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# Female Leadership, Democratization, and Firm Innovation: Social Inequalities and Gender Issues in Post-Communist Economies

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## ABSTRACT

Do women exhibit a different pattern of entrepreneurial behavior as compared to men in post-Communist societies? This paper addresses this question using survey data from 25 Eastern Europe and Central Asian states. The sample consists of 11,617 private firms. As a result of 11,000 observations and multiple robustness checks, we find that female owners are more likely to introduce new marketing strategies than males. We demonstrate that firm innovation increases among top female managers with the increase in democratization. Democratization eliminates the gender disadvantages in firm innovation for most types of firm innovation.

## HIGHLIGHTS

- (1) For most definitions, female leaders perform equally to males in firm innovation.
- (2) Female owners have a slightly higher tendency to introduce new marketing strategies than males.
- (3) Female top managers are less likely to invest in Research and Development as compared to male managers.
- (4) Firm innovation increases among top female managers with the increase in democratization.
- (5) Democratization eliminates the gender disadvantages in firm innovation for most types of innovation.

## KEYWORDS

Gender behavior; social inequalities; firm innovation; post-Communist societies; transition

## JEL Codes


O30; J16; J50; P20

## Introduction

This paper seeks to understand the relationship between female leadership and firm innovation using survey data from 25 transitional economies of Eastern Europe and Central Asia. The sample consists of 11,617 private firms, which participated in the Business Environment and Enterprise Performance Survey (BEEPS) conducted by the European Bank for Reconstruction and Development (EBRD) in partnership with the World Bank in 2012,

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over twenty years after the beginning of Post-Communist regime transition and after the Great Recession of 2009. Furthermore, in 2012, the BEEPS extended the number of innovation questions in the questionnaire to five questions.

In today's world of modern technology, innovation is at the center of a rapidly transforming, forward-paced way of life. Innovation is arguably the most important tool that a company can use in order to be competitive in the global race for progress (Tohidi and Jabbari 2011; Filippetti and Archibugi 2010). The double challenge of firm innovation and gender equality has become one of the most dominant issues for the post-Communist economies in Europe and Asia, transiting from state-owned centralized systems to market-based economies (Beer 2009; Brown 2004; Febbrajo and Sadurski 2010; Hellman 1998). This economic transition went hand-in-hand with major political restructuring of totalitarian system (with pronounced pseudo-equality agenda), witnessing transition to democracies in some cases (Eastern Europe) or consolidation of autocracies and hybrid regimes in other cases (Central Asia) (Hale 2015;; Yurchak 2013; Wilson 2005; Wedel 2003; Pop-Eleches and Tucker 2017 Gerber and Hout 1998). In the turbulent context of economic and political transition, gender rights, in general, and the place of women in entrepreneurship, in particular, came to the attention of scholars (Pollert 2003; Gheaus 2008; Nikolić-Ristanović 2004; Hurubean 2013; Hrycak 2002, 2006; Beissinger and Kotkin 2014). However, despite these growing studies on gender rights and social inequalities as historical legacies, there is still a need to consider the gender approach within entrepreneurship in post-Communist societies. Do women exhibit a different pattern of entrepreneurial behavior as compared to men in post-Communist societies? So far, studies have looked at the role of female directors on firm performance (Burke 1997; Chen, Leung, and Evans 2018; Konrad, Kramer, and Erkut 2008; Jurkus, Park, and Woodard 2011; Torchia, Calabrò, and Huse 2011), adopting CSR practices (Ibrahim and Angelidis 1994; Zou et al. 2018; Alonso-Almeida, Perramon, and Bagur-Femenias 2017; Kato and Kodama 2018) and positive business equity and valuation (Glass and Cook 2018; Adhikari, Agrawal, and Malm 2019; Martin, Nishikawa, and Williams 2009; Peni and Vähämaa 2010; Palvia, Vähämaa, and Vähämaa 2020). Fewer works have explored firm innovation in the context of female leadership (Reutzell, Collins, and Belsito 2018; Chatterjee and Ramu 2018). Our study aims to fill this gap in the literature.

Firm innovation can be defined as actions that create new ideas, processes, or products, which lead to positive effective changes in business performance (Betz 1987; Afuah 2003; Slater 1996). In other words, innovation collectively describes firm activities that lead to creating new value or capturing value in a new way that lends the company a competitive edge in the market (Schumpeter 1934; Chander, Keller, and Lyon 2000). It follows, therefore, that innovation is a crucial consideration for most organizations. It is thought to be the "key to success" for survival and flourishing in a market-based economy (Tohidi and Jabbari 2012). Firm innovation is also of great importance for the country overall, contributing to a nation's long-run economic performance (Solow 1956; Romer 1986; Nazarov and Obydenkova 2020; Merikull 2010; Bradley et al. 2012; Scherer 1999; Song and Song 2017). The global market has forced nations, including post-Communist states, into competition for creating and assimilating knowledge and technology to propel their prosperity. Nowadays, whether a country is competitive in the global platform depends more on the capacity of its industry to innovate than its natural endowments (Porter 1990). Romer's model (1990) suggests that encouraging greater allocation of resources to innovative activity

increases a country's potential for economic growth. Thus, policymakers are interested in unveiling practices and policies that promote innovation in workplaces and, consequently, in the whole society.

In a perfectly competitive society with symmetric information flow, female workers should be self-selected uniformly to industries and occupations based on their competitive advantages and interests. However, many reports (Branson 2012; Geiler and Renneboog 2015; Reutzel, Collins, and Belsito 2018; Konrad, Kramer, and Erkut 2008; Torchia, Calabrò, and Huse 2011) continuously point toward the fact that females are stuck in low-reward positions. Discriminatory practices against female workers are institutionalized in many developing nondemocratic or semi-democratic societies. Our empirical strategy aims to reveal whether we can observe equal propensities to innovate for female and male managers if the political institutional and sector-level differences are properly controlled. Our goal is to demonstrate how a variety of political regimes can be accounted for different outcomes in gender issues and firm innovation. Using two indicators of female leadership, the firm ownership and being a top manager, out of twelve estimated models (two measures of female leadership and six definitions of firm innovation), only in four models, we find evidence of the negative disparity in firm innovation among female leaders. The additional analysis reveals that these disparities can be explained by the moderating impact of democratization on firm innovation. With the increase in civil liberties and political rights of citizens, disparities in firm innovation vanish entirely in all but one definition of firm innovation. Female managers may be persistently less likely to invest in research and development (R&D) even in more democratic societies. The propensity to spend on R&D is only 2% points less as compared to male managers, the group that has a considerably low propensity, only 9%. Thus, the low propensity to invest in R&D for both types of managers may suggest that low investment in R&D exists in general in transition economies.

The paper is structured in the following way. Section 2 consists of recent academic discussion on female leadership and its role in firm innovation, democratization, and historical legacies of Communism. This discussion helps to elaborate on the mechanism through which female leadership may influence firm innovation. Section 3 further develops our empirical model and discusses the primary data sources and the descriptive statistics for our firms' sample. In Section 4, we report our main results. The final section concludes.

## **Female Leadership and Firm Innovation: Historical Legacies and Democracy**

As female participation and leadership in organizations increase, it is worth assessing the relationship between female-led firms and innovation. In the 1980s, Hisrich and Brush (1984) suggested that firms founded by women are more likely to focus on modifying existing products or services than innovation of new ones. Extant research in psychology and behavior suggests that women are more risk averse compared to men (Byrnes, Miller, and Schafer 1999; Jianakoplos and Bernasek 1998). Since innovation represents a culmination of risky processes with no guarantee of positive results, female-led companies tend not to pursue innovation opportunities (Ding, Murray, and Stuart 2006; Marvel, In, and Wolfe 2015; Whittington and Smith-Doer 2005). There are many possible explanations for this. In most parts of the world, women in business face more challenges in obtaining resources and capital than men (Reutzel, Collins, and Belsito 2018). This can lower their inclination toward innovative pursuits. Women

managers face additional challenges due to the dominant masculine nature of management culture (Watts 2009). Furthermore, women experience disadvantages in accumulating wealth and have expressed that they face lower distributive justice and unfavorable environment (Deere and Doss 2006; Warren, Rowlingson, and Whyley 2001; Reutzler, Collins, and Belsito 2018). This perception, whether true or not in a particular society, is likely to discourage their motivation for taking on additional financial risk through innovative ventures.

In contrast, an opposing body of research suggests that women are more likely to participate in innovation. Female directors enhance effectiveness of internal governance (Adams and Ferreira 2009). Higher levels of monitoring from female leaders in business push managers to improve process efficiency and innovate (Aghion, Reenen, and Zingales 2013). More women on board (critical mass of at least 3) have been evidenced to allow female directors to make substantial contribution to innovation and strategic tasks (Torchia, Calabrò, and Huse 2011). Female CEOs and board members demonstrate stronger business and equity practices (Glass and Cook 2018). Studies suggest that organizational innovation is encouraged by gender diversity, and there is evidence that when women do not feel outnumbered, their contribution to management and innovative strategy becomes more significant (Busaibe et al. 2017; Torchia, Calabrò, and Huse 2011). Filculescu (2016) claims that while variation exists across countries and regions, female-led firms demonstrate more innovative behavior than male-led firms. VanderBrug (2013) suggests that female entrepreneurs in developed nations are equally or more prone to introduce innovative products and services to the market than male entrepreneurs. However, the difference between developed democracies and developing world, nondemocratic and hybrid regime with undermined gender rights, should be considered. Higher democratization is argued to be associated with higher participation of women in business and politics (Donno and Russett 2004; Inglehart, Norris, and Welzel 2003). Richards and Gelleny (2007) find democracy to be positively related to several indicators of women empowerment. Yet, studies have also found contradictory evidence. Paxton (1997) found democracy to be insignificant or inversely related to female representation. Similarly, Seguino (2000) found a correlation between greater inequality and economic growth, and Arora (2012) found that states in India with higher gender inequality have higher income per capita. Based on this literature, it can be theorized that female leaders may have high potential for facilitating firm innovation but face barriers due to existing cultural perceptions and national policies.

From the historical perspective, female leadership in developing countries of Asia indicates that women are well-adapted to manage finances and organization departments due to long-standing religious and cultural traditions (Adler 1993). In the Americas and Europe, women played an active role in commerce during the 18th and 19th centuries. From owning land, operating businesses, holding shares to seeking and holding patents, women were involved in invention and manufacturing, motivated by market incentives (Swanson 2011). Since that era, much progress has taken place from the perspective of gender equality in many spheres of human life, yet significant gaps still exist in knowledge regarding the intersection of entrepreneurship, innovation, and gender (Filculescu and Cantaragiu 2012). How, if at all, is the closing gap of gender disparity mirrored in firm innovation across European and Central Asian Post-Communist regions?

There also exists a discrepancy between the increasing number of women graduating from university with STEM (Science, Technology, Engineering, and Mathematics) degrees and persisting low number of women in senior leadership positions in all sectors, especially those associated closely with innovation. A study based in the UK showed that the few women who are able to climb the corporate ladder find their success tied to their ability to assimilate into masculine styles of management (Watts 2009). It is widely accepted that national policies affect the extent and prevalence of innovation in the country's businesses. Subsequently, it becomes necessary to evaluate whether such policies are guided with gender-neutral awareness. A study comparing policies of Sweden and Canada found that the Swedish government employs deliberate actions to increase visibility of women in innovation leadership (Rowe 2018). This aligns with the high level of gender equality in Sweden. Studies have also found that moving toward more democratic societies increases the propensity of firm innovation (Nazarov and Obydenkova 2020). The impact of national institutional forces on women in leadership remains undertheorized. Research suggests that democracy reinforces gender equality (Welzel, Norris, and Inglehart 2002). Countries with higher levels of democracy and longer experience of women's suffrage have higher female participation in labor and commerce (Beer 2009). Research suggests that democracy is necessary, albeit not sufficient, for true gender equality. Inglehart, Norris, and Welzel (2003) argues that growing emphasis on gender equality is essential in the process of democratization, and Piccone (2017) suggests that the relationship between democracy and gender equality is mutually reinforcing.

Building on these studies, we test the importance of the level of democracy for post-Communist states in Europe and Central Asia. Eastern European states are quite unique in terms of democratization path, as they were heavily influenced by not only the European Union (EU) and democracies-led Regional Development Banks (e.g., the European Bank for Reconstruction and Development (EBRD), but also private banks in Europe associated with it "stick-and-carrot" mechanisms of democratization, sustainable development, with focus on corporate social responsibility, promotion of human rights, and gender representation at all levels (Anderson and Shawn Reichert 1996; Anderson and Singer 2008; Obydenkova 2012; Obydenkova and Rodrigues Vieira 2020; Obydenkova et al. 2021; Carrubba 1997; Lankina, Libman, and Obydenkova 2016a; Djalilov and Hartwell 2021). Studies addressed in detail the powerful role of the EU in democratization and promotion of human rights (including gender equality) among other issues in European neighborhood and beyond. However, the EU's impact on democratization, sustainable development, and human rights was undermined by the Great Recession 2008, reducing institutional and social trust that negatively associated with risk to invest (e.g., Armingeon and Guthmann 2014; Arpino and Obydenkova 2020; Boomgaarden et al. 2011; Mišić and Obydenkova 2021; Obydenkova and Arpino 2018; Armingeon and Ceka 2013). In other words, in the aftermath of the Great Recession the priority is "to survive," not to innovate. The Recession also increased radically the risks of investment in general and in firm innovation in particular.

In contrast to post-Communist European states, other former Communist countries (e.g., Central Asia) did not experience the democracy diffusion and promotion of the EU and other Western actors (such as regional development banks and the EBRD). On the contrary, it was involved in the deep network of autocracies-led regional international organizations such as the Commonwealth of Independent States, Eurasian Economic Union – both led by Russia and the



Shanghai Cooperation Organizations led by China (Ambrosio, Hall, and Obydenkova 2021; Hall, Lenz, and Obydenkova 2021; Hartwell 2021). Both China and Russia are notoriously famous for undermining human rights and social discrimination in particular (e.g., Demchuk et al. 2021). As previous research demonstrated, membership in their respective regional international organizations (IOs) serves as a tool for diffusion of practices and principles of nonsustainable development and ideological behavior (see, for example, Cooley 2012; Izotov and Obydenkova 2021; Hall, Lenz, and Obydenkova 2021). Therefore, to understand the empirical dynamics of gender issues in firm innovation across two very different post-Communist regions, we look into the case of eastern European States (with high level of democracy) and Central Asian states (with low level of democracy). Focusing on exclusively post-Communist economies allows us to control for important historical legacy of Communism that casts a long shadow on modern day economic development and human rights in the region.

Given the strong presence of historical legacies across post-Communist regions (Alesina and Fuchs-Schündeln 2007; Hale 2015; Hellman 1998; Lankina, Libman, and Obydenkova 2016b), it is important to understand how it affects social inequalities and gender rights. The ideology of Communism was based on the idea of “quality” that was often interpreted as “similarities,” not as equality of rights (Western tradition; Wedel 2003; Gerber and Hout 1998; Millar 1994; Barany and Volgyes 1995). The understanding of “human rights” and “gender rights,” therefore, was interpreted as similarities – that is similar (equal) salaries, access to goods, access to traditionally male-dominant sector of work (e.g., construction of railroads relying on physical force – mail dominant sector). It is not surprising that gender rights interpreted from this perspective of similarities had nothing to do with Western interpretation of women rights, that is, based on recognition of the differences among men and women (e.g., accounting for pregnancy, childbearing, and maternity rights) (Bandelj and Mahutga 2010; Gerber and Hout 1998; Millar 1994). The Communist interpretation of gender rights, thus, tends to result in the opposite outcomes for women and their role in society, politics, and professional careers. Claiming no gender differences, the Communist system was built to ignore the differences of female participation at all levels and professions. The best example would be the gender balance within the Communist Party of the Soviet Union (CSPU) from 1917 to 1991 (Libman and Obydenkova 2021). The predominant literature on the survival of these historical legacies in post-Communist states indicates strong heritage of social and economic inequalities, including but not limited gender inequalities (Libman and Obydenkova 2019, 2020). Within these debates, we select a sample of post-Communist states that is expected to reflect the historical legacies, yet, to a different extent. Eastern European states were part of Communist camp, however, not part of the Soviet hegemon, the USSR. They experienced faster and relatively more successful democratization and marketization, as compared to former Soviet Republics, including post-Soviet Central Asian states. Looking at two geographically different regions allows us to trace the impact of democratization in Eastern Europe and the persistence of historical legacies in Central Asia. Both regions present an interesting contrast in terms of social inequalities and gender rights that we test with the empirical model described below.

## Data and Empirical Model

The BEEPS survey offers a large data set of private and public enterprises. The survey is conducted mainly in Eastern European, post-Communist countries transitioning to capitalist democracy. The survey was primarily developed to study the impact of transition on

**Table 1.** Descriptive statistics of key dependent variables.

	Female Owner (3,752)	Female Top Manager (2,379)	Neither Owner nor Manager Female (7,235)
New products and services	25.6%	22.0%	24.0%
New production and supply methods	20.1%	17.3%	18.7%
New organizational management practices	21.8%	20.0%	19.7%
New marketing methods	24.9%	23.2%	21.3%
Any spending on R&D	9.4%	7.1%	9.0%
Innovation index	1.018	0.904	0.925

The sample of 11,617 private firms representing 25 transition economies and surveyed in the 2012 BEEPS. The first five measures are dichotomous questions whether a firm is engaged in the particular innovative activity in the last three years. Innovation index is the sum of responses for the five dichotomous innovation questions in the BEEPS.

small- and medium-sized firms (Mannasoo and Merikull 2014; Nazarov and Akhmedjanov 2012; Rraci 2010). In this analysis, we use the 2012 wave of the BEEPS. The *main independent variables* ( $X$ ) are the indicators whether among the major owners of the firm are there any females or whether the top manager is a female. Table 1 shows that among 11,617 firms ( $i$ ) in the sample, 32% owned by females and 20% employ female top managers.

In the 2012 wave, the BEEPS sample has information on 15,883 firms. We drop from the sample the firms representing Turkey (1,344 firms), Mongolia (360 firms), Kosovo (202 firms), and Montenegro (150 firms). We drop Turkish firms because Turkey was not part of the Socialistic block. Second, we omit Kosovan and Montenegrin firms because these two countries with Serbia comprised one country in the initial transition stage until gaining independence in the later years. Third, we drop Mongolia due to its geographic remoteness from other post-Communist republics. With this sample selection strategy, our sample consists of 13,827 firms. Of these firms, 11,617 are private firms, which comprise our final sample. Finally, we drop 2,200 public firms and ten firms with the unknown ownership structure.

### **Dependent Variables ( $Y$ )**

One of the advantages of BEEPS is that the 2012 data contains five variables identifying firm involvement in innovative activity. In the BEEPS, three variables identifying firm innovation are the same across different waves: whether the firm introduced new products/services or new production and supply methods and whether the firm spent on R&D in the last three years. Table 1 demonstrates that the firms with female ownership have higher propensities to innovate in all three measures. Firm innovation is 25.6%, 20.1%, and 9.4% in firms with female owners versus 24%, 18.7%, and 9% in firms without females in ownership or top management, respectively. Another important trend in Table 1 is that the firms with female top management lag in firm innovation in all three categories of innovation.

In the 2012 wave of BEEPS, the two additional definitions of firm innovation were included in the questionnaire: whether the firm has involved in new organizational management practices and whether the firm has introduced new marketing plans in the last three years. Similar to the previous three definitions of firm innovation, the firms with female ownership are more likely to be involved in these types of firm innovation than firms with women only in top management or firms without women in either ownership or top management. Finally, we create a firm innovation index that sums up the number of



innovative activities across all categorizations of firm innovation. A typical firm owned by female is involved in at least one innovative activity, while firms of the other two categories lag slightly in firm innovation.

### ***Independent Variables (I, F, and G)***

In the analysis, we introduce three types of variables to quantify the relationship between female leadership and firm innovation: industry indicators and firm-level and country-level characteristics.

#### ***Industry Indicators (I)***

Women may self-select themselves into specific industries, and firm innovation can vary widely across these industries. To capture the selection mechanism into high-reward industries, we use four categories of firm industry, namely, sales, services, construction, and manufacturing. Table 2 shows that females are more likely to own firms or to be assigned to top management positions in the sales industry. They are less likely to be owners or top managers in construction and manufacturing industries, which are more rewarding industries in the transition economies.

#### ***Firm-level Characteristics (F)***

Female leadership may have varying impacts on various firm characteristics. Table 2 shows that females are more likely to be owners or top managers of small enterprises rather than large enterprises. Comparing firms by other characteristics, firms with female owners have a less educated workforce and are less likely to be sole proprietors than the second types of firms. Firms with female top management are less likely to have foreign certifications but are more likely to be sole proprietors.

**Table 2.** Descriptive statistics on key variables.

	Female Owner (3,752)	Female Top Manager (2,379)	Neither Owner nor Manager (7,235)
<i>Industry Indicators</i>			
Sales	45.9%	50.4%	37.9%
Services	10.5%	12.1%	11.3%
Construction	5.8%	3.6%	10.3%
Manufacturing	37.8%	33.8%	40.5%
<i>Firm-level Characteristics</i>			
Firm Small Size (5 to 9 workers)	59.4%	62.4%	54.3%
Firm Medium Size (20 to 99 workers)	34.5%	32.8%	37.6%
Firm Large Size (100+ workers)	6.2%	4.7%	8.2%
Sole Proprietorship	7.4%	10.3%	8.1%
Foreign Certification	18.4%	16.0%	18.9%
University Educated Workforce, %	36.9%	38.4%	38.5%
<i>Country-level Characteristics</i>			
Democracy Index	4.36	4.30	4.04
Fertility, per woman	1.70	1.70	1.74
Female Labor Supply, %	52.70	53.17	53.81
GDP per capita, PPP	18.29	18.40	18.17

Note: The sample of 11,617 private firms representing 25 transition economies and surveyed in the 2012 BEEPS. The country-level variables are from the World Bank Database on major indicators and democracy index is from the Freedom House Database.

### Country-level Characteristics (G)

The macroeconomic and institutional differences may explain the differences in female leadership across different countries. The main country-level characteristic that we test for moderating impact on firm innovation is the democracy index. We use the index from Freedom House representing a composite score of political rights and civil liberties in a society, with value “1” representing the least free democratic society and “7” representing the freest democratic society. Table 2 shows that the female ownership or top management decreases with democracy. Some other country-level characteristics impacting the role of women in the management structure are fertility rate, female labor supply, and GDP per capita.

### Empirical Model

The empirical model that tests our main hypothesis of the study is as follows:

$$Y_{ij} = X'_{ij}b + I'_{ij}a + F'_{ij}\delta + G'_j\rho + \mu_j + \varepsilon_{ij}, \quad (1)$$

where subscripts  $i$  denote a firm located in the  $j$ th country.

The primary interest is coefficient  $b$ , which measures the difference in firm innovation,  $Y$ , for female-owned or female-managed firm after controlling for industry-level fixed effects, firm-level characteristics, and country-level characteristics. Since the selected country-level factors may not capture all institutional and macroeconomic differences across transition economies, in a more flexible specification, we estimate the model with country-level fixed effects,  $\mu_j$ , without controlling for country-level characteristics, which are invariant across the firms from the same country. If  $b$  is not different from zero, then we can conclude that the difference in firm innovation is explained by observed firm and industry- and country-level differences across the countries and gender plays no role in the propensity to innovate. Clustered over country, robust standard errors are used in the statistical inferences.

### Results

In this section, we report the coefficients associated with female leadership variables from three variants of Equation (1). In Model 1, we control for industry and firm characteristics discussed in the previous section. In Model 2, we add to the model the country-level characteristics presented in Table 2. In Model 3, instead of the country-level characteristics, we control for country-level fixed effects. We report the full results including all coefficients of Model 2 in Appendices A and B.

In Table 3, we start the discussion of the findings for female ownership's coefficients. In Model 1, for five out of the six definitions of firm innovation, female ownership is associated with higher firm innovation. Firms with female owners introduced new products or new production methods by 2% point more frequently than their counterpart firms. The female owners are also more likely to introduce new organizational management practices by 2.4% points or new marketing methods by 3.5% points. They also have higher innovation scores by 0.1 points. After adding country-level controls, the coefficient decreases in magnitude, and the statistical significance at the 5% level is preserved for only two of the definitions. Finally, in the model with the country-level fixed effects only for the new marketing

methods, female ownership is associated with higher firm innovation. However, the coefficient's magnitude is only a 1.5%-point advantage and is marginally insignificant at the 5% level.

In Table 4, we report results for the similar analysis but for the indicator of female top management as the main independent variable. In the model with only industry indicators and firm-level characteristics, a substantial disadvantage in firm innovation is present for two definitions of innovation: introduction of new products and services and the presence of spending on R&D. For all other definitions, the difference in firm innovation is close to 0. There are no substantial changes in the model with added country-level characteristics. However, in the model with the country-level fixed effects, for four out of six definitions, we observe disadvantages in firm innovation for the firms with female top management. The level of disadvantage is 2.9% points for introduction of new products and services, 2% points for introduction of new production and supply methods or any spending on R&D, and 0.07 points for the innovation index.

In Table 5, we test the hypothesis whether the level of society's democratization may explain the disadvantage in firm innovation for female top managers. For three out of four definitions of firm innovation with documented disadvantages in the previous analysis, we find that the democracy may explain the lag in firm innovation for female top managers. The coefficient corresponding to the interaction term between the indicator of female top management and democracy is positive in the regressions with dependent variables new products and services, new production and supply methods, and innovation index. In Figure 1, we simulated the disadvantage's magnitude for different levels of democracy and in all three instances, we observe that in consolidated democracies, the female top management disadvantage in innovation completely disappears.

## Conclusion

We find that, when controlling for industry- and firm-level characteristics, female-owned firms have a 2–3.5% higher propensity to innovate than male-owned firms through introduction of new products and services, production and marketing methods, and management practices. Additionally, female-led firms were found to have an 0.11 points higher innovation score than male-led firms in our analysis. In other words, female ownership has a positive association with firm innovation. However, the association becomes weaker when controlling for the country-level characteristics, and completely disappears when controlling for country-level fixed effects. Thus, we conclude that for most definitions of firm innovation, there is no significant difference in pursuing innovative activities between female-owned firms and male-owned firms.

Interestingly, results show that female-owned firms are probably more likely to introduce new marketing methods. Some researchers allege that women are better marketing strategists than men. Ritson (2008) suggests that women's genetic disposition for empathy, ability to connect with people (and therefore, consumers), strong perceptual skills, and intuitive thinking are some of the reasons why they are frequently seen to outperform men in marketing. The psychological dimension of this analysis should, however, remain on the agenda for further studies. The implication of our results indicates that female CEOs may better understand the importance of robust marketing strategies in growing their firm's bottom line and, therefore, prioritize continual improvement in that area. A set of

**Table 3.** Firm innovation and female ownership relationship for various measures of innovation.

Variable	New products and services		New production and supply methods		New organizational management practices		New marketing methods		Any spending on R&D		Innovation Index	
	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.
Model 1 (industry indicators and firm characteristics)												
Female Owner	0.019**	0.009	0.021***	0.008	0.024***	0.008	0.035***	0.009	0.009	0.006	0.110***	0.029
N. of observations	10,724		10,730		10,730		10,713		10,710		10,615	
Model 2 (industry indicators, firm- and country-level characteristics)												
Female Owner	0.006	0.009	0.012	0.008	0.016	0.009	0.029***	0.009	0.002	0.006	0.068**	0.029
No. of observations	10,319		10,415		10,415		10,128		10,125		10,030	
Model 3 (industry indicators, firm-level characteristics and country-level fixed effects)												
Female Owner	0.004	0.009	0.005	0.008	0.009	0.008	0.015	0.009	0.005	0.006	0.040	0.028
No. of observations	10,724		10,730		10,730		10,713		10,710		10,615	

Note: Regressions are based on the initial sample of 11,617 private firms representing 25 transition economies and surveyed in the 2012 BEEPS. Female Owner is an indicator variable based on the question "are there any females among the major owners of the firm?". The robust standard errors. \*\*\* significant at 0.01, \*\* significant at 0.05



**Table 4.** Firm innovation and top manager relationship for various measures of innovation.

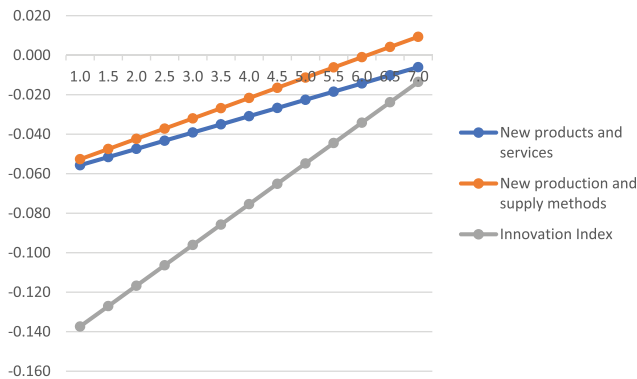
Variable	New products and services		New production and supply methods		New organizational management practices		New marketing methods		Any spending on R&D		Innovation Index	
	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.
Model 1 (industry indicators and firm characteristics)												
Female Top Manager	-0.020**	0.010	-0.008	0.009	0.003	0.010	0.008	0.010	-0.017***	0.006	-0.025	0.033
No. of observations	10,829		10,835		10,835		10,817		10,810		10,711	
Model 2 (industry indicators, firm- and country-level characteristics)												
Female Top Manager	-0.018	0.010	-0.008	0.009	0.005	0.010	0.011	0.010	-0.018***	0.007	-0.019	0.033
No. of observations	10,245		10,251		10,251		10,233		10,226		10,127	
Model 3 (industry indicators, firm-level characteristics and country-level fixed effects)												
Female Top Manager	-0.029***	0.010	-0.019**	0.009	-0.007	0.009	-0.002	0.010	-0.021***	0.006	-0.070**	0.032
No. of observations	10,829		10,835		10,835		10,817		10,810		10,711	

Note: Regressions are based on the sample of 11,617 private firms representing 25 transition economies and surveyed in the 2012 BEEPS. Female Top Manager is an indicator variable based on the question "is a top manager female?" The robust standard errors. \*\*\* significant at 0.01, \*\* significant at 0.05

**Table 5.** Firm innovation and top manager relationship for various measures of innovation.

Variable	New products and services		New production and supply methods		Any spending on R&D		Innovation Index	
	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.
Female Top Manager	-0.064***	0.024	-0.063***	0.023	-0.020	0.015	-0.158**	0.079
Female Top Manager * Democracy	0.008	0.005	0.010**	0.005	0.000	0.003	0.021	0.017
No. of observations	10,829		10,835		10,810		10,711	

Note: Regressions are based on the sample of 11,617 private firms representing 25 transition economies and surveyed in the 2012 BEEPS. Female Top Manager is an indicator variable based on the question "is a top manager female?" The robust standard errors. \*\*\* significant at 0.01, \*\* significant at 0.05.

**Figure 1.** Disadvantage in firm innovation for female top manager with change in democracy.

experiments conducted by Cronson and Gneezy (2009) provide empirical evidence that women are more situationally specific, a skill required to identify the best marketing strategies for the specific context or product. Although the same study demonstrated that women are neither more nor less socially oriented, however, their social preferences are more adjustable supporting the given thesis. This notion is echoed in existing research that evidences females having a better understanding of consumer behavior and marketing opportunities for companies (Byrnes, Miller, and Schafer 1999).

Furthermore, our initial analysis indicates that firms with females in top management have lower propensity to innovate than male-managed firms. After controlling for the moderating impact of democratization, female managers are less likely to invest only in R&D. This supports extensive research that suggests that women are more risk-averse than men (Byrnes, Miller, and Schafer 1999; Arch 1993) and are less likely to pursue high-risk/high-reward ventures (Kepler and Shane 2007). R&D is a direct path to innovation, and investment in R&D is a widely used measure of firm innovation. However, it also represents a considerable risk of low to no or delayed returns (McAdam et al. 2010; Pettigrew, Woodman, and Cameron 2001). This may explain why female managers experience higher apprehension associated with R&D expenditure and therefore be less inclined to pursue innovative opportunities (Alvarez and Busenitz 2001; Withers, Drnevich, and Marino 2011).

This study reveals a disadvantage in firm innovation for firms with women in top management. Research shows that women experience difficulty in gaining access to capital and human resources for pursuing innovation (Cliff 1998; Wu and Chua 2012).



Furthermore, women have been reported to perceive innovation opportunities as unfavorable because they experience a lack of environmental munificence and low distributive justice in allocation of economic rewards in business compared to their male counterparts (Roper and Scott 2009; Zhao, Seibert, and Hills 2005; Reutzell, Collins, and Belsito 2018). However, our analysis demonstrates that these same firms with female top management would experience no lesser levels of innovation in a more democratic society. In other words, our results suggest that *democracy* promotes the firm innovation for firms with female top management.

This finding underscores the significance of societal and country-level factors in influencing innovation in firms with female leadership, supporting Lindberg's (2012) claim that national policies play an important role in shaping women's participation in innovation. The results of this study may prompt policymakers to evaluate their approach to innovation policy and improve gender equality. Andersson et al. (2012) suggests that the gender-neutral approach to innovation policy may be responsible for the gender gap in innovation leadership. In fact, innovation policies have especially eluded gendering and identity (Nählinder, Tillmar, and Wigren 2015). Our findings, thus, are in line with the literature arguing that democratization facilitates and augments women's participation in business and government (Donno and Russett 2004; Inglehart, Norris, and Welzel 2003; Richards and Gelleny 2007). Our research supports this argument by illustrating that the disadvantages faced by firms with female top management in pursuing innovative ventures disappear when consolidated for a higher democracy index.

We also find additional confirmation on the tendency of women to avoid taking on investment risks due to experiencing lower financial security and distributive justice. Since firm innovation represents substantial financial risks, our results indicate that higher levels of democracy in society may ameliorate the environmental difficulties faced by women in leadership positions. Firm innovation is designed to create value for the firm's performance and output, leading to improved returns. In a society where female-led and female-managed firms are able to participate in firm innovation, at least to the same extent as their counterparts, women in business would achieve greater success and be better positioned to contribute to economic growth.

The participation of women in firms has witnessed rapid growth since the turn of the century. This is especially evident in advanced democratic economies (King et al. 2017; Brown 2004; Tinkler et al. 2015). Tyrowicz, van der Velde, and Goraus (2018) also looked into the overall gender employment gaps across advanced democracies versus transitional societies, while the study points to the "gender employment gaps on nearly 1500 micro databases from over 40 countries" using employment in general. In contrast, our study contributes to very specific niche of the entrepreneurial job market via looking at top leadership positions and, thus, leadership per se and gender behavior at top-ranked positions. Other studies nuanced different types of markets that condition gender status and behavior (e.g., in the scientific and academic market, gender status was investigated in Whittington and Smith-Doer 2005 showing trends different from other markets). To the best of our knowledge, this issue has not yet been addressed within transitional economies, with implications for firm innovations and variation in democracy stock. Previous studies addressed implications of democracy stock for public health and even for environmental performance but has not yet considered gender and social inequality (Nazarov and Obydenkova 2021a, 2021b). Other studies suggested that gender equality is

not simply a consequence of democratization but also a contributing factor to the process of transition (Inglehart, Norris, and Welzel 2003). Our findings, thus, contribute to this literature on the nexus of gender equality and democracy in general, approaching it from a very different behavioral and entrepreneurial perspective unleashing psychological dimension in gender studies as conditioned by political context and historical legacies (Alesina and Fuchs-Schündeln 2007; Pop-Eleches and Tucker 2017; Beissinger and Kotkin 2014; Libman and Obydenkova 2021a; Barany and Volgyes 1995). For example, within nondemocratic context, the study demonstrated that while female workers pay more attention to leadership than male ones, they still assume traditional “gender roles” instead of leadership roles (Erzikova and Berger 2016). Even more so, within a nondemocracy (in this case Russia), the study argues that “female top leaders in organizations did not desire leadership” (p. 28). Given the growing engagement of women in the workplace, the emerging implications of gender equality on democracy and vice versa are worth deeper exploration. Within the limits of this study, the findings suggest a positive relation between democracy and female firm innovation even within post-Communist societies.

A few broader issues are to be mentioned within the spirit of possible limitations of this study and future research agenda. First, it is highly important to recognize that a number of factors, such as large, geopolitics, culture, religion, historical legacies, and the level of (de-)centralization may all have altered the results. For example, within a geographically large states such post-Communist and Communist states as Russia, China, or Kazakhstan, the findings can differ across subnational regions (Wedel 2003; Cooley 2012). Second, the membership within the regional international organizations (such as not only the EU and the EBRD, on the one hand, but also the Eurasian Economic Union, on the other hand) was proven to be crucial for sociopolitical changes and economic development (Armingeon and Ceka 2013; Hartwell 2021; Libman and Obydenkova 2013, 2018a, 2018b; Agostinis and Urdinez 2021; Ambrosio, Hall, and Obydenkova 2021). According to these studies, the membership in these so-called “regional clubs” has implications for a wide array of issues. Hence, it is plausible that membership may also have consequences for social inequality in general and gender approach in particular, thus affecting the position of female employees on the market at all levels. However, intriguing these issues are as follows: they have to stay on the agenda for future research on gender behavior, social inequality, and female leadership.

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## Disclosure Statement

No potential conflict of interest was reported by the author(s).

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