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Differences and determinants of female entrepreneurship across selected EU countries: some empirical evidence for the period 2010–2018

Determinanty przedsiębiorczości kobiet w wybranych krajach UE: analiza empiryczna w latach 2010–2018

Introduction

Contemporary processes of economic development result not only from changes related to productivity, development of modern technologies, digitisation, and automation of production processes, but also from changes in attitudes and entrepreneurial behaviour. In today's economic environment, female entrepreneurship is becoming increasingly important. This is a consequence of, among other things, increasingly dynamic technological development, and related solutions, which are largely implemented in those sectors of the economy where women have traditionally been the predominant employees. The source of female entrepreneurial behaviour lies in the decreasing number of jobs for women and their growing aspirations and goals to secure financial independence and increase their income. It is expressed in the participation of women in economic processes in the form of self-employment. Entrepreneurship, by definition, refers to an activity characterised by creative thinking and creative approaches to human and physical resources at the disposal of an enterprise (Penc, 2008). Entrepreneurship also means a willingness to take economic risks, which is especially important in entrepreneurial behaviour. Female entrepreneurship is an important issue from the point of view of economic development and growth as well as due to the complexity of the phenomenon resulting from economic, social, demographic, cultural, sociological, and political conditions. Female entrepreneurship is of increasing interest to researchers, research institutions, economic analysts, and decision makers in the macroeconomic sphere. According to GEM

reports (Global Entrepreneurship Monitor, 2013), in 2012, about 126 million women from 67 countries started their own business. Additionally, 98 million women in the same regions had already been running their businesses for at least 3 years. It gives a total of 224 million self-employed women in the economies of 67 countries (Kelley et al., 2013). The results of the research indicate that female entrepreneurship in the economic sphere is growing, as is the role of women in politics, culture, and sports. The requirements of a market economy, progressing globalisation processes and growing competitive pressures mean that national economies, like the entire global economy, need female entrepreneurs as sources of job creation and stimulation of development processes.

Decisions on undertaking business activities are the result of a clash between psychologically, culturally, and socially determined intrinsic motivations and economically determined extrinsic motivations (Borowska, 2013). The article analyses quantitative indicators related to the social and economic sphere. Psychological and cultural determinants are of qualitative nature and are more difficult to measure, which does not mean that they have less influence on the course of the phenomenon and processes of female entrepreneurship. Intrinsic motivation includes pursuit of financial independence, attainment of higher income, negative experiences of paid employment, favourable market conditions, lack of employment opportunities, threat of unemployment, and greater certainty of self-employment. External determinants are divided into nationwide determinants and framework determinants of entrepreneurship, which include such features of the economy as openness, growth dynamics, monetary stability, efficient operation of the market, availability of capital, public programs to support entrepreneurship, commercial and professional infrastructure, technical infrastructure, education systems, cultural and social norms (Lisowska, 2008). Factors influencing female entrepreneurship also include social, demographic, and institutional factors. Social and demographic factors include those related to family situation, age, education level, ethnicity, previous experiences of employment and self-employment. Institutional factors include the availability of capital, childcare system, parental leave, and business costs (Verheul, van Stel Thurik, 2006). Both men and women face barriers that limit their willingness to take entrepreneurial actions. Eurostat surveys show that more women than men point to the lack of sources of finance and fear of the risk of failure as the main reasons for not starting a business (Lubińska-Kasprzak, 2010). According to the surveys, there are no significant differences between female and male entrepreneurs. An attempt was made to create a typology of female entrepreneurs. Factors such as age, prior employment, family responsibilities and background

were considered in creating individual types of female entrepreneurs. The research indicated five types (McKay, 2001):

- drifting young woman choosing self-employment to avoid being unemployed,
- young conqueror: aspiring, inexperienced, but well educated,
- conqueror: educated with prior work experience,
- returnee: a woman who decides to start her own business while returning to the labour market after a long career break,
- traditionalist: a woman over 45 who has always worked in the family business.

In addition to this typology, there are studies by other authors, such as Goffee and Scase, Ceromie and Hayes who present their own typologies, emphasising criteria such as (Goffee, Scase, 1985): motivations and values.

Increasing women's participation in the labour market and raising the female employment rate is crucial to achieving the "Europe 2020" headline target to raise the employment rate of the population aged 20–64 years to 75%. This strategy also aimed to eliminate gender disparities in the labour market and to introduce dualistic model in which both genders perform functions related to family support. The role of women compared to men is seen in terms of raising offspring and performing family duties (Charles et al., 2001). The gender role differentiation was identified based on the analysis of the level of entrepreneurship conducted by A. Rubio-Banóna, N. Esteban-Lloret (Table 1).

Table 1. Gender roles and entrepreneurship

Feature	Women	Men
Role in society	Social customs place women in the home, doing housework and caring for children and elderly	Men are responsible for working and earning money to support the family
Running a business	Women in business are an exception to the rule	Men in business are considered the standard
Access to funds and resources	More difficult access to funds and resources	They do not have to prove their competencies in financial management
Working in a business environment	People and building relationships between them are important	Money and material goods are important
The essence of work	One works to live	One lives to work
The role of manager	Managers are guided by intuition and seek agreement	Managers should make firm decisions and be assertive
Personality at work	Equality, solidarity, and quality of professional life are important	Fairness, competition at work and achievements are important
The method of dealing with conflicts	Conflicts are resolved through compromise and negotiation	Conflicts are resolved by trial of strength

Source: own study based on Rubio-Banóna, Esteban-Lloret, 2016.

Women choose to be self-employed mainly for two reasons: high unemployment rate and greater difficulty in finding a job compared to men (Momot, 2011). The most important group of factors influencing the decision to start a business is formed by individual factors related to the woman herself and the economic environment in which she operates (Minniti, Nardone, 2007).

In 2003, Dutch researchers in the government-funded Scientific Analysis of Entrepreneurship and SMEs programme distinguished the following determinants of female entrepreneurship levels at the macroeconomic scale (Verheul, Thurik 2003; Verheul, van Stel, Thurik 2006).

a) technological development – women are less likely than men to conduct business in high-tech sectors, and more likely to operate in services;
b) economic, including:
   – GDP per capita: increase in wealth is accompanied by increased demand for services that provide space for female entrepreneurship;
   – female unemployment level: the unemployment level has a greater impact on female entrepreneurship, as they are the ones who are usually made redundant during the crisis and have to seek income in self-employment;
   – increase in the share of the service sector: it encourages female entrepreneurship, as women often locate their business here.

The aspects of female entrepreneurship presented in the literature remain related to the factors selected for the study and to the attempt to demonstrate their relationship and impact on female entrepreneurship in the countries studied.

1. Methodology of the research

The subject of the article is empirical analysis of the diversity and factors affecting the level of female entrepreneurship in EU countries. The following countries were included in the study: Austria (AT), Belgium (BL), Czech Republic (CZ), Denmark (DK), Greece (EL), Spain (ES), Finland (FI), France (FR), Germany (GE), Hungary (HR), Ireland (IE), Italy (IT), Lithuania (LT), Netherlands (NL), Poland (PL), Portugal (PT), Sweden (SE), Slovenia (SI), United Kingdom (UK). Entrepreneurship is understood here as the rate of female self-employment among the female labour force. The analysis was based on data collected by the OECD and Eurostat for 2010–2018. According to the literature mentioned above, the following factors (variables) affecting female self-employment rate among the female labour force (fem_self) were selected:

– Gross Domestic Product per capita (current price in purchasing power standards),
– female unemployment rate among the female labour force (fem_unemp),
– gender wage gap (median) for full-time employees (gwp),
– percentage of females at risk of poverty or social exclusion (fem_pov),
– total fertility rate (fer_rate),
– crude marriage rate (marriages per 1,000 people) (mar_rate).

The selection of the above factors depended on the availability of data in the collected Eurostat and OECD databases. In a first step, the determinants of the female labour market were examined. The correlation between the level of female self-employment and the above-mentioned variables was then calculated for each country separately, which made it possible to indicate the direction and strength of the determinants. In the next step, economic panel model was estimated using "Gretl". It was decided to use the panel model because it accounts for cross-sectional and time-series data and reduces measurement error resulting from omitting important unobservable variables for the objects studied.

The explanatory variables for the model were selected from among the above-mentioned ones using the "backward" stepwise regression method, because it produced the highest value of the coefficient of determination while maintaining the significance of the structural parameters. Model selection was guided by the information criterion that the model provides. The parameters of the model were estimated using the weighted least squares method. The estimated model will take the following form:

$$y = a_0 + a_1x_1 + a_2x_2 + e$$

where:
y – explained variable (level of female self-employment),
x_1, x_2 – explanatory variables,
a_0 – absolute term,
a_1, a_2 – structural parameters,
e – random component (of residuals).

2. Determinants of female self-employment in European Union countries

Based on the analysis of the female employment rate in the studied EU countries, it can be concluded that in the period from 2010 to 2018 there is a small, systematic increase in the female employment rate in the EU countries. In 2010, the average female employment rate in the EU-28 countries amounted to 45.4%, while in 2018 it increased to 46%. In the period from 2010 to 2018, an increase in the female employment rate was recorded in the following countries: Czech Republic (increase by 3.80%), Italy (3.57%), Belgium (3.37%), Portugal (2.89%), Spain (2.66%), Greece (1.90%), Netherlands (1.80%), France (1.80%), Sweden (1.22%), Austria (0.70%), Germany (0.70%), United Kingdom (0.68%), Poland (0.65%), Slovenia (0.26%). The largest decrease in the female participation in the labour market was recorded in Lithuania (–3.88%), Hungary (–2.89%) and Denmark (–1.34%), while slightly smaller decrease was recorded in Ireland (–1.13%) and Finland (0.82%) compared to 2010. It should be noted that there is little change in the labour market in terms of male and female employment rate. The coefficient of variation in the studied countries in terms of female employment rate in 2010 was at 5.91%, in subsequent years it showed a decreasing trend, and in 2018 it was at 4.68%, which means that the studied countries do not differ significantly in terms of the studied feature. The information on the low variability of the studied factor indicates that despite differences in the level of social and economic development as well as cultural and historical differences, the female participation in the labour market governed by the market mechanism is similar. This phenomenon is interesting not only for economic, but also for demographic, sociological and political reasons.

The level of female entrepreneurship can be related to a country's GDP per capita. Its level can act as a stimulus or inhibitor in making a decision on self-employment. For example, an increase in the value of GDP per capita in economically weak countries may be accompanied by a decrease in economic activity undertaken by women. In the period from 2010 to 2018, the highest level of GDP per capita at purchasing power parity was recorded in Ireland, while the lowest in Greece, Poland, and Hungary. The average GDP per capita for the EU-19 during the period under study amounted to 39.92 thousand U.S. dollars. Based on the average level of GDP per capita in the years studied, the countries were divided into quartile groups. The first group includes countries with the lowest GDP per capita, where the female unemployment rate was below the EU-19 average, and these are: Hungary, Poland, Greece, Lithuania, and Portugal.

The second group includes those countries where the GDP level was close to the average, i.e. Slovenia, Czech Republic, Spain, Italy, and France. The third group includes countries where GDP was above the EU average, and the fourth includes countries with the highest GDP level (Table 2). The coefficient of variation of GDP per capita among the studied countries showed an increasing trend, in 2010 it was at 23.51%, while in 2018 it amounted to 27.24%.

Table 2. Spatial variation in the level of GDP per capita in EU countries in the period from 2010 to 2018 (in thousands of U.S. dollars)

Quartile group	Group boundaries	Country
First group	<30.86	HR (26.07), PL (26.29), EL (27.09), LT (28.76), PT (29.53)
Second group	30.86–39.32	SI (32.19), CZ (33.39), ES (35.15), IT (37.77)
Third group	39.32–47.84	FR (40.87), UK (41.32), FI (41.32), BL (43.07)
Fourth group	>61.14	GE (45.70), SE (47.82), DK (49.12), AT (49.84), NL (50.59), IE (61.14)

Source: own study based on data collected by the OECD. Retrieved from https://stats.oecd.org/index.aspx?lang=en (26.03.2021).

One of the leading economic factors influencing women's individual entrepreneurship is the country's economic situation and directly related labour market realities. It can be hypothesised that the high female unemployment rate has a stimulating effect on the female self-employment rate. To verify this assumption, the female unemployment rate among the female labour force was analysed. In the period from 2010 to 2018, the percentage of unemployed women among the female labour force ranged from 2.80% in the Czech Republic (2018) to 31.35% in Greece (2013). The EU-28 average was 9.4% (https://stats.oecd.org), while in the countries studied – 9.66%. The highest growth rate of female unemployment was observed in Spain in 2011 and 2012, when there was an increase of more than 31% in the level of female unemployment compared to the previous year. In contrast, in the United Kingdom, Poland and Germany, the growth rate of the unemployment rate was negative during the period studied. Based on the average unemployment rate for the years studied, the countries were divided into quartile groups. The first group includes countries with the lowest female unemployment rate, i.e. below the EU-19 average, and these are: Germany, Austria, the Netherlands, and the Czech Republic. The second group includes countries where the unemployment level was between 6.59% and 7.89%, which is still below the EU-19 average, and these are: Denmark, Sweden, Belgium, and Finland. The largest, third group consists of countries with unemployment levels close to the EU average in the years studied. These are: Hungary, Poland, Slovenia, Lithuania, France, and Ireland. The highest levels of unemployment in

the years studied were observed in Italy, Portugal, Spain, and Greece, classified as the fourth group (Table 3). These are at the same time countries belonging to the first and second quartile group in terms of GDP per capita and therefore with low and moderate levels of economic development.

Table 3. Time variation in the unemployment rate among women in the female labour force (female unemployment as % of the female labour force) in EU countries in the years 2010–2018

Quartile group	Group boundaries	Country
First group	<6.59	GE (4.56), AT (5.02), UK (5.82), NL (6.14), CZ (6.38)
Second group	6.59–7.89	DK (6.81), SE (7.35), BL (7.46), FI (7.81)
Third group	7.89–9.66	HR (7.89), PL (8.30), SI (8.65), LT (9.40), FR (9.50), IE (9.83)
Fourth group	>26.09	IT (11.94), PT (12.42), ES (22.24), EL (26.09)

Source: own study based on data collected by the OECD. Retrieved from https://stats.oecd.org/index.aspx?lang=en (26.03.2021).

The gender wage gap is one of the factors affecting undertaking of business activity by women. According to the data, women employed in EU countries earned on average 14.8% less per hour than men in 2018. In the studied period, the largest gender wage gaps were observed in: Austria, the United Kingdom and Finland, and the lowest in Belgium and Denmark (Table 4).

Table 4. Time variation in the gender wage gap (median) for full-time employees in EU countries, in the years 2010–2018

Quartile group	Group boundaries	Country
First group	<7.35	BL (5.13), DK (6.51)
Second group	7.35–13.20	EL (7.78), HR (8.00), IT (8.05*), SE (8.60), PL (9.96)*, IE (10.19)
Third group	13.20–16.30	FR (13.63), PT(15.36), CZ (15.81), GE (15.92)
Fourth group	>20.20	AT (17.03), UK (17.42), FI (18.58)

*data available from four years only.

Source: own study based on data collected by the OECD. Retrieved from https://stats.oecd.org/index.aspx?lang=en (26.03.2021).

Another variable analysed in the study was women's risk of poverty. The EU-19 female at-risk-of-poverty rate amounted to 21.40% in 2018. Based on Table 5 it should be noted that the situation in the countries studied varies greatly in terms of the female at-risk-of-poverty rate. In the years 2010–2018, the lowest risk of poverty was in Belgium in 2018 (11%), while the highest (39.4%) in Greece in 2014. Based on the coefficient of variation, it should be concluded that there is a large variation between countries in this regard. Countries with the lowest poverty risk during the study period included: Czech Republic, Finland, the

Netherlands, Denmark, and France. The highest percentage of women at risk of poverty was recorded in: Lithuania, Spain, Hungary, Italy, and Greece.

Table 5. Time variation in the percentage of females at risk of poverty or social exclusion in EU countries, in the years 2010–2018 (percentage data in brackets)

Quartile group	Group boundaries	Country
First group	>19.09	CZ (15.62), NL (16.86), FI (17.00), DK(17.78), FR (18.92),
Second group	19.09–21.71	SE (19.26), AT (19.67), BL (21.71), GE (21.04), SI (20.12)
Third group	21.71–27.34	IE (27.22), PL (24.31), PT (25.74), UK (24.34)
Fourth group	<34.64	EL (34.64), ES (27.47), IT (29.60), LT (31.82), HR (29.46),

Source: own study based on data collected by the OECD. Retrieved from https://stats.oecd.org/index.aspx?lang=en (26.03.2021).

The next variable studied was fertility. According to the reference transactional model (see: Becker, 1981), it should be concluded that the housekeeping and child-rearing activities will be carried out by a more productive person. In turn, the selection of the person is based on the economic criterion. Since women earn less on average than men, they are the ones who will fulfil this role (from an economic perspective). The fertility rate in EU countries was at a similar level, as the coefficient of variation in 2018 between the countries was at 10.24%. The highest fertility rates in 2018 were reported in France (1.8), Ireland (1.8) and Sweden (1.8), while the lowest in Italy (1.3) and Spain (1.3).

Another variable that was examined was marriage and assigned men's and women's roles in families. Playing the role of a wife may result in the limitation of a woman's time that could be devoted to running the business. The lowest percentage of marriages per 1,000 people in the years studied was recorded in: Slovenia, Portugal, Italy, Spain, and France. While the highest in: Finland, Denmark, Poland, Sweden, and Lithuania (Table 6). The countries also show great variation in this regard, as in 2017 the variation coefficient between them amounted to 22.97%.

Table 6. Time variation in marriage rates per 1,000 people in EU countries from 2010 to 2017 (percentage data in brackets)

Quartile group	Group boundaries	Country
First group	<3.70	SI (3.18), PT (3.26), IT (3.34), ES (3.53), FR (3.63)
Second group	3.70–4.49	BL (3.78), NL (4.01), HR (4.20), UK (4.43), CZ (4.49)
Third group	4.49–4.85	IE (4.58), AT (4.68), GE (4,79), EL (4,81)
Fourth group	>7.03	FI (4.89), DK (5.19), PL (5.29), SE (5.30), LT (7.03)

Source: own study based on data collected by the OECD. Retrieved from https://stats.oecd.org/index.aspx?lang=en (26.03.2021).

3. Female entrepreneurship in EU countries and its determinants

Over the years studied, the level of female self-employment among the female labour force remained unchanged in most countries. Only in five of the countries studied there was an increase in the percentage of female self-employment among the female labour force during the period studied, i.e. in: the Czech Republic (2.01%), Finland (2.87%), the Netherlands (14.71%), Lithuania (4.18%) and the United Kingdom (by 21.33%) in relation to 2010. In the remaining countries, there was a decrease in the level of female self-employment, with the largest observed in: Portugal (39.02%), Poland (20.06%).

EU-19 countries are very diverse in terms of female entrepreneurship. In 2010, the coefficient of variation was at 50.78%, while in 2018 it decreased to 45.78%. Table 7 presents the spatial variation in the female self-employment rate in the EU countries in the period from 2010 to 2018 by quartile groups. The results from the analysis of the data in the table are as follows:

– the first group represents the countries with the lowest rate of self-employment, not exceeding 8.25%, which in the study period was observed in: Denmark, Sweden, Germany, France, and Ireland;
– low levels of self-employment were also observed in: Hungary, Finland, Lithuania, the United Kingdom;
– high rate of self-employment exceeding the EU-19 average was recorded in: Austria, Belgium, the Netherlands, Spain, the Czech Republic, and Slovenia;
– the highest level of self-employment above the EU-19 average was observed in: Slovenia, Portugal, Poland, Italy, and Greece.

Table 7. Time variation in female entrepreneurship rate (female self-employment as % of female employment) in the EU-19 countries in the years 2010–2018

Quartile group	Group boundaries	Country
First group	<8.25	DK (5.45), SE (6.06), GE (7.96), FR (8.04), IE (8.18)
Second group	8.25–10.35	HR (8.31), FI (9.10), LT (9.39), UK (10.16)
Third group	10.35–12.99	AT (10.35), BL (10.72, NL (12.51), ES (12.52), CZ (12.91),
Fourth group	>30.32	SI (13.07), PT (15.56), PL (17.98), IT (18.022), EL (30.32)

Source: own study based on data collected by Eurostat. Retrieved from https://stats.oecd.org/index.aspx?lang=en (26.03.2021).

In the next stage of the conducted analysis, the Pearson correlation coefficient between the level of female self-employment and its determinants examined in the paper was used for each country individually (Table 8). A statistically

significant negative linear correlation between the female self-employment rate and GDP per capita was noted in: Austria (–0.964), Greece (–0.789), Germany (–0.967), Poland (–0.978), Portugal (-0.880), Slovenia (–0.756), Sweden (–0.943), Hungary (–0.703), Italy (–0.943). In an economy with a higher GDP per capita such as Sweden, there may be a low proportion of women among the self-employed. In contrast, in the Netherlands there is a positive linear correlation between the study variables.

The level of unemployment rate among women is positively linearly correlated with their level of self-employment. A statistically significant linear relationship occurred in the following countries: Finland (0.745), Spain (0.919), Germany (0.941), Poland (0.883), Sweden (0.963) and Hungary (0.772). Another variable that, as it turns out, can work bidirectionally is wage gap.

A statistically significant positive relationship between the level of female self-employment and the wage gap occurred in the following countries: Austria (0.955), Greece (0.833) and Sweden (0.731). In contrast, negative correlation is observed in the United Kingdom (–0.950), which means that an increase in the level of gender wage gap contributes to lower levels of female self-employment.

The variable of female poverty risk showed statistically significant relationship with the level of self-employment in the following countries: Austria (0.837), the Netherlands (0.863), Lithuania (–0.799), Poland (0.982) and Slovenia (0.733). This variable can cause both an increase and decrease in female entrepreneurship. The marriage rate variable works similarly. Only in the Netherlands and Germany an increase in the marriage rate has a statistically significant effect on a decrease in the level of entrepreneurship among women. By contrast, in Lithuania it works in the opposite direction. Fertility contributes to reduced female entrepreneurship in: the Netherlands (–0.754) and Germany (–0.961). In contrast, it contributes statistically significantly to the increase in this level in: Sweden (0.797) and Italy (0.834).

Table 8. Correlation between the female self-employment in the EU countries and the factors studied

Country	GDP per capita	Unemployment rate	Wage gap	Female poverty risk	Number of marriages	Fertility
AT	–0.964*	–0.134	0.955*	0.837*	–0.699	–0.699
BL	0.185	0.243	–0.799	0.004	0.243	–0.314
CZ	–0.144	0.2345	–0.128	0.249	–0.280	–0.226
DK	–0.557	0.641	0.339	0.496	–0.184	–0.016
FI	0.380	0.745*	–0.440	–0.229	–0.659	–0.495

Country	GDP per capita	Unemployment rate	Wage gap	Female poverty risk	Number of marriages	Fertility
FR	0.448	0.348	–0.634	–0.157	–0.173	–0.512
EL	–0.789*	–0.023	0.833*	–0.097	0.0489	–0.198
ES	–0.487	0.919*	X	0.456	–0.4332	–0.226
NL	0.839*	0.047	X	0.862*	–0.881*	–0.754*
IE	–0.102	0.136	0.521	0.226	0.553	–0.097
LT	0.416	–0.467	X	–0.799*	0.833*	0.540
GE	–0.967*	0.941*	0.304	0.639	–0.775*	–0.961*
PL	–0.978*	0.883*	X	0.982*	0.635	–0.543
PT	–0.880*	0.597	0.138	0.349	0.696	–0.147
SI	–0.756*	0.473	X	0.733*	0.106	X
SE	–0.943*	0.963*	0.731*	–0.036	–0.0872	0.797*
HR	–0.703*	0.772*	0.250	0.597	–0.351	–0.437
UK	0.639	–0.561	–0.950*	–0.224	–0.203	–0.511
IT	–0.943*	–0.108	X	0.074	0.322	0.834*

*statistically significant correlation, $p<0.05$, x – no complete data for calculation
Guilford scale: less than 0.05 – no relationship; 0.05–0.2 – negligible relationship; 0.2–0.4 – low relationship; 0.4–0.6 – moderate relationship; 0.6–0.8 – high relationship; 0.8–0.9 – very high relationship; 0.9–1 – full relationship.
Source: own study based on Eurostat data.

The above research findings show that in each country, different factors affect the level of female self-employment. It turned out that in the five countries studied, none of the factors indicated in Table 7 had a statistically significant effect on the level of female self-employment i.e. in: Belgium, the Czech Republic, Denmark, France, and Ireland.

To verify the variables, the panel model of the female self-employment rate for all countries was estimated using the weighted least squares method, which took the following form:

$$\text{Fem\_self} = 23.923 + 0.398\ \text{fem\_unem} - 8.954\ \text{fer\_rate} - 0.5109\ \text{mar\_rate}$$
$$R^2 = 0.651 \qquad (18.97) \qquad (7.139) \qquad (-16.31) \qquad (-2.863)$$

All variables and the constant in the estimated model are significant at the assumed significance level of $\alpha=0.05$. About 65% of the variation in the female self-employment rate variable was explained by the model. A 1 % increase in the female unemployment rate among the female labour force will increase their

level of self-employment by about 0.4 percentage point on average, with other factors remaining unchanged. In turn, the fertility rate, and the crude marriage rate result in a decrease of this level.

Table 9. Results of panel estimation of the function of female self-employment level

WLS estimation, using 150 observations 19 cross-sectional data units were included Dependent variable (Y): fem_self Weights based on per-unit error variances				
	Coefficient	*Standard error*	*t-Student*	*p value*
Const	23.9231	1.26090	18.97	<0.0001***
fem_unem	0.397940	0.0557410	7.139	<0.0001***
fer_rate	–8.95370	0.548999	–16.31	<0.0001***
mar_rate	–0.510911	0.178471	–2.863	0.0048***

Basic statistics for weighted data:			
Residual sum of squares	132.1149	Residual standard error	0.951261
Coefficient of determ. R-square	0.650920	Adjusted R-square	0.643748
F(3, 146)	90.74759	p-value for the F-test	3.37e-33
Log-likelihood	–203.3185	Akaike information criterion	414.6371
Bayesian information criterion	426.6796	Hannan-Quinn information criterion	419.5296
Basic statistics for the original data:			
Arithmetic mean of the dependent variable	12.02496	Standard deviation of the dependent variable	5.732180
Residual sum of squares	2421.493	Residual standard error	4.072538

Source: own study.

Based on the model (Table 9), it should be concluded that the following factors constitute the most important variables affecting the level of female self-employment in all the countries studied:

- unemployment rate, which has a stimulating effect on the level of female self-employment;
- total fertility rate, which is a strong inhibitor, as its increase by 1% will reduce the level of female self-employment by about 8.9 percentage point on average;
- crude marriage rate, which, if increased by 1%, will reduce the level of self-employment by 0.5 percentage point on average.

The estimated model explains the phenomenon of the level of female self-employment in the EU countries only in 65%, which means that the available

measurable data do not allow for a full explanation of the phenomenon. Thus, it should be kept in mind that there are a number of other factors determining the tendency of women to self-employment, such as: personality traits, entrepreneurial traditions in the family, willingness to take risks, women's education and field of study, their state of health, social status, need for independence, cultural conditions prevailing in a given country (e.g. functioning of stereotypes of social roles rooted in the society).

Conclusions

The level of female self-employment varies from country to country; however, only for 14 countries it was possible to establish a correlation coefficient between the level of female self-employment and indicators characterising the social and economic as well as demographic situation. The selection of indicators affecting the level of female self-employment has an original character and resulted from a review of the literature. Considering the countries studied individually, it is important to note that each country has different factors that have a statistically significant impact on the level of female self-employment. In four countries i.e. Belgium, the Czech Republic, Denmark, France, and Ireland, none of the studied factors affects the level of female self-employment.

GDP per capita affects female self-employment rates in 10 countries, while it acts as a stimulus only in the Netherlands, which is among the countries with the highest level of GDP per capita. It can be concluded that as the level of female self-employment in this country increases, so does GDP per capita (the Netherlands is among the countries with high levels of female entrepreneurship). As the level of GDP per capita increases, the level of female entrepreneurship decreases in the following countries: Austria, Greece, Germany, Poland, Portugal, Slovenia, Sweden, Hungary, and Italy.

Another variable was the level of wage gap, the increase of which in most countries increases the level of female self-employment, i.e. in: Austria, Greece, and Sweden. It acts as an inhibitor only in the United Kingdom.

Female poverty risk is statistically significant in 5 countries, and in four of them it acts as a stimulus (in: Austria, the Netherlands, Slovenia, and Poland), while in Lithuania the female self-employment rate decreases with increasing level of poverty.

A woman's financial situation can be changed by entering into a marital relationship. Such a woman may then be dependent on her husband. There was

a statistically significant negative correlation between the percentage of marriages and the level of female self-employment in the Netherlands and Germany, and a positive correlation in Lithuania.

Fertility has a statistically significant effect on female self-employment in only four countries. In Sweden and Italy, the increase in fertility increases the level of female self-employment, while in the Netherlands and Germany it contributes to a decrease in this level.

Studies have shown that correlations at the level of significance are found in countries with different economic, social, demographic, and cultural characteristics. The strength of the influence of the variables showing statistical significance on the female self-employment rate in the studied countries with market economy is similar. The differences that occur are not significant for the processes in the areas studied.

The panel model developed for 19 EU countries showed that the following factors significantly affect the level of female entrepreneurship:

– the female unemployment rate, with an increase in which the level of female self-employment also increases;
– total fertility rate and crude marriage rate, the increase in which results in lower levels of self-employment.

The model explains female self-employment rate in the EU countries in only 65%, confirming that qualitative variables are of significant importance. Women's behaviour in the labour market is important for the course of not only economic processes, but also political, social, and cultural ones. The explanation of women's behaviour in the labour market in the area of self-employment should be sought in the sphere of culture and traditions involving qualitative elements. The inclusion of quantitative indicators in the study, as it was done in this article, allows only a partial explanation of the phenomenon and can be treated as a contribution to further research. The results of the study indicate that the description of the phenomenon must take into account quantitative and qualitative analyses to varying degrees. Such a study must be interdisciplinary in nature. Research opportunities are limited by the availability of quantitative data, as well as their compatibility with available qualitative research findings. Creating a homogeneous research instrument in the form of a model incorporating quantitative and qualitative data on female entrepreneurship is a challenge for interdisciplinary research teams.

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Summary

There is a wide differentiation in the level of female entrepreneurship across European Union countries. The literature emphasises the importance of various intrinsic (i.e. educa-

tion, experience, human capital, access to capital resources) and extrinsic (i.e. influencing the level of entrepreneurship) factors. The purpose of this article is to empirically analyse the relationship between the level of female self-employment and the economic and social determinants of female labour force participation for 19 EU member states. This article uses panel data techniques to empirically analyse the relationship between the female self-employment and the following: gross domestic product per capita, female unemployment rate, total fertility rate, crude marriage rate, people at risk of poverty or social exclusion by age, gender wage gap (median) for full-time employees, masculinization index. Simple statistical methods and Pearson correlation coefficient were used in this paper. An econometric model was created to verify the factors affecting the level of female self-employment. Statistical data collected by Eurostat and the OECD were used to conduct the analyses. Due to limited data availability, the study covers the years 2010–2018. Gretl and Excel were used to conduct the analysis.

Keywords: female entrepreneurship, female self-employment, labour market.

Streszczenie

W krajach Unii Europejskiej występuje duże zróżnicowania poziomu przedsiębiorczości kobiet. W literaturze przedmiotu podkreśla się znaczenie różnych czynników wewnętrznych (tj. edukacja, doświadczenie, kapitał ludzki, dostęp do zasobów kapitału) oraz zewnętrznych (tj. wpływających na poziom przedsiębiorczości). Celem artykułu jest empiryczna analiza związku między poziomem samozatrudnienia kobiet a uwarunkowaniami ekonomiczno-społecznymi kobiet na rynku pracy dla 19 państw będących członkiem UE. W pracy wykorzystano proste metody statystyczne i współczynnik korelacji Pearsona. W celu weryfikacji czynników wpływających na poziom samozatrudnienia kobiet zbudowano model ekonometryczny. Do przeprowadzenia analiz wykorzystano dane statystyczne zgromadzone w Eurostacie oraz OECD. Ze względu na ograniczoną dostępność danych badaniem objęto lata 2010–2018. Do przeprowadzenia analizy wykorzystany został program Gretl oraz Excel.

Słowa kluczowe: przedsiębiorczość kobiet, rynek pracy, samozatrudnienie kobiet.

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