potential to discourage women in the very early phases of business creation and hamper their ability to raise capital and thrive in business (Owen et al., 2019; Swail & Marlow, 2018).

This study contributes to the literature by explaining that the differential evaluation of business plans written by women and men may be driven by the *evaluators'* gender identity. Importantly, our results show that, if we do not include the information about sectors, male and female applicants are evaluated similarly in terms of competence or business ability. Moreover, unlike previous studies that mostly use student samples (Bigelow et al., 2014; Snellman & Solal, 2023), our contribution also stems from the fact that evaluators in our study were recruited among entrepreneurs. Second, the fact that the study was conducted in Slovakia—a country with conservative views on gender roles and a hyper-masculine notion of

entrepreneurship (Adamus et al., 2021; Cukrowska-Torzewska & Lovasz, 2020)—points to culture-specific barriers that could slow down women's progress in entrepreneurship. In particular, the finding that female evaluators in our sample described themselves as more masculine than male evaluators lends credence to the view that hyper-masculine stereotypes about successful entrepreneurs may lead to self-selection of potential female entrepreneurs (Adamus et al., 2021). In other words, women who consider themselves congruent with the hyper-masculine stereotype of a successful entrepreneur are considerably more likely to be attracted by a career in entrepreneurship. Although in many aspects, Slovakia may seem an outlier, it is similar to other countries in Central Europe that persistently occupy lower ranks in various gender equality statistics. According to the 2024 edition, Slovakia together with Czechia scored 22nd amongst all 27 EU states in the Gender Equality Index. With an average score of 59.9, Slovakia is far behind the EU average of 71.0 (100 would indicate perfect equality in each of the measured dimensions while Sweden who holds the first place scores 82.0). What is most troubling, though, is the slow pace of progress since 2010 when the Gender Equality Index was first presented. Moreover, the progress, if any at all, has been achieved due to changes in how people manage their time. This indicates that little systematic institutional or structural changes were introduced over that time. When we take into account that the situation in other post-communist countries is analogous, our results may be seen as informative also for other conservative and currently unequal cultural environments. Finally, the study shows that caution is advised when recommending to increase the number of female evaluators of business plans at various stages of the evaluation process. If women who become involved in entrepreneurship are excessively masculine and masculinity is associated with a less favourable evaluation of potential female entrepreneurs, such policies could backfire against women, putting them in a more disadvantaged position (Snellman & Solal, 2023).

Literature review and hypotheses

Biases and stereotypes in business plan evaluation

The literature on cognitive processes unambiguously indicates that processing information is rarely free from flaws because people try to reduce the time and cognitive effort required to make informed decisions (Kahneman, 2012). For instance, a replication study by Kakinohana and Pilati (2023) compellingly showed that biases (such as overconfidence, the anchoring effect, the framing effect, the certainty effect, and the outcome bias) systematically influence choices and preferences. A systematic review of literature (Berthet, 2022; Ramos, 2019) reveals that the effects of cognitive biases are legible in multiple domains including management, investment, medicine, law, politics, economics, justice, and education. Apart from general cognitive biases that may interfere with evaluators' reasoning, implicit biases related to the sociodemographic characteristics of those who are evaluated—including biological sex and gender identity—can also influence the quality and integrity of professional judgements when strict evaluation criteria are absent (Featherston et al., 2020). Therefore, when seeking to reduce the cognitive burden, evaluators may, also inadvertently, fall prey to biases inherent in cognitive processes. Given the gendered views of entrepreneurship, it is plausible that gender biases and stereotypes may serve as shortcuts or cues facilitating the evaluation of nascent businesses. As gender role theory posits (Eagly, 1987; Eagly & Karau, 2002), society values different behaviour in men and women and thus has different expectations depending on an individual's biological sex. Consequently, occupations are often stereotypically viewed as more appropriate to one of the sexes. Based on these stereotypes, individuals may refrain from choosing a career socially viewed as unsuitable for them. The frequency of observing men and women in specific occupations may lead people to believe that biological sex predicts relevant skills and abilities (Eagly et al., 2000, 2020). This may suggest that evaluators responsible for taking employment-related

decisions may be prone to gender biases. Indeed, there is extensive evidence showing that biological sex is often implicitly used as a source of information about candidates' competence and their general suitability (Goldin & Rouse, 2000; Kubler et al., 2018). Although there is less evidence to indicate that these biases distort the hiring process in general (Birkelund et al., 2022; Carlsson & Eriksson, 2019), they become legible in gender-typed occupations (Ahmed et al., 2021; Neumark, 2018; Riach & Rich, 2002), including evaluations of scholarly papers where compared to otherwise similar articles female-authored papers are assessed below their citation-generating potential (Card et al., 2020). Extant literature shows that entrepreneurship, too, is viewed as a gender-typed, male-dominated career, wherein men are able to excel due to their greater agency, leadership and lower risk aversion (Adamus et al., 2021; Bird & Brush, 2002; Gupta et al., 2009; Malmström et al., 2017). Conversely, women are seen as lacking skills essential for becoming successful entrepreneurs (Balachandra & Dublish, 2019; Gupta et al., 2018; Swail & Marlow, 2018). Once they own a company, they are believed to be less growth-oriented (Brush, 2019). Thus, it is likely that the biological sex of entrepreneurs could serve as a signal of their ability and motivation and, consequently, bias the evaluation of their nascent businesses (Goldin & Rouse, 2000; Neumark, 2018).

Specific stereotypes and biases about women's lower ability to pursue a career in entrepreneurship may then translate into less favourable evaluations of women intending to start their own business and the notion that they are less promising entrepreneurs. Consequently, from the early phase of the business conceptualisation and creation, women may feel disadvantaged when aspiring to become an entrepreneur, e.g., by a lack of support and mentoring and, ultimately, disproportionately low investments in women-led companies (Balachandra, 2020; Balachandra et al., 2021; Bigelow et al., 2014; Edelman et al., 2018; Snellman & Solal, 2023). For instance, in the US, about 40 percent of new firms are

established by women, but only 3 to 5 percent of venture and angel capital is invested in businesses with women's involvement (Balachandra, 2020; Edelman et al., 2018). By contrast, older and larger companies with women on board and those that have already managed to acquire investments from other sources increase their chances of being funded (Brush et al., 2018; Lauto et al., 2022). Furthermore, women's presentations of business plans have been assessed as less persuasive, logical and merit-based compared to men's, even if the content of the presentations was identical (Brooks et al., 2014; Edelman et al., 2018). This corroborates the view that there is considerable uncertainty about women's ability to lead a business successfully and to use resources effectively. When the information about women's capabilities is imperfect and/or insufficient, biases and stereotypes may influence the evaluations more easily. Once a company survives critical developmental phases, evaluators and investors gain more confidence in the women's entrepreneurial competences. We expected that business plans ostensibly written by women will receive lower investment proposals and that this effect will be mediated by less favourable assessments of skills critical in surviving in business. Therefore, to test for biases in the evaluation of men and women in the business start-up phase, we pose the following hypothesis:

Hypothesis 1: Assessment of competence and business ability mediate the relationship between an applicant's biological sex and start-up investment amount.

Gendered notions of business sectors

Apart from direct effects, gender stereotypes may interfere with the evaluation of a business plan through a sector in which a start-up is planned. Literature abounds in evidence that the evaluations may differ depending on the sector of the business. In particular, the technological and hardware sectors seem to be viewed as male domains with a minor

proportion of female entrepreneurs (Brush et al., 2018). Despite being presented as a sector that levels the playing field and provides opportunities for all, in the digital sector women's involvement in a start-up reduces the probability of obtaining investment capital (Dy et al., 2017; Schillo & Ebrahimi, 2022). Gender role theory explains that the digital sector is associated with mathematical and science skills, and thus women may be seen as less competent in the field. Concurrently, Brush et al. (2018) found that in software development, women receive disproportionally little funding compared to men, showing that there may be tacit biases against women in this sector. Recent studies also show that women receive less funding when establishing their start-ups in male-dominated compared to female-dominated sectors (Kanze et al., 2020; Tonoyan & Strohmeyer, 2021). In addition, female-dominated sectors are often seen as lacking growth potential, and the value of such markets remains underestimated (Ahl, 2006; Bird & Brush, 2002; Bruni et al., 2004). Balachandra (2020) observed that investors show preference for start-ups in sectors they personally understand or have first-hand experience with. Consequently, companies responding to women's needs (cosmetics, menstrual products or underwear) and positioned in female-focused markets are often perceived (particularly by male investors) as unworthy of investment. Therefore, we formulate the following hypothesis:

Hypothesis 2: The sector of business moderates the role of biological sex on evaluations of competence (2a) and business ability (2b), and the amount of start-up investment (2c).

The role of evaluators' biological sex and gender identity in the evaluation process

With regard to why and when gender stereotypes may lead evaluators to favour men, the literature shows that over 90 percent of venture capitalists are men and 90 percent of US venture capital firms employ no women at all (Balachandra, 2020; Jetter & Stockley, 2021). If

the gendered character of interactions between evaluators and entrepreneurs matters, it will not come as a surprise that men are evaluated more favourably and raise more capital than women (Balachandra, 2020). This disparity is often explained via the gender homophily hypothesis, claiming that people give precedence to contacts with individuals whom they perceive as similar, and the similarity may be signalled by obvious and easily observable characteristics such as biological sex (Brush et al., 2018; Ertug et al., 2022; Ewens & Townsend, 2020). Indeed, recent studies provide evidence that, compared to male evaluators, female evaluators are more likely to assort with, show more interest in, and invest in female-led start-ups (Ewens & Townsend, 2020; Jetter & Stockley, 2021; Oranburg & Geiger, 2019). As a consequence, it is believed that increasing the number of female evaluators would have a positive impact on the fate of women-funded start-ups (Balachandra & Dublish, 2019; Geiger, 2020; Raina, 2016). Thus, we expect that the following hypothesis holds:

Hypothesis 3a: In their assessment of competence, likeability and business ability as well as start-up survival chances and the investment amount, evaluators favour same-sex applicants and their business plans.

Alternatively, the strong association of entrepreneurship and entrepreneurial skills with manliness may trump the effects of homophily by inducing the notion of the *lack of fit* between being a woman and being an entrepreneur (Ahl, 2006; Lee & Huang, 2018; Marlow, 2020; Tonoyan & Strohmeyer, 2021). Because of prevalent gender stereotypes about entrepreneurship and successful entrepreneurs, we may find support for an alternative hypothesis:

Hypothesis 3b: In their assessment of competence, likeability and business ability as well as start-up survival chances and the investment amount and the choice of the most promising applicant, evaluators favour male applicants and their business plans.

Finally, gender stereotypes, including occupational stereotypes, become apparent early in childhood and are internalised and reinforced in a feedback loop throughout life (Eagly, 1987; Hentschel et al., 2019). Conforming to socially-constructed gender stereotypes may shape evaluations of other people. For instance, Balachandra et al. (2019) found that entrepreneurs are punished for showing femininity but rewarded for behaving in a masculine way. In the absence of other cues, evaluators who endorse gender identity congruent with masculinity (and entrepreneurship) may view applicants' biological sex as a signal of business plan quality and the business's potential to thrive. Indeed, Kray et al. (2017) found that an individual's attribution of stereotypically masculine traits strengthens the effect of gender identity on the evaluation processes. Consequently, we expect that:

Hypothesis 4: Endorsement of stereotypically masculine characteristics are negatively associated with the assessment of female applicants and their business plans.

Measurement, data, and methods

Design of the experiment

The data were collected between 10th and 17th of December 2021. Participants were recruited by an external agency in Slovakia (chosen in an ESOMAR-compliant tender). Participants were selected based on their experience in entrepreneurship and we imposed no other requirements on their characteristics. A total of 498 entrepreneurs participated in the online survey hosted on Qualtrics. In line with the guidelines issued by the Research Ethics

Committee of Masaryk University in Brno, the study protocol was waived from the obligation to obtain formal ethical approval. The study was conducted in accordance with ethical guidelines and regulations specified by the Declaration of Helsinki and the American Psychological Association code of conduct. Informed consent for the participation in the study and publication of results as well as anonymised raw data was obtained from all participants. Participants were not deceived at any point and were informed that the data will remain confidential and that they can leave the survey at any moment. All measures and instructions were presented in Slovak. The study was part of a larger survey and some of the data were used in a diploma thesis of the first author's student.

Table 1 Comparison of Female and Male Evaluators

Variables	All	Female evaluators	Male evaluators	Comparative analysis
			N (%)	
N	498 (100%)	296 (59.4%)	202 (40.6%)	
Firm size 1-9	0.92 (0.28)	0.92 (0.27)	0.91 (0.29)	*χ2 = 0.42; p = 0.52*
Firm size 10+	0.08 (0.28)	0.08 (0.27)	0.09 (0.29)	*χ2 = 0.42; p = 0.52*
Sector manufacturing	0.14 (0.35)	0.08 (0.27)	0.24 (0.43)	*χ2 = 25.12; p < .01*
Sector IT	0.07 (0.25)	0.05 (0.21)	0.09 (0.29)	*χ2 = 4.24; p = 0.04*
Sector services	0.79 (0.41)	0.88 (0.33)	0.67 (0.47)	*χ2 = 31.04; p < .01*
			M(SD)	
Age	44.67 (11.27)	45.11 (11.18)	44.03 (11.37)	$t = 1.05$; $p = .30$; $d = 0.10$
Masculinity index	4.50 (0.76)	4.63 (0.71)	4.31 (0.80)	$t = 4.64$; $p < .01$; $d = 0.42$
Femininity index	4.01 (0.73)	4.07 (0.70)	3.93 (0.75)	$t = 2.17$; $p = .03$; $d = 0.20$

Note. N – frequency, M – mean, SD – standard deviation in brackets, χ^2 – chi-square value, t – t-test value, p – significance, d – effect size measured by Cohen's d

Demographic characteristics of participants, including age and biological sex, were provided by the agency (Table 1). The age of participants varies between 21 and 69 years (M = 44.7; SD = 11.3), and 59% of participants are women, which is higher than the proportion of women in entrepreneurship in Slovakia. More than 90% of participants are sole

entrepreneurs or lead establishments with less than 10 employees and their core business activities are in services (79%), manufacturing (14%), and the IT sector (7%). Female and male evaluators do not differ statistically by age, or firm size. However, there are notable differences related to their sector of economic activity. To account for these differences, we control for evaluators' characteristics in all models.

Characteristics of participants: gender identity and biological sex

To capture *gender identity*, we used short versions of the Bem Sex-Role Inventory (BSRI) (Bem, 1974). No licence was required to use the instrument. Participants had to assess themselves on the attribution of 12 traits indicative of gender identity (operationalised as masculine and feminine traits) using a 6-point scale (1=never; 6=always). For each evaluator, we calculate the mean scores for masculinity ($M = 4.50$; $SD = 0.76$) and femininity ($M = 4.01$; $SD = 0.73$); a higher score indicates stronger masculinity and/or femininity.

In the experiment, participants were put in the position of evaluators in a start-up competition. We asked participants to assess the following three fictitious business plans that differed by the sector in which the new business would be established: i) the production of natural cosmetics; ii) a travel agency offering accommodation (partially) in exchange for help on farms; and iii) development of a mobile application recommending places worth visiting and services in the vicinity. All business plans had a concise layout showing applicants' personal details (name, birthdate, field of study and degree major, contact details and previous work experience) and business details (company name, form of operation, target group, main competitors, planned marketing activities, and required investment capital). We have created fictional profiles of six applicants presented as authors of the business plans. They were presented as having tertiary education, 24 years old, with one year of working experience during university studies, and two years of work experience after graduation in the sector

corresponding to the business plan. We prepared two identical versions of the business plans—one set with men's names and another set with women's names—containing fictional personal data (name, date of birth, e-mail address, telephone number) invented by the study authors. Participants were randomly assigned to assess either the men's or the women's set of business plans. The applicants' biological sex could be derived by the name written in the plan and by the picture of a female or male avatar (see Supplementary Information and materials https://osf.io/wr7bf/?view_only=ac94491748e54888892b422622fcf748). The survey contained two attention check items, and all participants passed them. There were no missing responses, and we used all collected data in the analysis.

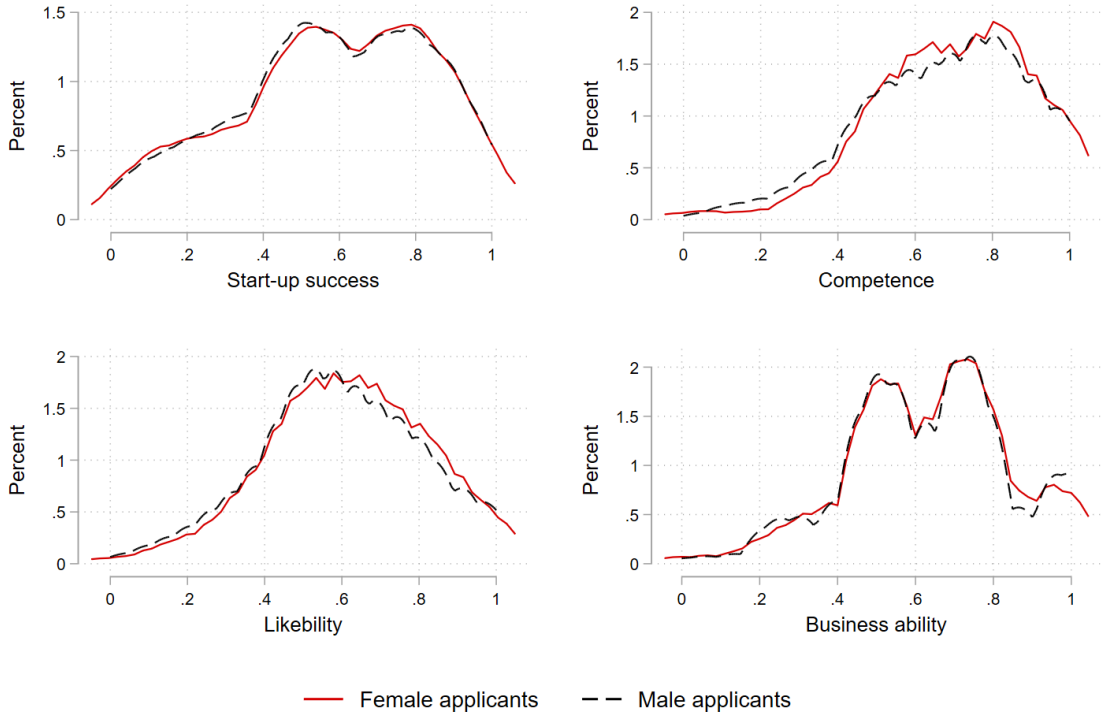
Measurement

Evaluation of business plans

For each business plan, participants first assessed an applicant's *competence* (3 items; e.g., Considering the planned business, the applicant has relevant skills and abilities), *likeability* (3 items; e.g., To what extent did you like the applicant, was he likable?) on a 7-point scale (1 = not at all; 7 = very, totally) and the *business ability* (4 items; e.g., To what extent do you agree that the applicant knows how to successfully identify new business opportunities) on a 5-point scale (1 = not at all; 5 = very, totally). Items were adapted from Moss-Racusin et al. (2012) and Adamus and Ballová Mikušková (2024). Distribution of evaluation scores by applicant gender are shown in Figure 1. Next, participants assessed the quality of the start-up plan by deciding the *investment amount* (EUR amounts are transformed to logarithmic scale) they would be willing to invest and the probability of *start-up survival* (on a scale from 1 to 100). We rescaled all of the evaluation scores on a common 0-1 scale. After participants assessed three business plans, they selected one applicant who they believe is the most promising in becoming a successful entrepreneur. For each applicant we have

calculated the chance that they would be selected as the most promising (complete materials can be found at: https://osf.io/wr7bf/?view_only=ac94491748e54888892b422622fcf748).

Figure 1 Distribution of evaluations by applicant gender



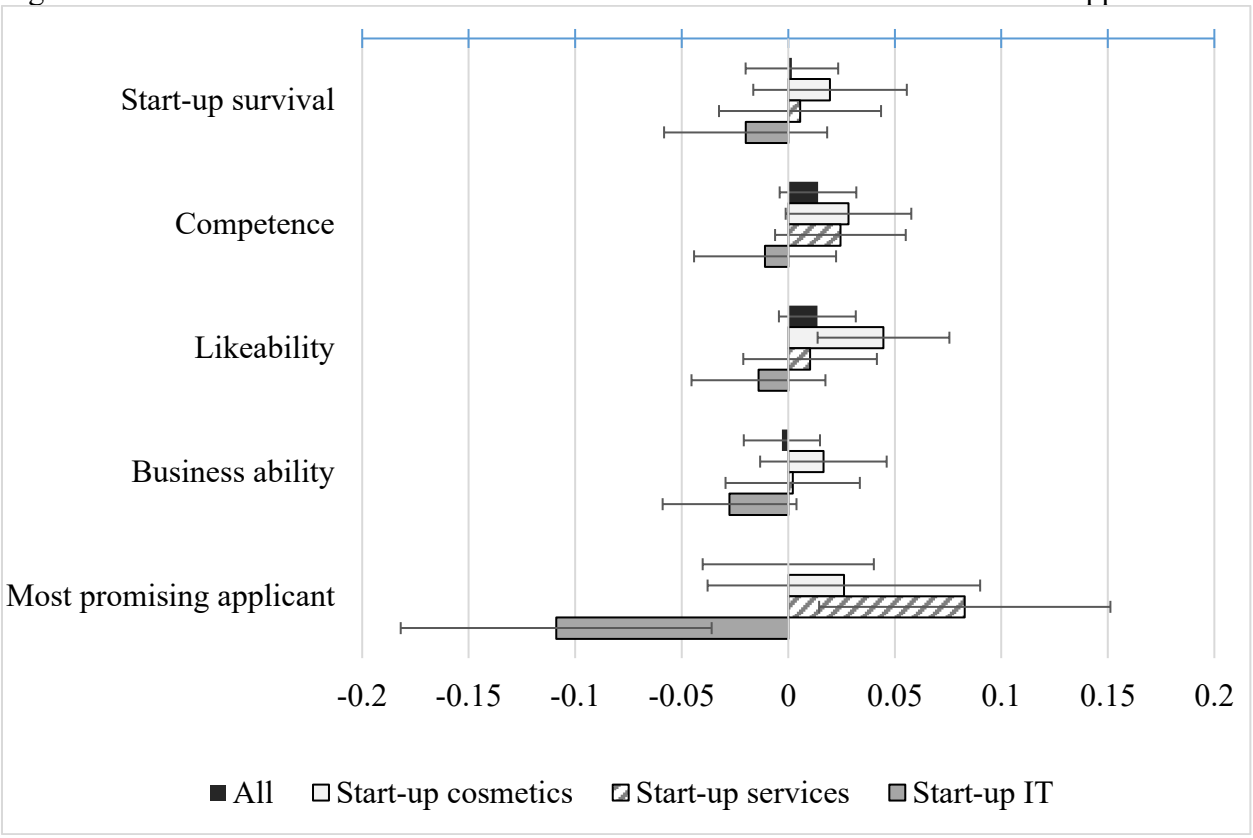
Note: Kernel density estimate of evaluation scores plotted separately for female applicants (solid line) and male applicants (dashed line).

Results

Descriptive analysis

Descriptive statistics and differences in the three variables—competence, business ability, and start-up investment—between males' and females' business plans are shown in Table 2 and Figure 2. On average, women and men receive similar assessments across measured variables. The investment amounts do not differ by the gender of the applicants as posited by Hypothesis 1 (*Assessment of competence and business ability mediate the relationship between an applicant's biological sex and start-up investment amount*) and therefore - given the absence of a total effect - we do not proceed with the mediation analysis. Differences emerge only when we take into account business sectors in which the business is to be established and thus, for other hypotheses, the mediation analysis could be meaningfully applied. For example, female applicants are viewed as more competent in the cosmetics sector (especially by female evaluators), while male applicants receive nominally more positive evaluations for business ability in the IT sector (this difference is not statistically significant at conventional levels, with a *p*-value of .15). No significant differences are observed for the start-up investment variable in any sector. Each evaluator selected one applicant as the most promising applicant so the average chances are 33%. Chances are similar for female and male applicants in the cosmetic sector. Women are 30% more likely to be selected as the most promising applicants in the service sector while chances of men applicants are 22% higher in the IT sector. In line with our Hypothesis 2 (*The sector of business moderates the role of biological sex on evaluations of competence (H2a) and business ability (H2b), and the amount of start-up investment (H2c)*), the results provide some evidence that gender biases in the evaluations become visible once sectors are taken into account.

Figure 2 Differences in Assessments of Business Plans Between Female and Male Applicants



Note. The values shown represent the difference between the average evaluation scores of female and male applicants, calculated on a standardized 0–1 scale. Positive values mean that, on average, female applicants received more favourable assessments than male applicants. The error bars indicate 90% confidence intervals.

Table 2 Assessment of start-up plans

	All evaluators			Female evaluators			Male evaluators		
Variables	Male applicants M(SD)	Female applicants M(SD)	p-value	Male applicants M(SD)	Female applicants M(SD)	p-value	Male applicants M(SD)	Female applicants M(SD)	p-value
Start-up all									
N	750 (50.2%)	744 (49.8%)		459 (51.7%)	429 (48.3%)		291 (48%)	315 (52%)	
Start-up survival	0.58 (0.25)	0.58 (0.26)	0.90	0.62 (0.24)	0.62 (0.24)	0.64	0.53 (0.26)	0.53 (0.26)	0.97
Invested amount	6.52 (3.53)	6.71 (3.49)	0.30	6.72 (3.40)	6.87 (3.33)	0.50	6.22 (3.72)	6.49 (3.69)	0.36
Competence	0.68 (0.22)	0.70 (0.21)	0.20	0.71 (0.21)	0.73 (0.20)	0.31	0.64 (0.22)	0.66 (0.20)	0.24
Likebility	0.60 (0.22)	0.61 (0.21)	0.21	0.63 (0.21)	0.64 (0.21)	0.54	0.55 (0.22)	0.58 (0.20)	0.11
Business ability	0.64 (0.21)	0.64 (0.21)	0.78	0.66 (0.21)	0.67 (0.21)	0.85	0.60 (0.20)	0.60 (0.20)	0.74
Most promising applicant	0.33 (0.47)	0.33 (0.47)	1.00	0.33 (0.47)	0.33 (0.47)	1.00	0.33 (0.47)	0.33 (0.47)	1.00
Start-up cosmetics									
N	250	248		153	143		97	105	
Start-up survival	0.54 (0.24)	0.56 (0.25)	0.37	0.58 (0.23)	0.59 (0.23)	0.71	0.48 (0.23)	0.53 (0.27)	0.26
Invested amount	6.41 (3.42)	6.55 (3.49)	0.64	6.63 (3.31)	6.68 (3.29)	0.90	6.06 (3.57)	6.38 (3.75)	0.54
Competence	0.67 (0.21)	0.70 (0.19)	0.11	0.70 (0.21)	0.74 (0.19)	0.09	0.63 (0.20)	0.65 (0.19)	0.50
Likebility	0.57 (0.21)	0.62 (0.21)	0.02	0.61 (0.21)	0.65 (0.21)	0.08	0.52 (0.20)	0.57 (0.21)	0.06
Business ability	0.61 (0.20)	0.62 (0.21)	0.36	0.63 (0.20)	0.65 (0.20)	0.55	0.57 (0.19)	0.59 (0.21)	0.37
Most promising applicant	0.24 (0.43)	0.26 (0.44)	0.50	0.25 (0.43)	0.22 (0.42)	0.62	0.22 (0.41)	0.31 (0.47)	0.12
Start-up services									
N	250	248		153	143		97	105	
Start-up survival	0.57 (0.25)	0.58 (0.26)	0.81	0.61 (0.24)	0.63 (0.26)	0.67	0.51 (0.27)	0.52 (0.26)	0.89
Invested amount	6.48 (3.57)	6.71 (3.54)	0.47	6.68 (3.46)	6.84 (3.45)	0.69	6.16 (3.73)	6.54 (3.68)	0.47
Competence	0.67 (0.21)	0.70 (0.21)	0.19	0.71 (0.20)	0.73 (0.21)	0.46	0.62 (0.21)	0.66 (0.20)	0.15
Likebility	0.60 (0.22)	0.61 (0.21)	0.59	0.64 (0.21)	0.64 (0.22)	0.91	0.55 (0.22)	0.57 (0.19)	0.32
Business ability	0.63 (0.21)	0.63 (0.21)	0.91	0.66 (0.21)	0.68 (0.22)	0.51	0.59 (0.22)	0.58 (0.19)	0.68

Most promising applicant	0.27 (0.45)	0.35 (0.48)	0.05	0.27 (0.44)	0.37 (0.48)	0.06	0.28 (0.45)	0.33 (0.47)	0.40
Start-up IT									
N	250	248		153	143		97	105	
Start-up survival	0.63 (0.26)	0.61 (0.26)	0.39	0.66 (0.25)	0.66 (0.24)	0.97	0.60 (0.28)	0.55 (0.26)	0.25
Invested amount	6.68 (3.62)	6.87 (3.44)	0.55	6.83 (3.45)	7.09 (3.25)	0.52	6.42 (3.88)	6.56 (3.69)	0.80
Competence	0.70 (0.24)	0.69 (0.21)	0.59	0.73 (0.23)	0.72 (0.21)	0.57	0.66 (0.24)	0.66 (0.22)	0.99
Likebility	0.63 (0.22)	0.61 (0.21)	0.46	0.65 (0.21)	0.63 (0.21)	0.42	0.59 (0.23)	0.59 (0.21)	0.96
Business ability	0.68 (0.22)	0.65 (0.21)	0.15	0.70 (0.23)	0.68 (0.20)	0.37	0.64 (0.20)	0.61 (0.21)	0.30
Most promising applicant	0.49 (0.50)	0.38 (0.49)	0.01	0.48 (0.50)	0.41 (0.49)	0.18	0.51 (0.50)	0.35 (0.48)	0.03

Note. Scores are on a standardized 0–1 scale. Investment amounts (in EUR) are transformed to logarithmic scale. N – frequency, M – mean, SD – standard deviation, p – significance

Multivariate analyses

We turn to multivariate analyses to test our hypotheses, using the evaluation scores of business plans as dependent variables. We estimate a model of the following form:

$$Y_{ij} = \beta_1 + \beta_2 f(A_j, E_i) + \beta_3 X_i + \delta_j + \varepsilon_{ij} \qquad (1)$$

where Y_{ij} is the evaluation score of project j given by the evaluator i. For each hypothesis we estimate model with different set of interaction terms between the biological gender of applicant and the biological gender of an evaluator (represented by $f(A_j, E_i)$). Vector X_i includes controls for other characteristics of the evaluator in such as age, size of company and the sector of their activity. The δ_j indicates the sector of the start-up project and ij is the random error.

First, we test for the presence of stereotypes in the assessment of business plans written by women in different sectors. To this end, we add an interaction term between the gender of the applicant and business sector in Equation (1). The results are presented in Table 3. The negative and significant coefficients on the interaction terms imply that female applicants submitting a start-up plan in the IT sector are assessed as less likeable, less competent, and as having lower business ability compared to female applicants in the cosmetics sector. In the lower part of Table 3, we additionally test for statistical differences in estimates between female and male applicants within each sector. The results suggest that, in cosmetics, women are rated as more likeable than men. Male applicants in the IT sector are assessed more positively than their female counterparts with respect to start-up survival, likeability, and business ability. Overall, our findings support the existence of gender bias in the evaluation of start-up plans, as posited by Hypotheses 2a and 2b. The differences in the invested amount are not statistically significant. Therefore, we find no support for Hypothesis 2c.

Table 3 Assessment of Start-up Plans Across Sectors

Variables	Start-up survival	Invested amount	Competence	Likeability	Business ability
Start-up cosmetics	ref.	ref.	ref.	ref.	ref.
Start-up services	0.03*	0.07	0	0.03**	0.03*
	(0.02)	(0.18)	(0.01)	(0.01)	(0.01)
Start-up IT	0.09***	0.27	0.03**	0.06***	0.07***
	(0.02)	(0.20)	(0.02)	(0.02)	(0.01)
Female applicant	0.02	0.13	0.03	0.04**	0.02
	(0.02)	(0.31)	(0.02)	(0.02)	(0.02)
Start-up services x Female applicant	-0.01	0.09	0	-0.03*	-0.01
	(0.02)	(0.26)	(0.02)	(0.02)	(0.02)
Start-up IT x Female applicant	-0.04	0.05	-0.04*	-0.06***	-0.04**
	(0.03)	(0.27)	(0.02)	(0.02)	(0.02)
Evaluator's characteristics					
Age	0.08	0.27	0.08	0.09	0.18***
	(0.08)	(1.26)	(0.07)	(0.07)	(0.06)
Firm size 10+	-0.04	-0.51	-0.02	0	-0.03
	(0.03)	(0.54)	(0.03)	(0.03)	(0.02)
Sector services	ref.	ref.	ref.	ref.	ref.
Sector manufacturing	-0.02	-0.5	-0.02	-0.04**	-0.02
	(0.02)	(0.41)	(0.02)	(0.02)	(0.02)
Sector IT	-0.05	-0.7	-0.03	-0.02	-0.04
	(0.04)	(0.59)	(0.03)	(0.03)	(0.03)
Constant	0.52***	6.46***	0.64***	0.54***	0.54***
	(0.04)	(0.62)	(0.04)	(0.03)	(0.03)
N	1494	1494	1494	1494	1494
R^2	0.02	0.01	0.01	0.02	0.03
Calculated differences in evaluation scores between female and male applicants by sector:					
Start-up cosmetics	0.02	0.13	0.03	0.04**	0.02
	(0.02)	(0.31)	(0.02)	(0.02)	(0.02)
Start-up services	-0.03	0.15	0.02	-0.02	-0.02
	(0.03)	(0.41)	(0.02)	(0.03)	(0.03)
Start-up IT	-0.11***	-0.09	-0.04	-0.07**	-0.1***
	(0.04)	(0.43)	(0.03)	(0.03)	(0.03)

Note. Significance levels: *** 0.01, ** 0.05, * 0.1. The table shows OLS estimates. Heteroscedasticity-robust standard errors clustered by evaluators are in parentheses. The sample includes 1,494 evaluations of business plans from 498 evaluators.

To test Hypothesis 3a (*In their assessment of competence, likeability and business ability as well as start-up survival chances and the investment amount, evaluators favour same-sex applicants and their business plans*), we include interaction terms capturing the

combinations of the evaluator's and applicant's biological sex in Equation (1). The estimates in Table 4 indicate that male evaluators give lower evaluations on average than female evaluators (i.e., the interaction terms involving female evaluators are positive and significant). However, no significant differences are found when comparing male evaluators' assessments of female versus male applicants, or when comparing female evaluators' assessments of male versus female applicants (see the bottom section of Table 4 for statistical tests). Therefore, we find no evidence of favouritism towards same-sex applicants.

Next, we test Hypothesis 3b (*In their assessment of competence, likeability and business ability as well as start-up survival chances and the investment amount and the choice of the most promising applicant, evaluators favour male applicants and their business plans*), that is the effect of the evaluator's biological sex on the assessment of female applicants by including an interaction term between the evaluator's and the applicant's biological sex. The interaction term in Table 5 is not statistically significant. Thus, we find no support for Hypothesis 3b. The results remain unchanged when we estimate the models separately for each sector.

We continue by investigating whether gender stereotypes influence the selection of the applicant perceived to have the greatest chance of succeeding in entrepreneurship. Variation in the biological sex of evaluators and applicants allows us to examine whether men's and women's chances of success are perceived differently across sectors. The dependent variable is a binary indicator equal to 1 if the applicant was selected ($M = 0.33$; $SD = 0.47$). We include a set of interaction terms capturing the evaluator's biological sex, the sector, and the applicant's biological sex.

Table 4 Assessment of Start-up Plans and the Same-sex Favouritism

Variables	Start-up survival	Invested amount	Competence	Likeability	Business ability
Start-up cosmetics	ref.	ref.	ref.	ref.	ref.
Start-up services	0.02**	0.11	0	0.02	0.02*
	(0.01)	(0.13)	(0.01)	(0.01)	(0.01)
Start-up IT	0.07***	0.29**	0.01	0.03**	0.05***
	(0.01)	(0.14)	(0.01)	(0.01)	(0.01)
Male evaluator x Female applicant	ref.	ref.	ref.	ref.	ref.
Female evaluator x Male applicant	0.08***	0.13	0.05**	0.05**	0.06***
	(0.03)	(0.41)	(0.02)	(0.02)	(0.02)
Male evaluator x Male applicant	0	-0.26	-0.02	-0.03	0
	(0.03)	(0.43)	(0.02)	(0.02)	(0.02)
Female evaluator x Female applicant	0.09***	0.28	0.07***	0.06***	0.06***
	(0.03)	(0.41)	(0.02)	(0.02)	(0.02)
Evaluator's characteristics					
Age	0.08	0.29	0.09	0.1	0.18***
	(0.07)	(1.26)	(0.07)	(0.07)	(0.06)
Firm size 10+	-0.04	-0.51	-0.02	0	-0.03
	(0.03)	(0.54)	(0.03)	(0.02)	(0.02)
Sector services	ref.	ref.	ref.	ref.	ref.
Sector manufacturing	0.01	-0.39	0	-0.02	0
	(0.03)	(0.42)	(0.02)	(0.02)	(0.02)
Sector IT	-0.02	-0.62	-0.01	0	-0.03
	(0.03)	(0.58)	(0.03)	(0.03)	(0.03)
Constant	0.47***	6.42***	0.62***	0.53***	0.50***
	(0.04)	(0.65)	(0.04)	(0.03)	(0.03)
N	1494	1494	1494	1494	1494
R^2	0.05	0.01	0.03	0.04	0.05
Calculated differences in evaluation scores by applicant gender for female and male evaluators:					
Female evaluators	-0.01	-0.15	-0.01	-0.01	0
	(0.02)	(0.35)	(0.02)	(0.02)	(0.02)
Male evaluators	0	-0.26	-0.02	-0.03	0
	(0.03)	(0.43)	(0.02)	(0.02)	(0.02)

Note. Significance levels: *** 0.01, ** 0.05, * 0.1. The table shows OLS estimates. Heteroscedasticity-robust standard errors clustered by evaluators are in parentheses. The sample includes 1,494 evaluations of business plans from 498 evaluators.

Table 6 presents odds ratios from a logit model and marginal effects from an OLS regression. We find that applicants in the IT sector are, on average, selected 2.8 times more often than applicants in the cosmetics sector (the reference category). Most notably, the behaviour of male evaluators in selecting the most promising female applicant is captured by two triple interaction terms. The odds ratio of 0.38 indicates that a female applicant in the IT

sector is 2.6 times less likely to be selected as the most promising candidate when start-up is submitted by a female applicant and evaluated by a man. This finding supports the presence of stereotypical thinking among male evaluators regarding the potential success of women across different fields. These results are confirmed by the OLS estimates, although the coefficient of interest for the triple interaction term is only marginally significant, with a *p*-value of 0.101.

Table 5 Assessment of Start-up Plans and Their Interactions with Evaluators' Biological Sex

Variables	Start-up survival	Invested amount	Competence	Likeability	Business ability
Start-up cosmetics	ref.	ref.	ref.	ref.	ref.
Start-up services	0.02**	0.11	0	0.02	0.02*
	(0.01)	(0.13)	(0.01)	(0.01)	(0.01)
Start-up IT	0.07***	0.29**	0.01	0.03**	0.05***
	(0.01)	(0.14)	(0.01)	(0.01)	(0.01)
Male evaluator	-0.08***	-0.39	-0.07***	-0.08***	-0.06***
	(0.02)	(0.39)	(0.02)	(0.02)	(0.02)
Female applicant	0.01	0.15	0.01	0.01	0
	(0.02)	(0.35)	(0.02)	(0.02)	(0.02)
Male evaluator x Female applicant	-0.01	0.11	0.01	0.02	-0.01
	(0.03)	(0.56)	(0.03)	(0.03)	(0.03)
Evaluator's characteristics					
Age	0.08	0.29	0.09	0.1	0.18***
	(0.07)	(1.26)	(0.07)	(0.07)	(0.06)
Firmsize 10+	-0.04	-0.51	-0.02	0	-0.03
	(0.03)	(0.54)	(0.03)	(0.02)	(0.02)
Sector services	ref.	ref.	ref.	ref.	ref.
Sector manufacturing	0.01	-0.39	0	-0.02	0
	(0.03)	(0.42)	(0.02)	(0.02)	(0.02)
Sector IT	-0.02	-0.62	-0.01	0	-0.03
	(0.03)	(0.58)	(0.03)	(0.03)	(0.03)
Constant	0.55***	6.55***	0.67***	0.58***	0.56***
	(0.04)	(0.63)	(0.04)	(0.03)	(0.03)
N	1494	1494	1494	1494	1494
R^2	0.05	0.01	0.03	0.04	0.05

Note: Significance levels: *** 0.01, ** 0.05, * 0.1. The table shows OLS estimates. Heteroscedasticity-robust standard errors clustered by evaluators are in parentheses. The sample includes 1,494 evaluations of business plans from 498 evaluators.

Table 6 The incidence of selecting the most promising applicant (logit and OLS model)

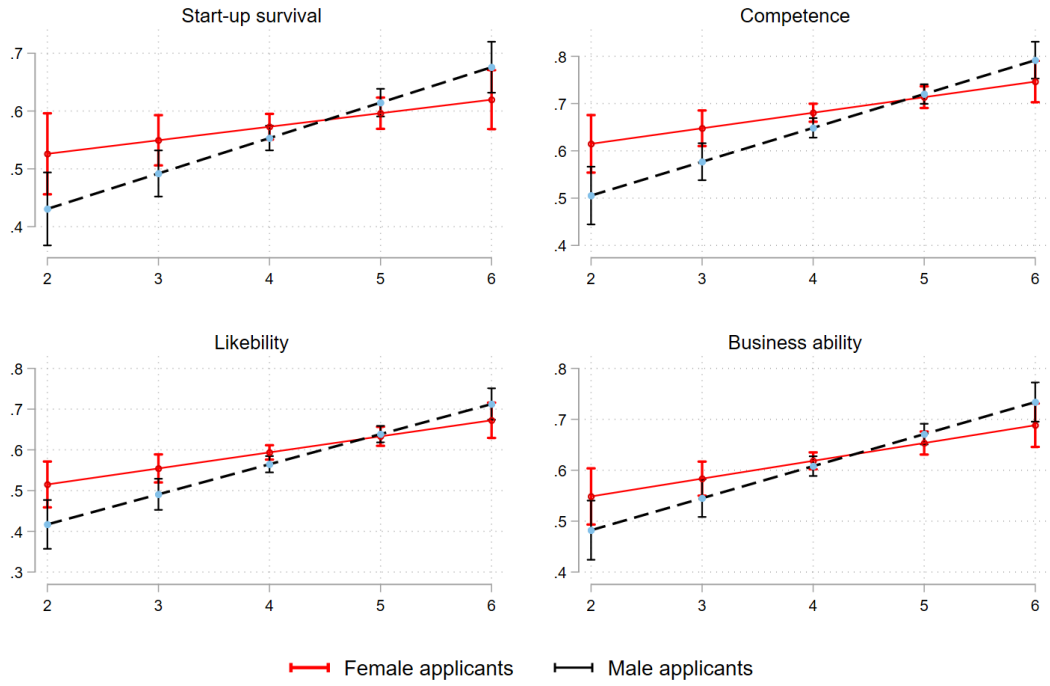
Variables	LOGIT	OLS
Start-up cosmetics	ref.	ref.
Start-up services	1.11	0.02
	(0.29)	(0.05)
Start-up IT	2.83***	0.24***
	(0.70)	(0.05)
Male evaluator	0.84	-0.03
	(0.26)	(0.05)
Start-up cosmetics x Male evaluator	ref.	ref.
Start-up services x Male evaluator	1.26	0.04
	(0.54)	(0.08)
Start-up IT x Male evaluator	1.3	0.05
	(0.53)	(0.09)
Female applicant	0.87	-0.02
	(0.24)	(0.05)
Start-up cosmetics x Female applicant	ref.	ref.
Start-up services x Female applicant	1.84	0.13*
	(0.69)	(0.07)
Start-up IT x Female applicant	0.83	-0.05
	(0.30)	(0.08)
Male evaluator x Female applicant	1.9	0.12
	(0.81)	(0.08)
Start-up cosmetics x Male evaluator x Female applicant	ref.	ref.
Start-up services x Female applicant x Male evaluator	0.42	-0.17
	(0.25)	(0.12)
Start-up IT x Female applicant x Male evaluator	0.38*	-0.2
	(0.22)	(0.12)
Constant	0.33***	0.25***
	(0.06)	(0.04)
N	1494	1494
Pseudo R^2, R^2	0.03	0.04

Note. Dependent variable equals 1 if the applicant was selected (M=0.33). The odds ratios are presented for the logit model and marginal effects for the OLS regression. Significance levels: *** 0.01, ** 0.05, * 0.1.

Finally, in Hypothesis 4 (*Endorsement of stereotypically masculine characteristics are negatively associated with the assessment of female applicants and their business plans*), we test how assessments of start-up plans depend on the evaluator's gender identity. Table 7 presents estimates from a set of models that include the evaluator's gender identity (expressed by the masculinity score) and its interaction with the female applicant indicator. The negative

interaction terms suggest that more masculine evaluators assess female applicants more harshly in terms of perceived start-up survival, invested amount, competence, and likeability. In other words, while masculine evaluators tend to give higher evaluations overall, the benefit associated with evaluator masculinity is smaller for female applicants than for male applicants.

Figure 3 The relationship between evaluation scores and masculinity index



Note. Marginal effects are calculated based on estimates in Table 7 and plotted separately for female applicants (solid line) and male applicants (dashed line). The x-axis shows the masculinity index. The error bars indicate 90% confidence intervals.

In the lower part of Table 7, we report the evaluator's masculinity elasticity for female and male applicants. The elasticity is positive and significant for male applicants in all evaluations and for female applicants in competence, likeability and business ability. The elasticity is higher for male applicants. For example, a 1-point increase in the evaluator's masculinity score (equivalent to a 16% increase in the masculinity index) is associated with a

0.07-point increase in the competence score for male candidates, compared to a 0.03-point increase for female candidates. Figure 3 illustrates the relationship between evaluation scores and the masculinity index. The marginal effects are significantly larger for male applicants (solid line) than for female applicants (dashed line). The evaluator's masculinity is associated with lower assessments of female applicants relative to male applicants, consistent with the prediction of Hypothesis 4.

Table 7 Assessment of start-up plans and their interactions with evaluators' gender identity

Variables	Start-up survival	Invested amount	Competence	Likeability	Business ability
Start-up cosmetics	ref.	ref.	ref.	ref.	ref.
Start-up services	0.02**	0.11	0	0.02	0.02*
	(0.01)	(0.13)	(0.01)	(0.01)	(0.01)
Start-up IT	0.07***	0.29**	0.01	0.03**	0.05***
	(0.01)	(0.14)	(0.01)	(0.01)	(0.01)
Female applicant	0.17*	3.89**	0.19**	0.17*	0.12
	(0.10)	(1.67)	(0.09)	(0.09)	(0.09)
Masculinity index	0.06***	0.79***	0.07***	0.07***	0.06***
	(0.02)	(0.25)	(0.01)	(0.01)	(0.01)
Masculinity index x Female applicant	-0.04*	-0.83**	-0.04*	-0.03*	-0.03
	(0.02)	(0.37)	(0.02)	(0.02)	(0.02)
Evaluator's characteristics					
Age	0.03	-0.08	0.02	0.02	0.12*
	(0.08)	(1.25)	(0.07)	(0.07)	(0.06)
Firm size 10+	-0.04	-0.51	-0.01	0.01	-0.03
	(0.03)	(0.53)	(0.03)	(0.02)	(0.02)
Sector services	ref.	ref.	ref.	ref.	ref.
Sector manufacturing	-0.01	-0.46	-0.01	-0.03	-0.01
	(0.02)	(0.41)	(0.02)	(0.02)	(0.02)
Sector IT	-0.04	-0.68	-0.02	-0.01	-0.04
	(0.04)	(0.58)	(0.03)	(0.03)	(0.03)
Constant	0.27***	3.06**	0.35***	0.25***	0.29***
	(0.07)	(1.27)	(0.07)	(0.07)	(0.07)
N	1494	1494	1494	1494	1494
R^2	0.04	0.02	0.05	0.06	0.06
Evaluator' masculinity elasticity					
For female applicants	0.18	-0.03	0.21**	0.29***	0.25**
For male applicants	0.47***	0.54***	0.47***	0.55***	0.44***
Evaluation score change with 1-point increase of masculinity index					
For female applicants	0.03	0.00	0.03	0.05	0.04
For male applicants	0.08	0.09	0.08	0.09	0.07

Note: Significance levels: *** 0.01, ** 0.05, * 0.1. Heteroscedasticity-robust standard errors clustered by evaluators are in parentheses.

Discussion and conclusions

Our study aimed at pinpointing sources of gender biases and differential peer evaluations of women and men in the start-up phase. The research comprised an online experiment that follows Goldberg's paradigm (Goldberg, 1968) with half of the participants receiving business plans ostensibly written by male and the other half by female applicants. Participants were randomly assigned to conditions and, apart from applicants' ostensible biological sex, the two sets of business plans were identical. This allowed us to identify any potential effects of applicants' biological sex on evaluations. Though generally, when we consider pooled data without distinguishing sectors of planned business activity, in our study male and female applicants were evaluated similarly, the biases became legible when subtler characteristics had been taken into account. Specifically, our results emphasise the importance of the gender identity (masculinity/femininity) of evaluators and sectors into which applicants intend to establish their start-ups. Finally, the study shows that without changing masculine stereotypes about entrepreneurship, including more women in the business plan evaluation process may have negative consequences for female applicants.

The results that male and female applicants are seen as similarly competent are in line with the findings by Eagly et al. (2020), who showed that beliefs about women's competence increased over time in the US—whether caused by the toning of gender stereotypes or political correctness. Perhaps similar patterns would also be observed in other countries. Indeed, a recent study from Slovakia corroborated the view that no significant sex-based differences are to be expected in evaluations of job candidates by HR professionals (Adamus & Ballová Mikušková, 2024). Nevertheless, the biological sex of applicants may become a significant factor in specific contexts. Our study shows that women's and men's business plans are evaluated differently depending on the sector in which the start-up is to be established, which - since biological sex may serve as a cue of legitimacy - is not an

uncommon finding in the field (Gupta et al., 2009; Marlow, 2002; Swail & Marlow, 2018). Moreover, the congruency between biological sex of a starting business person and the selected sector in which the new business is to be established was shown to play a considerable role in predicting crowdfunding success (Cowden et al., 2021; Liao, 2021). Women are viewed more negatively in sectors traditionally associated with men—such as IT—and more positively in women-oriented sectors—such as cosmetics production. In line with the extant literature (Brush et al., 2018; Kanze et al., 2020; Tonoyan & Strohmeyer, 2021), our results indicate that the evaluation process is likely to be biased by tacit stereotypes about women's ability to pursue a career in sectors requiring more mathematical, scientific or programming skills, or those that are believed to be highly growth-oriented (Gupta et al., 2019). A natural experiment by the founders of Witchy—a platform for the weird art trade—corroborates the view that such gender biases are present in the start-up phase. Being tired of repeated dismissals by potential investors, two female founders of the website invented a fictitious male partner and observed that the perception of their start-up changed (The Guardian, 2017). As gender role theory (Eagly, 1987; Eagly & Karau, 2002) explains, the assessment of women's business plans may be associated with the presence of women in the sector. Therefore, the absence of women in the IT sector may lead evaluators to believe that women lack the capabilities necessary to thrive in IT. When considerable investments are required to start a business, the reluctance to provide women with investment capital is likely to petrify the status quo with more men establishing start-ups in IT and, ultimately, succeeding in it. Interestingly, our results also point to a backlash against female applicants in the IT sector—this is the only case when they are viewed as significantly less likeable, with lower business ability and lower chances of start-up survival. Conversely, women's likeability increases when they intend to establish their business in the cosmetics production sector.

Nevertheless, we found no differences in the investment amount which could be seen as a positive result.

Most importantly, our study indicates that evaluators' characteristics are crucial for women's prospects in the business plan evaluation process. Unlike some previous studies, we do not observe even a slightly enhanced tendency of female evaluators to assess female applicants and their business plans more positively or to invest in female-led start-ups more (Edelman et al., 2018; Ewens & Townsend, 2020; Jetter & Stockley, 2021; Oranburg & Geiger, 2019). Although the findings may seem surprising, they are in line with recent results that show biases against women to be still widespread and held equally strongly by both men and women. According to the OECD report on gender social norms (OECD, 2023), nearly 90% of people globally hold some form of gender bias or are prejudiced against female political leaders or, importantly to this study, business executives. When it comes to scholarly evidence about biological sex as a basis for in-group identification and a source of favouritism, the results are mixed and greatly depend on the context or characteristics other than biological sex. As Sandberg (2018) observed, neither in her study nor the past literature, evaluators show consistent bias in favour of their own biological sex. In many domains, the results are nuanced. For instance, while Carlsson and Eriksson (2019) found evidence that in the Swedish cultural context, female recruiters tend to favour female applicants, Bagues et al. (2017) found no such effect in Italian and Spanish applications for professorship. Alas, the mere presence of female evaluators in academic committees may enhance biases among their male counterparts. On the other hand, an earlier study by Bagues and Esteve-Volart (2010) shows that committees predominantly composed of women tend to overestimate male candidates which may have aversive effects for women's chances of being employed. In line with these findings, a recent study that used Goldberg's paradigm showed that female HR professionals offered considerably higher wages to male candidates compared to ostensibly

identical women (Adamus & Ballová Mikušková, 2024) speaking against any in-group preferences based on an evaluator's own biological sex. Concurrently, our current results do not corroborate the homophily hypothesis claiming that evaluators may show a preference for same-sex applicants either. However, unlike in the Adamus and Ballová Mikušková (2024) study, after adding evaluators' gender identity into the model, the results show that with increasing self-ascribed masculinity, evaluators view female applicants and their business plans more negatively compared to male applicants. The findings are in line with the study by Kray et al. (2017) showing that stereotypically masculine traits strengthen the effect of gender stereotypes on women's assessments. Moreover, Gupta et al. (2012) found that more sexist women rated male-typed business ideas higher than female-typed ones when masculine stereotypes about entrepreneurship were activated, corroborating thus the idea that, under specific circumstances, gender biases against women may be stronger among women themselves. However, further research shows that women's situation in entrepreneurship may even resemble catch 22. Not only female evaluators may be more critical in their assessments of other women's businesses and less willing to invest in them, but when they are not, the mere endorsement by female investors may backfire by discouraging others to invest in the nascent business (Snellman & Solal, 2023). Such gender biases in peer evaluation and investments may limit women's access to mentoring networks and further impede their progress in entrepreneurship (Balachandra & Dublish, 2019; Moss-Racusin et al., 2012). If—due to enhanced self-ascribed masculinity—female entrepreneurs are more critical in their assessments of other women and their business plans, they may be less willing to serve as their mentors because they may see them as less able and promising.

Finally, our results indicate that cultural contexts may be important in the investigation of gender biases in entrepreneurship. Although we have no detailed data about masculinity of actual male and female entrepreneurs in other countries, previous studies persuasively show

that entrepreneurship is stereotyped as a masculine, jungle-like domain also elsewhere (Balachandra et al., 2019; Bird & Brush, 2002; Marlow, 2002, 2020). These findings and theoretical considerations add credence and external validity to our findings. We could speculate that in other, less conservative cultural contexts, stereotypes about occupations - including entrepreneurship - may change faster than in Slovakia. Alas, given the OECD (2023) report about gender social norms, such optimism remains largely unwarranted. Extant literature shows that, similarly as in other countries, entrepreneurship in Slovakia is viewed as a hyper-masculine occupation with both men and women believing that strong instrumental traits—traditionally associated with masculinity—are necessary to thrive in business (Adamus et al., 2021; Gupta et al., 2009). Interestingly, however, in the general population, there are no significant differences in self-ascribed masculinity between men and women (Adamus & Ballová Mikušková, 2023). Thus, our study corroborates the view that there may be strong self-selection of women who see themselves as masculine in entrepreneurship. In line with previous studies, such women are more likely to believe they have skills to pursue a career in entrepreneurship, express entrepreneurial intentions and, ultimately, start doing business (Adamus et al., 2021; Gupta et al., 2009). Alas, they may also be more sceptical about other women's entrepreneurial competences.

As with every empirical study, this study is not free from limitations. Specifically, our experiment included evaluations of simplified one-page proposals that may have limited ability to fully reflect the complexity of real-life investment situations. Further, the choice to focus on peer-evaluations by entrepreneurs may not cover all potential biases and stereotypes held by other stakeholders engaged in the evaluation of nascent businesses. Moreover, in our analyses, we controlled for evaluators' age and sector, but there may be other potentially confounding factors such as expertise, knowledge of the sector or investment experience that should be taken into account in future studies. Finally, although setting our study in Slovakia

provides an interesting cultural framework, whether the role of gender norms and stereotypes is robust across countries remains unclear. Given these limitations, caution is warranted when attempting to generalise our results to other cultural contexts and decisions made by other stakeholders. Future research could address the limitations by using diverse quantitative and qualitative methodological perspectives. It is also advisable to include a broader group of evaluators—such as venture capitalists, investors, bank employees, advisers, and potential customers—into research designs to better capture the gendered character of obstacles faced by women in the business creation process and in various cultural contexts.

Despite the limitations, our results allow us to formulate practical recommendations for policy and programmes popularising entrepreneurship. Relying on the homophily hypothesis, many practitioners and scholars call for increasing the presence of women in pitch contests and bodies providing investment capital (Balachandra & Dublish, 2019; Geiger, 2020; Raina, 2016). Our results cast a shadow on the optimistic view that more female entrepreneurs would boost opportunities for other women (Balachandra, 2020). In particular, when entrepreneurship is viewed as hyper-masculine (Adamus et al., 2021), such policies may backfire, putting women in a disadvantaged position. The presence of women in evaluating committees may not level the playing field for women. Instead, it may tilt it even more in favour of masculinity and manliness serving as its proxy. Although most likely there is no single solution to women's underrepresentation in entrepreneurship, our findings point to the role of gender biases and stereotypes in future interventions and policy aimed at encouraging more women in business. Without first understanding the sources of biases in peer evaluations, no significant change should be expected. Without eradicating masculine stereotypes distorting the evaluation processes, female entrepreneurs will remain discriminated against in access to mentoring networks and investment capital, and their

business may be deprived of equal opportunities to grow and obtain organisational objectives, including bringing satisfactory returns on investments.

Data availability statement

Raw data and all materials used in the study are available online at OSF:

https://osf.io/wr7bf/?view_only=ac94491748e54888892b422622fcf748

Competing interests statement

The authors declare that they have no known financial and non-financial conflicts of interests related to this study.

Ethical declaration

In accordance with the guidelines issued by the Research Ethics Committee of Masaryk University in Brno, the study protocol was waived from the obligation to obtain formal ethical approval. All participants read and signed informed consent forms and agreed to participate in the study. Participants also gave informed consent for the publication of anonymised results and raw data.

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