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What shapes entrepreneurial activity in the European Union?

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Abstract

PURPOSE: The aim of the article is to identify the factors influencing entrepreneurial activity in the European Union (EU) countries. In addition, to achieve the research goal, the authors provide answers to two research questions: (RQ1) What sets and types of variables influence entrepreneurial activity in the EU Member States? and (RQ2) Based on the defined factors influencing entrepreneurial activity, is there a difference between the old and new EU Member States? **METHODOLOGY:** Using panel regression analysis on the data from the 2009–2018 period, the article attempts to identify factors influencing entrepreneurial activity among EU countries. Furthermore, an examination of possible differences in entrepreneurial activity between the old and new EU Member States is conducted. By using variables that statistically significantly explain entrepreneurial activity, a heatmap was created. This made it possible to visualise differences between countries within each variable, as well as the impact of each variable on the analysed group of old and new EU Member States. **FINDINGS:** Our research indicates that entrepreneurial activity is higher in new EU Member States than in older ones, influenced by factors categorized into Human Capital and Institutional Conditions. Regarding Human Capital, higher entrepreneurial activity is associated with lower employment in the high-tech sector, higher HDI, greater participation in non-formal education, and a larger share of periodically employed individuals. Conversely, lower entrepreneurial activity correlates with a higher proportion of young people not in employment, education, or training and emigration. Notably, advanced digital skills impact on entrepreneurial activity, but their absence does not constitute a barrier to business creation. Among the Institutional variables, higher entrepreneurial activity is linked to tax burden, EU membership duration, and eurozone membership length. However, the Business Freedom indicator does not significantly affect entrepreneurial activity. **IMPLICATIONS:** Considering the EU's strategy and the importance of entrepreneurial activity across EU Member States, policy implications emphasize the need for tailored policies that support business activity, aiming to minimize inter-country differences and boost economic growth. **ORIGINALITY AND VALUE:** Unlike prior studies that mainly compare entrepreneurship between broad economic regions, our research uniquely distinguishes between new and old EU Member States, revealing significant disparities in entrepreneurial activity and its determinants. **Keywords:** entrepreneurial activity, determinants of entrepreneurship, European Union, human capital, institutional conditions, new and old EU member states, panel regression, panel data analysis, business environment, entrepreneurship determinants, EU integration, economic disparities, new business registrations.

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INTRODUCTION

The importance of exploring entrepreneurship was first recognized in the early works of Cantillon in 1755 and was later expanded by A. Smith and J. Schumpeter, who viewed entrepreneurs as innovators (Ahmad & Seymour, 2008). Over the last four decades, growing academic interest, driven by globalization, financialization, and deregulation, has led organizations like the World Bank, OECD (2012-2017), and European Commission (2013) to examine and evaluate policies to foster entrepreneurship, acknowledging its role in promoting economic growth, employment, innovation, and productivity.

In the past seventy years, academic interest and research have intensified, particularly regarding the determinants of entrepreneurship and entrepreneurial activity. A simple title search in the Web of Science (WoS) for the terms “entrepreneurship” and “determinants” or “factors” yields over 300 results addressing these aspects together. Whether studies are regional (e.g., Rusu & Roman, 2017; Maciejewski & Wach, 2019) or country-specific (e.g., Bruno et al., 2013) or employ different econometric techniques (e.g., OLS, Time Series, Panel, Cross-Section, Pooling Data), as summarized in Urbano et al. (2019), they generally include variables intended to assess their effect on entrepreneurship.

Determinants are not grouped uniformly, as their classification adapts based on research focus. Consequently, factors are grouped into categories such as individual, institutional, legal, (macro)economic, socio-demographic, human capital, technological, or cultural influences (Wennekers et al., 2005; Wong et al., 2005; Simón-Moya et al., 2014; Arin et al., 2015; Aparicio et al., 2016; Rusu & Roman, 2017; Almodóvar-González et al., 2020). A comprehensive literature review on institutions, entrepreneurship, and economic growth is provided by Urbano et al. (2019), which analyzed the past 25 years and argued that institutional antecedents impact entrepreneurial activity, potentially leading to economic growth. This topic remains relevant, as recent research emphasizes the complexity and interdependence between entrepreneurial activity and economic growth (Rusu & Roman, 2017; Rusu et al., 2022).

Our research focuses on investigating and evaluating determinants of entrepreneurial activity among the European Union (EU) countries, aiming to expand the current understanding of the factors influencing entrepreneurship in this region. Unlike previous studies that utilized Global Entrepreneurship Monitor (GEM) data, our analysis employs panel data covering 28 EU countries from 2009 to 2018, using data from Eurostat, the Heritage Foundation, and the United Nations Development Program (UNDP).

The study enhances existing research by examining established determinants while also identifying novel factors that may influence entrepreneurial activity in the EU. The findings contribute to both academic discourse and to the EU and national policymakers. In this paper, we examine the variables influencing entrepreneurial activity in the EU Member States and investigate whether there are differences in entrepreneurial activity between the old and the new EU Member States. The paper is organized as follows: following the introduction, Section 2 presents a literature review, Section 3 outlines the research design, data, and methodology, and Section 4 discusses the primary results of the empirical analysis, which uses a panel regression model. In Section 5, the findings are analysed, and the study concludes with a summary of key insights, limitations, and directions for future research.

LITERATURE REVIEW

Scholars widely acknowledge that entrepreneurship is a multifaceted concept observable from multiple perspectives, including individual, business, local, regional, industry, and national levels (Freytag & Thurik, 2007; Wosiek et al., 2021). In academic discourse, the terms “entrepreneurship” and “entrepreneurial activity” are often used interchangeably, as the two are closely linked (Ahmad & Seymour, 2008). Wosiek (2021) clarifies this relationship by suggesting that entrepreneurship can be conceptualized in two ways: broadly, as entrepreneurial activity—a scope to which we aim to contribute in this research—or narrowly, focusing on entrepreneurial behaviors, attitudes, or occupational roles (Wennekers, 2006).

Regarding the determinants of entrepreneurship, researchers continue to examine factors that either stimulate or hamper entrepreneurial activity, though a definitive consensus has yet to be reached (Rusu & Roman, 2017; Urbano et al., 2019). Research on the determinants is exhaustive, addressing numerous aspects of entrepreneurship or entrepreneurial activity, including identification and comprehensiveness of determinants of entrepreneurship, identification of different types of entrepreneurship/entrepreneurial activity, and the mutual relationships between entrepreneurship and economic growth (e.g., Wennekers & Thurik, 1999; Urbano et al., 2019). In this section, based on our research purpose, we contribute to the evaluation of determinants of entrepreneurial activity in the context of EU countries. The literature review section is therefore divided into two subsections: Measures of entrepreneurial activity (as dependent variable) that have been used

in previous research are defined, followed by the factors or groups of factors that have been assessed as determinants of entrepreneurial activity in prior academic studies.

Measures of entrepreneurial activity

Academic literature indicates several methods for identifying and measuring entrepreneurship or entrepreneurial activity. Focusing on the interactions among institutional variables, entrepreneurship, and economic growth, Urbano et al. (2019) in their systematic literature review highlight that entrepreneurship functions as a multifaceted conduit between institutions and economic performance or growth. Entrepreneurship encompasses diverse forms, including nascent entrepreneurial activity, startup density, productive versus unproductive entrepreneurship, self-employment, motivation-driven activity, corporate entrepreneurship, female and immigrant entrepreneurship, entrepreneurial universities, as well as innovative, social, sustainable, and growth-oriented entrepreneurship.

Years of research into entrepreneurship as a phenomenon have underscored the challenge of gathering suitable data and establishing reliable measures of entrepreneurship. To address this, the literature indicates that entrepreneurial activity – regardless of the study’s geographic scope or type of entrepreneurship examined – is commonly evaluated through the Total Entrepreneurial Activity (TEA) index, derived from Global Entrepreneurship Monitor (GEM) data. TEA has thus become one of the most prevalent measures (dependent variables) of entrepreneurial activity. However, due to the lack of complete annual GEM data coverage for all EU countries, this study examines entrepreneurial activity levels using Eurostat panel data for the EU countries over the period 2009–2018. This timeframe was chosen to mitigate potential influences from both the Global Financial Crisis (GFC) and the more recent COVID-19 pandemic, as well as the geopolitical impact of the Russian-Ukrainian war.

It is noteworthy that recent research has also explored the reverse effect—namely, the influence of economic growth on entrepreneurship (Stoica et al., 2020; Rusu et al., 2022). In these studies, GDP per capita or the global competitiveness index are employed as dependent variables, while various entrepreneurial activity metrics, such as TEA, opportunity-driven early-stage entrepreneurship (OEA), or enterprise birth and death rates, are used as independent variables.

Factors affecting entrepreneurial activity

Research on factors influencing entrepreneurial activity has evolved, yet ambiguity remains concerning the specific factor groups involved. Early work by Grilo and Thurik (2004) assessing European entrepreneurship determinants through the Eclectic Framework, which includes both demand- and supply-side factors, highlighted the importance of demographic variables along with survey-based explanatory variables such as administrative complexities and financial support availability. Giannetti and Simonov (2004), in their study of Swedish municipalities, found that individual, economic, and social environment factors significantly influence entrepreneurship. In a sample of 36 countries from 2002, Wennekers et al. (2005) found that nascent entrepreneurship correlates with economic development level (per capita income and an index of innovative capacity) as well as factors such as business ownership rates, population growth, aggregate taxes (positive effect), and social contributions (negative effect). This study confirmed a U-shaped relationship between nascent entrepreneurship rates and economic development levels. Wennekers (2006) further examined economic and non-economic determinants of nascent entrepreneurship, finding that technological, economic, demographic, cultural, and institutional factors impact entrepreneurial activity.

Using GEM micro- and macro-level data, Acs and Szerb (2007) summarized studies linking entrepreneurship, economic growth, and public policies. Their findings suggest that developed countries should focus on reducing entry barriers, while middle-income countries should emphasize human capital enhancement, technology accessibility, and enterprise development. In a cross-country study, Klapper et al. (2006) found that entry and legal regulations have significant negative effects on entrepreneurship. Their results indicate that business environment factors, such as costly entry regulations, access to finance, and informal sector influence, are key determinants impacting entrepreneurship in both developed and developing countries.

In a regional analysis of 127 regions across 17 European countries between 2001 and 2006, Bosma and Schutjens (2011) found that economic, institutional, and demographic factors influence entrepreneurial attitudes and activities. Nițu-Antonie et al. (2017) conducted a study in 33 European countries, assessing the simultaneous and lagged effects of entrepreneurial behaviour – including attitudes, activities, and aspirations – on GDP, imports, exports, and employment rates. Simón-Moya et al. (2014) grouped 62 countries based on their economic and institutional environments to analyse

their impact on entrepreneurial activity and innovation performance. They confirmed Aidis et al.'s (2008) findings that countries with higher economic freedom and robust formal institutions support greater opportunity-driven entrepreneurship. Simón-Moya et al. (2014) found that entrepreneurial activity and necessity-driven entrepreneurship are higher in countries with lower development levels, greater income inequality, and higher unemployment rates. Their study also emphasized the positive influence of informal institutions, particularly human capital, on entrepreneurship.

Autio & Fu (2015), using a sample of 18 Asia-Pacific countries from 2001 to 2010, examined the impact of institutional quality on formal and informal entrepreneurship. They found that higher economic and political institutional quality correlates negatively with informal entrepreneurship entry and positively with formal entrepreneurship entry. Aparicio et al. (2016) studied 43 Latin American countries from 2004 to 2012, concluding that informal institutions, such as control of corruption and confidence in skills, significantly impact opportunity-driven entrepreneurship more than formal institutions do.

In their study of 18 EU countries from 2002 to 2015, Rusu and Roman (2017) identified macroeconomic factors – including inflation, foreign direct investment, access to finance, and tax rates – as determinants of entrepreneurship. They also found that individual factors (fear of failure, entrepreneurial intentions, perceived capabilities, and opportunities) and business environment factors (start-up costs, time to start a business, and number of procedures) significantly influence entrepreneurial activity. Roman et al. (2018) confirmed these findings in a subsequent study of 18 EU countries from 2003 to 2015, highlighting the positive effect of the EU sovereign debt crisis on entrepreneurship.

Almodóvar-González et al. (2020) investigated the causality between economic growth and entrepreneurship, finding bidirectional causality that suggests the positive impact of entrepreneurship on economic growth may vary by country development level (developed vs. developing). Wosiek (2021) examined economic factors, such as the effect of unemployment on entrepreneurship, and found a positive relationship between rising unemployment and an increase in new service businesses in Poland between 2003 and 2018, particularly in knowledge-based, business-oriented services.

While many studies have sought to identify and categorize the factors influencing entrepreneurship, Dvouletý (2018) provides a summary of cross-country determinants, classifying them into legal and institutional frameworks, economic determinants (demand-side), and population characteristics (supply-side), along with entrepreneurship, R&D, and innovation policies. Regardless of the measure of entrepreneurship or self-employment used, Dvouletý (2018) finds that at the country level, determinants (independent variables such as the unemployment rate, FDI inflows, economic freedom index, and start-up procedures) show consistent directional impacts, a finding also supported by Szaban and Skrzek-Lubasińska (2018).

Regarding the recent impact of COVID-19 on entrepreneurship, Gavrilă and de Lucas Ancillo (2021) found that the pandemic accelerated entrepreneurship, innovation, and digitalization, as illustrated by a surge in Spanish Internet domain registrations.

Due to the exploratory nature of entrepreneurial activity determinants, classification of such determinants is not unanimous. However, institutional variables are consistently recognized as key factors influencing entrepreneurial activity. Systematic literature analysis over the past 25 years of research summarized in the works of Urbano et al. (2019) provides a most comprehensive classification of institutional variables. The study examines the interplay between institutional variables, entrepreneurship and economic growth and classifies institutional variables that affect entrepreneurship as formal (political structure, procedures-regulations, contracts, property rights, others), informal (social norms-culture, cognitive dimension, beliefs systems, others), institutional dimensions (regulative, normative, cultural-cognitive) and others. Studies that use GEM and TEA as a baseline for research on the determinants of entrepreneurial activity also highlight the significance of institutional variables. For example, the most recent research from Kara et al. (2024) further classifies institutional variables into cognitive, normative, and regulative institutions.

So, apart from institutional variables as defined in the works of Urbano et al. (2019), we expand the research along the lines of the study by Arin et al. (2015), which builds upon the comprehensiveness of Baumol's (1996) and Kirzner's (1997) understanding of the aggregate level of entrepreneurial activity. Therefore, we evaluate and contribute to the interplay of three identified groups of variables: human capital (population, education, and unemployment), level of development (GDP per capita, financial development, and technological progress), and previously defined institutional variables (Arin et al., 2015, p. 615). Taking into account the current stance in the literature, our objectives are twofold and thus add value to the research: firstly, we wish to contribute towards current literature by examining if several groups of variables impact the entrepreneurial activity, and secondly, to establish a possible differences in the entrepreneurial activity between groups of old and new EU countries.

METHODOLOGY

Research design and data description

The aim of the study is to identify the factors influencing new business registrations per 10,000 people of working age among EU countries. This measure of entrepreneurial activity was selected due to its inclusion in Eurostat's official data as a unit of measurement. For this purpose, annual data from Eurostat as well as the Heritage Foundation and the United Nations Development Program (UNDP) on EU countries for the period from 2009 to 2018 were collected. The UK is included in the dataset, as it was a part of the EU in the observed sample. The available time span is a result of trying to collect datasets for every country over an observed period. The selected time period is characterized by a relatively stable economic situation in the studied area without significant turbulence that could have a strong impact on the scope of the study and significantly distort the analysis results. Variables included in the analysis are listed in Table 1, along with their abbreviations used throughout the study, as well as a description of each variable. The dependent variable is the growth rate of new registered enterprises. To control for various potential effects that could affect the results, different types of variables are included in the analysis: human capital, level of development as well as institutional variables. Table 1 indicates and summarizes variables used in the model, including the expected sign to be estimated, or whether the variable is expected to stimulate or hinder the growth rate of new registered enterprises.

As a result of the literature review and previously conducted empirical research, the estimated model that allows us to achieve the research goal is presented in the methodology section. Determining the entrepreneurial activity among EU countries within the research model was carried out with the use of the variables grouped in Table 1.

Table 1. Description of variables

Abbreviation	Groups of variables	Description	Stimulant (S) / Hamper (H)	Source
y	Entrepreneurial activity	Number of new registrations per 10,000 people of working age ($y = \text{Var1}/\text{Var2}$)	Not applicable	Own calculations
var1	Not applicable	Births of enterprises in t - number	Not applicable	Eurostat
var2	Not applicable	Population on 1 January in working age 15-64	Not applicable	Eurostat
var3	Human capital	Duration of working life - annual data	S	Eurostat
var4	Level of development	Monthly minimum wage as a proportion of average monthly earnings (%)	H	Eurostat
var5	Institutional	Property rights (0-100 pts.)	S	The Heritage Foundation
var6	Institutional	Tax burden (0-100 pts.)	S	The Heritage Foundation
var7	Institutional	Business freedom (0-100 pts.)	S	The Heritage Foundation
var8	Level of development	Final consumption expenditure of households by consumption purpose - total (% of GDP)	S	Eurostat
var9	Human capital	Emigration (number)	H	Eurostat
var10	Level of development	Curative care beds in hospitals (Per hundred thousand inhabitants)	S	Eurostat
var11	Human capital	Young people neither in employment nor in education and training (NEET rates) aged 15-34 (%) Not employed persons	H	Eurostat
var12	Human capital	Long-term unemployment aged 20-64 (% of unemployment)	H	Eurostat
var13	Human capital	Employment in high-technology sectors (high-technology manufacturing and knowledge-intensive high-technology services) - % of total employment	H	Eurostat
var14	Human capital	Human Resources in Science and Technology - Scientists and engineers as % of active population	S	Eurostat
var15	Human capital	Human Development Index (0-100 pts.)*	S	UNDP
var16	Human capital	Employees by type of employment contract (Limited duration) - % of employment aged 15-64	S	Eurostat

Abbreviation	Groups of variables	Description	Stimulant (S) / Hamper (H)	Source
var17	Human capital	Participation rate in job-related non-formal education and training in age 35-54 (%)	S	Eurostat
var18	Human capital	Individuals who have above basic overall digital skills aged 25-64 (% of individuals)	S	Eurostat
var19	Institutional	Length of membership in the EU (number of years) - measured since the official establishment of the EU in 1993	S	EU official website ⁵
var20	Institutional	The membership in the euro area (1=Yes, 0=No)	Not applicable	EU official website ⁶

Note: *The original HDI scale is 0-1. The transformation to the 0-100 scale was made for the purpose of evaluating the regression model, specifically for interpreting the assessed coefficient.

Source: Own authors' draft based on data from Eurostat (2023), The Heritage Foundation (2023), United Nations Development Programme (UNDP) (2023). Retrieved 8 November 2024, from [https://european-union.europa.eu/principles-countries-history/eu-countries_en⁵](https://european-union.europa.eu/principles-countries-history/eu-countries_en<sup>5</sup) and [https://european-union.europa.eu/institutions-law-budget/euro/countries-using-euro_en⁶](https://european-union.europa.eu/institutions-law-budget/euro/countries-using-euro_en<sup>6</sup)

Human capital factors

The directions of changes in the analyzed variables, as indicated in Table 1, and their perception in terms of stimulating or hindering effects on entrepreneurship need to be explained. First, we will focus on human capital. The high percentage of long-term unemployed individuals in the population structure is, on the one hand, a problem in itself, and on the other hand, often leads to the risk of poverty or social exclusion. Skica (2020) proves that the problem of unemployment is accompanied by directing local government policies to current expenses, which include social transfers. The greater the saturation of the local labour market with unemployed persons, the more decisive the focus on current expenditure, and thus the lower the focus on activities conducive to creating conditions for entrepreneurship development (Niedzielski & Domańska, 2005).

In the study, we have also selected one variable regarding digital competences and their role in entrepreneurship. This variable refers to people of working age (25-64) who have above basic overall digital skills. Literature shows that there is a strong positive relationship between digital skills and entrepreneurship (Hudek et al., 2019; Oggero et al., 2020), which is why, the low level of digital competences in communities, expressed by a relatively high percentage of people who have never used a computer in the population structure, is a factor that reduces involvement in entrepreneurship. This fact is of particular importance in light of phenomena such as the digital economy (D'Souza & Williams, 2017; Barefoot, 2018) and digital entrepreneurship (Kraus et al., 2019; Sahut, 2021).

Kelley et al. (2012) show that countries with a longer average working life have a higher rate of new business creation (suggesting a positive correlation between working life and entrepreneurial activity). Shane and Venkataraman (2000) proved that the length of working life is among a number of factors influencing the creation of new businesses. Acs et al. (2013), examining the theory of entrepreneurship based on knowledge resources, take into account the influence of a long working life on the increase in the number of businesses. The authors found that a factor stimulating their creation is the use of experience gained during their professional career.

One of the variables illustrating human capital is the number of young people (aged 15-34) who are neither in employment nor in education or training (NEET). Bell and Blanchflower (2011) showed that prolonged NEET status may limit the ability to acquire skills, reduce the desire for entrepreneurship and start new businesses. Similar conclusions were reached by Scarpetta et al. (2010), who argued that young people who have been out of school or training for an extended period may lack the necessary skills and resources to start a business.

The percentage of employment in high-tech sectors in total employment in a country is also an indicator of human capital. Decker et al. (2016) point out that while employment in the high-tech sector(s) may stimulate growth in large, established firms, it sometimes correlates with fewer new business entries. The reason is that the concentration of resources and talents in established firms may block smaller business ventures. Hathaway (2013) also fits into this narrative. The author notes that although high-tech industries contribute to job creation in existing firms, this effect does not necessarily translate into higher rates of new firm creation. Instead, high-tech sectors may consolidate talent and investment in existing firms, reducing the likelihood of new firm formation despite overall employment growth in the sector.

In contrast to employment in high-tech sectors, we argue that the saturation of local and regional ecosystems with specialists (scientists and engineers) translates into a higher rate of new firm creation. This is confirmed by Zucker et al. (1998), who show that regions with a higher concentration of scientists and engineers are characterized by a greater

likelihood of high-tech firm creation. Moreover, the authors indicate that the presence of these human resources is a predictor of entrepreneurial activity in science-based sectors.

The state and changes of human capital are also influenced by emigration. It is inextricably linked to the outflow of human factor resources from the country, and thus has a negative impact on the creation of new companies in it (Anelli et al., 2019, 2020). Migrants have a competitive advantage in the supranational space and are generally more entrepreneurial (Brinkerhoff, 2016; Vandor & Franke, 2016). Thus, their outflow means a decrease in the entrepreneurial potential of the country from which they emigrate.

The group of variables expressing human capital also includes: Human Development Index (in line with Sterward et al. (2018), it was assumed that an increase in HDI leads to economic growth, supporting the creation of new businesses, as social development policy encourages the creation of incentives to start businesses), participation rate in job-related non-formal education and training (according to Shelest-Szumilas (2016), it was assumed that such activities reflect the readiness to start one's own business), as well as short-term employment (here we share the position of Audretsch and Keilbach (2004) who emphasize the relationship between short-term employment opportunities and starting new businesses, showing that the flexibility of the labour market, which includes a higher level of short-term employment, encourages individuals to start businesses due to the skills and experience gained during these periods).

Institutional factors

The second group of variables represents institutional factors. The size and the number of public levies (taxes and social security contributions) play a role in making decisions about entering into business (Kugler & Kugler, 2002). The higher the social security contributions (quasi-taxes) and the tax burden, the lower the propensity to start a business. A higher level of fiscal burdens determines the cost that an entrepreneur must incur when deciding to set up and run a business (Harden & Hoyt, 2003; Wasylenko, 1997). The study's tax burden indicator measures the level of economic freedom in tax terms. The higher its value, the greater the economic freedom in tax (i.e., fiscal) terms. This means that the fiscal burdens of current and potential entrepreneurs are smaller (The Heritage Foundation, 2023).

Business freedom and time required to start a business are a derivative of regulatory conditions for business (Kochmańska, 2007). A lower level of bureaucratization in the economy, procedural simplification (including shortened registration procedures), and deregulation should be perceived as factors favoring the setting up of a business (Tirapani, 2011; Fogel, 2006).

Property rights are also important for the creation of new businesses. Haydaroğlu (2015) confirms that a legal framework providing private property rights stimulates the creation of new firms by reducing transaction costs and promoting market stability. A similar point of view can be found in a slightly older work by Feder and Feeny (1991). According to their findings, a strong property rights system contributes to economic stability and promotes the formation of new firms.

The last set of explanatory variables among institutional factors (which determine entrepreneurship) are: the length of a country's membership in the EU (and, simultaneously, its status as an old or new EU Member), and the use of the Euro currency (i.e., the length of membership in the Euro area). The period of membership in the EU was considered a positive factor. The European Union, utilizing financial instruments, aims to enhance the competitive position and development of regions and Member States, particularly by supporting entrepreneurship. Therefore, the length of membership in the EU should be considered positively. The last variable in this group, i.e., the Euro currency and length of membership in the Euro area, was considered a control variable (therefore, no information about its expected stimulating or hampering nature was provided). Its role is to verify to what extent the differences in entrepreneurial activity in the studied countries are determined by factors other than the objectively recognized determinants of entrepreneurial activity.

The last, third group of variables consists of three selected parameters describing the level of economic development of the countries studied. These include: final consumption expenditure of households as a measure of economic well-being (in line with Reddy (2023), and Carree and Thurik (2010), it was assumed that it is positively related to a higher probability of engaging in new business ventures), medical infrastructure expressed by the number of hospital beds (following Byszek et al. (2018) and expressing well-being through the prism of the quality of health care in a given country, it was assumed that countries with better developed health care systems are characterized by a higher standard of living and economic well-being), and finally also the amount of the monthly minimum wage referred to the average monthly earnings (sharing the position of Kong et al. (2021), it was assumed that a high minimum wage has negative effects on entrepreneurship – high minimum wage enhances the threshold of starting a new business).

All of these variables differentiate the analysed countries in many respects. One of them (in the opinion of the authors of this article) is the entrepreneurial activity. The purpose of this article is to verify this position and to establish the above-mentioned factors describing the countries studied as positive or negative for the development of economic activity. To achieve the purpose of the paper and based on the literature review, the following research questions (RQa) were formulated:

RQ1: What sets and types of variables influence entrepreneurial activity in the EU Member States?

RQ2: Based on the defined factors affecting entrepreneurial activity, is there a difference between the old and new EU Member States?

METHODOLOGY

The usual approach for modelling panel data is panel regression. The most important modelling features highlighted by Greene (2003) and Wooldridge (2002) are presented below. The basic static panel model is the pooled one:

$$y_{i,t} = \alpha + \sum_{k=1}^K \beta_k x_{i,t,k} + \varepsilon_{i,t}, \varepsilon_{i,t} \sim i.i.d.(0, \sigma_\varepsilon^2), \text{cov}(x_{i,t,k}, \varepsilon_{i,t}) = 0 \quad \forall i, t, k \quad (1)$$

where i denotes a country, t is the year, $i \in \{1, 2, \dots, 28\}$, $t \in \{1, 2, \dots, 10\}$, $y_{i,t}$ is the value of the dependent variable of country i in year t , α is the constant equal for every country and every year, $x_{i,t,k}$ are values of the k -th independent variable for country i in year t , β_k is the value of the parameter k and $\varepsilon_{i,t}$ is the error term, assumed to be independently and identically distributed across all countries and time periods, with expected value of zero and homoscedastic variance, alongside being independent of all independent variables in the model. The use of panel models is a consequence of their advantages over time series or cross-sectional analysis. In panel models, we have access to more degrees of freedom, which makes the process of inferring about model parameters more accurate (Hsiao et al., 1995).

In addition, the article presents descriptive statistics and the Mann-Whitney test, with a detailed examination of possible differences in entrepreneurial activity between the old and new EU member states. This approach enables the identification of differences in the level of entrepreneurial activity that may be linked to various factors characteristic of these two groups of countries. Furthermore, the use of a heatmap visualizes the relative differences between countries within each variable and the influence of individual variables on a specific group within the grouping, thus providing a deeper understanding of the relationships between variables and revealing patterns that might not be immediately apparent from the regression analysis alone.

RESEARCH RESULTS

The main results are given in Table 2. Considering that the Breusch-Pagan/Cook-Weisberg test for heteroskedasticity is not significant at the 5% level, that the Wooldridge test for autocorrelation in panel data is not significant at the 1% level, and the individual VIF values are not greater than 10 (with the mean VIF < 4.47), we have decided that the pooled panel model is appropriate. The Jarque-Bera normality test was conducted to assess the distribution of model residuals. The test results were $\chi^2(2) = 4.008$, $p = 0.1348$, indicating that the residuals do not significantly deviate from normality at conventional significance levels.

The results show that several factors have a statistically significant impact on entrepreneurial activity in EU countries. These variables were divided into two groups: "Human Capital" and "Institutional conditions." In the "Level of development" category, none of the variables explained in the OLS model had a statistically significant impact on the level of entrepreneurial activity in the studied countries.

- Human capital: Emigration (var9), Young people neither in employment nor in education and training (NEET rates) 15-34 years (var11), Employment in high-technology sectors (var13), Human Development Index (var15), Employees by type of employment contract (Limited duration) (var16), Participation rate in job-related non-

formal education and training in age 35-54 (var17), Individuals who have above basic overall digital skills in 25-64 years (var18).

- Institutional conditions: Tax burden (var6), Business freedom (var7), Length of membership in the EU (var19), Euro currency and length of membership in the euro area (var20).

Table 2. Estimation results of the pooled OLS regression

Independent variables	Description	Model	VIF
var3	Duration of working life - annual data	0.027899 (0.014935)	4.28
var4	Monthly minimum wage as a proportion of average monthly earnings (%)	0.004678 (0.005799)	2.53
var5	Property rights (0-100 pts.)	0.000340 (0.0024)	6.18
var6	Tax burden (0-100 pts.)	0.021520*** (0.002793)	5.00
var7	Business freedom (0-100 pts.)	-0.008322* (0.003446)	3.20
var8	Final consumption expenditure of households by consumption purpose - total (% of GDP)	0.005934 (0.004561)	7.11
var9	Emigration (number)	-0.000002*** (2.25e-07)	2.73
var10	Curative care beds in hospitals (Per hundred thousand inhabitants)	0.000038 (0.000245)	2.59
var11	Young people neither in employment nor in education and training (NEET rates) 15-34 years (%) Not employed persons	-0.027634*** (0.008308)	5.97
var12	Long-term unemployment 20-64 years (% of unemployment)	-0.000668 (0.002539)	2.69
var13	Employment in high-technology sectors (high-technology manufacturing and knowledge-intensive high-technology services) - % of total employment	-0.141147*** (0.023641)	3.67
var14	Human Resources in Science and Technology - Scientists and engineers as % of active population	0.001774 (0.020919)	5.54
var15	Human Development Index (0-100 pts.)	0.541454*** (0.0058306)	2.14
var16	Employees by type of employment contract (Limited duration) - % of employment in 15-64 years	2.984969*** (0.395857)	3.02
var17	Participation rate in job-related non-formal education and training in age 35-54 (%)	0.016235*** (0.003308)	5.52
var18	Individuals who have above basic overall digital skills in 25-64 years (% of individuals)	-0.029489*** (0.004367)	6.29
var19	Length of membership in the EU (number of years) - measured since the official establishment of the EU in 1993	0.019754* (0.006832)	6.73
var20	The membership in the Euro area (1=Yes, 0=No)	0.376434*** (0.084821)	5.22
const		-11.363520*** (0.958892)	
Adjusted R-squared		0.7020	
RMSE		0.24302	
F test		F(18, 191) = 28.35 Prob > F = 0.0000	
Ramsey RESET test		F(3, 188) = 0.44 Prob > F = 0.7229	
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity		chi2(1) = 0.54 Prob > chi2 = 0.4640	
Wooldridge test for autocorrelation		F(1, 20) = 4.908 Prob > F = 0.0385	
Mean VIF		4.47	
Jarque-Bera normality test for residuals		chi(2) = 4.008 Prob > chi2 = 0.1348	

Note: *p < 0.05; **p < 0.01; ***p < 0.001. Standard errors are given in parentheses. All variables are time-dependent except for the variable var20, which is time-invariant.

Group 1 includes 15 EU countries (so-called “old EU Member States”). It consists of Belgium, France, Germany, Italy, Luxembourg, and the Netherlands (countries that founded the European Economic Community in 1957), supplemented by countries that joined the EU through four enlargements. In the first enlargement, in 1973, Denmark, Ireland, and the United Kingdom joined the EU. Then, in the second enlargement in 1981, Greece joined the European Community. Spain and Portugal joined the EU in 1986 (during the third enlargement), and the last countries of the old EU are Austria, Finland and Sweden. They joined in 1995, during the fourth enlargement.

Group 2 consists exclusively of new EU members, formed by three successive enlargements. In 2004, Cyprus, the Czech Republic, Estonia, Lithuania, Latvia, Malta, Poland, Slovakia, Slovenia, and Hungary joined the EU. During the next enlargement in 2007, the EU structures were expanded to include Bulgaria and Romania. The youngest EU member is Croatia, associated in 2013.

The Mann–Whitney test was conducted to assess differences between two distinct groups (Table 3).

Table 3. Results of comparative tests of two groups of countries - Old and New EU Member States

Two-Sample Wilcoxon Rank-Sum (Mann–Whitney) Test Results					
Group	Observations (n)	Rank Sum	Expected Rank Sum	z-value	p-value
Group 1 – Old EU Member States	15	171	217.5	-2.142	0.0322
Group 2 – New EU Member States	13	235	188.5		

Based on the descriptive statistics, the results of the Wilcoxon Rank-Sum (Mann–Whitney) test reveal a significant difference in the entrepreneurial activity between Old EU Member countries ($M = 171$) and New EU Member countries ($M = 235$), $z = -2.142$, $p < 0.05$. Notably, New EU Member countries exhibited higher scores compared to Old EU Member countries, suggesting that the rate of entrepreneurial activity is notably greater in New EU Member countries (Table 3 and Table 5 in Appendix).

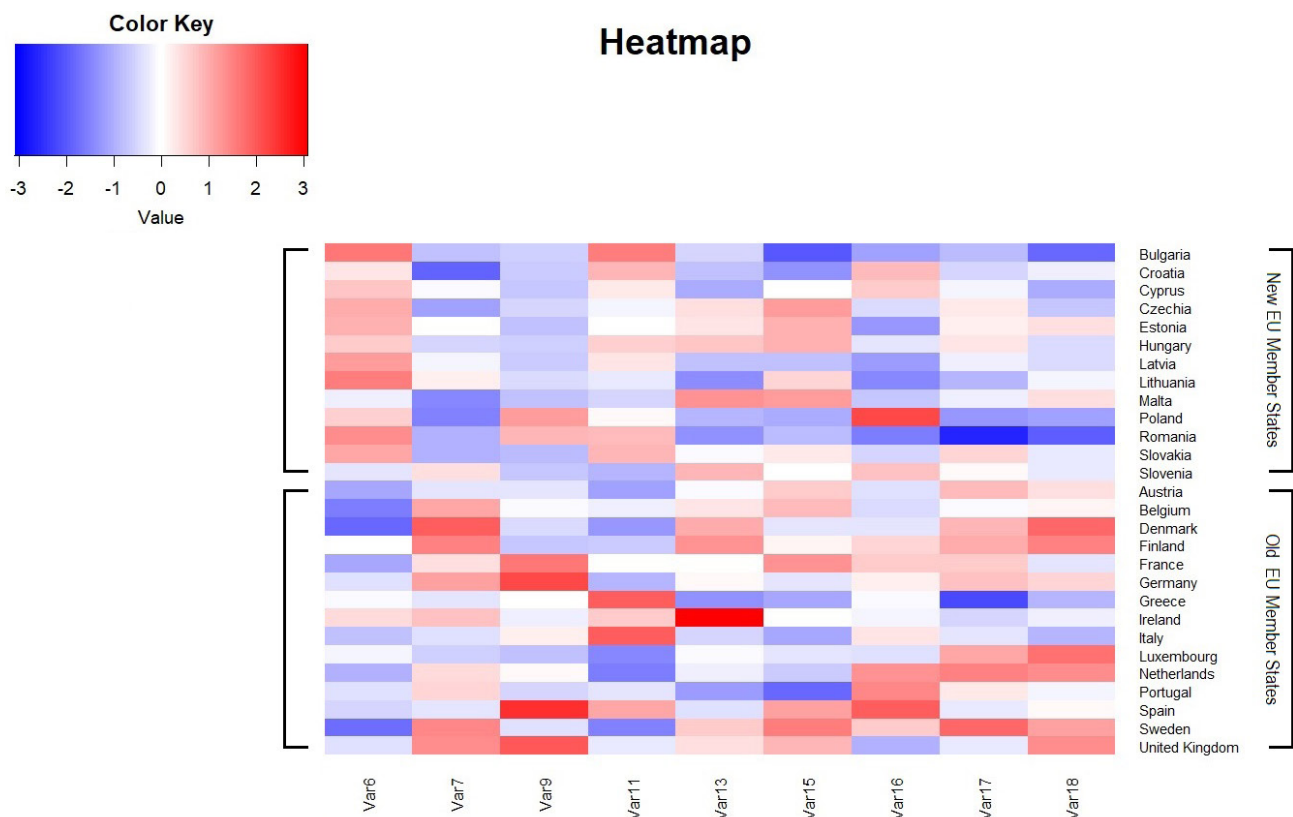


Figure 1. Heatmap of the analysed countries divided into country groups - Old and New EU Member States

Source: Own elaboration based on GeoNames, Microsoft, Open Places.

DISCUSSION

Factors affecting entrepreneurial activity in EU Member States

The research conducted using panel regression showed a statistically significant impact of 11 variables on new firm formation among EU Member States. In response to the first research question (RQ1), we briefly discuss the impact of each group on the entrepreneurial activity in the EU Member States.

A. Human capital factors

Entrepreneurial activity is explained by 7 variables from “Human capital” category. Human capital is considered as one of the factors influencing the decision to start and run one’s own business (Block et al., 2011). Moreover, human capital and entrepreneurship are complementary factors that influence economic growth (Mankiw et al., 1992). Formal education, a component of human capital, is in turn positively correlated with entrepreneurship indicators (Dunn & Holtz-Eakin, 2000; Ahn & Winters, 2023). Education (especially higher education), increases the level of formal entrepreneurship (i.e., entry into business) by building greater self-confidence, lower risk perception, and increased human capital (Jiménez et al., 2015). This position is confirmed by Coduras et al. (2010). The authors argue that individuals tend to acquire knowledge through education, which equips entrepreneurs with the skills and abilities necessary for running a business. As a result, education deficits are accompanied by lower entrepreneurial activity. In the case of the NEET group (i.e., not in employment, education or training, var11) (Batini et al., 2017), stimulating entrepreneurship is equivalent to developing the skills needed to create their own workplaces (Gonçalves, 2020). Hence, a higher NEET rate corresponds to a lower rate of entry into business. The solution to this problem, among others, is entrepreneurship education (Rodríguez-Modroño, 2019; Cabasés Piqué et al., 2016).

The analysis of employment in high-tech sectors as a percentage of total employment (var13) shows that lower employment in the high-tech sector is accompanied by a greater number of company creations. The obtained result may also suggest the interchangeability between employment and owning a business as alternative career paths (Sorgner & Fritsch, 2018) in the high-tech sector (Harhoff, 1999). The demonstrated inverse relationship between the studied variables confirms the flow observed in the high-tech sector from full-time employment to one’s own company (Thompson & Klepper, 2005), in which the rewards resulting from entrepreneurship depend entirely on the interaction of: ability, quality of business idea and experience in employment (Braguinsky et al., 2012). This formula is typical for spin-off companies involving advanced technologies, which are engaged in research on new fields and emerging sectors (Smith & Bagchi-Sen, 2012). For these companies, professional experience gained during employment in the industry may serve as a stimulant for starting their own business (Klepper & Sleeper, 2005).

The Human Development Index (var15) is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable, and having a decent standard of living (UNDP, 2023). In line with the literature (Doan, 2021), the study confirmed that a higher HDI index is accompanied by higher entrepreneurship. Promoting social development, therefore, contributes to entrepreneurship. This is important because most research (e.g., Ballesta et al., 2020; Gries & Naudé, 2011) focuses on the impact of entrepreneurship on human development. Meanwhile, the presented results prove the opposite direction of the relationship. The research results include, among others, the narrative of Obschonka et al. (2011), which suggests that entrepreneurial development is related to factors during the teenage years and interactions with personality during the growth stages of human development. Moreover, low levels of human development at the country level may inhibit individuals from pursuing business opportunities (Gries & Naude, 2011). The study of the relationship between HDI and entrepreneurial activity also takes into account differences in the level of development of the countries studied. Amorós and Cristi (2010) showed that entrepreneurship is related to social development and income inequality of countries. Ács and Amorós (2008) confirmed this fact by pointing out that the percentage of the population engaged in economic activities is higher in developed countries than in less developed regions or countries. The results presented in this paper confirm this point of view.

There is a well-known fact in the literature that non-formal methods of entrepreneurship education have a stronger impact on the development of human capital (Debarliev et al., 2022), which in turn has a positive impact on the decision to enter business (Doan, 2021). This study confirmed this fact, proving that the higher the share of society participating in informal education (var17), the higher the rate of entrepreneurship in the studied country. These findings are also

confirmed by Umihanić et al. (2017). The results indicate the validity, or even necessity, of supplementing formal education (especially regarding entrepreneurship), with non-formal education and training. Debarliev et al. (2022) go a step further. They claim that at the level of universities, study programs should be created that include non-cognitive teaching methods that strengthen entrepreneurship potential. The authors point out that informal education should not be identified with a consequence of completed formal education, but should complement it. Moreover, the importance of the role of informal education in decisions about entering business varies depending on the level of development of the country and assumes the role of either complementing formal education or its substitute in underdeveloped countries (Asiyai, 2018). The validity of employees' participation in non-formal education, as well as the deepening of knowledge resulting from work and the process of continuing education, plays an important role, as pointed out by Piątkowski (2020). More than half of all workers who participate in non-formal work-related learning reside in eight EU countries, which, with the exception of Slovakia, belong to the group of Old EU members. Additionally, it should also be mentioned that it is necessary to strengthen entrepreneurship education in schools and colleges with non-economic profiles. Graduates of these schools have very extensive specialist knowledge and advanced technical skills, but they lack the skills to run a business in their profession on their own (Riviezzo et al., 2023). They are in some way forced to enter into business in the form of partnerships with their colleagues (graduates of economics and related fields) as a result of synergy and combination of knowledge and specialist competence in the production/provision of services with economic knowledge.

The outflow of people from a given country (var9) has a negative impact on the creation of new companies in this country (Anelli et al., 2019). This is the result of, among others, brain drain (Anelli et al., 2020), which causes the outflow to affect competent and resourceful individuals who can cope abroad. These are the people who have the potential to start their own business (Anelli et al., 2023). People leaving a given country will be willing to set up a business in the country they are going to. Migrants have a competitive advantage in the transnational space and are generally more entrepreneurial (Brinkerhoff 2016; Vandor & Franke 2016). A country's greater determination to create conditions for entrepreneurship attractive enough to stop the outflow of qualified people may translate into higher domestic entrepreneurial activity.

As expected, the greater the number of people employed periodically (var16), the higher the entrepreneurship rate. Entering a business is a solution not only to the problem of uncertainty of continued employment, but also to the unattractive working conditions (which are a derivative of the contract form). The narrative line adopted in the article fits into the concept of necessity entrepreneurship (O'Donnell et al., 2024). According to the authors, the relationship detected in the study may suggest that people looking for an alternative to unfavourable employment conditions (which are a derivative of the term contract formula) and wanting to improve their financial situation have no other alternative than starting a business.

Possessing above-basic digital skills (var18) negatively impacts entrepreneurial activity. The estimation results indicate that a higher percentage of people in society with above-basic digital competencies not only fails to drive greater overall entrepreneurial activity but actually has a braking effect. Research shows that even in the case of digital business, digital competences are not the most important (Handayani et al., 2020). For individuals planning to start a company, the lack of the aforementioned competencies is not an obstacle, as these tasks can be performed by specialized employees or outsourced (Heeks, 2017). The obtained result is also explained by the fact that the study does not take into account the division of companies into PKD (i.e. NACE) sections, and the number of all new firms serves as the explained variable. The authors do not limit themselves to innovative and technologically advanced entities for which an above-average level of digital competences is a factor determining entrepreneurial intentions (Fazil et al., 2022; Oggero et al., 2020). However, this relationship (as research shows) does not apply to the entire economy. The result of our estimation can be explained, and the result itself is consistent with the findings in the literature. Fossen and Sorgner (2021) suggest that while digitalization creates opportunities for highly skilled workers, it can have a detrimental effect on those with fewer skills, limiting their chances to enter entrepreneurship. They argue that for high-skilled individuals, digitalization may encourage them to start unincorporated businesses, but for low-skilled individuals, it tends to reduce their entrepreneurial potential. Furthermore, with the rapid growth of advanced digital technologies, the opportunity costs for less ambitious entrepreneurial ventures rise, creating additional barriers for entry-level entrepreneurs. As a result, while digital skills may benefit growth-oriented entrepreneurship, they may discourage those with fewer resources or less ambition from pursuing smaller-scale entrepreneurial ventures. Similarly, Abaddi (2024) finds a significant negative relationship between digital skills and entrepreneurial activity among final-year undergraduate students in Jordan. This study suggests that higher levels of digital skills may, in fact, discourage entrepreneurial intentions. The increasing complexity and demands of modern entrepreneurial ventures may seem overwhelming or inaccessible to those without the necessary resources to engage in more challenging entrepreneurial activities.

The results of this study are of particular importance in the context of starting a business in the digital economy. The prevailing belief is that having higher digital competences is one of the most important elements of building a company's competitive advantage, regardless of its business profile. This means that an idea based on an in-depth analysis of needs and market analysis, as well as our knowledge and broadly understood entrepreneurial competences, is still more important than the skills that we are able to buy, but which do not determine the creation of new firms. It should be noted, of course, that this does not apply to businesses based on information technologies, for which these skills and knowledge are crucial. This is also a key observation in the context of educating personnel based on exact/technical/engineering sciences, where the specificity of graduates of these fields is to have specialized production/manufacturing knowledge or a "profession in hand", rather than the skills possessed by graduates of social sciences, even those useful in the process of establishing and managing an enterprise based on competition on the free market. The study results allow the authors to conclude that interdisciplinarity will play an important role when starting a business. A key finding from the study is that the interaction between social sciences and engineering/technical sciences should be strengthened, as their cooperation will be crucial for a synergistic effect in the context of creating new enterprises.

B. Institutional factors

Research has proven that entrepreneurial activity is explained by 4 variables from Institutional category. The conditions for starting a business are favoured by transparent tax policy and an acceptable level of fiscal burdens (Skica & Rodzinka, 2021) (var6). The results of the conducted research confirm this relationship between the variables studied. A higher value of the tax burden indicator (corresponding to greater economic freedom in the fiscal sense and thus less fiscalism, which is associated with favourable conditions for business) is linked to higher entrepreneurial activity.

The estimations performed did not confirm the assumed positive relationship between the indicator describing economic freedom (var7) and new business entry. The obtained result, although negative, was statistically significant. In the described model, a higher value of the indicator does not translate into decisions about entering the business. The obtained result is consistent with the common criticism of indicator measures of entrepreneurship determinants (Michaels, 2009; Du Marais, 2009). The business environment assessed using indicator measures does not encompass all factors that determine the decision to start a business (Lesik, 2020). They do not include macroeconomic stability, the development of the financial system, the size of the market, the quality of the workforce (Besley, 2015), or systemic factors and oligarchizing of the economy (Doing Business Report, World Bank), as well as the occurrence of bribery and corruption (Index of Economic Freedom, Heritage Foundation). However, they reward the state's small share in the economy, which paradoxically boosts the rankings of countries (totalitarian and authoritarian) that are little involved in the economy (Economic Freedom of the World, Fraser Institute) and are capable of terminating the operations of any company in the country by means of a regulation.

The entrepreneurial activity varies also across countries (Grilo & Irigoyen, 2006). Country-specific effects are visible both from the perspective of entrepreneurial intentions and entrepreneurial activity (Grilo & Thurik, 2005). EU membership (var19) stimulates entrepreneurs to implement their business ideas (Pfaffermayr et al., 2004), and institutions have a decisive impact on the universality and nature of entrepreneurship (Bosma et al., 2018). These are stronger (also due to their persistence) in the old EU countries (Lane, 2010), which promotes the role of EU membership in entrepreneurship.

Finally, the estimation results show that the decision to enter a business is favored by having the Euro currency (var20). It eliminates the problem of exchange rate differences, increases access to the EU market, and dynamizes cooperation within the EU (Ferrando et al., 2018; Panico, 2015). Tavlas (2004) and Ramos et al. (2000) find that the Euro area contributes to entrepreneurship through more integrated financial markets. Moreover, it reduces transaction risk, stimulates cross-border trade and investment, and facilitates price comparisons. These features of the euro area make it an instrument that favours the business environment and has a positive impact on entrepreneurship policy.

Differences in factors determining entrepreneurial activity between old and new EU Member States

In response to the second research question (RQ2), we focus on the differences between the old and new EU Member States in terms of the factors responsible for higher or lower entrepreneurial activity.

Longer membership in the EU promotes better compliance of national legal systems with EU regulations, easier access to funds, and improved administrative and institutional support, which in turn affects new firm formation (Campos et al., 2014). Countries that joined the EU before 2004 have benefited significantly (albeit unevenly) from

integration. They are also characterised by a high degree of persistence of the effects of EU accession, suggesting a continuous deepening of the integration process (Campos et al., 2019). The old EU Member States have diversified and developed their internal markets, facilitating the establishment of companies across various sectors of the economy, including high-tech and services (Ilzkovitz et al., 2007). Southern European countries, in particular Portugal, Greece, and Italy have gained substantial political and financial support through structural funds (Varga et al., 2014). Moreover, participation in the EU has attracted significant investments in innovation and technology. Countries such as Finland, Sweden, Denmark, the Netherlands, and Germany exemplify this trend, as they lead in research and development investments, thereby fostering the emergence of technological startups (Simionescu et al., 2021). It is also important to note that nations with a long history in the EU tend to exhibit a well-developed culture of entrepreneurship. This culture is characterized by a willingness to take high risks and social support for entrepreneurial ventures, as observed particularly in Great Britain, Sweden, and Ireland (see Hofstede, 1983; Beugelsdijk, 2007).

On the one hand, the information presented demonstrates the significant effort invested by the new EU countries in shaping the conditions for entrepreneurial development. On the other hand, it is difficult to argue with the fact that the solutions creating the climate for entrepreneurs who are currently profiting in the old EU countries are a function of their duration in the national legal systems, institutional maturity and culture, and entrepreneurial traditions. These, however, cannot be acquired just through the fact of accession to the EU structures. Their formation requires time for them to grow into the institutional and organizational tissue and take root in the consciousness of societies, creating a culture of entrepreneurship.

The presented heat map (Figure 1) clearly shows the boundary dividing the EU Member States into two groups based on factors influencing entrepreneurial activity - new EU countries (upper part of the figure) and old EU countries (lower part of the figure).

It can also be observed that both groups of countries differ in each of the factors influencing entrepreneurial activity. This is most visible for variables classified in the "Institutional conditions" category, i.e. var6, var7 and for variables var17, var18 which belong to the group of "Human Capital" factors.

Among the old Member States, the percentage of NEETs (var11), i.e. young people aged 15-34 who are neither employed nor in school or training, is lower (14.18%) than the average for all EU countries (15.38%). The lowest NEET rate (below 10%) in Group 1 is found in the following countries: the Netherlands, Sweden, Luxembourg, Denmark, and Austria. The highest percentage of NEETs (above 20%) is in the southern European countries of Spain, Italy, and Greece, which are struggling with high unemployment among young people. The value of this factor among the countries belonging to Group 2 (new EU Member States) is higher than the EU average, 16.77%. The lowest values are observed in Slovenia and Malta (11.04% and 12.78%), while the highest are found in Romania, Croatia, Slovakia, and Bulgaria (ranging from almost 20% to more). It is interesting that the range between the min and max values among the new EU countries is lower (12.06%) than in the old EU countries (17.54%). It should be emphasized that this is a factor belonging to the group of destimulants in the context of influencing the level of entrepreneurial activity; therefore, it is desirable for the percentage of NEETs to decrease.

In the case of employment in high-technology sectors (var13), the average value of this factor for all EU countries is 4.08%. In 12 countries, it is higher than the EU average (in 7 old and 5 new EU Member States). In the group of old Member States (Group 1), the highest values are in Ireland, Finland, and Denmark (8.05-5.41%). In turn, the lowest values are in the southern countries, i.e.: Greece, Portugal, Italy, and Spain (2.39-3.6%). The level of employment in high-technology sectors in Ireland is the highest in the entire European Union. Among the new Member States (Group 2), employment above 5% in high-technology sectors is found in Malta, Slovenia, and Hungary, while the lowest rates, below 3%, are observed in countries such as Poland, Cyprus, Romania, and Lithuania.

According to our study and the results obtained, The Human Development Index (var15) is a stimulant and promotes greater entrepreneurial activity, which means that higher values for this indicator are expected. The method of measuring the HDI index determines values from the range 0-100, where results closer to 100 are the expected value. Among all EU Member States, the level of the HDI index was higher than 80, with an average value of 88. Above-average results are observed in 12 countries, in equal parts among the old Member States (Sweden, France, Spain, the United Kingdom, Belgium, and Austria) and the new Member States (Malta, Hungary, Czechia, Estonia, Lithuania, and Slovakia).

Among the stimulants that affect entrepreneurial activity and belong to the group of "Human capital" factors, which are important from the perspective of our study, the percentage of people aged 35-54 participating in job-related non-formal education and training (var17) should be distinguished. In Group 1, the dominant position is occupied by Sweden

and the Netherlands, where almost 60% of employees aged 35-54 participate in various informal forms of improvement and acquiring knowledge correlated with their professional activity. On the other side, in Group 1, there is Greece, where the situation described occurs at a level of only 10%. In Group 2, the worst situation is in Romania (5.2%), which is half of the previously described Greece. The next lowest value is in Poland, but it is a much better level, at 21.25%. In Group 2, the highest percentage of people at the level of 40-43% who participate in non-formal education and improve their professional qualifications is found in Slovakia, Hungary, the Czech Republic and Estonia. The differentiation between groups 1 and 2 is quite clear, as the difference between the average values is 9 percentage points (40.89% and 31.84%, respectively). This shows the important role played by various educational programs addressed to members of the EU community based on the idea of lifelong learning.

Emigration is another factor statistically identified in the model as significant in influencing the level of entrepreneurial activity. This factor is a destimulant, i.e. a negative impact. The volume of emigration of EU citizens is mainly determined by the labour market situation in the sending country (primarily the level of unemployment), while the level of immigration in the EU is mainly determined by the wage differential between the sending and receiving countries (Cabańska, 2015; Wahba, 2021). In the new Member States, the main push factor is high unemployment and the main pull factor is the level of wages (the differences in wages between the new and old Member States are so large that, despite rising wage levels in the new Member States, there is emigration to the old EU countries). In the old Member States, decisions to emigrate (i.e., the outflow of people from these countries) are driven by improved economic and social conditions in the home country, known as return migration (Coleman, 1994).

Another factor influencing the level of entrepreneurial activity is the number of employees on temporary contracts (Limited Duration) (the EU average is 12%, as a percentage of the employed group aged 15-64). The creation of new enterprises in this case is likely the result of forced action due to unfavourable employment conditions, such as the lack of permanent employment. In Group 1, the highest percentage of people with temporary employment is found in Spain, Portugal, and the Netherlands (25-21%), and the lowest is below 10% in Belgium, Austria, Luxembourg, and the United Kingdom. In Group 2, Poland stands out significantly (27%), and the lowest values are observed in Romania and Lithuania.

In the case of the variable of having above-basic digital skills among people aged 25-64 (var18), the average value for all EU countries is 31%. In Group 1 (old Member States), the average is 36% and is higher than in Group 2 (new Member States) - 24%. There is a visible disproportion in the possession of digital skills between citizens of EU countries belonging to these two groups. The clear leaders in Group 1, as in the entire EU, are Denmark, Luxembourg, Finland, the Netherlands, and the United Kingdom, where more than 46% of citizens aged 25-64 have above-basic digital skills. The worst results in having above-basic digital skills are achieved by citizens of Greece and Italy. In Group 2, none of the countries reach the average value for countries in Group 1. The best result is in Malta and Estonia (35%). In turn, the weakest digital skills are achieved by citizens of Romania (9%) and Bulgaria (11%).

The level of entrepreneurial activity is also influenced by 4 institutional factors (in addition to the above-mentioned factors belonging to the "Human capital" group). The first factor in this group is the level of fiscal burden and transparent tax policy (var6). This parameter takes values from 0 to 100 points. The highest values are expected, which should be interpreted as having a positive impact on the level of entrepreneurial activity in a given country. The average value of this factor in the entire EU is 66 points. Disproportions are visible between the two groups (the difference between the average value for the old and new EU Member States is as much as 23 points – in favor of the countries from Group 2). In Group 1, the tax burden is most favourable in Ireland (73 points) and only there does it exceed the EU average. The strongest tax restrictions occur in Denmark, Sweden, and Belgium (39-44 points). In Group 2, as many as 11 countries achieve an indicator higher than the EU average. The least stringent fiscal burdens occur in Bulgaria, Lithuania, and Romania (87-90 points). In turn, Malta and Slovenia are on the opposite side. Although Malta is considered a tax haven, companies can minimize the level of fiscal burdens through effective forms of taxation; however, the basic flat-rate corporate income tax rate is as high as 35%.

Turning to the business freedom index (var7), it ranges from 0 to 100 points. The average value for the EU is 79 points, and among the countries in Group 1, it is higher (84 points) than the value among the countries of Group 2, the new Member States (72 points). In the old EU Member States, Luxembourg, Italy, Austria, Spain, and Greece recorded below-average results (73-76 points), while Sweden, Finland, and Denmark achieved the highest results (92-97 points). Among the new Member States, the vast majority achieves a result below the EU average. Only in two countries (Lithuania and Slovenia) are the values of the business freedom index higher than the EU average (82 points).

Analysing the level of entrepreneurial activity among all EU countries based on the “y” variable in our model, we come to very interesting observations. Of the five countries with the highest level of entrepreneurial activity in the analyzed period, four countries belong to Group 2 (Lithuania, Slovakia, the Czech Republic, and Latvia), i.e., new Member States. In turn, among the five countries with the weakest indicator, 4 countries belong to the so-called old EU (Greece, Ireland, Austria, and Germany).

CONCLUSION

This study extends our understanding of the factors influencing the level of entrepreneurial activity among EU Member States, reinforcing and expanding the existing literature in this area. An important contribution to science is the results of our study aimed at discussing the differences between groups consisting of new and old EU Member States. This is a significant contribution that also has practical implications for the effective impact of new countries’ accession to the European Union on entrepreneurial activity in these countries. The discussed factors influencing entrepreneurial activity in new Member States can be a determinant in creating appropriate sources of EU law aimed at entrepreneurial processes among Member States.

The results of the analyses allowed the authors to achieve the research goal and verify both research questions. The conducted research identified factors that affect entrepreneurial activity in EU countries. Moreover, statistically significant differences were identified in the level of entrepreneurial activity between the old and new EU Member States. The research was based on the analysis of panel data for EU countries from 2009 to 2018. Based on the analyses, a research model was developed, which identified two groups of factors: Human capital and Institutional conditions influencing the level of entrepreneurial activity.

It can be concluded that there is a visible differentiation in terms of conditions for new firm formation between the old and new EU Member States, with an advantage in favour of the latter. Membership in the EU and the investment outlays incurred in the New EU Member States, which were intended to strengthen the potential and competitiveness of these countries, brought a positive result in the area of entrepreneurship.

The conducted research allows for the formulation of the following conclusions. Human capital and entrepreneurship are complementary factors influencing economic growth. A higher NEET rate corresponds to a lower rate of entry into business. Lower employment in the high-tech sector is accompanied by a greater number of established companies. The inverse relationship between the variables studied was verified. This confirms the trend observed in the high-tech sector, where individuals transition from full-time employment to owning a company. Next, the study confirmed that a higher HDI is associated with higher entrepreneurship. Promoting social development, therefore, contributes to entrepreneurial activity. This study confirmed this fact, proving that the greater the share of society participating in non-formal education, the higher the entrepreneurship rate in the studied country. The outflow of population from a given country has a negative impact on the creation of new companies in that country. A greater determination by the country’s governments to stop the outflow of qualified people may translate into higher domestic entrepreneurial activity. As expected, the greater the number of people employed temporarily, the higher the entrepreneurship rate. The narrative presented in the article aligns with the concept of entrepreneurship driven by necessity. Additionally, a higher percentage of people in society with above-basic digital competences does not necessarily lead to higher entrepreneurial activity and may have a negative impact on the decision to start a business. This is a key observation in the context of educating staff based on STEM sciences, where the specificity of graduates of these fields is having specialist knowledge or a “profession in hand”, and not, as a rule, digital skills. The results of this study are of particular importance in the context of starting a business in the digital economy. The prevailing belief is that having higher digital competences is one of the most important elements of building a company’s competitive advantage, regardless of its business profile. The results of the conducted research also confirm that the conditions for starting a business are favoured by a transparent tax policy and an acceptable level of fiscal burden. A higher value of the indicator, corresponding to greater economic freedom in the fiscal sense, is identical with favourable conditions for entrepreneurial activity.

Regarding the second research question, we confirm that both groups of countries differ statistically in terms of the factors that describe our model. These factors can be categorized into two groups: “Human capital” and “Institutional factors,” which influence entrepreneurial activity, as confirmed by our research. Among the old Member States (Group 1), the percentage of NEETs, i.e., young people aged 15-34 who are neither in employment, education, nor training, is lower than the average for all EU countries. Among the countries belonging to Group 2 (new EU Member States), the percentage

of NEETs is higher than the EU average, which has a negative impact on the level of entrepreneurial activity. In the case of employment in high-tech sectors, the average value of this coefficient is higher among the 15 old EU countries than among the new Member States. There is a significant difference between groups 1 and 2 among people aged 35-54 participating in non-formal education and vocational training. Better values were observed in Group 2, with a dominant position of Sweden and the Netherlands, where almost 60% of employees participate in various non-formal forms of professional development. In Group 2, the average is only 32%, with a notably low value in Romania at 5%. In Greece, which belongs to Group 1, the situation is not significantly better, because only 10% of people participate in informal forms of improving professional skills. Additionally, a higher percentage of employees employed on temporary contracts is found in the old EU countries compared to the group of 13 new EU Member States. Another notable difference is visible in the percentage of people aged 25-64 who possess above-basic digital skills. A significant advantage can be observed among the Old EU Member States (36%), compared to the New EU members (24%). Additionally, according to our study, the Human Development Index as a stimulant for greater entrepreneurial activity occurs at an equal level in both groups (with a slight advantage of 1 point in the old EU countries). Considerable differences were also observed among institutional factors. Among the 13 new Member States, there is a more favourable situation in terms of fiscal burdens than in Group 1, which groups the old Member States. This variable has a stimulating nature, so the highest values are expected, which should be interpreted as indicating a positive impact on the level of entrepreneurial activity in a given country. A statistically significant difference also occurs between the groups for the parameter referred to as business freedom. The result obtained, although negative, was statistically significant. Higher values of the economic freedom index parameter occur in favour of the old Member States.

This study also had limitations, primarily related to the difficulty of obtaining complete data for the entire study period. Therefore, the study authors had to limit the analysis only to variables with repeated data in each year. The study was conducted at the country level until the UK's departure from the European Union, and it did not account for the market collapse caused by the COVID-19 pandemic or the war in Ukraine. In future studies, researchers can focus on the analysis of entrepreneurial activity with special consideration of external factors, including political factors such as wars, changes in the models of governing countries based on social support, migration processes or international relations and their impact on trade.

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Appendices

Table 4. Correlation matrix for the variables used in the model

Variables	y	var3	var4	var5	var6	var7	var8	var9	var10	var11	var12	var13	var14	var15	var16	var17	var18	var19	var20
y	1.000																		
var3	0.0640 (0.285)	1.000																	
var4	0.0801 (0.236)	-0.008 (0.905)	1.000																
var5	-0.1170 (0.050)	0.683 (0.000)	0.196 (0.004)	1.000															
var6	0.2634 (0.000)	-0.387 (0.000)	-0.323 (0.000)	-0.570 (0.000)	1.000														
var7	-0.1612 (0.006)	0.607 (0.000)	0.218 (0.001)	0.586 (0.000)	-0.522 (0.000)	1.000													
var8	-0.0014 (0.982)	-0.370 (0.000)	-0.093 (0.171)	-0.636 (0.000)	0.338 (0.000)	-0.351 (0.000)	1.000												
var9	-0.2445 (0.000)	0.102 (0.090)	-0.138 (0.041)	0.109 (0.070)	-0.218 (0.000)	0.127 (0.033)	0.052 (0.387)	1.000											
var10	-0.0068 (0.911)	-0.302 (0.000)	-0.074 (0.287)	-0.279 (0.000)	0.391 (0.000)	-0.203 (0.001)	0.133 (0.029)	0.056 (0.359)	1.000										
var11	-0.1302 (0.029)	-0.653 (0.000)	-0.382 (0.000)	-0.696 (0.000)	0.424 (0.000)	-0.376 (0.000)	0.579 (0.000)	0.101 (0.091)	0.027 (0.653)	1.000									
var12	0.1079 (0.071)	-0.547 (0.000)	-0.086 (0.204)	-0.571 (0.000)	0.293 (0.000)	-0.401 (0.000)	0.407 (0.000)	-0.045 (0.454)	0.101 (0.098)	0.641 (0.000)	1.000								
var13	-0.1209 (0.043)	0.287 (0.000)	0.135 (0.045)	0.543 (0.000)	-0.270 (0.000)	0.350 (0.000)	-0.614 (0.000)	-0.140 (0.019)	-0.338 (0.000)	-0.309 (0.000)	-0.138 (0.021)	1.000							
var14	-0.1533 (0.010)	0.637 (0.000)	0.334 (0.000)	0.658 (0.000)	-0.441 (0.000)	0.600 (0.000)	-0.585 (0.000)	0.107 (0.073)	-0.295 (0.000)	-0.575 (0.000)	-0.451 (0.000)	0.551 (0.000)	1.000						
var15	0.1131 (0.058)	0.300 (0.000)	-0.023 (0.740)	0.497 (0.000)	-0.236 (0.000)	0.165 (0.006)	-0.384 (0.000)	0.126 (0.035)	-0.148 (0.015)	-0.338 (0.000)	-0.254 (0.000)	0.457 (0.000)	0.290 (0.000)	1.000					
var16	-0.0025 (0.967)	0.139 (0.020)	0.101 (0.135)	0.126 (0.035)	-0.405 (0.000)	0.003 (0.957)	0.048 (0.427)	0.290 (0.000)	-0.397 (0.000)	-0.088 (0.142)	-0.057 (0.340)	-0.055 (0.357)	0.094 (0.115)	-0.121 (0.043)	1.000				
var17	0.1493 (0.012)	0.569 (0.000)	0.089 (0.188)	0.663 (0.000)	-0.515 (0.000)	0.422 (0.000)	-0.600 (0.000)	-0.164 (0.006)	-0.252 (0.000)	-0.655 (0.000)	-0.407 (0.000)	0.407 (0.000)	0.379 (0.000)	0.378 (0.000)	0.224 (0.000)	1.000			
var18	-0.0208 (0.728)	0.619 (0.000)	0.160 (0.018)	0.762 (0.000)	-0.586 (0.000)	0.554 (0.000)	-0.564 (0.000)	-0.015 (0.799)	-0.338 (0.000)	-0.693 (0.000)	-0.484 (0.000)	0.433 (0.000)	0.626 (0.000)	0.352 (0.000)	0.082 (0.174)	0.707 (0.000)	1.000		
var19	-0.1808 (0.002)	0.410 (0.000)	0.252 (0.000)	0.619 (0.000)	-0.724 (0.000)	0.633 (0.000)	-0.437 (0.000)	0.368 (0.000)	-0.328 (0.000)	-0.267 (0.000)	-0.235 (0.000)	0.245 (0.000)	0.497 (0.000)	0.146 (0.015)	0.266 (0.000)	0.381 (0.000)	0.534 (0.000)	1.000	
var20	0.0738 (0.218)	0.034 (0.572)	0.349 (0.000)	0.236 (0.000)	-0.128 (0.032)	0.143 (0.017)	-0.062 (0.304)	-0.070 (0.244)	-0.105 (0.085)	-0.053 (0.381)	0.194 (0.001)	0.026 (0.663)	-0.085 (0.155)	0.072 (0.233)	0.087 (0.145)	0.169 (0.005)	0.150 (0.012)	0.378 (0.000)	1.000

Note: the p-value is in parentheses.

Table 5. Descriptive statistics for the variables used in the model

Country	Group	y	var1	var2	var3	var4	var5	var6	var7	var8	var9	var10	var11	var12	var13	var14	var15	var16	var17	var18	var19	var20
Austria	1	.0046145	30 515.20	5 745 569.20	36.64	42.30	88.95	50.50	75.50	53.02	56 993.90	581.30	9.74	28.57	3.92	6.04	90	0.09	46.85	34.75	23	1
Belgium	1	.0060524	39 992.60	7 262 774.20	32.54	44.80	80.45	43.60	89.12	49.50	89 097.89	523.90	14.38	49.59	4.55	8.66	91	0.09	35.85	32.25	25	1
Denmark	1	.0064673	23 958.44	3 648 830.60	38.94	42.30	90.65	39.11	97.23	46.04	46 841.00	282.65	9.18	23.99	5.41	9.95	86	0.10	47.45	50.50	25	0
Finland	1	.0070245	24 164.80	3 504 621.20	37.50	42.30	90.46	65.84	93.18	50.94	15 044.10	311.75	12.04	25.28	5.82	10.12	88	0.16	49.15	47.50	23	1
France	1	.0104603	350 704.40	41 850 691.80	34.64	47.59	79.90	50.04	82.37	53.29	293 328.70	328.70	15.30	43.91	4.01	6.31	93	0.16	44.80	27.00	25	1
Germany	1	.0041181	222 012.78	53 541 424.20	37.73	41.05	88.39	60.51	89.29	51.41	358 491.30	615.73	10.88	45.37	4.19	7.45	86	0.14	46.15	36.75	25	1
Greece	1	.0052965	36 304.33	7 136 099.90	32.30	45.30	47.48	64.58	75.73	72.26	96 898.50	365.33	25.15	62.71	2.39	5.03	83	0.11	10.05	20.50	25	1
Ireland	1	.0049636	15 661.50	3 087 279.30	35.87	43.13	88.85	73.01	86.12	38.59	70 730.30	257.75	18.63	51.52	8.05	10.40	88	0.11	30.55	28.25	25	1
Italy	1	.0070526	277 130.20	38 887 931.70	30.61	42.30	55.58	55.25	74.60	61.12	122 619.80	277.55	25.14	55.32	3.38	4.09	83	0.14	32.90	21.00	25	1
Luxembourg	1	.0068239	2 857.00	375 981.50	32.73	46.91	88.85	64.33	73.38	35.47	11 411.10	401.33	8.12	30.75	3.94	8.72	86	0.09	49.30	49.25	25	1
Netherlands	1	.0110155	110 457.20	11 110 270.00	39.61	43.44	89.53	51.87	83.06	43.99	107 062.50	278.61	7.61	39.44	3.81	9.27	85	0.21	54.90	46.25	25	1
Portugal	1	.0217866	119 993.00	6 862 534.20	37.05	44.63	70.25	60.56	83.48	67.54	38 197.60	328.25	13.82	53.05	2.56	5.80	80	0.22	40.10	29.00	25	1
Spain	1	.0097029	264 727.90	31 210 278.50	34.82	35.09	70.43	58.28	75.54	60.33	392 145.70	248.16	20.83	44.29	3.60	5.69	92	0.25	33.35	31.50	25	1
Sweden	1	.0078224	51 535.50	6 155 472.20	40.87	42.30	90.62	40.66	92.30	44.60	48 728.00	231.13	7.82	21.05	4.92	10.64	94	0.16	58.80	43.50	23	0
U. Kingdom	1	.0082093	293 676.50	41 751 397.20	38.53	40.87	89.60	60.29	91.82	61.64	335 905.80	397.16	14.07	33.54	4.58	10.04	91	0.05	33.20	46.25	25	0
Bulgaria	2	.0087945	41 586.70	4 862 521.40	32.04	39.88	36.61	90.22	71.33	66.02	27 124.43	583.98	23.10	56.00	3.39	5.23	80	0.04	26.40	10.75	11	0
Croatia	2	.0057146	13 150.86	2 818 377.30	31.91	38.38	43.64	71.33	60.76	71.68	24 002.20	370.50	19.78	57.51	3.11	4.61	82	0.18	30.50	28.00	5	0

Country	Group	y	var1	var2	var3	var4	var5	var6	var7	var8	var9	var10	var11	var12	var13	var14	var15	var16	var17	var18	var19	var20
Cyprus	2	.0053592	3 144.38	587 653.50	36.53	42.30	74.66	77.05	77.92	71.61	14 387.50	346.68	16.77	33.58	2.79	5.73	87	0.16	35.15	19.50	14	1
Czechia	2	.0145349	94 503.90	7 154 576.70	34.86	34.17	70.33	81.68	67.85	49.64	39 783.50	437.51	14.62	40.54	4.56	5.42	92	0.09	40.00	23.00	14	0
Estonia	2	.0103043	8 712.56	872 812.40	36.95	37.03	84.80	80.60	78.45	52.00	8 349.30	366.64	15.56	41.36	4.48	6.06	91	0.04	39.50	35.25	14	1
Hungary	2	.0122299	57 684.70	6 726 573.90	31.42	43.76	61.27	76.36	73.98	52.45	30 985.30	432.91	18.31	45.81	5.00	5.16	92	0.10	40.90	25.25	14	0
Latvia	2	.0126775	15 723.00	1 344 229.80	35.21	44.09	55.09	83.87	77.42	59.92	24 914.20	353.84	16.99	44.23	3.12	4.67	85	0.04	34.00	25.25	14	1
Lithuania	2	.0220220	34 456.40	1 989 058.10	34.60	45.06	61.68	89.67	80.60	62.91	46 705.60	593.78	14.06	41.07	2.30	6.19	90	0.02	26.15	29.25	14	1
Malta	2	.0091443	2 925.75	296 114.70	32.82	45.65	74.08	63.53	65.26	62.39	5 752.60	287.37	12.78	55.89	5.80	5.53	92	0.07	34.25	35.25	14	1
Poland	2	.0103365	251 231.80	26 602 782.70	32.37	44.14	59.26	75.39	64.38	59.68	243 715.60	486.05	15.73	36.44	2.90	6.63	84	0.27	21.25	17.75	14	0
Romania	2	.0062866	74 124.20	13 501 662.60	32.56	38.70	43.49	87.10	69.83	61.34	202 112.40	503.06	19.46	42.94	2.38	5.85	84	0.01	5.20	9.00	14	0
Slovakia	2	.0168745	57 123.20	3 842 832.40	33.17	37.54	54.22	82.09	69.52	55.47	2 858.30	503.30	19.86	65.44	3.96	3.38	89	0.08	43.10	27.50	14	1
Slovenia	2	.0114455	14 532.80	1 396 965.10	34.38	49.50	63.16	61.55	82.22	57.31	15 041.40	425.65	11.04	47.35	5.24	6.99	88	0.17	37.55	27.75	14	1
Mean	-	.0095405	90 449.70	11 933 118.44	34.97	42.30	71.15	66.39	78.65	56.15	98 901.02	397.16	15.38	43.45	4.08	6.77	88	0.12	36.69	30.63	19.14	-
SD.	-	.0046815	105 168.26	15 254 133.99	2.73	3.64	17.08	14.76	9.43	9.59	117 567.60	114.17	4.96	11.55	1.29	2.10	4	0.07	12.00	11.04	6.25	-
Min	-	.0041181	2 857.00	296 114.70	30.61	34.17	36.61	39.11	60.76	35.47	2 858.30	231.13	7.61	21.05	2.30	3.38	80	0.01	5.20	9.00	5	-
Max	-	.0220220	350 704.40	53 541 424.20	40.87	49.50	90.65	90.22	97.23	72.26	392 145.70	615.73	25.15	65.44	8.05	10.64	94	0.27	58.80	50.50	25	-
LQ(Q1)	-	.0061695	15 707.63	2 611 047.50	32.56	40.62	58.34	57.52	72.87	50.62	21 762.68	305.66	11.79	35.73	3.12	5.37	84	0.08	32.31	24.69	14	-
UQ(Q3)	-	.0112305	112 841.15	11 708 118.15	36.98	44.67	88.85	77.94	84.14	61.83	110 951.83	490.30	18.84	51.90	4.67	8.68	91	0.16	45.14	35.63	25	-
Skew	-	1.33	0.67	1.4	0.37	-0.43	-0.4	-0.11	0.13	-0.19	1.4	0.45	0.26	-0.11	0.95	0.57	-0.28	0.44	-0.7	0.14	-0.42	-
Kurt	-	4.29	3.14	3.8	2.16	2.87	1.91	2.06	2.26	2.49	3.55	2.08	2.34	2.37	4.36	2.1	2.06	2.48	3.72	2.45	1.78	-
CV	-	0.49	1.16	1.28	0.08	0.09	0.24	0.22	0.12	0.17	1.19	0.29	0.32	0.27	0.32	0.31	0.05	0.58	0.33	0.36	0.33	-

Note: Group 1 = Old EU Member States, Group 2 = New EU Member States. Skew = Skewness, Kurt = Kurtosis, CV = Coefficient of Variation. The rows contain average values for the examined period. Var20 (Euro area) Yes=1, No=0.

Table 6. Descriptive statistics of variables in relation to country groups: new and old EU Member States

Variable	Description	Group	Mean	CI		Median	Min	Max	LQ(Q1)	UQ(Q3)	SD	Skew	Kurt	CV
				-95%	+95%									
Var6	Tax burden (0-100 pts.)	1	55.90	50.45	61.33	58.28	39.11	73.01	50.04	64.33	9.83	-0.23	2.18	0.18
		2	78.50	73.06	83.93	80.60	61.55	90.22	75.39	83.87	9.00	-0.56	2.43	0.11
		EU-28	66.39	60.66	72.11	64.46	39.11	90.22	56.76	78.83	14.76	-0.11	2.06	0.22
Var7	Business freedom (0-100 pts.)	1	84.18	79.82	88.53	83.48	73.38	97.23	75.54	91.82	7.86	0.02	1.66	0.09
		2	72.27	68.20	76.35	71.33	60.76	82.22	67.85	77.92	6.74	-0.10	1.84	0.09
		EU-28	78.65	74.99	82.3	77.67	60.76	97.23	72.35	84.80	9.43	0.13	2.26	0.12
Var9	Emigration (number)	1	138 899.75	64 863.17	21 2936.30	89 097.89	11 411.10	392 145.69	46 841.00	293 328.69	133 692.75	0.95	2.24	0.96
		2	52 748.64	6 176.08	99 321.20	24 914.20	2 858.30	243 715.59	14 387.50	39 783.50	770 69.38	1.86	4.73	1.46
		EU-28	98 901.02	53 313.06	144 489.00	46 773.30	2 858.30	392 145.69	19 523.15	11 484.15	117 567.60	1.40	3.55	1.19
Var11	Young people neither in employment nor in education and training aged 15-34 (%). Not employed persons	1	14.18	10.91	17.44	13.82	7.61	25.15	9.18	18.63	5.89	5.89	0.72	2.36
		2	16.77	14.77	18.78	16.77	11.04	23.10	14.62	19.46	3.31	3.31	0.11	2.44
		EU-28	15.38	13.46	17.3	14.96	7.61	25.15	11.54	19.04	4.96	4.96	0.26	2.34
Var13	Employment in high-technology sectors (% of total employment)	1	4.34	3.58	5.11	4.01	2.39	8.05	3.60	4.92	1.38	1.38	1.15	4.64
		2	3.77	3.08	4.46	3.39	2.30	5.80	2.90	4.56	1.15	1.15	0.35	1.82
		EU-28	4.08	3.57	4.58	3.95	2.30	8.05	3.11	4.75	1.29	1.29	0.95	4.36
Var15	Human Development Index (0-100 pts.)	1	88	85	90	88	80	94	85	91	4	0.04	-0.18	2.09
		2	87	85	90	88	80	92	84	91	4	0.04	-0.36	1.95
		EU-28	88	86	89	88	80	94	84	91	4	0.04	-0.28	2.06
Var16	Employees by type of employment contract (% of employment aged 15-64)	1	0.14	0.10	0.16	0.14	0.05	0.25	0.09	0.16	0.06	0.06	0.55	2.44
		2	0.10	0.05	0.14	0.08	0.01	0.27	0.04	0.16	0.08	0.08	0.89	2.87
		EU-28	0.12	0.09	0.14	0.10	0.01	0.27	0.08	0.16	0.07	0.07	0.44	2.48
Var17	Participation rate in job-related non-formal education and training in age 35-54 (%)	1	40.89	34.2	47.58	44.80	10.05	58.80	33.20	49.15	12.08	12.08	-0.91	3.90
		2	31.84	25.62	38.07	34.25	5.20	43.10	26.40	39.50	10.30	10.30	-1.35	4.41
		EU-28	36.69	32.03	41.34	36.70	5.20	58.80	31.73	45.48	12.00	12.00	-0.70	3.72
Var18	Individuals who have above basic overall digital skills aged 25-64 (% of individuals)	1	36.28	30.59	41.96	34.75	20.50	50.50	28.25	46.25	10.26	10.26	-0.04	1.65
		2	24.12	19.22	29.01	25.25	9.00	35.25	19.50	28.00	8.10	8.10	-0.52	2.48
		EU-28	30.63	26.35	34.91	28.63	9.00	50.50	24.13	36.00	11.04	11.04	0.14	2.45

Note: Group 1 = Old EU Member States, Group 2 = New EU Member States. CI = Confidence Interval for the Mean, LQ(Q1) = Lower Quartile, UQ(Q3) = Upper Quartile, SD = Standard Deviation, Skew = Skewness, Kurt = Kurtosis, CV = Coefficient of Variation.

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Tomasz Skica: Conceptualization, Data Curation, Writing Original Draft, Investigation, Writing - Review & Editing, Revisions. **Marcin J. Piątkowski:** Conceptualization, Data Curation, Writing Original Draft, Investigation, Writing - Review & Editing, Revisions, Project Administration. **Ademir Abdić:** Methodology, Formal Analysis, Validation, Writing - Review & Editing, Visualization, Revisions. **Lejla Lazović-Pita:** Writing Original Draft, Writing - Review & Editing, Revisions.

Conflicts of interest

The authors declare no conflict of interest.

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