



Univerza v Mariboru

Ekonomsko-poslovna fakulteta



Letnik: 67 | Številka: 2 | 2021 |
Volume: 67 | Number: 2 | 2021 |

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NAŠE GOSPODARSTVO

Revija za aktualna ekonomska in poslovna vprašanja

OUR ECONOMY

Journal of Contemporary Issues in Economics and Business

Izdajatelj:

Ekonomsko-poslovna fakulteta Maribor (EPF)

Uredniški odbor:

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Spletna stran:

http://www.ng-epf.si

Revija je uvrščena v bibliografske baze podatkov EconLit, European Reference Index for the Humanities and the Social Sciences (ERIH PLUS), Directory of Open Access Journals (DOAJ), ProQuest, EBSCO, Ulrich's Periodicals Directory in številne druge.

Published by:

Faculty of Economics and Business, Maribor (FEB)

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http://www.ng-epf.si

The journal is indexed/abstracted in EconLit, European Reference Index for the Humanities and the Social Sciences (ERIH PLUS), Directory of Open Access Journals (DOAJ), ProQuest, EBSCO, Ulrich's Periodicals Directory and in a number of other bibliographic databases.

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Challenges of the Output-Employment Growth Imbalance in Transition Economies

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Abstract

The trade-off between output and unemployment has become an essential part of modern macroeconomics and is known as Okun's law. However, in transition and emerging markets economies' context, the output-employment nexus has a much more important role as these countries strive to significantly improve the growth dynamics of both variables. This paper aims to analyze the particularities of this relationship in selected Central- and South-Eastern European transition (and former transition) countries to find out a discrepancy between the output and employment growth. Therefore, the employment elasticity coefficients are calculated. The estimated results suggest that, in the observed period, economic growth has not contributed to satisfactory employment growth, which is commonly referred to as a "jobless growth" hypothesis. Accordingly, this paper attempts to single out the main challenges of the output-employment growth misbalance in these countries and propose adequate policy measures that could reduce it. The industrial policy that differentiates from the "one-size-fits-all" paradigm is emphasized as the most important part of macroeconomic policy in transition economies to make their development more balanced. Additionally, short-run stabilization policy, especially the one focused on the labour market, has a significant role in these economies.

Keywords: economic growth, employment elasticity, Okun's law, labour market, transition economies

Introduction

The nexus between unemployment and output growth is one of the most frequently analyzed macroeconomic relations. It is commonly referred to as Okun's law, in honour of Arthur Okun, the first who has recognized the presence of the relationship in the United States (Okun, 1962). Okun's law indicates the negative relationship between unemployment and economic growth, stating that an economic upturn increases labour demand and thus reduces the unemployment rate.

ORIGINAL SCIENTIFIC PAPER

RECEIVED: JANUARY 2021

REVISED: APRIL 2021

ACCEPTED: MAY 2021

DOI: 10.2478/ngoe-2021-0007

UDK: 330.34:005.953:331.5

JEL: C22, E24, F43

Citation: Mihajlović, V., & Marjanović, G. (2021). Challenges of the Output-Employment Growth Imbalance in Transition Economies. *Naše gospodarstvo/Our Economy*, 67(2), 1-9. DOI: 10.2478/ngoe-2021-0007.

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NAŠE GOSPODARSTVO
OUR ECONOMY

Vol. 67 | No. 2 | 2021

pp. 1 – 9

A kind of alternative view about the linkage between the situation in the labour market and economic growth is to observe the employment-output nexus. Although the unemployment reduction might not necessarily be closely connected with the employment growth (i. e. in the case when there is intensive emigration of the unemployed labour force), the relationship between employment and output growth is assumed to be positive.

Albeit the importance of the two approaches could be treated as identical in the case of developed economies, the situation in transition countries will often be different. Namely, if the unemployment rate in transition economies decreases, it could be a sign that the growing number of unemployed is finding a job. It can also indicate that these unemployed persons leave to other countries to find a better work opportunity. Indeed, when one observes the New European Union (EU) Member States, the opening of their borders has often been followed by intensive emigration of unemployed workers to the more developed Western European countries (Zaiceva, 2014).

Therefore, this paper aims to analyse the nexus between employment and output growth in selected Central and South-Eastern European (former) transition economies, to investigate the extent to which the dynamics of these variables is balanced. The motivation lies in the fact that the transition process has often induced different growth imbalances of these variables. The most frequently analyzed misbalance of the sort is commonly referred to as a "jobless growth" or "jobless recovery", which occurs when the employment growth is relatively lower than output growth. Having in mind that the presence of these imbalances could prevent the economic growth from being more balanced and sustainable, along with the fact that it affects the standard of living in the countries faced with the problem, it is essential to identify its potential sources to propose adequate economic policy response. According to the defined aim of the study, the following research hypotheses are tested:

H1: In observed economies, the economic growth is accompanied by a less-than-proportionate growth of employment, indicating the presence of a jobless growth problem.

H2: The employment elasticities are higher in the economies which have completed the transition process earlier.

The first hypothesis is tested by calculating the employment elasticity coefficients by regressing the employment growth on the output growth. The second hypothesis is based on the premise that the transition process in the particular economy had been completed when it joined the EU. Accordingly, the observed (former) transition economies

are divided into the countries which have joined the EU in 2004, in 2007, and are still in the process of accession to compare their employment elasticity coefficients.

The rest of the paper is structured as follows. The second section elaborates on some of the basic characteristics of the Okun's law relationship and the linkage between employment elasticity and Okun's coefficient. The third section reviews the recent and most important empirical studies to date, whereas the fourth presents the research methodology and data used. In the fifth section, the empirical results and discussion is provided. Finally, the sixth section contains the main conclusions and policy recommendations.

Theoretical Background

The relationship between unemployment and output growth embodied in Okun' law is commonly presented as follows (Ball et al., 2015):

$$\Delta u_t = a + b\Delta y_t + \rho_t, \quad b < 0, \quad (1)$$

where a represents a constant, b refers to the "Okun's coefficient", u_t and y_t are unemployment rate and real output changes, respectively ($\Delta u_t = u_t - u_{t-1}$; $\Delta y_t = y_t - y_{t-1}$), whereas ρ represents the error term. This is known as the first difference version of Okun's law equation. Okun's coefficient measures the unemployment elasticity with respect to the real output changes (economic growth).

Since this study aims to enlighten the relation between employment and output growth, Equation (1) can be transformed in the following way:

$$\Delta n_t = a + \varepsilon \Delta y_t + \rho_t, \quad (2)$$

where n denotes employment, whereas ε represents the employment elasticity to the output changes. Having in mind the economic growth is equal to the sum of employment growth and labour productivity growth, the value of coefficient ε depends on the relative impact of these factors. If we express this in a more formal way, we get:

$$\Delta y = \Delta n + \Delta p, \quad (3)$$

where p refers to the labour productivity, measured as n/y . If we assume a constant economic growth, it means that any increase in employment must be accompanied with an equal decrease in labour productivity. Namely, by dividing

Equation (3) by Δy we obtain the following expression:

$$\varepsilon = 1 - \frac{\Delta p}{\Delta y}, \quad (4)$$

where employment elasticity (ε) equals to $\Delta n/\Delta y$. The values of the coefficient ε can be positive and negative, and should be interpreted in a way presented in Table 1.

Table 1. Interpretation of the employment elasticity coefficient values

Employment elasticity	GDP growth	
	Positive GDP growth	Negative GDP growth
$\varepsilon < 0$	NEG PPG	PEG NPG
$0 \leq \varepsilon \leq 1$	PEG PPG	NEG NPG
$\varepsilon < 1$	PEG NPG	NEG PPG

Notes: NEG – negative employment growth, PEG – positive employment growth, PPG – positive productivity growth, NPG – negative productivity growth
Source: Kapsos 2005, 4

Literature Review

Bearing in mind the theoretical and practical importance of Okun's law, several empirical studies dealt with the relationship between unemployment, employment, and output growth. Ball et al. (2017) provide an extensive analysis of the Okun's law stability in the United States since 1948 and in 20 advanced economies since 1980. They indicate that the relationship between output and unemployment is quite stable over time in most of the analysed countries, whereas the unemployment rate responds more strongly to output in recessions than during expansions. Similar conclusion can be found in Kargi (2016) for all OECD countries over 1987-2012 period. On the other hand, Owyang and Sekhposyan (2012) and Grant (2018) find evidence of substantial time variation of the Okun's coefficient in the United States, especially after the Great Recession of 2008. Novák and Darro (2019) investigate the Okun's law in EU28 in the period 2000-2014, and two sub-periods: pre-crisis (2001-2007) and the post-crisis period (2008-2014). Their study reveals the higher Okun's coefficient in the post-crisis period. Kapsos (2005) provides an extensive analysis of employment elasticities in developed and transition countries to investigate the impact of employment and productivity on economic growth in the function of poverty reduction. In similar research, Misztal (2014) estimates the employment elasticities in the Global Triad Countries (US, EU-15, Japan), China

and India, aiming to examine the sustainability of the jobless growth hypothesis in these countries.

The research of the jobless growth problem in empirical studies is also commonly tied to Okun's law asymmetry assumption. Namely, employment (unemployment) exhibits an asymmetric pattern if it responds differently in contractionary and expansionary phases of the business cycle. Several empirical studies are devoted to this kind of analysis. Empirical findings commonly underpin the theoretically established fact that unemployment reacts more intensively to the negative changes in the output (in recessions) than to the output increases in expansion. For instance, Harris and Silverstone (2001) confirm the presence of asymmetry between unemployment and output in seven OECD countries, whereas Silvapulle et al. (2004) analyze post-war US data and demonstrate that the short-run cyclical unemployment is more sensitive to negative than to positive cyclical output, which indicates asymmetry in their relationship. Caraianni (2012) finds evidence that Okun's coefficient is higher during a recession and lower during expansion in Romanian economy. A similar conclusion for nine transition countries is made by Cevik et al. (2013). They demonstrate that cyclical unemployment is more sensitive to cyclical output in downswing regimes than upswing regimes, as well as that the Okun coefficients vary across regimes and countries.

Yet, some other studies confirm the opposite phenomenon, so called "labour hoarding" hypothesis: economic downturns lead to a lesser unemployment growth since firms are reluctant to fire trained workers (e. g. Leitner & Stehrer, 2012; Nebot et al., 2019). There is also empirical evidence that labour hoarding is present in transition countries, especially in the early stages of the reform process, due to administrative constraints aimed to stop firing (Boeri & Garibaldi, 2006).

Having in mind the subject of previous empirical research, this study tries to add further to the literature by estimating the employment elasticities in selected (former) transition countries from Central and South-Eastern Europe to quantify the extent to which the economic growth in these economies is "jobless", as well as to identify the key sources of such imbalance.

Methodology and Data

To quantify the employment elasticities in observed economies, the model given by Equation (2) is estimated.

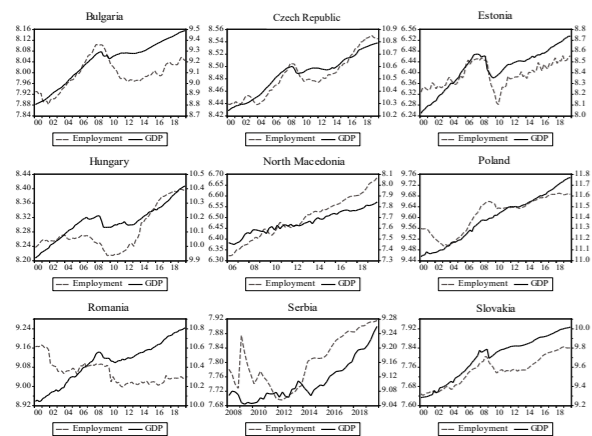
Hence, we regress the employment growth on the output growth to estimate the value of the employment elasticity

coefficient (ϵ). For that purpose, the Ordinary Least Squares method is employed.

The analysis includes nine (former) transition countries from Central and South-Eastern Europe: Bulgaria, Czech Republic, Estonia, Hungary, North Macedonia, Poland, Romania, Serbia, and Slovakia. The sample consists of countries that have joined the EU in 2004 (Czech Republic, Estonia, Hungary, Poland, and Slovakia), in 2007 (Bulgaria and Romania), and that are still in the accession process (North Macedonia and Serbia). The analyzed time period is 2000Q1-2019Q4 (80 observations) for all countries except for North Macedonia (2006Q1-2019Q4, 56 observations) and Serbia (2008Q1-2019Q4, 48 observations). The time series consists of quarterly, seasonally adjusted data about the number of employed persons and the real output (chain linked volumes, 2015=100). The source of data is Eurostat.

Figure 1 presents the empirical dynamics of the number of employed persons (left scale) and the real output (right scale) in observed countries. The data are transformed into logs using a natural logarithm. It is evident that the relationship between employment and output is different across countries. However, one can observe a kind of structural break in time series due to the Great Recession (2008). Indeed, this break is identified by the Zivot-Andrews test (Table 3). Accordingly, to make the estimation results more robust, in further analysis, the model is estimated not only for the entire period but also for two sub-periods: 2000Q1-2008Q4 and 2009Q1-2019Q4. In such a manner, it is possible to observe the tendency of the employment elasticity change as an important indicator of the employment-economic growth linkage over time.

Figure 1. Empirical dynamics of employment and GDP in observed economies



Source: Own calculation based on Eurostat database (2020)

Results and Discussion

Before the estimation of the employment elasticities, the stationarity properties of time series are checked by applying the Augmented Dickey-Fuller (ADF) test (Dickey & Fuller, 1979) and Phillips-Perron (PP) test (Phillips & Perron, 1988) for the presence of unit root in levels and the first differences (Table 2). It is evident that all-time series are stationary in the first differences, indicating that applying the linear regression model is completely justified. In addition, the stationarity is checked by Zivot-Andrews test of unit root with a structural break (Zivot & Andrews, 1992), which reconfirmed that the differenced time series are stationary (Table 3). Besides that, the structural break dates are identified by the Zivot-Andrews test. It is apparent that the structural break in time series is directly connected with the Great Recession of 2008. In line with that, as explained before, the two sub-periods are jointly analyzed.

The results of employment elasticity estimates are reported in Table 4. According to the p-values, most of the estimates are statistically significant. Finally, Table 5 presents the results of residual diagnostic tests (for normality, serial correlation, and heteroscedasticity) all indicating that the models are well suited and stable.

If we focus on Table 4 and observe the entire time period, it is evident that the employment elasticity coefficients are generally low, except in Bulgaria. In five out of nine countries the employment elasticities are below 0.2, whereas in the case of North Macedonia and Serbia they are even negative (although for Serbia the results are not statistically significant). It indicates that, in the observed period, the employment reacted to a small extent concerning economic growth, supporting the jobless growth hypothesis.

On the other hand, when we concentrate on the first sub-period (2000Q1-2008Q4), it is apparent that the employment elasticities are even lower in all cases, excluding Bulgaria. Therefore, the "joblessness" of output growth is more profound. It could be a corollary of the fact that a majority of observed countries have accessed the European Union in 2004 (Czech Republic, Estonia, Hungary, Poland, and Slovakia). The opening of state borders to labour flows has induced a number of workers from these countries to leave to more developed economies, thus reducing the employment growth in them. Finally, in the post-crisis period (2009Q1-2019Q4), the employment elasticities are almost equal to the values for the entire time period, except in the case of Estonia and, to a lesser extent, in Romania, where these coefficients are higher. In contrast, in Bulgaria, the employment elasticity has been reduced in the post-crisis period.

Table 2. Results of the stationarity tests

Variables	Bulgaria		Czech Republic		Estonia	
	ADF	PP	ADF	PP	ADF	PP
y	-2.58 (3)	-1.12 [3]	-2.32 (1)	-1.77 [0]	-3.46* (0)	-3.46* [0]
n	-1.79 (1)	-1.01 [2]	-1.79 (1)	-1.56 [4]	-2.48 (0)	-2.49 [2]
Δy	-3.75** (3)	-6.11*** [4]	-4.17*** (0)	-4.18*** [2]	-5.39*** (0)	-5.52*** [4]
Δn	-4.27*** (0)	-4.06** [5]	-4.25*** (0)	-4.28*** [4]	-6.36*** (0)	-6.38*** [3]
	Hungary		N. Macedonia		Poland	
	ADF	PP	ADF	PP	ADF	PP
y	-1.99 (1)	-1.79 [4]	-4.41*** (0)	-4.46*** [4]	-1.02 (0)	-1.19 [4]
n	-2.69 (0)	-2.51 [4]	-3.28* (1)	-2.06 [6]	-1.19 (2)	-1.06 [4]
Δy	-4.88*** (0)	-4.79*** [3]	-8.11*** (1)	-16.54*** [8]	-7.07*** (0)	-7.07*** [3]
Δn	-5.11*** (0)	-5.43*** [5]	-6.04*** (1)	-7.39*** [4]	-3.15** (1)	-5.57*** [3]
	Romania		Serbia		Slovakia	
	ADF	PP	ADF	PP	ADF	PP
y	-1.59 (1)	-1.12 [2]	-0.43 (0)	0.01 [5]	-3.62** (0)	-3.71** [11]
n	-1.62 (0)	-1.46 [3]	-2.02 (1)	-2.09 [3]	-1.87 (1)	-1.55 [1]
Δy	-5.03*** (0)	-4.93*** [5]	-5.58*** (3)	-6.89*** [3]	-8.58*** (0)	-9.87*** [9]
Δn	-8.47*** (0)	-8.55*** [3]	-7.17*** (0)	-7.61*** [9]	-5.18*** (0)	-5.14*** [2]

Notes: the significance levels: *** – 0.01, ** – 0.05, * – 0.1; Δ is the first difference operator; for ADF test, the numbers in parenthesis indicate the lag order selected (Akaike information criterion). For PP test, the numbers in brackets indicate the truncation for the Bartlett Kernel, as suggested by the Newey-West test (1987). For PP test are calculated the one-sided p-values. Source: own calculation

Table 3. The results of Zivot-Andrews test of unit root with structural break

Variables	Bulgaria		Czech Republic		Estonia	
	t-stat.	Break	t-stat.	Break	t-stat.	Break
y	-3.64*** (4)	2010Q4	-3.52*** (1)	2008Q4	-6.26*** (3)	2008Q4
n	-3.43*** (3)	2009Q3	-4.16*** (1)	2009Q1	-7.09*** (4)	2009Q1
Δy	-5.98*** (3)	2008Q4	-5.41*** (0)	2008Q1	-4.07*** (2)	2007Q2
Δn	-4.67*** (4)	2008Q2	-4.54*** (1)	2008Q3	-8.88*** (0)	2010Q3
	Hungary		N. Macedonia		Poland	
	t-stat.	Break	t-stat.	Break	t-stat.	Break
y	-4.81*** (1)	2008Q4	-4.75*** (0)	2010Q4	-4.61*** (4)	2012Q2
n	-3.85** (4)	2008Q4	-0.62* (2)	2009Q4	-5.32*** (3)	2006Q2
Δy	-7.03** (0)	2008Q3	-7.75** (1)	2013Q2	-4.23** (4)	2008Q3
Δn	-3.41** (4)	2011Q2	-5.91** (1)	2009Q4	-3.14*** (4)	2008Q2
	Romania		Serbia		Slovakia	
	t-stat.	Break	t-stat.	Break	t-stat.	Break
y						
n	-1.62 (0)	-1.46 [3]	-2.02 (1)	-2.09 [3]	-1.87 (1)	-1.55 [1]
Δy	-5.03*** (0)	-4.93*** [5]	-5.58*** (3)	-6.89*** [3]	-8.58*** (0)	-9.87*** [9]
Δn	-8.47*** (0)	-8.55*** [3]	-7.17*** (0)	-7.61*** [9]	-5.18*** (0)	-5.14*** [2]

Notes: the significance levels: *** – 0.01, ** – 0.05, * – 0.1; the numbers in parentheses indicate the selected lag length. Source: own calculation

Table 4. The employment elasticities for observed economies

2000Q1-2019Q4		2000Q1-2008Q4		2009Q1-2019Q4	
Constant	Employment elasticity (ϵ)	Constant	Employment elasticity (ϵ)	Constant	Employment elasticity (ϵ)
Bulgaria					
-0.01 (0.13)	0.42 (0.00)	-0.01 (0.17)	0.88 (0.02)	-0.01 (0.12)	0.24 (0.09)
Czech Republic					
0.00 (0.45)	0.14 (0.00)	0.00 (0.45)	0.12 (0.14)	0.00 (0.69)	0.15 (0.02)
Estonia					
-0.00 (0.86)	0.22 (0.01)	0.01 (0.34)	0.09 (0.22)	-0.00 (0.13)	0.71 (0.00)
Hungary					
0.00 (0.29)	0.18 (0.01)	-0.00 (0.21)	0.16 (0.02)	0.01 (0.06)	0.22 (0.03)
North Macedonia (2006Q1-2019Q4)					
0.01 (0.00)	-0.12 (0.07)	-	-	0.01 (0.00)	-0.16 (0.04)
Poland					
-0.00 (0.32)	0.27 (0.00)	0.00 (0.79)	0.25 (0.02)	-0.00 (0.04)	0.28 (0.00)
Romania					
-0.00 (0.04)	0.21 (0.04)	-0.00 (0.26)	0.11 (0.47)	-0.00 (0.08)	0.36 (0.01)
Serbia (2008Q1-2019Q4)					
0.00 (0.07)	-0.07 (0.74)	-	-	-	-
Slovakia					
0.00 (0.33)	0.18 (0.00)	0.00 (0.06)	0.13 (0.04)	-0.00 (0.90)	0.18 (0.00)

Note: the values in parenthesis refer to p-values.

Source: Own calculation

Although the analysis in this paper does not include some advanced economies to make a kind of reference point, it is helpful to compare the estimation results from Table 4 with some of the previous research dealing with developed economies. For instance, Misztal (2014) applied a similar methodology to estimate the employment elasticities in the Global Triad countries. He reveals that the value of the coefficient in the 1990-2012 period in the USA, EU-15, and Japan were 0.62, 0.50, and 0.25, respectively. It indicates that, generally, employment responds more strongly to economic growth in advanced economies. These findings are also in accord with the study by Mourre (2006), who reveals that the employment elasticities in the euro area in the period 1986-1990 were about 0.4, and increased to 0.6 in the period 1997-2000, whereas these elasticities in the United States were reduced from 0.6 to 0.4 between the first and second periods.

It is necessary to recognize the channels through which economic growth affects employment to properly address the problem of low employment content of economic growth in transition economies. Generally, there are three kinds of that influence: direct impact, indirect impact, and an induced impact (Lavopa & Szirmai, 2012). The direct impact is mainly related to the creation of new jobs, which means that previously unemployed persons become employed. The

indirect effect of economic growth on employment is determined by the relationship between the growing sector and the rest of the economy. If this linkage is stronger, then the indirect effect is more profound. Finally, the induced impact materializes by multiplying the positive effects of economic growth on the labour demand and the improvement of the employment process.

Therefore, it is important for transition countries to establish a tight linkage between the economy and the labour market. It can be done by improving the labour market policy aimed at increasing the employability. Accordingly, an active labour market policy measures could ameliorate the quality of the labour supply to meet the requirements of the economy in a better way (Card et al., 2018).

In addition, the source of jobless growth in transition economies can be linked to inadequate industrial policy. Namely, it is worth stressing that implementing the "one-size-fits-all" paradigm in these countries produces modest results if not adapted to the specificities of their economies. One of the most important aspects of the problem is premature deindustrialisation in some of these countries. While this process stems naturally from the development path of advanced economies, in transition countries it can produce economic growth without a proportional increase of employment

Table 5. The results of the residual diagnostic tests

Test	Observed time period		
	2000Q1-2019Q4	2000Q1-2008Q4	2009Q1-2019Q4
Bulgaria			
JB test	5.47 (0.06)	5.16 (0.08)	0.03 (0.98)
BG LM test	1.78 (0.18)	0.55 (0.58)	2.32 (0.06)
BPG test	0.03 (0.85)	0.29 (0.26)	0.87 (0.36)
Czech Republic			
JB test	0.45 (0.79)	0.83 (0.66)	0.44 (0.81)
BG LM test	3.57 (0.02)	3.12 (0.04)	2.45 (0.09)
BPG test	0.65 (0.42)	0.12 (0.73)	0.28 (0.61)
Estonia			
JB test	0.16 (0.92)	1.03 (0.59)	0.43 (0.80)
BG LM test	1.36 (0.26)	2.78 (0.08)	1.94 (0.16)
BPG test	3.69 (0.06)	0.79 (0.38)	0.39 (0.53)
Hungary			
JB test	5.51 (0.06)	1.33 (0.51)	1.97 (0.37)
BG LM test	0.299 (0.09)	1.51 (0.24)	1.17 (0.32)
BPG test	0.12 (0.73)	0.54 (0.47)	0.03 (0.87)
North Macedonia			
JB test	0.07 (0.97)	-	0.43 (0.81)
BG LM test	3.68 (0.06)	-	6.39 (0.02)
BPG test	0.84 (0.36)	-	0.36 (0.55)
Poland			
JB test	1.94 (0.38)	1.52 (0.47)	0.76 (0.68)
BG LM test	2.18 (0.13)	1.69 (0.20)	2.33 (0.06)
BPG test	2.85 (0.09)	1.08 (0.31)	3.94 (0.05)
Romania			
JB test	4.25 (0.12)	0.90 (0.64)	4.74 (0.09)
BG LM test	0.99 (0.37)	0.49 (0.61)	3.61 (0.06)
BPG test	0.01 (0.91)	0.03 (0.85)	3.12 (0.08)
Serbia			
JB test	0.44 (0.80)	-	-
BG LM test	0.65 (0.53)	-	-
BPG test	1.61 (0.21)	-	-
Slovakia			
JB test	3.25 (0.19)	0.86 (0.65)	6.31 (0.04)
BG LM test	2.59 (0.06)	0.19 (0.83)	2.71 (0.06)
BPG test	0.29 (0.59)	0.07 (0.79)	1.09 (0.30)

Notes: JB, BG LM, and BPG denote Jarque-Bera test for normality, Breusch-Godfrey test for serial correlation, and Breusch-Pagan-Godfrey test for heteroscedasticity, respectively; the values in parenthesis refer to p-values.

Source: Own calculation

(Andreoni & Tregenna, 2018). Therefore, the industrial policy should be conducted in a manner to provide a more balanced economic growth concerning the sectoral structure of the economy, which would provide a more dynamic employment growth.

Conclusions and Recommendations

Although the economic growth-employment imbalances are, in some extent, present in all economies, including the advanced ones, this problem is more profound in the transition economies' context. The main reason lies in the fact these countries strive to "catch up" with the developed economies but often without critical approach to the choice of ways to achieve that goal.

The analysis in this paper finds evidence that in observed (former) transitional countries from the Central and South-Eastern Europe is present the jobless growth phenomenon. The values of employment elasticities reveal that employment growth is slower than the growth of output. Therefore, the first research hypothesis is accepted. The identified sources of that discrepancy could be related to the structural reforms, changes in the relationship between the economy and labour market due to the EU accession, premature deindustrialisation, and inadequate active labour market policies which should ameliorate the matching

between labour supply and labour demand. Therefore, addressing these problems in observed transition economies could improve the employment content of economic growth, making it more balanced and sustainable.

As for the second hypothesis, the analysis does not provide enough empirical support to accept it. The estimated values of the employment elasticity coefficients give mixed evidence about the linkage between the time of completing the transition process and the extent to which employment reacts to economic growth.

However, there are some limitations of the analysis that should be taken into account. Regarding research methodology, there is a possibility to apply a variety of other econometric methods that would provide more valid results (such as Vector autoregression, Autoregressive Distributed Lag approach, Generalized method of moments, and so on). In addition, the research could incorporate a larger number of economies and include some indicators of jobless growth related to the sectoral structure of the economy. Finally, this study is only focused on employment as a quantity, whereas the problem of employment quality is not considered. The low quality of employment, or the so-called precarious employment, is a growing problem in transition and developing economies. In line with that, some further research can be focused on the impact of economic growth on employment quality, as the problem which represents the core of the economic development process.

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Izzivi neravnovesja med rastjo outputa in zaposlenosti v tranzicijskih gospodarstvih

Izveleček

Razmerje med outputom in brezposelnostjo je postalo ključni del sodobne makroekonomije in je poznano kot Okunov zakon. Vendar pa ima povezava med outputom in zaposlenostjo v kontekstu tranzicijskih in razvijajočih se gospodarstev mnogo pomembnejšo vlogo, ker si te države prizadevajo znatno izboljšati dinamiko rasti obeh spremenljivk. Cilj tega članka je analizirati posebnosti te povezave v izbranih srednje in jugovzhodno evropskih tranzicijskih (in nekdanjih tranzicijskih) državah, da bi ugotovili neskladnost med rastjo outputa in zaposlenosti. Zato smo izračunali koeficiente elastičnosti zaposlenosti v odvisnosti od gospodarske rasti. Ocenjeni rezultati kažejo, da v opazovanem obdobju gospodarska rast ni prispevala k zadovoljivi rasti zaposlenosti, kar običajno imenujemo hipoteza gospodarske rasti brez ustvarjanja novih delovnih mest. Na osnovi teh rezultatov si pričujoči članek prizadeva izpostaviti ključne izzive neustreznega ravnovesja med rastjo outputa in zaposlenosti v opazovanih državah in predlagati ustrezne ukrepe ekonomske politike za njegovo zniževanje. Kot najpomembnejši del makroekonomske politike za večjo uravnoteženost razvoja tranzicijskih gospodarstev poudarjamo industrijsko politiko, ki se razlikuje od paradigme "ena velikost ustreza vsem". V teh gospodarstvih ima prav tako znatno vlogo kratkoročna stabilizacijska politika, še posebej takšna, ki je osredotočena na trg dela.

Ključne besede: ekonomska rast, elastičnost zaposlenosti, Okunov zakon, trg dela, tranzicijska gospodarstva

ORIGINAL SCIENTIFIC PAPER

RECEIVED: APRIL 2021

REVISED: MAY 2021

ACCEPTED: MAY 2021

DOI: 10.2478/ngoe-2021-0008

UDK: 336.748

JEL: F31, F41, C22

Citation: Bošnjak, M., Novak, I., & Vlačić, D. (2021). Market Efficiency of Euro Exchange Rates and Trading Strategies. *Naše gospodarstvo/Our Economy*, 67(2), 10-19. DOI: 10.2478/ngoe-2021-0008

Market Efficiency of Euro Exchange Rates and Trading Strategies

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Abstract

This paper tests the hypothesis on market efficiency for returns on the euro against fifteen currencies while assuming predictability of returns, dependent on the sign and magnitude of endogenous shocks. Considering the properties of exchange rate returns, the quantile autoregression approach was selected in empirical analysis. Based on the research data sample, consisting of daily exchange rates between January first, 1999, and April thirty, 2020, the paper suggests profitable trading strategies depending on a currency pair. In the case of six out of fifteen currency pairs, exchange rate returns were found non-predictable or almost non-predictable. In the case of nine considered currency pairs, there was a significant linkage between current and past exchange rate returns, found as dependent on the sign and magnitude of endogenous shocks in exchange rate returns. Finally, the paper considered possible factors of inefficiency and suggested further research of the topic.

Keywords: quantile autoregression, market efficiency, foreign exchange, euro

Introduction

Financial markets have become increasingly integrated due to the growing process of globalization and integration. The role of exchange rate as an international financial transmission mechanism and its influence on competitiveness of an economy among others make the topic extremely important for any economy. There are many theoretical approaches dedicated to determine and explain behaviour of exchange rates. This paper belongs to the empirical literature grounded on efficient market theory originally developed by Fama (1965). The efficient market hypothesis assumes that changes in exchange rate dynamics arise due to new information. Therefore, based on the efficient market hypothesis, exchange rate dynamics should be unpredictable and behave as a pure random walk process. However, empirical literature provides mixed findings regarding the validity of efficient market hypothesis (Katusiime et al., 2015). A well-known and frequently documented property of exchange rates dynamics, referred to as the phenomenon

of clustering volatility, is that high volatility periods tend to be followed by high volatility periods, and low volatility periods tend to be followed by the low ones. Empirical literature directed towards the phenomenon of clustering volatility mainly relies on the various specification of conditional heteroskedasticity models based on Engle's (1982) ARCH and Bollerslev's (1986) GARCH model. Furthermore, exchange rates distribution was often skewed and exhibited excess kurtosis, referred to as fat tails of empirical distribution. Therefore, the property of clustering volatility and potential asymmetries in exchange rates dynamic and fat tails of its distribution point out the need to examine the dependence structure between current and past returns across different quantiles of residuals distribution. This paper aims to examine the dependence structure of returns depending on the size and sign of its endogenous shocks. Consequently, working hypothesis of this paper assumes that efficiency of returns in daily euro-exchange rates depend on the sign and magnitude of its endogenous shocks. Taking into account aforementioned properties of exchange rate series, the quantile autoregression approach proposed by Koenker and Xiao (2004, 2006) seems to be well suited to exhibit the property of persistence in exchange rate dynamics. Despite the suitability of the approach, the quantile autoregression specification was employed to examine dynamics of nominal exchange rates with high-frequency data only in papers from Kuck et al. (2015) and Kuck and Maderitsch (2019). Following the quantile autoregression approach, Kuck et al. (2015) illustrated temporal dependence patterns for daily exchange rate returns of the USD/EUR, USD/JPY, USD/GBP, USD/AUD, USD/CHF and USD/CAD between 1999 and 2014. Based on estimates from this paper, trading strategies were derived for each currency pair. In short memory patterns, very active trading is a preferred strategy, while in the case of persistence, a buy-and-hold strategy yields higher returns. Therefore, the research additionally aims to contribute to the existing body of literature with suggestions of trading strategies on foreign exchange markets for the considered pairs of currencies.

The remainder of the paper is organized as follows: section 2 briefly summarizes existing literature related to the considered topic. Section 3 illustrates employed methodology, Section 4 provides research data and empirical results, while Section 5 gives implications and discussion. The final section provides an overview of the main findings of the research.

Brief Literature Overview

The literature review provides recent findings regarding the validity of foreign exchange market efficiency. The contemporary empirical literature on the link between exchange

rate dynamics and efficient market hypothesis is viable. It brings various evidence from all over the globe while revealing diversity in the properties of exchange rate dynamics. Since the topic represents an empirical issue, the results always depend on data selection and econometric model specification. Ca'Zorzi et al. (2017) employed a dynamic stochastic general equilibrium (DSGE) approach and found DSGE models well suited to forecast real exchange rate. However, DSGE model forecasts of nominal exchange rate underperform random walk. Eichenbaum et al. (2017) found that the current real exchange rate improves to forecast changes in the nominal exchange rate in countries with monetary policy targeting inflation and floating exchange rates regimes. However, the finding does not hold for countries with quasi-fixed, crawling-peg, and heavily managed floating exchange rate regimes. Based on the assumption of interest rate parity, Engel et al. (2018) found inflation significant to forecast changes in U.S. dollar exchange rates while the interest-rate differential was not significant. Engel and Wu (2018) pointed out that economic fundamentals could well explain nominal exchange rate dynamics. Furthermore, the evidence suggested that liquidity yields were significant in explaining exchange rate movements for all G10 countries. Della Corte et al. (2016) established the relationship between a country's major commodity export price and its nominal exchange rate. Cheung et al. (2018) provided an exhaustive analysis of forecasting power for the competing models to predict nominal exchange rates and point out that there was no one specific model to outperform the others. Belbutte et al. (2017) examined persistence of official and informal Kwanza/USD exchange rates. The results indicated persistence in the two exchange rates in levels first differences, while the persistence in the official market was significantly lower than in the informal exchange rate. Juselius and Assenmacher (2017) illustrated that Swiss US nominal exchange fluctuates with long persistent swings. Salazar (2017) showed that over time the nominal exchange rate in Chile exhibited long and persistent swings around relative prices. Juselius (2017) explained the persistence of swings with imperfect knowledge, reflexivity, and feedback mechanisms. Consistently with imperfect knowledge expectations, Juselius and Stillwagon (2018) examined exchange rates for the US and UK and showed that the nominal exchange rate had moved away from equilibrium over the medium run, whereas over the long run the nominal exchange rate was adjusted. Li et al. (2016) employed the multifractal detrended cross-correlation analysis (MF-DCCA) and analyzed cross-correlation between crude oil market and five selected exchange rate markets. The results revealed a strong multi-fractality between crude oil market and exchange rate markets in the short term and in the long term. Furthermore, the cross-correlations between the exchange rates and crude oil returns were found persistent. Katusiime et al. (2015) examined market efficiency and trading rule profitability in

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the foreign exchange market in Uganda from January 1994 to June 2012. The results illustrated the pricing inefficiency of the foreign exchange market except for a few brief episodes of efficiency while pointing out the buy-and-hold strategy as a preferred strategy on the foreign exchange market in Uganda. Hsu et al. (2016) analyzed technical trading rules in the foreign exchange market daily data over 45 years for 30 developed and emerging market currencies. The results supported a predictable foreign exchange market with potential excess profitability for developed and emerging currencies. Sensoy et al. (2016) examined efficient market hypothesis under the framework of fractional integration for several developed and emerging economies. The results indicated strong rejection of market efficiency, mostly in emerging countries, while exchange rates of developed countries are found less inefficient. However, the results always depend on data selection and model specification. The Brief literature overview illustrates that contemporary empirical literature still struggles to establish an unambiguous connection between efficient market hypothesis and exchange rate dynamics. Therefore, this paper makes a step ahead and illustrates efficiency euro-exchange rates for endogenous shocks of different sign and magnitude.

Methodology

An efficient market hypothesis (EMH) can be mathematically formulated with the help of the martingale theory. Based on martingale theory, if a time series $\{y_t\}$ was a martingale with respect to its past, then its future value could not be predicted based on its current and past values. Therefore, equation (1) should hold for all t .

$$E(y_{t+1} | y_1, \dots, y_t) = y_t \tag{1}$$

Consequently, the development of time series y_t can be described as a random walk process in equation (2):

$$y_{t+1} = y_t + \varepsilon_t \tag{2}$$

Where y_t is a time series at its levels. Based on equation (2), the development of returns was presented in equation (3):

$$y_{t+1} - y_t = \varepsilon_t \tag{3}$$

Therefore, to validate EMH one can estimate specifications in equation (4) or (5). Afterward, in the case of market efficiency, statistical tests should confirm the hypothesis of $\rho = 1$ or $\rho - 1 = 0$.

$$y_{t+1} = \rho \cdot y_t + \varepsilon_t \tag{4}$$

$$y_{t+1} - y_t = (\rho - 1) \cdot y_t + \varepsilon_t \tag{5}$$

When statistical tests confirm the hypothesis of $\rho = 1$ in a time series, the stochastic process is called the unit root process, and a time series embodies a stochastic trend. Econometric literature developed a range of different tests to validate the existence of unit root in a time series. However, contemporary econometric literature often points out the low power of the unit root test. To overcome the biasness of results from unit root tests, several unit root tests with different assumptions under null hypothesis were employed. Augmented Dickey–Fuller (1979) (ADF test), Phillips–Perron (1988) (PP test), the Generalized Least Squares and Dickey–Fuller test (DF-GLS) test from Elliot et al. (1996) (ERS test) and Kwiatkowski et al. (1992) (KPSS test) were considered. However, exchange rate series are well known for the phenomenon of clustering volatility often tested and confirmed using ARCH tests following (Engle, 1982). Therefore, the nature of exchange rate series might be nonlinear, and standard linear unit root tests might be inadequate. Recent empirical literature (Kuck et al., 2015; Kuck and Maderitsch, 2019) successfully implemented Quantile Autoregression (QAR) approach from Koenker and Xiao (2004, 2006) and revealed nonlinear and asymmetric nature of exchange rate returns development while Bošnjak et al. (2019) revealed properties of CDS returns. Following Koenker and Xiao (2004, 2006) autoregression coefficient $\alpha(\tau)$ in equation (6) is supposed to depend on sign and magnitude of endogenous shock $\varepsilon(\tau)$. Consequently, the autoregression coefficient $\alpha(\tau)$ is estimated for each of the observed quantile of endogenous shock $\varepsilon(\tau)$ following specification in equation (6):

$$Q_{y_t}(\tau | \Delta y_t) = \alpha(\tau) \cdot \Delta y_{t-1} + \varepsilon(\tau) \tag{6}$$

Where: $Q_{y_t}(\tau | \Delta y_t)$ corresponds to the τ -th conditional quantile of the observed series returns, $\varepsilon(\tau)$ presents τ -th quantile of a residual-term (ε_t) and $\alpha(\tau)$ denotes quantile (τ) dependent autoregressive coefficient. Therefore, the term $\varepsilon(\tau)$ illustrates the sign and magnitude of endogenous shocks, while the term $\alpha(\tau)$ shows its dependence structure suitable to judge on dependence structure or persistence of endogenous shocks depending on its sign and magnitude.

Research Data and Empirical Results

Data sample in this research consists of daily exchange rates for EUR/USD, EUR/JPY, EUR/GBP, EUR/EUD, EUR/CAD, EUR/CZK, EUR/DKK, EUR/HUF, PLN, EUR/SEK,

EUR/NOK EUR/HKD, EUR/HRK, EUR/CNY, and EUR/RUB mid-exchange rates retrieved from European Central Bank (ECB). The daily exchange rates for EUR/HRK, EUR/CNY and EUR/RUB range from April first 2005 up to the end of April 2020 while data for all the other exchange rates under consideration range from January fourth 1999 up to the end of April 2020. Daily exchange rate series were observed in (natural) log values. An increase in the exchange rate presents an appreciation of the euro, and positive endogenous shocks indicate appreciation shocks. Correspondingly, a decrease in the exchange rate presents depreciation of the euro, and negative endogenous shocks indicate depreciation shocks. Hence, endogenous shocks within 0.10 quantile are considered as the highest euro depreciation shocks, while endogenous shocks above 0.90 quantile are considered as the highest euro appreciation shocks. Endogenous shocks around the median are considered endogenous shocks of the smallest magnitude, while other endogenous shocks are considered moderate in its magnitude. Following the methodological procedure, unit root tests were performed, and results were reported in Table 0-A in the Appendix. All of the employed unit root tests unambiguously indicate unit root existence in the exchange rate levels, while exchange rate returns being stationary. Therefore, the exchange rate tended to persist at its level, while exchange rate returns illustrated mean reverting property. However, mean reversion of exchange rate returns does not necessarily indicate the efficiency of the foreign exchange market. Figure 1 in the Appendix illustrates the empirical density function for each of the considered currency pairs. Empirical density function

clearly illustrates excess kurtosis at point zero, indicating the departure of empirical distribution from normality while zero-returns of the exchange rate being highly likely. QAR approach is consistent with the empirical properties of exchange rate returns, and QAR estimates for fifteen currency pairs were examined. Table 1 summarizes estimates for EUR/CNY, EUR/USD, EUR/JPY, EUR/GBP, and EUR/HKD exchange rate returns.

As illustrated in Table 1, estimates for EUR/CNY, EUR/USD, EUR/GBP, and EUR/HKD exchange rate returns were martingales and fully in line with assumptions based on efficient market hypothesis. The linkage between past and current returns for these four currency pairs was not distinguishable from zero. However, the estimates for EUR/JPY exchange rate returns suggest some dependence between current and past returns. Negative endogenous shocks in EUR/JPY exchange rate returns of the highest magnitude were followed by negative returns. Therefore, depreciation of EUR against JPY was expected to last for some short period. As $\alpha(\tau)$ was a negative sign for endogenous shocks above the median, positive endogenous shocks were followed by negative endogenous shocks. Hence, the appreciation of EUR against JPY was followed by the depreciation of EUR against JPY. Furthermore, appreciation of higher magnitude was followed by the depreciation of higher magnitude since $\alpha(\tau)$ increases in its absolute values as the quantile increases. Table 2 presents estimates for EUR/AUD, EUR/CZK, EUR/DKK, EUR/HUF and EUR/PLN exchange rate returns.

Table 1. Euro returns against CNY, USD, JPY, GBP and HKD

Quantile	Estimates of (standard errors)				
	EUR/CNY	EUR/USD	EUR/JPY	EUR/GBP	EUR/HKD
0.10	-0.02052 (0.03108)	0.01063 (0.02601)	0.06935** (0.02804)	0.02859 (0.02123)	-0.00991 (0.02582)
0.20	-0.03427 (0.02272)	-0.01695 (0.02078)	0.04132** (0.01836)	0.00750 (0.01650)	-0.02208 (0.02110)
0.30	-0.03351 (0.01689)	-0.01720 (0.01484)	0.01815 (0.01506)	0.01491 (0.01490)	-0.01965 (0.01515)
0.40	-0.01853 (0.01626)	-0.01136 (0.01412)	-0.00073 (0.00811)	0.00159 (0.01294)	-0.01504 (0.01401)
0.50	-0.02968 (0.01474)	-0.01080 (0.01298)	-0.01102 (0.01262)	-0.00830 (0.01319)	-0.01169 (0.01246)
0.60	-0.01710 (0.01459)	-0.00843 (0.01310)	-0.02374* (0.01252)	0.00259 (0.01364)	-0.01178 (0.01337)
0.70	-0.01367 (0.01710)	0.00835 (0.01550)	-0.04059*** (0.01357)	0.01818 (0.01605)	0.00713 (0.01495)
0.80	-0.02798 (0.01904)	0.01101 (0.01971)	-0.04700*** (0.01619)	0.01230 (0.01833)	0.00508 (0.01982)
0.90	0.00670 (0.03056)	0.02201 (0.02650)	-0.07761*** (0.02207)	0.03183 (0.02549)	0.02302 (0.02677)

Source: Own estimates; Note: ***, ** and * denotes significance at levels of 1%, 5% and 10%, respectively

Following the results presented in Table 2, each currency pair exhibited some form of dependence structure between past and current returns. Estimates for EUR/AUD exchange rate returns suggested predictability of appreciation of EUR against AUD. Based on estimates from Table

2, euro appreciation of a higher magnitude is supposed to be followed by appreciation. In contrast, behaviour of EUR/AUD exchange rate returns after euro-depreciation and its appreciation of the smallest magnitude was not predictable. In the case of EUR/CZK exchange rate returns,

there was predictable behaviour after endogenous shocks of smaller magnitude, either positive or negative. Positive endogenous shocks of smaller magnitude were followed by positive returns, while negative returns followed negative endogenous shocks of smaller magnitude. After sizable magnitudes of endogenous shocks in EUR/CZK exchange rate returns, either positive or negative, there was no predictability of the next returns. Estimates for EUR/DKK exchange rate returns indicate no predictability of returns after euro-appreciation shocks of small magnitude and euro-depreciation shocks of the highest magnitude. In all other cases, depreciation was expected to follow depreciation shocks, while appreciation was expected to follow appreciation shocks. In the case of EUR/HUF exchange

rate returns, predictability of returns was identified after depreciation shocks of higher magnitude and appreciation shocks of the highest magnitude. After euro-appreciation, shocks of the highest magnitude followed further euro-appreciation, while euro-depreciation shocks of higher magnitudes were followed by euro-appreciation as well. Following dependence structure between past and current returns for EUR/PLN exchange rate returns, appreciation of EUR against PLN could be predictable after positive endogenous shocks of a certain level and after the highest negative shocks. After endogenous shocks of small magnitude, the next-day return was not predictable. Table 3 summarizes estimates for EUR/SEK, EUR/NOK, EUR/RUB, EUR/CAD and EUR/HRK exchange rate returns.

Table 2. Euro returns against AUD, CZK, DKK, HUF and PLN

Quantile	Estimates of (standard errors)				
	EUR/AUD	EUR/CZK	EUR/DKK	EUR/HUF	EUR/PLN
0.10	-0.00233 (0.02645)	-0.02430 (0.02729)	0.03040 (0.02424)	-0.05618** (0.02441)	-0.05016* (0.02636)
0.20	-0.02476 (0.01525)	0.00165 (0.01647)	0.03175* (0.01826)	-0.03897** (0.01669)	-0.02630 (0.01619)
0.30	-0.01242 (0.01449)	0.01694 (0.01228)	0.02936*** (0.01103)	-0.02168** (0.01030)	-0.02508* (0.01316)
0.40	-0.00741 (0.01301)	0.01801* (0.01041)	0.03220*** (0.00523)	-0.00252 (0.01077)	-0.01180 (0.01081)
0.50	0.00110 (0.01249)	0.02762*** (0.00669)	0.00000 (0.01089)	0.00397 (0.00793)	0.01071 (0.00968)
0.60	0.01512 (0.01311)	0.02770*** (0.01021)	0.00043 (0.00640)	0.01152 (0.01109)	0.01554 (0.01144)
0.70	0.03479** (0.01525)	0.03663*** (0.01226)	0.04190*** (0.01261)	0.01179 (0.01285)	0.02909** (0.01377)
0.80	0.04016** (0.01799)	0.02854 (0.01766)	0.05302*** (0.01687)	0.01475 (0.01593)	0.04259** (0.01930)
0.90	0.05334* (0.02739)	0.02108 (0.02936)	0.06341*** (0.02273)	0.06631** (0.03120)	0.05008** (0.02439)

Note: ***, ** and * denotes significance at levels of 1%, 5% and 10%, respectively.

Source: Own estimates

Findings

The EFA results revealed two findings. *First*, time risk items were linked to the underlying online purchase processes (to the delivery and after-sales processes). Respondents perceived the items measuring the time aspect as part of the underlying processes and not as a separate “time” risk factor.

Second, the “counterfeit product” risk dimension did not become part of the financial factor model as it did for example in the survey of Zhang et al. in 2012. Additionally, this item does not correlate with any other analysed risk items. Consumers struggle to assess product originality. Nevertheless, this is a decidedly important product characteristic, especially if the product is a special and expensive brand. This issue seems to matter to Hungarian respondents particularly. This concern is not only a Hungarian topic. There is a rising number of internationally developed methods

and patents to fight the selling of counterfeit products, e.g. Blockchain-based applications for product anti-counterfeiting (Ma, Li, Chen, X., Sun, Chen, Y. & Wang, 2016), or use of authentication keys and authentication server (US Patent US10558979B2, 2020).

As illustrated in Table 3, each currency pair exhibited some dependence between past and current returns. Estimates for EUR/SEK exchange rate returns indicate predictability of euro appreciation after appreciation shocks of different magnitudes. There was no predictable depreciation neither behaviour of returns after any depreciation shocks of EUR against SEK. Therefore, EUR/SEC exchange rate returns exhibited asymmetries in their behaviour. In the case of EUR/NOK exchange rate returns. Appreciation of EUR against NOK was predictable after endogenous shocks of high magnitude, either positive or negative. Depreciation of EUR against NOK was not predictable, neither exchange rate returns after endogenous shocks of small magnitude. EUR/RUB exchange rate returns were predictable across

quantiles except the two lowest. Appreciation of EUR against RUB was predictable after appreciation endogenous shocks at any quantile. Depreciation EUR against RUB was predictable as well, but not at the two highest quantiles of depreciation endogenous shocks. Predictable appreciation of EUR followed its appreciation endogenous shocks and predictable depreciation of EUR followed its depreciation endogenous shocks. Estimates for EUR/CAD and EUR/HRK exchange rate returns supported efficient market hypothesis across all quantiles except one quantile for each currency pair. Therefore, EUR/CAD and EUR/HRK exchange rate returns can be considered as almost efficient.

Implications and Discussion

Kuck et al. (2015) employed a quantile autoregression approach and following Baur (2013) and Brunnermeier et al. (2008), recognized currencies as funding or investment against US dollar. Research results from this paper suggest that four out of fifteen considered currency returns were entirely in line with the efficient market hypothesis, namely EUR/CNY, EUR/USD, EUR/GBP and EUR/HKD exchange rate returns. EUR/CAD and EUR/HRK exchange rate returns were found as almost in line with the efficient market hypothesis and not worth of special attention from traders.

Table 3. Euro returns against SEK, NOK, RUB, CAD and HRK

Quantile	Estimates of (standard errors)				
	EUR/SEK	EUR/NOK	EUR/RUB	EUR/CAD	EUR/HRK
0.10	-0.03391 (0.02275)	-0.09682*** (0.01990)	-0.02532 (0.02571)	-0.03856 (0.02667)	-0.00947 (0.02400)
0.20	-0.01689 (0.01871)	-0.03858** (0.01633)	-0.00817 (0.01597)	-0.03598* (0.01849)	-0.00473 (0.01921)
0.30	0.00360 (0.01572)	-0.02532* (0.01383)	0.03237*** (0.01065)	-0.01607 (0.01548)	0.01676 (0.01411)
0.40	0.01487 (0.01394)	-0.01613 (0.01188)	0.03827*** (0.01089)	-0.01446 (0.01357)	0.01622 (0.01071)
0.50	0.02600* (0.01329)	0.00415 (0.01153)	0.06462*** (0.00990)	-0.01901 (0.01327)	0.00000 (0.00816)
0.60	0.01546 (0.01352)	0.01097 (0.01208)	0.07447*** (0.01013)	-0.02030 (0.01424)	0.01011 (0.01145)
0.70	0.01765 (0.01441)	0.03744*** (0.01451)	0.08997*** (0.01178)	0.00026 (0.01547)	0.03132** (0.01354)
0.80	0.03597** (0.01741)	0.04526** (0.02063)	0.11038*** (0.01543)	0.01072 (0.02064)	0.02615 (0.02045)
0.90	0.05460** (0.02532)	0.08531*** (0.02474)	0.14544*** (0.03089)	0.03692 (0.02523)	0.00909 (0.03743)

Note: ***, ** and * denotes significance at levels of 1%, 5% and 10%, respectively.

Source: Own estimates

However, for nine of the fifteen considered currencies, there could be some profitable trading strategies. Firstly, there was significant predictability of EUR/JPY exchange rate returns. Appreciation of EUR against JPY was followed by its depreciation and the depreciation of EUR against JPY was followed by the depreciation of EUR against JPY. Therefore, there was the predictability of EUR depreciation against JPY and in this case, JPY can be identified as an investment currency only. Due to the negative $\alpha(t)$ coefficient for EUR depreciation of the high magnitude, the active trading strategy should be involved after EUR appreciation comparing to the case of EUR depreciation against JPY. EUR/HUF, EUR/PLN and EUR/NOK exchange rate returns exhibited similar dependence structure. After depreciation of EUR against these three currencies followed its predictable appreciation. Furthermore, the appreciation of EUR against these three currencies was predictable after the depreciation of EUR as well. Hence when considering these three currency pairs HUF, PLN and NOK could be considered as funding currencies only and a more active trading strategy

should be in place after euro-depreciation endogenous shocks. AUD and SEK were found as funding currencies as well. However, appreciation of EUR against these two currencies was predictable after endogenous shocks of EUR appreciation only. Depending on the sign and magnitude of endogenous shocks, CZK, DKK and RUB were identified as both, investment and funding currencies. However, EUR/CZK exchange rate was more appropriate during calm periods of small endogenous shocks. Depreciation of EUR against CZK was followed after small depreciation shocks making CZK a suitable investment currency. Similarly, appreciation of EUR against CZK was followed after small appreciation shocks making CZK a suitable funding currency. DKK and RUB should be considered as investment and funding currencies. However, there were more opportunities for these two currencies to serve as investment currencies, particularly during periods of endogenous shocks of high magnitude or dynamic period on foreign exchange markets. Even though sources of foreign exchange market inefficiencies are beyond the scope of this research, to contextualize

research findings from this paper, some facts are worth of mentioning. Research results from this paper provided different dependence structure of returns for different currency pairs. Therefore, it is reasonable to assume that there are various sources of inefficiency to be investigated. The sources of inefficiency might be examined within theories of exchange rate determination. Engel et al. (2018) identified inflation rate while not interest-rate differential as a predictor of changes in U.S. dollar exchange rates. Therefore, there might be market inefficiency of adjusting the exchange rate to the inflation rate while Purchasing Power Parity (PPP). A currency of a country might appreciate after an increase of its interest rate. Hence, Uncovered Interest Parity (UIP) might be another theory that provides a possible explanation. While examining the efficiency of the Korean foreign exchange market, Kang (2019) pointed out risk premia in the international financial market and of central bank interventions as the main drivers of foreign exchange market inefficiencies. Levich et al. (2019) suggested that after the financial and economic crises from 2008 foreign exchange market became more efficient and inefficiency was related to emerging market currencies. Findings from Levich et al. (2019) might be understood in the context of excess liquidity that emerged as a consequence of reaction from central banks to the crisis. Therefore, liquidity constraints might be related to foreign exchange market inefficiency as well. However, sources of inefficiency for currency pairs considered in this paper remain to be examined in further research.

Conclusions

Several conclusions can be drawn the research presented in this paper. Firstly and consistently with the existing body

of literature, research findings from this paper suggested that empirical properties of foreign exchange rate series depart from normality. Secondly, the quantile autoregression approach is well suited to capture empirical properties of exchange rate series and reveal a specific form of dependence structure between current and previous returns for different sign and magnitude of endogenous shocks. Thirdly, in line with the efficient market hypothesis, six out of fifteen currency pairs exchange rate returns were found non-predictable or almost non-predictable. In the case of nine considered currency pairs there was a significant linkage between current and past exchange rate returns that was found to depend on the sign and magnitude of endogenous shocks in exchange rate returns. Some profitable trading strategies were suggested based on the structure of dependence between current and previous returns found in this paper. In the case of trading with EUR/JPY, JPY should be considered only as an investment currency, while more active trading strategies should be in place after EUR appreciation comparing to the case of EUR depreciation against JPY. HUF, PLN and NOK could be considered as funding currencies only and more active trading strategy should be involved after euro-depreciation endogenous shocks. AUD and SEK should be considered funding currencies, while CZK, DKK and RUB could be considered investment and funding currencies. Empirical findings from this paper suggest that the foreign exchange market efficiency depends on a currency pair in the first place. Depending on currency pairs, inefficiencies appeared across different quantiles of endogenous shocks suggesting various potential sources of foreign exchange market inefficiencies. Further research might be directed towards sources of foreign exchange inefficiencies and consider specific effects like market liquidity. Further research might also address foreign exchange market efficiency for specific time periods.

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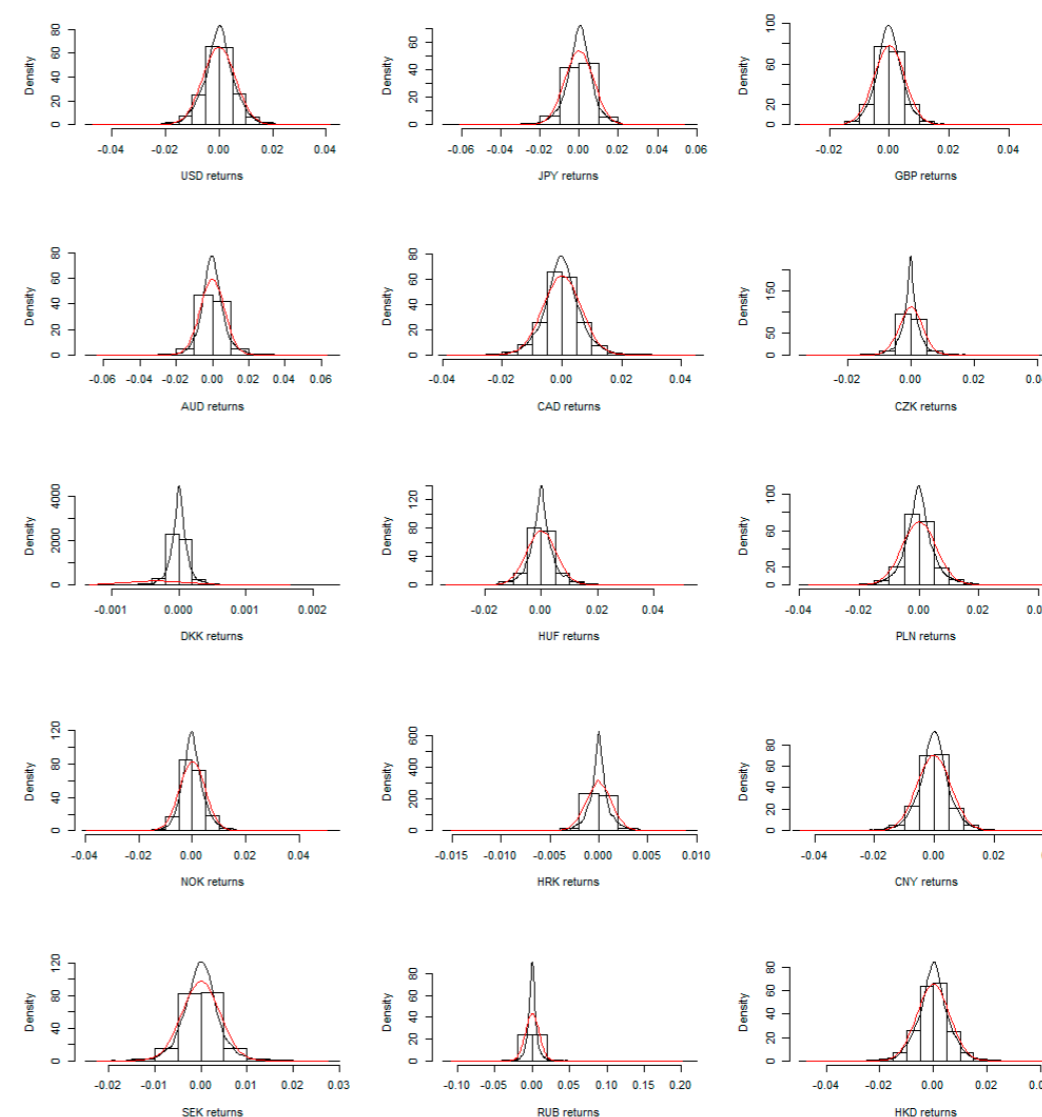
Appendix

Table A. Unit root test results

Currency pair		ADF test	PP test	KPSS test	ERS test
EUR/USD	In levels	-1.492908	-1.479215	1.835449	-1.531169
	In first differences	-74.06045	-74.06285	0.092588	-73.82070
EUR/AUD	In levels	-2.657189	-2.647104	0.763090	-2.037184
	In first differences	-72.06848	-72.05835	0.037617	-3.762704
EUR/CUD	In levels	-3.992422	-3.926264	0.434773	-1.884410
	In first differences	-73.88933	-73.96224	0.039235	-71.71690
EUR/CZK	In levels	-1.478668	-1.512645	1.905751	-1.335231
	In first differences	-73.38142	-73.38485	0.038226	-4.460989
EUR/DKK	In levels	-4.104789	-3.934646	0.172070	-3.753606
	In first differences	-70.54209	-70.53090	0.019467	-8.063880
EUR/GBP	In levels	-2.796410	-2.754517	0.804253	-1.942399
	In first differences	-71.97012	-71.99930	0.070024	-69.73873
EUR/HKD	In levels	-1.473057	-1.470299	1.820727	-1.524046
	In first differences	-74.10288	-74.10497	0.091604	-73.84312
EUR/HUF	In levels	-4.143357	-3.798491	0.961985	-3.307227
	In first differences	-73.45379	-74.00907	0.013890	-9.846900
EUR/JPY	In levels	-2.135897	-2.095066	0.745905	-2.047637
	In first differences	-74.54041	-74.56018	0.064438	-2.503096
EUR/NOK	In levels	-2.269483	-2.250473	1.237134	-1.054403
	In first differences	-73.95505	-73.97203	0.032424	-2.555699
EUR/PLN	In levels	-3.160395	-3.078826	0.323370	-3.032678
	In first differences	-53.38697	-72.45319	0.025380	-2.782901
EUR/SEK	In levels	-2.715647	-2.509558	0.623982	-2.091403
	In first differences	-73.34194	-73.69031	0.046746	-3.183294
EUR/CNY	In levels	-2.540774	-2.529852	0.694431	-2.430713
	In first differences	-62.96893	-62.96882	0.031843	-6.704023
EUR/HRK	In levels	-2.951178	-2.789143	0.961775	-2.560812
	In first differences	-32.83798	-63.76806	0.046523	-29.41636
EUR/RUB	In levels	-2.484858	-2.645928	0.661083	-1.757228
	In first differences	-33.84804	-56.88094	0.045820	-6.316480

Source: Own estimates

Figure 1. Empirical density function for exchange rate returns



Source: Own estimates

Tržna učinkovitost deviznih tečajev evra in trgovalne strategije

Izvleček

Ta članek preverja hipotezo o tržni učinkovitosti na donose evra v primerjavi s petnajstimi valutami z domnevo o predvidljivosti donosov, odvisnih od predznaka in jakosti endogenih šokov. Upoštevajoč značilnosti donosov deviznega tečaja smo v empirični analizi izbrali avtoregresijski pristop s kvantili. Na osnovi vzorca raziskovalnih podatkov, sestavljenega iz dnevni deviznih tečajev v obdobju od 1. januarja 1999 do 30. aprila 2020, članek nakazuje dobičkonosne trgovalne strategije v odvisnosti od para valut. V primeru šestih izmed petnajstih parov valut so se donosi na devizne tečaje izkazali kot nepredvidljivi ali skoraj nepredvidljivi. V primeru devetih upoštevanih parov valut je obstajala znatna povezava med aktualnimi in preteklimi donosi na devizne tečaje, za katero smo ugotovili odvisnost od predznaka in jakosti endogenih šokov v donosih na devizni tečaj. Ob koncu članek obravnava možne dejavnike neučinkovitosti in predlaga nadaljnje raziskave obravnavane teme.

Ključne besede: avtoregresija s kvantili, tržna učinkovitost, devizni tečaj, evro

ORIGINAL SCIENTIFIC PAPER

RECEIVED: JANUARY 2021

REVISED: APRIL 2021

ACCEPTED: MAY 2021

DOI: 10.2478/ngoe-2021-0009

UDK: 005.7:001.895(497.11)

JEL: C19, L26, O31

Citation: Pitić, G., & Vučković, A. (2021). Organizational Factors of Innovativeness in Serbian Enterprises. *Naše gospodarstvo/Our Economy*, 67(2), 20-28. DOI: 10.2478/ngoe-2021-0009

Organizational Factors of Innovativeness in Serbian Enterprises

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Abstract

This paper analyses correlations between several organizational characteristics and product/process innovations in enterprises in Serbia. We used the World Bank Enterprise Survey data on 339 small, medium, and large companies from various industries. Many of the factors analysed in this study are consistent with theoretical conclusions in the literature on this topic and relate to organizational maturity. Also, factors such as the size of the company and the industry to which it belongs were analysed. For correlations testing, the Chi-square correlation coefficient and the Cramer's V test were used. The analysis revealed correlations between innovativeness and many organizational characteristics. However, in some cases, contrary to theoretical claims, correlations were not confirmed. We found that the introduction of new products and/or processes in the company is influenced by business strategy, production targets, number of performance indicators monitored, establishment of quality management system, formal training programs for company's full-time employees, ease of achieving the company's production targets, level of awareness of management and employees about the company's production targets, spending on research and development activities within the company, and acquisition of external knowledge, way of promoting non-managers in a company, time frame of the company's production targets, company's size and main market.

Keywords: innovativeness, corporate entrepreneurship, correlation analysis, organizational characteristics, Serbia

Introduction

Issues of corporate entrepreneurship and organizational innovativeness and the factors that foster them have been the subject of numerous studies for decades. At the time of the Fourth Industrial Revolution, it seems that Schumpeter's idea of creative destruction, as a driver of economic development, has never been more relevant (Schumpeter, 1934). The Fourth Industrial Revolution, whose main feature is the fusion of digital, physical, and biological systems, changed almost all aspects of life and work (Schwab, 2016). However, the mentioned revolution encompasses technological changes and changes in economics and management (Xu et al., 2018). Increased focus on users, the application of digital technologies

to improve the efficiency of business processes, the creation of new business models based on electronic platforms are just some of the features of management in modern organizations (Li et al., 2017). The development of companies and countries in the modern economic and technological environment is increasingly viewed through the prism of their ability to create new or improve existing products, services, and processes (Liu, 2017). In this regard, corporate entrepreneurship and innovation are seen as key aspects of organizational transformation, necessary to respond to the technological, economic, and social changes caused by the Fourth Industrial Revolution (Guerra Guerra, 2018). In other words, current technological changes within the Fourth Industrial Revolution have imposed the need to improve innovativeness in organizations to respond to opportunities and threats from the business environment.

Serbia faces significant challenges in this regard, given its lag behind developed countries in some of the key elements of competitiveness. This paper aims to analyse the internal factors affecting innovativeness in enterprises in Serbia, determine the importance of each of the factors and find room for improvement in this regard. In this way, recommendations regarding the improvement of certain aspects of management practice in companies would improve their innovativeness, which would further lead to raising the competitiveness of the entire economy. This is one of the few studies of this type conducted on the example of Serbia, and its conclusions can be applied to other economies. The study examined the influence of factors that have already been the subject of previous studies around the world and analysed the influence of several new factors. In this way, it contributes to the overall fund of knowledge when it comes to research on innovativeness in organizations as a topic of increasing importance.

Chapter 2 of this paper provides an overview of the conclusions of the conducted research on this topic in the past. Chapter 3 provides a description of the methodology of the original research conducted by the authors of this paper. Chapter 4 is dedicated to the presentation of results and discussion in this regard.

Literature Review

According to Covin & Miles (1999), corporate entrepreneurship includes situation where (1) an "established" organization enters a new business; (2) individuals champion new product ideas within a corporate context; and (3) an "entrepreneurial" philosophy permeates an entire organization's outlook and operations. Corporate entrepreneurship refers to the pursuit of entrepreneurial activities and initiatives

aimed at transforming the organization (Goodale et al., 2011). Namely, corporate entrepreneurship is a mechanism by which an organization adapts to changing conditions in the external environment through knowledge improvement, internal adaptation, and efficient use of resources to develop new products, services, processes, and management systems (Morris et al., 2011, p. 11). The link between corporate entrepreneurship and innovation is pointed out by McFazdean et al. (2005) so that they define corporate entrepreneurship as the effort of promoting innovation in an uncertain environment. According to the same authors, innovation is a process that provides added value and novelty to the organization, its suppliers, and customers through the development of new procedures, solutions, products, and services, as well as new methods of commercialization. Within this process, the principal roles of the corporate entrepreneur are to challenge bureaucracy, assess new opportunities, align, and exploit resources, and move the innovation process forward. The corporate entrepreneur's management of the innovation process will lead to greater benefits for the organization (McFadzean et al., 2005). Organizational innovations, according to Schumpeter (1934), include the following: (1) launch of a new product or a new species of an already known product, (2) application of new methods of production or sales of a product (not yet proven in the industry), (3) opening of a new market (the market for which a branch of the industry was not yet represented), (4) acquiring of new sources of supply of raw material or semi-finished goods, (5) new industry structure such as the creation or destruction of a monopoly position. When it comes to the importance of innovation and corporate entrepreneurship for organizations, Covin & Miles (1999) point out that corporate entrepreneurship can enable organizations to gain cost leadership through improving the efficiency of business processes. Also, organizations can gain differentiation-based advantage through creating new products and consequently strengthening their reputation. Kuratko et al. (2001) indicate that a strategic approach to corporate entrepreneurship in organizations contributes to improving the long-term performance of the organization. Zahra et al. (1999) draw attention to the fact that corporate entrepreneurship not only contributes to improving a company's market and financial performance but also contributes to the creation of knowledge and development of competencies in the company. The development of innovativeness is especially important for middle-income countries, including Serbia. Namely, in this way, middle-income countries can make a shift from a factor/efficiency driven economy to an innovation-driven economy, which is characterized by the ability to produce innovative and sophisticated products/services, primarily based on knowledge. Thus, countries can generate higher income and avoid the middle-income trap (stay at the same middle level of development due to structural constraints) (Hardiana & Hastiadi, 2019).

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Corporate entrepreneurship and innovation in organizations is very common in the scientific literature. Over the past few decades, many research studies have been conducted with the aim of determining which organizational factors are the most important in terms of the development of organizational innovativeness. Also, several review papers were published, where the results of the mentioned research were sublimated and where conclusions were defined regarding the most important organizational factors affecting organizational innovativeness. Hornsby et al. (1993), based on a broad analysis of research in corporate entrepreneurship, defined an interactive model of corporate entrepreneurship, which includes organizational and individual factors that influence this process. When it comes to organizational factors, they found that five factors can positively affect the level of corporate entrepreneurship: management support (quick adoption of employee ideas, recognition of people who bring ideas forward, support for small experimental projects, and seed money to get projects off the ground), autonomy/work discretion (the extent that they are able to make decisions about performing their work in the way that they believe is most effective), rewards/reinforcement (rewards and reinforcement enhance the motivation of individuals to engage in innovative behaviour), time availability (time to incubate the new ideas), organizational boundaries (boundaries, real and imagined, that prevent people from looking at problems outside their jobs). Subramanian & Nilakanta (1996) review studies that have dealt, on the one hand, with the influence of organizational factors on the innovation in organizations, and on the other hand, with the influence of organizational innovation on organizational performance. Centralisation, formalisation, size, organizational slack, and specialisation were considered as organizational factors influencing innovation. It was found that these factors significantly affect the number of innovations and the time required for their adoption in the organization. Guth & Ginsburg (1990), in their model of corporate entrepreneurship in strategic management, defined four factors that affect corporate entrepreneurship in an organization: external environment, strategic leaders, organization form/conduct, and organizational performance. Smith et al. (2008) in their literature review on factors influencing an organization's ability to manage innovation indicate that previous research in this area has focused on factors, such as utilization of technology, technical skills and education, technology strategy, idea generation, selection and evaluation techniques, implementation mechanism, organizational strategy, innovation strategy, vision and goals of the organization, strategic decision making, organizational differentiation, centralisation, formality, communication, collaboration, attitude to risk, attitude to innovation, employees motivation to innovate, employee skills and education, employee personalities, training, utilization of slack resources, planning and management of resources, knowledge resources, technology resources, financial resources,

organizational learning, knowledge of external environment, utilization of knowledge repositories, management personalities management style, motivation of employees. The authors point to the existence of a positive correlation between these factors and corporate entrepreneurship. In the literature review, as part of creating the so-called hierarchical model of corporate entrepreneurship maturity, Vučković et al. (2017) highlight the following factors as key to the effectiveness of this process: organizational culture (promoting innovativeness at all levels of the organization, participatory leadership, risk taking and work motivation), organizational infrastructure (includes the flat organizational structure, then clear and concrete policies, strategies, plans and procedures for innovation management in the organization, and finally the simple and clear communication channels for information exchange within innovation management), organizational resources and abilities (sufficient human, material and financial resources, necessary for the implementation of new ideas in the organization). When it comes to research on this topic in Serbia, Miric et al. (2019) conducted a study of factors affecting organizational innovativeness in social enterprises in Serbia. They concluded that some of the most important factors in this regard are awareness of the enterprise's social mission, perception of innovation as important, orientation towards growth, motivation to work, professional life satisfaction, etc.

According to the Global Competitiveness Index, in 2019, Serbia was ranked 72nd in the world (out of 141 countries), with its ranking among the lowest in Europe. Serbia lags behind the countries of the European Union in each of the areas of competitiveness. In terms of some of the organizational factors contributing to corporate entrepreneurship and innovation, Serbia is ranked lower than its overall rank. For example, some of these factors are attitudes towards entrepreneurial risk (107th), willingness to delegate authority (82nd), companies embracing new ideas (80th), the extent of staff training (104th), quality of vocational training (84th), reliance on professional management (114th) (WEF, 2019).

This paper aims to investigate the correlation between organizational characteristics and the level of innovativeness in the companies in Serbia. The research aims to find which organizational characteristics can positively influence the introduction of new products and processes. The main hypothesis, which will be tested in the research is: "High level of management maturity positively affects the level of innovativeness in the companies in Serbia." This hypothesis will be tested through correlation analysis, by using statistical tests to check a correlation between 15 organizational characteristics and two indicators of innovativeness. Most of the mentioned organizational characteristics refer to some aspects of management practice in companies. Thus, by examining the correlation between them and innovativeness

indicators, it is possible to determine whether the level of maturity of certain aspects of management practice affects the introduction of new products and processes in companies in Serbia. In this way, it would be possible to create a basis for establishing management models in companies in Serbia that encourage innovation.

Methodology

Based on the previous thematic review, corporate entrepreneurship and innovativeness are greatly important for company's and country's development in the modern economy. Also, a literature review established a list of factors for which there is both theoretical and practical evidence to influence innovativeness in organizations. Following the need to improve innovativeness in companies in Serbia, this paper will present an analysis of the correlation between 15 organizational characteristics and two innovativeness indicators in a representative sample of Serbian companies. The mentioned analysis was conducted on a sample of 339 organizations, included in the World Bank Enterprise Survey, which concerned the business environment in Serbia. This survey was conducted during 2019, and it covered companies of various industries, as well as sizes in terms of the number of employees. The Serbia 2019 Enterprise Survey (ES) covered the topics, such as general information of the firm/establishment, infrastructure, and services, sales and supplies, management practices, degree of competition, innovation, capacity, time use of top manager, land and permits, crime, finance, business-government relations, labour, business environment, performance, green economy module, environment-related aspects. The sample includes companies ranging in size from five to 13 thousand employees, and in terms of industry, they are divided into six categories: manufacturing, retail, wholesale, construction, hotels and restaurants, and services (The World Bank, 2019).

The sample for 2019 Serbia ES was selected using stratified random sampling. Three levels of stratification were used in this country: industry, establishment size, and region. As it is standard for the ES, the Serbia ES was based on the following size stratification: small (5 to 19 employees), medium (20 to 99 employees), and large (100 or more employees). Regional stratification was done across four regions: Belgrade, Šumadija and Western Serbia, Southern and Eastern Serbia, and Vojvodina. The ES indicators are calculated with some regions combined to achieve the thresholds for representativeness. Particularly, Šumadija and Western Serbia, and Southern and Eastern Serbia are combined. The survey was implemented following a 2-stage procedure. Typically, first, a screener questionnaire was applied over the phone to determine eligibility and make appointments. Then a face-to-face

interview took place with the Manager/Owner/Director of each establishment. The Questionnaires have common questions (core module) and respectfully additional manufacturing- and services-specific questions. We have surveyed the eligible manufacturing industries using the Manufacturing questionnaire (includes the core module, plus manufacturing-specific questions). Retail firms have been interviewed using the Services questionnaire (includes the core module plus retail-specific questions). The residual eligible services were covered using the Services questionnaire (includes the core module). The response rate was 36.5%.

Correlation analysis was performed in the SPSS program, using the Chi-square coefficient and the Cramer's V test. Fifteen organizational characteristics, representing independent variables in correlation analysis, were selected from the questionnaire based on a review of the relevant literature (similar research) and the assumption that these organizational characteristics may impact innovativeness. When it comes to innovativeness indicators (dependent variables), indicators which were chosen, directly express the outcome of innovation activities in companies. All variables are categorical since all questions in the questionnaire were closed.

Results and Discussion

Table 1 shows the organizational factors and innovativeness indicators that are included in the correlation analysis. Also, the value of the correlation between each of the variables is given.

A formalized, written business strategy with clear key performance indicators in companies in Serbia positively contributes to product and process innovation. A strong correlation in terms of process innovations and somewhat weaker in terms of product innovations indicate that Serbian organizations are primarily oriented towards creating a cost advantage through the so-called managerial innovations, driven primarily by market forces and less by technology. Managerial innovations concern approaches to devise strategy and structure of tasks and units, modify the organization's management processes and administrative systems, motivate and reward organizational members, and enable organizational adaptation and change (Damanpour & Aravind, 2012). Although almost 44% of surveyed companies stated that they had introduced a new product in the previous three years, a large percentage of them do not have a defined strategy (42%). This result indicates that product innovations in Serbia are not often the result of companies' long-term and strategic orientation but ad hoc activities, which respond to current market demand. To improve competitiveness, companies in Serbia should pay more attention to long-term

Table 1. Correlation between organizational characteristics and innovativeness indicators

Organizational characteristics	Innovativeness indicators		Introduction of new or improved products or services during the last three years (Yes/No)		Introduction of any new or improved process during the last three years (Yes/No)	
	Chi-square	Cramer's V	Chi-square	Cramer's V	Chi-square	Cramer's V
Formalized, written business strategy with clear key performance indicators (Yes/No)	6.536*	0.140*	12.857**	0.197**		
Production targets such as production volume, quality, efficiency, waste, or on-time delivery (Yes/No)	15.791**	0.275**	5.739*	0.166*		
Number of performance indicators that are monitored at the company (1-2 indicators / 3-9 indicators / 10 or more indicators)	14.002**	0.292**	24.104**	0.383**		
Ease of achieving the company's production targets (Achieved without much effort / Achieved with some effort / Achieved with normal amount of effort / Achieved with more than normal effort / Achieved with extraordinary effort / Not achieved)	15.398**	0.289**	20.994**	0.338**		
Internationally recognized quality certification (Yes/No)	8.914**	0.165**	7.398**	0.150**		
Formal training programs for company's permanent, full-time employees (Yes / No)	38.012**	0.336**	19.549**	0.241**		
Awareness of management and employees about the company's production targets (Only senior managers / Most manager and some production workers / Most managers and most production workers / All managers and most production workers)	4.272	0.152	16.733**	0.302**		
Time frame of the company's production targets (Long-term / Short-term / Both)	6.579*	0.189*	5.188	0.168		
Main market in which the company sells its main product (Local / National /International)	15.169**	0.213**	8.975*	0.164*		
Spending on the acquisition of external knowledge (Yes/No)	29.714**	0.298**	47.011**	0.375**		
Spending on research and development activities within the company (Yes/No)	37.519**	0.335**	24.995**	0.273**		
Frequency of meetings of top managers with employees involved in production activities (Never / Once a week / 2-4 times a week / Daily / More than once a day)	5.064	0.199	1.747	0.117		
Way of promoting non-managers in a company (Based solely on performance and ability / Based partly on performance and ability, and partly on other factors / Based mainly on other factors / non-managers are normally not promoted)	10.944*	0.238*	6.353	0.181		
Company's main activity and product (Manufacturing / Retail trade / Wholesale trade / Construction / Hotel or restaurant / Services)	9.863	0.171	4.050	0.110		
Company's size - number of employees (Small / Medium / Large)	8.629*	0.160*	30.151**	0.300**		

Notes: A mark (*) indicates a correlation where the significance is less than 0.05, while (**) indicates a correlation with a significance less than 0.01. The brackets show the answers offered in the questionnaire for each of the question concerning the given organizational characteristics.

planning by defining appropriate business strategies. Also, in line with the challenges of modern business, an integral part of these strategies should be constant innovation, both process and product.

The existence of defined production targets has a positive effect on product and process innovation in companies in

Serbia. Namely, defining clear, precise, and quantitative production targets contributes to the efficiency of management by monitoring the production flow and taking preventive and corrective measures to achieve the goals. The factors closely related to the production goals are the performance indicators, monitored by an organization. Correlation analysis found that organizations that monitor more indicators are

more likely to innovate than those that monitor fewer indicators. Among the organizations that monitor 1-3 indicators, most organizations have not innovated their products and processes in the previous three years. However, among organizations that monitor 3-9 indicators, innovative organizations are in a slight majority. When it comes to organizations that monitor ten or more indicators, innovative organizations are in the significant majority. Production targets and indicators that an organization monitors reflect the level of management systematicity in the organization. Organizations that define production targets and monitor a larger number of indicators are more committed to sustainable business. Therefore, these organizations are aware of the space for improvement in their products and processes, and consequently, more often innovate in this field.

Companies in Serbia that have difficulties in achieving production targets more often implement product and process inventions. This is logical since companies that face difficulties in their work are almost "forced" to innovate their products and processes to achieve their targets more easily. On the one hand, this indicates that companies with difficulties in achieving their targets often see a way out of this situation by innovating their products and processes. On the other hand, with companies that easily achieve their goals, there is not enough awareness that innovation is a continuous process, which provides a long-term competitive advantage. In other words, one company needs to innovate continuously and not only when it has business problems.

Establishing a management system, which is in line with the requirements of international standards, contributes to the introduction of new or improved products and/or services and the introduction of new and improvement of existing business processes. Namely, the requirements of international standards, created according to the Standard ISO 9001, imply the organization's orientation towards its customer's requirements and the commitment to continuous improvements. In this regard, organizations, to certify their management systems, must demonstrate compliance with the requirements of the standard. Monitoring and respecting customer requirements is one of the conditions to create a new product or improve an existing one since these activities are carried out to increase customer satisfaction and thus higher sales. The improvement of the processes is partly aimed at improving customer satisfaction because by improving the efficiency and the quality of production, a cheaper but also a higher quality product is created.

Employee training is another factor that affects the introduction of new products and improved business processes. Namely, the precondition for anything to be innovated is adopting as much existing knowledge as possible in a certain area. Only when organizations master existing knowledge

can they see opportunities for creating something new. In this regard, through regular employee training, they stay in touch with current innovations in their field of work, which encourages their creativity in creating new or improving existing products and processes.

Companies in Serbia where all managers and workers are familiar with production targets, more often innovate their processes, unlike those companies where only top management or a small circle of employees is familiar with the mentioned goals. By presenting production targets to employees at all levels in the company, it provides employees with the opportunity to gain insight into the broader picture of the company's functioning and, accordingly, to undertake activities to make improvements beyond their standard work tasks. Awareness of production targets allows employees to propose and implement inventions in the production process to achieve these targets. However, this factor does not affect product innovation in companies in Serbia. This can be explained by the fact that the process of developing new products and services is most often concentrated in departments such as research and development and/or marketing, so the workers in production and other departments are more committed to improving their work efficiency through process innovation.

This research showed that companies in Serbia, which are simultaneously focused on short-term and long-term goals, introduce more new products than organizations focused only on short-term or long-term goals. However, this factor also does not affect the frequency of business process improvements. One of the characteristics of successful strategic management is the combination of long-term and short-term perspectives. In other words, managers must have a vision of the future of their organization, while focusing on its current operational needs (Dess et al., 2008, p. 11). As one of the main conditions for competitiveness in today's economy, innovation can improve the organization's competitiveness long-term and short-term (depending on the type and scope of innovation). In this regard, the improvement of innovativeness in Serbia requires applying a strategic approach in companies, i.e., focusing on long-term and short-term perspectives.

When it comes to the main markets, companies that are primarily focused on the local market much less often create new or improve existing products and processes, unlike companies that operate in the national and international market. There are more competitors in national and international markets than in local ones, and there are also a larger number of customer groups with their own specific needs. The intensity of rivalry is exactly what leads companies in national and international markets to create new products more often since, in that way, they can maintain or improve

their competitive position in dynamic market conditions. Also, companies operating in larger markets are aware that process innovations can improve production efficiency and lower prices, which also contributes to a stronger competitive position.

The analysis found that the collection of external knowledge in purchase or licensing of patents and non-patented inventions, know-how, and other types of knowledge from other businesses or organizations contributes to innovation in terms of products and processes. Namely, by collecting external knowledge, organizations in many cases, directly gain the knowledge necessary to implement a particular invention, which could not be implemented with the existing knowledge fund.

A strong correlation was also found in organizations' investment in research and development and product and process innovation. Namely, organizations that have invested in research and development are more likely to innovate their products and processes. This information seems logical because for the implementation of radical inventions in an organization it is necessary to invest significant financial resources. However, it was noted in the sample that many organizations in Serbia implemented inventions without any investment in research and development. It is obvious that these are most often incremental innovations (innovations that aim at small and gradual improvements of products and processes). This information is encouraging because it indicates that companies in Serbia are aware that various types of innovations do not require financial investments. Through these innovations the company can be improved. Due to not-so-great strength of the Serbian economy, many companies face a lack of financial resources needed to invest in research and development. In this regard, the solution to improve innovativeness in Serbian companies should be sought in networks of innovations, i. e. cooperation of several companies in creating innovations, which shares costs, reduces risk, combines complementary knowledge and skills, and speeds up launching products, etc.

The number of meetings per week that the top manager holds with low-level managers and production workers has shown no impact on product and process innovation in companies in Serbia. Theoretically speaking, this factor can encourage innovation, since more frequent meetings of this type can reduce the barrier between employees at different levels of the organization and thus improve mutual communication. This can contribute to greater freedom of employees in creating new ideas and faster flow of information necessary for development and implementation of ideas. However, based on the obtained data, it is obvious that the frequency of meetings does not contribute to the improvement of innovativeness. Namely, the meetings' content themselves is also

important, i. e. the existence of two-way communication, which, in addition to simply issuing orders and reporting on the workflow, would include the exchange of ideas for innovation in products and processes.

The way non-managerial employees are promoted in Serbian companies impacts product innovations, but not on process innovations. Namely, companies where promotions were made solely based on performance and ability and not based on tenure and family connections more often introduce new or improve existing products. Fairness and ethics in employee promotion are a way to create a healthy work environment and greater motivation for employees. Also, employees interested in doing their job successfully are more willing to contribute to the organization by creating and implementing inventions. Based on the research results, promotion in an organization should include criteria regarding the ability to innovate, which would encourage employees to think more often about potential innovations in their work environment.

In the analysed sample of companies, no correlation was found between the companies' industries and their innovativeness. However, the organization's size was found to play a significant role in introducing new products and processes. Namely, it has been found that large organizations in Serbia introduce new products and processes more often than medium and small ones. This information is understandable when we consider that implementing innovations in the development of new products and radical improvement of processes is necessary to have sufficient financial resources and appropriate organizational infrastructure. For that reason, large companies in Serbia have an advantage in terms of the ability to implement product and process inventions.

Conclusion

Factors that contribute to innovativeness in Serbian companies coincide with the theoretical framework in this area. However, there is still room for improvement in the connection of corporate entrepreneurship with strategic management. Namely, the organization with a high level of management maturity aims to create a sustainable and long-term competitive advantage. As pointed out in the paper, innovativeness is one of the main conditions for competitiveness in today's economy. In this regard, creating innovations in an organization must be based on mature management practice, which combines long-term and short-term perspectives, precisely through the definition of strategy, and then through clear goals and performance indicators. Also, it is necessary to free the organizational structure and culture from bureaucratic barriers and simplify the communication between top management and

employees. Special attention needs to be paid to innovation networks, as this can address the lack of resources needed for research and development in Serbian companies.

The research presented in this paper was limited because it relied on a sample and questionnaire previously defined within the World Bank Enterprise Survey. In terms of innovativeness indicators, only product and process innovation were analysed. However, the issue of innovativeness is much more complex and requires a deeper analysis. Future research of this type in Serbia can be expanded and

focused on top management's attitude towards innovation, the existence of organizational infrastructure and human resources necessary for creating innovations, developing new ideas, etc. Additionally, the new survey may include other industries, in addition to those included in this one. Also, research of this type with the use of data from the World Bank Enterprise Survey can be conducted for other countries, which allows mutual comparison of management practices and defines universal conclusions about the impact of individual organizational factors on innovativeness in companies.

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Organizacijski dejavniki inovativnosti v srbskih podjetjih

Izvleček

Ta članek analizira korelacije med več organizacijskimi značilnostmi in inovacijami proizvodov/procesov. Uporabili smo podatke Enterprise Survey Svetovne banke o 339 malih, srednjih in velikih podjetjih iz različnih industrijskih panog. Mnogi analizirani dejavniki v tej študiji so konsistentni s teoretičnimi dognanji iz literature na tem področju in se nanašajo na organizacijsko zrelost. Tudi dejavniki kot npr. velikost podjetja in industrijska panoga, ki ji podjetje pripada, so bili analizirani. Za preverjanje korelacij smo uporabili Hi-kvadrat test in Cramerjev V test. Analiza je pokazala korelacije med inovativnostjo in mnogimi organizacijskimi značilnostmi. V nekaterih primerih, v nasprotju s teoretičnimi dognanji, pa korelacije niso bile potrjene. Ugotovili smo, da na uvedbo novih proizvodov in/ali procesov v podjetje vplivajo oblikovana poslovna strategija, proizvodni cilji, število opazovanih kazalnikov uspešnosti, vzpostavitev sistema upravljanja kakovosti, programi usposabljanja za zaposlene s polnim delovnim časom, enostavnost doseganja proizvodnih ciljev podjetja, raven ozaveščenosti menedžmenta in zaposlenih o proizvodnih ciljih podjetja, poraba za aktivnosti raziskav in razvoja v podjetju in za pridobitev znanja iz okolja podjetja, način promocije zaposlenih, ki niso menedžerji, časovno obdobje proizvodnih ciljev podjetja, velikost podjetja in ključni trg.

Ključne besede: inovativnost, korporativno podjetništvo, korelacijska analiza, organizacijske značilnosti, Srbija

Sustainable Transport of Goods Using Combined Transport Solutions: The Case of EU

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Abstract

This paper analyzes the importance of bimodal solutions in the rail-road transport of goods with an emphasis on the aspect of ecology within the geographical region of EU-28. Using the panel regression analysis in the period from 2010 to 2019, we are trying to confirm the dependence between the road and rail transport of goods by applying several freight units' measures: the freight transport performance in tonne-kilometres, the freight transport performance in tonne-kilometres per thousand of USD, and the amount of goods transported in thousands of tonnes. The application of data to all selected freight units' measures in the regression models confirms a relationship between road and rail transport. A direct relationship between these two modes of transport confirms the complementarity effect, which means that, in most cases, the goods transport solutions require the combination of road and rail mode, where the railway should be considered as the main transport/carrier, the road transport, however, should have the role of short pre-transport or post-transport. The ecological aspect of such bimodal solutions can also be emphasized since the railway transport is considered as an ecological mode.

Keywords: bimodality, combined transport of goods, ecology, European Union

Introduction

The main objective of state transport policies (Banister, 2018) is to reduce or to eliminate the environmental burden and damage for public health, caused by road freight transport, supporting the most ecological transport modes, such as the railways and inland waterways, which can be used as carriers in combined transport operations (Široký, Schröder & Gašparík, 2017). This objective is also identified within the European Union's White Paper – Roadmap to a Single European Transport Area – Towards a competitive and resource-efficient transport system. By 2030, 30% of the road freight over 300 km (Carboni & Dalla Chiara, 2018) should shift to other modes, such as rail or waterborne transport (Široký, Schröder & Gašparík, 2017). The combined transport would be ineffective in the short haulages (Carboni & Dalla Chiara, 2018) - the loading to be completed requires a certain amount of time.

The analysis in Table 1 is based on strengths and weaknesses of the transport modalities, such as road and rail. These two transportation modes can be characterized

ORIGINAL SCIENTIFIC PAPER

RECEIVED: JUNE 2020

REVISED: FEBRUARY 2021

ACCEPTED: APRIL 2021

DOI: 10.2478/ngoe-2021-0010

UDK: 656:502.131.1(4-6EU)

JEL: M21, R40, Q56

Citation: Minárik, M. (2021). Sustainable Transport of Goods Using Combined Transport Solutions: The Case of EU. *Naše gospodarstvo/Our Economy*, 67(2), 29-39. DOI: 10.2478/ngoe-2021-0010

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NAŠE GOSPODARSTVO
OUR ECONOMY

Vol. 67 | No. 2 | 2021

pp. 29 – 39

Table 1. Strengths and weaknesses of road and rail transport modes

Road transport	
Strength	Weaknesses
Irreplaceable for very short distances	Limited capacity
Irreplaceable in logistics	Unreliable in time
Flexible	Dependent on traffic disorders
Possible time and cost savings at medium distances	Environmental problems
Addressing responsibility	Dependent on the weather
Free pricing	Problems in custom transit regime
Railway transport	
Strength	Weaknesses
Possible time and cost savings at medium and long distances	Less flexibility
More capacity and diverse fleet	Lower operability
Exact timetables	Problems with logistics
The possibility to achieve higher speeds	Problems with modern forms of business
Save and relatively trouble-free	Lower price flexibility
Easy border crossing and transit	High investments
Joint responsibility of the participating railways	
Environmentally friendly	

Source: Hansenová (2007), Furdová and Hansenová (2013)

by the issues of transportation costs, transit time, delay percentage, frequency and free time (Kurtuluş & Bilge Çetin, 2020). The authors of these five concepts prepared a tailor-made investigation for the Turkish transport sector concerning the modal shift. The result of these intermodal rail-road transport solutions is the doubling of the train frequency and the 50% reduction of the transit time, depending on the increased frequency. According to Hansenová (2007) and Furdová and Hansenová (2013), road transport is one of the most challenging transportation mode concerning environmental problems, encompassing CO2 emissions, carbon footprint, etc.

Intermodal solutions, where rail transport is a carrier, embody transport of accompanied (e. g. trucks, trailers and tractors with their drivers) and unaccompanied (e. g. TEU, FEU and other types of containers, swap bodies and semitrailers without their drivers) intermodal transport units, using trains (UNECE, 2018). The intermodal transport units are well-known as loading units in combined transport, defined as objects of transshipment while protecting the goods to be transported (e. g. containers, which can be transported across all transport modes) (INTERREG, 2020). Among the advantages of the use of these type of loading units are economic viability, easy handling, and transshipment, using several types of technology (e. g. rolling Motorway – RoLa,

Roll-on Roll-Off – RoRo, Cargo Beamer, Modalohr or MegaSwingTMDuo), beneficial utilization of space, easier storage, better options for gathering information, statistics and accounting can be underlined (INTERREG, 2020).

During the last ten years (2009-2018), multimodal transport within EU-28 countries has recorded a decline in freight volume relative to GDP. According to Eurostat (2020), the volume of freight multimodal transport relative to GDP in 2018 reached only 96% compared to the reference year 2010 with a volume of 100%. The most significant decline in the importance of multimodal freight transport can be observed in Estonia (with 47.5% in 2018, compared to 100% in 2010), Malta (62.8% in 2018) and Ireland (66.6% in 2018). Conversely, the largest increase can be observed in the case of Slovenia (118.4% in 2018, compared to 100% in 2010), Czech Republic (109.7% in 2018) and Croatia (103.7% in 2018). The smallest changes or the greatest stability in terms of volume of freight multimodal transport relative to GDP for the period 2009-2018 can be observed in Lithuania, Belgium, Poland and Spain. Considering the growth of GDP in current prices in euros per capita for the EU-28 countries for the period 2009-2018 (from 24 050 EUR to 30 170 EUR), we are convinced that there can be no question of a decline in the importance of multimodal transport. If the volume of freight multimodal transport was expressed

in absolute values, an increase in the transported volume would be recorded.

Focusing on the rail - road intermodal combined transport, there are some characteristic features and data for the EU-28 countries (UIRR, 2020). Rail freight transport has a relatively high market share in North-Eastern Europe, where it gains more than 25% of the share of the total modal split. The Western countries like France, United Kingdom or Spain struggle with shifting from road to rail, and the rail freight transport has a relatively low market share, gaining less than 12% of the share of the total modal split. The market share of the road freight transport is around 74% within the EU-28 countries. Almost half (48.15%) of all road transport services are less than 300 km long, which is another evidence of its effectiveness on the short haulages (Rail Freight, 2019).

Rail freight corridors within the EU-28 countries come out of the European rail transport routes, based on the EU Regulation 913/2010. The principal objective of adopting this regulation was to optimise the use of the densely used European rail network. The five most important intermodal freight lanes in the EU-28 countries are Germany - Italy, Germany - Netherlands, Germany – Czech Republic, Belgium - Italy and Czech Republic – Slovakia (UNECE, 2018).

Slovenia, situated along the Mediterranean and the Baltic Adriatic transport corridors, needs to establish a framework for intermodal transport to ensure effective logistic chains, developing new railway infrastructure at the nodes with other transport modes. These attempts encompass for example the modernization of the port of Koper, railway lines for the leg between Koper and Divača with several tunnels and bridges, as the most expensive investments within this project.

Theoretical Backgrounds

This paper studies the mutual relationship among the transport modes in the form of a regression analysis, whose outcomes should be a model or models, justifying the significance of the sustainable rail-road combined transport solutions (Matthias et al., 2020). The geographical focus of the study is limited to the EU-28 countries. There are more approaches to the topic of the combined transport, e. g. the definition of IRU (2020): „Combined transport refers to the carriage of goods from one place to another using different means of transport: road for the first and last leg of the journey and rail or water for the rest.“

The United Nations Economic Commission for Europe (2020) defines the combined transport as „intermodal transport where the major part of the European journey is by rail,

inland waterways or sea and any initial or final legs carried out by road are as short as possible.“ Intermodal transport of goods and the high quality of transport infrastructure are crucial aspects of the comparative advantage for logistics (Park, 2020).

Rail-road combined transport is generally considered as an appropriate solution aiming the reduction of externalities with no negative impact on mobility, but its main problem use to be the lack of adequate infrastructure, leading to high costs for operators (Cavallaro et al., 2021). An example of such operators is CTO – combined transport operators which operate within terminals of intermodal transport. The terminals form a crucial part of the whole intermodal chain because they have a high impact on the competitiveness of this kind of transport solutions (Mathisen & Hanssen, 2014) comparing to no combined transport. The rail transport operates between intermodal terminals. The bimodal rail-road combined transport is a solution for a single rail transport that comprises problems, like less flexibility in accessing terminals from the origin area (e. g. factories) and accessing the destination area (e. g. factories) from terminals (Bierwirth et al., 2014). This accessibility of the bimodal solution is due to the flexible road transport component that is related to the short pre- and post- transportation. The whole process within a bimodal transport solution has a common basis with the intermodal transport units, such as containers, swap bodies and semitrailers. These units are taken by road transport mode to the departing terminal of intermodal transport, transported by rail transport mode to a destination terminal of intermodal transport. They can then continue their journey once again using the road transport mode (UNECE, 2018).

The European Union (European Commission, 2020) regulates the combined transport through the Combined Transport (CT) Directive (Council Directive 92/106/EEC). This regulation aims to develop combined transport operations by reducing authorisation procedures and quantitative restrictions for the combined transport operations and provide financial supports in the form of fiscal incentives for these operations. Combined transport in Europe is dynamically developing and this development from the transport and the environmental policy point of view represents the main points of the EU's strategy. This system for sustainable transport of goods is strongly supported at the level of EU (UIRR, 2020) with more measures which UIRR (2020) define as „the elaboration and preservation of framework conditions to ensure it fair access to the transport market.“

Because of the previously described facts, we will try to confirm our ideas of the existence of the ecological combined transport operations. The outcomes for this research are based on our previous research dedicated to the topic of

Multimodal Transport of Dangerous Goods and its Impact on the Ecology. It deals with the idea that the ecological aspect of transport is very clear in the transport of dangerous goods (Minárik, 2019). The internet web of Green Modal Transport (2019) emphasizes some facts that are considered as advantages of a modal transfer: environmental, economic and social benefits, reduction of greenhouse gas emissions, sustainable development, reduction of negative impacts on sensitive ecological areas, lesser consumption of non-renewable resources, fuel costs and in general operating costs savings (Hanssen & Mathisen, 2011), lower impact of the road transport taxes mainly in Germany and France. According to some authors (Forckenbrock, 2001), the external cost of an intermodal train per tonne-km is only 28% of the external cost of a general freight truck. However, it is verified that intermodal transportation is a profitable alternative to long-distance road transportation (Bierwirth et al., 2014).

Methodology

The main objective of this article is to analyze the importance of a bimodal rail-road solution in the transport of goods (Bierwirth et al., 2014) with an emphasis on the aspect of ecology within the geographical region of EU-28 countries over the past 10 years, starting with 2010 and finishing with 2019 (the last data available) The objective was achieved by verifying the hypothesis, which was formulated as follows:

H1: The transport of goods in the EU-28 countries is being realized in environmentally friendly combined transport solutions (the combination of the road and railway transport mode), where the road transport depends on railway transport.

The dependence of road transport on railway transport is analyzed based on different units of measure, which are stated below. The research has geographical limitations for the EU-28 member states (including the United Kingdom). All data come from the OECD (2021) and Eurostat databases (2018, 2020). The analysis proceeds in the form of three regression models. The first model – Pooled OLS analyzes the dependence between the freight transport performance in million of tonne-kilometers of road and rail transport modes. The second model – Fixed-effects analyzes the dependence between the freight transport performance in tonne-kilometers per one thousand units of current USD GDP of road and rail transport modes and the third model – Random-effects analyzes the dependence between the amount of goods in thousand of tonnes transported by road and rail transport modes. The panel regression analysis made in the Gretl statistical program, in all three cases, consists of the independent variables for the rail transport (within the period of 2010 - 2019) and of the

dependent variable for the road transport (within the period of 2010 - 2019). The main idea was to identify a possible relationship between the road transport (the road transport is considered as short pre- and post-transports) and rail transport which is considered as a carrier (Rail Freight, 2019).

The existence of a possible direct relationship between these two modes of transport should confirm the complementarity effect, which means that, in most cases, the goods transport solutions require the combination of road and the rail mode. In other words, it could confirm that road transport plays an important role in the pre-transport or post-transport operations within combined transport solutions. The existence of a possible indirect relationship between these two modes of transport should confirm the substitutional effect, which means that, in most cases, the goods transport solutions do not require the combination of road and rail mode and the transport is realized in unimodal road transport substituting the rail transport solution or in unimodal rail transport substituting the road transport solution. There are three cases of the resulting linear regression models, which have the forms set by the equations:

$$\text{Pooled OLS model: } y_{it} = \alpha + \beta_1 x_{it1} + \beta_2 x_{it2} + \dots + \beta_k x_{itk} + u_{it} \quad (1)$$

$$\text{Fixed-effects model: } y_{it} = \alpha_i + \beta_1 x_{it1} + \beta_2 x_{it2} + \dots + \beta_k x_{itk} + u_{it} \quad (2)$$

$$\text{Random-effects model: } y_{it} = \beta_1 x_{it1} + \beta_2 x_{it2} + \dots + \beta_k x_{itk} + (\alpha_i + \epsilon_i) u_{it} \quad (3)$$

Results and Discussion

We start our research by creating the regression model of dependence of the road freight transport performance in millions of tonne-kilometers on the rail freight transport performance in million of tonne-kilometers. The Pooled OLS model (table 2) was selected in this first phase of the research.

The regression analysis was completed with the following tests: test for normality of residual; Null hypothesis: error is normally distributed. Test statistic: Chi-square(2) = 2.6301, with p-value = 0.268461.

White's test for heteroskedasticity; Null hypothesis: heteroskedasticity not present. Test statistic: LM = 1.38581, with p-value = P(Chi-square(2) > 1.38581) = 0.500122. Since Chi-square(2) = 5.99146 (5.99146 > 1.38581). It allows us to claim, that the model meets the condition of homoskedasticity.

Table 2. Pooled OLS model

	Coefficient	Std. Error	t-ratio	p-value	
Const	9.88293	0.0572208	172.7	<0.0001	***
Rail_million_Tkm	3.26897e-05	2.38055e-06	13.73	<0.0001	***
Mean dependent var	10.42012	S.D. dependent var			1.227081
Sum squared resid	222.6795	S.E. of regression			0.949493
R-squared	0.403676	Adjusted R-squared			0.401262
F(1, 27)	188.5679	P-value(F)			1.07e-13
Log-likelihood	-339.4066	Akaike criterion			682.8132
Schwarz criterion	689.8481	Hannan-Quinn			685.6449
Rho	-0.101485	Durbin-Watson			1.820700

Notes: using 249 observations, included 28 cross-sectional units, time-series length: minimum 6, maximum 10, dependent variable: l_Road_million_Tkm, Robust (HAC) standard errors

Source: Own processing based on the data of OECD (2021) within the analyzed period 2010-2019 using Gretl statistical program

Wooldridge test for autocorrelation in panel data: Null hypothesis: No first-order autocorrelation (rho = 0). Test statistic: t(27) = -1.89159, with p-value = P(|t| > 1.89159) = 0.0693175. Autocorrelation is not presented in the model.

We proceeded diagnostics: using n = 28 cross-sectional units for Fixed-effects estimator, allows for differing intercepts by cross-sectional unit. Joint significance of differing group means: F(27, 220) = 1.23498 with p-value 0.204706. A low p-value counts against the null hypothesis that the pooled OLS model is adequate, favouring the Fixed-effects alternative. This assignment allows us to affirm that the pooled OLS model is not inadequate.

The Hausman test statistic: H = 22.8979 with p-value = prob(chi-square(1) > 22.8979) = 1.70837e-006. A low p-value counts against the null hypothesis that the Random-effects model is consistent, in favor of the Fixed-effects model. This tests confirms that we could proceed the regression using the Fixed-effects model. The main problem, which impeded the application of this estimator was the presence of autocorrelation.

The model from table 2 can have the following interpretation: if the rail transport performance in millions of tonne-kilometers (the variable of Rail_million_Tkm) is increased by 10 millions (within the analyzed period from 2010 to 2019), the road transport performance (the variable l_Road_million_Tkm) would increase by 0.22 % within the analyzed 10 years period starting with 2010 and finishing with 2019. The claim is valid for the analyzed EU-28 countries. The following table 3 depicts the summary statistics for the analyzed variables.

We also processed the testing of hypothesis for the variable Rail_million_Tkm: H₀: β₁=0, H₁: β₁≠0, | (0.0220261466 - 0) / 0.0059007935 | > 2.052; 3.73274 > 2.052. We reject H₀ and claim that the coefficient for the variable Rail_million_Tkm is statistically significant, it means that the rail transport performance in Tkm affects the road transport performance in Tkm.

The model as a whole was also verified for the statistical significance at the level of significance α = 0.1 by the following: H₀ means that the model is not statistically significant, H₁ means that the model is statistically significant. The critical value of F_{0,1} (1,27) = 4.21001; the calculated F value of the statistics from our model is 188.5679. Since 188.5679 > 4.21001, we reject the null hypothesis H₀. At the same time, the p-value from our calculations confirms the rejection of the null hypothesis and the acceptance of the alternative hypothesis H₁.

We focused on the coefficient of determination, which reaches R² = 0.403676. It can be said that the regression model with independent variable x₁₁ (Rail transport performance in Tkm within the analyzed 10 years period) explains 40.37 % of the variability of dependent variable ŷ_i (road transport performance in Tkm-total goods). The remaining 59.63 % of the variability of this variable is due to factors not included in the regression model and random effects. The linear regression model of dependence of road transport performance on the rail transport performance in Tkm is statistically significant.

We enrich our previous research with the regression analysis related to the relationship between road and rail transport assessed by fixed-effects model (table 4).

Table 3. Summary statistics

Variable	Mean	Median	Minimum	Maximum
L_Road_million_Tkm	10.428	10.396	7.5224	12.887
Rail_million_Tkm	16433	9722.0	72.000	1.3120e+005
Variable	Std. Dev.	C.V.	Skewness	Ex. kurtosis
L_Road_million_Tkm	1.2119	0.11621	0.031694	-0.25132
Rail_million_Tkm	23850	1.4513	3.2144	10.944
Variable	5% Perc.	95% Perc.	IQ range	Missing obs.
L_Road_million_Tkm	8.6612	12.631	1.3014	22
Rail_million_Tkm	204.22	54691	16790	31

Notes: using the observations 1:01 - 28:10, (missing values were skipped)
Source: Own processing based on the data of OECD (2021) within the analyzed period 2010-2019 using Gretl statistical program

The regression analysis was completed with the following tests: Test for normality of residual - Null hypothesis: error is normally distributed. Test statistic: Chi-square(2) = 14.6357 with p-value = 0.000663587.

Joint test on named regressors - Test statistic: $F(1, 217) = 158.662$, with p-value = $P(F(1, 217) > 158.662) = 1.14322e-027$.

Test for differing group intercepts - Null hypothesis: The groups have a common intercept. Test statistic: $F(27, 217) = 0.48876$, with p-value = $P(F(27, 217) > 0.48876) = 0.985375$

Distribution free Wald test for heteroscedasticity - Null hypothesis: the units have a common error variance. Asymptotic test statistic: Chi-square(28) = 30.5376 with p-value = 0.337992. It allows us to claim that the model meets the condition of homoskedasticity.

Table 4. Fixed-effects model

	Coefficient	Std. Error	t-ratio	p-value	
Const	3.73893	0.0996981	37.50	<0,0001	***
L_Rail_Tkm_per_1000_Units_of_Current_USD_GDP	0.343566	0.0272756	12.60	<0,0001	***
Mean dependent var	4.870255	S.D. dependent var			0.868104
Sum squared resid	99.97969	S.E. of regression			0.678775
LSDV R-squared	0.458495	Within R-squared			0.422352
LSDV F(28, 217)	6.561959	P-value(F)			5.95e-17
Log-likelihood	-238.3141	Akaike criterion			534.6281
Schwarz criterion	636.2827	Hannan-Quinn			575.5597
Rho	-0.079486	Durbin-Watson			1.801568

Notes: using 246 observations, included 28 cross-sectional units, time-series length: minimum 6, maximum 10, dependent variable: L_Road_Tkm_per_1000_Units_of_Current_USD_GDP
Source: Own processing based on the data of OECD (2021) within the analyzed period 2010-2019 using Gretl statistical program

model is consistent in favor of the Fixed-effects model.

The model from table 4 can have the following interpretation: if the rail transport performance (the variable of L_Rail_Tkm_per_1000_Units_of_Current_GDP) is increased by 10 % (within the analyzed period from 2010 to 2019), the road transport performance (the variable L_Road_Tkm_per_1000_Unit_of_Current_USD_GDP) would increase by 0.79 % within the analyzed 10 years period starting with 2010 and finishing with 2019. The claim is valid for the analyzed EU-28 countries. The following table 5 depicts the summary statistics for the analyzed variables.

We also processed the testing of hypothesis for the variable Rail_Tkm_per_1000_Units_of_Current_USD_GDP: $H_0: \beta_1=0, H_1: \beta_1 \neq 0, |(0.343566 - 0) / 0.0272756| > 1.970; 12.60 > 1.970$. We reject H_0 and claim that the coefficient for the variable Rail_Tkm_per_1000_Units_of_Current_USD_GDP is statistically significant, it means that the rail transport performance affects the road transport performance.

The model as a whole was also verified for the statistical significance at the level of significance $\alpha = 0.1$ by the following way: H_0 means that the model is not statistically significant, H_1 means that the model is statistically significant.

Table 5. Summary statistics

Variable	Mean	Median	Minimum	Maximum
L_Road_Tkm_per_1000_Units_of_Current_USD_GDP	4,8503	4,6974	3,4062	6,8872
L_Rail_Tkm_per_1000_Units_of_Current_USD_GDP	3,2894	3,7014	-1,6861	6,6542
Variable	Std. Dev.	C.V.	Skewness	Ex. kurtosis
L_Road_Tkm_per_1000_Units_of_Current_USD_GDP	0,86109	0,17753	0,39343	-0,95530
L_Rail_Tkm_per_1000_Units_of_Current_USD_GDP	1,6650	0,50618	-0,59990	0,44507
Variable	5% Perc.	95% Perc.	IQ range	Missing obs.
L_Road_Tkm_per_1000_Units_of_Current_USD_GDP	3,6611	6,3665	1,4208	25
L_Rail_Tkm_per_1000_Units_of_Current_USD_GDP	0,16493	5,8402	2,2197	33

Notes: using the observations 1:01 - 28:10, (missing values were skipped)
Source: Own processing based on the data of OECD (2021) within the analyzed period 2010-2019 using Gretl statistical program

110.301, with p-value = 1.11818e-024. 'Between' variance = 0. 'Within' variance = 2.10935e+011, mean theta = 0.

Joint test on named regressors - Asymptotic test statistic: Chi-square(1) = 399.874, with p-value = 5.86553e-089.

Breusch-Pagan test - Null hypothesis: Variance of the unit-specific error = 0. Asymptotic test statistic: Chi-square(1) = 6.34814, with p-value = 0.0117504.

The critical value of $F_{0.1}(28, 217) = 1.52834$; the calculated F value of the statistics from our model is 6.561959. Since $6.561959 > 1.52834$, we reject the null hypothesis H_0 . At the same time, the p-value from our calculations confirms the rejection of the null hypothesis and the acceptance of the alternative hypothesis H_1 .

We focused on the coefficient of determination, too. It reaches $R^2 = 0.458495$. It can be said that the regression model with independent variable x_{i1} (Rail transport performance within the analyzed ten years period) explains 45.85% of the variability of dependent variable \hat{y}_i (road transport performance). The remaining 54.15% of the variability of this variable is due to factors not included in the regression model and Random-effects. The linear regression model of dependence of road transport performance on the rail transport performance is statistically significant.

We enrich our previous research with the regression analysis on the relationship between the amount of goods in thousands of tonnes transported by road and by railways (table 6).

The regression analysis was completed with the following tests: Test for normality of residual - Null hypothesis: error is normally distributed. Test statistic: Chi-square(2) =

Wooldridge test for autocorrelation in panel data - Null hypothesis: No first-order autocorrelation ($\rho = -0.5$). Test statistic: $F(1, 22) = 0.0348655$, with p-value = $P(F(1, 22) > 0.0348655) = 0.853589$. Autocorrelation is not presented in the model.

The model meets the condition of homoskedasticity due to the application of the robust standard errors when creating the model in Gretl statistical program.

Table 6. Random-effects model (GLS)

	Coefficient	Std. Error	z	p-value	
Const	3.73893	0.0996981	37.50	<0,0001	***
Rail_Tonnes	7,26760	0,363437	20,00	5,87e-089	***
Mean dependent var	556570,5	S.D. dependent var			714042,4
Sum squared resid	3,34e+13	S.E. of regression			435836,4
Log-likelihood	-2549,000	Akaike criterion			5101,999
Schwarz criterion	5108,352	Hannan-Quinn			5104,576
Rho	-0,120817	Durbin-Watson			1,410255

Notes: using 177 observations, Included 28 cross-sectional units, time-series length: minimum 3, maximum 8, dependent variable: Road_Tonnes. Robust (HAC) standard errors
 Source: Own processing based on the data of OECD (2021) within the analyzed period 2010-2019 using Gretl statistical program

Before we made a decision for the Random-effects estimator, the following diagnostics was proceeded. Joint significance of differing group means: $F(27, 148) = 0.388642$ with p-value 0.997289. A low p-value counts against the null hypothesis that the pooled OLS model is adequate, favouring the Fixed-effects alternative. This assignment allowed us to affirm that the pooled OLS model was not inadequate, but due to the presence of heteroskedasticity, we could not apply this estimator. The test does not say that we would not be allowed to proceed our analysis using Random or Fixed effects estimators. To decide which estimator select out of these two, we proceeded the Hausman test statistic: $H = 0.587649$ with p-value = $\text{prob}(\text{chi-square}(1) > 0.587649) = 0.44333$. A low p-value counts against the null hypothesis that the Random-effects model is consistent, favouring the Fixed-effects model. It means that the Random-effects model is not inadequate in our case.

The model from table 6 can have the following interpretation: if the amount of goods transported by railways (the variable of Rail_Tonnes) is increased by 1000 tonnes (within the analyzed period from 2010 to 2019), the amount of goods transported by road (the variable Road_Tonnes) would increase by 7270 tonnes within the analyzed ten years period starting with 2010 and finishing with 2019. The claim is valid for the analyzed EU-28 countries. The table 7 depicts the summary statistics for the analyzed variables.

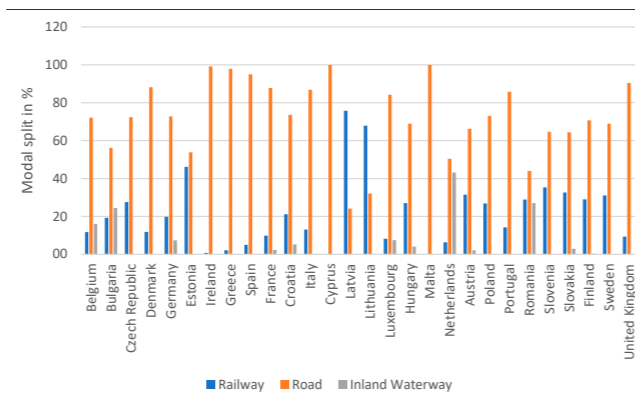
Based on the p-value of individual regression coefficients, we argue that the linear regression model of dependence of the amount of goods transported by road on the amount of goods transported by railway is statistically significant.

Figure 1 displays the transport performance of the railway, road and inland waterway transport of goods as a percentage of total transport performance within the EU-28 countries. The importance of the combined transport solutions, in

which road transport and the railway and/or inland waterway transport modalities are also enhanced from the ecological point of view. The most dominant position in almost all of these countries has the road transport with a small exception of only two countries – Latvia and Lithuania, where the most dominant position has the railway transport of goods in Tkm. Table 8 compares the average utilization of freight transport vehicles in tonnes within the EU-28 countries.

The calculations are made as a ratio between the measures of millions of vehicle-kilometers and millions of tonne-kilometers. The most utilized road transport vehicles are in Finland, Estonia, Bulgaria, Sweden, Lithuania, Spain, and Slovenia. The less utilized ones are in the United Kingdom, Ireland, and Slovakia.

Figure 1. Transport performance according to transport modes



Source: Own processing based on the data of Eurostat (2018) using MS Excel

Table 7. Summary statistics

Variable	Mean	Median	Minimum	Maximum
Road_Tonnes	5.3593e+005	2.1611e+005	14402.	3.2082e+006
Rail_Tonnes	63687	47358	540.00	3.7474e+005
Variable	Std. Dev.	C.V.	Skewness	Ex. kurtosis
Road_Tonnes	7.0462e+005	1.3148	2.0313	3.8721
Rail_Tonnes	77825	1.2220	2.5878	6.9194
Variable	5% Perc.	95% Perc.	IQ range	Missing obs.
Road_Tonnes	29139	2.0041e+006	5.5418e+005	11
Rail_Tonnes	1373.0	2.3420e+005	71501	103

Notes: using the observations 1:01 - 28:10, (missing values were skipped)
 Source: Own processing based on the data of OECD (2021) within the analyzed period 2010-2019 using Gretl statistical program

Table 8. Average utilization of freight transport vehicle in tonnes across the EU-28 countries

Country	Tonnes per vehicle	Country	Tonnes per vehicle
Belgium	N/A	Croatia	15,38976857
Bulgaria	16,43292683	Italy	15,76811411
Czech Republic	11,41550862	Cyprus	12,56338028
Denmark	11,27669173	Latvia	15,83632524
Germany	13,29801436	Lithuania	16,3258427
Estonia	16,45299145	Luxembourg	15,88785047
Ireland	11,24031008	Hungary	14,27153065
Greece	N/A	Netherlands	12,66568591
Spain	16,14497061	Austria	14,62145289
France	12,32733608	Poland	N/A
Portugal	14,95598911	Finland	17,47533909
Romania	14,62105001	Sweden	16,38206481
Slovenia	16,08176556	United Kingdom	10,23191667

Source: Own processing based on the data of Eurostat (2018) using MS Excel

Conclusion

The main objective of this paper was to analyze the importance of bimodal combined solutions in the rail-road transport of goods with an emphasis on the aspect of ecology within the geographical region of EU-28 countries. This objective was achieved by an in-depth analysis of panel data over the ten years period 2010 - 2019 from OECD and Eurostat, which deal with the freight transport performance in tonne-kilometers, the freight transport performance in tonne-kilometers per one thousand units of current USD GDP and the amount of goods transported in thousands of tonnes,

all three for the rail and road transport modalities. Within this analysis, a direct relationships between the freight road and rail transport performance in Tkm, between the freight road and rail transport performance in tonne-kilometers per one thousand units of current USD GDP and between the amount of goods in thousand of tonnes transported by road and rail transport modes were confirmed. These dependencies have three linear regression models that allow us to accept the following hypothesis: The transport of goods in the EU-28 countries is being realized in environmentally friendly combined transport solutions (the combination of the road and railway transport mode).

The existence of these three separate models (Pooled OLS, Fixed-effects and Random-effects) allows us to argue that our hypothesis is confirmed from different points of view represented by the OECD and Eurostat data. In other words, there is a preference of the combined road transport as a short pre- and/or post-transport with predominantly the railway transport as a main carrier within the intermodal solutions.

Our further research will focus on freight rail-road combined transport in the modern logistic systems using the same sample of EU-28 countries within the same period of the last decade. We will consider the case of Switzerland's piggy-backing in the rail-road intermodal transport as a sustainable pattern (UNECE, 2018).

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Acknowledgment

This paper is a part of research projects VEGA n.1/0420/19 and VEGA n. 1/0039/20.

Trajnostni transport blaga z uporabo rešitev kombiniranega transporta

Izvleček

Ta članek analizira pomen bimodalnih rešitev v železniško-cestnem transportu blaga s poudarkom na ekološkem vidiku znotraj geografske regije EU-28. Z uporabo panelne regresije podatkov za obdobje od 2010 do 2019 poskušamo potrditi odvisnost med cestnim in železniškim transportom blaga z uporabo več meril tovornih enot: uspešnost tovornega transporta v tonskih kilometrih, uspešnost tovornega transporta v tonskih kilometrih na tisoč USD in količina prevoženega blaga v tisočih tonah. Aplikacija podatkov na vsa izbrana merila tovornih enot v regresijskem modelu potrjuje povezavo med cestnim in železniškim transportom. Neposredna povezava med tema dvema oblikama transporta potrjuje učinek komplementarnosti, ki pomeni, da v večini primerov rešitve transporta blaga zahtevajo kombinacijo prevoznih sredstev po cesti in železnici, pri čemer je treba obravnavati železnico kot glavno transportno sredstvo, cestni transport pa mora imeti vlogo kratkega pretovora ali premeščanja. Ker je železniški transport mogoče obravnavati kot okolju prijazen, so takšne bimodalne rešitve pomembne tudi z ekološkega vidika.

Ključne besede: bimodalnost, kombinirani transport blaga, ekologija, Evropska unija

ORIGINAL SCIENTIFIC PAPER

RECEIVED: JANUARY 2021

REVISED: MAY 2021

ACCEPTED: MAY 2021

DOI: 10.2478/ngoe-2021-0011

UDK: 331.5-053.9(497.4)

JEL: M50

Citation: Ovin, R., Divjak, M., Veingerl Čič, Ž., & Maček, A. (2021). Elderly Population and Labour Market Stabilization in Europe – The Case of Slovenia. *Naše gospodarstvo/Our Economy*, 67(2), 40-48. DOI: 10.2478/ngoe-2021-0011

Elderly Population and Labour Market Stabilization in Europe - The Case of Slovenia

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Abstract

The growing share of the retired population in Europe worsens the balance of the social costs as social consensus in most European countries rests on extensive social transfers for this population group. With its 25% share in GDP and 50% share in social transfers, the European (continental) model is indeed not sustainable when compared globally. The current prevailing model of "rejuvenation" of the labour market through immigration did not prove as a sustainable solution. The same is valid for the perspective of fast technological change. It is based on filling the labour market with low-paid jobs enabling host economies to leave aside the imperative permanent change in the labour market structure. This paper discusses the case of Slovenia and tries to search the reasons for the absence of elderly population in the labour market in this country. Based on the data comparison and disposable studies, authors try to identify the main issues when endeavouring to keep elderly population in the labour market.

Keywords: elderly population economic activity, labour market, HRM gap in Slovenia

Introduction

We will briefly expose main facts defining labour market's environment to introduce the background of the Slovenian labour market issues related to population ageing, discussed in the first two chapters of this paper. Therefore, after briefly describing the essential developments on the German labour market we will broaden the discussion to the consequences of ageing population for the European labour market. Afterward we will discuss the developments and practice, proving the

importance of leadership development in Slovenia to catch up with its EU partners in this field.

Unlike after World War I (WW I), when the winning powers impoverished Germany with their reparations' requests, the winning states changed the style after World War II. Except from the Soviet Union that again implemented this practice in the German Democratic Republic (GDR), the other occupation powers had focused on including Germany in the reconstruction of Europe. In the years after Germany's capitulation, two big projects initiated by the USA supported the Germany's fast path of reconstruction: the inclusion of Germany in the Marshall Plan and the Dodge-Goldsmith-Colm plan (Clay 1950, p. 209), which resulted in the introduction of „Deutsche Mark“. The later has abruptly changed the economic landscape of Germany, at the same time bringing all disposable factors on the market. A successful reconstruction campaign also caused a huge need for labour. The highly problematic big refugees flow from Soviet occupation zone and expatriated German nationals from Eastern European countries – in the period between 1944 – 1950 their number is estimated between 12 million (Statistisches Bundesamt, 1958) and 14.6 million (Federal Ministry for Expellees, Refugees and War Victims, 1967) – also supplied highly needed workforce.

With fast-growing economy needs for labour force, this push on the labour market has already, after ten years of peace turned into a German government's labour pull policy. So, after mid 50's the international invitation contracts (Anwerbeverträge) were closed with Italy (1955), Spain, Greece (1960), Turkey (1961), Morocco (1963), Portugal (1964), Tunisia (1965), Yugoslavia (1967) – (BPB 2012). Following them, up to now, additional new push processes have been founded – all of them based on widespread information on German governments' labour market and social transfer policies as well as enabled through general development of transport and information technologies. This formed an attractive option for people facing disturbances and insecurities in less developed countries, thus stimulating them to migrate to Germany. Here we firstly mean the labour leaving the former GDR after 1989 unification, as mismanaged and obsolete East German state and economy could not offer them economic and political freedom. Similar were the consequences of the war in Yugoslavia (1991 – 2001) and especially the war in Syria (after 2011). One should additionally consider the free labour movement within the EU, bringing additional labour force flow to Germany.

Such developments quite changed the German demographic landscape (see Statistisches Bundesamt, 2016; Statista 2019). So, from 1964 when Germany employed 1 million foreign workers, their number in 2013 grew to 4 million. As demography is concerned, that meant 16 million people

with migration background, which represented 19.7% of the entire population. One would expect that such developments would, at the same time, mean the rejuvenation of the labour force through migrations. However, the figures tell a different story. According to Eurostat (2017), in the year 2016 the share of the population aged 65+ in Germany reached 21.1%, which placed this country only second after Italy (22.0%). The EU average amounted 19.2%.

It seems, however, that the need for labour on the German labour market remains strong since despite the reservations presented above, introduced in January 2020 and valid since March 2020, is a new law on skilled labour force immigration – *Fachkräfte-ein-wanderungs-gesetz* (Deutscher Bundestag, 2020). Focusing on skilled labour is selective; however, it continues with the dependence of German labour market on the foreign workforce.

Brief Literature Review

Despite hurdles felt with elderly workforce participation, such as generally fast technology changes, since 1990's elderly workforce participation in the OECD labour markets is constantly developing. This is the consequence of improvements achieved by higher inclusion in education and labour market policies bringing in tax benefits and pension reforms, combined with urbanization and growth of the service sector (Grigoli et al., 2021). These developments may also be supported by the elderly workforce's decisions to change jobs in the years preceding their retirement, aiming to achieve easier working conditions (Hurd, 1996).

Lower performance, difficulties in adapting to the changing working environment and new conditions, especially automation (Grigoli et al., 2021), together with the poor motivation for permanent education are typical push factors that prevent stronger elderly workforce participation in the labour market (Krajnakova & Vojtovič 2017, 325). Here also typical hurdles felt in a workplace is present, in the form of "age discrimination, based on stereotypes and myths about the limitations of older workers", as discussed in Radović – Marković (2013). However, the fact is that average ageing of the workforce has a negative effect on labour productivity and total factor productivity, as shown in Aiyar et al. (2016) study.

Using the data collected in the longitudinal Survey on Health and Ageing in Europe (SHARE study) with the sample of 11,462 participants in the age of 50–64 years, Alavinia and Burdorf (2008) found reasons not directly related to respondents' jobs. These individuals are primarily of poor health, topped with lower education, single, physically inactive, and high body mass. The study by Kalwij and Verleuen (2005)

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supports the importance of health for elderly labour market decisions. Using the data of individuals aged 50-64 in 11 European countries, the SHARE Survey found that better health conditions influence higher participation rates for elderly workforce and the opposite - declining health condition with age accounts considerably for the decline in participation rates.

We should not forget institutional environment influence on elderly workforce's participation level. As Brugiavini et al. (2005) and Börsch-Supan (2021) studies show, more accessible welfare systems reduce the elderly workforce's motivation for adjustment and participation and thus influence earlier retirement.

Ageing Population to Define Public Policies in Europe

This chapter brings some basic figures referring to ageing population in the EU concerning labour market. Relevant to our topic is the data on the share of population aged 65+, old-age dependency ratio (65+ years / 20 – 64 years), economically active population between 65 – 75 years of age, and young population unemployment rate. Of course, the country in focus remains Slovenia. If not quoted otherwise all data come from the Eurostat (2017, 2019) and refer to 2016.

With the share of population aged 65+ the youngest in comparison is Ireland (13.2%), followed by Luxembourg (14.2%) and Slovakia (14.4%). Below the EU average are also Poland (16.0%), Norway (16.4%), Romania (17.4%), Austria (18.5%) and Slovenia (18.4%). The EU average (19.2%) essentially exceeds Germany (21.1%) and Italy (22.0%). The 2018 numbers for the USA are 16% (PRB, 2019) and for China 11% (World Bank, 2020). As for our observation period, leaving their problems in the field aside, the other two leading world economies have a better starting situation than the EU.

Concerning the old-age dependency ratio – the ratio of the number of elderly people at an age when they are generally economically inactive (i. e. aged 65 and over), compared to the number of people of working age (i. e. 15-64 years old), — the most favourable situation seems to be in Ireland (coefficient 24.4) and Norway (29.1). With the coefficient 31.0 Austria is just a bit worse off than Belgium, which coefficient 32.5 equals the EU's. With a value 33.5 Slovenia is still in a better position than Croatia (35.0), Germany (36.1) Greece (37.1) and Italy (39.0). Because in the USA, old age support, more than in other countries, derives from the

investments in assets during the working age, the coefficient has been 27.6 (United Nations, 2019a).

Regarding the share of the economically active population of 65 – 74 years of age, the data in the EU strongly differ among the countries. With 26.0% Spain is on the top. Among the group exceeding the EU average (9.5%) are also Norway (18.9%), Sweden (16.1%), Ireland (15.7%), Romania (15.0%), and Denmark (14.3%). Below age, we are mentioning Poland (7.7%) and Austria (7.5). Slovenia (4.8%) belongs to the tail, together with Hungary (4.2%) and Belgium (3.6%) (Statistisches Bundesamt, 2016).

The last decade has seen divergent developments in the field of the young population unemployment rate. So, in Greece, it deteriorated from 21.9% in 2008 to 39.9% in 2018. While the EU demonstrated slight improvement (15.9%; 15.2%) unlike the countries where the situation has deteriorated (Finland – 16.5%; 17.0%; Austria 8.5%; 9.4%). Slovenia (9.4%; 8.8%) was among the countries where the economic growth after 2014 was off-set in youth employment (Poland – 27.2%; 11.7%, Sweden – 20.2%; 16.8%; Germany 10.4%; 6.2%).

Although is a global problem, the presented figures prove that the ageing of the population represents a special challenge for European countries. Apart from being a problem "per se" for the labour market, in the EU it also brings pressure for public finances. For instance, in the USA or the UK, financing of elderly population rests predominantly on public transfers. Their share typically ranges from 60% in Poland, 66% in Slovenia, 68% in Germany, over 83% in Austria, up to 83% in Hungary and 87% in Sweden. Because of different pension financing systems, essential share of financing of elderly population in the USA or the UK to a greater extent rests on asset-based reallocation. In the USA the public transfers' contribution to elderly financing is 26% compared to asset reallocation – 57%. Also, in the former EU member UK this relation is untypical compared to the EU – 44% vs. 48% (United Nations, 2019b).

Sharing the ageing population problem with other countries in Europe could mean a certain relief for Slovenian policy as there will always be a certain room for best practice sharing. On the other hand, there are some issues when Slovenia seems to be clearly in less favourable position if compared with other EU countries. The share of elderly population economic activity is evident from the data presented above. Therefore, in the following chapter we are focusing on this issue.

Slovenian governments have well recognized the issue. Therefore, Slovenia has been actively participating in numerous programs and projects in active ageing, financed mainly from the EU Social fund. Considering that these programs are quite synchronised in the EU and having no

systemic doubt about them in Slovenia, we must assume that the reason for elderly population in Slovenia to participate on the labour market lies far less than in most EU countries outside the facts that can be influenced by labour market policy. Using concepts of psychological agreements and studies dealing with management/leadership development in Slovenia we will try to prove that the resilience of elderly population to stay on the labour market can be derived to the management/leadership quality and respectfully their development stage.

The Sources of the Resilience of Elderly Population to Stay on the Labour Market – the Case of Slovenia

The facts presented in the previous chapters point to a disproportion that apart from ageing is also causing unfavourable relationship with economic dependence of the elderly: the youth unemployment. To a certain extent, improvement in this field would ease the ageing population issue, but for sure not erase it.

According to above presented data with 4.8% economic active population in the age group of 65 – 74 years, Slovenia acts as a caboose among the member states regarding the activity of elderly population. When we consider the 55 to 65 years' population, after being caught around 35% in 2009 – 2016, the share has approached 45% at the end of 2019. Comparing this data with Sweden which has stabilized its share under 75% or Denmark (70%), the gap is clearly seen. In this way Slovenia is staying behind comparable states such as Poland (50%).

The structure of Slovenian economy does not differ from other EU countries to have any economically conditioned reason for being in such as arrears. Using results of some comparison studies, we will try to prove that unlike most political measures dealing mostly with educational projects for this part of the deprived population the focus should rather be to enlighten the leadership of Slovenian companies.

Before finally entering this discussion, let us turn to a universal reason, which defines the ageing labour force's resilience to stay on the labour market. Fast technology change and digitalization pose a great stress on the labour market and thus on the policy makers. Reluctance to accept the changes they bring is documented. As an example, presented below are the study results among Slovenian and Croatian employers on characteristics they ascribe to two different groups of employees: young and elderly (Vehovec, 2008).

The survey on employers' attitudes towards ageing workers was conducted on a sample of 216 Croatian and 200 Slovenian firms in 2008. In Table 1 we present selected results for Slovenian companies. Valued from 1 (no importance) to 5 (high importance), their answers show rather typical differences in employers' perspectives regarding different employee generations.

Table 1. Comparison of mean values for perceived characteristics of older and younger employees in Slovenia (2008)

Variable	Old	Young	Gap
Loyalty	4.14	2.79	1.35
Good health	2.56	4.07	-1.51
Adaptability to change	2.52	4.07	-1.55
Physical strength	2.54	4.04	-1.50
Adaptability to new technologies	2.43	4.30	-1.87
Readiness to learn	2.55	4.04	-1.49
Ability to acquire new skills and knowledge	2.34	4.19	-1.85

Source: Vehovec 2008, 124

Regarding loyalty, it is normal to expect that it will be ranked quite higher with elderly employees than with younger ones. Typically, adaptability to change and ability to acquire new skills demonstrate quite a gap between two chosen generations and explain their sentiments when changes are expected and introduced.

As already mentioned, fast technology change represents an additional problem for not-too-distant labour market policies based on filling the labour supply gap of low-skilled work with migrants. Low-skilled work will have to catch up with new skills and competencies requirements, where due to different cultural backgrounds, the immigrant labour force will catch it harder.

The data presented above support the opinion that the transition in learning will have to be carried on, supported by corresponding measures in legislation, administration, financing, the public network of organisations and programs for adult education, public services, and an adult education infrastructure (OECD, 2018). Due to the speed of change that digitalization is causing in working environment, an entirely different thinking and operation will be required from learners and students. In this respect, McKinsey (2012) emphasizes the capability of education providers and employers to step into one another's worlds and to work with their students early actively.

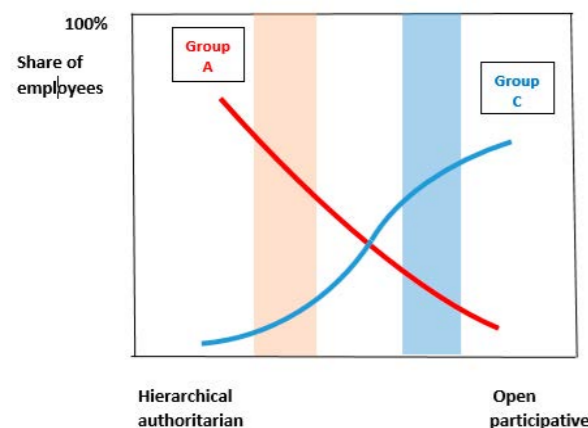
The psychological agreement, work environment, and leadership

Let us now focus on the management/leadership issue of the absence of elderly generation from the labour market in Slovenia. The topic on leadership we are starting with the discussion on psychological contract/agreement. Here we lean on the theory by Handy (2004), according to whom the psychological contract means the relationship between an individual worker and the organization (meaning embedded leadership in the organization). The ideal situation would be that the leadership and individual worker share essential imaginations and expectations with the "opposite" side. Using Handy's interpretation, here we will concentrate on three types of psychological agreements:

- Group A – forced agreement – the worker has no alternative than to comply with the leadership style in the organization.
- Group B – calculative agreement – knowing his/her market price, the individual worker adjusts her/his contribution to the organization strictly from financial/promotional reward.
- Group C – co-operative agreement – the individual worker identifies himself with the organization on essential points.

Figure 1 presents the position of different psychological agreement groups according to the work environment formatted by corporate culture as defined by management/leadership stages of development.

Figure 1. Psychological agreement in a different work environment



Source: Adopted from Handy (2004)

In Figure 1 we did not consider the group with type B's psychological agreement as their acting derives more from

their characteristics than from the conditions in the working environment.

Figure 1 shows that the closer we are to the hierarchical and authoritarian working environment, the bigger the share of employees with less or no chances to change and find work in a better environment. So, we will accept the existing working conditions (typically for the amber pillar). According to the presupposition of this paper, the bigger will be the difference between the common sense experienced outside the company in comparison to the real experience in the company, less the employees will wish to stay in the company longer than necessary (e. g. after fulfilling the official conditions for retirement). On the other hand, closer we are to the environment that overlaps with what we denote as the common sense (forming open and participative working environment), greater will be the stimulation of the employees to do so (typically for blue pillar).

We should also consider the typical difference between generations of workers. One would expect that the elderly workforce would be more sensitive to the working environment and would be focused on other labour environment characteristics than younger generations.

Differences in the expectations with jobs among generations

To underline statements in the former subchapter, we will now face them with the findings of the global study by ManPower (2020), where expectations from the working environment of different workers generations are compared. In Table 2 below, the data from this study is interpreted in the form of average rankings. They demonstrate the attitude of different generations regarding the chosen characteristics of the workplace, which are attracting or retaining them with their workplace. We considered together both genders, while the study distinguishes results for men and women.

When certain characteristic of interest for this article did not make it among first five, we assigned it the rank 6 and considered it with average ranking calculation. Interestingly the characteristic "good place to work" only made it among first five (although typically) just with men over age of 65 (rank 3 though) and is therefore not shown in the Table 2. "More pay" clearly made it to the top for all of considered generations, although with the eldest generation of boomers it had to share its top position with "challenging work". The falling trend when we follow the average ranking of this item clearly demonstrates the change of motivation for work with different generations and in this way along the time. Practically opposite trend shows the item "flexible hours" which surely implies the conclusion that the nature of loyalty to a

Table 2. What is attracting and respectively retaining workers at work (average rankings)

Generation	More pay	Challenging work	Flexible hours	Good boss
Generation Z (age 18 – 24)	1.0	4.5	3.75	.../5.75
Millennials (age 25 – 34)	1.0	3.25	2.25	.../5.25
Generation X/1 (age 35 – 44)	1.0	3.25	2.0	.../5.75
Generation X/2 (age 45 – 54)	1.0	3.5	3.0	.../6.0
Boomers/1 (age 55 – 65)	1.0	2.5	4.0	.../5.5
Boomers/2 (age 65 +)	1.5	1.5	5.0	4.5

Source: ManPower, 2020

firm (working place) has also changed essentially along the time/generations. The fact that "good boss" made it into the applicable ranking only with the boomers over 65, implies the fact that with conditions for retirement fulfilled they react to this item unlike any other generation. Together with characteristic "good place to work", which appeared only in the group of men over 65 years of age, these results could imply higher sensitivity of elderly work force to the work environment where they should stay if decided to prolong their economic activity.

Human resources management in Slovenian companies

In the field of measurement of management/leadership efficiency in the field of human resources management (HRM) in Slovenia recently no study has been made. So, we are commenting on the results of the study by Slovenian Manager Association (Ložar, 2008). According to this research the Slovenian companies demonstrated a certain gap when modernity of their management/leadership model is concerned. We followed the division of management models/theories as presented by Enock and Beynon (2017) and applied average values as acquainted through poles in top international companies compared to the average of Slovenian firms. The "generations" of management models were used as points (from 1 – 4, 1 representing the classical and 4 system theory models). The levels achieved by the average Slovenian firm with the use of contemporary management models were generally 2.88/4 and in the HRM field 2.58/4. At the same time, the comparability with the best companies in the industry were in general achieved by 20.9% Slovenian companies, while in the HRM field just 15.7% of companies achieved top standards.

When considering the attitude of a typical employee in Slovenia when the option of retirement is offered, one cannot ignore the gap in management modernity as a possible reason for the reluctance of employees to pursue their career

after fulfilling the official conditions for retirement. This gap is shown in Figure 1 by using blue and amber coloured columns.

The reasons for the deficiencies regarding psychological contract in Slovenia lie in the general development of interpersonal relations connected with the culture and historical experience that clearly differ from full-fledged industrial nations. While modern management schemes and models/theories can be promoted, interpersonal relations can only be developed in the course of development and positive experience. Like other European transition states Slovenia will have to discover a way to catch up with developed societies of the West. This will not be easy as these countries missed the learning processes that developed societies went through last centuries when national states, industrial revolution and citizenship emerged in the West.

Conclusions

Comparing our results with international studies exposes additional dimensions of the problem that we are addressing. As seen from the results presented above, remaining on the labour market is related to the treatment that workers are being subject to before fulfilling the conditions for retirement. Our study concentrates on Slovenia, while in open labour markets such as the USA, studies prove another dimension. Apart from being the fact during their mid-career period (Browne & Misra, 2003), pathways to retirement demonstrate differences according to ethnicity, thus adding to the inactive elderly labour force. According to Flippen and Tienda (2000) Black, Hispanic, and older women face more involuntary job separation in the years immediately before retirement, the worst situation being experienced by Black men and Hispanic women.

The results of our and other studies would also improve by considering differences in art of jobs that elderly workforce

is exercising. The importance of this perspective can be seen from the Tomioka et al. (2020) clinical study. It proved, that men who spent most of their careers in a white-collar job reported much less decreased subjective cognitive functioning than the men with blue-collar jobs. With the women the same fact was related to longer working years.

Positions and attitude towards elderly workforce presented above is often supported by acting of their working environment – younger co-workers. This attitude gets back to general treatment of the elderly as members of the society. Using the pool of 112 participants from the University of Wyoming psychology department, Ragan and Bowen (2001) found that the negative perception of elderly can be managed towards more positive results through targeted information to younger respondents. This would show the necessary path of the company policies wanting to profit from elderly workforce participation. As discussed above, psychological factor influences the elderly workforce motivation to stay active. Although not proved by a wide margin, in this respect, Welsh et al. (2016) stress that “older workers who had worked in good quality jobs reported marginally better self-rated health”, which again can be related to their motivation to stay active in their profession.

As presented above and using the case of Germany, the typical Western European solution of cherry-picking on the open labour market is now showing growing unsustainability in different areas. So, instruments and measures to (re)activate elderly active population is becoming a must (Bijak et al., 2008). In this respect, an initiative for the EU to promote inter-generative learning (IGL) in businesses (Radović – Marković, 2013) as well as age management practices (CEDEFOP, 2012) surely is a step in the right direction.

On the other hand, one creating a policy response, one should beware the essential differences only between individual

European countries when reasons for age gaps are concerned. For instance, OECD statistical data (UNECE, 2019) show a significant but comparable gap for Luxembourg and Greece. Also, the similarity of the gap size in countries with relatively small gaps, such as Iceland and Switzerland, requires better insight since the labour market in both countries differs significantly. Therefore, it is not hard to judge that such statistics can represent a minimal base for any national or even EU labour market policy.

Undoubtedly, acting to keep people longer at work in Slovenia will require a transition in management and leadership in human resources. In this respect, it is worth mentioning the initiative of the Slovenian Public Stipend Fund (2017) who had come up with a Handbook for employers. To our knowledge, after then, there has been no other direct initiative to try to change the prevailing management/leadership attitude towards (elderly) workforce.

From the EU, there has been quite some guidance in this field but are from the point of a member country with less developed democratic principles and personal integrity not sufficiently exposing the role of the leadership with enabling the working environment friendly to (elderly) workforce. Typically, 2012 Guiding Principles for Active Ageing and solidarity between generations (Council of the European Union, 2012) address main fields where an adjustment in the EU societies will be needed to retain the elderly workforce in the economic activity, while none of them refers directly to management/leadership.

Therefore, the arrears in management/leadership culture development will still cause the active aging policies in transition countries like Slovenia to be costlier for a certain period. One could not expect that the EU could modernize the management/leadership approach in the European transition countries. Only time is needed, which will hopefully pass the free flow of ideas and experience.

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Acknowledgment

This article presents a part of research financed by the Slovenian Research Agency entitled: Krepitev digitalnih kompetenc ranljivih skupin za izboljšanje zaposljivosti in višjo dodano vrednost na trgu dela (Strengthening of digital competencies of deprived groups for improving their employability and their higher value added on the labour market, CRP-2019, No. V5-1927).

Starejše prebivalstvo in stabilizacija trga dela v Evropi – primer Slovenije

Izvleček

Rastoči deleži upokojenega prebivalstva v Evropi slabšajo bilanco socialnih stroškov, saj družbeni konsenz na našem kontinentu temelji na obsežnih transferjih temu delu prebivalstva. V primerjavi z ostalim svetom, kjer EU prispeva približno četrtno svetovnega BDP in dosega polovico socialnih transferjev, takšen model ne more biti ekonomsko vzdržan. Dosej prevladujoči model pomlajanja trga dela s pomočjo migracij se je pokazal kot nevdržan iz številnih razlogov. Tako pa je tudi s perspektive hitrih tehnoloških sprememb. Sedanja realna politika trga dela temelji na polnjenju trga dela z nižje plačanimi delavci iz tujine, kar le podaljšuje čas, ko bo moralo priti do velikih sprememb v strukturi trga dela. Prispevek izhaja iz primera Slovenije in raziskuje vzroke za slabšo participacijo starejše delovne sile na slovenskem trgu dela. Na temelju podatkov in rezultatov razpoložljivih študij avtorji poskušajo opredeliti razloge za relativno slabe rezultate pri zagotavljanju trajajoče aktivnosti starejše populacije na trgu dela.

Ključne besede: gospodarska dejavnost starejše populacije, trg dela, HRM vrzel v Sloveniji

The European Social Fund Supports the Reintegration of the Long-term Unemployed Individuals Aged 50+ Into the Labor Market - A Comparison of the Federal States in Austria

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Abstract

This paper shows the importance of European Social Fund's (ESF) countermeasures for reintegrating long-term unemployed persons aged 50+ in Austria since their number has increased in recent years. Four research questions are defined, which deal with the theoretical background, the ESF's contribution, the possible causes of long-term unemployment, and their reflection in a country comparison figures. For the qualitative methodology, we conducted expert interviews and case study analysis. Concerning the quantitative method, we evaluated raw data from the AMS Public Employment Service, Austria, and Statistics, Austria. A correlation was established based on the content-related evaluation of the theoretical approaches, the expert analysis, and the presentation of statistics. It is necessary to identify the causes in time and take appropriate measures to prevent them from combating long-term unemployment among this target group.

Keywords: labor market, long-term unemployed aged 50+, the European Social Fund, Austria

Introduction

The increasing age of the population is noticeable in the European context and Austrian society. In recent years, the baby boomer generation of the 1960s has grown into the 50+ age group. As a result, the proportion of the population of working age between 50 and 64 has increased. In Austria, the number of unemployed people aged 50+ has been growing faster than in the other groups since November 2009. Over a more extended period, from February 2000 to February 2019, the number

REVIEW PAPER

RECEIVED: OCTOBER 2020

REVISED: APRIL 2021

ACCEPTED: MAY 2021

DOI: 10.2478/ngoe-2021-0012

UDK: 339.96:331.56(436)

JEL: J64

Citation: Kadri, A., Bobek, V., & Horvat, T. (2021). The European Social Fund Supports the Reintegration of the Long-term Unemployed Individuals Aged 50+ Into the Labor Market - A Comparison of the Federal States in Austria. *Naše gospodarstvo/Our Economy*, 67(2), 49-65. DOI: 10.2478/ngoe-2021-0012

**NG
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NAŠE GOSPODARSTVO
OUR ECONOMY

Vol. 67 | No. 2 | 2021

pp. 49–65

of people aged 50+, registered as unemployed, has almost doubled. This issue will remain critical in the future because the long-term trend towards an older working-age population will continue in the coming years (Arbeitsmarktservice Österreich, 2020; European Parliament, 2021).

From the existing theory and empirical research, we know that since the end of 2009, the number of unemployed persons aged 50+ has increased disproportionately compared to the other age groups in developed countries. It is relatively complex for people aged 50+ to return to the labor market after losing their jobs. This situation reflects in a more extended period of unemployment. A stay in unemployment of more than 365 days represents long-term unemployment, making it even more challenging to return to work. Among the factors perceived as particularly burdensome for older people are the increasing density of the workload, low management culture, devaluation of knowledge due to rapid technological change, and the growing burden of stress and time pressure. Three groups of risk factors are distinguished. Firstly, the high physical work requirements, the stressful and dangerous working environment, and poorly organized work. There is a clear link between long-term unemployment and characteristics of the unemployed persons, e. g. lower qualifications, and health restrictions (Clemens 2001, 23 - 28; Westermeier 2019, 6).

The research gap exists in terms of how the ESF, via respective national authorities, could integrate the long-term unemployed into the labor market. In general, the ESF aims to increase employment opportunities, invest in education, skills, and lifelong learning, and actively involve people at risk of poverty and exclusion. Therefore, the ESF has a higher budget and a specific list of priorities to reduce unemployment, both for categories of people at risk of poverty and people excluded from society (Artis & Nixon 2003, 256 - 259). Unemployed people are the leading cause of poverty and social exclusion (Council of Europe, 2010). The European Social Charter (ESC) refers to social and economic human rights in Articles 1, 4, 15, and 30. In addition to the right to work and adequate remuneration, ESC also defines disabled people's rights to independence, integration, and participation in society. Regardless of their age and the origin of their disability, to take the necessary measures for people with disabilities, it is required to provide them with access to public or private institutions, counseling, education, vocational training, and employment. More specifically, Article 30 defines the right to protection against poverty and social exclusion. Appropriate measures are necessary to promote engagement, housing, training, education, culture, and social and medical assistance for individuals and their families, living in social exclusion or poverty situations. If these measures need to be adapted, it is also necessary to implement them (Council of Europe, 1996).

Apart from the national support measures for the reintegration of the long-term unemployed people aged 50+ into the labor market, the ESF intervenes to avoid the consequences of long-term unemployment and to ensure stability (Mathijssen 2010, 399). The issue of long-term unemployment and its causes, factors, and effects is an important topic not only in the Austrian but also in the European context.

This paper aims to illustrate the importance and relevance of national support measures for reintegrating the long-term unemployed people aged 50+ into the labor market. It also aims to explain these measures from the organization's point of view, the so-called funding recipient. Following the qualitative and quantitative analyses, the empirical results are evaluated and documented. Apart from the primary research questions, the paper also highlights the sustainability of ESF projects and possible improvement potentials for the next ESF+ funding period. Finally, it draws conclusions and provides an outlook for the next ESF+ funding period.

The main research question is "What are the measures with which the ESF, via respective national authorities, could integrate the long-term unemployed people aged 50+ into the Austrian labor market?" The supplement research questions that combine theory and practice with facts, figures, and a case study are the following:

1. RQ1: What are the ESF principles, and how is the ESF procedure implemented in Austria? We base RQ1 on the literature arguing that the creation of European Social Fund (ESF) improved employment possibilities and contributed to raising the standard of living (El-Agraa 2011, 26). The EU's Common Provisions Regulation No. 1303/2013 of the European Parliament and the European Council contains the general provisions for the European Structural and Investment Funds (ESI Funds) 2014-2020. The provisions of this Regulation determine the requirements for the implementation of the funds. The Austrian Partnership Agreement links the EU framework and the national and regional programs of the four ESI funds. This partnership intends to ensure that the expenditure is as effective and efficient as possible and responds to the needs of the region or community concerned (ÖROK, 2019).
2. RQ2: What are the possible causes, factors, and effects concerning age unemployment? Discrimination in general, as well as in the workplace, can occur at different levels and take different forms, such as worse access to the labor market (employment discrimination), lower wages (wage discrimination), and reduced opportunities for further training (Putz et al. 2014, 18). Another aspect is discrimination in the workplace, which is manifested, among other things,

by age-segmented task assignments and exclusion from certain more prestigious activities. In addition, we can also include a lack of career development opportunities or a lack of opportunities for further training (Putz et al. 2014, 67). The forms of discrimination mentioned here lead to reduced career opportunities in general, lower income from gainful employment, and fewer opportunities for individual development. Personal characteristics, such as age, also lead to differentiation in the labor market (Putz et al. 2014, 18).

3. RQ3: What contribution has the ESF made to the reintegration of the long-term unemployed aged 50+ in Austria? One of the key objectives of the Europe 2020 strategy is to increase the employment rate, especially that of older workers, to 77% - 78% by 2020 (Lutz & Bock-Schappelwein 2014, 52). In the 2018 ESF Annual Implementation Report, among several other aspects, concerning progress in implementing measures to address the unique needs of the target groups most at risk of poverty, discrimination, or social exclusion, with a particular focus on marginalized communities and people with disabilities and the long-term unemployed are stated (ESF Austria, 2019).
4. RQ4: How did the long-term unemployment rates of the people aged 50+ develop between 2004 and 2019 in the Austrian regions, and which demographic characteristics are relevant? As recorded by the AMS, long-term unemployment was a negligible indicator in Austria until a few years ago. However, it has increased significantly since the AMS changed its strategy in 2014, which led to fewer but longer-lasting measures. Therefore, the numbers have increased significantly from 2014 (Arbeitplus.at, 2020).

This paper is divided into several units and covers the ESF's theoretical aspects and the fundamentals of long-term unemployment. On the one hand, the focus is on theories; on the other hand, statistics and qualitative interviews support it. In addition to research of textbooks, we also used relevant journals and internet sources to formulate the theoretical part of the paper.

Theoretical Background

Factors of long-term unemployment

According to AMS Austria definition, persons registered as unemployed for more than 365 days are considered long-term unemployed. These persons are not involved in

education and are not entitled to training measures (NEET). Any interruptions of up to 28 days (e. g. short training, illness, or temporary employment episodes) do not change their status (Arbeitsmarktservice Österreich, 2020).

According to the Austrian Public Employment Service, demographic shifts and changes in labor market participation are essential explanatory factors for the disproportionate increase in unemployment among older people. As mentioned above, some demographic characteristics play a role, including age criteria. The working-age population in Austria has aged in recent years, mainly due to the baby boom generation in the 1960s, with a high birth rate. The number of persons aged 50+ has thus increased. Consequently, the share of the people aged 50 to 64 in the working-age population has grown over the years, and the forecasts also indicate a further increase. Apart from the population's age structure, the employment behavior of people aged 50+ has also changed in recent years. The critical point is that they retire early less frequently and thus remain longer in the labor market. As a result, more people in this age group might potentially be employed but are also unemployed. (Arbeitsmarktservice Österreich 2020a, 1).

Demographic factors include rising life expectancy, aging of the "baby-boom" generation, and a low birth rate. The birth rate in Austria is 1.4 children per woman, considerably below the minimum ideal value of 2.1. Furthermore, the fact that pregnant women's average age is continuing to rise significantly increases the generation gap (Gruber et al. 2007, 16).

Since the end of 2009, the number of unemployed persons aged 50+ has increased disproportionately compared to the other age groups. According to AMS statistics, the number of persons aged 50+, registered as unemployed, has almost doubled from 2000 to 2019. About a quarter of them are 50 years old or older (Arbeitsmarktservice Österreich 2020, 2).

It is relatively difficult for people aged 50+ to return to the labor market after losing their jobs, reflecting a more extended period of unemployment. A stay in unemployment of more than 365 days represents long-term unemployment, making it even more challenging to return to work. Almost 50 percent of the long-term unemployed people in September 2019 were 50 years old or older (Arbeitsmarktservice Österreich 2020, 3). However, it is difficult to get back into employment after becoming long-term unemployed (Klinger & Rothe 2010, 632).

There are several factors mentioned by which older employees are more affected by possible unemployment. On the one hand, a higher risk of losing one's job implies changes in the company or restraints and prejudices towards older people. Often the structures in the companies are not

age-appropriate, meaning that usually, after a certain age, no further training is offered, and thus no other career opportunities arise. An additional factor is the different levels of stress in the various occupational groups and sectors. Older people, particularly physical workers, are more affected if there is too little health promotion. These people then usually suffer from deteriorating health. Among the factors perceived as particularly burdensome for older people are the increasing density of the workload, low management culture, devaluation of knowledge due to rapid technological change, and the growing burden of stress and time pressure. Three groups of risk factors are distinguished. Firstly, the high physical work requirements, the stressful and dangerous working environment, and poorly organized work. There is a clear link between long-term unemployment and characteristics, lower qualifications, and health restrictions (Clemens 2001, 23-28; Westermeier 2019, 6).

In particular, the long-term unemployed confront the expectation of taking up gainful employment and overcoming their dependence on social benefits as soon as possible. Primarily, this same unemployed group is unlikely to cope with the new conditions of competition and competitiveness and will also have little chance of finding a job independently in the foreseeable future. Although it is assumed that this group is less likely to be distant from the labor market or to have a low willingness to work, health restrictions and a lack of education or training qualifications are more likely to be a reason for their long-term unemployment (Lobato 2017, 4).

Concerning the qualification of older workers, almost every fifth company considers that older applicants' qualifications and competence levels are insufficient (Putz et al. 2014, 59). Discrimination in general, as well as in the workplace, can occur at different levels and take various forms, such as worse access to the labor market (employment discrimination), lower wages (wage discrimination), and reduced opportunities for further training (Putz et al. 2014, 18). Another aspect is discrimination in the workplace, which is manifested, among other things, by segmented task assignments and exclusion from certain more prestigious activities. Besides, a lack of career development opportunities or a lack of opportunities for further training can also be included (Putz et al. 2014, 67). The forms of discrimination mentioned here lead to reduced career opportunities, lower income from gainful employment, and fewer individual development opportunities. Personal characteristics, such as age, also lead to differentiation in the labor market (Putz et al. 2014, 18).

The increase in poverty has been the concern of European policymakers since the mid-70s, leading to the first program to combat poverty. The concept of social exclusion is addressed in a political and legal context within the EU, whereby the Treaty of Amsterdam lists this issue as one of

the six objectives of European social policy intending to combat exclusion (Barnes et al. 2002, 12-14).

Age-related employment problems in companies

Response to unemployment of disadvantaged groups of workers is becoming a topic of interest, especially in times of recession. Some sectors of the economy or companies may be affected more than others by cyclical economic ups and downs. For example, immigrants represent a disproportional share in economically sensitive sectors such as construction or the hotel and catering industry (Prean & Mayr 2016, 1-18).

Furthermore, long-term unemployed persons develop feelings of guilt about their long-term unemployment and experience financial difficulties and lack of social contacts. In addition, this affected group of people suffer from a loss of confidence, feelings of isolation, and decreasing self-motivation (Patton & Donohue 1998, 337).

Measures to combat long-term unemployment

First, conditions must be created to develop older people's potential, as they show experience in terms of knowledge, learning ability, and motivation (Clemens et al. 2005, 193). For years, efforts have been made in theory and practice to promote older and underperforming staff in the labor market. Already in the mid-nineties, various model experiments were undertaken. In general, five areas of measures were defined, including qualification measures, work design, part-time work for older employees, personnel development, and integration of more senior and severely disabled persons (Clemens 2001, 101-140).

The results of a study in Austria, which analyzed part-time schemes for older workers, are in line with international results on models for a smooth transition from employment to retirement. These programs often provide an alternative form of transition to retirement. The entry age for partial retirement should be based on the statutory retirement age to extend working life (Graf et al. 2011, 228).

Qualification measures for older workers and older long-term unemployed are of utmost importance. Older workers' qualifications must be integrated into a system of organizational and personnel development and innovative career design. Implementation projects have proven that scientific models in the field of competence development work in practice. Work design means adapting the workload structure of a job to the performance of the integrated person. Measures must be taken to ensure that the workload is reduced. The work

activity is designed to refer to ergonomic and technical adjustments, reduce time pressure and inappropriate working hours, and assure a health-friendly performance of work. Since the 1970s, the concepts have been developed to ensure a smooth transition to retirement. This method of reducing working hours intends to enable a slow transition to later retirement. Through personnel development and career planning, older employees with health problems are to be integrated. The basic idea here is to enable promotion and career opportunities and thus create a less stressful workplace.

Furthermore, acquiring new qualifications and thus experiencing a positive professional change is another positive aspect. The last measure integrates older and severely handicapped people into new rationalization concepts, such as group work. Older people can use their skills and capabilities through teamwork (Clemens 2001, 101-140).

Age should not be used as a selection criterion. Instead, the focus must be on age-appropriate learning, primary education, good healthcare, fair wage, and human resources policies. Finally, it should be mentioned that the most critical factor is the mental attitude towards aging. It is up to companies and politicians to promote an appropriate and more positive mindset regarding aging (Von Cranach et al. 2004, 223-227).

One of the key objectives of Europe 2020 strategy was to increase the employment rate, especially that of older workers, to approx. 78% by 2020 (Lutz & Bock-Schappelwein 2014, 52). In international comparisons, the low employment rate of older people and relatively high social protection expenditure on pensions are seen as a critical weakness of Austria. One factor here is the health situation. The overall strategy to promote work and employability consists of prevention and treatment, activation and reintegration, and protection. The area of activation and reintegration was identified as underdeveloped in Austria. Against the background of demographic changes, the issue of active and healthy aging is particularly relevant (ESF Austria 2019, 108).

One example mentioned for Austria is individual socio-economic enterprises (SÖB), which are not profit-oriented social enterprises. They offer temporary jobs, so-called transit jobs for the long-term unemployed. Thereby employment is combined with training and continuous support to overcome possible problems. The long-term unemployed are allocated to the various companies by the public employment services. These projects are also supported and partly financed by the ESF (European Commission 2019, 32-33).

In the 2018 Annual Implementation Report (AIR), subsequent information was provided, among several other aspects, concerning progress in implementing measures to

address the unique needs of the target groups most at risk of poverty, discrimination, or social exclusion, with a particular focus on marginalized communities and people with disabilities and on the long-term unemployed. From call documents analysis, IP 2.1 covers a wide range of target groups strongly affected by poverty, discrimination, or social exclusion. Most of the calls (18) are directed at "persons with a migration background, followed by the case of "BMS (Means-tested Minimum Income) recipients with multiple problems" (13 calls) and "persons with no or insufficient employment integration or persons who are far from the labor market and have low employability" (12 calls). Further mentions are "Educationally disadvantaged and low-qualified persons" (10 calls), "People with disadvantages, impairments or disabilities" (10 calls), or "Other marginalized groups with low employability and workability" (9 calls). Far less common are "working poor" (3 calls), "Roma/Romnja" (1 call), and "addicts (focus: alcohol addiction)" (1 call) addressed in the calls. However, it can be assumed that these groups are to be found, for example, as participants in projects of the calls for "persons with a migration background who are remote from the labor market" or "BMS recipients with multiple problems" and so forth (ESF Austria 2019, 128).

Methodology

We used quantitative and qualitative methods to answer the research questions in this paper. Statistical data on long-term unemployment of persons aged 50+ from Austria and its provinces are presented and compared. Besides, interviews are conducted with ESF funding organizations, the AMS Public Employment Service Austria, and a funding recipient is used as a case study. The ESF funding bodies provide information, advice, support, and guidance for the various project submissions and are thus an essential component in the implementation of the ESF in Austria. As the national platform for labor market policy, the AMS combines facts and figures with direct access to the long-term unemployed persons aged 50+ and contributes an essential part to this research with its empirical data. The direct cooperation with the actors concerned enables the project organizers to access the data collection of relevant information to provide individual support to the project participants. The long-term unemployed persons aged 50+ are prepared for the labor market through various measures. The concepts and the reports of the project executing organizations provide data for future projects and are also important indicators for the EU Commission. Following the qualitative and quantitative analysis, the empirical results are evaluated and documented. In addition to the main questions, we highlight the sustainability of ESF projects and possible improvement potentials for the next ESF+ funding period. Finally, the topic is briefly

summarised, a conclusion is drawn, and an outlook on the next ESF+ funding period is framed.

For the theoretical part of the work, in a first step, secondary literature was studied to define the relevant key terms. This information was obtained by searching books, relevant scientific articles, and journals online and printed. In the second step, the research questions RQ1, RQ2, and RQ3 were answered based on empirical studies in the form of qualitative expert interviews with the responsible authorities in the federal states and the administrative authority. Based on the results of the initial literature search and the qualitative research, a quantitative-methodological approach is applied to answer the research question RQ4, using unique quantitative evaluations of the data sets of the Austrian Public Employment Service, as well as evaluations from the paid database of the Statistics Austria and the corresponding reports.

We conducted the interviews according to a structured interview guide. Four personal interviews took place in the experts' offices in Salzburg. The advantage of individual interviews is the more precise data collection and the fact that personal communication provides an opportunity to ask sub-questions and perform in-depth research. However, since the experts from the other federal states and institutions were not represented due to the worldwide pandemic situation COVID -19, the interview questionnaires were sent out in a written form by e-mails. The detailed answers of the experts were subject to an in-depth analysis. We clarified the ambiguities by subsequent telephone conversation.

Selection of the interviewed persons

The theoretical aspects must first be considered to select suitable persons for interviews. It is essential to ask who the experts are and how they are defined. According to Kaiser (2014, 36) an expert has "special knowledge" while a non-expert has only general or everyday knowledge. The experts, who have already been involved in implementing the ESF program for several years, were selected for this study. The people responsible for this area at the national and federal levels were chosen carefully. Figure 1 shows the selected experts for the interviews in this research.

The interview guide is structured into five main parts, which

are divided into sub-categories. These are shown in figure 2.

All interviews are transcribed and analyzed in German to follow Kuckartz's (2010) transcription rules and not show any falsification of the interview experts' statements. Only the results of the content analysis are translated into English.

For the evaluation of the expert interviews, a method, which leads to the collection of results utilizing a step-by-step procedure, was chosen. The basic principle of the content analysis of a summary is that the resume's respective abstraction level is precisely defined. According to Mayring (2015, 72), content analysis is divided into the following four steps.

There is, among other possibilities, the possibility of using computer programs to carry out a qualitative content analysis of the interviews. The MAXQDA program was chosen for this analysis because we conducted interviews in German. This program is available in a German version, including a manual, and provides many practical examples in German (Kuckartz, 2010, 8). Furthermore, this program offers not only free webinars but also a test version. Specifically, the program MAXQDA Plus was chosen because it contains the module "MAXDictio" in addition to the functions of MAXQDA Standard. This module enables the implementation of numerous quantitative text analysis procedures, especially in qualitatively oriented projects. There are also tools for visual text exploration, performing vocabulary analysis, supporting content analysis, and operationalizing dictionaries with which groups of self-defined words can be created and evaluated (MAXQDA - Products, 2020). One of the core functions of MAXQDA, which plays a vital role in content analysis, is the coding of the text content of interviews. Coding is assigning one or more codes to such a segment, enabling a systematic qualitative content analysis. The selection of codes is an instrument for identifying and classifying content and creating order (MAXQDA - About Codes and Coding, 2020).

The code system chosen for the qualitative evaluation of the interviews is based on the interview guide's categories. The focus was divided into five main parts, which were then divided into sub-categories. On this basis, a code system was developed in the software that can code the relevant text passages so that the analysis steps, according to Mayring (2015), can then be carried out in a logical sequence (figure 4).

Figure 1. Introduction of the selected experts for interviews

EXPERT INTRODUCTION C1	
P1	P6
Expert P1 is a member of the social inclusion and social welfare department and is responsible for the needs-based minimum benefit system and the basic provision of some individual support measures. Besides, P1 has been working with the ESF since the 1990s and is responsible for it.	Expert P6 covers the areas of the labour market, the promotion of apprenticeship training and the promotion of scientific institutions. The labour market sector comprises the development and implementation of the country's labour market and qualification strategy as well as the implementation of the partnership principle within the framework of the "Territorial Employment Pact". In addition, the area of responsibility includes the implementation of the ESF programme (investment priority 2) of the Operational Programme.
[Interview 1_Institution1_P1: (Line 15 - 19)]	[Interview 5_Institution4_P6: (Line 15 - 20)]
P2	P7
Expert P2 is a qualified social work specialist and has been active for three years in the field of minimum income support and disability assistance.	Expert P7 is responsible for the European Social Fund (ESF) in the Economics and Research Division / Labour Market Department. In addition, P7 is also responsible for national funding projects in the youth sector.
[Interview 2_Institution2_P2_P3: (Line 13 - 17)]	[Interview 6_Institution5_P7: (Line 15 - 15)]
P3	P8
Expert P3 is head of the Social Affairs group and is active since 2003 in the areas of social welfare and disability assistance, and recently in the fields of minimum income and participation. In addition, the scope of responsibilities also includes labour market projects.	Expert P8 has a management position in the ESF Minorities funding area.
[Interview 3_Institution3_P4: (Line 12 - 18)]	[Interview 9_Institution8_P10: (Line 15 - 19)]
P4	P10
Expert P4 is head of the research department in the fields of labour market analysis and statistics. Furthermore responsible for controlling and a part of public relations.	Expert P10 is responsible for the ESF in the department of general economic affairs. The tasks include the processing of EU programmes (ERDF and ESF) as well as the development of topics for calls and the operational implementation.
[Interview 3_Institution3_P4: (Line 12 - 18)]	[Interview 9_Institution8_P10: (Line 15 - 19)]
P5	P11
Expert P5 has been working for Caritas for seven years in the area of perspectives and commitment. This area includes employment, sustainability as well as migration and opportunity. In addition, there are the areas of responsibility, living standards and assistance to the homeless as well as civil society initiatives.	Expert P11 is a representative of the ESF Managing Authority in Austria and responsible for public relations and communication. In addition, the scope of responsibilities includes the thematic focus "Active and healthy ageing".
[Interview 4_CARM1_P5: (Line 14 - 25)]	[Interview 10_Institution9_P11: (Line 15 - 15)]
*Expert P9 is responsible for the target group of youth with impairments / disabilities and unfortunately does not fall within the focus of the master thesis. [Interview 8_Institution7_P9: (Line 9 - 11)]	

Source: Own illustration

Figure 2. Interview guideline

PART I	PART II	PART III	PART IV	PART V
Expert Introduction	Long-term unemployment	Workflow of ESF-Projects	Contribution	ESF+

Source: Own illustration

Figure 3. Workflow of the summary content analysis

I. Paraphrasing	II. Generalization to the level of abstraction
<ul style="list-style-type: none"> Delete all text elements that have no (or little) content, such as embellishing, repetitive, illustrative phrases. Translation of text passages with content to a uniform language level. Transform them into a grammatical short form. 	<ul style="list-style-type: none"> Generalize the objects of the paraphrases to the defined level of abstraction, so that the old objects are implied in the newly formulated. Generalize the sentence statements (predicates) in the same way. Leave the paraphrases that are above the desired level of abstraction In case of doubt, use theoretical assumptions.
III. First Reduction	IV. Second Reduction
<ul style="list-style-type: none"> Delete synonymous paraphrases within the evaluation units. Delete paraphrases that are not considered essential to the content at the new level of abstraction. Adoption of the paraphrases that are still considered central to the content (selection). Take theoretical assumptions for cases of doubt. 	<ul style="list-style-type: none"> Combining paraphrases with the same (similar) object and similar statement to form a paraphrase (bundling). Combining paraphrases with several statements about one object (construction/integration). Combining paraphrases with the same (similar) object and different statements to form a paraphrase (construction/ integration). Take theoretical assumptions for cases of doubt.

Source: Own illustration based on Mayring 2015, 72

Figure 4. MAXQDA - Code system Qualitative Analysis

CODE SYSTEM	
●	Expert Introduction
● C1	Expertise at national level
●	Expert knowledge of ESF
●	Long-term unemployment
● C2	Causes and Factors
●	Correlation of demografic characteristics
●	Workflow of ESF-Projects
● C3	Call to Implementation
●	Monitoring and Evaluation
●	Contribution
● C4	ESF and national level
●	Co-operation with AMS Austria
●	ESF+
● C5	Publications
●	Potential for improvement

Source: Own illustration SM

Results

Based on the results, the main research question “What are the measures with which the ESF, via respective national authorities, could integrate the long-term unemployed persons in the age of 50+ into the labor market in Austria?” could be answered. The ESF Managing Authority has overall responsibility for the operational implementation of the European Social Fund. The implementation itself is decentralized via so-called administrative funding bodies in the federal states. These funding bodies allocate and manage the subsidies, depending on the thematic focus. The corresponding calls and awards are recorded in a central database (ZWIMOS) and published on the ESF website. This database is an essential tool explicitly developed for ESF implementation and the management and control of all projects and their indicators. The funding bodies can create calls in this database, which are then published on the website by the managing authority. Before the calls are prepared, ideas are collected, and a call paper is developed. Afterward, interested project executing organizations can inform themselves and submit their project idea in cooperation with the funding agency via ZWIMOS. After a successful application and a review of the submitted ideas and concepts, the agency will conclude a funding contract with the most competitive project management organization. In the contract, the rights and obligations of recipients are regulated, and the payment modalities are defined to start the

project implementation. In general, projects are financed 50% nationally and 50% by the ESF. Applicants who do not meet the admission criteria will be rejected. After the project starts, the project organizers must comply with the rights and obligations as agreed in the contract, including complete documentation of the project's progress and the project participants by submitting factual reports and a final report. These reports ensure the traceability of the project implementation and the measurability of the specified measures and objectives. It is also essential that all relevant documents are uploaded into the system to ensure transparency for further reviews by the audit authorities during on-site inspections and system audits. An essential element is to ensure practical cooperation and communication between the parties involved to achieve a sustainable impact. The funding agency continuously reviews the projects and the First Level Control (FLC) to meet their defined objectives. This can take the form of interim or final settlements. The FLC checks the expenditure submitted for settlement for eligibility following the prescribed manuals and particular guidelines. Only after several reviews and checks will the final funding amount be transferred to the project owner. After that, projects are subject to a second check by the Second Level Control (SLC) based on samples. There are also additional controls at higher levels of authority. One of these is the project examination, which is carried out on a sample basis. Another is the system audit, which examines the managing authority and the responsible bodies to determine whether the entire ESF implementation process complies with the management and control system (VKS).

Answering RQ1: What are the ESF principles, and how is the ESF procedure implemented in Austria?

In addition to the theoretical research, the ESF managing authority, those responsible for the managing bodies, and a project promoter were interviewed using the interview method to answer this first research question.

The funding organization and the FLC continuously review the projects to ensure that they achieve the defined objectives. This can take the form of interim or final accounts. The FLC checks the eligibility of the expenditure submitted for settlement according to the prescribed manuals and particular guidelines. Only after several checks and controls are carried out, the project owner's final amount of funding is transferred. After that, the projects are subject to a second audit by the SLC based on random samples. There are also additional controls at higher levels of authority. One of these is the project audit, which is carried out on a sample basis. Another is the system audit, where the managing authority and the responsible bodies are examined to ensure that the entire ESF implementation process aligns with the management and control system (VKS).

Answering RQ2: What are possible causes, factors, and effects related to age unemployment?

In addition to theoretical research, the second research question was answered by interviewing the Public Employment Service and the responsible persons of the implementing organizations and a project executing agency.

The results of the content analysis show many similarities and overlaps compared to the theoretical approaches. In summary, it was found that both long-term unemployment and unemployment, in general, have several causes. One of them is economic development, which is of crucial importance. Unforeseen events, such as financial crises, wars, and pandemics, can occur. Demographic characteristics play an essential role for all those who are unemployed. Another crucial aspect is the health situation of people in old age, which impacts performance. Physical performance is limited for people aged 50+, especially in the construction industry. In principle, in addition to physical illnesses, mental illnesses also play a significant role, as, over the years, excessive pressure has arisen in both professional and private life. Discrimination or multiple discrimination based on origin, gender, and language is often the reason for a difficult start in the labor market. Minorities are often affected and must struggle with traditional role models instead.

Besides, it must be considered that older minorities are more often affected by diseases and lower life expectancy. Another important aspect is the outdated qualifications. A lack of further training opportunities and insufficient investment in qualification and cooperation programs is a significant factor that leads to stagnation in the capabilities of those affected. In summary, the theoretical findings and quantitative and qualitative analyses show that older and low-skilled persons are affected by long-term unemployment much more frequently than younger or higher qualified unemployed persons. However, it is noticeable that people with an apprenticeship certificate are also more regularly affected by unemployment. In many cases, this is probably because these people have not exercised their acquired qualifications over a long period, or their occupational profiles are outdated or no longer exist.

Moreover, it is noticeable that the choice of vacancies on the labor market for poorly or unskilled people is becoming smaller and smaller. Among the demographic characteristics, regionality plays an important role. It is more favorable to find a job in urban areas since they are easily accessible by public transport than the mountainous or rural areas. Finally, the question of the duration of unemployment is of utmost importance. Long-term unemployment has negative dynamics since the longer it lasts, the more difficult it is to find a way back into the labor market.

Furthermore, personal risk factors, such as tense self-image and limited self-esteem, should not be underestimated. These individual risk factors endanger both economic existence and psychological well-being. Low esteem and hardly any perception and consideration of the employer or society's abilities lead to feelings of uselessness, fear, and despair. Besides, there exist various prejudices towards the people concerned, such as "Older people are too slow, cost too much money and perform less well, retire soon, are on sick leave more often or cannot cope with the digital and fast-moving world." However, the willingness to be mobile and flexible decreases with age - compared to younger workers, especially in the construction and tourism industries.

The underestimated issue is the biased image of this group of people, often stigmatized and classified as unfit or unwilling to work. It is often overlooked that older people also have more experience. There is a lack of perception and understanding that there is a very high outflow of know-how when people leave this age group, and thus the transfer of knowledge is lost for future generations. Under certain circumstances, a large part of the experience is put at risk. Although this cannot be demonstrated in payroll accounting, it can undoubtedly be seen in companies' performance.

Answering RQ3: What contribution has the ESF made to the reintegration of the long-term unemployed people aged 50+ in Austria?

The EU recommendations and the other measures were examined from the Austrian perspective to address this research question.

The case study was chosen because the target group is the same as the long-term unemployed people aged 50+, and because it is a new project and the persons responsible for project implementation have no experience of the ESF. This is relevant because new project initiators have a unique perspective on the submission and implementation process. This case study provides different ideas from different perspectives. Finally, the sustainability of ESF projects is discussed. The ESF Managing Authority has provided a list of projects for the 2014-2020 funding period (ESF 2020, 2019, 2017a), downloaded as an Excel file from the ESF website. The list of projects applied in this document is dated January 31, 2020. This project list contains 1,129 projects from the beginning of the publication date in January 2014 to January 2020.

Concerning the target group defined in this paper, the long-term unemployed people aged 50+, it can be noted that this group occurs in many projects. However, there are no specifically defined calls for proposals. The results of the EU recommendations show that three critical key results have

already been achieved in Austria. These include developing a new profiling system in the Public Employment Services, a well-established one-stop shop, and close cooperation between employers Public Employment Services and employers. Nevertheless, there are still challenges that Austria must face.

On the one hand, there is still a gap between employers' qualification requirements and the long-term unemployed qualifications. On the other hand, data exchange between Public Employment Services and social services could be further improved. Finally, a specific, individual assessment of the long-term unemployed people needs to be carried out.

Besides the background of demographic change, the area of active and healthy aging is particularly relevant. In Austria, many social non-profit enterprises offer temporary jobs, so-called transit jobs, for the long-term unemployed in cooperation with ESF projects. These combine employment with training and continuous support to overcome possible difficulties.

The long-term unemployed are distributed by the Public Employment Services among different enterprises. The ESF Austria submits annual implementation reports and the corresponding information for citizens. According to the 2018 report, the target group most at risk of poverty, discrimination, or social exclusion was targeted. Furthermore, special attention was paid to marginalized communities, people with disabilities, and the long-term unemployed. By the end of 2018, a total of around 170,000 participants reached the ESF-funded measures.

Many demands have been made in migrants far from the labor market and needs-based minimum income recipients with multiple disabilities. The other calls concerned people with insufficient occupational integration or people far from the labor market and low employability. People with educational disadvantages and low qualifications and people with disabilities, impairments, or handicaps were also considered. Far less frequent were calls among the working poor and Roma/Romnja minorities and alcohol addicts.

Approximately 60% of the budget for the financing period 2014-2020 was approved for implementing projects until the end of 2018. This means that a program budget of around 40% is still available for further projects. As mentioned in the delimitation, this work cannot cover all ESF projects from the project list. Only one case study per federal state was listed, in which the target group of long-term unemployed people aged 50+ could have participated.

The Caritas case study presented, called CARMi, enables the gradual development of employability of minimum income

recipients in the age of 50+ by providing employment, day structure, qualification, individual care, placement, and, if necessary, treatment. After clarifying the employability, Caritas offers a wide range of low-threshold and integrative employment opportunities to the people assigned in the city of Salzburg. Caritas Salzburg has extensive expertise in the implementation of projects for the labor market integration of older people. The planned measures, methods, and care settings provide personal stabilization and a gradual build-up of employability. Employment opportunities are in logistics, administration, sales, and crafts within the framework of a phased plan. Besides, it is intended to organize internships in the regular labor market if the applicant is suitable.

Concerning the intended placement in the regular labor market at the end of the project, various workshops and application training courses offer an ideal supplement. The maximum duration of the project participation is one year plus follow-up support. According to the ex-ante evaluation and the progress report on the partnership agreement, however, the ESF is not directly involved in sustainable development since no environmentally relevant investment measures are planned in the Operational Programme. In summary, the results conclude that, in addition to national measures, the ESF makes an essential contribution to the reintegration of long-term unemployed people aged 50+.

Answering RQ4: How did the long-term unemployment rates of people aged 50+ in the Austrian federal states develop between 2004 and 2019, and which demographic characteristics were significant?

In this section, the research question RQ4 is answered with quantitative evaluations of the Austrian Public Employment Service data sets and related reports. These data were provided by the AMS exclusively for this research. Additional data were obtained from the database, for which a fee was charged by Statistik Austria. An overview of Austria, in general, is given in the subchapter. Subsequently, the figures of the federal provinces are presented.

Long-term unemployment in Austria

For a better overview, this chapter will highlight critical data in Austria to show the ratio of all unemployed individuals to long-term unemployed people aged 50+. Long-term unemployment has increased significantly since the change in Strategy of the AMS in 2014, which led to fewer but longer-lasting measures. Therefore, the figures from 2014 (Arbeitplus.at, 2020) have increased significantly.

All age groups have increased in size over the years. The total number of people in employment has more than doubled in the period 2004-2019. It is striking that the increase was considerable in the middle age group of 55 - 64. This shows that there are more and more older workers in the labor market and reflects the demographic structural development of the population.

From the Austrian point of view, the number of long-term unemployed people in the 50 - 54 age group has slightly decreased, while the number of long-term unemployed individuals in the 55 - 59 age group has remained unchanged. The number of long-term unemployed people aged 60+ has risen somewhat.

In table 1, the long-term unemployment within the employment measures is presented for 2004-2019 to illustrate the difference with the long-term unemployed (NEETS).

According to the figures in table 1, the total number of long-term unemployed people tripled between 2004 - 2019. The age group of 55 - 59 is most affected, followed by 50 - 54 years old.

The ESF has also introduced demographic indicators as a benchmark for project performance. Personal characteristics of the long-term unemployed persons aged 50+ indicate that the men are more affected than the women. Another significant difference concerns nationality. Natives are more affected by long-term unemployment than foreign nationals. The level of education is of great importance. Therefore, the lower the educational level, the higher the risk of drifting into long-term unemployment. People with primary education and those who have completed an apprenticeship are most often affected. After all, about half of them suffer from health restrictions.

Comparison of the Austrian federal states

The long-term unemployed are now examined in more detail and differentiated by region and other demographic criteria in table 2.

Table 2 provides an overview of the average number of long-term unemployed persons aged 50+ in Austrian federal states in 2004 - 2019. The results show that the provinces of Carinthia, Upper Austria, and Tyrol have recorded a massive increase. Comparing the last two years, 2018 and 2019, the numbers have increased by almost nine percent. Nevertheless, in 2019 Vienna also has the highest number of long-term unemployed persons in this age group.

In Burgenland, the number of unemployed persons in this age group has decreased from 2004 to 2014. From 2014, however, long-term unemployment of this group of people has risen significantly, and by 2017 the number has almost quadrupled. In 2018 it fell slightly and rose very moderately in 2019. In Carinthia, this number almost tripled between 2004 and 2014. In 2014-2017, the number of long-term unemployed persons in this age group has more than doubled. In this federal state, this number has increased by 8% in the annual comparison of the period 2018-2019.

In Lower Austria, the long-term unemployment of people aged 50+ was low in 2004-2014. In the years from 2015 to 2017, this number more than doubled, while from 2018 onwards, it has slightly decreased. Apart from Vienna, Lower Austria is also the most affected region by long-term unemployment of people aged 50+. Upper Austria's long-term unemployment among the people in the age group 50+ was deficient from 2004 to 2014. In the years 2015-2017, the number of these people increased by more than eight times. On the contrary, this number has fallen slightly again from 2018 onwards.

Federal state Salzburg experienced a similar trend from 2004 to 2014, followed by a significant increase in the years 2014 to 2019, when the values have almost quadrupled. A comparison

of the last two observed years (2018 and 2019) shows that this number has increased minimally. However, federal state Salzburg has the lowest number of long-term unemployed people aged 50+ after federal states Vorarlberg and Tyrol.

The decrease and increase of long-term unemployed persons in this age group can also be observed in Styria. Long-term unemployment in this federal state increased almost fivefold from 2014 to 2017. However, this number has slightly decreased from 2018 onwards.

In Tyrol, the number of long-term unemployed persons quadrupled in the period from 2004 to 2014. In the period from 2014 to 2017, this number has hardly doubled. It is remarkable in this federal state that the number of long-term unemployed persons in the age group of 50+ has decreased significantly from 2018 onwards.

Contrary to the trend in Vorarlberg, the number of long-term unemployed in the years 2004-2006, 2009, and 2010 is higher than in 2014. However, in the years 2014-2017, the number has almost tripled. In the comparison of the last two years, 2018-2019, the number has decreased minimally.

In Vienna, long-term unemployment of people aged 50+ fall rapidly from 2004 to 2005 and was very low in the period

Table 1. Long-term unemployed people in the context of employment measures for the individuals aged 50+ in Austria (annual average 2004 – 2019)

Year	50 to 54 years	55 to 59 years	60 to 64 years	65 years and older	Total Sum (50+)
2004	6.272	6.772	2.760	137	15.941
2005	5.702	5.226	2.163	122	13.212
2006	5.554	4.803	1.632	118	12.107
2007	5.190	4.361	1.489	115	11.155
2008	4.763	4.072	1.615	112	10.562
2009	4.908	3.891	1.542	99	10.439
2010	6.078	4.267	1.493	93	11.931
2011	6.267	4.551	1.762	92	12.672
2012	6.623	5.147	2.104	84	13.958
2013	8.379	6.938	2.553	91	17.960
2014	13.021	12.218	3.993	113	29.345
2015	16.714	16.826	5.621	140	39.300
2016	17.937	19.257	6.796	165	44.155
2017	17.815	21.284	7.961	181	47.241
2018	15.104	20.461	8.258	221	44.045
2019	14.354	20.748	8.814	279	44.194

Source: Illustration of the own analysis based on specific AMS data

Table 2. Long-term unemployed persons aged 50+ in Austria (annual average 2004 – 2019, by federal states)

Year	Burgenland	Carinthia	Lower Austria	Upper Austria	Salzburg	Styria	Tyrol	Vorarlberg	Vienna	Austria
2004	311	236	2.406	41	151	1.028	146	200	5.721	10.238
2005	262	212	2.046	16	118	857	145	206	1.592	5.453
2006	191	187	1.301	15	93	695	140	173	557	3.353
2007	103	208	682	8	96	657	145	78	354	2.331
2008	109	256	738	12	106	696	145	65	298	2.425
2009	166	320	1.071	25	126	459	186	177	254	2.783
2010	136	352	1.086	47	114	275	216	224	172	2.622
2011	79	311	939	29	112	227	191	48	167	2.104
2012	114	265	1.050	52	128	419	252	48	86	2.413
2013	119	393	1.465	71	132	366	340	59	76	3.022
2014	250	746	2.664	305	211	723	605	156	181	5.841
2015	606	1.355	4.789	1.390	435	2.010	945	350	3.336	15.216
2016	907	1.699	6.094	2.388	637	3.081	1.058	444	8.031	24.339
2017	976	1.815	7.113	3.247	761	3.576	1.085	469	9.080	28.122
2018	901	1.804	6.595	2.969	758	2.886	803	471	9.028	26.213
2019	924	1.954	6.171	2.594	769	2.848	674	421	9.859	26.214

Source: Illustration of the own analysis based on specific AMS data

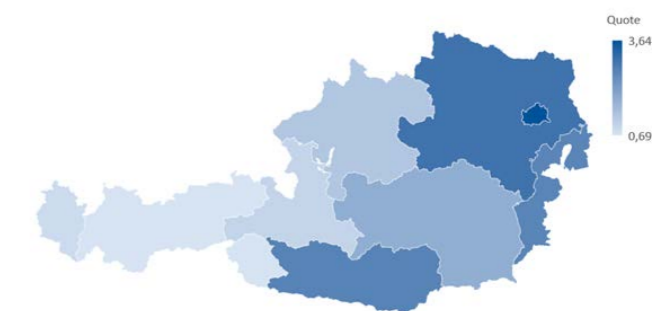
from 2005-2014. On the contrary, the number has risen dramatically in the years from 2015 to 2019. A peak was recorded in 2019. Vienna is also the city most affected by long-term unemployment among the people in the age group 50+.

Long-term unemployment of people in the age group 50+ has become significantly more critical in Austria from the middle of 2010. Previously, the share of long-term unemployed persons in the age group 50+ was low. The total number of employed persons more than doubled in the period from 2004 to 2019. As the theoretical conclusions in this research indicate, the figures also reflect demographic differences. The ESF also uses demographic indicators as a benchmark for project performance. The demographic graphs show significant differences in gender, age, nationality, education level, health status, and occupation. Besides, there is a correlation between qualifications and the occupations concerned. Unskilled workers or persons with apprenticeship training in administration, cleaning, trade, and construction are more affected by long-term unemployment. According to the data, the total number of long-term unemployed tripled in the period from 2004 to 2019. The age group of 55 to 59 years old is the most affected, followed by those aged from 50 to 54.

Finally, figure 5 sorts the Austrian federal states according to

the number of employed and long-term unemployed persons aged 50+ in the year 2019.

Figure 5. Comparison of Austrian federal states according to the number of employed and long-term unemployed persons aged 50+



Source: Illustration of the own analysis based on specific AMS data

Figure 5 shows that regarding long-term unemployed persons aged 50+, the most affected federal states are Vienna, Lower Austria, Burgenland, and Carinthia. In the ESF+ for the following funding period 2021 - 2027, the possible potential for improvement was identified. The preparations for the ESF+ are proceeding according to plan. A continuous negotiation process is underway in the programming process. There is

a close exchange with the European Commission and the funding bodies to prepare the ESF+ in the best possible way in terms of content and administration. Besides, preparations for the new Operational Programme ESF+ have begun. All information will therefore be published in detail on the ESF homepage. The following funding period's potential for improvement was identified and worked out based on the content analysis of questionnaires. Some considerations are summarised in the next section.

Discussion

Contribution of the paper to the conceptual knowledge

Within the theoretical part, the causes and factors of long-term unemployment were elaborated to understand the situation of the target group concerned. The individual risk factors were also covered. Finally, discrimination against older people in the labor market and poverty and social exclusion were addressed. The results of the content analysis, compared to the theoretical approaches, show many commonalities and overlaps.

In summary, it was found that long-term unemployment and unemployment, in general, have several causes. One of them is economic development, which is crucial. Unforeseen events can occur, such as economic crises, wars, and pandemics. Demographic characteristics play a significant role for all unemployed persons. Another decisive aspect is the health situation of older people, which impacts performance. Physical capacity is limited for people aged 50+, particularly in the construction industry. In principle, in addition to physical illnesses, mental illnesses also play a significant role, as excessive pressure has occurred over the years in both professional and private life. Discrimination or multiple discrimination based on origin, gender and language are often the reasons for a difficult start in the labor market. Minorities are often affected and must struggle with traditional role models instead.

Furthermore, it must be considered that older minorities are more often affected by diseases and a lower life expectancy. A further significant aspect is the outdated qualifications. The lack of offers for further training and insufficient investment in qualification programs and cooperation programs is a significant factor that causes the qualifications of those concerned to remain stagnant. In summary, the theoretical knowledge and quantitative and qualitative analyses indicate that older and low-skilled persons are affected by long-term unemployment much more frequently than younger or higher

qualified unemployed persons. However, it is noticeable that persons with an apprenticeship certificate are more frequently affected by unemployment. In many cases, this can probably be attributed to the fact that these persons have not exercised their acquired qualifications over a more extended period or that the occupational profiles are outdated or no longer exist. Moreover, it is noticeable that the selection of vacancies on the labor market for poorly or untrained people is becoming increasingly smaller.

Contribution to the practice

As a result, there is a clear need to streamline management and simplify ESF implementation. This need has been recognized at the European level and partly reflected in the new regulations' proposals. The requirements are rigorous in form and content and remain highly administrative, despite some improvements compared to previous periods. Smaller project promoters are often affected by these criteria. Although they have excellent ideas and experience in dealing with the unemployed and people at risk of poverty, they are excluded from the ESF outset. Because they have neither the necessary human nor technical resources, these bureaucratic requirements are a significant hurdle.

In summary, the following solutions were proposed to reduce the bureaucratic burden: simplifying audit manuals, formal criteria, guidelines, and the use of more straightforward and more understandable language. In addition to the bureaucracy, the time management of the submission phase was also addressed. The time between the call for proposals and submission, which is difficult for project initiators to manage in the ordinary course of business, is minimal. This point is very relevant for new applicants who have no experience with the ESF.

Another aspect is more intensive training and communication with management bodies. More intensive training of all those involved is essential when new, simplified accounting methods are introduced. As all audit manuals are published on the homepage, it would be a considerable simplification if there were access to audit checklists. It is assumed that the audit is conducted following these guidelines. In addition to the content implementation processes, the topics of the participants were also addressed. Key issues such as the reimbursement of travel expenses and, if necessary, psychotherapeutic and medical care are of great importance for the target group of the long-term unemployed in the age group of 50+. As the theoretical approaches and the interviews have already indicated, this target group usually must cope with physical and psychological health consequences. Besides, regional differences generally make access to the project location more difficult, which involves travel costs. It would

be useful for these calls to make special arrangements to pay travel costs and additional medical care.

Cooperation between the Laender was also addressed, but this project design issue needs to be discussed further. As far as the implementation of projects in ESF+ is concerned, the knowledge and experience already acquired will be applied and built on future economic developments. Future strategies must include new approaches, instruments, and measures that address the target groups of 50+ and people with mental health problems. In this context, the pandemic COVID-19 will be crucial for the development of the Strategy, as this dramatic event has created many new challenges in terms of unemployment. Digitalization was also raised as an issue. More intensive use of digital media and databases will play an essential role in the future. The ESF+ aims to create further simplifications for all stakeholders and thus improve the image of the ESF. In the long term, ESF Austria plans to establish itself as a trademark of Europe's social dimension.

Conclusion

For the last 60 years, the ESF has been the EU's main financial instrument for investing in people, helping them find jobs, and creating fairer employment opportunities for all EU citizens. The ESF aims to improve employment and education opportunities and the situation of the most vulnerable people, such as those at risk of poverty. The Treaty of Rome had already laid the foundations, and the first funding programs were implemented in 1975.

The ESF had been part of the funding landscape since Austria's accession to European Union 25 years ago. Austria's primary focus is on promoting social integration, especially of disadvantaged groups and groups at risk of exclusion. For this reason, projects to prevent and combat unemployment, reduce school drop-out rates, and promote equal access to lifelong learning are supported. A budget of around 875 million euros was available for the labor market and qualification projects in the funding period 2014 - 2020. The ESF is co-financing about half of the costs of applicants with around EUR 442 million. The Operational Programme defined strategies for the Union's Strategy for smart, sustainable, and inclusive growth in economic, social, and territorial cohesion in 2014 - 2020.

Calls for proposals are published on the ESF website, based on the OP priorities and actions defined on the ESF website. The Managing Authority publishes all calls, regulations, and results and has overall responsibility for implementing and delivering the ESF program. Both the theoretical approaches and the analyses of the research questions show that, based

on statistical data, it is essential to recognize the problem of long-term unemployment among the target group and identify the causes and take appropriate measures time. For this reason, targeted projects at the national level and ESF-funded projects are relevant for the reintegration of the long-term unemployed persons.

The results of the quantitative method show a substantial increase in long-term unemployment over the period from 2004 to 2019. In addition to the research questions, this paper gives a brief insight into the subsequent ESF+ funding period 2021 - 2027 and possible improvement potential. The results indicate that further simplifications in implementation are planned. Also, the European Commission proposes a total budget of 101 billion euros for the ESF+. Priority will be given to modernizing strategic infrastructure, strengthening human capital for competitiveness, improving working and living conditions, and environmental sustainability. The ESF+ financial measures contribute to implementing the objective defined in Employment Guidelines, the European Semester overall objective of Policy Coordination smart, inclusive, and sustainable growth after 2020.

Implications for future research

Due to the global pandemic outbreak in early 2020, it appears that the group of long-term unemployed persons aged 50+ will increase dramatically. One reason for this will undoubtedly be the economic recession, with the tourism and accommodation sector being hit hard. Another point could be that the target group of the persons in the age of 50+ will receive less attention than before, due to many unemployed and the budget will be used for other measures, such as short-time work. In the future, it will be challenging for this target group to get out of unemployment quickly after this incident, as the benefits are likely to increase concerning older people with health restrictions. Finally, due to the Covid-19 pandemic, much attention has been paid to health issues. Even though the economy has recovered, it is advisable to offer more targeted projects for long-term unemployed people in the age group of 50+. The aging of society continues in general.

It would be interesting to investigate further how the number of long-term unemployed persons aged 50+ in Austria will develop, mostly based on demographic characteristics, such as the differences between urban and rural areas. This research dealt with ESF implementing organizations' perspectives, including a case study that presented the project organization's view. For the future analysis, however, qualitative research based on interviews and questionnaires with the affected long-term unemployed persons aged 50+ and their perspectives would be interesting.

Limitations

This paper refers exclusively to the ESF for the 2014 - 2020 programming period, focusing on long-term unemployment among persons aged 50+. It is generally considered from an Austrian perspective. From the European perspective, the regulations and guidelines for implementation in Austria are

presented. It is not the aim of this paper to compare European countries or give project implementations on a purely national level. The objective of the national comparison is to provide general statistical data on long-term unemployment and to present ESF projects that also support the target group of long-term unemployed people in the age of 50+.

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Evropski socialni sklad podpira ponovno vključitev dolgotrajno brezposelnih posameznikov v starostni skupini 50+ na trg dela - primerjava zveznih dežel v Avstriji

Izvleček

Ta članek obravnava pomen Evropskega socialnega sklada (ESS) pri vključevanju naraščajočega števila dolgotrajno brezposelnih v starostni skupini 50+ na trg dela v zadnjih letih v Avstriji. Zastavljena so štiri raziskovalna vprašanja, ki obravnavajo osnove in prispevek ESS, možne vzroke dolgotrajne brezposelnosti in njihov odraz v številkah. V okviru kvalitativne metodologije so bili opravljeni intervjuji s strokovnjaki in izvedena študija primera. V okviru kvantitativne metode so bili ovrednoteni neobdelani podatki Javnega zavoda za zaposlovanje (AMS Avstrija) in avstrijskega statističnega urada. Ugotovljena je bila povezava med vsebinskimi ocenami teoretičnih pristopov, strokovno analizo in statističnimi podatki. Za boj proti dolgotrajni brezposelnosti v tej ciljni skupini je treba pravočasno ugotoviti vzroke in sprejeti ustrezne ukrepe za njeno preprečevanje.

Ključne besede: trga dela, dolgotrajno brezposelni v starostni skupini 50+, Evropski socialni sklad, Avstrija

NAVODILA AVTORJEM

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Morebitne tabele in slike naj bodo črno-bele in oštevilčene ter naslovljene nad, opombe in viri pa pod tabelo oziroma sliko. Vse tabele in slike pošljite tudi v izvornih datotekah (.xls, .ppt in podobno).

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Nekaj osnovnih napotkov:

Navedbe virov v tekstu

Primer 1a: Another graphic way of determining the stationarity of time series is correlogram of autocorrelation function (Gujarati, 1995).

Primer 1b: Another graphic way of determining the stationarity of time series is correlogram of autocorrelation function (Gujarati, 1995, p. 36).

Primer 2a: Engle and Granger (1987) present critical values also for other cointegration tests.

Primer 2b: Engle and Granger (1987, p. 89) present critical values also for other cointegration tests.

Navedbe virov v seznamu virov

Primer 1 – Knjiga: Gujarati, D. N. (1995). *Basic Econometrics*. New York: McGraw-Hill.

Primer 2 – Članek v reviji: Engle, R. F., & Granger, C. W. J. (1987). Co-integration and Error Correction: Representation, Estimation and Testing. *Econometrica*, 55(2), 251-276.

Primer 3 – Poglavlje v knjigi, prispevek v zborniku: MacKinnon, J. (1991). Critical Values for Cointegration Tests. In R. F. Engle & C.W. J. Granger, (Eds.), *Long-Run Economic Relationships: Readings in Cointegration* (pp. 191-215). Oxford: University Press.

Primer 4 – Elektronski vir: Esteves, J., Pastor, J. A., & Casanovas, J. (2002). *Using the Partial Least Square (PLS): Method to Establish Critical Success Factors Interdependence in ERP Implementation Projects*. Retrieved from <http://erp.ittoolbox.com/doc.asp?i=2321>

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References in the text

Example 1a: Another graphic way of determining the stationarity of time series is correlogram of autocorrelation function (Gujarati, 1995).

Example 1b: Another graphic way of determining the stationarity of time series is correlogram of autocorrelation function (Gujarati, 1995, p. 36).

Example 2a: Engle and Granger (1987) present critical values also for other cointegration tests.

Example 2b: Engle and Granger (1987, p. 89) present critical values also for other cointegration tests.

References in the list of references

Example 1 – Book: Gujarati, D. N. (1995). *Basic Econometrics*. New York: McGraw-Hill.

Example 2 – Journal article: Engle, R. F., & Granger, C. W. J. (1987). Co-integration and Error Correction: Representation, Estimation and Testing. *Econometrica*, 55(2), 251-276.

Example 3 – Book chapter or article from conference proceedings: MacKinnon, J. (1991). Critical Values for Cointegration Tests. In R. F. Engle & C.W. J. Granger, (Eds.), *Long-Run Economic Relationships: Readings in Cointegration* (pp. 191-215). Oxford: University Press.

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