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Girl Power: Creating More with Less

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Girl Power: Creating More with Less

Abstract:
Studies show that women are very productive employees, but that as business owners, compared to their male counterparts, they run companies that earn less, grow at a lesser rate, and employ a smaller number of employees. One of the explanations for this discrepancy argues that indicators such as sales, turnover or profit do not measure performance adequately because they are dependent on the size of the firm. Since women often make a conscious decision to keep their companies small, these performance measures may not adequately represent women-owned businesses. We study a panel of micro firms across all industries, from three EU countries of comparable size (Croatia, Slovenia, and Slovakia) in the period 2010 – 2019. Results indicate that female-owned firms have higher values of both turnover per asset and value added per asset. Additionally, results suggest that during recession years, female-led firms show a degree of resilience to these adverse effects, and they manage to increase their turnover per asset by 3 to 4 percent on average, compared to male-led firms. We conclude that although women-owned micro firms tend to have less resources compared to men's, women can create larger output per asset, suggesting capability to combine those resources in a very effective way.

Keywords: women entrepreneurship; firm performance; effectuation effect; recession
JEL classification: B54, J16, L26

Ženska moć: Od malo stvoriti mnogo

Sažetak:
Studije pokazuju da su žene vrlo produktivne zaposlenice, ali u usporedbi s muškarcima, vlasnice su poduzeća koja zarađuju manje, rastu po nižoj stopi i zapošljavaju manji broj radnika. Jedno od objašnjenja ovog odstupanja glasi da pokazatelji poput prodaje, prihoda ili dobiti ne mjere uspješnost na odgovarajući način jer ovise o veličini poduzeća. Budući da žene često donose svjesnu odluku da njihova poduzeća ostanu mala, ove mjere uspješnosti možda neće na odgovarajući način predstavljati poduzeća u vlasništvu žena. Oslanjajući se na teoriju efektuacije, tvrdimo da kada se učinak mjeri prema danim resursima, žene rade bolje od muškaraca. Proučavamo panel mikro poduzeća iz svih industrija, iz tri zemlje EU-a usporedive veličine (Hrvatska, Slovenija i Slovačka) u razdoblju 2010.–2019. Rezultati pokazuju da poduzeća u ženskom vlasništvu imaju više prometa po imovini i dodane vrijednosti po imovini. Osim toga, podaci pokazuju da tijekom recesije poduzeća koje vode žene pokazuju određeni stupanj otpornosti na ove štetne učinke te uspijevaju povećati promet po imovini u prosjeku za 3 do 4 posto u usporedbi s poduzećima u vlasništvu muškaraca. Zaključujemo da iako ženska mikro poduzeća obično imaju manje resursa u usporedbi s muškarcima, žene su u mogućnosti stvoriti veći učinak po imovini.

Ključne riječi: žensko poduzetništvo; performanse poduzeća; efekt efektuacije; recesija
JEL klasifikacija: B54, J16, L26

1 Introduction

Some recent findings suggest that women may be more productive than men. "State of the Workplace Report: Gender" (Hive, 2018), based on 3,000 male and female users of its platform, showed that women completed 10 percent more work in less time. European Chamber of Digital Commerce (2019) reported that women worked 20 percent harder and longer than men, with as much as a 20 percent higher chance that they will get done. Abouzahr et al. (2018) reported that startups founded and cofounded by women were better financial investments, because "for every dollar of funding, these startups generated 78 cents, while male-founded startups generated (…) just 31 cents".

At the same time, extant empirical research tells us that, compared to men-owned firms, women-owned businesses earn less, grow at a lesser rate, employ a smaller number of employees, and have a smaller probability of survival (Chaganti & Parasuraman, 1997; Coleman, 2007; Lee & Marvel, 2014; Robb, 2002; Robb & Wolken, 2002; Sabarwal & Terrell, 2008; Watson, 2002).

How can we explain that women seem to be very productive employees, yet they appear to run less successful companies? Fairlie and Robb (2009, p. 1) give one explanation for the performance gap, showing that this is a direct consequence of the fact that female-owned businesses have "less access to capital, less business human capital acquired through prior work experience in a similar business, and less prior work experience in a family business". Another explanation is that performance metric is wrong: indicators such as sales, turnover, and profit do not measure performance adequately because they are dependent on the size of the firm. Size does not equal success because not all enterprises want to get bigger: studies showed that one of the main factors behind firm growth is the intention to grow (Davis & Shaver, 2012; Wiklund & Shepherd, 2003), and women often make a conscious decision to keep their companies small (Watson et al., 2017).

The need to measure performance differently is supported by social feminist theory which posits that as men and women are subjected to different socialization methods from birth and shaped by different experiences, they have fundamentally different ways of viewing the world (Fischer et al., 1993), and consequently different ways of operating in a business environment. Because female-owned firms tend to be intentionally smaller (Sabarwal & Terrell, 2008), performance indicators need to be adjusted for size, as proposed by Watson (2002). When performance is measured as output conditional on assets which a firm employs to create it, the gap between female-owned and male-owned businesses disappears. Watson (2002) provided the evidence demonstrating, on a sample of Australian business owners, that women-owned firms earn comparable rates of return on equity and assets to those earned by men-owned firms. Except for Watson (2002), the literature that investigates gender performance scaled by input is limited: Robb and Watson (2012) look

at the sample of new US ventures and show that there is no difference between the two types of firms when performance is scaled by total assets, and Zolin et al. (2013) showed the same for a sample of Australian new ventures. This literature suggests that although women entrepreneurs on average have less financial, human, and social resources, as documented by extant research (Carter et al., 2007; Robb & Wolken 2002; Still & Timms, 2000), they seem to be very efficient in the use of those resources.

The ability to be more effective in the use of resources becomes particularly important in periods of constricted economic activity. Interestingly, not much is known about business owners' gender differences in how they react to shocks in their environment (Manolova et al., 2020). Almost all existing studies on this topic focused on natural disasters such as earthquakes (Li et al., 2020), hurricanes (Hiramatsu & Marshall, 2018), and pandemics; Josephson & Marshall, 2016; Marshall et al., 2015), and pandemic (Manolova et al., 2020). These studies focused on things other than measuring firm performance: for example Manolova et al.(2020) examined business model adaptations in female and male-owned firms in pandemics, Josephson and Marshall (2016) and Hiramatsu and Marshall (2018) studied business behavior, such as applying for small business loans, following a natural disaster, and Li et al. (2020) and Marshall et al. (2015) investigated long-term firm survival following Wenchuan earthquake in China and Hurricane Katrina in the USA, respectively. While natural disasters usually do cause recessions, these "black swan" events are rare and very specific, unlike economic downturns which may be caused by many "mundane" reasons, such as lack of consumer confidence, restricted financial sector liquidity, higher interest rates, etc. The sparse literature suggests that our knowledge about how entrepreneurs of different genders approach economic crisis is lacking, and that more research in that direction is needed.

In this study, we seek to answer whether and to what extent economic downturns affects performance of women entrepreneurs compared to their male counterparts. To our knowledge, the only other paper that addressed gender differences related to an economic crisis not caused by a natural disaster is Cesaroni et al. (2015) who, based on Italian micro firm survival data in the 2008 financial crisis, concluded that women-owned businesses in Italy showed a greater resilience and were able to deal better with the crisis than men-owned companies. We study a panel of 117,798 micro firms across all industries, from three EU countries of comparable size (Croatia, Slovenia, and Slovakia) in the period 2010–2019. We have chosen three small European countries that share similar economic transition history and Slavic culture, but at the same time are different enough in their industry structure, history of EU accession and their current economic status. They also vary according to the Gender Equality Index, with Slovenia rated the highest (at the average of the EU), followed by Croatia and then Slovakia. As such, they present a different setting compared to large highly developed economies of the US and Australia used in Watson (2002), Robb and Watson (2012), and Zolin et al. (2013). Following the three

quoted papers, in this study we choose performance indicators such as the ratio of firm's turnover to firm's total assets, and the ratio of value added to total assets. Both indicators measure firm efficiency by showing how successfully the firm transforms its resources (measured by total assets) into outputs.

We seek to contribute to the literature in the following ways. We examine how efficiently women-owned micro firms transform assets into output compared to men-owned micro firms and show that women have higher output to input ratio (not just *comparable*, as shown in Watson (2002), Robb and Watson (2012), and Zolin et al. (2013)), thus creating more output with less assets. This contradicts the usual perception of female-owned firms as "weaker". Moreover, we show that in years of economic downturn women-owned firms have better performance than men-owned firms. This is again contrary to expectations that "weaker" women's firms will be hit harder by economic constriction.

We study three small EU countries (Croatia, Slovakia, and Slovenia), while prior findings on input/output gender performance come from the US and Canada and as such need not be transferable. Unlike most extant studies that used a representative sample of firms from one country, we use almost complete micro firm populations from the three countries. In addition, we use a 10 year-long panel, while extant studies used either cross-sectional data or panel with maximum 5 years of data.

The paper is organized as follows. Section 2 presents the theoretical background and our hypotheses, section 3 presents data and methodology, followed by the results and discussion in section 4. Lastly, section 5 provides conclusions.

2 Theoretical background and hypotheses

Gender has significant impact on how entrepreneurs approach and run their businesses. In spirit of social feminist theory, Jennings and Brush (2013) state that "entrepreneurial activity occurs within—and is thus impacted by—systems of socially constructed and widely shared beliefs about the characteristics typically associated with women and men and the behaviors and roles deemed appropriate for members of each sex". These differences are still not fully acknowledged: Ahl and Marlow (2012) claim that the norm against which all entrepreneurs are compared is an idealized image of a male entrepreneur, and that success is measured according to that masculine norm. They further suggest that since women business owners are considered as lacking in masculine qualities, they are somehow deemed defective, although they are only different.

Gender, although socially constructed, is shown to be a powerful determinant of the way entrepreneurs conduct business. Women's intentions for launching and managing new

businesses may differ from men's (Carter & Brush, 2004). Manolova et al. (2012) found that, while men were motivated by a desire for financial success, women were likely to have additional multiple motivations such as a desire for self-realization, recognition, and innovation. Women face different societal pressures than men: they tend to do most of the domestic housework and are the primary care givers for children and other family members. Since they have "many hats", they value work flexibility, practice multitasking, rely on informal networks, and emphasize cooperativity (Smythe & Saunders, 2020). Women work well with other women (Smythe & Saunders, 2020) and that cooperation seems to improve output. For example, Amore et al. (2014) find that female directors significantly improve the operating profitability of female-led companies. Due to various demands on their time, work flexibility is an important issue for women entrepreneurs: they favor both work time flexibility and workplace flexibility. Extant research shows that women have much higher preference for flexible work schedules compared to their male colleagues (Edwards & Field-Hendrey, 2002; Mas & Pallais, 2017; Wiswall & Zafar, 2018). Oladipo et al. (2020) show that women-owned firms can significantly outperform men-owned firms if they can conduct their business from home. The joint effect of female ownership and home-based business is not small: Oladipo et al. (2020) calculate it to be about 39.53 percent ROA gain, concluding that there is "a possibility that female owners can perform better than their male counterparts, if they are able to run their businesses with workplace flexibility" (Oladipo et al., 2020, p. 3).

Considering the amount of evidence about different ways women and men approach business decisions, it is intriguing that there are almost no studies that address the different ways gender affects strategic choice in an economic crisis, such as recession. To our best knowledge, the only study on the topic of gender and recession is Cesaroni et al. (2015), who observed higher survival of female-owned micro firms in Italy following a financial crisis of 2008. Aiming to generate some insight into that, they surveyed a sample of 150 female-owned and 150 male-owned businesses from a province of Marche, seeking to understand what business strategies were employed during the economic downturn of 2008. They found that a large majority of entrepreneurs used defensive strategies aimed to improve efficiency, such as restructuring, resizing, and refocusing the core business. However, women used these strategies more frequently than men. This result is not surprising considering that offensive strategies require resources, and that female-owned businesses have fewer resources even in the best of times. The question of whether gender difference in strategic approach results in better or worse performance during and after economic downturn has not been resolved yet, and we attempt to contribute to that discussion with this paper.

With that in mind, to help formulate our hypotheses, we turn to the theory of effectuation, a decision-making framework that guides entrepreneurial action and behavior (Sarasvathy, 2001, 2008). Effectuation and causation are two alternative, but non-exclusive approaches

entrepreneurs use when running their businesses (Chandler et al., 2011; Yang et al., 2021). To quote Sarasvathy (2001, p. 245), "causation processes take a particular effect as given and focus on selecting between means to create that effect. Effectuation processes take a set of means as given and focus on selecting between possible effects that can be created with that set of means". In other words, causation approach entails up-front planning to achieve specific goals, followed by execution of those plans. It assumes that the future is predictable, and it requires high up-front resource commitments (Sarasvathy, 2001; Smolka et al., 2018). Contrary to that, effectuation approach assumes unpredictable phenomena, which is why decision makers will try to gather information through experimental and iterative learning techniques. Effectuation espouses the principle of affordable loss, which means that activities are chosen so that they never generate losses greater than the set limit (Sarasvathy, 2001). Consequently, effectuation means that downside risks are limited, and operations are kept lean (Smolka et al., 2018; Yang et al., 2021). Since women entrepreneurs find it harder to obtain external financing, they may naturally be pushed toward effectuation strategy as opposed to causation, because it does not require up-front investments and is financially frugal. In other words, lack of access to resources and their high cost compels women to make the most from the resources they have, i.e., to practice effectuation. In addition, effectuation also espouses collaboration and commitment-based trust, as opposed to competition and hard contractual agreements favored by causation (Smolka et al., 2018), which better fit female management style. Maybe for all these reasons, women seem to be better at effectuation, as shown by Yang et al. (2021, p. 81), who find that "when entrepreneurs use resource combination activities to obtain growth through the effectuation approach, female entrepreneurs will utilize their existing resources with more efficiency than male entrepreneurs". In other words, when both men and women are required to practice effectuation, women get better results.

This paper focuses on micro firms that usually face larger unpredictability compared to other enterprises. Smaller businesses are more vulnerable to alterations in their environment, such as changes in demand or even conditions such as extreme weather (Collier, 2016). Due to their limited cash flow, they face higher financial risk. This larger uncertainty is likely to discourage linear planning, which is incorporated in causation approach, and hence likely to favor effectuation approach. Consequently, those entrepreneurs who are better at effectuation (as Yang et al. (2021) show women to be) should show better business outcomes. Thus, we formulate the following hypothesis:

Hypothesis 1:
Overall, women-owned micro firms have better performance measured as output per assets compared to their male counterparts.

Following the same line of reasoning, it would be sensible to expect that the more unstable the environment is, the more all entrepreneurs are forced to utilize effectuation. Those of

them who are more proficient with that strategy can be expected to achieve a better outcome. Therefore, uncertain times, such as recession years, should favor women entrepreneurs because they are better at effectuation, as Yang et al. (2021) show. Thus, we formulate the following hypothesis:

Hypothesis 2:
In recession, women-owned micro firms have better performance measured as output per assets compared to their male counterparts.

3 Data and methodology

3.1 Data

This research utilized two datasets: (1) financial and structural data on the population of enterprises for the 2010 – 2019 period for Croatia, Slovenia, and Slovakia, obtained from the Buerau Van Dijks' AMADEUS database (hereinafter: FINANCIALS dataset); and (2) data on demographic information of business owners (hereinafter: OWNERS dataset), obtained from the same source. The FINANCIALS dataset includes balance sheet and profit and loss statement data covering more than 300 variables, as well as firm characteristics such as region, size, industry sector, firm ID and year of the report. On the other hand, the OWNERS database contains identifiers for entrepreneurs, together with their demographic characteristics such as age and gender, but also their position and function within the firm. Our analysis is concentrated on micro firms (up to 10 employees) in private ownership only.

After merging the FINANCIALS and OWNERS datasets, we start data cleaning procedure for each country. First, we remove all firms with no gender ownership information. We then remove all firms from certain NACE 1-digit sectors (section T – activities of households as employers, undifferentiated goods- and services-producing activities of households for own use; and section U – activities of extraterritorial organizations and bodies) as their number in our sample is less than 20 firms. Finally, we exclude outliers, defined as top and bottom 1 percent observations according to turnover, value added, and total assets. We, thus, end up with 45,578 firms from Croatia, 26,146 firms from Slovenia and 47,913 firms from Slovakia.

3.2 Method and variables used in the analysis

Performance indicators include turnover divided by total assets, and value added divided by total assets[1]. Total assets (their book value) also include intangible assets, so with this approach we also capture specific intellectual property or specific proprietary skill set, if it exists. As firm assets are resources used for creation of economic benefit (Corporate Finance Institute, 2021), these two indicators measure how efficiently firms can convert resources into outputs. Since chosen indicators are adjusted for firm resources, they do not favor larger firms based only on their size, and as such are more objective measures of firm success. For example, traditional indicators such as turnover and value added would favor a firm that is large but inefficient over a small but very efficient firm. On the other hand, as Watson (2002) points out, investors would rather choose a small efficient firm, which means that traditional indicators may not by itself be a good basis for comparison.

In this study we choose not to consider output per employee as an indicator. We do this because the number of employees may not be an accurate measure of labor input in micro firms. Many micro firms are family-owned, where it is customary that family members contribute with unrecorded and unpaid work (Philipps, 2008). Having said that, we still use a number of employees as a rough indicator of a firm's size (although we cannot precisely measure real labor input, we can still agree that a firm with five registered employees is organizationally different from a firm with one registered employee).

Effect of gender ownership structure on the performance of a firm is empirically investigated using the following model:

$$\begin{aligned} OutputTa_{isct} = {} & \alpha + \beta_1 l_{isct} + \beta_2 DebtRatio_{isct} + \beta_3 FirmAge_{isct} + \psi_s + \theta_c + \phi_{1t} \\ & + \phi_2 Recession_{ct} + \gamma_1 Female_{isc} + \gamma_2 Female_{isc} \times Recession_{ct} + \varepsilon_{isct} \end{aligned} \quad (1)$$

$OutputTa_{isct}$ is a generic name which stands for output divided by total assets. Since we have two measures of output, our dependent variables will be $TurnTa_{isct}$, and $ValueTa_{isct}$. More precisely, for a firm i in NACE 2-digit sector s in country c in time t, variable $TurnTa$ represents the (ln) turnover over total assets, and $ValueTa_{isct}$ represents the (ln) value added over total assets.

As for independent variables, l represents (ln) number of employees, a proxy for firm size, $DebtRatio$ represents (ln) value of total liabilities divided by total assets, $FirmAge$ is the number of years certain firm is on the market, ψ_s is the NACE 2-digit sector fixed effect, θ_c

[1] We chose to consider value added rather than profits because value added is a much broader performance measure than net income, as it also provides information about output which goes to other participants of the production process, for example labor, taxes, etc. (Haller and Stolowy, 1998). Since we compare three countries with different tax rates, and that fact can affect the comparison of net income, we choose to investigate turnover and value added, quantities that are not affected by national regulations.

is the country fixed effect, ϕ_{1t} is the year fixed effect, *Recession* is a dummy variable indicating whether there was a recession in a particular country in a particular year, *Female* is a dummy variable indicating a woman ownership of the firm, *Female×Recession* is a dummy interaction variable indicating a woman ownership of the firm in a recession year, and ε_{isct} is the error term of the model assumed to follow normal distribution with zero mean and a constant variance.

Our inclusion of the number of employees (firm size)[2] and firm age is customary for analyses of this type and was used in Watson (2002) and Robb and Watson (2012), as firm performance measures can be impacted by the number of employees as well as industry and market specific knowledge which is correlated with firm age. As customary, we utilize technological sector variables to account for specificities arising from belonging to different industry sectors. To gain a better insight on the impact of gender, we included some additional firm specific variables. Justification for inclusion of debt ratio is to approximate firms' financial constraints, as financially more constrained (vulnerable) firms may be worse performers. We also included an indicator of recession in each country, which is 1 in years of economic downturn, and 0 otherwise. Geographic variable captures spatial factors that may affect firms (for example operating in a depressed region as opposed to a more prosperous one). Description of all variables used in this research is presented in Table 1.

Table 1 **Description of variables used in the analysis**

Variable	**Description**
Dependent variable	
Turnover	ln(1 + real revenue from sales)
Value added	ln(1 + real value added)
Firm characteristics	
Firm Age	Age of the firm
*Firm performance characteristics**	
Labor	ln(1 + number of employees)
Total assets	ln(1 + real value of total assets (both current and non-current))
Average wage	ln(1 + real average personnel costs)
Debt ratio	ln(real total liabilities / real total assets)
Fixed effects	
Sector	Dummy for each NACE Rev. 2 2-digit sector** in our sample
Country	Dummy for each country in our sample
Recession	Dummy for recession year in a particular country
Year	Dummy for each year in our sample
Female	Dummy for female-ownership of a particular firm

*Notes: * All monetary variables are expressed in EUR and were deflated using year- and sector- (NACE 2-digit) specific Eurostat output deflators with base in 2010. **Definitions of these sectors are available at https://ec.europa.eu/eurostat/documents/3859598/5902521/KS-RA-07-015-EN.PDF.*

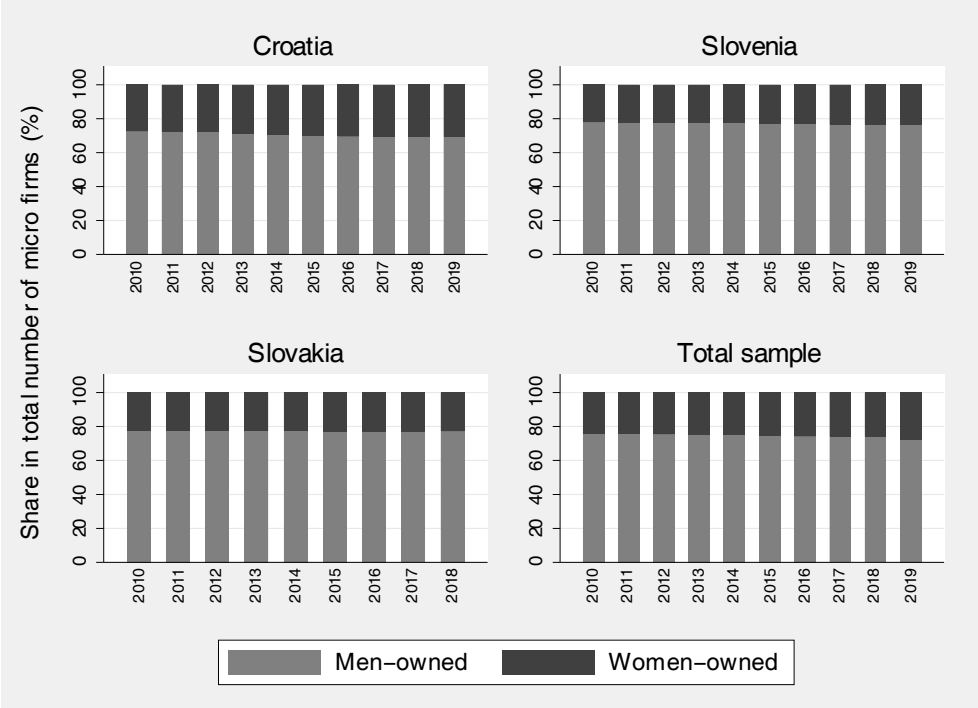
[2] Even though our analysis is based solely on micro-sized firms, this is included in the model to disentangle effects of micro-sized firms with, for example, one employee from micro-sized firms with 9 employees (maximum number of employees to be categorized as micro firm).

4 Results

4.1 Descriptive statistics

In this section we present some descriptive statistics, while remaining descriptive information is available in Table A1 in the Appendix. Figure 1 presents a gender distribution of micro firms across observed period in each of the selected countries and the overall sample. For Slovenia and Slovakia, the share of women-owned firms is relatively constant at about one-in-five throughout the analyzed period. In Croatia, on the other hand, the share of female-led firms slightly increased from about 25 percent in 2010 to about 30 percent in 2019.

Figure 1 **Gender ownership distribution of micro firms by years and countries**

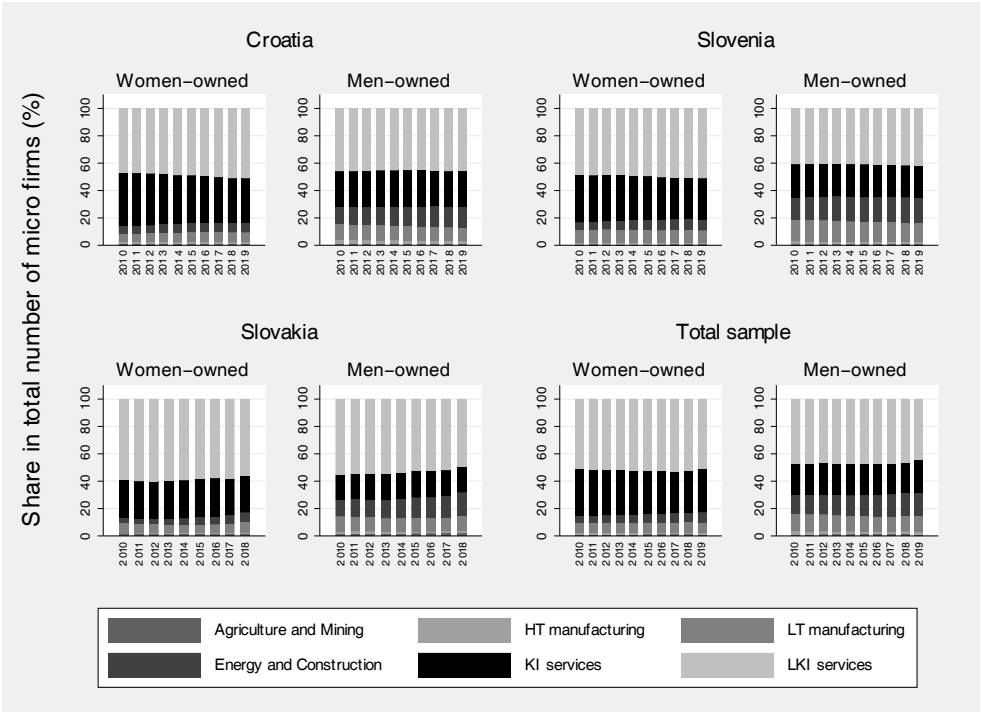


Sources: AMADEUS database and authors' calculations.

Figure 2 presents a gender distribution of micro firms across the observed period and across selected technological sectors in each of the selected countries and the overall sample. What is common across all three countries is that women-owned enterprises are mainly concentrated in less knowledge-intensive (LKI) service industries, such as wholesale and retail trade, warehousing, travel agencies, services to buildings, business and office support activities, rental and leasing activities. However, these are all activities where the most of men-owned firms also operate. The greatest differences between men- and women-owned firms are found in LKI "other" service industries (this further sub-division is not shown on

graph), such as postal and courier activities, washing and (dry-)cleaning of textile and fur products, hairdressing and other beauty treatments, funeral and related activities, and physical well-being activities. Women are over-represented in these industries, especially in Croatia where the percentage of firms goes up to about 90 percent in 2019. Compared to men-led firms, enterprises run by women are also over-represented in knowledge-intensive (KI) service industries (such as legal and accounting activities, management consultancy activities, technical testing and analysis, and advertising and market research). On the other hand, women-led firms are under-represented (compared to men) in low-technological (LT) manufacturing industries (such as manufacture of coke and refined petroleum products, manufacture of rubber and plastic products, manufacture of basic metals, repair and installation of machinery and equipment, manufacture of food products, beverages, tobacco products, textile, wearing apparel, wood and products of wood, paper and paper products, printing and reproduction of recorded media, and manufacture of furniture), and construction industry. In Slovenia, the share of women-owned firms across technological sectors remained relatively constant throughout the analyzed period, while in Croatia and Slovakia the share of female-led firms increased in LKI service industries at the expense of KI service industries.

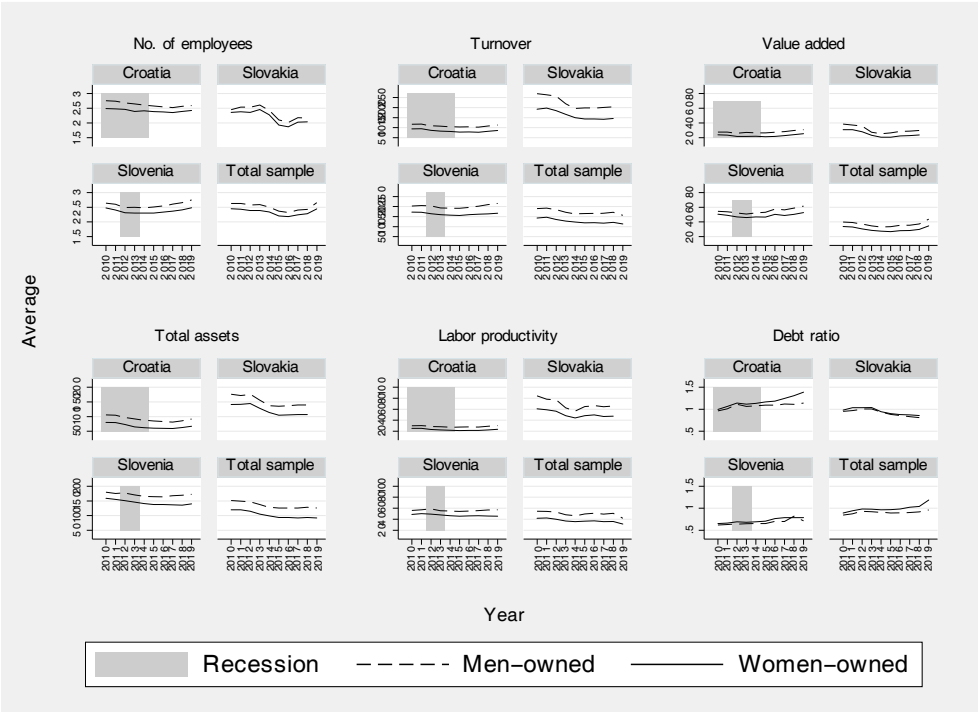
Figure 2 **Gender ownership distribution of micro firms by years, countries, and technological intensity sectors**



Notes: HT = high-tech, LT = low-tech, KI = knowledge-intensive, LKI = less knowledge-intensive. Definitions of these technology sectors are available at https://ec.europa.eu/eurostat/cache/metadata/Annexes/htec_esms_an3.pdf.
Sources: AMADEUS database and authors' calculations.

Figure 3 presents a distribution of selected performance indicators for women- and men-owned micro firms for each country and overall sample by each year in our analyzed period 2010 – 2019. We also include a reference to the period each country spent in recession, following the 2008 financial crisis. As evident, it took Croatia the longest to recover from adverse effects of the crisis (recession period ranged from 2009 – 2014), followed by Slovenia which recorded two years of recession (2012 and 2013). Finally, Slovak economy showed the greatest resilience to adverse effects of the 2008 financial crisis, as it recorded negative growth rate only in 2009, and returned on growth curve from 2010 onwards. Focusing now on performance indicators, men-owned micro firms recorded higher values in all selected performance indicators throughout the analyzed period, regardless of the analyzed country or the state of economy (recession or expansion). Also, both types of firms follow the same trend in these indicators, and the difference in average values seems to be rather consistent. Focusing now on individual countries, firms from both Slovenia and Slovakia have higher average values of turnover, total assets, and labor productivity compared to Croatia, which is not surprising given that Croatia is lagging in terms of GDP per capita. In terms of the number of employees, there are no noticeable differences among countries, but given that we are concentrating on micro firms only, this is to be expected. A more detailed descriptive statistics of these indicators are presented in Table A1 in the Appendix.

Figure 3 **Gender ownership distribution of selected firm performance indicators across the observed period**



Notes: Scales on vertical axes are different for each variable but are consistent for each country within the same variable. All monetary variables are expressed in EUR. Turnover, value added, total assets and labor productivity are expressed in thousands of EUR. Recession years are denoted by shading.
Sources: AMADEUS database and authors' calculations.

Figure 4 presents a distribution of our two selected independent variables, both for women- and men-owned micro firms for each country and overall sample by each year in our analyzed period 2010 – 2019. As before, we also include a reference to the period each country spent in recession (represented as shaded area on graphs). These relative indicators suggest that, compared to male-led firms, ratio of firm's turnover to firm's total assets and ratio of firm's value added to firm's total assets are both higher for female-led firms, regardless of country or year. The difference seems to be most dominant in Croatia, and least evident in Slovakia. Moreover, this difference seems to be rather consistent throughout the analyzed period in Slovenia and Slovakia, while in Croatia it seems to be increasing, especially from 2015 onwards.

Figure 4 **Gender ownership distribution of selected firm performance indicators across the observed period**

Notes: Scales on vertical axes are different for each variable but are consistent for each country within the same variable. All monetary variables are expressed in EUR.
Sources: AMADEUS database and authors' calculations.

4.2 Model estimation and results

Our results are presented in Table 2, where the first two columns present results related to turnover, and the last two columns present results related to value added. For each output variable, we estimated two different models: the nominal output is considered first, followed by the output scaled by total assets. As mentioned before, we do not scale performance by number of employees, because we consider it as a not very precise measure.

Namely, it is possible that a lot of unpaid and/or undeclared work happens in micro firms, especially if the firm is owned by a family. As mentioned before, we still use a number of employees as a rough indicator of a firm's size.

Table 2 shows that the output indicators increase as a firm increases its number of employees, capital, and average wage. These are all standard and expected results, well documented in previous literature. Interestingly, we find a negative effect of firm age, meaning the longer the firm is on the market its output indicators will be lower. One possible explanation is that as a firm spends more years on the market, its assets start to accumulate, so the ratio of turnover (value added) to assets starts to decline. Next, as expected, we find a negative impact of recession on both output indicators, as negative economic climate that comes with recession reduces business opportunities and limits potential for earnings, especially for micro firms.

Table 2 **Estimation results**

	Turnover	**Turnover / assets**	**Value added**	**Value added / assets**
Regressors[a]	(1)	(2)	(3)	(4)
Capital (total assets)	0.448***		0.218***	
	(0.001)		(0.001)	
Employees	0.617***	0.126***	0.829***	0.118***
	(0.003)	(0.003)	(0.002)	(0.003)
Debt ratio	-0.015***	0.073***	-0.176***	-0.058***
	(0.001)	(0.002)	(0.001)	(0.002)
Average wage	0.416***	0.187***	0.640***	0.298***
	(0.002)	(0.002)	(0.002)	(0.002)
Firm age	-0.011***	-0.028***	-0.008***	-0.031***
	(0.000)	(0.000)	(0.000)	(0.000)
Recession	**-0.033*** **	**-0.093*** **	**-0.016*** **	**-0.105*** **
	(0.004)	**(0.006)**	**(0.004)**	**(0.007)**
Female owner	**-0.063*** **	**0.018*** **	**-0.027*** **	**0.090*** **
	(0.003)	**(0.004)**	**(0.002)**	**(0.004)**
Recession × Female owner	**0.047*** **	**0.040*** **	**0.036*** **	**0.027*** **
	(0.006)	**(0.008)**	**(0.005)**	**(0.008)**
N	559,914	559,914	519,057	518,676
Adjusted R^2	0.659	0.521	0.703	0.595

*Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$, two-sided p values.*
[a] In these models we also control for effects of years, NACE 2-digit sectors and countries. However, for the sake of brevity and presentation purposes, these results are available on request.
Source: Authors' calculations.

As expected, the data show that female-owned firms perform better in terms of both turnover per asset and value added per asset. Compared to men-owned firms, women-owned firms have higher turnover per asset by 1.8 percent, and higher value added per asset by 9.0 percent, on average. This confirms Hypothesis 1.

Additionally, the data show that during recession years, where the overall turnover per asset and added value per asset in the economy is dropping, female-led firms show a degree of resilience to these adverse effects, and they manage to increase their turnover per asset by 4.0 percent and value added per asset by 2.7 percent. Therefore, Hypothesis 2 is confirmed.

We have additionally run our model based on firm age (Table A2 in the Appendix), to account for the fact that male-led firms might be growing faster. Namely, it has been established, in the literature, that, unlike men, women business owners often make conscious decisions to keep their companies small. In light of that, a question arises if it is appropriate to compare micro firms owned by women (which may be small by choice, and otherwise very successful), with micro firms owned by men, because the latter may include mostly unsuccessful firms (as successful men-owned firms intend to grow beyond micro size). To check for this, we conducted panel regressions for three subgroups of firms: firms up to five years of age, firms between five and ten years of age, and finally firms older than ten years of age. Our findings show robustness of our model, namely within each group female owned firms perform better, and there is a positive effect of being a female-owned firm in recession.

4.3 Discussion

Our results confirm the findings of Watson (2002), Robb and Watson (2012), and Zolin et al. (2013), that the female underperformance hypothesis is not correct. Moreover, our data show that women-owned firms are not just equal but better performers when output is scaled by assets. A particularly interesting finding is that recession does not damage the performance of female-owned micro firms to the same extent as men-owned firms, since our data show that, in recession years, female-owned firms have better performance than male-owned firms.

How can these findings be explained? To understand what could be driving our results, we call upon causation-effectuation theory. It is important to state that we did not measure these constructs in our study, which would involve administering one of the developed scales via a questionnaire (Chandler et al., 2011; Melo et al., 2019). Since our goal was to study entire micro-firm populations of three countries, the cost of such a survey would reach prohibitive levels. Having said that, we believe that we can still use established knowledge about effectuation and causation to shed light on our findings.

Effectuation and causation are two non-exclusive management styles. Effectuation takes a set of means as given and chooses a goal that is achievable with those means. It assumes that phenomena are unpredictable and can be navigated through experimental and iterative learning techniques, flexibility, and lateral thinking. Activities are chosen so that they never generate losses greater than the set limit (Sarasvathy, 2001), which keeps the operation lean

and limits downside risks (Smolka et al., 2018; Yang et al., 2021). Opposite to that is causation management style, which fixes a specific goal, and then chooses a set of means to achieve it. It assumes that environment is predictable and uses linear planning to reach the desired goals. Causation, unlike effectuation, requires high upfront investment of resources (Sarasvathy, 2001; Smolka et al., 2018).

The description of effectuation style reads as a description of how female-owned micro firms are usually managed: women often find it hard to acquire sufficient resources, in particular external financing, so they frequently have to manage with what is available, making sure they do not exceed a loss greater than the set limit. Flexibility (including workplace and worktime), an important characteristic of effectuation approach, is both highly valued by and necessary for women entrepreneurs. Flexibility is particularly important because women business owners deal with some degree of uncertainty daily, as various societal requests on their time can be unpredictable. Since they tend to frequently practice effectuation management style, women entrepreneurs become more effective at it compared to men, as Yang et al. (2021) show.

Generally, the fact that micro firms face larger uncertainty compared to other firms (Collier, 2016) pushes entrepreneurs of both genders towards practicing effectuation, as opposed to causation which requires planning and upfront commitment of resources. This situation favors those business owners who are better at effectuation, which is why they can be expected to be more productive. Therefore, in line with Yang et al. (2021), it could be anticipated that female-owned firms perform better, especially in years of economic downturn when effectuation is an even more suitable approach for micro firms, due to larger uncertainty. Indeed, our data show that female micro firm owners can generate more output per asset compared to their male counterparts. The fact that women owners usually have less assets than men, and that they generate more per asset, suggests that they can use their existing resources more effectively.

5 Conclusion

In this paper we investigate the female underperformance hypothesis. We examine output scaled by assets, both in "normal" and in recession years. On average, comparison of female and male owned micro firms shows that women are better at generating higher turnover per asset (1.8 percent), and higher value added per assets (9 percent). While our data show that recession periods are indeed damaging for all firms (both turnover per asset and value added per asset show decline of about 10 percent), it is evident that, in recession years, women perform better than men in terms of output per asset. We can explain these findings by drawing upon theory of effectuation and causation. Since women are better versed in effectuation, they perform better in situations that discourage causation (Yang et

al., 2021). These include times of economic downturn, but also everyday uncertainty associated with running a micro firm even at the best of times.

To conclude, our data show that although women-owned micro firms tend to have less assets than men-owned micro firms, women can combine those assets in a very efficient way, so that they can generate higher output per asset than men entrepreneurs. Our findings are like those by Watson (2002), Robb and Watson (2012), and Zolin et al. (2013), except that those studies find no difference between genders in output per asset, while we find that women business owners are more efficient than men. This discrepancy can be explained by different business environments. The US and Australia are ranked much better on ease of doing business than the three countries from our study (The World Bank, Doing Business project 2019, rankings for the referenced countries are: the US 6, Australia 14, Slovenia 37, Slovakia 45, Croatia 51). This means that the amount of uncertainty that micro firms face is likely to be smaller in the US and Australia compared to the three countries from our study. For that reason, businesses in the three countries will be pushed toward effectuation management style to a larger extent than those in the US and Australia. This in turn will allow women to capitalize on their experience in practicing effectuation.

In this paper we rely on the social feminist theory, which claims that different socialization experiences of the two genders result in different behavior patterns, including different business management styles. Our data support this view by showing that women have adapted to their specific circumstances by becoming more effective at combining their existing resources to produce output. Many countries introduce subsidies targeted at women entrepreneurs, aimed at increasing their numbers and hence, producing growth. The fact that women are very effective in combining existing resources does not mean that subsidies for women are not warranted. It is quite the opposite, as Srhoj et al. (2021) show: even small women-targeted subsidies aimed at providing annual cost of childcare or skill acquisition produce a significant increase in output, showing that public support to women entrepreneurs pays off.

The study in this paper uses almost full micro-firm populations in three EU countries. The large scale of this research precluded the use of a questionnaire, which could capture personal characteristics of women entrepreneurs, such as their employment history, levels of their human and social capital, their personal or family wealth, number of children, and partner's employment history. Also, a questionnaire could address specific questions regarding utilization of effectuation or causation approach in firms. Future research could use smaller scale surveys on representative samples to examine the impact of personal characteristics of the owner on utilization of effectuation management style.

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Appendix

Table A1 **Descriptive statistics of performance variables (averages)**

Panel A: Men-owned firms										
Country	**Year**	**Number of employees**	**Turnover**	**Value added**	**Total assets**	**Turnover / total assets**	**Value added / total assets**	**Labor productivity**	**Debt ratio**	**Average wage**
Croatia	2010	2.76	116.78	27.65	106.06	1.83	0.53	29.97	0.96	5.47
	2011	2.74	117.26	27.58	104.86	1.93	0.56	30.34	1.01	5.33
	2012	2.69	109.56	25.90	96.91	2.06	0.59	28.81	1.11	5.09
	2013	2.65	107.51	27.00	92.08	2.31	0.74	28.29	1.07	4.99
	2014	2.61	103.98	26.43	87.75	2.45	0.79	27.47	1.08	5.03
	2015	2.57	103.34	26.51	85.01	2.60	0.83	27.53	1.09	4.96
	2016	2.54	104.08	27.27	83.10	2.67	0.89	28.02	1.09	5.02
	2017	2.52	102.37	28.22	81.46	2.74	0.97	27.65	1.12	5.25
	2018	2.57	108.04	29.71	85.99	2.75	0.98	29.23	1.11	5.52
	2019	2.59	112.58	30.90	91.77	2.73	0.99	30.34	1.14	5.88
Slovenia	2010	2.64	202.76	54.40	179.83	1.87	0.59	55.87	0.62	11.75
	2011	2.60	204.71	53.78	175.47	1.96	0.61	57.14	0.63	11.70
	2012	2.49	203.48	52.15	176.91	1.97	0.60	59.00	0.64	11.75
	2013	2.50	193.35	50.70	170.67	1.98	0.62	55.39	0.65	11.23
	2014	2.48	191.82	52.26	165.63	2.05	0.67	54.83	0.65	11.35
	2015	2.51	191.19	53.24	164.11	2.07	0.69	54.14	0.65	11.43
	2016	2.55	196.02	57.40	164.07	2.17	0.78	54.73	0.70	11.63
	2017	2.60	202.09	56.47	167.71	2.16	0.73	55.69	0.70	11.76
	2018	2.66	209.47	58.74	169.29	2.21	0.75	56.85	0.82	11.94
	2019	2.75	215.76	61.51	172.57	2.24	0.78	57.18	0.71	12.52
Slovakia	2010	2.45	269.15	38.39	176.25	2.25	0.38	84.37	0.95	8.31
	2011	2.54	263.63	37.24	171.59	2.33	0.36	78.13	0.97	7.53
	2012	2.54	256.90	35.70	175.73	2.25	0.36	77.06	1.01	7.88
	2013	2.61	218.93	27.41	156.15	2.22	0.33	62.59	1.01	5.73
	2014	2.43	195.85	25.32	136.90	2.24	0.36	56.55	0.94	4.93
	2015	2.11	198.73	26.43	135.16	2.27	0.36	64.78	0.88	5.22
	2016	2.02	197.78	28.40	137.06	2.22	0.37	66.65	0.86	5.93
	2017	2.18	200.96	28.93	139.63	2.16	0.37	64.52	0.83	5.64
	2018	2.16	203.64	29.83	139.47	2.22	0.37	66.12	0.81	5.96

Note: Turnover, value added, total assets, labor productivity, and average wage are expressed in thousands of EUR.

Panel B: Women-owned firms										
Country	**Year**	**Number of employees**	**Turnover**	**Value added**	**Total assets**	**Turnover / total assets**	**Value added / total assets**	**Labor productivity**	**Debt ratio**	**Average wage**
Croatia	2010	2.49	93.66	24.00	80.15	2.09	0.74	25.32	1.00	5.04
	2011	2.48	94.38	23.44	79.56	2.20	0.78	25.33	1.07	4.89
	2012	2.46	86.44	21.68	72.72	2.31	0.79	23.47	1.14	4.63
	2013	2.39	82.22	21.62	65.16	2.67	0.97	22.31	1.11	4.49
	2014	2.41	80.50	21.79	62.50	2.93	1.09	21.98	1.13	4.59
	2015	2.39	77.51	21.30	60.72	3.02	1.14	21.21	1.17	4.49
	2016	2.38	78.59	21.61	60.04	3.23	1.18	21.61	1.18	4.50
	2017	2.36	77.29	22.83	59.51	3.28	1.31	21.62	1.25	4.76
	2018	2.39	81.43	24.17	63.04	3.45	1.41	22.57	1.31	5.00
	2019	2.42	85.98	25.36	67.27	3.24	1.35	23.70	1.39	5.39
Slovenia	2010	2.48	172.05	50.54	159.17	2.04	0.72	48.73	0.65	11.71
	2011	2.40	171.35	48.97	155.20	2.10	0.73	50.20	0.66	11.51
	2012	2.31	164.47	46.81	150.85	2.11	0.72	49.28	0.69	11.44
	2013	2.30	159.95	45.94	145.49	2.21	0.76	47.81	0.68	11.02
	2014	2.30	156.59	46.75	140.65	2.22	0.80	46.45	0.69	11.01
	2015	2.30	155.34	46.67	137.20	2.27	0.82	45.63	0.70	11.14
	2016	2.34	159.62	50.24	137.97	2.44	0.95	46.08	0.76	11.29
	2017	2.37	161.71	48.68	136.74	2.50	0.90	46.46	0.79	11.29
	2018	2.41	163.39	50.35	135.64	2.50	0.93	45.95	0.79	11.38
	2019	2.48	166.53	52.76	139.60	2.53	0.98	45.65	0.79	11.85
Slovakia	2010	2.36	192.18	30.93	141.41	2.37	0.48	60.64	0.98	7.83
	2011	2.38	197.86	30.81	141.83	2.51	0.49	59.06	1.03	7.38
	2012	2.36	184.86	27.94	144.41	2.34	0.45	56.64	1.04	7.42
	2013	2.46	166.34	23.15	127.96	2.34	0.44	48.38	1.04	5.40
	2014	2.28	149.71	20.62	114.21	2.34	0.46	44.38	0.95	4.69
	2015	1.93	143.52	20.73	104.65	2.33	0.44	48.37	0.90	4.99
	2016	1.87	142.72	22.25	106.17	2.22	0.47	49.60	0.88	5.57
	2017	2.03	141.80	22.75	106.89	2.20	0.46	46.78	0.87	5.37
	2018	2.03	145.50	23.49	106.83	2.26	0.47	47.34	0.86	5.66

Note: Turnover, value added, total assets, labor productivity, and average wage are expressed in thousands of EUR.
Sources: AMADEUS database and authors' calculations.

Table A2 **Estimation results based on firm age**

	Up to 5 years		5 – 9 years		10 years or above	
	Turnover / assets	**Value added / assets**	**Turnover / assets**	**Value added / assets**	**Turnover / assets**	**Value added / assets**
Regressors[a]	(1)	(2)	(3)	(4)	(5)	(6)
Employees	0.126***	0.141***	0.155***	0.154***	0.130***	0.111***
	(0.005)	(0.006)	(0.006)	(0.007)	(0.005)	(0.006)
Debt ratio	0.040***	-0.167***	0.080***	-0.054***	0.118***	0.056***
	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)
Average wage	0.203***	0.343***	0.192***	0.294***	0.239***	0.336***
	(0.003)	(0.003)	(0.004)	(0.005)	(0.005)	(0.005)
Firm age	-0.076***	-0.108***	-0.040***	-0.038***	-0.008***	-0.006***
	(0.001)	(0.002)	(0.002)	(0.002)	(0.000)	(0.001)
Recession	**-0.123*** **	**-0.113*** **	**-0.048*** **	**-0.049*** **	**-0.050*** **	**-0.061*** **
	(0.009)	**(0.011)**	**(0.013)**	**(0.014)**	**(0.009)**	**(0.011)**
Female owner	**0.017*** **	**0.081*** **	**0.016** **	**0.095*** **	**0.019*** **	**0.092*** **
	(0.005)	**(0.006)**	**(0.008)**	**(0.009)**	**(0.006)**	**(0.007)**
Recession × Female owner	**0.020**	**-0.016**	**0.001**	**-0.024**	**0.064*** **	**0.068*** **
	(0.013)	**(0.014)**	**(0.018)**	**(0.020)**	**(0.011)**	**(0.013)**
N	238,341	217,644	123,077	112,966	198,496	188,066
Adjusted R^2	0.516	0.637	0.503	0.678	0.596	0.652

*Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$, two-sided p-values.*
a In these models we also control for effects of years, NACE 2-digit sectors and countries. However, for the sake of brevity and presentation purposes, these results are available on request.
Source: Authors' calculations.

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