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O ČASOPISU

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ARTICLES – ČLANCI

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The performance of Croatian hotel companies – DEA window and Malmquist productivity index approach*

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Abstract

The hospitality industry operates in a dynamic and competitive environment where efficiency and productivity are crucial for sustainable success. The main goal of this paper is to assess the dynamic changes in the efficiency and productivity of large and very large Croatian hotel companies and to investigate whether their location influences these factors. It also aims to determine how resilient the companies are to macroeconomic shocks and to identify the causes of inefficiency and productivity changes separately for each location. The analysis is conducted for 70 large and very large hotel companies in total and separately for those in coastal and the continental Croatia from 2017 to 2022 using the Window Data Envelopment Analysis and the Malmquist Productivity Index. The results show a slight decrease in relative efficiency in 2020 due to the impact of the COVID-19 pandemic. The main cause of inefficiency for coastal hotel companies throughout the period is management performance and other exogenous factors. Conversely, the main cause of inefficiency for continental hotel companies shifted from non-optimal production size to management and other exogenous factors after 2020. Productivity declined between 2019 and 2020 due to the decline in technological change for companies in both locations. Prior to 2020, coastal and continental hotel companies followed a similar trend. While coastal hotels recovered faster in 2021, continental hotels recovered more steadily and achieved higher productivity in 2022. This research provides valuable insights for hotel managers and academics seeking to navigate the ever-changing field of hotel management.

Keywords: *hotel companies, efficiency, productivity, Malmquist Productivity Index (MPI), Window Data Envelopment analysis,*

JEL classification: *C67, D24, G14*

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1. Introduction

The hotel industry is one of the most important economic sectors driving socio-economic development worldwide, especially in Mediterranean countries such as Croatia, where the travel and tourism sector accounts for 25.8% of GDP which is by far the largest share in the EU (Statista 2023). However, traditional hotels face the challenge of maintaining and improving efficiency as the accommodation industry has been affected by the pandemic in 2020 (Dogru et al., 2023; Ozdemir et al., 2021). Accordingly, all accommodation providers in Croatia experienced a decline in tourist arrivals and overnight stays compared to the last year's period. Hotels recorded the sharpest decline in overnight stays, with a drop of 60.7% in July 2020 compared to the same month in 2019 (Rašić, 2020).

Efficiency and productivity are of the utmost importance in the Croatian hotel industry given the increasing demand for high-quality services. Highly efficient companies achieve greater increases in market share and profits through international trade than their less efficient counterparts (Melitz, 2003). Efficient hotel management not only ensures that day-to-day operations run smoothly but also contributes to the country's positive image in tourism. Streamlining processes, from reservation systems to check-in/out procedures, not only improves the guest experience but also enables hotels to manage the growing influx of visitors smoothly. In addition, the productivity of hotels has a direct impact on the economic benefit to local communities. Well-managed hotels create employment opportunities, promote economic growth, and provide jobs for many people. Focusing on productivity also means that the use of resources contributes to sustainability efforts and is in line with Croatia's commitment to responsible tourism. Leveraging technological advancements, investing in staff training, and adopting sustainable practices are crucial steps to ensure Croatian hotels remain at the forefront of the hospitality industry. This will not only raise the country's tourism profile but also promote economic growth and cultural exchange.

This paper aims to evaluate the dynamic changes in the efficiency and productivity of large and very large Croatian hotel companies. In this way, the causes of inefficiency and productivity of these companies will be identified. The results will provide managers with valuable insights into the factors that influence the efficiency and productivity of these hotel companies.

There are two common methodological approaches to evaluating hotel efficiency and productivity: the parametric (stochastic frontier), where estimates are made using econometric techniques, and data envelopment analysis (DEA), a non-parametric approach based on mathematical programming (Oukil et al., 2016). The DEA is the most commonly used method for assessing efficiency and productivity in sectors associated with hospitality and tourism (Assaf and Josiassen, 2016). Researchers evaluating hotel efficiency and productivity prefer DEA because

it offers more flexibility in terms of the assumptions imposed on the estimated production function (Chatzimichael and Liasidou, 2019). The key advantage of this approach is the ability to evaluate the efficiency of individual hotels and identify the factors that explain differences in efficiency. This paper measures the efficiency and productivity of Croatian hotel companies within the Data Envelopment Analysis (DEA) framework. The DEA window analysis is used to assess efficiency and the Malmquist Productivity Index (MPI) is used to assess the change in total factor productivity of each hotel between two periods from 2017 to 2022.

The geographical location of hotels can contribute to the differences in their efficiency. Different locations often have different levels of economic development, labor costs, and market demand, all of which can affect the efficiency of hotels (Cordero and Tzeremes, 2017; Zhou et al., 2008). Accordingly, this paper attempts to offer new empirical insights into hotel companies in two major Croatian regions, the coastal and the continental regions. In particular, the focus is on evaluating their efficiency and productivity over six years (2017–2022) characterized by significant changes in the tourism industry due to the COVID-19 pandemic, which has slowed down foreign and domestic demand.

This paper consists of 6 sections. After the introduction, the rest of the paper is structured as follows. Section 2 reviews the relevant literature on efficiency and productivity evaluation in the hotel industry. Section 3 presents the methodology used, i.e. the window DEA and the MPI, while Section 4 focuses on the model specification, variable selection, and empirical analysis. Section 5 contains the results and a discussion, while Section 6 concludes the paper.

2. Literature review

The importance of measuring efficiency and productivity in the tourism industry has been repeatedly emphasised in the relevant literature. Efficiency and productivity assessment has become an important improvement tool for hotel companies to measure hotel performance. Chen (2007) argues that evaluating hotel efficiency is important from a strategic perspective because it enables performance comparisons between competing hotels, provides control over organizational outcomes, and facilitates the comparison of profits generated by different inputs. The hotel industry is facing increasing global competition, which is impacting hotel profitability and emphasising the need to increase efficiency (Assaf and Cvelbar, 2011). Early on, Lee-Ross and Ingold (1994) pointed out the need to develop appropriate productivity indices that would allow researchers to accurately capture the various productivity changes in hotel operations. Given the need for such methodological tools, DEA has emerged as one of the most widely used methods for assessing the production frontier of hotels.

The first application of DEA to the hospitality industry, in particular the restaurant sector, was in 1986 by Banker (1986) and Morey and Johns (1997), who used DEA to evaluate and benchmark the productivity of a chain of 15 hotels. Assaf and Agbola (2011) applied the double bootstrap DEA approach to evaluate the technical efficiency of Australian hotels from 2004 to 2007. The results indicate a gradual improvement in the average technical efficiency of Australian hotels. The most important determinants influencing the technical efficiency of Australian hotels are the number of years in business, location, star rating and physical size. Xu and Chi (2017) used a DEA window analysis to evaluate the operating efficiency of US hotels and found that hotels with higher operating efficiency had better financial performance. Tekiner (2023) used the CRS and VRS input-oriented DEA to evaluate the efficiency of 88 hotels in Cappadocia, Turkey, in 2020 during the Covid-19 pandemic period and found that revenue per available room is one of the main reasons for inefficiency.

The MPI (Caves et al., 1982) has been used to measure changes in productivity over time. The first applications of the MPI approach based on DEA to measure and decompose the productivity of different hotel sectors were carried out by Hwang and Chang (2003) and Barros and Alves (2004). Sun et al. (2015) applied the MPI to examine the productivity of the tourism industry in China from 2001 to 2009. Their results show that the most important factor for productivity changes is technological change. Barros and Alves (2004) used an output-oriented MPI based on DEA to evaluate the efficiency of 42 hotels of a Portuguese publicly owned hotel chain in the period 1999-2001. They found that most hotels underwent efficient technical change but did not experience technological change. Tourism is an industry that reacts very sensitively to crises and economic shocks. Cordero and Tzeremes (2017) evaluated the productivity of hotels in the Spanish Balearic and Canary Islands between 2004 and 2013. Their results show that the economic crisis had a significant negative impact on hotel productivity, especially in 2008 and 2009, after which hotels experienced a renewed increase in productivity due to technological advances and other innovations. Frančeškin and Bojnec (2023) used the MPI to evaluate the performance of Slovenian hotel companies from 2001 to 2018. The results show a decrease in total factor productivity, primarily due to the challenges of introducing new production technologies, which were exacerbated by the economic crisis in 2008. Like global economic crisis, Covid-19 pandemic had a strong negative impact on the global tourism and led to a decline in tourism productivity worldwide in 2020 (Kim et al., 2021). These studies have shown that the MPI not only evaluates the efficiency changes for each DMU, but also provides insights into the causes of these changes.

The application of DEA at the regional level is only found to a limited extent in the literature. Differences in regional economic development, market demand, and labor costs influence the efficiency of hotels. Several researchers evaluated hotel

efficiency taking into account their location. Solana-Ibanez et al. (2016) found that Spanish hotels on the coast are more efficient than hotels in other locations. Lado-Sestayo and Fernandez-Castro (2019) also evaluated the efficiency of hotels in different regions of Spain and found differences in efficiency between them. Barros et al. (2011) found significant differences in the efficiency of French tourism regions. Barros (2005a, 2005b) used DEA to examine the factors that influence efficiency within a Portuguese hotel group and found a statistical relationship between establishment location and the efficiency achieved. Pulina et al. (2010) applied DEA window analysis to assess and analyze dynamic changes in the efficiency of the Italian hotel industry. Their study suggests that Sardinia could be considered as a region *falling further behind*, while certain regions in northern and central Italy could be considered *moving ahead*. A similar study was conducted by Karakitsiou et al. (2020) who evaluated the efficiency of the hotel and restaurant industry in all thirteen regions of Greece using the DEA. Their results show that Attica and South Aegean can be classified as *progressing* regions, while regions such as Thessaly, Central Macedonia, Central Greece, and Epirus can be considered *declining* regions.

As for Croatia, most studies focus on assessing the efficiency of the tourism industry when Croatia is one of the countries observed (Cvetkoska and Barišić, 2014; 2017) or at the level of Croatian counties (Rabar and Blažević, 2011; Hodžić and Alibegović, 2019), using data at the country or county level. Only a few studies have been conducted on the efficiency and productivity of Croatian hotels, using data at the company level. Poldrugovac et al. (2016) used an output-oriented BCC model and applied it to the hotels' internal accounting data. The results show that the average efficiency is high and that there is a significant relationship between size and hotel efficiency. Pervan and Babic (2021) conducted a study on a sample of 69 large and medium-sized hotels operating in Croatia in 2019. In the first stage, they used the DEA to assess hotel efficiency, and in the second stage, they conducted a truncated regression model using the results obtained in the first phase as the dependent variable and hotel ownership, age, location, size, and star rating as independent variables. The study results showed that all the variables analyzed (except age) play a significant role in determining the level of efficiency achieved.

Although the existing literature has made remarkable progress in the study of hotel efficiency, there is still room for further progress in this area. Furthermore, research on efficiency and productivity at the level of Croatian hotel companies is scarce or non-existent. To the best of the author's knowledge, there are no studies on efficiency using the window DEA analysis and productivity using the MPI within the DEA framework for Croatian hotel companies, as well as efficiency and productivity analyses at the hotel company level that take into account the location of a company. In view of this, this paper aims to fill that gap.

3. Methodology

Data Envelopment Analysis (DEA) is a widely recognized method originally introduced by Charnes et al. (1978) to evaluate the efficiency of a group of similar decision making units (DMUs) considering multiple inputs and outputs. It is a non-parametric method based on linear programming that measures relative efficiency by calculating the ratio between weighted inputs and weighted outputs for each DMU, which in this paper are large and very large hotel companies in Croatia. The efficiency score can vary between 0 and 1. DMUs with an efficiency score of 1 are considered efficient, and DMUs with an efficiency score below 1 are considered relatively inefficient. Relatively efficient DMUs cannot increase their output without either increasing some inputs or decreasing other outputs, and conversely they cannot decrease their input without either decreasing some outputs or increasing other inputs. DEA was originally developed to measure efficiency in the public sector, but due to its advantages, such as the ability to accommodate multiple inputs and multiple outputs in different units, it was soon recognized and used in the private sector as well. It is important to emphasize that DEA measures relative and not absolute efficiency. This means that DMUs that are considered relatively efficient serve as a benchmark for the relatively inefficient DMUs. The best-known DEA models are the CCR model and the BCC model. The CCR model (Charnes et al.,1978) assumes constant returns to scale (CRS) ($u_0 = 0$), i.e. if inputs increase, outputs also increase proportionally. They presented the following model:

$$\max \theta = \frac{\sum_{r=1}^{s} u_r y_{r0}}{\sum_{i=1}^{m} v_r x_{i0}}$$

$$\text{Subject to } \frac{\sum_{r=1}^{s} u_r y_{r0}}{\sum_{i=1}^{m} v_r x_{i0}} \leq 1, \quad j = 1, \ldots, n; \tag{1}$$

$$\text{with } u_r, v_i > 0, \quad i = 1, \ldots, m; \; r = 1, \ldots, s$$

Where y_{rj}, $x_{ij} > 0$ represent input and output for DMU j, θ stands for relative efficiency, $(x_{1j},...,x_{mj})$ is input vector of DMUj with the input weight vector $(v_1,...,v_m)$, and $(y_{1j},...,y_{qj})$ is the output vector of DMUj with the output weight vector $(u_1,...,u_q)$.

This method was further extended by Banker et al. (1984) (BCC model), who assume variable returns to scale (VRS) ($u_0 \neq 0$), where an increase in inputs does not necessarily have a proportional effect on output.

$$\max \theta = \frac{\sum_{r=1}^{s} u_r y_{r0} - u_0}{\sum_{i=1}^{m} v_r x_{i0}}$$

$$\text{Subject to } \frac{\sum_{r=1}^{s} u_r y_{r0} - u_0}{\sum_{i=1}^{m} v_r x_{i0}} \leq 1,\ j = 1, \ldots, n;\ u_r, v_i \geq 0 \qquad (2)$$

with u_0 unrestricted in sign.

In addition to the choice of model, the orientation of the model must also be selected when performing a DEA. Two main types of DEA orientation are input-oriented and output-oriented models. The orientation of the DEA should be chosen based on the goals of the DMUs. In an input-oriented model, the goal is to minimize inputs while producing a certain level of outputs, while in an output-oriented model, the goal is to maximize outputs for given inputs.

A fundamental guideline in the DEA application is to ensure that the number of DMUs exceeds three times the sum of inputs and outputs. Failure to comply with this criterion can lead to the formation of numerous seemingly efficient units, which reduces the discriminatory power of the model. The window DEA analysis is used for addressing this issue. It evaluates the efficiency of DMUs compared to their historical values and other DMUs over different periods. Selecting an optimal window size is crucial to avoid unfair comparisons over time. Asmild et al. (2004) emphasize that while the window should be as small as possible to minimize temporal differences, it must also be large enough to obtain an adequate sample size. This balance ensures a robust and fair assessment of DMU performance and increases the DEA model reliability in capturing efficiency variations over time.

The application of DEA covers many different areas, including banking (Kamarudin et al., 2019; Učkar and Petrović, 2021) education (Arbula Blecich, 2020; Arbula Blecich and Tomas Žiković, 2016; Navas et al. 2020), health (Dukić Samaržija et al., 2018; Top et al., 2020), R&D (Arbula Blecich, 2021; Du and Seo, 2022), energy (Vlahinic-Dizdarević and Šegota, 2012) among others.

3.1. Window DEA

A major limitation of the DEA was the inability to track efficiency fluctuations over time. Among the various methods that address this problem, window DEA analysis proves to be a robust approach to assess changes dynamically in DMU efficiency. Unlike conventional DEA models such as the CCR and BCC models, which evaluate relative efficiency within a single period, window DEA analysis is a dynamic method in which individual DMUs are treated as different units over different periods. This framework allows the inclusion of a relatively larger number of inputs and outputs compared to the number of DMUs, which increases discriminatory power, especially in scenarios with a limited number of DMUs

(Halkos and Tzeremes, 2009). It also allows a comparative analysis of the efficiency of each DMU in a given period compared to their performance in other periods.

In order to clarify and articulate the dynamic shifts in the efficiency of selected DMUs, the window DEA relies on the moving average method. This means that when observing changes over time, the first (oldest) period in each shift window is replaced by the following period. The window DEA method is used to evaluate the relative efficiency of hotels in successive time periods. A moving time window is defined and efficiency scores are calculated for each hotel company within this window. The dynamic nature of the analysis allows efficiency trends to be identified over time.

A set of DMUs N (n = 1,…, N) uses r inputs to produce s outputs in a time period T (t = 1,…, T). DMU_n^t indicates the quantity of inputs or outputs for DMUn in time period *t*. The input vector (X_n^t) and the output vector (Y_n^t) are represented as follows (Jia and Yuan, 2017):

$$X_n^t = \begin{bmatrix} x_n^{1t} \\ \vdots \\ x_n^{rt} \end{bmatrix} \qquad Y_n^t = \begin{bmatrix} y_n^{1t} \\ \vdots \\ y_n^{st} \end{bmatrix} \tag{3}$$

If we assume that the window starts at time k ($1 \leq k \leq T$) and the window length is p ($1 \leq w \leq T\text{-}k$), then the input (Xkw) and output (Ykw) matrices of each window (kw) are as follows (Jia and Yuan, 2017):

$$X_{kw} = \begin{bmatrix} x_1^k & x_2^k & \cdots & x_N^k \\ x_1^{k+1} & x_2^{k+1} & \cdots & x_N^{k+1} \\ \vdots & \vdots & \ddots & \vdots \\ x_1^{k+w} & x_2^{k+w} & \cdots & x_N^{k+w} \end{bmatrix}$$
$$Y_{kw} = \begin{bmatrix} y_1^k & y_2^k & \cdots & y_N^k \\ y_1^{k+1} & y_2^{k+1} & \cdots & y_N^{k+1} \\ \vdots & \vdots & \ddots & \vdots \\ y_1^{k+w} & y_2^{k+w} & \cdots & y_N^{k+w} \end{bmatrix} \tag{4}$$

When inputs and outputs of DMU_n^t are substituted into CCR (1) and BCC (2) models, the results of the DEA window analysis are obtained.

The number of data points is calculated as follows:

$$w = k - p + 1 \tag{5}$$

$$\textit{Number of} \text{ different } \textit{DMUs} \ (\textit{data points}) = n * p * w \tag{6}$$

where:

n = number of DMUs (in our case no. of hotel companies),

p = length of window,

w = number of windows and

k = number of periods

For a 6-year period (2017-2022) and a 2-year window, the calculation of the number of data points is as follows:

$w = 6 - 2 + 1 = 5$

Number of 'different' *DMUs* (*data points*) – *full sample* = $70 * 2 * 5 = 700$

Number of 'different' *DMUs* (*data points*) – *coastal Croatia* = $56 * 2 * 5 = 560$

Number of 'different' *DMUs* (*data points*) – *continental Croatia* = $14 * 2 * 5 = 140$

It can be noted that there are more than enough data points for each sample to conduct the analysis.

CCR efficiency corresponds to Technical Efficiency (TE), which reflects a company's ability to use the given inputs to maximize outputs, assuming an optimal operating size. The BCC model evaluates Pure Technical Efficiency (PTE) ignoring the effects of scale size by comparing a DMU only with a DMU of similar size. PTE evaluates the efficiency of a DMU's resource utilization under exogenous conditions, with a lower PTE indicating that the DMU is managing its resources inefficiently. Using the BCC model, the TE score can be broken down into the PTE and the Scale Efficiency (SE), which is expressed by the following relationship (Al-Refai et al., 2016).

$$SE = \frac{TE}{PTE} \tag{7}$$

Scale Efficiency (SE) evaluates how the size of the operation affects efficiency and provides an indication of management's ability to select the optimal resource size to achieve the expected production level. If the TE score is equal to the PTE score, this means that the SE score is equal to 1 and therefore the optimal size of the operation has been achieved.

3.2. Malmquist Productivity Index

The DEA-based Malmquist Productivity Index (MPI) is used to evaluate changes in total factor productivity in the hotel sector over time. MPI was originally proposed by Färe et al. (1994) and is defined as a linear programming model based on DEA (Oliveira et al., 2023; Örkcü et al., 2016):

$$M(x^t, y^t, x^{t+1}, y^{t+1} = \left[\frac{D^t(x^{t+1}, y^{t+1}}{D^t(x^t, y^t)} \cdot \frac{D^{t+1}(x^{t+1}, y^{t+1}}{D^{t+1}(x^t, y^t)}\right]^{\frac{1}{2}} \quad (8)$$

In the previous equation, x represents the input vector and y the output vector. The expression (x^t, y^t) is defined as a function of the distance results, while M is defined as the total productivity change between t and t +1 period.

When comparing the efficiency frontier of one period with the next, the MPI decomposes productivity changes into components related to technical efficiency changes and technological changes and can be presented as follows (Kutlar et al., 2015):

$$\begin{aligned}&\text{Malmquist productivity index (MPI)} = \\ &= \text{Technical Efficiency chalge (TEC)} * \text{Technological change (TC)}\end{aligned} \quad (9)$$

where:

$$Technical\ efficiency\ change\ (TEC) = \frac{D_0^{t+1}(x^{t+1}, y^{t+1})}{D_0^t(x^t, y^t)} \quad (10)$$

$$Technological\ change\ (TC) = \left[\left(\frac{D_0^t(x^{t+1}, y^{t+1})}{D_0^{t+1}(x^{t+1}, y^t)}\right)\left(\frac{D_0^t(x^t, y^t)}{D_0^{t+1}(x^t, y^t)}\right)\right]^{\frac{1}{2}} \quad (11)$$

The concept of productivity is described in the literature as the product of efficiency changes (representing the catch-up process) and technological changes (indicating a frontier shift). An MPI index of more than 1 indicates growth from one period to another, while a value below 1 indicates a decline in MPI performance or growth compared to the previous period. When calculating the MPI, a production frontier represents the efficient level of output that can be achieved with a given inputs. It is also assumed that this frontier can shift over time. The MPI stands for the growth in Total Factor Productivity (TFP) of a DMU and is defined as the result of the change in efficiency (catch-up) and technological change (frontier-shift); if it is greater than 1, this is an indication of positive TFP growth from one period to the next, while a TFP value of less than 1 indicates a decline in TFP growth compared to the previous year.

Over time, the potential production level of an organization tends to increase as technological advances affect the optimal input-output combination. These technological changes lead to an upward shift in the production possibility frontier so that more output can be achieved with the same level of inputs. Consequently, productivity increases for each DMU within an industry can result either from improvements in technical efficiency (reaching parity with the existing frontier)

either from technological advances (gradual upward shift of the frontier), or a combination of both (Al-Refaie et al., 2015). In the presence of inefficiency, the relative movement of a specific DMU over time depends both on its position relative to the corresponding frontier (an indicator of technical efficiency) and on the movement of the frontier itself (an indicator of technical change). If inefficiency were neglected, productivity growth would become indistinguishable between improvements resulting from a DMU reaching its frontier and those resulting from the upward movement of the frontier over time (Al-Refaie et al., 2016). Consideration of the CRS model leads to a change in technical efficiency (TEC) and technological change (TC).

One of the main problems of DEA-based efficiency and productivity studies is their sensitivity to sample characteristics (Assaf and Tsionas, 2018). The excessive sensitivity to extreme values and outliers, as well as the number of DMUs added to or excluded from the model, affects the estimated distance functions and thus the efficiency results, as well as the MPI and its components (Tzeremes, 2021).

The MPI is a powerful tool for the hospitality industry, providing insights into efficiency, benchmarking, and dynamic change. Hotels can use the MPI to benchmark their performance against other hotels or industry standards to identify best practices. The dynamic nature of the MPI enables the assessment of productivity changes over time. The MPI breaks down productivity changes into technical efficiency changes and technological changes, which can help hotels better understand whether productivity improvements are due to better resource utilization or the introduction of new technologies. It also helps with resource allocation and ensures that investments are directed to the areas with the highest potential for productivity improvements. The MPI can serve as a basis for policy and management strategies at different levels, e.g. at the corporate level, hotel chains can develop policies to promote efficiency and innovation in their properties, and at the individual hotel level, managers can implement specific measures to improve operational efficiency and service quality. MPI can contribute to sustainability efforts and cost management. More efficient use of resources can reduce waste and lower operating costs, supporting economic and environmental sustainability goals.

4. Empirical data and analysis

This section explains the variable selection and model specification and presents the results of the dynamic relative efficiency obtained with the DEA window and the findings on the main causes of inefficiency. In addition, this section presents the productivity changes using the MPI.

4.1. Variable selection

In this paper, the production function of a hotel company is defined as the utilization of total employees and total fixed assets in converting them into total revenues (Tzermis, 2021; Pulina et al., 2010; Cordero and Tzeremes, 2017). According to Hwang and Chang (2003) and Tzeremes (2021), the production input of a hotel includes several elements such as materials, capital, machinery, and equipment, all of which are part of the total fixed assets. Together with labor, as measured by the costs of employees, these inputs are essential for providing tangible and intangible services. These services include accommodation, catering, laundry, rental, beauty salons and fitness services, which are ultimately reflected in the revenue generated.

The selection of variables is based on previous studies, in particular, those that have defined the production function of hotel companies in the same way as in this paper, namely those of Tzermis (2021), Cordero and Tzeremes (2017) and Devesa and Peñalver (2013), as well as on the availability of data. In constructing estimated hotel production frontier, costs of employees (measured in thousands of Euros) as a representation of human resources (Devesa and Peñalver, 2013; Lado-Sestayo and Fernandez-Castro, 2019; Pulina et al., 2010) and total fixed assets (measured in thousands of Euros) as a measure of capital investment (Cordero and Tzeremes 2017; Higuerey et al., 2020; Tzeremes, 2019) are considered as inputs, while the main output is represented by the total revenues (measured in thousands of Euros), which is a direct result of the services provided and the achievement of the objectives set (Günaydın et al., 2022; Higuerey et al., 2020; Tzeremes, 2021). When selecting the output data, EBIT was also tested as a possible output variable in addition to the operating income. However, as this variable did not fulfill the isotonic condition in every year observed (Wang et al., 2015), which is one of the prerequisites for the application of DEA, i.e., that the output grows with the growth of the input, it could not be used. Although hotels produce multiple outputs, the lack of detailed data on these does not detract from the importance of focusing on revenue efficiency and productivity changes, which are critical to effective hotel management.

The input and output data are collected from the Bureau van Dijk's (BvD) Orbis Europe database for large and very large companies with NACE code 55.1 (hotels and similar accommodation) operating in Croatia within the 2017-2022 period. This paper applies the size classification provided by the Bureau van Dijk's (BvD) Orbis Europe database. Companies on Orbis Europe are classified as very large or large if they match at least one of the conditions listed below for the respective category:

Table 1: Size classification for large and very large companies (Bureau van Dijk's (BvD) Orbis Europe)

Very Large	Large
Operating revenue >= 100 million EUR (130 million USD)	Operating revenue >= 10 million EUR (13 million USD)
Total assets >= 200 million EUR (260 million USD)	Total assets >= 20 million EUR (26 million USD)
Employees >= 1,000	Employees >= 150
Listed	Not very large

Source: Bureau van Dijk's (BvD) Orbis Europe database

The selected hotel companies had to operate continuously during the entire period and were not allowed to have missing data, which is why some of them were excluded from the sample. The following table contains descriptive statistics, separately for coastal and continental Croatia for the 2017-2022 period.

Table 2: Descriptive statistics

		Coastal Croatia			Continental Croatia		
		Costs of employees th EUR	Tangible fixed assets th EUR	Operating revenue (Turnover) th EUR	Costs of employees th EUR	Tangible fixed assets th EUR	Operating revenue (Turnover) th EUR
2017	Max	72,225.3219	589,152.3203	236,423.5801	10,270.8700	206,758.5700	35,521.6300
	Min	21.0500	1,072.5700	84.1600	63.3100	4,033.9700	231.3500
	Average	5,397.2388	63,214.7135	20,753.0776	1,917.1957	38,524.9614	7,912.2157
	SD	11,199.1245	97,561.0807	40,246.8653	2,467.9712	49,729.0666	8,634.0693
2018	Max	84,045.8714	688,732.2012	267,481.6793	9,785.0500	201,105.4100	39,714.2900
	Min	41.1100	1,035.9700	92.3900	89.1900	1,297.9400	144.0000
	Average	5,992.6721	67,932.4227	22,775.4363	2,063.5714	38,183.9914	8,817.8364
	SD	12,808.0991	111,365.3741	44,843.4335	2,312.6063	48,140.1077	9,199.3931
2019	Max	91,279.1921	743,156.0835	289,121.8097	9,603.4600	196,022.0800	38,694.5500
	Min	67.8100	4,209.3800	191.2855	166.5400	4,136.1100	617.0300
	Average	6,486.8739	71,548.6904	23,891.1488	2,137.3964	38,498.4950	10,071.5750
	SD	13,898.5686	118,577.1685	47,607.2030	2,265.0564	46,541.9376	10,610.9867
2020	Max	30,140.0039	751,203.6007	88,831.1806	7,873.1200	195,941.0100	22,382.2300
	Min	35.8413	4,108.0400	24.1597	134.2300	6,534.7200	223.1200
	Average	3,336.8153	69,419.9406	9,096.7433	1,656.7314	37,845.1243	5,143.0579
	SD	6,001.8681	117,759.2051	17,476.3782	1,868.1518	46,522.3925	5,201.8229
2021	Max	58,413.4362	693,520.9909	216,381.5984	9,810.7700	193,861.9100	27,670.5800
	Min	34.4210	976.4200	340.4900	191.1100	7,092.1000	911.5100
	Average	4,782.9842	68,020.3322	19,642.5182	2,002.2186	44,195.0986	7,494.2971
	SD	9,918.4703	111,279.1272	38,668.0400	2,289.7596	51,476.0999	6,254.8538
2022	Max	109,730.2283	669,778.5485	322,242.7753	13,046.0000	193,695.3300	50,179.0000
	Min	37.6933	962.6100	46.4530	92.1900	7,382.9100	450.1800
	Average	7,381.6960	69,743.3822	27,681.1949	2,522.0486	46,043.3936	13,484.0843
	SD	16,771.9611	113,138.4581	54,709.4563	3,086.4319	52,513.6401	13,210.3309

Source: Authors' calculation

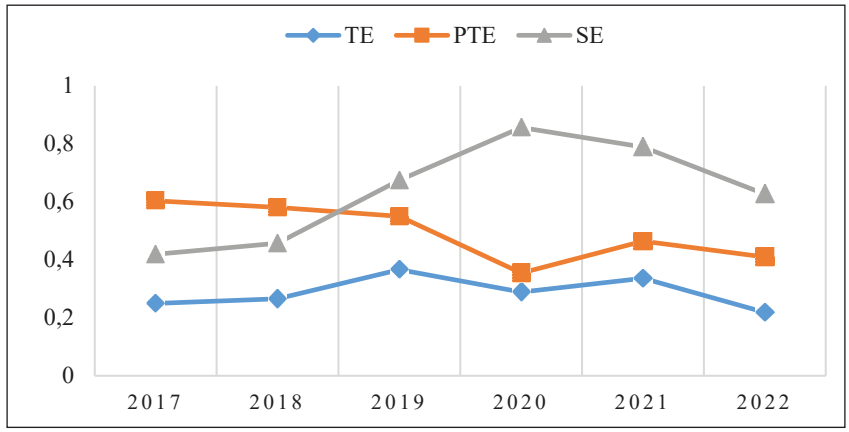
The results obtained are divided into five windows. The windows are formed based on the moving average. For example, the first window covers the period from 2017 to 2018, i.e., the window length is two years. The second window covers the period from 2018 to 2019, the third from 2019 to 2020, the fourth from 2020 to 2021, and the fifth from 2021 to 2022. There is no theoretical basis for choosing the specific window length (Cullinane et al., 2004). However, it should be as small as possible to minimize unfair comparisons over time, but at the same time, large enough to ensure a sufficient sample size (Asmild et al., 2004).

4.2. Window DEA analysis

In recent years, the tourism industry has faced numerous global crises, including the COVID-19 pandemic, political instability, terrorist incidents, economic downturn, and natural disasters. These crises have been attributed to, among other factors, fluctuations in the operational efficiency of hotels. Economic conditions fluctuate from time to time while market dynamics change in terms of customer base, customer expectations, preferences, and needs (Hwang and Chang, 2003).

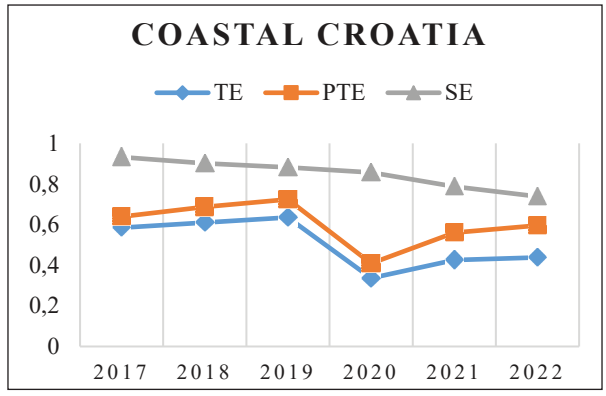
This study spans a six-year period of data collection, which allows the use of a two-year time window. This time frame allows for a more in-depth examination of the stability and trends in the efficiency of Croatian hotel companies. The results are presented for the entire sample (Graph 1), which includes 70 hotel companies from coastal and continental Croatia, and separately for coastal (56 hotel companies) and continental Croatia (14 hotel companies) (Graph 2) to determine whether there are differences in resilience to external influences depending on location. It also aims to identify the sources of inefficiency, i.e. management performance and other exogenous factors or the fact that companies are not operating at an optimal production size. While PTE is affected by management, technology, and other exogenous factors, SE as the ratio between TE and PTE provides information on whether the DMU is operating on the optimum size of resources. For the entire sample (Graph 1), a production frontier includes all observed companies regardless of their location. For the hotel companies located in coastal and continental Croatia (Graph 2), a separate production frontier is used for each sample.

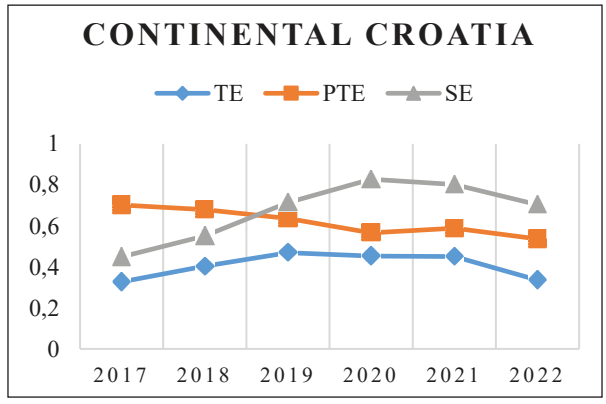
Graph 1: Dynamics of TE, PTE and SE – average by year for the full sample



Source: Author's construction

Graph 2: Dynamics of TE, PTE and SE – average by year for hotel companies located in coastal and continental Croatia





Source: Author's construction

It can be seen that the relative efficiency of hotel companies fell slightly in 2020 for all three samples. It is logically due to the COVID-19 pandemic and the fact that hotels were closed for a certain period, and traveling was much more difficult. Interestingly, the drop in relative efficiency is not as sharp, although it is most pronounced for coastal Croatia. Nevertheless, there is a big difference in the sources of inefficiency. For hotel companies located in coastal Croatia, the main source of inefficiency throughout the period is management performance and other exogenous factors, which are even more pronounced in 2020. For hotel companies located in continental Croatia, on the other hand, the main source of inefficiency before 2019 was the non-optimal production size. In 2020, when the COVID-19 pandemic broke out, management and other exogenous factors were also the main source of inefficiency in continental Croatia, which continued in 2021 and 2022.

Since the DEA measures relative and not absolute efficiency, it is incorrect to compare the results of different samples, as each sample separately forms its frontier. Therefore, the results of the entire sample are used to answer the question of which companies are more efficient depending on their location. Looking at the results for the entire sample, but for hotel companies in coastal and continental Croatia separately on average for the period 2017-2022, it can be seen that hotel companies in continental Croatia are more efficient in all components than those in coastal Croatia, as can be seen in Table 3.

Table 3: TE, PTE and SE of hotel companies located in coastal and continental Croatia – full sample

	Coastal Croatia	Continental Croatia
TE	0.2672	0.3689
PTE	0.4878	0.5189
SE	0.6178	0.7149

Source: Authors' calculation

4.3. Malmquist Productivity Index analysis

The MPI assesses the change in efficiency over time and can be calculated as the product of the c*atch-up* and *frontier shift*. The term *catch-up* refers to the extent to which a DMU increases its efficiency. Meanwhile, the term *frontier shift* refers to the change in the efficiency frontiers surrounding the DMU between the two time periods. The productivity change (MPI) is split into two components: TEC and TC. The results for TEC, TC, and MPI are presented in Table 4 for the full sample during the 2017-2022 period.

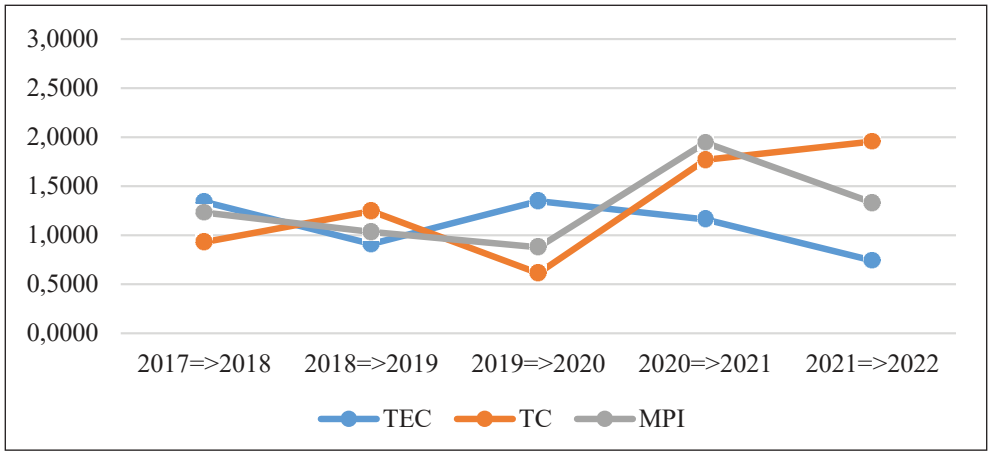
Table 4: TEC, TC amd MPI for the full sample

Period	TEC	TC	MPI
2017=>2018	1.3407	0.9295	1.2308
2018=>2019	0.9102	1.2451	1.0332
2019=>2020	1.3471	0.6119	0.8775
2020=>2021	1.1611	1.7685	1.9440
2021=>2022	0.7403	1.9558	1.3311
Geo. Average	1.0999	1.3022	1.2833
Max	4.8284	1.7760	5.0138
Min	0.7623	1.0157	0.9721
SD	0.5368	0.1328	0.5541

Source: Authors' calculation

The minimum average MPI score for hotel companies in Croatia is 0.9721, while the maximum average score is 5.0138. It is noticeable that hotel companies in Croatia have the highest geometric average of 1.2833, indicating an average increase in MPI of 28.33%. This increase in productivity is due to technological change (30.22%) rather than technical efficiency change (9.99%). When looking at productivity changes over the period, it is noticeable that productivity decreased by 12.25% from 2019 to 2020 due to a technological decrease (38.81%) as a consequence of the pandemic. The average changes in productivity for the entire sample can be seen more clearly in Graph 3.

Graph 3: TEC, TC amd MPI for the full sample



Source: Author's construction

These results underline the importance of investing in technology for effective productivity management which is in line with Peypoch et al. (2021). The most important factor contributing to the productivity level of hotel companies in Croatia and enabling a quick recovery from the pandemic seems to be the sustainable investment in a long-term innovation focused on services and processes.

In the following table, the results are presented individually for coastal and continental Croatia to see if they follow different trends in productivity changes.

Table 5: TEC, TC and MPI separtely for coastal and continental Croatia

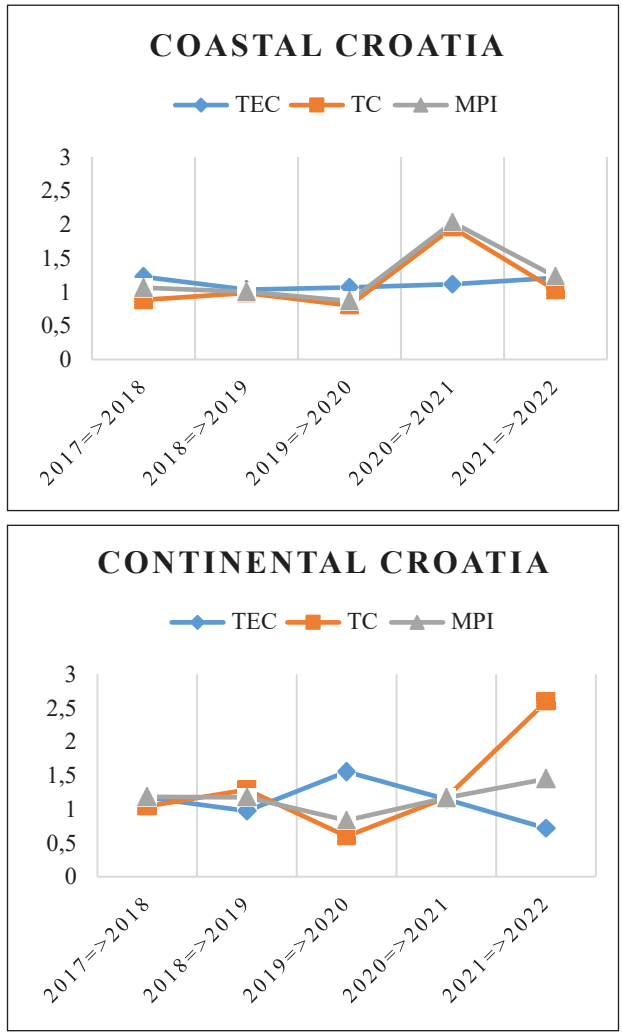
Period	Coastal Croatia			Continental Croatia		
	TEC	TC	MPI	TEC	TC	MPI
2017=>2018	1.2248	0.8821	1.0629	1.1738	1.0436	1.1830
2018=>2019	1.0346	0.9834	1.0022	0.9760	1.2907	1.1760
2019=>2020	1.0662	0.8000	0.8650	1.5547	0.5972	0.8345
2020=>2021	1.1153	1.9524	2.0299	1.1480	1.1746	1.1688
2021=>2022	1.2101	1.0280	1.2271	0.7190	2.5927	1.4495
Geo. Average	1.1302	1.1292	1.2374	1.1143	1.3398	1.1624
Max	3.0720	1.7662	3.7534	2.0599	1.6510	1.8560
Min	0.7972	0.8639	0.9903	0.6978	0.7359	0.7359
SD	0.3259	0.1458	0.3966	0.3470	0.2964	0.2856

Source: Authors' calculation

On average, hotel companies followed a similar pattern before 2020, both in coastal and continental Croatia. Interestingly, hotels on the Croatian coast recovered at a higher rate from the pandemic in 2021 than companies in continental Croatia. On the other hand, hotel companies located in continental Croatia recovered more steadily from the pandemic in the following years having reached a higher level of productivity than hotels on the Croatian coast in 2022. Croatian tourism, especially in the coastal region is highly seasonal. The tourists who come to continental Croatia do not only come during the summer holiday, which makes tourism in continental Croatia more resilient to seasonal changes. However, it should be noted that most hotel companies in continental Croatia are located in Zagreb (71.4%), the Croatian capital, which has a considerable impact on efficiency and productivity results due to market concentration. This is expected since demand has a key role in the efficiency of hotel companies. Hotels located near more populated areas are more efficient because they attract more customers (Barros, 2005b). This is in line with Oukil et al. (2016) who conducted a two-stage DEA application for 58 hotels

in the Sultanate of Oman and found that most of the hotels classified as efficient were located in the capital Muscat. Changes in productivity for both samples separately are shown in Graph 4.

Graph 4: TEC, TC and MPI separtely for coastal and continental Croatia



Source: Author's construction

5. Discussion

According to the results of this study, the main conclusion is that the COVID-19 pandemic hit the hotel sector hard resulting in temporary hotel closures and increased travel requirements for tourists. This had a significant impact on their relative efficiency and productivity, which declined in 2020. The inefficiency of hotel companies in coastal Croatia during the entire observation period was primarily due to management performance and other exogenous factors. For hotel companies in continental Croatia, on the other hand, the main source of inefficiency before 2019 was the non-optimal production size, which changed after 2020 due to COVID-19, and the main source of inefficiency became management performance and other exogenous factors. This trend continued in 2021 and 2022.

Looking at productivity changes from one year to the next, the results show that the pandemic caused a decline in productivity in hotel companies from 2019 to 2020 by 12.25% due to technological decrease (38.81%), but only for a short period that is in line with research results of Barros and Alves (2004) and Cordero and Tzeremes (2017). Most hotels were able to recover from this decline fast and improve their efficiency and productivity to maintain their competitive market position. These results are in line with several studies that have examined the dynamics of efficiency during the economic crisis (Baidal et al., 2013; Cordero and Tzermes 2017; Lu, 2015). Although an economic crisis has a significant negative impact on hotel productivity, it is usually followed by a quick recovery. To analyze what influences productivity, the productivity change (MPI) is broken down into two components: technical efficiency change (TEC) and technological change (TC). The results show that the main cause of the decline in productivity is TEC, which is consistent with the findings of Lu (2015). When observing the entire period (2017 to 2022), on average MPI for hotel companies in Croatia increased by 28.33%, mainly due to an increase in TC that is in line with Barros and Alves (2004). Sustainable investment in a long-term innovation strategy focused on services and processes have proved to be a key element in increasing productivity and enabling hotel companies in Croatia to recover quickly from the effects of the pandemic.

Previous research (Cordero and Tzeremes, 2017; Pulina et al., 2010; Karakitsiou et al., 2020; Solana-Ibanez et al., 2016) has shown that the geographical location of hotels is a factor that can have a strong influence on differences in efficiency and productivity due to differences in economic development, market demand, etc. Accordingly, one of the aims of this paper was to investigate how the location of hotel companies affects their efficiency and productivity depending on whether they are located on the coast or the continental Croatia. Interestingly, hotel companies on continental Croatia were less affected by the pandemic than those on the Croatian coast. They also experienced a more steady recovery and reached a higher productivity level in 2022 than their counterparts on the coast. Although continental

Croatia is not known as a tourist destination, the main reason for these results is that 71.4% of hotels in continental Croatia are located in the Croatian capital Zagreb. It is in line with the findings of Barros (2005b) and Oukil et al. (2016), as hotels in more populated areas, have higher efficiency and productivity due to the higher demand for their services.

6. Conclusions

The continuous measurement of hotel productivity remains a major research challenge (Song et al., 2012). This challenge is particularly significant for providing managers and policymakers with an initial evaluation tool to assess the impact of implementing hotel development strategies. The outcomes that result from hotel design and development inevitably influence the overall productivity and efficiency of hotels. Therefore, it is of utmost importance to develop and apply estimators to measure hotel productivity. As the Croatian economy is highly dependent on tourism, hotel efficiency, and productivity have become a key element of the country's image in the global travel industry.

In 2020, the relative efficiency of hotel companies fell slightly due to the impact of the COVID-19 pandemic. Although this decline was not very large, the cause of inefficiency for hotel companies located in continental Croatia has shifted due to management and other external factors, while for companies on the Croatian coast, management, and other external factors remained the main source of inefficiency throughout the period. The productivity of large and very large Croatian hotel companies has largely declined between 2019 and 2020, regardless of location, which shows the impact of the COVID-19 pandemic on the hotel industry in Croatia. It can be noted that from 2019 to 2020 when the COVID-19 pandemic hit, the main cause of MPI deterioration was a drastic decrease in TC. Despite this sharp decline, hotel companies in Croatia have recovered quickly from the effects of the pandemic. Hotel companies in continental Croatia, mainly located in the Croatian capital Zagreb, have recovered faster than those on the Croatian coast, proving that businesses in more populated areas attract more customers and achieve higher efficiency and productivity levels.

As far as the author knows, this is the first study on efficiency using window DEA analysis and productivity using MPI for Croatian hotel companies. Furthermore, to the authors' knowledge, this is the first efficiency and productivity analysis at the hotel company level that takes into account the location of a company. The limitations of this paper arise from the availability of comprehensive data on multiple outputs. Despite these limitations, the study focuses on the salient aspects of revenue efficiency and productivity change that are paramount for hotel management. Future studies should focus on taking macroeconomic factors

into account and examining the relationship between certain macroeconomic factors and obtained levels of efficiency and productivity. In addition, future studies should consider more detailed data to obtain more specific results. In this paper, only large and very large hotels are analyzed. However, in future research, small and medium-sized hotels should also be included in the sample. A second-stage analysis should be conducted to determine whether size has a significant impact on hotel efficiency and productivity. These results will provide managers with guidance on when to increase or decrease the scale of operations and how to make better use of available resources over time. The implementation of an innovative process leading to changes in TC has an impact on hotel companies and contributes to the strategies of differentiation and customization of tourism demand (Stamboulisa and Skayannisb, 2003). The results can also help policy-makers to present Croatia as a destination in a way that makes it more resilient to negative demand shocks.

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Vrednovanje efikasnosti i produktivnosti poslovanja hrvatskih hotelskih poduzeća – pristup DEA analize prozora i Malmquist indeksa produktivnosti

Andrea Arbula Blecich[1]

Sažetak

Ugostiteljska industrija djeluje u dinamičnom i konkurentnom okruženju u kojem su efikasnost i produktivnost ključni za održivi uspjeh. Glavni cilj ovog rada je procijeniti dinamičke promjene u efikasnosti i produktivnosti velikih i vrlo velikih hrvatskih hotelskih poduzeća te istražiti utječe li njihova lokacija na te čimbenike. Također, cilj rada je i utvrditi koliko su poduzeća otporna na makroekonomske šokove te identificirati uzroke nefikasnosti i promjena produktivnosti zasebno za svaku lokaciju. Analiza je provedena za 70 velikih i vrlo velikih hrvatskih hotelskih poduzeća skupno te posebno za poduzeća koja se nalaze u primorskoj i u kontinentalnoj Hrvatskoj od 2017. do 2022. godine korištenjem DEA analize prozora i Malmquist indeksa produktivnosti. Rezultati pokazuju blagi pad relativne efikasnosti u 2020. zbog utjecaja pandemije Covid-19. Glavni uzrok neefikasnosti za primorska hotelska poduzeća kroz cijelo razdoblje je izvedba menadžmenta i drugi egzogeni čimbenici. Suprotno tome, glavni uzrok neefikasnosti za kontinentalna hotelska poduzeća pomaknuo se s neoptimalne veličine proizvodnje na upravljanje i druge egzogene čimbenike nakon 2020. Produktivnost je pala između 2019. i 2020. zbog smanjenja tehnoloških promjena za poduzeća na obje lokacije. Prije 2020. hotelska poduzća u primorskoj i kontinentalnoj Hrvatskoj slijedila su sličan trend. Dok su se primorski hoteli oporavljali brže u 2021., kontinentalni su se hoteli oporavljali stabilnije i postigli veću produktivnost 2022. Ovo istraživanje pruža vrijedne uvide za menadžere hotela i akademike koji se kontinuirano trebaju prilagođavati stalnim promjenama koje zahtijeva upravljanje hotelima.

Ključne riječi: *hotelska poduzeća, efikasnost, produktivnost, Malmquist indeks produktivnosti, DEA analiza prozora*

JEL: *C67, D24, G14*

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Effects of job attitudes on withdrawal behaviors: Evidence from the Croatian hotel industry*

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Abstract

The hotel industry, like other service sectors, faces significant challenge in managing withdrawal behaviors, due to their substantial impact on performance and profitability. This paper investigates the relationship between two job attitudes – organizational commitment and job involvement – and two withdrawal behaviors – absenteeism and intention to leave. The study utilized a random sample of 734 hotel employees in Croatia. Logistic regression analysis was used to predict absenteeism and turnover intentions. Statistically significant negative relationships were found between affective and normative commitment and absenteeism, as well as affective, normative and continuance commitment and turnover intentions. However, no significant effect was found between job involvement and absenteeism, although a strong and negative relationship exists between job involvement and turnover intentions. Additionally, a positive relationship was identified between job involvement and all components of organizational commitment. These findings can provide a foundation for human resource management and decision-making processes in the hotel industry, offering insights into employee attitudes, and can be a pushover in the creation of strategies to manage undesirable employee behaviors.

Keywords: *absenteeism, turnover intentions, organizational commitment, job involvement, hotel industry*

JEL classification: *J22, J63*

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1. Introduction

Tourism and hospitality play an important role in the global economy due to its significant economic contributions. These sectors stimulate economic growth, create jobs, and foster cultural exchange. According to the World Travel & Tourism Council (WTTC), in 2023, the tourism sector contributed approximately 10.4% to the global GDP and supported around 334 million jobs, which is about 1 in 10 jobs in the global workforce. In a country like Croatia, where tourism accounts for 19.6% of the GDP (Croatian National Bank, 2024) and directly employs about 6% of the total workforce (Croatian Bureau of Statistics, 2024), the significant impact of tourism on the overall economy is clearly evident.

The hotel industry, a vital component of tourism, is labor-intensive, and the human factor plays a key role in its success. Similar to other service industries, the hotel industry faces significant challenges in managing withdrawal behaviors, which include physical withdrawal manifestations such as absenteeism and turnover intentions. Turnover research has shown that an employee's self-expressed intentions to leave their job are the best predictor of actual turnover (Beecroft et al. 2008). Withdrawal behaviors adversely affect hotel profitability by increasing costs related to replacement, employment, training, and other planned or unplanned expenses. According to the European Commission (Hassard, 2014), absenteeism costs €20 billion a year in the EU-15 alone. The Bureau of Labor Statistics (Walsh, 2021) estimated the overall absenteeism rate for all employees in the United States in 2020 was 2.8%. When it comes to turnover, the annual overall turnover rate in the U.S. in 2017 was 26.3%, based on the Bureau of Labor Statistics.

Researchers found withdrawal behaviors significantly decrease customer satisfaction (Yan et al., 2021; Mohsin et al., 2022), causing lower service quality and increased workload for other employees (Mukwevho et al., 2020).

Absenteeism and turnover intentions are often being researched in hospitals and among nurses (Smokrović et al., 2022, Labrague et al., 2020; Brborovic et al., 2016), in manufacturing industry (Nowak et al., 2023; Li et al., 2019) and public sector (Mastekaasa, 2020; Kim and Min Park, 2014), while studies in hotel industry are quite scarce (Mukwevho et al., 2020; Pizam and Thornburg, 2000; Kim et al., 2015; Qiu et al., 2015).

Although the causes of absenteeism and turnover intentions in various settings can be attributed to a combination of factors, including individual (Kolz, 1999; Störmer and Fahr, 2013; Seyrek and Turan, 2017), job-related (Barmby et al., 2001; Scoppa, 2010; Samad, 2006; Ahmad, 2018), and organizational support factors (Adebayo and Nwabuoku, 2008; Madden et al., 2015; Perryer, 2010), research has consistently shown that job attitudes play a significant role in influencing both turnover intentions and absenteeism (Punnett et al., 2007; Wegge, 2007; Maynard

et al., 2006; Shahnawaz and Jafri, 2009). Job attitudes that are being examined in this research are organizational commitment and job involvement.

This study aims to advance insights into the relationship between job attitudes and withdrawal behaviors, specifically absenteeism and turnover intentions, thereby contributing to the literature in several ways. First, although the relationship between job attitudes and withdrawal behaviors has been extensively researched, studies exploring the link between organizational commitment and job involvement with absenteeism and turnover intentions remain relatively scarce. Second, while research on these behaviors is common in various sectors and industries, they are notably rare within the hotel and tourism sectors, where only a few studies have been conducted. Third, the significance of implementing human resource practices to manage absenteeism and turnover intentions is still insufficiently emphasized. Finally, no previous studies exploring absenteeism and turnover intentions within the tourism and hotel industry have been identified in Croatia, a country that generates 14.6 billion EUR from tourism and where the dependence on this sector is particularly pronounced.

Based on the above, following hypotheses have been proposed:

- *H1: Organizational commitment is negatively related to absenteeism.*
- *H1a: Affective commitment is negatively related to absenteeism.*
- *H1b: Continuance commitment is negatively related to absenteeism.*
- *H1c: Normative commitment is negatively related to absenteeism.*
- *H2: Organizational commitment is negatively related to turnover intentions.*
- *H2a: Affective commitment is negatively related to turnover intentions.*
- *H2b: Continuance commitment is negatively related to turnover intentions.*
- *H2c: Normative commitment is negatively related to turnover intentions.*
- *H3: Job involvement is negatively related to absenteeism.*
- *H4: Job involvement is negatively related to turnover intentions.*
- *H5: Organizational commitment and job involvement are positively related.*

This research paper is organized in the following way. The paper begins with the Literature review and hypothesis development section, where key theories and previous studies are discussed to establish a foundation for the current research and formulate hypotheses. The Research methodology section explains the methodological framework, including the design and approach of the study, the data collection process, the sample characteristics, instruments, and scales used to assess the primary research. The Analysis section deals with the statistical techniques used to examine the data. The Results and Discussion section presents the findings,

interprets their implications, and integrates them with existing literature. The paper concludes with the Conclusion section, which summarizes the key insights, gives practical implications for management, acknowledges the study's constraints, and suggests some recommendations for further studies in this field.

2. Literature review and hypothesis development

This section provides an insight into the concepts of organizational commitment and job involvement, two attitudes that are explored in this paper. The third subsection offers an overview of recent studies on the relationship between these attitudes and absenteeism and turnover intentions. Based on previous research, hypotheses are defined at the end of the chapter.

2.1. Organizational commitment

Traditionally, organizational commitment has been conceptualized and measured in various ways. Authors agree that organizational commitment is a multidimensional construct and the antecedents, correlates, and consequences of commitment vary across dimensions (Meyer et al., 2002). Despite this, the classification of commitment in three distinguishable components – affective, continuance and normative, developed in the 1990s by Allen and Meyer (1990), continues to serve as a foundation for many studies. According to this classification, the affective component of organizational commitment refers to employees' emotional attachment to, identification with, and involvement in, the organization. The continuance component addresses commitment based on the costs that employees associate with leaving the organization, while the normative component refers to employees' feelings of obligation to remain with the organization (Allen and Meyer, 1990). Organizational commitment however can be a result of a combination of two or three mentioned aspects of commitment, i.e., it does not necessarily have to be based on only one component. According to Maslić Seršić (2000), one individual may simultaneously feel a strong emotional connection (affective component) but also an obligation to stay in the organization (normative component), while another employee may be satisfied with his job (affective component) but also aware that leaving the organization would be complicated and incur some costs (instrumental component). The intensity of each component, therefore, depends on the individual, his personal values and needs.

Recent studies about organizational commitment are oriented at the COVID-19 crisis (Chanana, 2021; Sokal et al., 2021), improvement of employee performance (Ridwan et al., 2020), emotional intelligence and quality of work life (Sudiro et al., 2023).

2.2. Job involvement

The main stream of research about the job involvement has been derived from the work of Lodahl and Kejner (1965) and Kanungo (1982). Job involvement refers to the psychological identification and participation of an individual in their work (Morrow, 1983). It encompasses the extent to which an individual is personally engaged to their job tasks and responsibilities. It is important to differentiate between work involvement and job involvement. Work involvement, influenced by the process of early socialization, pertains to an individual's values regarding work and its benefits. In contrast, job involvement is specifically tied to an individual's current employment situation and depends on the degree to which it meets their current needs (Brown, 1996).

In newer studies, job involvement is being researched between millennial workers (Tapia-Andino and Barcellos-Paula, 2023) and is often being put in relation with different types of leadership (Zia et al., 2022; Xu et al., 2022).

2.3. The relationship between organizational commitment, job involvement and withdrawal behaviors

Organizational commitment and job involvement serve as precursors to employee withdrawal behaviors, specifically sickness absenteeism and turnover intentions. Sickness absence is the most common form of absenteeism and it refers to the pattern of missing work in which an employee is absent from work owing to sickness and health complaints (van Ruysseveldt et al. 2024). Absenteeism can be caused by various determinants, which can be categorized to personal, demographic, attitudinal, health-related, organizational, and job determinants (Čikeš et al., 2018). While absenteeism is a way of 'escaping' the work context temporarily, turnover intentions indicate the inclination of an employee to withdraw from the organization definitely (Schaufeli et al., 2009). Turnover intention has been defined as the conscious and deliberate willingness to leave the organization, and is considered the last in a sequence of withdrawal cognitions (van Ruysseveldt et al., 2023).

In 1987, Blau and Boal conceptualized that job involvement and organizational commitment have been used to predict general turnover and absenteeism. Further empirical studies confirmed the relationship between these job attitudes and absenteeism and/or turnover as their determinants (Cheloha and Farr, 1980, Somers, 1995; Johns, 2001; Luchak and Gellatly, 2007). The higher the organizational commitment and job involvement are, the lower absenteeism is (Ho et al., 2012, Davey et al., 2009). Organizational commitment has been found to have a negative association with turnover intentions, suggesting that employees who are more emotionally and psychologically attached to their organizations are less likely to

have intention to leave (Yan et al., 2021). When it comes to a relationship between job involvement and organizational commitment, studies have shown that a positive relationship exists between these variables (Mathieu and Zajac, 1990; Saxena and Saxena, 2015). The higher organizational commitment is, the higher is employees' job involvement.

Following these findings, we propose these hypotheses:

- *H1: Organizational commitment is negatively related to absenteeism,*
- *H1a: Affective commitment is negatively related to absenteeism,*
- *H1b: Continuance commitment is negatively related to absenteeism,*
- *H1c: Normative commitment is negatively related to absenteeism,*
- *H2: Organizational commitment is negatively related to turnover intentions,*
- *H2a: Affective commitment is negatively related to turnover intentions,*
- *H2b: Continuance commitment is negatively related to turnover intentions,*
- *H2c: Normative commitment is negatively related to turnover intentions,*
- *H3: Job involvement is negatively related to absenteeism,*
- *H4: Job involvement is negatively related to turnover intentions, and*
- *H5: Organizational commitment and job involvement are positively related.*

3. Methodology

This section outlines the methodology of a study focused on exploring the relationship between job attitudes and withdrawal behaviors—specifically absenteeism and turnover intentions—within the Croatian hotel industry. The data collection process, measurement techniques, and the methods used for data processing are thoroughly explained and illustrated.

3.1. Procedure and sampling

The primary research was conducted in Croatia, during April and May 2019. The questionnaire was distributed among hotel employees within randomly selected hotels throughout the country.

In the context of this research, employees of the Croatian hotel industry are those employed in business entities classified in the category 55.10 Hotels and similar accommodation, of the Croatian National Classification of Business Activities (i.e., NKD). The number of employees taken into consideration for accessing sampling

(the population) is set for the year 2018. According to the Croatian Chamber of Commerce data, Croatia had 31.703 employees who worked in 1.183 hotel entities. To estimate the sample size, an a priori power analysis was conducted, using the G*Power 3.1 program (Faul et al., 2009). Based on an alpha error of the study of 0.05 and a power of 0.95, a sample size required 312 participants.

The process of data collection had several steps. First, we randomly selected 100 hotel entities from the Croatian Ministry of Tourism and Sport data (2019). After that, we asked permission from the hotel entity Director and/or Board of Directors to collect the data from their employees. In total, 2338 questionnaires were distributed by e-mail or the courier/Human resource management department, depending on how the hotel entity management requested. Finally, 734 usable questionnaires were returned, which presents a response rate of 37.11% for the case where both a) the hotel entity Director and/or Board of Directors, and b) their employees, agreed to participate. After fulfilling the survey, employees who received the questionnaire in person sealed their answers in an envelope in order to ensure anonymity and confidentiality.

3.2. Measurements

Demographic and labor variables were gender, age, total length of service, length of service in the current company, level of education (low, medium, high) and type of working contract (part-time, full-time). Low educational level was defined as completing the primary school and vocational secondary school; medium education was defined as completing high school and high education was defined as completing university or PhD.

Dependent variables. Absenteeism was measured by self-reported sickness-absence frequency in the past 12 months. Absence frequency refers to the number of absence spells per person per year, irrespective of their duration (Chadwick-Jones et al., 1971). Sickness absence did not include the days of absence regarding maternity or parental leave. The intention to leave the organization was measured by two items from Dawley et al. (2010): *I will likely look for another job in the next twelve months.* and *I will likely look for another job in the next three years.*, and evaluated on a Likert-type scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Independent variables. An original organizational commitment scale by Meyer et al. (1993) was previously translated in Croatian by Maslić Seršić (2000) and was used in this study. The questionnaire consisted of three subscales that measure affective, continuance and normative commitment. As a measure for job involvement, ten items from Kanungo (1982) were used. All items for independent variables were assessed using a five-point Likert-type scale (strongly disagree=1 to strongly agree=5).

Items with no previous translation were translated into Croatian using the double-blind back translation method. In order to test the survey elements, an exploratory factor analysis was conducted. Survey items and the results of the exploratory factor analysis are reported in Table 1. First, Kaiser–Meyer–Olkin (KMO) and Bartlett's test of sphericity were used to test the suitability of items for factor analysis. KMO values were: 0.735 for affective commitment, 0.842 for continuance commitment, 0.858 for normative commitment, and 0.919 for job involvement, all exceeding the recommended value of above 0.5 (Kaiser, 1974). Bartlett's test of sphericity was significant for all constructs, with a p-value of <0.001. Further, principal components with eigenvalues greater than 1.0 and a varimax rotation for factor loadings were used to decide on the number of factors for every construct. Analysis extracted two factors for affective commitment, named joy affect factor and attachment affect factor, as previously elaborated by Bergami and Bagozzi (2000), and one factor for continuance and normative commitment, as well as for job involvement. Items with a factor loading lower than 0.6 were extracted from further analysis (one from the normative commitment scale and three from the job involvement scale). The KMOs for new factor structures were 0.850 for normative commitment ($p<0.001$) and 0.922 for job involvement ($p<0.001$). Cronbach's alpha showed excellent internal consistency for job involvement, good consistency for affective commitment – joy, continuance, and normative commitment; and questionable consistency for affective commitment – attachment (George and Mallery, 2003).

Table 1: Results of exploratory factor analysis

Items	Factor loading	Eigen value	Variance explained (%)	Reliability
Affective commitment – overall			68.295	0.731
Affective commitment – factor joy		2.647	44.110	0.828
This organization has a great deal of personal meaning for me.	0.875			
I really feel as if this organization's problems are my own.	0.837			
I would be very happy to spend the rest of my career with this organization.	0.853			
Affective commitment – factor attachment		1.451	24.185	0.684
I do not feel like 'part of the family' at my organization.*	0.791			
I do not feel 'emotionally attached' to this organization.*	0.776			
I do not feel a strong sense of belonging to my organization.*	0.755			

Items	Factor loading	Eigen value	Variance explained (%)	Reliability
Continuance commitment		3.283	54.712	0.833
Right now, staying with my organization is a matter of necessity as much as desire.	0.610			
If I had not already put so much of myself into this organization, I might consider working elsewhere.	0.755			
One of the few negative consequences of leaving this organization would be the scarcity of available alternatives.	0.718			
It would be very hard for me to leave my organization right now, even if I wanted to.	0.766			
Too much of my life would be disrupted if I decided I wanted to leave my organization now.	0.828			
I feel that I have too few options to consider leaving this organization.	0.742			
Normative commitment		3.181	63.628	0.856
I would not leave my organization right now because I have a sense of obligation to the people in it.	0.739			
I owe a great deal to my organization.	0.816			
Even if it were to my advantage, I do not feel it would be right to leave my organization now.	0.855			
I would feel guilty if I left my organization now.	0.829			
This organization deserves my loyalty.	0.743			
Job involvement		4.565	65.217	0.910
The most important things that happen to me involve my present job.	0.749			
I live, eat and breathe my job.	0.828			
Most of my interests are centered around my job.	0.878			
I have very strong ties with my present job which would be very difficult to break.	0.846			
Most of my personal life goals are job-oriented.	0.840			
I consider my job to be very central to my existence.	0.778			
I like to be absorbed in my job most of the time.	0.724			

Note: *reverse-coded items

Source: Author's calculation

After factor analysis, the median split was used to create categorical variables for all independent and dependent variables. All values on the variables at or below the median are categorized as low and all values above the median are categorized as high (Table 2).

Table 2: Median values for dependent and independent variables

Variable	Median
Affective commitment – joy	3.67
Affective commitment – attachment	3.33
Continuance commitment	3.17
Normative commitment	3.2
Job involvement	3.28
Absenteeism frequency	0
Turnover intention (in 1 year)	2
Turnover intention (in 3 years)	2

Source: Author's calculation

3.3. Analysis

Descriptive statistics were used to summarize the demographic, dependent and independent variables. The Shapiro-Wilk test indicated that the data were not normally distributed ($p<0.05$). To examine the differences between groups, Mann-Whitney U test was conducted. The association between variables was assessed using the Chi-square test of independence. Logistic regression was utilized to estimate the relationship between dependent and independent variables. SPSS version 23 was used for data analysis.

4. Results and discussion

In total, 734 employees participated in the study (37.1%). Most of the participants were women (60.9%). The median was 38 years. Most of the participants had a medium level of education (38.6%), followed by high (31.6%) and low education (29.8%). A total of 63.5% of employees had a full-time contract. At the time of filling out the survey, most employees (53.3%) worked in the current company for more than 5 years, while 56.3% of them had more than 10 years of overall experience. Most employees reported low commitment to the organization (50.7% for affective commitment – joy; 67.3% for affective commitment – attachment; 77.1% for continuance commitment; 77.4% for normative commitment) and

low job involvement (73.8%). In total, high absenteeism was reported by 33.8% of participants. The proportion of employees with a high intention to leave the organization within the next 1 year was 37.3% and within the next 3 years was 49.4%.

The Mann-Whitney U test indicated a statistically significant difference in age with respect to absenteeism frequency (p=0.011) and turnover intentions for both the next 1 year (p<0.001) and the next 3 years (p<0.001), as detailed in Table 3. The median age of employees with high absenteeism frequency is 35 years (20-65), which is lower compared to 39 years (19-65) for those in the low absenteeism frequency group. Similarly, younger employees demonstrate higher turnover intentions, with a median age of 34 years (19-65) in the high turnover intention group, compared to 39 years (20-65) for the next 1 year, and 41 years (20-65) for those planning to leave in the next 3 years. These findings indicate that younger employees are significantly more likely to be absent from work and to demonstrate greater turnover intentions. Further, results of the test showed that no statistical difference was found between absenteeism frequency and the length of service, but a statistically significant difference exists when observing turnover intentions and total length of service (p=0.000), as well as the length of service in the current company (p=0.000). Employees with high turnover intentions, both in 1 year and in 3 years, generally had lower median total years of service (10 (1-40) for 1 year and 9 (1-40) for 3 years) than employees with low turnover intentions (15 (1-45) for 1 year and 18 (1-45) for 3 years). Also, median years of service in the current company was lower among employees with a high turnover intention (5 (1-40) for 1 and 3 years) than employees who had low turnover intentions (8 (1-43) for 1 year and 9 (1-43) in 3 years). The analysis reveals a pattern in which employees with fewer total years of service report higher turnover intentions, whether considering leaving within one or three years, compared to those with more years of service, who show lower intentions to leave (Table 3).

Table 3: Results of Mann-Whitney U test

	Absenteeism frequency			Turnover intention (in 1 year)			Turnover intention (in 3 years)		
Variable	Low Med (range)	High Med (range)	*p*-value	Low Med (range)	High Med (range)	*p*-value	Low Med (range)	High Med (range)	*p*-value
Age	39 (19-65)	35 (20-65)	0.011	39 (20-65)	34 (19-65)	0.000	41 (20-65)	34 (19-65)	0.000
Total length of service (in years)	15 (1-45)	11.5 (1-45)	0.072	15 (1-45)	10 (1-40)	0.000	18 (1-45)	9 (1-40)	0.000
Length of service in the current company (in years)	7 (1-43)	5 (1-40)	0.165	8 (1-43)	5 (1-40)	0.000	9 (1-43)	5 (1-40)	0.000

Source: Author's calculation

The chi-square test indicated a statistically significant difference in absenteeism frequency among employees based on their management level ($\chi 2 = 12.148$, df = 3, p = 0.007), as indicated in Table 4.

Table 4: Results of Chi-square test of independence for absenteeism frequency

	Absenteeism frequency					
Variable	Total n (%)	Low n (%)	High n (%)	*X2*	*df*	*p*-value
Gender				1.503	1	0.220
Female	438 (60.9)	283 (59.3)	155 (64.0)			
Male	281 (39.1)	194 (40.7)	87 (36.0)			
Type of working contract				0.608	1	0.436
Full-time	457 (63.5)	298 (62.5)	159 (65.4)			
Part-time	263 (36.5)	179 (37.5)	84 (34.6)			
Level of education				1.310	2	0.520
Low	217 (29.8)	137 (28.4)	80 (32.5)			
Medium	281 (38.6)	190 (39.4)	91 (37.0)			
High	230 (31.6)	155 (32.2)	75 (30.5)			
Member of management level				12.148	3	0.007
No	515 (72.5)	325 (68.7)	190 (80.2)			
Yes, lower-level management	120 (16.9)	88 (18.6)	32 (13.5)			
Yes, middle-level management	62 (8.7)	51 (10.8)	11 (4.6)			
Yes, top-level management	13 (1.8)	9 (1.9)	4 (1.7)			
Affective commitment – joy				9.085	1	0.003
Low	372 (50.7)	227 (46.7)	145 (58.5)			
High	362 (49.3)	259 (53.3)	103 (41.5)			
Affective commitment – attachment				0.264	1	0.607
Low	494 (67.3)	324 (66.7)	170 (68.5)			
High	240 (32.7)	162 (33.3)	78 (31.5)			
Continuance commitment				0.053	1	0.818
Low	566 (77.1)	376 (77.4)	190 (76.6)			
High	168 (22.9)	110 (22.6)	58 (23.4)			
Normative commitment				10.160	1	0.001
Low	568 (77.4)	359 (73.9)	209 (84.3)			
High	166 (22.6)	127 (26.1)	39 (15.7)			
Job involvement				0.260	1	0.610
Low	542 (73.8)	356 (73.3)	186 (75.0)			
High	192 (26.2)	130 (26.7)	62 (25.0)			

Source: Author's calculation

Among the employees with low absenteeism frequency, most of them (68.7%) are not part of management, 18.6% of them belong to the lower-level, 10.8% to the middle-level, and 1.9% to the top-level management. In the group of employees with high absenteeism frequency, 80.2% of them don't belong to hotel management. Employees within top-level management have the lowest frequency of high absenteeism, at 1.7%. These findings suggest that absenteeism is less prevalent among management, particularly top-level management, potentially due to higher levels of responsibility.

A statistically significant difference exists in absenteeism frequency among groups with different levels of affective commitment – joy ($\chi2 = 9.085$, df = 1, p = 0.003). Among employees with high absenteeism frequency, 58.5% demonstrate low affective commitment. Conversely, in a group of employees with low absenteeism frequency, 53.3% reported high affective commitment. There is also a statistically significant difference in absenteeism frequency between groups with varying levels of normative commitment ($\chi2 = 10.160$, df = 1, p = 0.001). Among employees with low absenteeism frequency, 73.9% exhibit low normative commitment. In contrast, a higher proportion of employees with high absenteeism frequency, 84.3%, demonstrate high normative commitment. No statistical significance in a chi-square test was found between absenteeism and the following variables: gender, type of working contract, level of education, affective commitment – attachment, continuance commitment, and job involvement. This indicates that the observed differences between the groups are likely due to random chance rather than a meaningful association between the variables.

When observing turnover intentions between employees, statistically significant differences were found in regard to their working contract type (in 1 year: $\chi^2 = 15.576$, df = 1, p < 0.000; and 3 years: $\chi^2 = 20.463$, df = 1, p < 0.000) and their management level (in 1 year: $\chi^2 = 14.295$, df = 3, p = 0.003; and 3 years: $\chi^2 = 11.481$, df = 3, p = 0.009), as detailed in Table 5.

Table 5: Results of Chi-square test of independence for turnover intentions in 1 and 3 years

	Turnover intention (in 1 year)						Turnover intention (in 3 years)					
Variable	Total n (%)	Low n (%)	High n (%)	X2	df	*p*-value	Total n (%)	Low n (%)	High n (%)	X2	df	*p*-value
Gender				2.396	1	0.122				1.025	1	0.311
Female	437 (61.0)	282 (63.2)	155 (57.4)				436 (60.9)	224 (62.7)	212 (59.1)			
Male	279 (39.0)	164 (36.8)	115 (42.6)				280 (39.1)	133 (37.3)	147 (40.9)			
Type of working contract				15.576	1	0.000				20.463	1	0.000
Full-time	457 (63.7)	312 (69.2)	145 (54.5)				456 (63.6)	260 (71.6)	196 (55.4)			
Part-time	260 (36.3)	139 (30.8)	121 (45.5)				261 (36.4)	103 (28.4)	158 (44.6)			
Level of education				0.546	2	0.761				3.158	2	0.206
Low	215 (29.7)	130 (28.7)	85 (31.3)				214 (29.5)	110 (30.1)	104 (28.9)			
Medium	280 (38.6)	178(39.3)	102 (37.5)				281 (38.8)	150 (41.1)	131 (36.4)			
High	230 (31.7)	145 (32.0)	85 (31.3)				230 (31.7)	105 (28.8)	125 (34.7)			
Member of management level				14.295	3	0.003				11.481	3	0.009
No	513 (72.6)	298 (67.9)	215 (80.2)				512 (72.4)	237 (67.1)	275 (77.7)			
Yes, lower-level management	119 (16.8)	83 (18.9)	36 (13.4)				120 (17.0)	68 (19.3)	52 (14.7)			
Yes, middle-level management	62 (8.8)	49 (11.2)	13 (4.9)				62 (8.8)	41 (11.6)	21 (5.9)			
Yes, top-level management	13 (1.8)	9 (2.1)	4 (1.5)				13 (1.8)	7 (2.0)	6 (1.7)			
Affective commitment – joy				80.920	1	0.000				90.460	1	0.000
Low	370 (50.6)	173 (37.8)	197 (72.2)				370 (50.6)	123 (33.2)	247 (68.4)			
High	361 (49.4)	285 (62.2)	76 (27.8)				361 (49.4)	247 (66.8)	114 (31.6)			
Affective commitment – attachment				50.468	1	0.000				49.194	1	0.000
Low	491 (67.2)	264 (57.6)	227 (83.2)				491 (67.2)	204 (55.1)	287 (79.5)			
High	240 (32.8)	194 (42.4)	46 (16.8)				240 (32.8)	166 (44.9)	74 (20.5)			
Continuance commitment				21.886	1	0.000				43.597	1	0.000
Low	563 (77.0)	327 (71.4)	236 (86.4)				564 (77.2)	248 (67.0)	316 (87.5)			
High	168 (23.0)	131 (28.6)	37 (13.6)				167 (22.8)	122 (33.0)	45 (12.5)			
Normative commitment				40.791	1	0.000				59.212	1	0.000
Low	565 (77.3)	319 (69.7)	246 (90.1)				566 (77.4)	243 (65.7)	323 (89.5)			
High	166 (22.7)	139 (30.3)	27 (9.9)				165 (22.6)	127 (34.3)	38 (10.5)			
Job involvement				52.505	1	0.000				75.878	1	0.000
Low	539 (73.7)	296 (64.6)	243 (89.0)				539 (73.7)	221 (59.7)	318 (88.1)			
High	192 (26.3)	162 (35.4)	30 (11.0)				192 (26.3)	149 (40.3)	43 (11.9)			

Source: Author's calculation

In a group of employees with low turnover intentions within one year, 69.2% are full-time employees, compared to 30.8% who are part-time employees. Similar proportions are observed with respect to turnover intentions over three years, with 71.6% being full-time and 28.4% part-time employees. Furthermore, the majority of employees with high turnover intentions are under full-time contracts, accounting for 54.5% of those intending to leave within one year and 55.4% within three years. Regarding group differences between turnover intentions and management level, findings suggest that these intentions are generally less pronounced among managers, particularly in top management, for both low and high turnover intentions, regardless of the time period. There is also statistically significant difference in turnover intentions and affective commitment – joy (in 1 year: $\chi^2 = 80.920$, df = 1, $p < 0.000$; and 3 years: $\chi^2 = 90.460$, df = 1, $p < 0.000$). Among employees with high turnover intentions, 72.2% demonstrate low affective commitment over a 1-year period and 68.4% over a 3-year period. In contrast, those with low turnover intentions tend to show higher affective commitment, 62.2% for the 1-year period and 66.8% for the 3-year period falling into this category. Statistically significant differences were also found between turnover intentions and the following variables: affective commitment – attachment (in 1 year: $\chi^2 = 50.468$, df = 1, $p < 0.000$; and 3 years: $\chi^2 = 49.194$, df = 1, $p < 0.000$), continuance commitment (in 1 year: $\chi^2 = 21.886$, df = 1, $p < 0.000$; and 3 years: $\chi^2 = 43.597$, df = 1, $p < 0.000$), normative commitment (in 1 year: $\chi^2 = 40.791$, df = 1, $p < 0.000$; and 3 years: $\chi^2 = 59.212$, df = 1, $p < 0.000$) and job involvement (in 1 year: $\chi^2 = 52.505$, df = 1, $p < 0.000$; and 3 years: $\chi^2 = 75.878$, df = 1, $p < 0.000$). In a group of employees with low turnover intentions for both periods of time, most of them reported lower levels of affective commitment – attachment, continuance commitment, normative commitment, and job involvement. However, among employees with higher turnover intentions, a larger proportion also reported low levels of these three components of commitment and job involvement. Finally, no statistically significant association was found between turnover intentions, both in the next 1 year and in 3 years, and the variables of gender and level of education based on the chi-square test.

In order to test the hypothesis, we applied logistic regression. The results are shown in Table 6. Negative relationships were found between absenteeism and: affective commitment – joy (OR = 0.623, 95%CI = 0.457-0.848, p = 0.003) and normative commitment (OR = 0.527, 95%CI = 0.355-0.785, p = 0.002). Significant relation between affective commitment – attachment and absenteeism were not found. Employees with high affective commitment (joy) are 1.6 times less likely to be absent from work than those with low affective commitment (joy). These findings partially confirm *H1a*. Individuals with high normative commitment are 1.9 times less likely to be absent from work compared to employees with low normative commitment, confirming *H1c*. No statistical significance was found between absenteeism and continuance commitment, which contradicts *H1b*. Following these

findings, hypothesis *H1* is partially confirmed. *H3* is being rejected because no relationship was found between absenteeism and job involvement. Allen and Meyer (2000) also found affective commitment to be negatively related to absenteeism, but no relation with absenteeism was found between continuance and normative commitment. Direct effects of job involvement on absenteeism were also not supported in some other previous studies (Brooke and Price, 1989).

Table 6: Results of logistic regression

	Absenteeism frequency		Turnover intention (in 1 year)		Turnover intention (in 3 years)		Job involvement	
Variable	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Affective commitment – joy	0.623***	0.457-0.848	0.234***	0.169-0.324	0.230***	0.169-0.313	9.688***	6.290-14.921
Affective commitment – attachment	0.918***	0.661-1.274	0.276***	0.191-0.398	0.317***	0.228-0.440	2.300***	6.290-14.921
Continuance commitment	1.043	0.726-1.500	0.391***	0.262-0.585	0.289***	0.198-0.423	4.887***	3.375-7.075
Normative commitment	0.527***	0.355-0.785	0.252***	0.161-0.393	0.225***	0.151-0.335	9.517***	6.447-14.049
Job involvement	0.913	0.643-1.296	0.226***	0.147-0.345	0.201***	0.137-0.293		

Note: *** p<0.001, ** p<0.01, * p<0.05

Source: Author's calculation

In regard to turnover intentions in 1 year, negative relationships were found in regards to all dependent variables: affective commitment – joy (OR = 0.234, 95%CI = 0.169-0.324, p < 0.000), affective commitment – attachment (OR = 0.276, 95%CI = 0.191-0.398, p < 0.000), continuance commitment (OR = 0.391, 95%CI = 0.262-0.585, p < 0.000), normative commitment (OR = 0.252, 95%CI = 0.161-0.393, p < 0.000) and job involvement (OR = 0.226, 95%CI = 0.147-0.345, p < 0.000). Also, turnover intentions in 3 years are significantly negatively affected by: affective commitment – joy (OR = 0.230, 95%CI = 0.169-0.313, p < 0.000), affective commitment – attachment (OR = 0.317, 95%CI = 0.228-0.440, p < 0.000), continuance commitment (OR = 0.289, 95%CI = 0.198-0.423, p < 0.000), normative commitment (OR = 0.225, 95%CI = 0.151-0.335, p < 0.000) and job involvement (OR = 0.201, 95%CI = 0.137-0.293, p < 0.000). The highest impact has job involvement, followed by normative, affective commitment – joy, continuance commitment and affective commitment – attachment. These findings support the hypothesis *H2* and *H4*, as well as the sub-hypothesis *H2a, H2b and H2c*. It is more likely that hotel employees with higher organizational commitment

and job involvement will have lower intentions to leave regardless of the period of time, compared to employees with lower levels of organizational commitment and job involvement.

Similar findings regarding the relation between organizational commitment and withdrawal behaviors were found by Somers (1995), indicating that affective commitment emerged as the most consistent predictor of absenteeism and turnover; normative commitment was related only to withdrawal intentions and no direct effects for continuance commitment and absenteeism or turnover intentions were observed. Also, Tsaousoglou et al. (2022) found organizational commitment to be predictor of turnover intentional behavior among lodging industry employees.

All three dimensions of organizational commitment had a significantly positive effect on job involvement: the highest impact had affective commitment – joy (OR = 9.688, 95%CI = 6.290-14.921, $p < 0.000$), followed by normative commitment (OR = 9.517, 95%CI = 6.447-14.049, $p < 0.000$), continuance commitment (OR = 4.887, 95%CI = 3.375-7.075, $p < 0.000$) and affective commitment – attachment (OR = 2.300, 95%CI = 1.641-3.240, $p < 0.000$). These findings are confirming *H5*. The higher the employees' commitment is, the higher is their job involvement. This validation is also analogous to past findings on the effect of job involvement on organizational commitment (Ćulibrk et al., 2018).

5. Conclusions

The aim of this study was to enhance understanding of the relationship between job attitudes and withdrawal behaviors, specifically absenteeism and turnover intentions. Empirical research has shown that employees with higher organizational commitment and greater job involvement tend to have lower rates of absenteeism and fewer turnover intentions. Furthermore, employees who demonstrate high levels of organizational commitment are also highly engaged in their jobs.

This paper has several theoretical, empirical, and practical contributions. First, while organizational commitment, job involvement, absenteeism, and turnover intentions have been extensively researched separately, both theoretically and empirically, international literature and Croatian scientific and professional practice feature only a limited number of studies addressing the relation between these attitudes and withdrawal behaviors and our paper is fulfilling this gap. Second, this represents the first known study to examine withdrawal behaviors in the Croatian hotel industry, a sector of crucial importance for the whole economy. Third, the insights gained from this study have broader implications beyond the hotel industry and can be applied to various sectors. Understanding how absenteeism and turnover intentions are influenced by job attitudes is crucial for improving organizational outcomes across different industries. Finally, theoretical and empirical insights

into how absenteeism can be influenced by managing employees' work attitudes are not sufficiently applied in practice, leading to the neglect of a significant and potent factor for managing organizational outcomes and success. These practices can include involving employees in decision-making, offering work-life balance programs, and improving working conditions, which can be particularly hard and challenging in the tourism sector. Since the highest rates of absenteeism and turnover intentions were found among younger employees and the ones who worked in a hotel for a shorter period of time, these groups require special focus. The new generation of workers, particularly Generation Z, exhibits unique characteristics and mindsets, showing less inclination to stay in a single job for their entire careers compared to previous generations (X and Y). Organizations across different sectors should therefore pay more attention to these employees, offering them different compensation and benefits, and involve them more extensively in management processes than in the past. Such measures are essential for improving job attitudes and, consequently, reducing withdrawal behaviors. Moreover, these strategies should be considered by policymakers to develop guidelines and policies that support employee retention and engagement on a broader scale. These strategies should be implemented at every management level within the hotel industry and beyond.

Our study has several limitations, and the first one is the use of self-reported absence data. Employees may underreport or over-report their absenteeism due to fear of consequences. Future studies might use the company-registered sickness absenteeism data. Further, this study may face limitations related to how absenteeism is defined and measured. We used sickness absence and measured it with frequency. Future studies may also use other forms of absenteeism. Additionally, our study included two job attitudes and two withdrawal behaviors. Future research could investigate other (and more) job attitudes to expand the findings of our research. Finally, future research should aim to estimate the costs of absenteeism in Croatia, which would provide a more comprehensive understanding of its economic impacts, both for the organizations and the whole country and to further emphasize the importance of effective management of withdrawal behaviors.

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Efekti stavova prema radu na povlačenje s posla: dokazi iz hrvatskog hotelijerstva

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Sažetak

Hotelijerstvo, kao i drugi uslužni sektori, suočava se sa značajnim izazovima u upravljanju ponašanjima povlačenja s posla, zbog njihovog značajnog utjecaja na učinak i profitabilnost. Ovaj rad istražuje odnos između dva stava prema radu – odanosti organizaciji i zaokupljenosti poslom – i dva ponašanja povlačenja – apsentizma i namjere napuštanja. U istraživanju je korišten slučajni uzorak od 734 zaposlenika hotela u Hrvatskoj. Logistička regresijska analiza korištena je za predviđanje apsentizma i namjere napuštanja. Utvrđeni su statistički značajni odnosi između afektivne i normativne odanosti i apsentizma, kao i afektivne, normativne i instrumentalne odanosti i namjere napuštanja. Međutim, nije pronađen značajan učinak između zaokupljenosti poslom i apsentizma, iako postoji jaka i negativna veza između zaokupljenosti poslom i namjere napuštanja. Dodatno, identificiran je pozitivan odnos između zaokupljenosti poslom i svih komponenti odanosti organizaciji. Ovi rezultati mogu poslužiti kao temelj za upravljanje ljudskim resursima i procese donošenja odluka u hotelijerstvu, nudeći uvid u stavove zaposlenika i mogu poslužiti kao poticaj u stvaranju strategija za upravljanje nepoželjnim ponašanjem zaposlenika.

Ključne riječi: *apsentizam, namjere napuštanja, odanost organizaciji, zaokupljenost poslom, hotelijerstvo*

JEL klasifikacija: *J22, J63*

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Macroeconomic, institutional and financial determinants of current account deficit in North Macedonia: Evidence from time series*

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Abstract

The role of current account balances in macroeconomic policy is progressively high, especially in transition countries. Using yearly level data for a 1994-2022 period, based on co-integration analysis, this research empirically investigates the macroeconomic, institutional, and financial determinants of the current account deficit in North Macedonia. The results of the study reveal that a country's current account deficit is significantly affected by domestic demand factors like real effective exchange rate, output gap, and trade openness, the fiscal-related factor of gross debt position, the institutional-related factor of economic freedom, legal and property rights, regulatory index, control of corruption, government effectiveness, as well as financial development captured by money supply. The study also finds out that the country has recorded more deficit in the current account than potentially expected during two time periods, the pre-financial crisis period 2001-2008 and during the COVID-19 crisis period 2019-2022.

Keywords: *current account deficit, error correction mechanism, North Macedonia*

JEL classification: *F32, F37*

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1. Introduction

The Current Account Deficit is one of the most important issues, often studied by economists. Its importance is moreover outlined in developing countries, once considering its influence on macroeconomic stabilization policies. The Current Account Deficit can be caused by excessive domestic demand, lack of domestic savings, overvalued exchange rates, or high imports and low exports (Dauti, 2021). A country suffering from a Current Account Deficit spends more than it earns. Excessive domestic demand means that domestic producers are unable to fulfill domestic production and therefore the dependency rate of the domestic output from imports increases, eventually leading to an increase in the current account deficit (Crescenzi et al. 2016). This deficit, in a second economic cycle, implies the need for depreciating the national currency which increases the potential for financing the deficit through exports, since local products are becoming cheaper in foreign currency at international markets and foreign products are becoming more expensive in the local currency at the domestic market. However, the weakness of the local currency decreases the domestic production capacity, moreover, when the necessary inputs for this production are in foreign currency. As a result, the country will not have enough production capacity to satisfy the increased foreign demand for local products and therefore the further increase in the current account deficit may take place (Obstfeld, 2012).

Generally, the recorded high level of deficits in transition countries have raised concerns regarding the extent to which it poses serious risks for the respective economies. However, the widening of the deficit, to some extent, has been attributed to the preparation of the transition countries for EU membership. These factors refer to the gradual liberalization of prices. This development reflects the fact that consumer price inflation has remained persistently at about the level of the euro area average, while, at the same time, there has been a steady rise in relative unit labor cost relative to other euro area countries. Furthermore, transition countries' efforts for income convergence toward EU patterns have also contributed to the increase in consumer spending, i.e., in the current account deficit. In general, the country exposed to the high deficit on the current account must find a recovery method, by potentially reducing the deficit through the inflow in the capital account, which may arise from the increase in the domestic assets, foreign currency, or increase in the level of Foreign Direct Investment. However, a current account deficit is not automatically a bad thing in case a certain country is importing the necessary inputs to produce an output, to export the outputs in the future, thus, potentially creating a current account surplus, which would be an attractive investment opportunity for foreigners.

In this paper, using cointegration analysis to capture the long-run relationship among the variables, we try to quantify macroeconomic, institutional, and financial factors

that affect the current account balances in North Macedonia, in the long run, using time series data on a yearly 1994-2022 period. Among the macroeconomic factors, the research outlines the enhancement effect of gross debt and domestic output gap and the deteriorating effect of trade openness on the current account deficit. Among institutional factors, the research reveals the enhancement effect of economic freedom, control of corruption and regulatory quality, and the deteriorating effect of legal and property rights, regulatory index, and government effectiveness on the current account deficit in North Macedonia. The financial development is found to trigger the deficit in the current account. Results from this study will provide important input into the formulation of a policy framework that would assist in maintaining a sustainable level of current account deficit, in accordance with country macroeconomic stabilization policies. The paper is organized as follows. The coming section reviews the latest empirical evidence on current account deficits in transition countries, trying to identify the gap in the literature, which will be subject to an empirical assessment. Section three describes the methodology and method of analysis, the hypothesis, and the econometric assessment. Section four describes North Macedonia's cyclical movement of current account deficit, as well as comparative statistics of Western Balkan countries' experience with the respect to cyclical movement of current account deficit. This section also presents the empirical results and calculation of the potential level of the current account deficit in North Macedonia. Section five discusses the results and the final section concludes the study and outlines some policy recommendations.

2. Literature review

The literature on the determinants of current account balances has identified three groups of studies. The first group of studies deals with the response of current account imbalances to potential shocks in one specific determinant. The second group of study deals with the panel data studies of the determinants of current account balances and the third group of studies, in addition to macroeconomic determinants treat the institutional as well as financial determinants of current account balances. (Legg et al., 2011; Cheung et al., 2013). On the grounds of the first group of studies, Kent and Cashin (2003), using the intertemporal model and terms of trade data for 128 countries, over the period 1960-1999, examined the relationship between current account balance and terms of trade affected by the persistence of terms of trade shocks and found that the greater (lesser) the persistence effect of the terms of trade, the more (less) the investment effect dominates the consumption – smoothing effect on saving, so that the current account balance moves in the opposite (same) direction as that of the shock. Lee and Chinn (2006) using VAR analysis for G7 countries (US, Canada, the UK, Japan, Germany, France, and Italy), examined the relationship between exchange rate and current account dynamics for the period from 1979/1980 to 2000. The authors found that

with the expectation of the US, in the rest of the remaining countries, temporary (permanent) shocks play a larger role in explaining the variation in the current account (real exchange rate). With the exception of the UK, temporary shocks depreciate the real exchange rate and improve the current account balance. On the grounds of panel data studies, examining the relationship between current account deficit and a set of macroeconomic variables.

Cavdar and Aydin (2015) using a panel–logit model for the selected panel of 16 OECD countries over the years 2005-2009, found a positive relationship between current account deficit and public expenditure and a negative relationship between consumer price index (CPI), unemployment rate and the current account deficit. These three variables were also found to have an indirect effect on the economies of 16 OECD member countries by increasing the probability of a volatile regime. In another study for a panel of heterogenous 33 OECD countries, New EU Member States are included. Bussière et al. (2006), using various panel data, instrumental variable (IV), and Generalized Method of Moments (GMM) techniques for estimating a dynamic panel data intertemporal model for the current account, found a strong agglomeration effect of the current account, suggesting that actual position of current account is determined from their past values and a significant effect of the fiscal balance. Moreover, the authors found a substantial effect of relative per capita income, suggesting that poorer countries are more likely to run larger current account deficits. Moreover, expansionary fiscal policies also were found to raise the current account deficit, confirming that the Ricardian offset is incomplete.

Turning to the transition countries Aristovnik (2006), in a study related to the determinants of the current account balance in selected transition economies, Eastern Europe and the former Soviet Union, for a yearly period 1992-2003, found a negative effect of economic growth on the current account balance, implying that the attributed increase of growth is moreover associated to higher investment rather than savings rate. The author confirmed the hypothesis of stage development, as the poorer countries in the region register higher deficits in the current account. Also, the empirical findings of Aristovnik (2006), suggest that fiscal balance has a positive and significant impact on the current account, confirming the validity of the hypothesis of a twin deficit and the appreciation of the real exchange rate and the deterioration of terms of trade aggravate the current account position.

As to the case of North Macedonia, based on individual country studies, Sadiku et al. (2015), by applying the ARDL approach, examined the short and long-run determinants of current account position in North Macedonia in a period 1998q1-2013q4, found a positive cointegration relationship between current account and fiscal balance, financial development, terms of trade and negative cointegration relationship between current account and trade openness. Bucevska (2020) tested the twin deficit hypothesis for the case of North Macedonia, using quarterly data for the budget deficit and current account on a yearly period 2005-2017 and different

estimation techniques of time series data sets, like VAR, VECM, and Granger – Causality found that efforts absorbed on improving the current account imbalances through fiscal policy will be ineffective in the short run and the existence of a long run relationship between the budget deficit and the current account deficit point out to the requirement of applying policy initiatives focused not only on reducing the budget deficit but also on improving the external position of the country through export promotion. However, the above-presented empirical literature for the case of North Macedonia on treating macroeconomic determinants of the current account deficit is not scant, but on addressing institutional determinants is missing to a large extent. By addressing the research question related to the impact of institutional and financial factors affecting current account balances in North Macedonia, this research extends the previous empirical work on the topic of country-level data. Investigating a set of institutional factors, related to political, economic and legal system in addition to financial and economic factors of North Macedonia, as identified by Altayligil and Çetrez (2020), adds value to the performed research on the grounds of the country's capacity to meet the EU integration agenda, which throughout institutional efficiency aims to achieve low and sustainable current account position in line with the Treaty of European Commission (Dauti and Elezi, 2022).

3. Methodology and method of analysis

The paper will try to shed light on the impact of macroeconomic, institutional, and financial factors on the current account deficit in North Macedonia, relying on a yearly time series data set for the period 1994-2022. The empirical equation of the current account deficit for the case of North Macedonia, which accounts for macroeconomic, institutional, and financial determinants, following (Bitzis et al. 2008) is as follows:

$$\begin{aligned} CAD_{jt} &= a_0 + a_1\, GD_{jt} + a_2\, REER_{jt} + a_3\, Y^{gap}_{jt} + a_4\, TO_{jt} + a_5\, X^{gap}_{it} + \\ &+ a_6\, EF_{jt} + a_7\, LPR_{jt} + a_8\, RI_{jt} + a_9\, M2_{jt} + a_{10}\, FUEL_{jt} + a_{11}\, CC_{jt} + \\ &+ a_{12}\, GOV_{jt} + a_{13}\, PR_{jt} + a_{14}\, RQ_{jt} + \varepsilon_t \end{aligned} \tag{1}$$

Where CAD_{jt} is the dependent variable, denoting the current account deficit as a share of GDP, GD_{jt} is the gross debt position as a share of GDP, $REER_{jt}$ is the real effective exchange rate, Y^{gap}_{jt} is the output gap of North Macedonia, calculated using Hodrick Prescot filter, TO_{jt} refers to the trade openness as a share of GDP, X^{gap}_{it} is the output gap in the European Union, calculated using Hardrick Prescot filter, EF_{jt} refer to economic freedom, LPR_{jt} refers to legal and property rights, RI_{jt} denote the regulation index, $M2_{jt}$ is the money supply in annual growth rate, $FUEL_{jt}$ is the fuel exports as a percentage of merchandise exports, CC_{jt} denote the control of corruption in percentile rank, GOV_{jt} is the government effectiveness in percentile

rank, PR_{jt} is the political risk in percentile rank and RQ_{jt} is the regulatory quality in percentile rank. In the last equation, the first term captures the effect of the budget deficits on the current account deficits and the second term captures the impact of price competitiveness. The domestic output gap, the real effective exchange rate and the terms of trade captures the impact of domestic demand. Also, the domestic output gap refers to the effect of cyclical factors (Dauti and Elezi, 2022). Descriptive statistics of the data used is given in the appendix 1A. Data description and source of the data is given in the appendix table 1B.

3.1. Hypothesis

GD_{jt} denoting gross debt position as a share of GDP captures the impact of fiscal policy-related factors on the current account deficit. By studying the relationship between fiscal and current account balance, we argue that while different crises have heightened the debt and fiscal situation in North Macedonia, aggravating many fiscal consolidation programs, like expenditure cuts and revenue increase, have led to a high current account deficit due to fiscal deficit (Bitzis et al. 2008). Hence, following this discussion we expect the budget deficit to have a positive impact on the current account deficit. In this view, we endorse the Keynesian Absorption Theory, instead of the Ricardian Equivalence Hypothesis, which states that when the economy is operating at full employment capacity an increase in the budget deficit drives the balance of payments into deficit by expanding the aggregate demand. In the Keynesian view, deficits can be used to counterbalance gaps between saving and investment, thus steadying output around its potential (full-employment) level (Bitzis et al. 2008).

$REER_{jt}$ denoting the Real Effective Exchange Rate, captures the impact of price competitiveness on the current account deficit. Appreciation (increase) in the exchange rate means a fall in the competitiveness level of the domestic production in international markets, thus lowering exports and therefore widening the deficit in the current account and depreciation (decrease) of the exchange rate, due to its positive association with exports, lowers current account deficit, impacting negatively the current account balance. Referring to the Keynesian absorption theory, devaluation, through its impact on domestic production, leads to a switch in spending from foreign to domestic goods, and hence, an improvement in the trade balance, thus lowering the deficit in the current account.

Y^{gap}_{jt} and X^{gap}_{jt} denote the cyclical components of output gap in North Macedonia and the European Union, respectively. Also, along with the European output gap, the domestic output gap refers to the effect of cyclical factors on the current account deficit. In cases when the domestic output gap is positive (negative), it is a signal of a high (low) level of domestic demand. Hence, the positive (negative) association between the country's output gap and current account deficit is expected, due to

lowered (enhanced) domestic aggregate demand, below (above) their most efficient capacity. In cases when the output gap of the EU is negative (positive), this is a signal of insufficient (sufficient) help of the EU toward the recovery process of North Macedonia's external economic conditions.

TO_{jt} denote the trade openness expressed as the sum of imports and exports of goods and services to GDP ratio, which also indicates trade liberalization. Trade openness is expected to be negatively related to the current account deficit because, as the domestic economy liberalizes its trade, it is more exposed to international trade with fewer trade restrictions. Hence, the deficit in the current account is lowered as the exports increase due to fewer trade restrictions (Chinn and Prasad, 2003).

The impact of country's institutional performance on the current account deficit in North Macedonia, is the novelty part of the research. To capture the effect of institutional performance on current account deficit, several variables are tested individually in relation to current account deficit, like economic freedom (EF_{jt}), legal and property rights (LPR_{jt}) and regulatory index (RI_{jt}). Other individual variables treated within the framework of institutional performance are governance related factors, like: control of corruption (CC_{jt}), government effectiveness (GOV_{jt}), political risk (PR_{jt}) and regulatory quality (RQ_{jt}). In all the case, we expect the institutional performance to be negatively related to current account deficit, since good institutions promote economic development and hence, export increase in the second stage, thus exposing the country to less deficit and higher surplus in the current account, subject to performing better efficiency of the domestic institutions.

$M2_{jt}$ capturing the monetary aggregate of money supply in annual growth rate, denotes financial sector development in North Macedonia. The improvement of financial sector is expected to be positively related to the improvement of current account balance, hence, impacting negatively (positively) the deficit (surplus) in the current account balance. $FUEL_{jt}$ captures the participation of the country in the international energy market. Here, we test the hypothesis of a negative association between fuel exports and current account deficit, since, the increase of fuel exports should lower trade deficit, thus leading to surplus conditions in the current account.

3.2. Econometric assessment – Unit root test

Testing for stationarity is applied for the purpose of avoiding the growth or declining trend of the data, thus making sure that the observed time series data is stationary. One of the most commonly used methods for the stationarity test, is the Dickey-Fuller test, at the augmented version (ADF), which is used to determine whether the various time series are integrated at the order of zero I (0). The starting point in unit root test is:

$$Y_{jt} = aY_{it-1} + \varepsilon_t; -1 \leq a \leq 1 \quad (2)$$

The null hypothesis in the Augmented Dickey-Fuller test is that the underlying process which generated the time series is non-stationary. This will be tested against the alternative hypothesis that the time-series information of interest is stationary. If the null hypothesis is rejected, it means that the series is stationary i.e., it is integrated to order zero. If, on the other hand, the series is non-stationary, it is integrated to a higher order and must be differenced until it becomes stationary. When testing for unit root we want to find out whether *a* in the equation (2) is equal to one. If *a* is smaller than one, the series is stationary. If, on the other hand, *a* is greater than one, than it would be an explosive series. Subtracting Y_{jt-1} from both sides in equation (2), we get equation (3), which is estimated by the Augmented Dickey – Fuller test.

$$Y_{jt} = \beta Y_{jt-1} + \varepsilon_t \quad (3)$$

Since the null hypothesis in equation (2) is that a is equal to one, in equation (3) it must be that β is equal to zero. Hence, when β is zero, there is unit root, and we have insufficient evidence to reject the null hypothesis of non-stationary. The Augmented DF Test is performed on each variable separately, on the following regression.

$$\Delta X_{jt} = \delta_0 + \delta_1 + \delta_3 X_{t-1} + \sum_{i=1}^{k} a_i \Delta X_{jt-1} + u_t \quad (4)$$

The variable ΔX_{jt-1} in equation (4) expresses the first differences with k lags and final u_t is the variable that adjusts the errors of autocorrelation. The coefficients δ_0, δ_1, δ_3 and a_i are estimated. When comparing the t statistics with their critical values as shown in Table 1 and 2, we notice that all variables are becoming stationary on their first difference. This means that the null hypothesis that a given series, contain a unit root and is non-stationary was rejected at the first difference for all variables and the variables are integrated to order I (1). We start with the plot of the values of explanatory variables.

The plot of the explanatory variables determining the current account deficit in North Macedonia, provided in Figures 1 and 2, shows that all the explanatory variables are becoming stationary, on their first difference. This means that the null hypothesis that a given series contains a unit root and is nonstationary, was rejected for the first differences of respective explanatory variables of the current account determinants.

Table 1: Augmented Dickey Fuller test of the selected variables in levels

Variables	T-statistic	Critical value at 5%	Probability	Remarks
CAD_{jt}	-0.81 (-3.63)	-2.99 (-3.58)	0.013 (0.027)	Non-Stationary
GD_{jt}	-0.81 (-1.28)	-2.99 (-3.58)	0.815 (0.892)	Non-Stationary
$REER_{jt}$	-2.45 (-1.96)	-2.99 (-3.58)	0.127 (0.622)	Non-Stationary
Y^{gap}_{jt}	-2.67 (-2.62)	-2.99 (-3.58)	0.079 (0.271)	Non-Stationary
TO_{jt}	0.67 (-2.86)	-2.99 (-3.58)	0.989 (0.174)	Non-Stationary
X^{gap}_{jt}	-2.54 (-2.49)	-2.99 (-3.58)	0.105 (0.331)	Non-Stationary
EF_{jt}	-1.50 (-2.46)	-2.99 (-3.58)	0.532 (0.347)	Non-Stationary
LPR_{jt}	-0.90 (-1.76)	-2.99 (-3.58)	0.788 (0.719)	Non-Stationary
RI_{jt}	-1.40 (-1.06)	-2.99 (-3.58)	0.578 (0.932)	Non-Stationary
$M2_{jt}$	-5.72 (-1.43)	-2.99 (-3.58)	0.628 (0.975)	Non-Stationary
$FUEL_{jt}$	-1.98 (-1.92)	-2.99 (-3.58)	0.292 (0.641)	Non-Stationary
CC_{jt}	-1.27 (-1.12)	-2.99 (-3.58)	0.643 (0.924)	Non-Stationary
GOV_{jt}	-1.38 (-1.50)	-2.99 (-3.58)	0.591 (0.823)	Non-Stationary
PR_{jt}	-1.34 (-3.08)	-2.99 (-3.58)	0.608 (0.108)	Non-Stationary
RQ_{jt}	-0.81 (-2.01)	-2.99 (-3.58)	0.812 (0.595)	Non-Stationary

Note: Value outside (inside) the brackets denote the absence (presence) of trend. In all the cases we have insufficient evidence to reject the null hypothesis of non-stationarity. The variables contain a unit root and are non-stationary.

Source: Authors' calculations

Table 2: Augmented Dickey Fuller test of the selected variables in levels

Variables	T-statistic	Critical value at 5%	Probability	Remarks
CAD_{jt}	-5.38 (-5.30)	-2.99 (-3.59)	0.000 (0.000)	Stationary
GD_{jt}	-4.08 (-4.04)	-2.99 (-3.59)	0.000 (0.000)	Stationary
$REER_{jt}$	-4.75(-5.83)	-2.99 (-3.59)	0.000 (0.000)	Stationary
Y^{gap}_{jt}	-2.67 (-2.62)	-2.99 (-3.59)	0.000 (0.000)	Stationary
TO_{jt}	-4.92 (-5.22)	-2.99 (-3.59)	0.000 (0.000)	Stationary
X^{gap}_{jt}	-5.19 (-5.13)	-2.99 (-3.59)	0.000 (0.000)	Stationary
EF_{jt}	-4.94 (-4.82)	-2.99 (-3.59)	0.000 (0.000)	Stationary
LPR_{jt}	-4.10(-4.32)	-2.99 (-3.59)	0.000 (0.000)	Stationary
RI_{jt}	-5.67 (-5.77)	-2.99 (-3.59)	0.000 (0.000)	Stationary
$M2_{jt}$	-6.34 (-6.13)	-2.99 (-3.59)	0.000 (0.000)	Stationary
$FUEL_{jt}$	-5.63 (-5.58)	-2.99 (-3.59)	0.000 (0.000)	Stationary
CC_{jt}	-3.90 (-3.85)	-2.99 (-3.59)	0.000 (0.000)	Stationary
GOV_{jt}	-5.89 (-5.96)	-2.99 (-3.59)	0.000 (0.000)	Stationary
PR_{jt}	-6.30 (-6.30)	-2.99 (-3.59)	0.000 (0.000)	Stationary
RQ_{jt}	-5.18 (-5.12)	-2.99 (-3.59)	0.000 (0.000)	Stationary

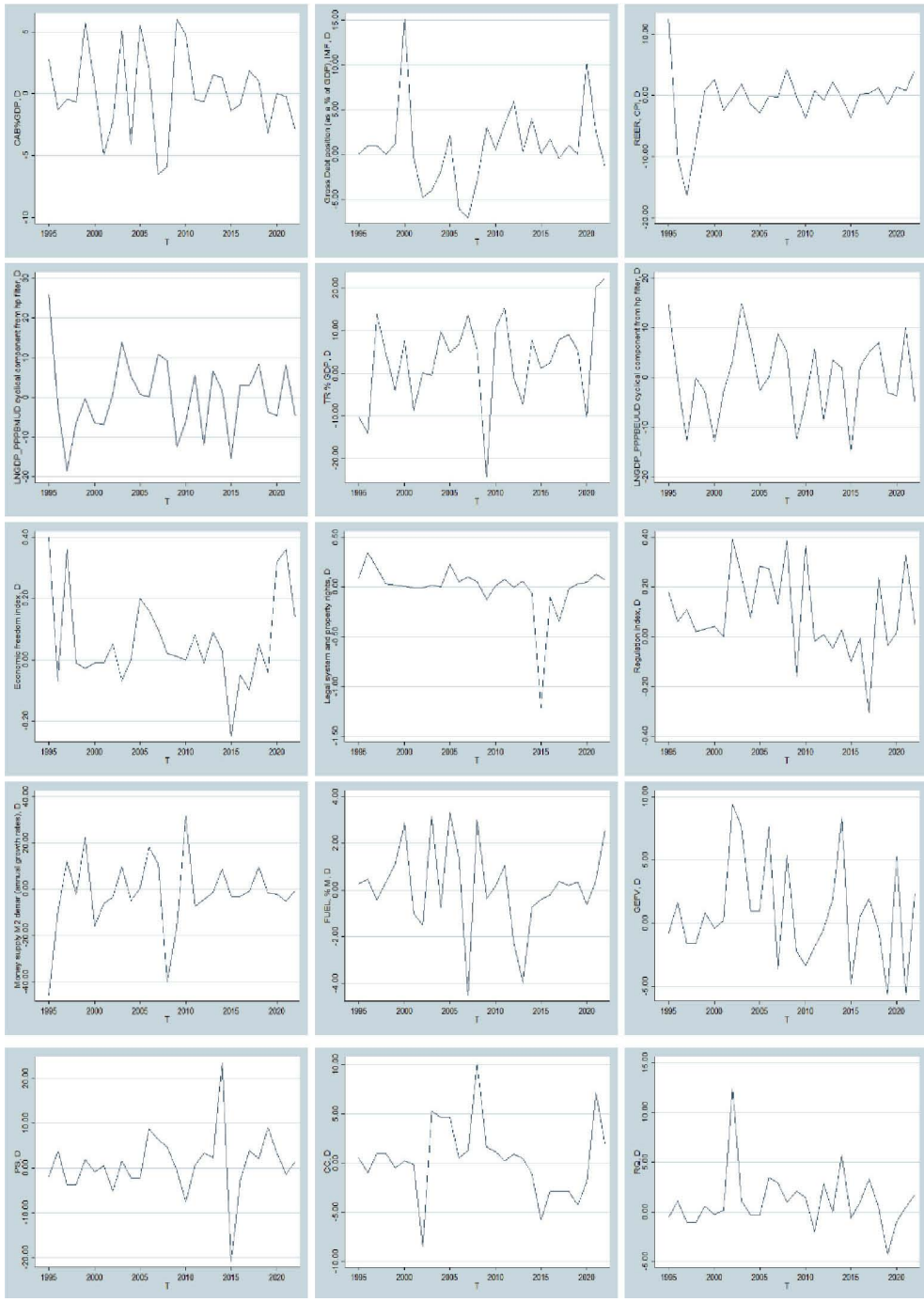
Note: Value outside (inside) the brackets denote the absence (presence) of trend. The variables do not have unit roots and are becoming stationary in the first difference.

Source: Authors' calculations

Figure 1: Augmented Dickey Fuller test for the variables in levels

Source: Authors' calculations

Figure 2: Augmented Dickey Fuller test for the variables in differenced terms



Source: Authors' calculations

3.3. Cointegration analysis

The stationary test we have conducted, suggest that the model (5) should be estimated, using the differenced variables. Hence, here we can only look at a short-run relationship among these variables. The final short-run model has the following form:

$$\begin{aligned}\Delta_1 CAD_{jt} = {} & a_0 + a_1 \Delta_1 GD_{jt} + a_2 \Delta_1 REER_{jt} + a_3 \Delta_1 Y_{gap_{jt}} + a_4 \Delta_1 TO_{jt} + \\ & + a_5 \Delta_1 X_{gap_{it}} + a_6 \Delta_1 EF_{jt} + a_7 \Delta_1 LPR_{jt} + a_8 \Delta_1 RI_{jt} + a_9 \Delta_1 M2_{jt} + \\ & + a_{10} \Delta_1 FUEL_{jt} + a_{11} \Delta_1 CC_{jt} + a_{12} \Delta_1 GOV_{jt} + a_{13} \Delta_1 PR_{jt} + \\ & + a_{14} \Delta_1 RQ_{jt} + \mu_t\end{aligned} \tag{5}$$

Where μ_t refer to error term derived out from the short run model. Cointegration refer to cases when two or more series share a stochastic trend. Engle and Granger (1987), suggested a two-step process to test for cointegration (an OLS regression and a unit root test), based on the Engle and Granger - ADF test. So, in a first step the so-called *cointegrating regression*, in which all the variables would be in levels and no dynamics included, would be estimated by ordinary least squares (OLS), and the residuals from this regression will be tested for the presence of a unit root (Bajo-Rubio and Sosvilla-Rivero, 1994; Dauti, 2009). If the residuals were found to be stationary, the cointegrating regression might be taken as a long-run relationship and we could then proceed to the second step, where an Error Correction Model (ECM), including those lagged residuals as an error-correction term would be postulated in order to consider the short-run dynamics.

Table 3: ADF test of the obtained residuals after estimating OLS regression

Variables	T-statistic	Critical value at 5%	Probability	Remarks
ε_{t-1}	-4.87 (-4.78)	-2.99 (-3.59)	0.000 (0.000)	Stationary
ε_{t-1}*	-4.964	-1.950		Stationary

Note**:** Value outside (inside) the brackets denote the absence (presence) of a trend. The error term provided from the OLS estimation of equation (1) does not have unit root and is stationary. * Denote the e-granger test.

Source: Authors' calculations

When we test for the presence of unit root on the residuals obtained, after OLS estimation of Equation (1), we find that the residuals are stationary, thus confirming the presence of the long-run relationship between the variables, and the series is cointegrated. Therefore, we proceed with the second step by analyzing the Error Correction Mechanism, thus enhancing the approach of non-stationary time series.

3.4. Error correction mechanism

In order to make a formal analysis of cointegration approach, we employ the second step of estimation procedure for dynamic modeling suggested by Engle and Granger (1987). Hence, in order to model the long run dynamics, when estimating the final short run model (Equation 5), suggested by Augmented Dickey – Fuller test, we consider the postulation of the lagged residuals as an error correction term, obtained from the OLS estimation of Equation (1). Following this approach, we estimate the cointegration regression shown on Equation (6), which confirm the long run relationship between variables. The error correction model is as follow:

$$\begin{aligned}\Delta_1 CAD_{jt} = {} & a_0 + a_1 \Delta_1 GD_{jt} + a_2 \Delta_1 REER_{jt} + a_3 \Delta_1 Y_{gap_{jt}} + a_4 \Delta_1 TO_{jt} + \\ & + a_5 \Delta_1 X_{gap_{it}} + a_6 \Delta_1 EF_{jt} + a_7 \Delta_1 LPR_{jt} + a_8 \Delta_1 RI_{jt} + a_9 \Delta_1 M2_{jt} + \\ & + a_{10} \Delta_1 FUEL_{jt} + a_{11} \Delta_1 CC_{jt} + a_{12} \Delta_1 GOV_{jt} + a_{13} \Delta_1 PR_{jt} + \\ & + a_{14} \Delta_1 RQ_{jt} + \varepsilon_{t-1}\end{aligned} \tag{6}$$

Where, the ε_{t-1} denote the error correction mechanism. Following this procedure, the results of applying the ECM procedure to Equation (6) for current account deficit are shown in column 3, Table 4.

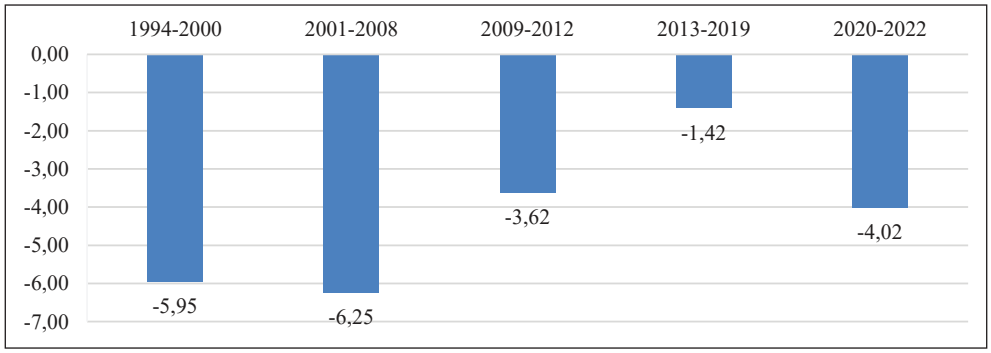
4. Data description and empirical analysis

Following the approach of Dauti and Elezi (2022), for the purpose of outlining the cyclical behaviour of the current account deficit in North Macedonia, due to different crisis periods, the descriptive analysis is navigated on the grounds of four different periods, 2000-2008 capturing the pre-international financial crisis period, 2009-2012 outlining the Eurozone debt crisis period, 2013-2019 considering the pre-COVID crisis period and 2020-2022 capturing the COVID-19 crisis period.

4.1. Current account trends in North Macedonia

The current account balance has been in persistent deficits over different periods, thus provoking the increase of the country's imports, which has lately been covered by private and official transfers. The widened deficit in 2022 was due to high prices of imported energy, which is expected to be recovered to its near balance, due to robust remittance inflows (Havolli, 2009). The highest deficit was recorded during the period 2001-2008, where in 2008 the deficit reached its peak, at about 13.1 percent as a share of GDP, as shown in Figure 3. This deficit was mainly caused by the international financial turmoil, which hurt private transfers and remittances.

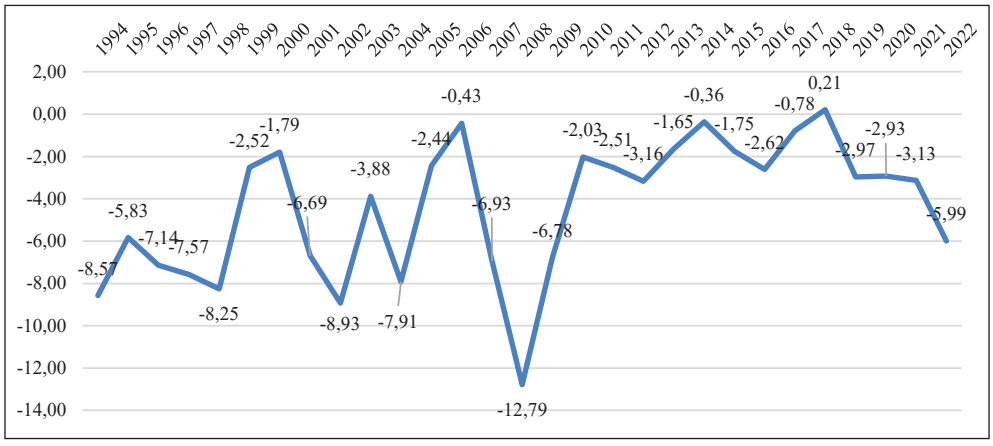
Figure 3: Current account deficit as a share of GDP in North Macedonia



Source: Authors' calculations based on data from World Bank (2024-a)

Summarizing the main factors that have contributed to the increase in the current account deficit, we can account for the following: an increase in domestic demand for imported goods like food, technology, oil, and energy and an increase in spending as the economy converges toward EU path (Dauti and Emini, 2019). However, the surplus level of the current account, in GDP terms, could be reached only once for North Macedonia in 2018 (Figure 4).

Figure 4: Current account deficit as a share of GDP in North Macedonia over a yearly time span 1994-2022

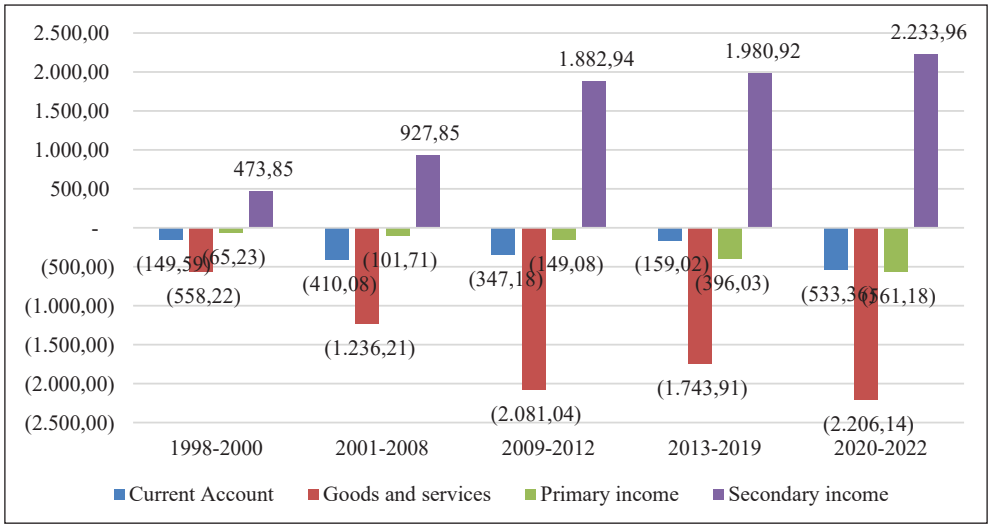


Source: Authors' calculations based on data from World Bank (2024-a)

Figure 4 shows that the current account deficit in North Macedonia was negative during the entire investigated period 1994-2022, reaching its peak in 2008, with a record of 12.8 percent, the result of the global financial crisis. In 2010 and the subsequent years up to 2016, the situation changed in favor of recording

significantly less deficit in the current account up to the pandemic COVID-19 yearly period of 2020. Whereas in the post-pandemic years of 2021 and 2022, especially in 2022, the deficit level in the current account reached its record of almost 6 percent in GDP terms, a result which can be attributed to inconsistent macroeconomic stabilization policies and economic consequences of the pandemic at a global scale, where North Macedonia external sector could not be immune.

Figure 5: Composition of current account, in millions of USD dollar 1998-2022



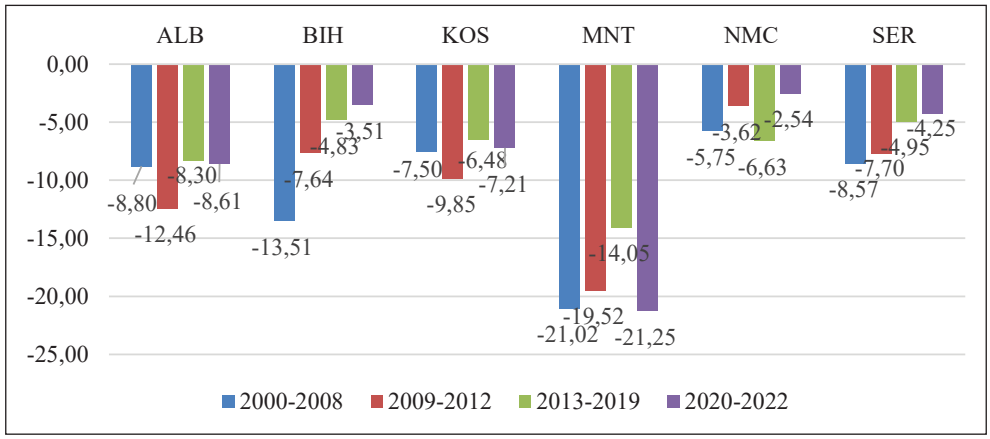
Source: Authors' calculations based on data from National Bank of the Republic of North Macedonia (2024-a)

As viewed from Figure 5, the surplus in the current account transaction during the five time periods mainly originates from the net inflow in secondary income consisting of transactions with non-residents and remittances and trade in services, which is recording a constant upward trend, while traditional deficit item in the current account position is mainly contributed from the deficit in trade of goods and services, making the country highly import dependent.

4.2. Comparative statistics

As viewed from figure 6, the highest deficit in the current account in terms of GDP percentage, during the COVID-19 crisis was recorded in Montenegro (21.25 per cent), followed by Albania (8.61 percent) and Kosovo (7.21), which is an indication of distressing effect of the pandemic, forcing these countries to be moreover reliable on imports rather than exports, thus hampering their macroeconomic performance on the grounds of external conditions.

Figure 6: Current account deficit as a share of GDP in Western Balkan (WB) countries



Source: Authors' calculations based on data from World Bank (2024-a)

The same countries suffered due to the Eurozone debt crisis period, which also harmed private transfers and remittances that constitute a traditional surplus item in the current account position of these countries. On the other hand, more stable positions based on current account deficit were observed in Serbia and North Macedonia during the four observed periods, thus making these countries more sustainable based on their economic performance when exposed to external economic conditions. However, Serbia's and North Macedonia's position of the current account deficit during the international financial turmoil period (2000-2008) was higher on a comparison basis than the rest of the WB countries, a case that can be attributed to different internal political crisis these countries had during this observed period. A healthy current account surplus is associated with stronger economic performance and better regional employment during the early stages of the post-2008 recession (Crescenzi et al., 2016). Although the surplus level in the current account at individual WB countries could not be reached during the time frame considered in the analysis, it was reduced significantly during the late years 2020-2022, except for Montenegro and Albania.

4.3. Empirical analysis

Focusing on the estimated results from Table 1, the coefficient of error correction term in the short-run model denotes the speed of adjustment toward the long-run equilibrium level of the estimated model, implying that the deviations from the long-run equilibrium are corrected gradually by the Error Correction Term, through a series of partial short-run adjustments. The coefficient of the error term is -1.1, which means that almost the whole discrepancy between the long-run and short-run model is corrected within a year. This coefficient shows us how fast the current account deficit

in North Macedonia changes to disequilibrium changes in the explanatory variables. A highly significant error correction term implies the existence of a stable long-run relationship among variables (Banerjee et al., 2014). The coefficient of R^2 is 0.89, meaning that 89% of changes in the dependent variable of the current account deficit are explained by the selected explanatory variables. The results from the co-integration analysis suggest that the fiscal policy-related variable of general government debt as a percentage of GDP is positively related to the current account deficit, implying that a 1 percent increase in the debt component of North Macedonia, will increase the deficit in the current account by 0.37 percent, on average, ceteris paribus. This result implies that the increase of public deficit can reduce the national savings, without a Ricardian offset or crowding out effect from private savings and hence can increase the current account deficit. Also, the effect of budget deficits on current account balances may be related to the allocation of fiscal expenditures. This means an increase in the public deficit lowers national savings. It also shows that an increase in fiscal deficits has the effect of expanding total consumption and current account deficits. The statistically significant and negative coefficient of REER indicates that potential depreciation of the domestic currency (as outlined by the Mundel-Fleming model), increases exports (as outlined by the Harberger-Laursen-Metzler, HLM effect), leading to improvement in the current account position in the second run (which is compatible with the Mundell-Fleming model). Depreciation of the exchange rate means an increase in the competitiveness level of North Macedonia's product at the international level, thus leading to an improvement of deficit in the current account, and hence a switch of foreigners spending to North Macedonia's goods, thus boosting exports. From the results, a 1 percent increase in the REER leads to an average decrease of the current account deficit by 0.2 percent, implying that the country's potential for exchange rate devaluation may eventually reduce the deficit level in the current account, via exports increase. As claimed in the results, the output gap in North Macedonia is proved to have a positive impact on the current account deficit, hence, increasing the country's output gap by 1 percent, leads to a 0.5 percent increase in the current account deficit, a case which reflects the presence of increased level of domestic aggregate demand. Trade openness is confirmed to be negatively related to the current account deficit, meaning that as the country liberalizes its trade policies it gets more involved in international trade and hence, may be exposed to less deficit in the current account. Henceforth, a 1 percent increase in the trade openness, decreases the deficit in the current account by 0.24 percent, ceteris paribus. Institutional-related factors, like economic freedom, legal and property rights, regulatory index, control of corruption, government effectiveness, and regulatory quality are significantly related to the current account deficit outlining the impact of institutional efficiency on the county's cyclical behavior of external conditions. Improvement of the civil services (captured by the government effectiveness coefficient), the protection of legal and property rights, and improvement in the regulation index, decreased the current account deficit in North Macedonia, on average by 4.9 percent, 0.2 percent, and 6.8 percent respectively, other things being equal.

Table 4: Results of the determinants of current account deficit in North Macedonia

Variables	(1)	(2)	(3)
CAD_{jt} dependent variable	OLS	Short run model	ECM model
GD_{jt}	0.426***	0.220	0.375***
	(0.118)	(0.127)	(0.106)
$REER_{jt}$	-0.249**	-0.0952	-0.244*
	(0.112)	(0.164)	(0.131)
$Y_{gap_{jt}}$	0.437*	0.356	0.512***
	(0.210)	(0.203)	(0.159)
TO_{jt}	-0.250***	-0.237***	-0.249***
	(0.0762)	(0.0529)	(0.0398)
$X_{gap_{jt}}$	-0.173	-0.186	-0.276
	(0.212)	(0.206)	(0.156)
EF_{jt}	6.315	9.275**	8.529**
	(4.523)	(3.825)	(2.875)
LPR_{jt}	-4.766*	-2.767	-4.995**
	(2.233)	(2.751)	(2.167)
RI_{jt}	-6.357	-7.312*	-6.869**
	(4.544)	(4.073)	(3.054)
$M2_{jt}$	0.220***	0.198***	0.240***
	(0.0490)	(0.0352)	(0.0292)
$FUEL_{jt}$	0.659*	1.271***	0.787**
	(0.358)	(0.324)	(0.283)
CC_{jt}	0.472***	0.224	0.260**
	(0.143)	(0.150)	(0.113)
GOV_{jt}	-0.411*	-0.295	-0.249*
	(0.204)	(0.177)	(0.134)
PR_{jt}	-0.0244	-0.0539	0.0262
	(0.0940)	(0.0899)	(0.0715)
RQ_{jt}	0.776**	0.631**	0.448**
	(0.319)	(0.244)	(0.191)
ε_{t-1}			-1.101***
			(0.329)
Constant	12.95	0.303	0.292
	(27.54)	(0.635)	(0.476)
Observations	29	28	28
R-squared	0.776	0.805	0.899

Note**:** Dependent variable is Current Account Balance as a share of GDP. t-statistics in brackets, ***, ** and * indicate significance of coefficients at 1, 5 and 10 per cent, respectively. Column (1) denote the results, based on the OLS estimates of equation 1. Column (2) denote the short run results obtained from the OLS estimates of equation 5 and column 3, denote the OLS estimates from equation 6 (ECM model).

Source: Authors' calculations

This result implies that the country's performance, concerning external economic conditions, will improve through potential influx in the current account originating from exports or remittances, once there is an evident boost of institutional performance of the country with respect to protecting legal and property rights and applying sound government regulation policies. On the other hand, other institutional-related factors like control of corruption, economic freedom, and regulatory quality worsen the deficit level in the current account. Interpreting the coefficient of the control of corruption, a 1 percent increase in the extent to which public power is exercised for private gains through corruption channels leads to an increase in the current account deficit in North Macedonia, on average, by 0.2 percent. Interpreting the coefficient of the regulatory quality index, a 1 percent increase in the extent to which regulation policies applied for promoting private sector development in North Macedonia will contribute to the deficit in the current account by 0.4 percent, other things remaining equal.

Also, economic freedom contributes to worsening the external position of the country on the grounds of current account by increasing its deficit, meaning that jurisdictions by trade freedom, tax burden, and judicial effectiveness are inconsistent and subject to political pressures, and hence, confirming the regional predispositions of potential importers toward North Macedonia's products at international markets. The results suggest that financial development is positively related to the current account deficit, a result that can be attributed to the underdeveloped financial sector in the country. Hence, a 1 percent increase in the financial sector development would, on average, increase the deficit in the current account by 0.24 percent. Also, fuel exports as a share of total merchandise exports are found to increase the current account deficit, per average of 0.7 percent, for a 1 percent increase in fuel exports.

4.4. Calculating the potentials of current account deficit in North Macedonia

To calculate potential values of current account deficit in North Macedonia, we have used the Hodrick Prescott filter. The calculation of the potential deficit in the current account in North Macedonia are considered for the period 1994-2022 based on the actual data of the current account deficit.

Figure 7: Actual and potential values of current account deficit in North Macedonia

Note: The calculations are based on STATA using Hodrick – Prescott filter.

Source: Authors' calculations

Table 5: Actual and potential values of current account deficit in North Macedonia

Years (average)	Actual deficit in the current account	Potential deficit in the current account	Cyclical component	Actual over potential level of current account deficit
1994-2000	-5.95	-6.52	-0.57	0.91
2001-2008	-6.24	-5.27	-0.97	1.18
2009-2013	-3.22	-3.51	-0.28	0.91
2014-2018	-1.05	-2.16	-1.10	0.48
2019-2022	-3.75	-2.96	-0.79	1.26

Note: Potential values of current account deficit are calculated using the Hodrick-Prescot filter. The data are presented on a yearly average term within shown time periods.

Source: Authors' calculations

The ratio of actual to potential current account deficit below one shows that the country has recorded less current account deficit than is predicted by the model. Also, there exists more scope for recording more deficit in the current account, which is evident during three time periods 1994-2000; 2009-2013, and 2014-2018, which is a signal of the overheating cycle on the grounds of the country's

external economic conditions. This means that during the observed period, 2009-2012, which outlined the Eurozone debt crisis period, North Macedonia's external economic conditions were unaffected. Also, during the normal times of 1994-2000 and 2014-2018, the country's external sector was in a favorable economic situation. The ratio of actual to the potential current account, above shows that the country has recorded more deficit in the current account than potentially expected, which is a signal of evident crisis imported to the country, a circumstance which is manifested during two time periods, the pre-financial crisis period 2001-2008 and COVID-19 crisis period 2019-2022. These two scenarios show that North Macedonia's external economic conditions were significantly worsened due to regional or international predisposition of foreigners toward the country's financial and economic resources, throughout declined demand for the country's products and services at international markets, worsened influx of country's secondary income or breaking up the regional or international supply chain, where North Macedonia intermediate products were involved, a scenario which was manifested during COVID-19 pandemic crisis.

5. Results and discussion

Based on the co-integration analysis the research finds out that the current account deficit in North Macedonia during the observed yearly period, 1994-2022, on macroeconomic grounds was triggered by fiscal factors (general government debt), price competitiveness-related factors (real effective exchange rate) and business cycle related factors (output gap). The domestic output gap and the trade openness capture the impact of domestic demand on the current account deficit. Also, the domestic output gap together with the European output gap refers to the effect of cyclical factors in North Macedonia and the EU level, respectively. The enhancement effect of government debt, through the implicit impact of the fiscal deficit component of this debt, on current account deficit is in line with the twin deficit hypothesis confirmed in previous empirical studies on the existence of the twin deficit hypothesis in North Macedonia (Bucevska, 2020; Sadiku et al, 2015; Stojcevska and Miteski, 2016). Also, the positive association between the budget and the current account deficit is a signal for an increase in debt potential in the country's economy and hence vicious circle can take place throughout the interaction between the budget and current account deficit. Therefore, to improve government debt sustainability, a prior reduction of the budget deficit via improvements in the current account balance shall proceed. The negative relationship between the price competitiveness indicator captured by the real effective exchange rate and current account deficit implies that with the increase of competitiveness level of country products at regional or international markets, which is mainly manifested throughout the depreciation of the exchange rate, the deficit in the current account decreases, as the foreign demand elasticity concerning North Macedonia's product prices increases. This finding is compatible with the

Mundel-Fleming model and Harberger-Laursen-Metzler, HLM effect, on the relationship between exchange rate, exports, and current account deficit (Mordecki and Miranda, 2019). Also, it is generally accepted standard, particularly for a small and open economy, such is the case with North Macedonia, that changes in the real effective exchange rate can encourage economic activity by fluctuating the relative returns in the tradeable and non-tradeable sectors. On the grounds of domestic demand factors like North Macedonia's output gap and trade openness, the results confirm the enhancement effect of the output gap and the deteriorating effect of trade openness on the current account deficit. The enhancement effect of the output gap (actual GDP is higher than potential GDP) on the current account deficit, comes through demand pressure factors, suggesting that actual domestic aggregate demand above its potential level, may also affect the elasticity of the current account deficit concerning cyclical movement, moreover, outlining the positive level of the output gap in North Macedonia, during most of the period, which reflects high level of domestic demand. The insignificant coefficient of the EU output gap, concerning North Macedonia's current account deficit, implies that the EU output gap does not impact the elasticity of the current account deficit on the grounds of EU cyclical movement, which is a signal of unimportant transactions between North Macedoni's and EU economic agents. Therefore, the net EU savings did not help the recovery process of North Macedonia's external sector, which to some extent may be an outcome of the weakened EU approximation path of the country on economic and political grounds, during the observed yearly period. The deteriorating effect of trade openness on the current account deficit implies that trade liberalization policies could improve the country's trade balance, via exports increase and hence reduce the deficit level in the current account. The research outlines the importance of institutional performance on the level of the current account balance of the country. The positive relationship between the economic freedom index, control of corruption, and current account deficit indicates that the country's external balance concerning the current account deficit is sensitive to misuse of the ability of economic agents in the business decision-making process without government limitations and the misuse of political power by host country elites and governments, respectively. The positive and statistically significant coefficient of the regulatory index indicates that sound regulation policies that promote private sector development in North Macedonia are contributing to the increase of the current account deficit, the result that can be attributed to the inconsistency of private sector development policies for North Macedonia, thus confirming the economic agent's regional predispositions toward this inconsistency. The research confirms the enhancement effect of financial development indicators on the deficit level of the current account. Given that higher financial developments mean more investment; it is expected that a high investment ratio will contribute to a surplus condition on the current account. Therefore, we endorse investment promotion policies which could be vital for improving the country's current account balance condition.

6. Conclusion

The current account balance as an outcome of investments and saving decisions of optimizing agents, is an important indicator for macroeconomic stabilization policies. The purpose of this research was to test empirically the macroeconomic, institutional, and financial determinants of the current account deficit in North Macedonia, over a yearly period 1994-2022, using cointegration analysis. We also investigated the stationarity of the time series data. Since all of them became stationary in their first difference, we performed cointegration analysis throughout the error correction term modeling process, to capture the long-run relationship between the variables. The descriptive part of the research confirms that chronic current account deficits in North Macedonia, over a yearly period under investigation, imply an excess of domestic absorption over aggregate supply/income. The empirical part of the research reveals that the current account performance of the country is determined by macroeconomic-related factors (domestic demand captured by domestic output gap, trade openness, and real effective exchange rate), fiscal factor (general government debt), institutional performance captured throughout good governance indicators as well as legal factors and financial development factor, which is broadly considered through monetary aggregate of money supply, M2. Government debt is confirmed as a deficit enhancement factor in the current account. Price competitiveness level, captured through the real effective exchange rate is confirmed as a deteriorating factor of the deficit in the current account balance, giving rise to possible depreciation policies of exchange rate, which through its impact on exports increase, could improve the deficit level in the current account. The enhancement effect of the domestic output gap on the current account deficit implies the importance of cyclical movement for the country's economic external conditions and high level of domestic demand, whereas, the deteriorating effect of trade openness on the current account deficit implies that trade liberalization policies could expose the country to less deficit situation in current account. The study finds out that North Macedonia can improve its external economic conditions through enhanced institutional performance by strengthening the legal and property rights, and regulatory index and increasing the quality of public and civil services as well as policy formulation and implementation through good government effectiveness. On the other hand, other institutional-related factors like economic freedom, control of corruption, and regulatory quality are found to enhance the deficit level in the current account. Investigating these institutional factors on an individual basis about the current account deficit for North Macedonia is a novelty approach undertaken in this study. It adds value to the empirical evidence on the grounds of the tested hypothesis related to the impact of institutional performance on the current account balance in the country. The limitation of the research is about the effect of the interaction between institutional-related factors and macroeconomic factors on the current account balance, which on the other hand could be considered

a profound force behind the performance of the current account balance in North Macedonia. Therefore, a fruitful direction for future research would be to treat such interactions, considering that North Macedonia went through many institutional challenges associated with integration tasks into the EU.

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Appendix

Table 1A: Descriptive statistics

Variables	Observations	Mean	Standard deviations	Min	Max
CAD_{jt}	(4.42)	3.22	(12.79)	0.21	(4.42)
GD_{jt}	35.21	8.79	20.64	53.41	35.21
$REER_{jt}$	104.48	8.98	98.14	136.45	104.48
Y^{gap}_{jt}	0.00	10.14	(20.08)	21.17	0.00
TO_{jt}	100.20	27.43	57.92	170.82	100.20
X^{gap}_{it}	0.00	8.78	(19.44)	17.76	0.00
EF_{jt}	7.13	0.37	6.23	7.95	7.13
LPR_{jt}	5.58	0.61	4.54	6.28	5.58
RI_{jt}	7.47	0.90	5.91	8.50	7.47
$M2_{jt}$	13.17	13.33	(14.30)	56.00	13.17
$FUEL_{jt}$	3.64	2.87	0.13	9.38	3.64
CC_{jt}	41.45	9.16	25.40	56.40	41.45
GOV_{jt}	42.65	10.95	25.14	56.25	42.65
PR_{jt}	31.65	10.81	15.53	56.67	31.65
RQ_{jt}	53.16	12.28	35.33	70.00	53.16

Source: Authors' calculations

Table 1B: Variable description and data source

Variables	Definition	Source
CAD_{jt}	Current Account Deficit as a share of GDP	IMF, world economic outlook (WEO), database of January 2024-a
GD_{jt}	Gross debt position as a share of GDP,	IMF, world economic outlook (WEO), database of January 2024-b
$REER_{jt}$	Real Effective Exchange Rate	IMF, world economic outlook (WEO), database of January 2024-c
TO_{jt}	Trade openness (sum of exports and imports over GDP)	IMF, world economic outlook (WEO), database of January 2024-d
Y^{gap}_{jt}	Cyclical components of output gap in North Macedonia. Measured as a percentage difference of actual GDP (aggregated demand) from trend – potential GDP, (aggregate supply), as calculated with the Hodrick-Prescott filter	Own calculation using data of GDP from IMF, world economic outlook (WEO), database of January 2024-e
X^{gap}_{jt}	Cyclical components of output gap in EU-27 countries. Measured as a percentage difference of actual GDP (aggregated demand) from trend – potential GDP, (aggregate supply), as calculated with the Hodrick-Prescott filter	Own calculation using data of GDP from IMF, world economic outlook (WEO), database of January 2024-e
EF_{jt}	Economic Freedom	Fraser institute (2024)
LPR_{jt}	Legal and Property Rights	Fraser institute (2024) and World Bank (2024-c)
RI_{jt}	Regulation index	Fraser institute (2024)
$M2_{jt}$	M2, monetary aggregate proxying money supply	National Bank of North Macedonia (2024-b)
$FUEL_{jt}$	Fuel Exports as a percentage of merchandise exports	World Bank (2024-b) WITS platform from the Comtrade database maintained by the United Nations Statistics Division
CC_{jt}	Control of corruption, in percentile rank	World governance indicator, World Bank (2024-d)
GOV_{jt}	Government effectiveness, in percentile rank	World governance indicator, World Bank (2024-d)
PR_{jt}	Political risk, in percentile rank	World governance indicator, World Bank (2024-d)
RQ_{jt}	Regulatory Quality	World governance indicator, World Bank (2024-d)

Source: Authors' construction

Makroekonomske, institucionalne i financijske odrednice deficita tekućeg računa u Sjevernoj Makedoniji: Dokazi iz vremenskih serija

Bardhyl Dauti[1]

Sažetak

Uloga salda tekućeg računa u makroekonomskoj politici progresivno je velika, posebice u tranzicijskim zemljama. Koristeći podatke na godišnjoj razini za vremenski raspon od 1994. do 2022. godine, na temelju analize kointegracije, ovo istraživanje empirijski istražuje makroekonomske, institucionalne i financijske odrednice deficita tekućeg računa u Sjevernoj Makedoniji. Rezultati istraživanja ukazuju da na deficit tekućeg računa zemlje značajno utječu čimbenici domaće potražnje kao što su realni efektivni tečaj, proizvodni jaz i trgovinska otvorenost, fiskalni čimbenik stanja bruto duga, institucionalni čimbenik ekonomske slobode, pravna i imovinska prava, regulatorni indeks, kontrola korupcije, učinkovitost vlade, kao i financijski razvoj obuhvaćen novčanom opskrbom. Rezultati studije također ukazuju da je zemlja zabilježila veći manjak na tekućem računu od potencijalno očekivanog tijekom dva vremenska razdoblja: razdoblje prije financijske krize 2001. – 2008. god. i tijekom kriznog razdoblja COVIDa-19 od 2019. do 2022. god.

Ključne riječi: *deficit tekućeg računa, mehanizam ispravljanja pogrešaka, Sjeverna Makedonija*

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The impact of designated market-makers on liquidity in frontier markets: Evidence from Zagreb and Ljubljana Stock Exchanges*

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Abstract

Many exchanges around the globe have implemented market-making schemes in an attempt to mitigate liquidity risk and enhance trading volume. This research examines the impact of designated market makers on stock liquidity in frontier markets, specifically measured by bid-ask spreads and trading turnover. Using a difference-in-differences analysis, we studied 19 stocks that introduced designated market makers at the Zagreb Stock Exchange and Ljubljana Stock Exchange between May 2010 and January 2022. To the best of our knowledge, this is the first study investigating the impact of market makers in these specific markets and only the second in frontier markets overall. As expected, we find a significant reduction in bid-ask spreads for most stocks following the introduction of market makers. However, unlike findings of studies conducted in more developed markets, our results for turnover are not conclusive, suggesting that market makers alone may not be sufficient to overcome structural impediments to market liquidity in frontier markets, such as lack of free float and the dominance of large investors with long-term investment horizons.

Keywords: *market making, designated market-makers, liquidity provision, frontier markets, market quality*

JEL classification: *G10, G12, G14*

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1. Introduction

Stock exchanges worldwide rely, irrespective of their specific market designs and characteristics, on market-making to bolster liquidity (Anand et al., 2009; Charitou and Panayides, 2009). Market-makers play a vital role by providing liquidity to other traders through the simultaneous posting of buy and sell orders. Their primary objective is to profit from the bid-ask spread, while steering clear of accumulating a large net position in a stock (Xiong et al., 2015). The widespread adoption and persistence of market making as a function across diverse markets and over time underscore the significant and enduring role that market makers play in facilitating liquidity provision (Benos and Wetherilt, 2012).

Traditionally, exchanges and market-makers establish contractual agreements that outline specific obligations for market-makers in exchange for corresponding benefits. Throughout the remainder of this paper, we will specifically refer to such formal liquidity providers as *designated market makers* (DMMs). The typical obligations assigned to DMMs involve maintaining a presence in the market for a selected portion of the trading day and adhering to maximum spread and minimum quoted size requirements. These obligations in presence, spread, and size ensure that DMMs consistently and continuously provide their services. In return for these obligations, benefits are extended to DMMs, which may include fee rebates, informational advantages, and trading privileges. In certain cases, exchanges may directly compensate DMMs with fees for assuming market-making responsibilities.

With the rise of electronic trading, where participants actively contribute liquidity, traditional market-making appeared to face obsolescence (Skjeltorp and Ødegaard, 2015). The emergence of high-frequency trading, in particular, promised sufficient endogenous liquidity by leveraging increased trading speed and significantly higher trading volumes (Xiong et al., 2015). Contrary to these expectations, DMMs continued to play a crucial role in electronic limit order markets. In the case of large caps, some of the research confirmed that endogenous liquidity providers tended to retract liquidity and curtail their activities during stressed market conditions with the potential to destabilize markets. This structural vulnerability worked in favour of maintaining exchanges' DMM structures (Anand and Venkataraman, 2016).

Moreover, in response to these concerns related to systemic risks, the European Union mandated that algorithmic traders pursuing a market-making strategy enter into a binding agreement with the exchange (European Parliament and Council, 2014). More recent studies on the impact of high-frequency market makers during the COVID-19 crisis present conflicting conclusions with one finding that algorithmic trading was not associated with harmful effects on market quality (Chakrabarty and Pascual, 2023), while another found that market withdrawal was most exacerbated in securities most exposed to high-frequency market makers (Foley et al., 2022). Another interesting evolution in DMM structures is the

introduction by DMMs of a fee charged to the issuing firm in the case of small caps (Skjeltorp and Ødegaard, 2015). In some instances, issuers also provide the market maker with an inventory of shares to facilitate market-making activities (Venkataraman and Waisburd, 2007).

Various countries such as France (Venkataraman and Waisburd, 2007), Sweden (Anand et al., 2009), the Netherlands (Menkveld and Wang, 2013), Norway (Skjeltorp and Ødegaard, 2015), and Germany (Theissen and Westheide, 2023) have scrutinized the introductions of DMM. These studies adopt an event study methodology, analyzing market dynamics before and after implementing DMMs. A consensus emerges across these studies, indicating that the most substantial enhancement in liquidity is observed in small-cap, illiquid stocks. This finding is anticipated, given that such stocks exhibit asymmetrical order books, typically lacking offsetting buy and sell orders for large sizes at any given time. In contrast, large-cap, liquid stocks generally experience comparatively lesser benefits from active market making (Weild et al., 2013).

Lack of liquidity in secondary markets can lead to higher investor-required rates of return, and extreme illiquidity might discourage market participation, undermining the positive contribution of capital markets to capital allocation and economic growth. Therefore, the provision of liquidity by market-makers generates positive externalities. In economic theory, when market making is associated with positive externalities, market makers might not be fully compensated for the social benefit of a liquid market. Without some form of policy intervention, the provision of this service may fall below a socially optimal level (Benos and Wetherlit, 2012; Menkveld and Wang, 2013). Bessembinder et al. (2015) posit that DMM contracts, where the issuer pays the market maker for providing liquidity, offer a potential market solution to this market imperfection. By internalizing the cost of market making with issuers, issuer-sponsored DMM contracts enable the inclusion of stocks in market-making schemes where expected trading profits from market-making services may not adequately compensate for a DMM's costs and risks. From the DMM's perspective, the value of the contract is determined by the lump-sum fee received from the issuer, benefits granted by the exchange (if any), trading results, and the perceived value of cross-selling opportunities stemming from the relationship with the issuer (Venkataraman and Waisburd, 2007). From the sponsoring issuer's viewpoint, DMMs create value only if the reduction in the firm's cost of capital offsets the cash outflow in the form of a lump-sum fee. Another source of value creation is viewing market making as an insurance policy for current shareholders against high transaction costs when trading needs arise (Menkveld and Wang, 2013).

This study aims to assess the impact of DMMs on liquidity in frontier markets characterized by thin trading volumes, exemplified by the Zagreb Stock Exchange (ZSE) and the Ljubljana Stock Exchange (LJSE). Generally, frontier markets are

countries considered less mature than emerging markets due to factors including demographics, development, politics, or liquidity. Major global index providers classify countries into three categories: developed markets, emerging markets, and frontier markets. In the CEE and SEE regions, most index providers classify the Czech Republic, Hungary, and Poland as emerging markets, while the other countries fall into the frontier markets category. Unlike existing literature that predominantly focuses on specific segments of developed markets specialized in small caps, this paper is centred on two frontier markets that have introduced issuer-sponsored DMM contracts in their top-tier trading segments. This initiative aims to enhance market quality and attract participants to markets significantly constrained by illiquidity. Notably, the study stands out by focusing on markets with a limited number of stocks, and where the available data is less detailed compared to larger markets. The paper introduces an analytical framework for DMM implementation and provides tailored tools for evaluating market quality improvements, particularly suited for frontier markets characterized by a smaller stock population.

This study adds to the limited body of literature that systematically examines the role of DMMs in augmenting liquidity for thinly traded stocks. The scarcity of such studies is attributable, in part, to the infrequency of DMM contract introductions or substantial model changes within stock exchanges. The contribution to the existing literature is twofold: firstly, to our knowledge, only one prior study has delved into the repercussions of DMMs in frontier markets (Čekauskas et al., 2011); secondly, our findings diverge, to some extent to consensus results observed in more developed markets where DMMs have exhibited a substantial positive impact on trading volume. These insights may hold significant implications for policymakers in frontier markets as they formulate and refine their market-making systems.

We employ an event study framework to investigate shifts in market quality for all stocks having introduced a DMM on the ZSE and LJSE between May 2010 and January 2022. These stocks are referred to as MM stocks. The study focuses on two major liquidity indicators: bid-ask spread and turnover. Initially, we identify control stocks – referred to as C-stocks – from the pool of firms that did not introduce a DMM. Subsequently, we evaluate the impact of DMM introductions using a difference-in-differences analytical framework, complemented by paired two-sample t-tests for differences in means for both liquidity indicators.

Building upon the insights garnered from prior research in this domain, we formulate the following research hypotheses:

H1 – The introduction of a DMM will result in narrower observed spreads.

H2 – The introduction of a DMM will lead to an increase in turnover.

Given the inherent illiquidity of the ZSE and the LJSE, stemming from low levels of free float and the predominance of long-term investors, we anticipate that addressing

temporal asynchronies in order flow and leveraging network externalities – where existing liquidity begets new liquidity – may not singularly drive a substantial surge in turnover. Aligned with these anticipations, our findings reveal a notable contraction in bid-ask spreads after the introduction of DMMs, although the influence on turnover presents a less pronounced effect.

The remainder of the paper is organized as follows. Section 2 provides an overview of the existing literature and synthesizes previous research. In Section 3, we present the methodology. In Section 4 we introduce the institutional background and present the data. In Section 5 we elaborate on the results and place them in a scientific and practical context. Section 6 concludes.

2. Literature review

Within the extensive body of literature on market making, studies specifically addressing the impact of DMMs on market quality is relatively scarce. This scarcity is primarily attributed to methodological challenges associated with disentangling the effects of DMMs from broader market dynamics. Consequently, the prevailing approach in the literature involves adopting a conceptual framework akin to event studies. In these studies, market quality indicators are systematically compared in the periods before and after the introduction of DMMs. This methodological choice, while effective in capturing specific events, inherently limits the overall number of studies due to the sporadic occurrence of such events.

Despite these challenges, a consensus emerges from existing research indicating that DMMs contribute positively to market quality. In addition, several studies report abnormal positive returns around the introduction of DMMs, implying a favourable market response and potential reductions in the cost of capital. This section provides a comprehensive overview of pertinent studies, laying the groundwork for the development of methodology in the subsequent sections.

In selecting target markets, the predominant focus of most studies centres on thinly traded stocks, as these are perceived to derive the greatest benefits from the activities of DMMs in enhancing liquidity. Sabourin (2006) provides a theoretical underpinning for this approach, arguing that, all else being equal, the expected best prices within a limit order book featuring market makers become more appealing than in a pure limit order book as asset volatility rises. This rationale is further substantiated by the observation that asset volatility tends to decrease with equity capitalization. Consequently, there is a justified inclination to introduce DMMs in lower capitalization stocks rather than larger caps.

An empirical study conducted by Theissen et al. (2013) utilizing a dataset covering 110 German stocks delves into the trading activity of market makers. The study

unveils a U-shaped relationship between market makers' participation rates and firm size coupled with trading volume. Specifically, the participation rates of market makers are highest for the smallest firms, decrease with firm size, and then exhibit an upward trend for the largest size quintile. Expectedly, the study identifies that other traders tend to tap into the liquidity provided by market makers, particularly during periods of heightened volatility and substantial informational asymmetries. The study reveals that market makers, on average, do not accrue profits, underscoring the intricate dynamics of their role in various market conditions.

Among the pioneering inquiries into the impact of DMMs on thinly traded stocks is the study by Nimalendran and Petrella (2003), which leveraged trading data from the Italian Stock Exchange. This investigation seized the opportunity presented by the introduction of two distinct regimes for thinly traded stocks to evaluate the influence of DMMs on market quality. The empirical findings, derived from comparing a pure order-driven system to a hybrid order-driven system incorporating a DMM, underscored the superior market quality offered by the latter across various metrics, including bid-ask spread and market depth. Notably, the analysis revealed that the adoption of a hybrid trading system particularly benefited very thinly traded stocks over less inactive ones. In another study, Venkataraman and Waisburd (2007) employed data from the Paris Bourse, focusing on a sample of less liquid securities engaged in call auctions. The research demonstrated that DMMs contribute to enhanced market quality, as indicated by the frequency with which call auctions clear and the reduced variability in both returns and trading volume. Moreover, the investigation documented an increase in market valuation coinciding with the introduction of DMMs. Anand et al. (2009) turned their attention to the Stockholm Stock Exchange between 2002 and 2004, specifically examining the introduction of issuer-sponsored DMMs. Their findings highlighted a substantial improvement in market quality for stocks supported by DMMs, manifested through reduced percentage quoted spreads and enhanced liquidity. The study further revealed that firms characterized by low trading activity, wide spreads, and heightened information asymmetry were more inclined to enter into contracts for liquidity provision. These observations extended to firms contemplating changes to their equity structure in the near term, such as secondary offerings, rights issues, and splits.

Subsequent investigations in diverse stock exchanges further corroborated the positive impact of DMMs on market quality. In an event study focused on 74 small-cap stocks within Euronext Amsterdam, Menkveld and Wang (2013) observed that the introduction of DMMs led to improved liquidity levels, reduced liquidity risk, and abnormal returns. Similarly, Čekauskas et al. (2011) delved into the effects of DMMs on liquidity across three frontier stock markets: Nasdaq OMX Tallinn, Vilnius, and Riga. Utilizing measures such as bid-ask spread, volume, and Amihud's measure of illiquidity, the study revealed that issuer-sponsored DMMs

(as in Vilnius and Tallinn) positively influenced liquidity, while DMMs entering into agreements solely with the exchange (as in Riga) did not exhibit the same impact. A comprehensive examination by De Carvalho et al. (2021) involved 55 Brazilian stocks, employing Chow's structural break test to assess the influence of market makers on liquidity proxies. Their findings highlighted significant changes in the average spread, turnover ratio, and trading volume. Finally, analysing differences between the regular and extended trading sessions at the NYSE Arca market, Scharnowski (2024) found that the reduction in the market quality after potentially market-stirring posts in social media can be at least partially the result of the absence of DMMs in the extended trading sessions.

Diverse perspectives on DMMs have been explored in additional studies, shedding light on their impact on market dynamics. Skjeltorp and Ødegaard (2015), in an investigation based on data from the Oslo Stock Exchange, identified a crucial determinant influencing a firm's decision to engage DMMs—the likelihood of issuing capital in the near future. In a more recent study, Bessembinder et al. (2020) underscored that implementing stricter order maintenance requirements and offering higher rebates to DMMs were associated with improved liquidity for thinly traded stocks at the New York Stock Exchange. Examining the competitive landscape among DMMs, research conducted on data from NYSE Euronext Paris by Bellia et al. (2022) revealed that heightened competition led to a substantial decrease in quoted and effective spreads. Similar outcomes were observed in a study by Theissen and Westheide (2023) focusing on Deutsche Börse's Xetra system. Shifting the focus to the effects of market-making in fragmented markets, Clark-Joseph et al. (2017) demonstrated that the removal of voluntary liquidity providers on one exchange left liquidity unchanged. Conversely, removing DMMs resulted in a broad decrease in liquidity across the market. In another study, Clapham et al. (2018) explored the impact of liquidity provider incentives introduced by a market venue in a fragmented market. While these incentives increased liquidity in the specific market, they did not lead to an overall increase in liquidity and turnover. In a study conducted on four Euronext markets (Amsterdam, Brussels, Paris, and Lisbon) Daures-Lescourret and Moinas (2023) showed that in the case of multi-traded stocks trades in one market affects the intensity of competition between market makers in the other venues. A distinct investigation by Ding et al. (2022) scrutinized the voluntary liquidity provision schemes for large caps and liquid stocks in NASDAQ Stockholm. The study revealed that liquidity provision schemes delivered improvements in liquidity, notably in the form of lower spreads. Importantly, no evidence of market liquidity migration from alternative platforms to NASDAQ Stockholm was found. In the context of concerns about the impact of market makers' withdrawal during extreme price movements, Bellia et al. (2023) demonstrated using 37 liquid French stocks that DMMs provide liquidity under isolated selling pressure but consume liquidity when multiple stocks experience stress. An emerging field of research focuses on applying artificial intelligence and

machine learning to marketmaking. Hambly et al. (2023) found that reinforcement learning algorithms have been successfully applied in this area, while Lee (2020) highlights the associated systemic risks and advocates for regulatory requirements similar to those for high-frequency traders.

To the best of our knowledge, Čekauskas et al. (2011) is the only internationally available paper dealing with the impact of market makers on stock market liquidity in frontier markets. However, liquidity more generally is a pervasive topic as these markets are by definition struggling with the lack of it. Over the years, several papers have approached the issue of illiquidity in CEE and SEE markets from different angles. Benić and Franić (2008) found that Amihud's illiquidity measure for Croatia, Slovenia, and Serbia, compare very poorly not only to Germany but also to Hungary and Poland. Similarly, using the proportion of days with zero trades as a proxy for illiquidity, Milunovich and Minović (2014) compared market illiquidity across eleven national markets of the Balkans. They found lower levels of illiquidity in EU member countries compared to non-EU markets. Using the Liquidity-adjusted Capital Asset Pricing Model and the price impact measure as a proxy for liquidity, Minović and Živković (2010) found that illiquidity is an important and persistent driver of expected returns in the Serbian market. More recently, Olbryś (2019) explored market tightness as one dimension of market liquidity in seven CEE markets in the context of serious problems with stock illiquidity. Based on daily percentage relative spreads as a proxy of market tightness, the analysis found that the number of zeros in daily volume is very high for many companies (Olbryś, 2019: 558). In a later study, Olbryś (2020) explored the patterns of market-wide commonality in liquidity on six CEE stock exchanges and found no evidence of co-movements in liquidity. Stereńczak et al. (2020) examine the illiquidity premium in frontier markets using a sample of 22 countries from 1991 to 2019 and using six different liquidity measures. The authors found no evidence of a significant illiquidity premium in frontier markets. They explain the insignificance of the illiquidity premium with the low integration of frontier equity markets with the global economy and the limited role of international investors. Finally, within the strain of literature dealing with measures of liquidity in stock markets, some authors are focusing specifically on emerging and frontier markets (Clark, 2011; Marshall et al., 2013).

3. Methodology

This research adopts an event study framework to analyse the impact of the introduction of a DMM on market quality. Building on earlier empirical research across various markets, our expectations align with the anticipated positive influence of market-making on market quality, manifested through a reduction in spreads and an increase in turnover. The event study design is instrumental in

mitigating the risk that the observed differences in market quality attributed to the introduction of a DMM may be influenced by unobserved variables.

Another important methodological decision is the selection of proxies for market liquidity. Naik and Reddy (2022), in their comprehensive review of literature from 2009 to 2020, find that a liquid market is generally defined as one in which a large quantity can be traded promptly, with low transaction costs and minimal price impact. Reflecting this definition, the reviewed studies measure stock market liquidity using various indicators that capture its multidimensional nature: depth (volume measure), breadth (price impact measure), immediacy (time measure) and transaction costs (spread and transaction cost measure). Most papers confirm that combining multiple measures or using multidimensional measures is more effective than relying on a single metric. In his analysis of liquidity measures in the context of emerging and frontier market indices, Clark (2011) also highlights that a combination of measures is superior to any single measure used on its own.

As Marshall et al. (2013) noted, the choice of liquidity measure depends on the research purpose. In this study, we use spreads and turnover as liquidity proxies, guided by the practical reasons for introducing DMMs by stock exchanges and issuers, as well as by data availability. Spreads and turnover address two of the four dimensions of liquidity – depth and transaction costs. These measures are particularly relevant to the objectives of stock exchanges and issuers that sponsor market-making schemes that should attract trades and provide low-cost transaction options. Additionally, since DMMs must adhere to a maximum spread, reducing the spread is a clear and pragmatic way to measure their success. Due to data limitations, we could not calculate the price impact of individual trades or implement time measures. However, these liquidity dimensions are less relevant for assessing DMMs' success in achieving their objectives.

Following a methodology similar to Anand et al. (2009), we express the bid-ask spread as a percentage. It is calculated as the difference between the executable best bid and ask orders exposed in the order book at a specific point in time, divided by the mid-price at that same point in time:

$$spread_{s,i} = \frac{ask_{s,i} - bid_{s,i}}{\left(ask_{s,i} + bid_{s,i}\right)/2} \tag{1}$$

where $spread_{s,i}$ is the bid-ask spread for stock s at time i, $ask_{s,i}$ is the ask price for stock s at time i, and $bid_{s,i}$ is the bid price for stock s at time i. In our study, due to availability constraints, spread calculations are based on observations occurring at each full hour during the continuous trading period.

Turnover is expressed in euros and calculated as the product of the number of traded stocks (trading volume) and the trade price. For the purposes of this research,

turnover encompasses only transactions that took place within the continuous auction model, excluding reported block and over-the-counter trades.

In line with our expectation that changes in market quality are linked to the introduction of a DMM, we designate the introduction date (ID) as our event date. To account for market wide factors that may influence the bid-ask spread and turnover, we introduce a C-stock for each MM-stock, following the methodology introduced in Huang and Stoll (1996) and later applied in Venkataraman and Waisburd (2007). For each MM-stock, the C-stock is selected from a pool of candidate stocks defined as those without a DMM. Calculations involve utilizing various data sets during the pre-period: average price, average daily turnover, and average market capitalisation. The pre-period for each MM-stock spans the trading days between ID_{-5} and ID_{-34}. A score is assigned to each MM-stock against all the candidate stocks for the respective period:

$$C - score_c = \sum_{j=1}^{3} \left(\frac{a_{j,c} - a_{j,MM}}{(a_{j,c} + a_{j,MM})/2} \right)^2 \quad (2)$$

where $a_j \in$ {average price, average daily turnover, average market capitalization} during the pre-period for candidate stocks c and MM-stocks. The C-stock is chosen from the pool of candidate stocks c based on the lowest C-score assigned during the scoring process for the respective MM-stock. A limitation of using average price, trading volume, and market capitalization – particularly when applied to a small number of MM-stocks and a limited pool of candidate stocks, as is the case in frontier markets – is that it may not fully capture the comparability required for accurate difference-in-differences analysis.

Once the control group comprising C-stocks is identified, we assess the influence of introducing a DMM on bid-ask spreads and turnover. Following the methodology outlined by Menkveld and Wang (2013), we initially perform a difference-in-differences analysis, calculated as the post-event minus pre-event differences across MM-stocks and their corresponding C-stocks, as per equation (3):

$$\delta_{DD} = \left(\bar{Y}_{MM,1} - \bar{Y}_{MM,0}\right) - \left(\bar{Y}_{C,1} - \bar{Y}_{C,0}\right) \quad (3)$$

where δ_{DD} is the difference-in-differences, signifying the impact of introducing a DMM on spreads or turnover, and $\bar{Y}$ is the average indicator (spread or turnover) for both MM-stocks and C-stocks over a 1-year period before ID (pre-ID, $\bar{Y}_0$) and a 1-year period after the ID (post-ID, $\bar{Y}_1$). Daily turnover data is available on the ZSE and LJSE websites.

The difference-in-differences approach is a statistical technique suitable for experimental research designs using observational study data. It assesses the effect

of an independent variable (the introduction of a DMM) on an outcome (the spread or turnover) by comparing the average change over time in the outcome variable for the MM-stocks group with the average change over time for the C-stocks group.

Moving forward, we employ a regression framework to test spreads and turnover, examining whether firms engaging with a DMM demonstrate superior market quality compared to those without. The regression analysis is formulated as follows:

$$y_i = \beta_0 + \beta_1 * Time_i + \beta_2 * DMM_i + \beta_3 * (Time_i * DMM_i) + \varepsilon_i \quad (4)$$

where y_i is the observed variable y for the i^{th} observation, $Time_i$ is a dummy variable taking the value 0 or 1 depending on whether the i^{th} measurement corresponds to the pre-ID or post-ID period respectively, and DMM_i is a dummy variable taking the value 0 or 1 depending on whether the i^{th} measurement corresponds to a C-stock or a MM-stock. The null hypothesis (H0) in the regression analysis posits that the introduction of a DMM has no significant influence on spreads or turnover. The significance level used is $\alpha = 0.05$. Given the number of MM-stocks (19) on the ZSE and LJSE, pairing them with 19 C-stocks in both pre-ID and post-ID periods results in a total of 76 observations in the regression. This small number of observations is a limitation of this approach. A larger number of observations would enhance the precision and reliability of the estimates.

To bolster the robustness and granularity of our observations, we further test the significance of spread and turnover changes at the individual MM-stock level. For this purpose, a two-tailed paired sample t-test with a significance level $\alpha = 0.05$ is employed, as indicated by the following equation:

$$t = \frac{d}{\sigma/\sqrt{n}} \quad (5)$$

where d represents the mean difference per paired value, σ is the standard deviation of the differences, and n is the number of observations. The observations encompass spreads from Equation (1) and daily turnover for each MM-stock and C-stock for a one year period before and after the ID. Data at the ID is excluded from the calculation to mitigate potential bias. The null hypothesis (H0) states that there is no significant difference between the means of the data before and after ID. The number of observations is much larger in this analysis compared to the regression in Equation (4), enhancing the robustness of our estimations. The choice of a two-tailed paired sample t-test is well-adapted to the characteristics of analysed data sets, as the data is segmented into two distinctive periods: pre-ID and post-ID.

4. Empirical data and analysis

Data on daily turnover in frontier stock exchanges indicates that the median trading volume is just USD 8 mn per day. This figure represents only 2.6% and 0.6% of the median daily trading volume observed in global emerging markets and developed market exchanges, respectively (Mobilist, 2023). Trading statistics for 2023 reveal that the average daily turnover at the ZSE and LJSE was slightly over EUR 1 mn, which is low even by frontier market standards. As a consequence, illiquidity in frontier markets adversely affects even blue-chip stocks. In contrast to large stock markets in developed economies, market-making strategies in these markets struggle to generate adequate trading volume and profitability. This makes it challenging to attract endogenous liquidity providers. To address this, the ZSE and LJSE permit listed companies to engage DMMs, who assure minimum liquidity against a lump-sum annual fee. The decision to select the investment firm providing DMM services lies with the listed company, with the ZSE and LJSE not directly involved in this selection process.

A joint study investigating the impact of DMMs on market quality at the ZSE and LJSE holds significance for several reasons. Firstly, from a regulatory standpoint, both jurisdictions adhere to the same set of European regulations. Croatia's legislative framework was already aligned with the Union acquis before its accession to the European Union in July 2013. Furthermore, both exchanges utilize the same trading platform, Xetra®T7. Thirdly, from a macro perspective, both economies are relatively small, classifying their markets as part of the MSCI Frontier Market Index due to their size and illiquidity. Lastly, market fragmentation issues are negligible since both exchanges serve as the sole trading venues for the stocks admitted to trading, with an exception for HT whose depositary receipts were traded on the London Stock Exchange until 2014.

The ZSE and LJSE operate as electronic limit order book markets, ensuring transparency and visibility of orders to all participants. Market orders follow automatic execution against the book based on price-time priority rules. Trading hours for continuous trading at the ZSE span from 09:30 to 15:55, with a ten-minute break for an intraday auction at noon. On the other hand, continuous trading at the LJSE occurs from 9:15 to 15:15. While ZSE and LJSE trading rules, along with specific market-making rules, are generally aligned, minor differences persist.

Market makers on both exchanges adhere to minimum affirmative obligations related to presence, spread, and size. While compliance with minimum requirements is mandatory, listed firms retain the flexibility to negotiate narrower spreads or larger quoted sizes with the DMM. Fees paid by issuers to DMMs are a matter of direct negotiation and remain undisclosed to the public. Importantly, the ZSE and LJSE refrain from conferring any informational or trading advantages to DMMs.

At the ZSE, the regulated market comprises three tiers: The Prime Market, the Official Market, and the Regular Market. For issuers seeking admission to the highest segment, the Prime Market, hiring a DMM is obligatory (ZSE, 2021: art. 79, par. 3). DMMs on the ZSE must fulfill presence obligations by posting limit orders during at least 60% of continuous trading hours. Liquidity categorization dictates the maximum allowed spreads between simultaneous bid and ask orders, ranging from 2% to 7%, depending on the stock's daily trading volume. The minimum quote size varies inversely with liquidity, ranging from 4,600 EUR to 1,300 EUR (ZSE, 2023). The ZSE does not provide financial incentives for DMMs. Presently, nine ZSE-listed stocks receive DMM support, with seven on the Prime Market and two on the Regular Market. One stock, SPAN, could not be included in the analysis due to a lack of a pre-period.

The LJSE's regulated market features two tiers: The Prime Market and the Standard Market. Similar to the ZSE, stocks are classified into three liquidity groups based on average daily turnover thresholds. Maximum allowed spreads vary for each group, ranging from 3% to 5%. The minimum required presence is 50% of continuous trading time. DMMs at the LJSE are granted a fee discount, contingent on their trading results and the liquidity group of the stock (LJSE, 2022). Notably, hiring a DMM is not a prerequisite for admission to the highest trading segment (LJSE, 2020). Currently, all seven stocks with DMM support at the LJSE are traded on the Prime Market.

The study focuses on 18 firms that engaged in contracts with DMMs between May 2010 and January 2022 on the ZSE and LJSE. This population comprises 12 stocks from the ZSE and 7 from the LJSE, denoted as MM-stocks. The total number of stocks surpasses the number of firms, as one Croatian firm entered into a market-making contract for both its ordinary and preferred shares. The remaining stocks serve as a pool from which C-stocks are selected based on Equation (2). On the LJSE, with 23 listed stocks, nine trade on the Prime Market. This limited number of stocks poses challenges for C-stock selection. Conversely, the ZSE lists 90 stocks, with six on the Prime Market, providing a more extensive pool for analysis.

The empirical analysis employs four datasets. The first includes DMM contract introduction and termination dates for all MM-stocks. The second comprises daily data on closing prices and trading volume for all ZSE and LJSE stocks for one year before and after the ID. The third dataset includes daily market capitalization data for the same period. The fourth dataset encompasses intraday data for all MM-stocks and C-stocks, featuring the best bid and offer quotes at every full hour during continuous trading hours one year before and after ID. Unfortunately, comprehensive data on bid-offer spreads and transaction breakdowns by investment firms are unavailable, hindering the ability to differentiate DMM transactions from others.

Table 1 presents the MM-stocks along with their corresponding C-stocks, identified in accordance with Equation (2). The pool of potential C-stocks comprises listed stocks lacking a DMM at the ID. Consequently, certain stocks from the MM-stocks list are incorporated into the pool of candidate C-stocks.

Table 1: MM stocks and Control Stocks

Stock Exchange	MM-stock	ID	C-stock	C-score
ZSE	ATGR	28.05.2010	ATPL	0.6955
ZSE	ULPL	28.05.2010	VDKT	1.4757
ZSE	ADPL	17.02.2012	BLJE	0.2917
ZSE	LEDO	30.01.2013	ERNT	2.8885
ZSE	HT	24.07.2013	PBZ	4.7880
ZSE	PODR	09.09.2013	ADRS	0.6592
ZSE	DDJH	31.10.2013	BLJE	0.7730
ZSE	KOEI	16.10.2014	ERNT	0.4601
ZSE	RIVP	01.07.2015	DLKV	2.9034
ZSE	ARNT	06.06.2017	KRAS	0.4235
ZSE	ADRS	01.02.2018	MAIS	0.7625
ZSE	ADRS2	01.02.2018	ATPL	1.5193
LJSE	KRKG	02.01.2019	LKPG	2.6657
LJSE	ZVTG	02.01.2019	LKPG	0.7057
LJSE	PETG	03.01.2019	CICG	1.6447
LJSE	POSR	06.01.2019	LKPG	0.5937
LJSE	CICG	03.01.2021	TLSG	3.9610
LJSE	NLBR	10.01.2021	TLSG	1.9069
LJSE	TLSG	02.01.2022	LKPG	2.0517

Source: Authors' calculations

The average spreads and daily turnover for the 19 pairs of MM-stocks and their corresponding C-stocks are presented in Table 2 and Table 3, covering the 1-year period before and after the ID.

Table 2: Average spreads

MM-stock	Pre-ID (%)	Post-ID (%)	C-stock	Pre-ID (%)	Post-ID (%)
ATGR	1.467	0.801	ATPL	0.644	0.888
ULPL	1.348	1.506	VDKT	2.938	3.632
ADPL	1.246	1.151	BLJE	1.151	1.370
LEDO	2.458	1.893	ERNT	0.876	0.792
HT	0.294	0.361	PBZ	2.483	2.704
PODR	2.027	1.183	ADRSPA	3.799	2.824
DDJH	1.716	2.529	BLJE	1.430	1.918
KOEI	1.773	1.735	ERNT	0.717	0.833
RIVP	1.085	0.632	DLKV	2.916	2.123
ARNT	2.126	1.090	KRAS	2.601	2.314
ADRS	2.333	1.111	MAIS	2.675	1.704
ADRS2	1.099	0.661	ATPL	1.888	1.983
KRKG	0.521	0.438	LKPG	1.491	1.831
ZVTG	1.139	0.796	LKPG	1.491	1.831
PETG	0.934	0.708	CICG	1.412	1.579
POSR	1.956	1.070	LKPG	1.495	1.813
CICG	1.954	1.435	TLSG	1.126	0.920
NLBR	1.300	1.079	TLSG	1.138	0.909
TLSG	0.890	1.209	LKPG	1.569	1.533

Source: Authors' calculations

Table 3: Average daily turnover

MM-stock	Pre-ID (EUR)	Post-ID (EUR)	C-stock	Pre-ID (EUR)	Post-ID (EUR)
ATGR	45,393	83,951	ATPL	190,817	88,131
ULPL	39,358	26,544	VDKT	13,871	10,459
ADPL	65,458	60,362	BLJE	85,362	40,320
LEDO	34,221	57,729	ERNT	62,700	62,700
HT	261,079	302,469	PBZ	10,578	14,962
PODR	30,249	52,996	ADRS	17,634	22,225
DDJH	25,370	24,049	BLJE	27,468	28,776
KOEI	24,246	18,091	ERNT	94,967	40,591
RIVP	78,322	136,432	DLKV	26,528	12,275
ARNT	20,225	48,309	KRAS	15,998	7,208
ADRS	18,221	19,368	MAIS	6,286	16,755
ADRS2	108,442	77,324	ATPL	50,730	27,124
KRKG	311,046	373,018	LKPG	63,960	30,974
ZVTG	119,665	129,645	LKPG	63,960	30,974
PETG	131,917	93,685	CICG	196,603	63,141
POSR	39,423	43,214	LKPG	63,803	31,098
CICG	67,986	56,421	TLSG	62,737	49,172
NLBR	185,809	200,274	TLSG	62,525	48,423
TLSG	49,426	40,877	LKPG	58,867	45,708

Source: Authors' calculations

These statistics indicate that the spreads fall comfortably within the limits set by the ZSE and LJSE for the specified liquidity groups. This observation suggests that DMMs may be negotiating narrower spread obligations with issuers in comparison to the spreads stipulated by the stock exchanges. Notably, it is intriguing that, for the majority of stocks, spreads were already narrower than the mandated spreads, even during the pre-ID period.

In our research, we explore the impact of a DMM contract on a stock's liquidity, measured through average spread and turnover levels. Employing a difference-in-differences approach as the core methodology, the results derived from equations (3) and (4) are summarized in Table 4 and Table 5.

Table 4: Difference-in-differences calculations

Variable	C-stocks mean		MM-stocks mean		δ_{DD}
	Pre-ID	Post-ID	Pre-ID	Post-ID	
Spread (%)	1.781	1.763	1.456	1.126	-0.313
Turnover (EUR)	61,863	35,317	87,150	97,093	36,489

Source: Authors' calculations

Table 5: Regression results for spreads and turnover

SPREADS	Coeff.	Std. err.	t	P-value	95% conf. int	
MM-stock	-0.00325	0.00228	-1.43	0.158	-0.00780	0.00129
Post-ID	-0.00018	0.00228	-0.08	0.938	-0.00472	0.00436
Interaction term	-0.00313	0.00322	-0.97	0.336	-0.00955	0.00330
Constant	0.01781	0.00161	11.05	0.000	0.01460	0.02102
TURNOVER						
MM-stock	-26,456	22,748	-1.17	0.247	-71,894	18,801
Post-ID	25,287	22,748	1.11	0.270	-20,060	70,635
Interaction term	36,488	22,748	1.55	0.126	-10,118	80,577
Constant	61,862	16,085	3.85	0.000	29,797	93,928

Source: Authors' calculations

The difference-in-differences calculations results from Table 4 reveal a notable 33 basis points reduction in spreads for MM-stocks following the introduction of DMMs, with 31.3 basis points attributable specifically to DMMs. Simultaneously, daily turnover experienced a rise of 9,943 EUR, of which 36,489 EUR can be ascribed to DMMs, considering the sharp decline in turnover for the pool of C-stocks. These outcomes align with our expectations. However, the p-values from the difference-in-differences regression analysis based on Equation (4) indicate that the null hypothesis (H0) cannot be rejected. In other words, we cannot affirm that the introduction of a DMM significantly influenced the spreads or turnover of the stocks.

We further assess the significance of the spread and turnover changes at the individual MM-stock level following the introduction of a DMM. The results of two-tailed paired sample t-tests, conducted with a significance level $\alpha = 0.05$, are presented in Table 6 and Table 7 for the spread and turnover liquidity

variables, respectively, for each MM-stock and its corresponding C-stock. The p-value in these tests evaluates whether the change in, for instance, the spread of the MM-stock is statistically different from the change in the spread of the C-stock. Consequently, the null hypothesis (H0) in Table 6 posits that the spread for MM-stocks did not change significantly compared to C-stocks after ID, with the variable analyzed being the difference in spread between the MM-stock and the C-stock. Similarly, the null hypothesis (H0) in Table 7 is that the turnover for MM-stocks did not change significantly compared to C-stocks after ID, with the variable analyzed being the difference in turnover between the MM-stock and the C-stock.

Table 6: Results of two-tailed paired sample t-tests for spreads

Pair	Pre-ID (%)	Post-ID (%)	P-value	No. obs.	Interpretation
ATGR-ATPL	0.823	-0.086	0.000	1,994	rejecting H0
ULPL-VDKT	-1.590	-2.126	0.000	1,990	rejecting H0
ADPL-BLJE	0.0950	-0.590	0.000	1,984	rejecting H0
LEDO-ERNT	1.582	1.101	0.000	2,000	rejecting H0
HT-PBZ	-2.189	-2.343	0.002	2,000	rejecting H0
PODR-ADRS	-1.772	-1.642	0.037	1,992	cannot reject H0
DDJH-BLJE	0.286	0.611	0.000	2,003	rejecting H0
KOEI-ERNT	1.056	0.901	0.000	2,224	rejecting H0
RIVP-DLKV	-1.831	-1.491	0.000	2,219	rejecting H0
ARNT-KRAS	-0.475	-1.224	0.000	2,248	rejecting H0
ADRS-MAIS	-0.342	-0.593	0.000	2,223	rejecting H0
ADRS2-ATPL	-0.790	-1.323	0.000	2,223	rejecting H0
KRKG-LKPG	-0.969	-1.393	0.000	1,694	rejecting H0
ZVTG-LKPG	-0.352	-1.035	0.000	1,694	rejecting H0
PETG-CICG	-0.478	-0.871	0.000	1,714	rejecting H0
POSR-LKPG	0.461	-0.743	0.000	1,708	rejecting H0
CICG-TLSG	0.828	0.515	0.098	1,791	cannot reject H0
NLBR-TLSG	0.162	0.170	0.890	1,796	cannot reject H0
TLSG-LKPG	-0.679	-0.324	0.000	2,000	rejecting H0

Source: Authors' calculations

These statistics reveal a significant decrease in the difference in spread between the MM-stock and its corresponding C-stock in 13 out of 19 paired sample t-tests conducted, accounting for 68.42% of the total population. Notably, the spread significantly increased for three MM-stocks – DDJH, RIVP, and TLSG – compared to the change in spread for their respective C-stocks. In the cases of PODR, CICG, and NLBR, the null hypothesis (H0) could not be rejected. Upon referring to pre-ID and post-ID spreads from Table 2, it is observed that for four out of these six stocks where test results deviate from expectations (PODR, RIVP, CICG, NLBR), the average bid-ask spread post-ID is narrower than the pre-ID spread. These results may signify challenges arising from the limited number of shares in the pool of candidate C-stocks. Nonetheless, these outcomes align with expectations, as the spread obligations of market makers, when properly calibrated, mechanically lead to narrowed spreads.

Table 7: Results of two-tailed paired sample t-tests for turnover

Pair	Pre-ID (EUR)	Post-ID (EUR)	P-value	No. obs.	Interpretation
ATGR-ATPL	-145,424	-4,180	0.000	101	rejecting H0
ULPL-VDKT	25,487	16,086	0.067	101	cannot reject H0
ADPL-BLJE	-19,904	20,042	0.008	243	rejecting H0
LEDO-ERNT	-28,480	-3,379	0.097	274	cannot reject H0
HT-PBZ	250,501	287,506	0.070	248	cannot reject H0
PODR-ADRS	12,616	30,771	0.013	247	rejecting H0
DDJH-BLJE	-2,098	-4,727	0.440	248	cannot reject H0
KOEI-ERNT	-70,721	-22,501	0.000	248	rejecting H0
RIVP-DLKV	51,794	124,157	0.000	129	rejecting H0
ARNT-KRAS	4,226	41,101	0.000	248	rejecting H0
ADRS-MAIS	11,935	2,613	0.086	232	cannot reject H0
ADRS2-ATPL	57,713	50,199	0.637	247	cannot reject H0
KRKG-LKPG	247,086	342,044	0.000	245	rejecting H0
ZVTG-LKPG	55,705	98,671	0.051	245	cannot reject H0
PETG-CICG	-64,687	30,544	0.000	245	rejecting H0
POSR-LKPG	-24,381	12,116	0.000	243	rejecting H0
CICG-TLSG	5,249	7,249	0.795	252	cannot reject H0
NLBR-TLSG	123,283	151,851	0.190	252	cannot reject H0
TLSG-LKPG	-9,441	-4,831	0.546	249	cannot reject H0

Source: Authors' calculations

In the context of the two-tailed paired sample t-tests analyzing the difference in turnover between MM-stocks and their corresponding C-stocks, the null hypothesis (H0) was rejected for 9 out of the 19 pairs, constituting 47.37% of the total population. In all these cases, the t-tests indicated a significant increase in turnover. However, for the remaining 10 MM-stocks, H0 could not be rejected. Notably, turnover for MM-stocks decreased compared to the C-stock in five instances – ULPL, DDJH, ADRS, ADRS2, TLSG – accounting for 26.32% of the total population. These outcomes align with our expectations that the introduction of DMMs would have a less pronounced positive impact on turnover compared to spreads. The relatively weaker influence of market makers on turnover, as opposed to observed bid-ask spreads, can be attributed to the larger dependence of trading volume on exogenous factors, such as market structure. In simple terms, while spread obligations imposed on market makers may automatically narrow or limit observed spreads, the conjunction of spread and size obligations does not necessarily create a corresponding need or motivation for increased trading among market participants. The presence of strategic long-term owners or institutional investors with extended investment horizons, along with a lack of free float, can negatively impact trading volumes despite narrower spreads and the continuous display of bid and ask orders by market makers.

Analyzing the results from both Table 6 and Table 7 reveals a significant positive impact on both spreads and turnover in seven out of 19 MM-stocks (36.84% of the total population), while eight stocks demonstrate a significant improvement in one of the liquidity criteria. Improvement is found predominantly in spread, although two stocks exhibit a significant improvement in turnover without a corresponding significant narrowing of the bid-ask spread. No significant impact in any liquidity criteria is observed in four MM-stocks (21% of the total population). Three of these four stocks are traded on the LJSE, presenting an intriguing finding considering that, unlike the ZSE, the LJSE financially rewards its most active DMMs.

5. Results and discussion

The first hypothesis posited that the DMM introduction would narrow bid-ask spreads. The results of a difference-in-differences calculation support this hypothesis, though the overall regression analysis on the entire group of MM-stocks remains inconclusive. However, individual tests confirmed the significant impact in most stocks where DMMs were introduced. Limitations arise from the small sample of stocks with DMMs and the challenge of selecting appropriate control stocks in frontier markets, influencing the overall regression results. To address this, individual tests were conducted for each stock with a DMM, offering a more nuanced perspective.

Confirming earlier studies by Nimalendran and Petrella (2003), Anand et al. (2009), Menkveld and Wang (2013), Čekauskas et al. (2011), and De Carvalho (2021), our findings align with the consensus that DMM introductions tend to narrow observed spreads in continuous auction models. Distinctively, our study contributes valuable insights by focusing on the empirical effects of DMM introductions in prime trading tiers of exchanges in frontier markets. We note that positive spread effects cannot solely be attributed to exchange-imposed constraints, as observed spreads were already narrower than the maximum spreads allowed in certain instances. The mandated presence of DMMs at 50% and 60% of trading hours, depending on the exchange, also points to the fact that the narrowing of spreads is not the mere result of mechanical adjustment of DMMs to their exchange-mandated obligations. Owing to challenges related to data availability, we were unable to discern and isolate the activity of DMMs from other market participants. Additionally, a comprehensive examination of DMMs' contracts with issuers, and a comparison of their stipulated requirements with those of the ZSE and LJSE, proved unfeasible. The absence of these insights limits a fuller understanding of the factors contributing to the observed narrowing of spreads.

The second hypothesis suggested that introducing a DMM would augment turnover. Although the results of the difference-in-differences calculations attribute an absolute turnover increase to the introduction of DMMs, the regression analysis conducted on the entire population fails to reject the null hypothesis that DMMs do not significantly influence turnover. Moreover, unlike in the case of spreads, a more detailed examination, focusing on individual stock pairs showed a significant causal relationship between the introduction of DMMs and an increase in turnover in less than 50% of stock pairs. This insight suggests that while DMMs effectively address issues of asynchronous order flow and insufficient endogenous liquidity provision, they encounter challenges overcoming structural impediments to market liquidity, such as a lack of free float and the prevalence of long-term investors. Although narrower spreads, coupled with firm limit orders, contribute to reduced trading costs and liquidity risks, they did not alone stimulate a self-reinforcing cycle where heightened trading begets further trading.

These findings related to turnover deviate from empirical research in other markets as documented by Anand et al. (2009), Menkveld and Wang (2013), and De Carvalho et al. (2021) and underscore the divergence in impact on spreads and trading volume. Such disparities are particularly noteworthy for market regulators and stock exchanges in frontier markets aiming to boost trading volumes through the implementation of DMMs. To optimize outcomes, policymakers may consider integrating market-making schemes with complementary tools aimed at fostering broader market participation.

6. Conclusion

This paper investigates the influence of DMMs on stock liquidity at the ZSE and LJSE. The findings align with the first hypothesis, suggesting that the introduction of DMMs effectively reduces bid-ask spreads. However, the results do not convincingly support the second hypothesis, which posits that DMMs contribute to an increase in turnover.

Although the small sample size of the study limits the potential for generalization to all frontier markets, the observed divergence from previous empirical findings from more developed markets, which commonly indicate enhanced spreads and trading volume, underscores the distinctive microstructure dynamics inherent in frontier markets. These markets, often beset by suboptimal liquidity and structural obstacles—such as restricted free float levels and the prevailing influence of strategic, long-term institutional investors—manifest unique challenges. Most importantly, the paper reveals that resolving temporal asynchronies in order flow may not be sufficient to enhance trading volumes. This nuanced understanding contributes valuable insights to the existing literature, predominantly focused on larger, more mature, and more liquid markets, providing a richer contextualization of the implications for market microstructure in the specific context of frontier economies.

The study's limitations stem primarily from two sources: the relatively small stock population on the ZSE and the LJSE, and the narrow scope of available data. This small number of stocks affects not only those supported by DMMs but also the overall number of listed stocks. Although our dual analytical approach, which includes both aggregate and individual levels, mitigates this limitation to some extent by offering valuable insights at a more granular level and laying a foundation for future research, the limited number of stocks reduces the robustness of statistical analysis. Additionally, the use of average price, trading volume and market capitalization creates challenges to the selection of control stocks, potentially introducing unintended biases. Limitations arising from data availability primarily highlight opportunities for future research. Particularly beneficial would be the inclusion of transaction-level data that distinguishes between DMMs and other participants, as well as access to DMMs' contractual obligations with issuers.

The optimal structuring of DMM contracts and its implications for market quality are crucial considerations for stock exchanges and regulatory bodies. While our findings underscore the valuable role of DMMs, in particular in narrowing spreads, certain aspects remain unexplored and provide interesting avenues for future research. Specifically, access to DMM obligations from their contracts with issuers and transaction-level data, along with the ability to distinguish DMMs from other market participants, would enable studies on the market share and activity of DMMs under various conditions and across various market segments. This would also help

determine the profitability of the DMM function and assess the effectiveness of DMM contract mechanisms. Also, more detailed data would allow studies of other aspects of liquidity, such as the price impact and other cost aspects of transactions. Finally, alternative incentives for liquidity providers exist, which have not been implemented at the ZSE and LJSE. For example, allocating a diversified portfolio of liquid and illiquid stocks to DMMs can effectively reduce the cost associated with maintaining a presence in less liquid securities. An intriguing alternative involves issuers themselves providing cash and stocks to market makers, thereby mitigating inventory risk. In addition, the interaction between DMMs' spread obligations and the tick size regime applied by exchanges may also be explored. To conclude, given the unconvincing results of the introduction of DMMs on turnover, the key insight for regulators and policymakers is that bolstering liquidity may be most effective through an integrated approach – combining DMMs with other strategic measures that facilitate short-term trading and increase the participation of small investors.

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Utjecaj službenih održavatelja tržišta na likvidnost na graničnim tržištima: primjer Zagrebačke i Ljubljanske burze

Petar-Pierre Matek[1], *Maša Galić*[2]

Sažetak

Burze diljem svijeta koriste održavatelje tržišta s ciljem smanjenja rizika likvidnosti i povećanja trgovinskog prometa. Cilj je ovog rada istražiti utjecaj uvođenja službenih održavatelja tržišta na likvidnost na graničnim tržištima, mjerenu rasponom između kupovnih i prodajnih cijena i trgovinskim prometom. U istraživanju koristimo analizu razlika-u-razlikama na 19 dionica koje su uvele službenog održavatelja tržišta na Zagrebačkoj burzi i Ljubljanskoj burzi od svibnja 2010. do siječnja 2022. Prema našem saznanju, ovo je prva studija utjecaja održavatelja tržišta na ovim tržištima te druga graničnim tržištima općenito. Sukladno očekivanjima, kod većine dionica rezultati pokazuju značajno smanjenje raspona između kupovnih i prodajnih cijena nakon uvođenja održavatelja tržišta. Međutim, za razliku od istraživanja provedenih na razvijenijim tržištima, rezultati utjecaja na trgovinski promet su neuvjerljivi te upućuju na to da održavatelji tržišta teško mogu samostalno prevladati strukturalne prepreke većoj likvidnosti na graničnim tržištima, kao što su manjak slobodno raspoloživih dionica ili dominacija velikih investitora s dugim investicijskim horizontom.

Ključne riječi*: održavanje tržišta, službeni održavatelji tržišta, pružanje likvidnosti, granična tržišta, kvaliteta tržišta*

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Exploring the relationship between sustainable marketing and the performance of a higher education institution*

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Abstract

This paper addresses the challenges and opportunities of applying sustainable marketing in higher education institutions (HEI), focusing on the performance of the higher education institution in achieving multiple goals from the perspective of stakeholders. Although the existing academic literature, contains a wide range of research on sustainability, it is mainly focused on the for-profit sector. A lack of research examining sustainable marketing in the public sector, especially in the field of higher education, has been noted. An analysis of the existing scientific literature was carried out and the barriers to wider adoption of sustainable marketing in the academic environment are identified. Quantitative research was conducted to test the proposed conceptual model defined by the multidimensional construct of sustainable marketing and its impact on the success of a higher education institution. The research results showed a positive relationship between sustainable marketing and higher education institution performance. The benefits of implementing sustainable marketing can be seen in creating positive changes that we as a society want to experience, in the rational use of resources, and in creating added value while considering the long-term interests of society and the environment. The research findings can contribute to a better understanding of the

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role of sustainable marketing in higher education and provide guidelines for its broader application to create a more sustainable and socially responsible academic environment.

Keywords: ***s****ustainable marketing, stakeholders, higher education institutions, performance measurement*

JEL: *M31, C51, I23, Q01*

1. Introduction

Sustainable marketing challenges the traditional marketing model by prioritizing long-term welfare over short-term gains (Gordon et al., 2011). Knowledge is the most valuable resource and the most important precondition for economic development and the well-being of the entire society. Therefore, the role of HEI is very important because universities are the heart of the social, cultural, intellectual and technological development of the community. Previous empirical research on sustainable marketing orientation, originating in the work of Jamrozy (2007), Bridges and Wilhelm (2008), Belz and Peattie (2009), Wheeler et al. (2003), Hunt (2011), and Sheth et al. (2011) cover different activities and are mostly related to the for-profit sector, while the search for available research on sustainable marketing orientation related to the higher education segment results in small representation. In this segment, one comes across research by the author Abou-Warda (2014), who investigates and confirms the relationship between the sustainable marketing orientation of HEIs in Egypt and their accreditations as a selected measure or indicator of success. The recommendations and suggestions of previous research that indicate the need for empirical validation of the concept of sustainable marketing form the origin and conceptual framework of this paper. Menon and Menon (1997), and Kumar et al. (2013) emphasize the need to develop a measurement instrument for sustainable marketing in terms of strategic orientation and indicate the requirement for quantitative empirical validation of the sustainable marketing construct based on the theoretical frameworks of Jamrozy (2007), Mitchel et al. (2010). There is a lack of involvement of business entities in the non-profit sector, especially in the higher education segment (Abou-Warda, 2014).

To fill the identified research gap, the fundamental objective is to test a conceptual model for measuring the impact of sustainable marketing on HEI performance. Ruiz de Sabando et al. (2018) state that the perceptions of different stakeholders regarding their subjective evaluation of HEI's success in the achievement of set goals can be retained with a more appropriate approach to performance measurement in the context of higher education. Similarly, Harris (2001) explains that for performance evaluation and its connection to marketing orientation, it is necessary to include the perceptions of internal and external

stakeholders. Subjective views of students as direct users are considered relevant to evaluating the service quality, while the attitudes and perceptions of other stakeholders are relevant to evaluating success in achieving the stated goals that are the focus of this research. Therefore, the purpose of this research is to investigate the attitudes and perceptions of key stakeholders towards sustainable marketing in HEI. Accordingly, the research hypothesis was set H1: Sustainable marketing statistically significantly impacts the performance of HEI. To address the identified research gap and achieve the purpose of the study, following the relevant research recommendations, the authors developed a conceptual model aimed at measuring the impact of sustainable marketing on higher education performance to test the proposed hypothesis.

The paper contains the scientific literature review in the area of the research topic, methodology with a proposal of a conceptual model, research findings with a discussion, and a conclusion, stating the limitations of the research.

2. Literature review

The following is a review of the scientific literature in the field of sustainable marketing in HEI, the role of stakeholders in sustainability and performance in the context of higher education.

2.1. Sustainable marketing in higher education

Sustainability in higher education as a concept encompasses the integration of sustainability into teaching, research and community engagement (Lozano et al., 2013). Educational institutions are increasingly recognizing the importance of aligning their marketing strategies with sustainability principles, which can improve institutional reputation. Universities, as centers of knowledge, have the potential to influence social norms and business practices, which gives them a key role in promoting sustainable marketing (Lozano et al., 2015). Concurrently, research on sustainability can generate innovative solutions, while community engagement can facilitate the diffusion of sustainable practices (Fadeeva and Mochizuki, 2010). In terms of current trends, universities worldwide are increasingly embedding sustainability into their strategic plans, curriculum designs, and research agendas (Lozano et al., 2015; Williams, 2021).

Numerous previous studies define sustainable marketing as a multidimensional construct (Jarvis et al., 2003; Jamrozy, 2007; Mitchell et al., 2010; Crittenden et al., 2011; Hunt, 2011; Sheth et al., 2011; Chow and Chen, 2012; Sharma and Kiran, 2013; Abou-Warda, 2014; Mahmoud, 2016; Lučić, 2020; Mukif et al., 2020; Sinčić Ćorić et al., 2020). Despite all economic, social, and political obstacles, sustainable

marketing contributes to (1) efficiency (van Dam 2019; 2003; Mitchell et al., 2010), (2) creation and improvement of stakeholder relationships and trust (van Dam and Apeldoorn, 1996), (3) better understanding of the market and community expectations (Andrews, 1998), (4) simultaneous meeting of key stakeholders' needs (Mitchell et al., 2010) and of other interest groups (Belz and Peattie, 2009), (5) encouraging desired mindsets and behaviors (Mahmoud 2016), (6) adopting sustainability values and principles throughout all structures (Slater and Narver, 1995), (7) organizational learning and improvement of adaptability (Mitchell et al., 2010), (8) balancing and improving social, economic, and environmental performance (Chow and Chen, 2012; Sharma and Kiran, 2013; Vollero et al., 2022), and (9) sustainable positive business performance from the perspective of creating economic, environmental, and social contributions (Belz and Peattie, 2009; Mitchell et al., 2010) of HEIs.

Dyllick and Hockerts (2002) explain the implementation of sustainability in business, which is done by applying the principles of triple responsibility: economic, social, and environmental (Jamrozy, 2007; 2009; Richardson, 2018). The application of sustainable marketing can be seen as a prerequisite for a sustainable competitive advantage of a HEI that contributes to sustainable economic development (Hunt, 2011; Nefat, 2015), and society as a whole (Fadeeva and Mochizuki, 2010). By embracing sustainability, universities can enhance their societal relevance, foster innovation, and prepare graduates for the sustainability challenges and opportunities of the 21st century (Lozano et al., 2013). Sustainable marketing in higher education is a business culture that involves continuous dialogue with all stakeholders and represents the only successful simultaneous possibility of balancing the needs, requirements, and expectations of HEIs' stakeholders, environment protection with the long-term interests and goals of the HEI, and of the society as a whole (Richardson, 2018).

2.2. Stakeholders in higher education

Stakeholders in higher education are individuals or groups who have an interest in the activities, outcomes, and overall performance of an educational institution. Each of these stakeholder groups brings a unique perspective to the mission and goals of a HEI. The needs and expectations of these diverse stakeholders often intersect but can also be in conflict. Therefore, engaging with these stakeholders, understanding their perspectives, and aligning their interests toward shared goals becomes an important task for HEIs (Mainardes, Alves, and Raposo, 2012). Understanding and managing these multiple stakeholder relationships is crucial for HEIs' success and sustainability, and is particularly relevant for sustainable marketing, as it aims to create and communicate value for all stakeholders, and to foster mutually beneficial relationships with them (Polonsky, 2011).

HEIs relate to several different stakeholders in their internal and external environments, the number and interrelationships of which are extremely complex. Therefore, HEIs should distinguish between different groups of stakeholders and their importance (Mihanović, 2007; Baturina, 2018). Chahal and Sharma (2006) maintain that socially responsible action is the result of the expectations and concerns of all stakeholders involved, their influence, and pressures. Following Kotler's (2008) reflections on the different importance of each stakeholder group they represent, three main groups of stakeholders are distinguished: (1) unavoidable stakeholders, (2) necessary stakeholders, and (3) desirable stakeholders. In the academic literature, sustainable marketing is considered from the perspective of multiple stakeholders (Wheeler et al., 2003; Maignan et al., 2005; Kirchoff et al., 2011), drawing on Grinstein and Goldman's (2011), and Turan's et al. (2016) stakeholder theory, with Amaral and Magalhaes (2002) highlighting the importance of the role of external stakeholders in the context of HEI management, and Enders (2004) emphasizing the challenges of HEI management considering multiple stakeholders.

Effectively managing these diverse stakeholder relationships is essential for HEIs. It requires a clear understanding of each stakeholder group's interests, expectations, influence, and the ability to communicate effectively with each group. This involves not only providing information but also listening and responding to stakeholder feedback, and engaging stakeholders in meaningful dialogues and collaborations (Freeman et al., 2010; Gordon et al., 2011).

2.3. Performance of higher education institutions

The performance of a HEI is pivotal to achieving its educational, research, and social goals. Performance refers to the efficiency and effectiveness of an institution's operations, including financial management, resource utilization, and service delivery (Marginson, 2013; Wijesundara and Prabodanie, 2022). Performance in the public sector can be defined as the degree to which certain values are realized for users of services and programs of public business entities (Vitezić, 2007). The measurement of public sector performance can be described as an evaluation, assessment or judgment of the impact, results or level of achievement of the set goals based on the activities carried out, which can be quantified by diverse indicators (Vrdoljak Raguž, 2010).

Since the purpose of business entities in the public sector is not simply to make a profit, but is reflected in the level of satisfaction of public needs (Magdinceva Sopova and Stojanovska-Stefanova, 2020), which are sometimes insufficiently defined, Vitezić (2007) explains that measuring the level of achievement of the set goals in this sector is extremely complex, and requires a more heterogeneous group of performance indicators, while profit sector companies focus on only two

main interest groups (shareholders and consumers), and are dominantly followed by financial, quantitative performance indicators (Behn, 2003). Similarly, Duque-Zuluaga and Schneider (2008) note that measuring public sector performance is more complex than measuring the performance of the for-profit sector due to the presence of a larger number of stakeholders and the mismatch in the mission and programs of public sector entities. Harmonizing business outcomes is difficult because success or failure cannot be objectively expressed only by financial indicators. Alfirević et al. (2008) explain that performance of public and non-profit enterprises can be viewed from different aspects due to the fact that different groups of stakeholders are interested in their activities, and they particularly emphasize the importance of the education system for social development.

Pun and White (2005) explain that business performance represents the level of success in achieving the set goals, its measurement is a function of controlling the achievement of the business entity, and in addition to traditional financial indicators, modern systems for measuring business performance include non-financial indicators such as customer and employee satisfaction, service and product quality, social responsibility, and achievement of strategic goals (Mečev and Grubišić, 2020; Nguyen Thi Khanh and Nguyen, 2022). Ruiz de Sabando et al. (2018) find that perceptions of various stakeholders regarding subjective evaluation of achievement of goals set by the HEI, service quality, loyalty, student retention, and word of mouth can be sustained with a more relevant approach to performance measurement in the context of higher education. Achieving superior performances in a HEI requires strategic management, effective governance, and a commitment to continuous improvement. It also requires engagement with stakeholders, as their support and feedback can contribute to the institution's success and its long-term viability.

Despite contextual differences, conceptually similar existing research confirmed a positive relationship between the sustainable marketing and performance of business entities in for-profit sector (Jarvis et al., 2003; Jamrozy, 2007; Mitchell et al., 2010; Hunt, 2011; Crittenden et al., 2011; Sheth et al., 2011; Chow and Chen, 2012, Sharma and Kiran, 2013; Mahmoud, 2016; Lučić, 2020; Sinčić Ćorić et al., 2020; Mukif et al., 2020). Only the research of Abou-Warda (2014) is available to date, confirming the positive relationship between sustainable marketing and accreditations of Egyptian public HEIs.

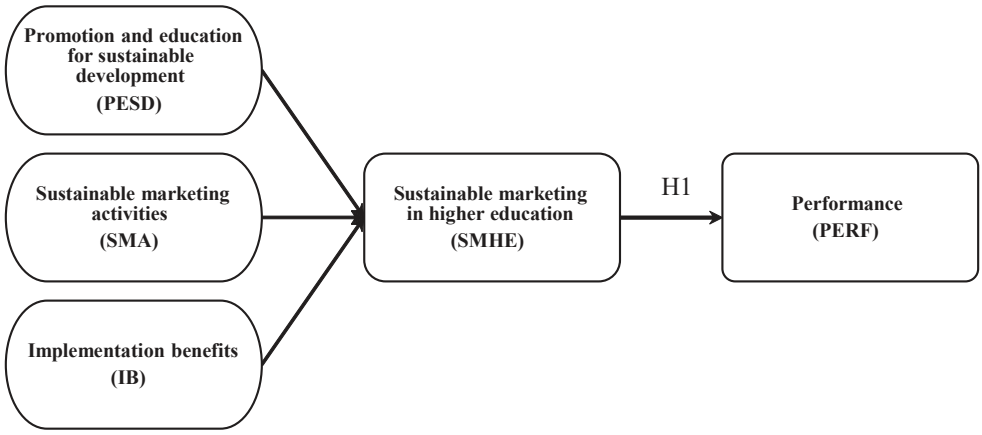
3. Methodology

This part of the paper presents the methodological framework of the empirical research based on a comprehensive literature review and previous relevant research on the relationship between sustainable marketing (i.e. sustainable

marketing orientation as its operationalization) and performance in the context of higher education. As an appropriate approach to assess the performance of a HEI, the subjective assessment of success in achieving the multiple goals of the HEI about its competitors was used as a selected non-financial performance indicator according to Ruiz de Sabando et al. (2018).

To achieve the empirical objectives, exploratory primary research was conducted following the literature review, which is suitable to investigate the attitudes and perceptions of key stakeholders towards sustainable marketing in HEI. In doing so, the authors propose a conceptual model shown in Figure 1. Development of structural and measurement model that follows, consisting of two constructs: (1) Sustainable Marketing in Higher Education (SMHE) as a multidimensional construct and (2) Performance (PERF) as a unidimensional construct, assessed as success in achieving the multiple goals of a HEI.

Figure 1: Conceptual model



Source: Author's construction

The primary quantitative empirical research was conducted using a measurement instrument developed by Meštrović et al. (2021) for SMHE and Meštrović (2022) for PERF. It examines the attitudes and perceptions of key stakeholders in higher education regarding sustainable marketing and the performance of HEI, which is assessed by its success in achieving its multiple goals, both defined on 7-point Likert scales. The research was conducted between May 10 and May 30, 2019, using an anonymous online Google Forms questionnaire on a convenience sample and additionally using a snowball technique to reach a broader range and number of stakeholders in higher education.

Univariate and multivariate statistical analyses were performed using the Statistical Package for Social Sciences program (SPSS 23.0) to analyze and interpret the results and test the proposed hypotheses. The sample was described and systematized using the methods of descriptive statistical analysis, while partial least squares structural equation modeling (PLS-SEM), a multivariate method that combines factor and regression analysis and does not assume normality of the data distribution (Hair et al., 2017), was applied to examine the relationships between the constructs, using SmartPLS 3.3.3.

4. Empirical data and analysis

A total of 380 higher education stakeholders completed the questionnaire. For this study, only responses from stakeholders other than students were considered relevant to assessing the success of the HEI in achieving its multiple goals relative to its competitors. Thus, the sample consisted of 262 females and 118 males who fully completed the questionnaire. The following Table 1 shows a sample of higher education stakeholders other than students by the ownership structure of business entities in which the respondents are employed and by their level of education.

Table 1: Sample – respondents' education level and business entities' ownership structure

Education level	Business entities' ownership structure							
	Public		Mixed		Private		Total	
	N	%	N	%	N	%	N	%
3-years vocational secondary education and training	1	100.0		0.0		0.0	1	0.3
General secondary education or 4- and 5-years vocational secondary education and training	25	73.5		0.0	9	26.5	34	9.0
University or professional undergraduate study	24	70.6		0.0	10	29.4	34	9.0
University or professional graduate study	127	67.9	10	5.3	50	26.7	187	49.3
Postgraduate scientific magistral study	12	66.7		0.0	6	33.3	18	4.7
Doctoral study	100	95.2		0.0	5	4.8	105	27.7
Total	289	76.3	10	2.6	80	21.1	379	100.0

Source: Authors' calculation

According to Hair et al. (2017) and Memon et al. (2020), the sample of 360 respondents is considered adequate, i.e. large enough for the purposes of PLS-SEM analysis.

The results of the descriptive statistical analysis of the Sustainable Marketing in Higher Education (SMHE) construct, as measured by the three dimensions of (1) Sustainable Marketing Activities (SMA), (2) Promotion and Education for Sustainable Development (PESD), and (3) Implementation Benefits (IB) are shown in Table 2 that follows. The IB dimension was rated with the highest mean score ($\bar{x}$ = 5.86, σ = 0.001), the lowest mean score ($\bar{x}$ = 5.33, σ = 0.001) achieved the SMA dimension, while the PESD dimension was graded with the mean score 5.85 (σ = 1.063). The SMA dimension's highly rated item was SMA4 – Partnership with regional and local government bodies ($\bar{x}$ = 5.73, σ = 1.200), while the item SMA9 – Regularly considering the impacts of own business decisions on various members of stakeholders (employers, students, potential students, parents of students, employees, higher education institutions, scientific institutions, relevant ministry, local and regional government bodies), on natural and financial resources and society at large was rated with the lowest mean score ($\bar{x}$ = 4.66, σ = 1.551). The IB dimension's highly rated item was IB11 – Creating benefits for all stakeholders and wider society ($\bar{x}$ = 6.01, σ = 1.158), and the item IB6 – Increasing study success was rated with the lowest mean score ($\bar{x}$ = 5.45, σ = 1.303). The PESD dimension's highly rated item was PESD6 – Promotion of sustainable development principles through own business practices ($\bar{x}$ = 6.03, σ = 1.195), while the PESD dimension's item with the lowest mean score was PESD3 – Implementation of study programs on sustainable development ($\bar{x}$ = 5.64, σ = 1.314).

Table 2: Descriptive statistical anaysis of SMHE construct construct

Code	Item	Mean	SD
Sustainable marketing activities (SMA)		5.33	0.001
SMA1	Adjusting business processes to laws and legal regulations while striving to achieve own business goals	5.04	1.108
SMA2	Concern about environmental and societal long-term benefits while striving to achieve own business goals	5.24	1.238
SMA3	Dialogue with key stakeholders (employers, students, prospective students, parents of students, employees, higher education institutions, scientific institutions, relevant ministries, local and regional government bodies and society at large)	5.34	1.411
SMA4	Partnership with regional and local government bodies	5.73	1.200
SMA5	Partnership with the local community	5.41	1.291
SMA6	Partnership with economic entities	5.49	1.274
SMA7	Partnership with competitors	5.20	1.369

Code	Item	Mean	SD
SMA8	Concern about all employees while striving to achieve own business goals	5.27	1.242
SMA9	Regularly considering the impacts of own business decisions on various members of stakeholders (employers, students, potential students, parents of students, employees, higher education institutions, scientific institutions, relevant ministry, local and regional government bodies), on natural and financial resources and society at large	4.66	1.551
SMA10	Increasing the application of modern information and communication technology (ICT) in business processes and teaching methods	5.58	1.302
SMA11	Increasing the availability of formal, informal and nonformal education to all stakeholders	4.88	1.523
SMA12	Anticipating and respecting the needs of broader community and future generations	5.51	1.288
SMA13	Transparency and availability of data on own activities taken that contribute to the society at large and on efforts being taken to reduce the negative impact on the environment	5.44	1.264
SMA14	Acceptance, implementation and application of the principles of sustainable development as an essential part of business culture, at all levels and all aspects of business	5.56	1.289
SMA15	Promotion of new ideas that contribute to acceptance and implementation of sustainability as a lifestyle and business philosophy	5.58	1.286
Implementation benefits (IB)		5.86	0.001
IB1	Creating the change, we want to testify as a society at large	5.91	1.165
IB2	Rationalising usage of resources	5.95	1.066
IB3	Creating added value for users while taking into account long-term interests of both society and environment	5.75	1.107
IB4	Adapting existing and/or creating new study programmes	5.79	1.091
IB5	Increasing loyalty and satisfaction of users and other stakeholders	5.83	1.163
IB6	Increasing study success	5.45	1.303
IB7	Increasing the visibility of higher education institution	5.99	1.213
IB8	Intensifying internal and external mobility of students and employees	6.00	1.160
IB9	Increasing ethics and morality, availability and transparency of business, procurement and donation data	5.82	1.219
IB10	Education for sustainable development	5.83	1.190
IB11	Creating benefits for all stakeholders and wider society	6.01	1.158
IB12	Creating and achieving competitive advantage	5.96	1.134
IB13	Simultaneous achievement of environmental, societal and economic goals	5.90	1.148

Code	Item	Mean	SD
Promotion and education for sustainable development (PESD)		5.85	1.063
PESD1	Improving the entire higher education system's quality	5.98	1.237
PESD2	Improving continuous professional development and training of all employees engaged in the higher education system	5.92	1.297
PESD3	Implementation of study programs on sustainable development	5.64	1.314
PESD4	Implementation of elective courses on sustainable development	5.75	1.318
PESD5	Reporting about own endeavours and achievements in accordance to sustainable development	5.75	1.139
PESD6	Promotion of sustainable development principles through own business practices	6.03	1.195

Note: SD = standard deviation

Source: Authors' calculation

The results of the descriptive statistical analysis of the Performance (PERF) construct, which is assessed as success in achieving the multiple goals of the HEI are shown in Table 3 that follows.

Table 3: Descriptive statistical anaysis of PERF construct

Code	Item	Mean	SD
Performance		4.86	0.989
PERF1	Efficiency of higher education institution's management	5.02	1.100
PERF3	Continuous employee professional development and training	4.88	1.233
PERF4	Application of ICT in learning and education	4.72	1.350
PERF5	Motivating environment for learning and teaching	4.51	1.276
PERF6	Improving student standards in order to increase fairness. with special care for the social dimension of study	4.74	1.518
PERF7	Intensifying incoming and outgoing mobility of students and employees	4.73	1.455
PERF9	Study programs' quality	5.15	1.358
PERF10	Adaptation of study proframmes that contribute to sustainable development. while taking into account the specifics of the local environment and community	4.74	1.378
PERF11	Enabling access to education for all stakeholders	4.95	1.342
PERF12	Continuous implementation of activities raising the level of entire population's educational structure	5.02	1.268
PERF13	Students' competences for future professions. creative and innovative work and development	4.81	1.382
PERF14	Integrating sustainable development principles. values and practices into all aspects of education and business	4.80	1.387

Code	Item	Mean	SD
PERF15	Reporting on own efforts and achievements that are in line with the principles of sustainable development	4.70	1.367
PERF16	Ethics. morality and publicity of actions	4.47	1.430
PERF17	Ability to meet the needs and desires of key stakeholders	4.74	1.180
PERF18	Ensuring the minimum accessibility standards for students with disabilities	4.91	1.252
PERF19	Contributing to the creation of a knowledge society and collective well-being	4.98	1.308
PERF20	Innovations transfer from science into economy and social activities	5.13	1.193

Note: SD = standard deviation

Source: Authors' calculation

As shown in the previous table, the highest scoring item of the PERF construct was PERF9 – Study programs' quality ($\bar{x}$ = 5.15, σ = 1.358), followed by PERF20 – Innovations transfer from science into economy and social activities ($\bar{x}$ = 5.13, σ = 1.193), while items PERF5 – Motivating environment for learning and teaching ($\bar{x}$ = 4.51, σ = 1.276) and PERF16 – Ethics, morality and publicity of actions ($\bar{x}$ = 4.47, σ = 1.430) had the low mean scores.

The reliability of the measurement scales of the constructs was assessed by Cronbach's alpha coefficients and correlations with the associated constructs. The values of the Cronbach's alpha coefficients of the measurement scales ranged from 0.928 to 0.958 (i.e. 0.939 for SMA, 0.958 for IB, 0.928 for PESD and 0.953 for PERF construct), whereas the values of the correlations with the associated constructs were above the threshold of 0.30 (Nunnally, 1967), both confirming the internal consistency. All the scales' items were retained and will be analyzed within the structural and measurement model in the part that follows.

5. Results and discussion

The Confirmatory Factor Analysis (CFA) was conducted according to the recommendations of Hair et al. (2017) before creating the structural model. Accordingly, the structural model SMHE-PERF presented in Figure 2, which frames the relationship between SMHE and PERF, was defined by one exogenous higher-order construct SMHE consisting of three lower-order constructs: (1) SMA, (2) PESD and (3) IB, and one endogenous latent construct PERF. SMHE, as the higher-order construct, was defined as a reflective-formative model, type II (Jarvis et al., 2003; Sarstedt et al., 2019).

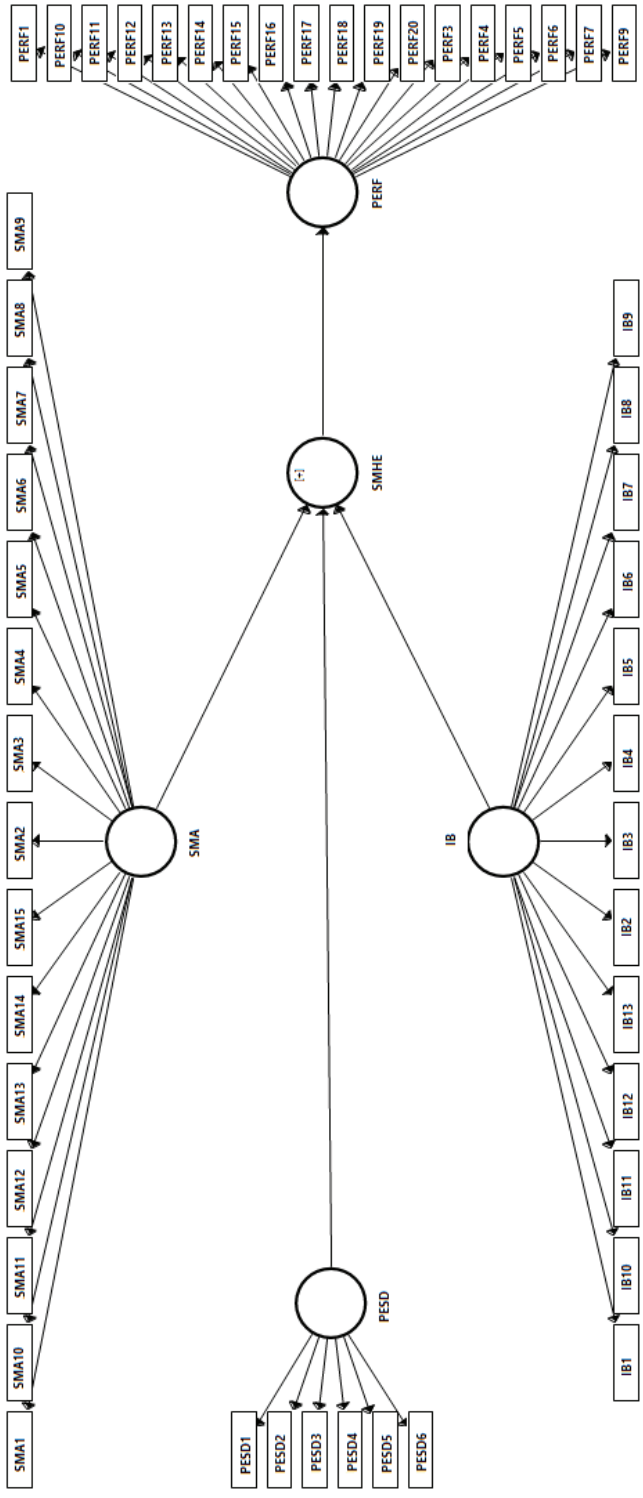


Figure 2: Structural and meaurement model SMHE-PERF

Source: Authors' calculation

The evaluation of the higher-order constructs using the PLS-SEM method was carried out using the two-stage approach recommended by Hair et al. (2020) and Sarstedt et al. (2019), which does not require the same number of indicators of the lower-order constructs (Becker et al., 2012). The first stage involves the evaluation of the lower-order construct of the reflective measurement model, followed by the evaluation of the structural model.

5.1. Structural and measurement model evaluation

The higher-order exogenous construct SMHE (reflective-formative, type II), determined by three lower-order reflective constructs, and endogenous construct PERF determined by reflective variables, were evaluated by the PLS-SEM method using a two-stage approach that does not require an equal number of indicators of lower-order constructs. The weighting path scheme was used, recommended by Hair et al. (2017) as an appropriate approach to examine the relationships in models consisting of higher-order constructs. The *A* setting of the formative construct indicator weighting mode with a maximum number of iterations of 300 and a stop criterion of 10^-7 was determined according to Becker et al. (2012).

The reflective measurement model analysis and evaluation includes indicators' reliability, internal consistency, and discriminant and convergent validity testing (Hair et al., 2020; Sarstedt et al., 2019). Based on the results of the initial analysis, it was concluded that all indicators of the SMHE-PERF model have standardized factor loadings higher than the threshold of 0.70 (Hair et al., 2019) except SMA1, IB11, and IB12, which were removed. The removal of the SMA10, SMA15, SMA2, SMA4, and PERF18 with standard factor loadings lower than 0.70 did not increase the composite reliability (CR) and the average variance extracted (AVE) values, so it was decided to be kept in further analysis.

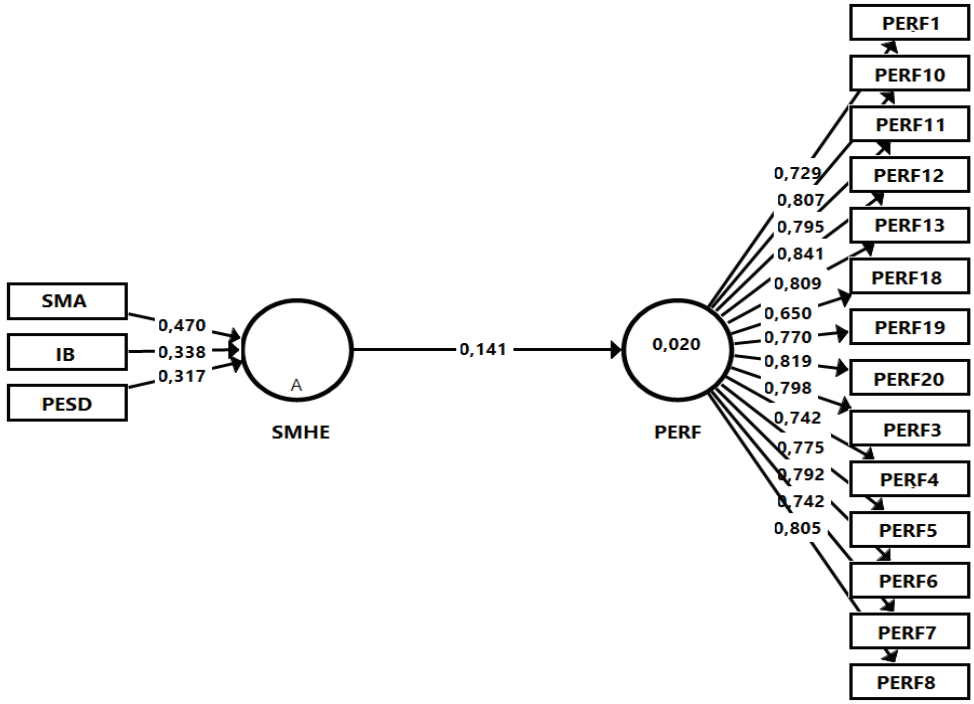
The standardized factor loadings of all variables in the reflective model SMHE-PERF, ranging from 0.623 to 0.876 and Cronbach's alpha coefficients ranging from 0.909 to 0.953, indicate a high level of reliability of latent construct measures. The calculated values of the Rho_A coefficients ranging from 0.910 to 0.957 indicate a high degree of model's stability and consistency, CR values ranging from 0.932 to 0.958 confirm the reliability of the indicators, and AVE values higher than 0.50 (i.e. ranging from 0.547 to 0.735) confirm internal consistency and convergent validity. The obtained results confirm esential prerequisites for both validity and reliability of all (outer) measurement model constructs (Hair et al., 2019).

Evaluation of the structural (or inner) model involves assessing the relationship between the constructs and the structural model's predictive capability (Hair et al., 2017), namely: (1) estimation of indicator collinearity by checking the variance inflation factors (VIF) of latent constructs; (2) testing the significance and relevance

of structural model relationships by calculating the path coefficients connecting constructs and representing hypothesis relationships using a nonparametric method of resampling; (3) estimation of predictive significance by calculating the coefficient of determination (R^2), evaluation of the effect size by calculating the coefficient of influence (f^2) and blindfolding-based crossvalidated redundancy measure (Q^2); and (4) assessment of the structural model's quality by calculating the standardized root mean square residual (SRMR).

The collinearity assessment as the first evaluation criterion was performed by checking the VIF values of the latent construct, which for the proposed SMHE-PERF model (Figure 3) was 1.000. Accordingly, it was concluded that there was no collinearity between the latent constructs (Hair et al., 2017).

Figure 3: Structural model SMHE-PERF



Source: Authors' calculation

The evaluation of the significance and relevance of the structural model relationship between the latent constructs SMHE and PERF was applied by calculating the path coefficient between the constructs that also represent the relationship proposed by hypothesis H1 *Sustainable marketing statistically significantly impacts*

the performance of higher education institutions. The results of the analysis are shown in Table 4 which follows. Since the t-value is higher than 1.96 at the significance level of 5%, the relationship between the constructs SMHE and PERF in the structural model SMHE-PERF is statistically significant and positive, thus confirming the proposed hypothesis.

Table 4: Hpyothesis testing – examining the direct relationship in structural model SMHE-PERF

Hypothesis		Original sample β	t-value	p-value	95% confidence interval	confirmation
H1	SMHE → PERF	0.141	6.412	0.000	0.103 – 0.189	+

Source: Authors' calculation

Predictive significance, as the third criterion in the evaluation of the structural model, was assessed by calculating the coefficient of determination (R^2), the effect size (f^2), and the coefficient of validated redundancy (Q^2). The R^2 coefficients of the dependent constructs were calculated using the associated path coefficients and standardized factor loadings of the reflective construct PERF and weighting values for the higher-order formative construct SMHE. Figure 3 shows that the calculated R^2 value for the dependent variable PERF (R^2 = 0.020), although weak, is within acceptable limits according to the interpretation of Chin (1998) and Ringle et al. (2015), which means that the SMHE-PERF model explains 2.0% of the variance of the dependent construct PERF. The calculated coefficient of influence (f^2) of the SMHE-PERF structural model is 0.020, which can be described as a weak influence of the exogenous latent construct SMHE on the endogenous variable PERF. The value of the Stone-Geisser coefficient of the endogenous construct PERF (Q^2 = 0.076) is higher than zero, which confirms the predictive relevance of the SMHE-PERF model.

Finally, the quality of the SMHE-PERF structural model was assessed by calculating the standardized root mean square residual (SRMR). Since the recommended threshold value is lower than 0.08 (Hu and Bentler, 1998, cited in Garson, 2016; Hair et al., 2017), the obtained calculated SRMR value of 0.062 confirmed the quality of the proposed SMHE-PERF structural model.

5.2. Discussion

The results show that respondents gave high average scores to perceived success in achieving the multiple goals of HEI and also to the dimensions of SMHE. The conducted CFA confirmed the three-dimensional structure of the SMHE construct yielding acceptable results that determined a framework for the development of the structural model. Both the reliability and validity of the proposed SMHE-PERF

model were confirmed, as well as the significance of the impact of sustainable marketing on the performance of the HEI (ß = 0.141, t-value = 6.412, p = 0.000), confirming the proposed hypothesis.

The results of the CFA confirmed the three-factor structure of the SMHE construct, with satisfactory values of factor structure adequacy. The obtained CFA results indicate that for structural and measurement model development, the SMHE construct should be specified as a multidimensional construct consisting of three dimensions named according to the attributable items and the area they operationalize, and PERF as an unidimensional construct.

Although the results are in line with the only to the date available previous research in the higher education environment of Abou-Warda (2014), who developed sustainable marketing as a multidimensional construct and confirmed its statistically significant positive relationship with the academic accreditation of Egyptian public higher education institutions, no study has assessed its influence on higher education's performance, accessed as success in achieving its multiple goals. In addition to recognizing that each group of stakeholders in higher education has different needs and expectations, and therefore perceives the role and performance of HEIs differently, it is also necessary to highlight the key finding of the empirical research conducted, namely the positive relationship of sustainable marketing with HEIs performance, that is viewed in achieving multiple goals.

The results of the study determined numerous advantages of implementing sustainable marketing in the context of higher education, which is manifested in the creation of positive changes that we want to testify as a society, rational use of resources, creation of added value for users, taking into account the long-term interests of society and the environment, satisfaction of all stakeholders, improvement of the presence of the higher education institution in the media, enhancement of mobility of students and staff, ethics and morality, availability and transparency of business data, achieving a competitive advantage, developing education for sustainable development, and promoting new ideas about sustainability as a philosophy of life, leading to the sustainable development of the entire society.

6. Conclusions

The conducted research has confirmed that sustainable marketing has a positive impact on the performance of HEI. The success of higher education institutions is reflected in the success in achieving its multiple objectives, and the ultimate goal of higher education includes the realization of social, economic, and environmental contributions, which enables the transition to a knowledge society and the creation of the overall well-being of all stakeholders in society. Sustainable marketing, considered an obligation rather than an option in contemporary academic literature,

represents a relatively new and underrepresented paradigm in higher education. The need to shift the marketing strategy to a more *sustainable* one arises as a logical consequence of current circumstances and societal evolution. This implies defining optimal ways of achieving triple goals, bearing in mind that marketing, as a management function and mindset, should contribute to the improvement of management processes and the well-being of society as a whole.

This study contributes to the theory related to sustainable marketing and performance in the context of higher education and with its empirical findings, represents a valuable source for managerial implications. Sustainable marketing has a significant positive impact on the performance of a higher education institution. It can enhance its reputation and capabilities, increase operational efficiency, financial performance, and stakeholder relationships, contribute to environmental and societal goals, and ensure its long-term sustainability.

What is worth mentioning is the fact that the quality of the information from the data collected during the preliminary research is based solely on the perceptions of the heads of institutions and corporate executives, who were the only expert sample involved in the research from which the measurement instruments were derived. This limitation is also reflected in the possible bias of respondents because by evaluating success in achieving goals, it is possible to evaluate them inappropriately and thus present a situation that is different from the actual situation. Future research could focus on obtaining a larger database and broader aspects and factors of sustainable marketing that were not considered in this research. The possibility of respondent bias can be eliminated by research that includes a wider range of higher education stakeholders and by using relevant objective indicators of the success of higher education, and longitudinal research would be preferable. As the data collected is not accessed as taken from representatives of a specific industry, but from individuals (i.e. natural persons), the results obtained should be considered with appropriate attention and consideration. Accordingly, as this research was conducted in the Croatian higher education market, consisting of predominantly public HEIs financed by the government from the state budget, the results of the study should not be generalized as applicable to all the HEIs, since they vary in their main characteristics, i. e. ownership structure, funding means and principles, competition dynamics, location, stakeholders' influence, the scientific scope of study programmes, etc. Despite the aforementioned limitations, the findings of this research contribute to the existing literature with a conceptual and empirical contribution to the field of sustainable marketing in the context of higher education.

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Istraživanje povezanosti održivog marketinga i uspješnosti poslovanja institucija visokog obrazovanja

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Sažetak

Ovaj se rad bavi izazovima i mogućnostima primjene održivog marketinga na visokim učilištima, fokusirajući se na uspješnost visokoobrazovnih institucija u postizanju višestrukih ciljeva iz perspektive dionika. Iako postojeća akademska literatura sadrži širok spektar istraživanja o održivosti, ona su uglavnom usmjerena na profitni sektor. Uočen je nedostatak istraživanja održivog marketinga u javnom sektoru, posebice u području visokog obrazovanja. Analizirana je postojeća znanstvena literatura i identificirane prepreke široj primjeni održivog marketinga u akademskoj zajednici. Provedeno je kvantitativno istraživanje kako bi se testirao predloženi konceptualni model definiran višedimenzionalnim konstruktom održivog marketinga i njegovim utjecajem na uspješnost poslovanja institucije visokog obrazovanja. Rezultati istraživanja pokazali su pozitivan odnos između održivog marketinga i uspješnosti poslovanja visokog učilišta. Prednosti implementacije održivog marketinga očituju se u stvaranju pozitivnih promjena koje društvo nastoji dostići, u racionalnom korištenju resursa te u stvaranju dodane vrijednosti uz uvažavanje dugoročnih interesa društva i okoliša. Nalazi istraživanja mogu doprinijeti boljem razumijevanju uloge održivog marketinga u visokom obrazovanju i dati smjernice za njegovu širu primjenu u stvaranju održivijeg i društveno odgovornijeg akademskog okruženja.

Ključne riječi: *održivi marketing, dionici, visoka učilišta, uspješnost, mjerenje*

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Impact of labour income in gross value added on migrations in Bosnia and Herzegovina*

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Abstract

The transition countries of Southeast Europe, especially the countries of the Western Balkans, have achieved modest economic growth rates since the beginning of the transition process. High unemployment rates, relatively high external imbalances, and rising external debt are common for the entire region. This paper will explain the impact of a decrease in the share of labour income in total gross value added on the increased outflow of the working-age population. The subject of a specific analysis is the increase in inequality and the consequences of differences in income on the economy and society of the country will be explained Increasing inequality in Bosnia and Herzegovina is measured by a significant decrease in the share of labour income in total gross value added in Bosnia and Herzegovina affects the outflow of the working-age population abroad.

Keywords: *transition country, share of labour income in gross value added, migrations*

JEL classification: *P2, H60, J10*

1. Introduction

Inequality in income distribution has long been considered beneficial and a prerequisite for quicker economic growth. Redistributing income towards poorer citizens has been considered as a means of reducing investment, as it would be used for spending instead of saving. However, contemporary research has shown a negative link between the inequality caused by a rift in income distribution and the growth of gross social product. Another finding was that this income distribution inequality increased the migration of the working population. Lower-income

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populations might have limited economic opportunities and thus, they will feel forced to migrate to other countries to improve their job opportunities and enjoy a higher standard of living. Additionally, economic inequality may also result in a similarly unequal distribution of education, healthcare, and infrastructure resources, as well as political instability. This instability can in turn cause economic uncertainty and volatility. As a result, migrations increase.

The focus of this paper is to determine the impact of a decrease in the share of labour income in total gross value added on the increased outflow of the working-age population. The research mostly focused on questioning the bond between political stability and freedom (level of democracy or freedom rank) on the level of population migration. With this in mind, it stands to reason that the first step would be to identify who qualifies as a migrant. There is no consensus on the unified definition of *migrant*. The European Union glossary defines in the *global context*, a person who is outside the territory of the State of which they are nationals or citizens and who has resided in a foreign country for more than one year irrespective of the causes, voluntary or involuntary, and the means, regular or irregular, used to migrate. Furthermore, other sources define the migrants by foreign birth, by foreign citizenship, or by their movement into a new country for a temporary (sometimes for as little as one month) stay, or to settle for the long term.

This article consists of seven sections. After the Introduction and setting of the research objectives and hypothesis in the second section, the third section reviews the relevant literature on migration and economic complexity. The fourth section describes the applied methodology (the multiple regression linear method). The fifth section deals with the macroeconomic indicators in Bosnia and Herzegovina. While the phenomenon of migration has been explored before, it has been primarily focused on developed nations, leaving a gap in understanding how these dynamics interact in developing countries. One such country, and the subject of this research, is Bosnia and Herzegovina. The sixth section presents the data analysis and estimation of the research results. The final section, The Conclusion implies that this research may have some limitations. However, using a holistic perspective and considering multiple factors, such as income distribution, political stability, migration patterns, and their interconnections, this article may provide valuable insight into unique challenges faced by transitional countries. Moreover, identifying the impact of income inequality on migration patterns may offer valuable insights for policymakers attempting to reduce inequality and retain skilled labor in Bosnia and Herzegovina.

2. The Problem

The transition countries of Southeast Europe, especially the ones of the Western Balkans, have achieved modest economic growth rates since the beginning of the

transition process. High unemployment rates, relatively high external imbalances, and rising external debt are common for the entire region.

Bosnia and Herzegovina is a transitional country in Southeast Europe, which has begun its transition to a market-oriented economy with a delay in its integration into global flows. It has the highest outward migration with about 30% of those who migrated in 2018 being between the ages of 18 to 35. In addition to this, people of all education levels are migrating, creating significant skills shortages, including technical skills, which are an important skills asset for any emerging country. Reasons for emigration include unemployment, which is the greatest concern in Bosnia and Herzegovina, overall poor living conditions, weak health care and education, and environmental concerns, particularly air pollution. At the same time, the wage differential with the European Union constitutes a strong pull factor. Preliminary analysis of the volume and structure of profitability in Bosnia and Herzegovina shows that it was relatively low long after the war, with a relatively high share of trade and services. In the traditional theory, profit levels and rates play the role of promoters of economic growth and development, stimulate employment, and increase competitiveness (quotation). At the beginning of the transition process, transition countries viewed private sector profitability as the most important factor in terms of its advantage over the public sector.

Unsurprisingly, the strong growth in gross value added (GVA) and profitability growth in the 2013-2018 period was met with great approval by the entire society. In addition to all the benefits achieved this way, it must be noted that the share of wages – labour income in the GVA has decreased. The GVA growth has largely spilled over into even higher profit growth – capital income growth. The consequence of a decrease in the share of labour income in total gross value added is the rise in inequality. The overall Gini coefficient for Bosnia and Herzegovina increased during this period.

However, the most important social phenomenon in Bosnia and Herzegovina is migration i.e. labour outflow. Due to the labour outflow, Bosnia and Herzegovina is losing a significant number of the young, able-bodied population.

With this in mind, this research poses a basic research problem: To what extent does the increase in inequality as measured by a decrease in the share of labour income and an increase in the share of capital income in total gross value added affect the increase of the working-age population abroad?

2.1. Objectives of the research

This paper will explain the impact of a decrease in the share of labour income in total gross value added on the increased outflow of the working-age population. The subject of a specific analysis is the increase in inequality and the consequences of

differences in income on the economy and society of the country will be explained. We will also try to determine the cause-and-effect relationship between the rise in inequality and the massive departure of the working-age population abroad. This will highlight good policies that can help reduce inequality and retain the working-age population in Bosnia and Herzegovina.

2.2. The Research Hypothesis

Increasing inequality in Bosnia and Herzegovina measured by a significant decrease in the share of labour income in total gross value added in Bosnia and Herzegovina affects the outflow of the working-age population abroad.

3. The literature review

In the economic literature, there are many sources dealing with the bond between income distribution and economic growth Kuznets (1955), Paukert (1973), Shaw (1973), Alesina and Perotti (1994), Greenwood and Jovanović (1990). Nestić (1999) elaborates that two types of bonds between income distribution end economic growth – via fiscal channel and channel of political instability. The fiscal channel presumes that the decisions made by governments related to the fiscal field – taxing and spending which are closely related to the trying of income distribution or influence on income have an impact on economic growth. Another channel relates to politics (in) – "larger inequality in income distribution brings to social pressure which can then result in instability which will harm enticement of saving and investments." (Nestić, 1999: 194). Distribution and stabilization fiscal politics aim to realize greater social righteousness, redistribution richness, and income as well as stabilization of economic flows in case of disturbances and crises. Political (in)stability – larger inequality in income distribution leads to social pressure and finally significant population migrations. Most of the contemporary theorists by their research prove the existence of a correlation between inequality in income distribution and wealth and GDP growth i.e. the existence of significant negative bonds (Barro, 1991; Clarke, 1995). Kaldor (1957), Karabarbounis and Neiman (2013) claim that exactly stability and growth of the share of income are a key form of dealing with any macroeconomic model, namely to increase productivity and macroeconomic dynamics.

McKenzie (2017) claims that poorer people very often do not have the adequate knowledge and skills to migrate i.e. to create adequate standards in the country they migrate to namely the population itself does not mean that they will migrate. Even there is a widespread prejudice that only poor people migrate. Clemens and Mendola (2020) have come to the same conclusion.

Basically, not only that the amount of income itself or the trend of increase or decrease of citizens concerning BDP of the source country influences the readiness of people to migrate.

International migration is deeply shaped by income inequality, but most studies on the determinants of international migration flows have focused on one specific dimension: between country income inequality (generally proxied by wages or per capita GDP differences). Although cross-country differences in per capita GDP capture part of the potential gains associated with international migration (for instance, those related to better in-kind public services and institutions, as emphasized by Ravallion (2019), individual benefits accruing to immigrants also depend on which part of the income distribution immigrants expect to *land* in, as well as on the shape of such distribution. As Milanovic (2005; 2015) puts it, by choosing one country, a person receives at least two *public'* goods—the average income of the country and the inequality of income distribution (Coniglio et al., 2023).

Economic inequality, which has been more or less widespread in Western developed countries over the last thirty years, is the result of a situation where a small part of the population benefits from most or all of the benefits from economic progress while at the same time, the majority of the population has little or no benefits. Piketty (2014) points to a long-term and ever-growing problem of concentrating wealth.

This inequality further results in the continuous redistribution of national wealth and income toward the top of the social pyramid, to the detriment of the rest of the population. Globalization is considered to be the main culprit for increasing inequality both within developed and underdeveloped countries (Lakner and Milanovic, 2015). Today, in Western countries, most wealth, defined as a set of tangible goods, financial assets, and rights held by individuals or families, is now concentrated in a significantly low percentage of the population. Of course, the degree of concentration of wealth shows significant differences from country to country. In the same countries, income, which means all income from property (interest, dividends and rent) or labour, and social transfers such as social assistance or unemployment benefits, is somewhat less evenly distributed than wealth. Concerning the reciprocal relationship between the unequal distribution of income and wealth, it has been found that the increase in income inequality has the effect of increasing differences in the size of wealth.

The largest inequalities in the distribution of wealth among all industrialized countries today exist in the United States. Interestingly, Stiglitz (2014) states that it was precisely the rise of inequality in the US that preceded the economic crises of 1929 and 2008.

In the United States, in the 1980s, 37.4 percent of income was appropriated by the rich, and only 23.7% went to the 80% of the poorest. The same thing happened in the period 1988-2008 when five percent of the richest had appropriated 38% of

income and 50% of newly created assets. Between 2000 and 2007, one percent of *super-rich* Americans claimed over 20% of the country's total income, and that same percent received 19% of the national income in 1948.

On the downside, from the 1980s until the crisis of 2008, the wages of most employees stagnated or fell, and near the very end of this period, workers' minimum wages were $ 5.15 compared to 1966 when the lowest wage was worth $ 8 today.

The lack of wage growth occurred despite US economic growth, which averaged nearly 4% annually from 1990 to 2008. The average wage in the US economy between 2000 and 2007 increased only slightly by 0.1% per year.

According to the latest study by the Organization for Economic Co-operation and Development (OECD), inequalities in income distribution continue to grow in all the world's leading economies, and the gap between the rich and the poor is widening. Inequality has grown in 17 countries since 1980 until the 2008 financial crisis. The most outstanding differences between the rich and the poor are, as expected, in the United States and the United Kingdom, joined by Mexico and Israel. The slightest differences are in Denmark, Norway, and the Czech Republic, although they are also affected by a growing inequality trend. However, because of the previously extremely low inequality, the growth in income disparities has not yet significantly exacerbated uniformity in these countries. Even though the increasing inequality trend is somewhat common to most European developed countries (including transition countries), inequality ranges vary from country to country.

4. Methodology and data

Correlation and regression analysis methods are used. Since the problem we are investigating can be treated as a problem of one dependent and multiple independent variables, it is a convenient situation for using the multiple regression method. Also, we assume that the relationship between variables is linear, so the model we use will be a multiple linear model.

The basic features of this model are:

Y – dependent variable

X1, X2, ..., Xp – independent variables

Then the linear model is:

$$Y = po + p1X1 + ... + PpXp + s$$

Where po, pi, ..., Pp are unknown parameters to be evaluated, and *s* is a measurement error, i.e., residuals.

Accordingly, we will test here whether independent variables explain a significant part of the variability of the dependent variable, i.e., is there a relationship and determine which part of the variability of the dependent variable can be explained by the independent variable, i., link strength.

This paper aims to point out the crucial importance share of labour income in total gross value in Bosnia and Herzegovina, to highlight good solutions, flaws, and gaps in the economic policies of the country under review, but also to analyse and propose new opportunities for improvement.

From all of the above, it may be concluded that in this paper, the research started from theoretical facts to the statistical and macroeconomic methods that determined the research results from which the final indicators were derived.

5. Macroeconomic indicators in Bosnia and Herzegovina

In the period before the global financial and economic crisis, the real growth rates in Bosnia and Herzegovina were over 5%. However, the global economic recession has led to a decline in economic activity. After the fall in real GDP in 2009 by 3% and two years of crisis, with very modest growth rates, the economy in Bosnia and Herzegovina did not record economic growth in 2012. In 2012, a 1% GDP decline occurred as a downward trend compared to the modest 0.8% in 2010 and 1% in 2011. In 2013 and 2014, we had a modest growth.

For the years 2015, 2016, and 2017, we have very positive trends in this area. Real growth was significantly higher than in the previous period as an immediate result of a strong economic expansion in the European Union. Bosnian and Herzegovinian economies also recorded significant export and productivity growth, but overall economic growth remains below pre-crisis growth rates of over 5%.

5.1. Inequality in Bosnia and Herzegovina

The scale of inequality in Bosnia and Herzegovina is reflected in the distribution of average income and average consumption by income deciles (population divided into deciles by income, i.e. consumption). There are larger differences in the distribution of income concerning consumption, which indicates a greater inequality of income than consumption. However, the consumption differences are also significant and we can assume that they are influenced by large income inequalities. It is obvious that the average consumption is higher than the average income in all income deciles except the last two.

Interestingly, the average consumption in the first income decile (consumption of the poorest decile) corresponds to the average income of persons in 6th income

decile. It may suggest that people in lower income deciles meet consumption from non-income sources (growing fruits and vegetables for personal use, payments in kind, etc.). Also, this difference may indicate the existence of a significant share of undeclared income or benefits, i.e., grey economy. Milanovic (1998) states that people often hide their sources of income and most often report less income than the real one, while they are less careful when reporting consumption. Furthermore, the disparity between income and consumption may also indicate a measurement problem, meaning that persons in lower income deciles underestimated their income or that their permanent income was higher than the declared income in a given reference period (Milanovic, 1998).

Unlike the first eight income deciles in the last two deciles with the highest income, the average income exceeds the average consumption. This suggests the existence of *surplus* income in the last two income deciles, i.e. the existence of income that exceeds consumption needs in a given period.

The disproportion between consumption and income in Bosnia and Herzegovina is also confirmed by the data on the total average income of 316 KM (convertible mark) and the total average consumption of 501 KM, which indicates that the total consumption in Bosnia and Herzegovina is on average 58.6% higher than the total income.

The average income in the 10th decile (the richest 10% of the population in BiH) is on average 35.5 times higher than the average income of the 1st decile (the poorest 10%) and 6 times the income of people in the middle of the distribution (between the 5th and 6th deciles). The average consumption of the richest decile is 3.3 times higher than the average consumption of the poorest decile and 2.2 times higher than the average consumption of people in the middle of the distribution.

5.2. Migration in Bosnia and Herzegovina

One of the most outstanding phenomena in Bosnia and Herzegovina in the last ten years is the migration outflow of the population. Due to the migration outflow, Bosnia and Herzegovina is losing a significant number of young, able-bodied population. In this analysis, we will use data on newly issued residence permits for Bosnia and Herzegovina citizens in EU countries maintained in Eurostat databases.

Table 1: Number of newly issued residence permits for Bosnia and Herzegovina citizens in EU countries

	2010	2011	2012	2013	2014	2015	2016	2017
EU	11,013	11,717	14,856	16,440	18,688	19,934	26,400	36,401
Germany	1,279	1,462	3,450	4,036	5,347	5,257	9,461	12,461
Slovenia	2,328	3,446	3,581	3,064	4,369	4,861	6,330	10,414
Croatia				1,284	1,002	866	2,382	5,526
Austria	1,703	2,459	3,077	3,603	4,057	4,520	4,060	3,350
Sweden	674	719	869	780	762	768	809	1,085
Italy	3,226	1,908	1,920	1,689	1,402	1,556	1,040	989
Switzerland			681	702	621	609	668	624
Czech Republic	123	70	359	217	179	479	590	528
France	356	334	326	417	400	357	377	364
Great Britain	237	212	219	335	172	155	208	329
Norway	154	166	196	225	224	279	256	306
Netherlands	182	417	162	195	169	164	173	164
Belgium	286	179	140	161	156	167	131	161
Malta	4	20	21	36	64	101	82	145
Luxembourg	85	99	148	74	101	126	124	138
Slovakia	6	18	37	36	27	46	43	126
Hungary	40	53	70	142	120	138	180	118
Poland	17	38	43	34	54	67	51	114
Finland	232	92	204	90	94	106	97	95
Denmark	97	58	75	103	65	67	56	83
Spain	52	59	41	57	61	46	56	76
Iceland	14	4	7	6	8	8	6	41
Ireland	30	32	28	25	25	19	47	40
Greece	21	14	15	23	25	21	35	37
Romania	18	7	31	19	14	24	39	22
Bulgaria	3	3	5	7	6	5	6	16
Portugal	3	10	17	4	7	11	8	12
Liechtenstein				12	13	15	9	8
Latvia	0	1	4	2	3	0	2	4
Cyprus	11	6	12	3	5	6	8	3
Estonia	0	0	0	2	1	0	2	1
Lithuania	0	1	2	2	1	1	3	0

Source: Eurostat

According to Eurostat, in the observed eight years, 155,449 people have emigrated from Bosnia and Herzegovina to one of the EU countries. The five key migrant countries from Bosnia and Herzegovina are Germany, Slovenia, Croatia, Austria, and Italy. What is of particular concern is that the number of those who move out of Bosnia and Herzegovina is consistently increasing yearly. At the beginning of the period, there were about 11,000 people, and about 36,000 people at the end of the period.

What is worth emphasizing here is that only legal migration was recorded, with people who obtained residence permits and joined the formal sector. Also, there is a proportion of the population who *illegally* move to EU countries, and this number is estimated at 15-20% of the number of migrants moving through official channels.

6. The data analysis

Data on the share of wages in GVA, political stability, and freedom rank are entered into the model as independent variables, while the data on migrants from Bosnia and Herzegovina are entered as a dependent variable. Data are for the period from 2008 to 2017.

Table 2: Political stability and freedom rank statistical correlation

	Share of wages in GVA	Political stability	Freedom rank	Migrants from BH
	x1 (independent variable)	x2 (independent variable)	x3 (independent variable)	Y (dependent variable)
1	0.571137775	-0.54	57	26,330
2	0.599135998	-0.67	54	12,648
3	0.590927125	-0.69	53	11,013
4	0.596771824	-0.82	56	11,717
5	0.604406937	-0.54	57	14,856
6	0.582397907	-0.4	55	16,440
7	0.586387235	-0.02	53	18,688
8	0.571714591	-0.4	55	19,934
9	0.55572468	-0.4	59	26,395
10	0.546818825	-0.38	61	36,403

Suorce: OECD (2021)

Results of multiple correlation show as follows:

$$Y = 247159 – 392247\ X_1$$

This result shows that the inverted connection exist between the variable X1 and variable Y – hence, the hypothesis that the decrease in the share of labour income in gross value added has an effect on the outflow of the working population abroad has been confirmed.

Table 3: Calculation of ANOVA methodology

ANOVA table					
Source	DF	Sum of Square	Mean Square	F Statistic	P-value
Regression	1	499,062,493.9	499,062,493.9	43.33181	0.0001725
(between yi and yi)					
Residual	8	92,137,860.55	11,517,232.57		
(between yi and yi)					
Total (between yi and yi)	9	591,200,354.4	65,688,928.27		

Source: OECD (2021)

Table 4: Correlation matrix

Y	X1	X2	X3	
Y	1	-0.918777	0.448019	0.804996
X1	-0.918777	1	-0.404108	-0.697064
X2	0.448019	-0.404108	1	0.017448
X3	0.804996	-0.697064	0.0174482	1

Source: OECD (2021)

Table 5: Coefficient Table Iteration 1 (adjusted R-squared = 0.901)

Coeff	SE	t-stat	lower t0.025 (6)	upper t0.975 (6)	Stand Coeff	p-value	VIF	
b	75,399.1	65,978.5	1.14278	-86,045	236,843	0	0.29667	
X1	-222,086	74,613.5	-2.9765	-404,659	-39,513	-0.5202	0.02475	2.77444
X2	8,403.6	4,576.23	1.83636	-2,794	19,601.2	0.23015	0.11596	1.42678
X3	1,376.03	501.891	2.7417	147.95	2,604.11	0.43837	0.03366	2.32207

Source: OECD (2021)

Table 6: Coefficient Table Iteration 2 (adjusted R-squared = 0.867)

Coeff	SE	t-stat	lower t0.025 (7)	upper t0.975 (7)	Stand Coeff	p-value	VIF	
b	135,598	66,253.9	2.04664	-21,068	292,264	0	0.07993	
X1	-296,997	72,289.9	-4.1084	-467,935	-126,058	-0.6957	0.00452	1.94514
X3	1,004.7	531.52	1.89025	-252.14	2,261.55	0.32007	0.10064	1.94514
b	247,159	34,609.8	7.14128	167,348	326,969	0	9.8E-05	
X1	-392,247	59,587.7	-6.5827	-529,657	-254,838	-0.9188	0.00017	1

Source: OECD (2021)

R square (R2) equals 0.844151. It means that the predictors (Xi) explain 84.4% of the variance of Y.

Adjusted R square equals 0.824670.

The coefficient of multiple correlation (R) equals 0.918777. It means that there is a very strong direct relationship between the predicted data (y) and the observed data (y).

The last iteration doesn't contain the greatest adjusted R-squared, we use the Backward Stepwise Selection based on the predictor's p-value.

Overall regression: right-tailed, F(1,8) = 43.331807, p-value = 0.000172474. Since p-value < a (0.05), we reject the H0.

The linear regression model, Y = b0 + b1X1 +...+ bpXp, provides a better fit than the model without the independent variables resulting in, Y = b0.

The following independent variables are not significant as predictors for Y: X2 and X3.

Therefore, we excluded these variables from the model.

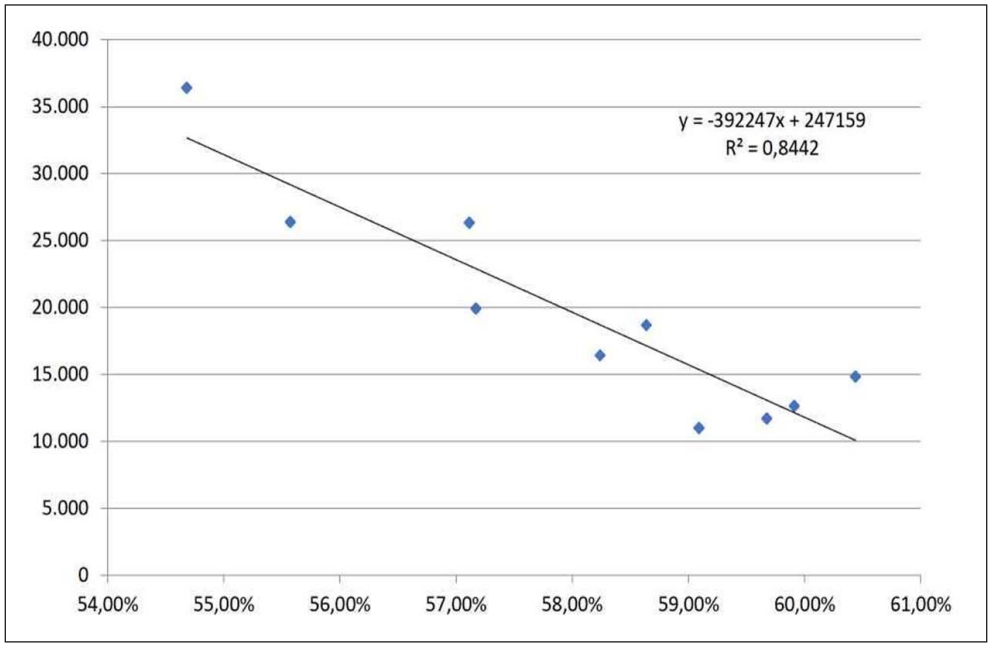
The Y-intercept (b): two-tailed, T = 7.141284, p-value = 0.0000979272. Hence b is significantly different from zero. Linear regression assumes normality for residual errors. Shapiro Wilk p- value equals 0.493900. It is assumed that the data is normally distributed.

The White test p-value equals 0.787118 (F = 0.247753). It is assumed that the variance is homogeneous. There is no multicollinearity concern as all the VIF values are smaller than 2.5.

The priori power is low: 0.1911, we reject the H0.

The power to prove each predictor significance is always lower than the power of the entire model.

Figure 1: P-value calculation



Source: OECD (2021)

There is a limited number of theoretical literature that combines the share of wages in GVA and migrations. Authors such as Piketty, Stiglitz et al., highlight the importance of theoretical and empirical relations between the mentioned pair. Theoretical explanation for their relation can be seen in lower (higher) shares of wages in national income which relate to wages of medium and lower deciles of population and which influence growing (reducing) inequality in income. At the same time, a higher (lower) share of profit in the functional distribution of income results in a higher (lower) share of income for the upper decile of the population and so makes an impact on the increase (reducing) of income inequality (Gomez Serrano et al., 2016). Of course, it is much more probable that the income which is part of profit makes an income of upper deciles of the population because it is much more probable that the part-takers in this category of the population own a company, shares or simply have more desirable political treatment by which they realize an easier access to financial services.

As in most countries in the rest of the world, the share of wages or income from work and increase in capital share presents a mirror image of economic structure in the transformation process. Change in itself is influenced by a mix of factors that differently contribute to the change of relative share of income from work and capital diversely from country to country. And, Bosnia and Herzegovina is specific due to its political system and development model.

In the case of developed countries such as the USA and Great Britain, growing inequalities in years before the crisis led to an imbalance of saving and investment/consumption considering that the deciles of the lower-income population have borrowed money from deciles with larger income and creditors abroad. In Bosnia and Herzegovina, income inequality has also been growing. However, financial markets are way less inclusive and developed in developed countries. Therefore, the lower-income deciles could not follow the increase in income of upper deciles through crediting in the period of economic reforms excluding the last five years after the rise of the global financial crisis when the phenomenon of financialization becomes more and more apparent. Due to that, the increase in savings has been directed to financing the inland deficit instead of the need to develop the inland market. Besides that, the corporal sector has increased its net debts intending to generate even higher investment instead of paying out growing profits to households as reimbursements to executive managers/management, bonuses, and dividends as was the case in the USA and Great Britain so the share of wages in GDP in the last few decades has been relatively decreasing.

The decreasing trend of share in income from work in Bosnia and Herzegovina has imminently led to an increase in income inequality considering that the income from capital has almost always been more unequally distributed than the income from work, as it has already been explained. As sectoral access added value pro-worker has been extremely high through few decades and the largest part of added value has gone to the corporal sector considering that the flow of cheap workforce from rural areas has put pressure on the number of wages in urban centres where the industry is gathered. Surely the distribution of factor income, when these two production factors are in question, under the influence of the above-mentioned logic of financial repression and work surplus in rural parts of the country.

Economic inequality can have a significant impact on economic migration patterns in a country. Here are a few ways economic inequality can affect economic migration:

Limited economic opportunities: Economic inequality can lead to limited economic opportunities for people in the lower-income brackets. In such cases, people may feel forced to migrate to other countries to find better job opportunities, higher wages, and better living standards.

Unequal distribution of resources: Economic inequality can result in an unequal distribution of resources such as education, healthcare, and infrastructure. This can make it difficult for people in certain regions to access these resources, making it harder for them to improve their economic status. This may prompt them to migrate to other areas or countries where resources are more accessible.

Brain drain: Economic inequality can lead to a brain drain, which is the loss of highly skilled professionals and workers who migrate to other countries. This can be detrimental to a country's economic growth and development, as it loses some of its most talented and innovative individuals.

Political instability: Economic inequality can cause political instability, which can lead to economic uncertainty and volatility. In such situations, people may choose to migrate to more stable and prosperous countries to escape economic and political upheaval.

Overall, economic inequality can significantly impact economic migration patterns in a country. Countries with high levels of economic inequality may experience increased emigration as people seek better economic opportunities and living standards elsewhere.

7. Conclusion

With this in mind, this research has several possible limitations. Firstly, it has limited scope. It focuses specifically on Bosnia and Herzegovina, and the results may be hard to generalize and apply to other countries with different economic, social, and political climates. Secondly, not all factors are taken into account when considering migration patterns. The focus is on economic factors, such as income distribution and inequality, and it does not consider other migration factors, such as social, cultural, and political. Lastly, as the research is based on a specific period (2010 – 2017), it may not accurately reflect long-term changes and trends. Economic and social dynamics may have changed since the end of this study.

Inequality in income distribution was considered a desirable and necessary condition for achieving faster economic growth. More recently in recent literature, these postulates have been questioned. Furthermore, the same literature describes that inequality can lead to an uneven distribution of resources such as education, health, and infrastructure. In addition, economic inequality can cause political instability that can lead to economic uncertainty and volatility, and all of the above factors can cause an increase in migration. The research example for Bosnia and Herzegovina in the unrivaled period confirms the identified impact of the decrease in the share of income from labor in the total gross value added, which conditions the increase in outflow of the working-age population in Bosnia and Herzegovina. In addition, the study results also questioned the link between political stability and freedom, i.e. the level of democracy (rank of freedom) and the level of population migration. It is desirable to investigate further the next five-year chronological period, 2018-2023, and compare the results obtained with the results of this study, which would lead to more precise research results and conclusions, anyone can use them to develop strategies and economic policies for public authorities based

on achieving faster and more significant economic growth by preventing negative migration flows – emigration caused by the income gap of the population as a basic demographic resource of the state.

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Utjecaj dohotka od rada u bruto dodanoj vrijednosti na migracije u Bosni i Hercegovini

Goran Radoš[1]

Sažetak

Tranzicijske zemlje jugoistočne Europe, posebice zemlje zapadnog Balkana, od početka tranzicijskog procesa ostvaruju skromne stope gospodarskog rasta. Visoke stope nezaposlenosti, relativno visoke vanjske neravnoteže i sve veći vanjski dug zajednički su cijeloj regiji. U ovom radu objasnit će se utjecaj smanjenja udjela dohotka od rada u ukupnoj bruto dodanoj vrijednosti na povećani odljev radno sposobnog stanovništva. Predmet posebne analize je povećanje nejednakosti te će se objasniti posljedice razlika u dohotku na ekonomiju i društvo zemlje. Povećanje nejednakosti u Bosni i Hercegovini mjereno značajnim smanjenjem udjela dohotka od rada u ukupnoj bruto dodanoj vrijednosti u Bosni i Hercegovini utječe na odljev radno sposobnog stanovništva u inozemstvo.

Ključne riječi: *tranzicijska zemlja, udio dohotka od rada u bruto dodanoj vrijednosti, migracije*

JEL klasifikacija: *P2, H60, J10*

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The influence of personal motives and personal norm on purchasing sustainable products*

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Abstract

This paper investigates personal motives and their role in predicting the purchase of sustainable products. Five types of personal motives were identified and tested by applying structural equation modelling. The present research also confirms the influence of inherent constructs of the Theory of Planned Behaviour. It investigates the role of personal norms, often neglected in previous research. The results revealed that altruism, generativity, and environmental concern significantly positively influence the attitude toward purchasing sustainable products. Furthermore, a negative impact of frugality on the attitude towards purchasing sustainable products was found. It confirms that, although pro-environmental behaviour can be seen as frugal behaviour, frugality can harm the attitude towards purchasing sustainable products if consumers perceive sustainable products as more expensive. However, the impact of health consciousness on the attitude towards the purchase of sustainable products was found to be insignificant, which could be explained by the fact that consumers may not perceive all sustainable products to be healthier, indicating that this variable is category-specific. Finally, a positive impact of personal norms on the intention to purchase sustainable products was confirmed, indicating that personal norms should be included in prediction models alongside social norms.

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1. Introduction

Unsustainable consumption has been identified as a major contributor to various environmental problems. Thus, promoting change in this sense is a key to achieving sustainable development (Tanner and Kast, 2003). In other words, an evolution of consumption patterns is necessary (Alam et al., 2020).

Previous research on sustainable consumer behaviour has identified a significant gap between attitudes and behaviour as a major challenge. Prothero et al. (2011) found that consumers generally support sustainable consumption, but their actual behaviour when it comes to purchasing sustainable products often does not align with their positive attitudes (Kollmus and Agyeman, 2015). Nguyen et al. (2019) state that between 46 and 67% of UK consumers have a positive attitude towards buying sustainable products, while only 4-10% actually buy them. This phenomenon is known as the attitude-behaviour gap (Terlau and Hirsch, 2015). Therefore, it is critical to understand the influencing factors of sustainable consumer behaviour.

Numerous studies have attempted to identify predictors of sustainable consumer behaviour to narrow the gap between attitudes and behaviour. However, there is still no consensus in the literature as to which concept offers the best explanation of sustainable consumer behaviour (Marzouk and Mahrous, 2020). The theory of planned behaviour (TPB) stands out, particularly in this area of research. TPB is based on social-psychological concepts, but it overlooks some of the important factors that influence consumer behaviour. Therefore, consumer behaviour research often has the opportunity to extend this theory with additional factors, depending on the specific research context.

Many authors have extended this model by including additional psychological variables such as motivation, perception, learning, beliefs, and attitudes. In sustainable consumption research, authors often extend the existing TPB model by including environmental concerns as a crucial predictor of intention and behaviour (Chaudhary and Bisai, 2018; Lee et al., 2014; Yadav and Pathak, 2016-a; Zhang et al., 2019).

The most studied motives are those that have a positive influence on the intention to purchase sustainable products, such as altruism (Mostafa, 2009; Ryan, 2017) and health consciousness (Voon et al., 2011; Xu et al., 2020; Yadav and Pathak, 2016-a). On the other hand, although some authors (Shiel et al., 2020; Urien and Kilbourne, 2011) found a positive relationship between concern for future generations

(generativity) and sustainable purchasing behaviour, there is still a lack of research in this area.

Furthermore, one of the rarely used predictors is frugality or rational behaviour. According to Tapia-Fonllem et al. (2013), it is a basic characteristic of a sustainable lifestyle, as well as the previously mentioned altruism. Lastovicka et al. (1999) point out that frugality, although often associated with sustainable consumption, used to be neglected in previous research.

The present research aims to provide a more detailed insight into personal motives whose impact is insufficiently investigated and considers them within the complete model of TPB. Therefore, the study hypothesizes a positive influence of four types of personal motives (altruism, health consciousness, generativity, and environmental concern) and a negative influence of rationality on the attitude toward buying sustainable products. Besides investigating the impact of personal motives on attitudes towards the purchase of sustainable products, it also confirms the influence of inherent constructs of this theory e.g. attitudes towards behaviour, subjective norms, and perceived behavioural control, strengthening the predictive power of the model. A positive influence of all inherent constructs has also been hypothesised. Finally, the present research has also examined the potential direct positive impact of personal norms which is a construct often overlooked in previous studies.

The paper is structured as follows. After the introduction, a comprehensive literature review and derived hypotheses are presented, followed by the methodology, in which a conceptual model as well as the participants and the procedure are explained. Finally, the study results are presented, interpreted, and discussed in light of previous research. General conclusions are followed by the research limitations and suggestions for future research.

2. Literature review and hypotheses development

To develop a conceptual model of the study and provide the basis for the development of hypotheses, a literature review was conducted and the key findings from previous research were summarised, focusing on personal motives as well as norms, behavioural control and the intention to buy sustainable products.

2.1. Motives for purchasing sustainable products

An analysis of relevant literature has identified several personal motives that align with the values advocated by sustainable consumption. These include altruism, which is characterized by a commitment to assisting others, and health consciousness, which is linked to the benefits of sustainable products. Rationality is also recognized as an essential factor, emphasizing the rational use of resources and

thoughtful purchasing decisions. Furthermore, the concept of generativity, defined as concern for future generations, is integral to the definition of sustainability. Finally, environmental concern, which focuses on the impact on the environment, is identified as a significant motivating factor. Together, these motives reinforce the framework of sustainable consumption, addressing ethical, health-related, environmental, and future-oriented considerations.

2.1.1. Altruism

Altruism, i.e., concern for the well-being of others, is an effective motivator that encourages an individual to adopt sustainable consumption patterns (Marzouk and Mahrous, 2020; Teng et al., 2015).

Altruism is usually defined as the desire to serve another person for their own sake and not for one's own benefit (Batson, 2011). Ryan (2017) emphasizes the importance of altruism as a fundamental human value that plays a key role in the issue of sustainability. Similarly, Tapia-Fonllem et al. (2017), categorize altruism as a component of sustainable behaviour that includes actions intended to help other people without expecting anything in return. In his norm activation model, Schwartz (1977) associated altruism with pro-environmental or sustainable behaviour. Researchers (Panda et al., 2020; Steg et al., 2014) also found that consumers with higher levels of altruism are more considerate of the environmental impact of their behaviour than the personal consequences.

Various studies, including Kaufmann et al. (2012) and Mostafa (2009), confirm this by demonstrating the significant positive influence of altruism on the intention to purchase sustainable products. Prakash et al. (2019) found that altruism had a positive influence on both the purchase attitude and the intention to buy sustainable products, while Bautista et al. (2020) identified altruism as an important mediator between attitudes and the intention to buy sustainable products.

Based on the above, the first hypothesis is formulated as follows:

H1: Altruism has a direct positive influence on attitudes towards buying sustainable products.

2.1.2. Health consciousness

Health is of vital importance to every individual, and health consciousness can lead to the selection of safe and healthy products (Abdulsahib et al., 2019).

Yadav and Pathak (2016-b: 123) define health consciousness as "the degree to which health concerns are integrated into a person's daily activities." Consumers who are health-conscious exhibit awareness and concern for their own well-being,

driving them to enhance or preserve their overall health and quality of life. They also actively engage in health-promoting behaviours and demonstrate a high level of knowledge regarding health issues (Michaelidou and Hassan, 2008).

Globally, the level of consumer awareness and concern about nutrition, health, and the quality of products consumed is growing (Chakrabarti, 2010). Sustainable products, which include organic food, are seen as a healthier option compared to conventional products, and health consciousness is considered one of the main factors motivating the purchase of such products (Yadav and Pathak, 2016-a). In the context of sustainable consumption, previous research has extensively investigated the relationship between health consciousness and the purchase of sustainable or organic products (Kuran and Mihic, 2014; Michaelidou and Hassan, 2008; Singh and Verma, 2017; Yadav and Pathak, 2016-a).

Based on the above, the following hypothesis was formulated.

H2: Health consciousness has a direct positive influence on the attitude towards buying sustainable products.

2.1.3. Generativity

The concept of generativity was established by Erikson (1950). According to Zhang and Mao (2008), generativity can be understood as a motivation to engage in consumer activities aimed at positively impacting future generations. Typically, it is described as being less oriented towards individual success and happiness and more towards leaving a legacy for others (Morselli and Passini, 2015).

Urien and Kilbourne (2011) defined generativity as a resource that encourages people towards the public good and maintaining continuity from one generation to the next. This definition aligns with later definitions by Shiel et al. (2020), who state that generativity concerns an individual's care about providing something useful or significant not just for themselves but also for current and future generations, as well as definition by Afridi et al. (2021-b: 1), who assert that generativity "refers to individuals' beliefs that their current behaviour has consequences that extend to future generations."

Previous research has rarely linked generativity with sustainable consumer behaviour, although it is mentioned in the very definition of sustainable development. There are only a few studies (Afridi et al., 2021-a; Afridi et al., 2021-b; Quoquab et al., 2019; Shiel et al., 2020) that have explored and confirmed a positive link between generativity and sustainable purchasing. However, none of these have investigated generativity within the TPB.

Based on the elaborated and the basic postulates of TPB, we propose the following hypothesis.

H3: Generativity has a direct positive influence on the attitude towards buying sustainable products.

2.1.4. Rationality

A definition of sustainable consumption states that "sustainable consumption does not pertain to consuming less, but rather consuming differently; it concerns efficient consumption and improved quality of life" (Manoochehri, 2001). As previously discussed, sustainable consumption aims to change consumption patterns. One approach to achieving sustainable consumption is through more frugal or rational consumption of goods and services.

Rationality or frugality is conceptualized as a lifestyle trait that reflects disciplined acquisition and resourceful use of products and services. It involves avoiding immediate, short-term consumption temptations through clever use of what is already owned or available, to achieve long-term goals (Lastovicka et al., 1999).

Michaelis et al. (2020) define frugality as an individual's general tendency towards (1) resource preservation and (2) the application of economic rationality in resource acquisition, i.e., evaluating the alternative costs of newly acquired resources. Tapia-Fonllem et al. (2017) emphasize that frugality includes the deliberate avoidance of unnecessary resource consumption and define it as the cautious use of resources and an interest in avoiding waste. According to Bove et al. (2009), frugality relates to the degree to which an individual restrains from purchasing and is resourceful in product use. This concept can elucidate consumer behaviours such as restrained product use, value awareness, price consciousness, and avoidance of impulsive purchasing (Lastovicka et al., 1999).

Despite its association with sustainable consumption, previous research has largely overlooked the consumer trait of frugality (Lastovicka et al., 1999). In their research, Evers et al. (2018) found that both materialism and frugality positively influence sustainable consumption behaviours. Fujii (2006) argues that pro-environmental behaviour should be viewed as frugal behaviour. However, Wang et al. (2021) challenge the view that frugality is a positive trait concerning sustainable consumer behaviour, presenting a research model and providing evidence of the negative impact of frugality on the intention to purchase sustainably. This is grounded in the assumption that sustainable products are often perceived as more expensive.

Based on the above, the following hypothesis was formulated.

H4: Rationality has a direct negative influence on the attitude towards buying sustainable products.

2.1.5. Environmental concern

Environmental concern (EC) is usually defined as people's awareness of environmental issues and their readiness to support efforts to address them (Chaudhary and Bisai, 2018; Mas'od and Chin, 2014. In the context of consumer decision-making, EC is described as an evaluation or attitude towards the environmental consequences of one's own or others' behaviours (Fransson and Gärling, 1999). Its significance is emphasized in the consumer decision-making process (Yang et al., 2018), and, according to research, it is a strong motivator for purchasing (Smith and Paladino, 2010). The existing literature highlights the importance of incorporating EC in studies on the purchase of sustainable products (Goh and Balaji, 2016).

Maichum et al. (2017) found that EC significantly positively affects the intentions to purchase eco-friendly products, while Chaudhary and Bisai (2018) found that environmental concern had an indirect impact on purchase intentions through attitudes. Similarly, in the research by Yadav and Pathak (2016-a), environmental concern did not influence the intention to purchase organic food but positively correlated with consumer attitudes toward buying organic food, which is in line with the findings of Smith and Paladino (2010) and of Mostafa (2009). Based on the elaborated, the fifth hypothesis is proposed:

H5: Environmental concern has a direct positive influence on the attitude towards buying sustainable products.

2.2. Intention to buy sustainable products

In the field of human psychology and behavioural research, the concept of intention plays a crucial role, and models of behavioural intentions have received strong support in various behavioural domains (Chen, 2007). This concept involves the capacity for deliberate action and the ability to influence outcomes through such actions.

When there is an opportunity to act, intention leads to behaviour, and if measured, the intention will serve as the best predictor of behaviour (Fishbein and Ajzen, 1975, as cited in Teng and Wang, 2015). Therefore, for a comprehensive understanding of behaviour, researchers must measure intentions precisely and accurately. Generally, the stronger the intention, the greater the likelihood of executing a particular behaviour, provided that the behaviour is within the individual's volitional control (Ajzen, 1991).

Fishbein and Ajzen describe intention as the "probability that a person will perform a certain behaviour" (Fishbein and Ajzen, 1975: 288). The concept of intention serves as an indicator of future actions, directing and reflecting behaviour across various domains (Moriano et al., 2012). Within his TPB, Ajzen

(1991) argues that intention is a crucial predictor of behaviour. It encompasses motivational factors that initiate behaviour, reflecting the extent to which individuals are prepared to exert effort and strive towards performing that behaviour, often influenced by personal values, attitudes, social norms, and perceived behavioural control. Specifically, purchase intention is defined as an individual's deliberate plan to expend effort on acquiring a particular product or service (Spears and Singh, 2004).

Consumer behaviour research identifies purchase intention as a fundamental element in the purchasing process, typically seen as necessary to motivate and encourage consumers to acquire products and services (Naz, 2022). Chen et al. (2020) emphasize the importance of understanding consumer purchase intentions, noting that such insights can enable companies to analyze market trends and adjust their products or services accordingly.

Consistent with previous research on intention and behaviour, the intention to purchase sustainable products has been validated as a proxy for actual purchasing behaviour, according to Chekima et al. (2016).

Therefore, following previous investigations, purchase intention appears as a dependent variable in the present research.

2.2.1. Attitudes

According to TPB, attitudes are a key predictor of behavioural intentions. An attitude towards behaviour refers to an individual's positive or negative evaluation of that behaviour, which plays a crucial role in shaping intentions to purchase, according to the TPB. Attitudes are formed from the beliefs individuals hold about the object of the attitude (Ajzen, 1991)

An attitude can be defined as a "learned predisposition to behave in a consistently favourable or unfavourable way towards a given object" (Schiffman and Wisenblit, 2015: 172). According to Allport (1935), an attitude is conceptualised as a mental and neural state of readiness, organised through experience, which exerts an influential role in shaping an individual's responses to all related objects and situations. Similarly, Eagly and Chaiken (1993: 1) describe an attitude as "a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour."

In the realm of sustainable consumer behaviour research, various types of attitudes have been examined. These include attitudes towards environment (Biswas and Roy, 2015; Leonidou et al., 2010; Maichum et al., 2017), attitudes towards sustainability (Gericke et al., 2019; Zwickle and Jones, 2018), attitudes towards morality (Arvola et al., 2008; Yadav and Pathak, 2016-a), attitudes towards

purhasing (Chan, 2001; Chaudhary and Bisai, 2018; Paul et al., 2016), and attitudes towards products (Al Zubaidi, 2020; Braga Junior et al., 2019).

Research has shown that a positive attitude towards a particular behaviour is positively associated with the intention to perform that behaviour (Ajzen, 1991; Chen and Tung, 2014; Mostafa, 2006). The attitude towards sustainable purchasing refers to the cognitive evaluation of consumers' sustainable purchasing behaviour (Joshi and Rahman, 2017). An individual's attitude towards product consumption is an important factor in predicting and understanding consumer choices over different products and services (Voon et al., 2011). However, studies have shown different results regarding the relationship between consumer attitudes and sustainable purchasing behaviours. Tanner and Kast (2003), in different studies, found both positive relationships and weak or non-existent ones. Onel (2017) suggests that sustainable consumption can be encouraged through a positive attitude towards sustainable products and behaviours. Dabbous and Tarhini (2019) confirm that although attitude is a key factor in participation, consumers' desire for sustainable engagement may not lead to actual behaviour simply because they are unaware of the benefits that such participation might offer. Therefore, this research aims to examine specifically the attitude towards behaviour as the primary predictor of behavioural intentions.

Accordingly, the following hypothesis, H6, is proposed: Attitude towards purchasing has a direct positive influence on the intention to buy sustainable products.

2.2.2. Norms

Ajzen acknowledged the importance of social norms and reference groups in human behaviour, introducing the concept of subjective norms within the frameworks of the Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975) and TPB (Ajzen, 1991).

Within the framework of both theories, subjective norms refer to a specific regulation of behaviour, based on what important others demand, desire, or expect regarding the performance or non-performance of a specific behaviour. Subjective norms can be described as "perceived social pressure to perform or not to perform the behaviour" (Ajzen, 1991: 188).

Onel (2017) explains that in the context of sustainable purchasing behaviour, if an individual believes that their social environment, such as family, close friends, and colleagues, approves of their decision to purchase such products, they are more likely to engage in purchasing. In other words, positive subjective norms will lead to actual behaviour through increased behavioural intentions.

Research examining the relationship between subjective norms and consumer intentions to purchase sustainable products is quite extensive. Different studies

have demonstrated that subjective norms have a significant impact on consumer behavioural intentions (Al-Swidi and Saleh, 2021; Kumar et al., 2021; Maichum et al., 2016; Vermeir and Verbeke, 2006).

Based on the above, Hypothesis H7 is proposed: Subjective norms have a direct positive influence on the intention to buy sustainable products.

Based on TPB, previous research has primarily investigated normative issues through the concept of subjective or social norms (Onel, 2017). However, besides social norms, the impact of personal norms should not be neglected (Blankenberg and Alhusen, 2019). Individuals follow social norms and integrate them into their personal value system, transforming them into specific personal norms that reflect their moral standards, which have proven to be an important motivator in studies of ecological behaviour (Arvola et al., 2008; Tanner and Kast, 2003). Schwartz (1973), as cited by Aertsens et al. (2009), defines personal norms as the internal beliefs of individuals about the rightness or wrongness of a behaviour. They are based on the general values of the individual. Personal or moral norms have been considered a key predictor of behaviour within the Norm Activation Model (NAM), proposed by Schwartz (1977). Although Ajzen (1991) states that in certain contexts it is necessary to consider not only perceived social pressures but also personal feelings and moral obligations for performing a specific behaviour, these are not included in the basic model of the TPB.

Authors have previously integrated the Norm Activation Model (NAM) with the TPB in various contexts such as buying organic food (Aertsens et al., 2009; Thøgersen, 2009), buying energy-efficient products (Wang et al., 2019), visiting green hotels (Bashir et al., 2019) etc.

Based on the above, Hypothesis H8 is proposed: Personal norms have a direct positive influence on the intention to purchase sustainable products.

2.2.3. Perceived behavioural control

Perceived behavioural control (PBC) refers to an individual's perception of the ease or difficulty of performing a particular behaviour, along with their beliefs about the presence or absence of external factors that might facilitate or hinder the behaviour (Ajzen, 1991).

The inclusion of PBC into the earlier model (TRA) was justified by its ability to predict behaviours that are not under complete volitional control (Armitage and Conner, 2001). Within the framework of the TPB, perceived behavioural control is considered a key predictor influencing the decision to engage in a behaviour.

Previous research has frequently established a significant positive relationship between PBC and intentions towards sustainable behaviour (Matharu et al., 2021),

such as purchasing sustainable products in general (Chaudhary and Bisai, 2018; Maichum et al., 2016), purchasing sustainable clothing (Kumar et al., 2021; La Rosa and Johnson Jorgensen, 2021), organic food (Carfora et al., 2021; Yadav and Pathak, 2016-b; Yadav and Pathak, 2017) etc.

Based on the above, the following hypothesis is proposed: H9: Perceived behavioural control has a direct positive influence on the intention to buy sustainable products.

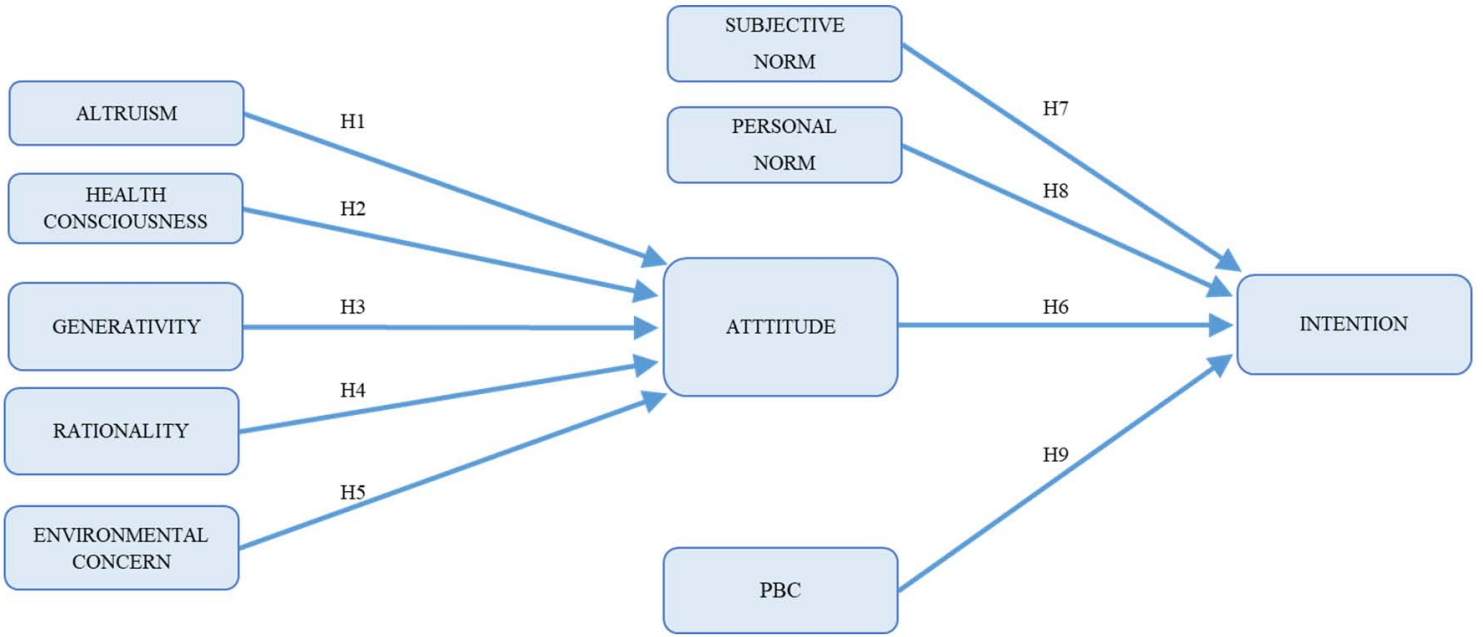
3. Methodology

All the constructs examined and the hypothesised relationships are presented in a conceptual model, which is followed by a description of the sample. Additionally, both univariate and multivariate statistical methods were employed. Specifically, exploratory and confirmatory factor analysis (CFA), and Structural Equation Modelling (SEM).

3.1. Conceptual model

A conceptual model was developed for the present study (Figure 1), which aims to explore the personal motives that play a decisive role in the formation of consumer attitudes and purchase intentions. The study will examine five types of personal motives: altruism, health consciousness, rationality, generativity, and environmental concern. These personal motives have been examined within the TPB theoretical framework with the addition of personal norms along with subjective norms.

Figure 1: Research conceptual model



Source: Author's construction

3.2. Participants and procedure

A highly structured questionnaire was employed, created using the online platform Alchemer which was also used for data collection. The survey was conducted from May to June 2023, in five Slavonian counties in Croatia (Virovitica-Podravka County, Požega-Slavonia County, Brod-Posavina County, Osijek-Baranja County and Vukovar-Srijem County), on a total sample of 485 respondents (Table 1).

Table 1: Demographic and socioeconomic characteristics of survey participants (N=485)

		n	%
Gender	Male	228	47.0
	Female	257	53.0
	Total	485	100.0
Age	18-31	163	33.6
	32-45	68	14.0
	46-59	172	35.5
	60+	82	16.9
	Total	485	100.0
Education	Primary School	34	7.0
	High School	268	55.3
	College (Associate)	68	14.0
	University (Bachelor)	81	16.7
	Master's Degree	28	5.8
	Phd	6	1.2
	Total	485	100.0
Employment Status	Student	5	1.0
	Unemployed	80	16.5
	Employed	47	9.7
	Retired	256	52.8
	Student	97	20.0
	Total	485	100.0
Average Monthly Income (€)	do 400 €	47	9.7
	401 - 800 €	78	16.1
	800 – 1,200 €	117	24.1
	1,201 – 1,600 €	88	18.1
	1,600 – 2,000 €	59	12.2
	More than 2,000 €	96	19.8
	Total	485	100.0

Source: Authors' calculation

Univariate and multivariate statistical methods were employed, including exploratory (EFA) and confirmatory factor analysis (CFA) in SPSS and Structural equation modelling (SEM) in AMOS to test the hypotheses.

A total of 10 variables were examined. Using the desired ratio (20:1) proposed by Kline (2005), the sample size in this study is deemed appropriate for conducting SEM analysis. Factor loadings and Cronbach's alpha values for individual scales are presented in Table 2.

Table 2: Results of exploratory factor analysis

Variables and source	Item	Item statement	Communality	Mean
Altruism (Mas'od and Chin, 2014)	ALT_1	I would help a stranger find their way or an address.	0.522	4.40
	ALT_2	I would give money to a charity.	0.404	3.99
	ALT_3	I would donate goods or clothes for charitable purposes.	0.557	4.40
	Cronbach's Alpha: 0.769			
	Variance: 2.07%			
	Mean: 4.26			
Health Consciousness (adapted based on: Tarkiainen and Sundqvist, 2005)	HC_1	I take care of my health.	0.519	3.85
	HC_2	I think a lot about my health.	0.554	3.65
	HC_3	I'm very self-conscious about my health.	0.590	3.88
	HC_4	I carefully choose the products I buy to ensure good health	0.571	3.55
	Cronbach's Alpha: 0.852			
	Variance: 5.58%			
	Mean: 3.73			
Generativity (Morselli and Passini, 2015)	GEN_1	I carry out activities in order to ensure a better world for future generations	0.448	3.71
	GEN_2	I have a personal responsibility to improve the area in which I live	0.550	3.76
	GEN_3	I give up part of my daily comforts to foster the development of next generations	0.468	3.30
	GEN_4	I think that I am responsible for ensuring a state of well-being for future generations	0.476	3.69
	Cronbach's Alpha: 0.803			
	Variance: 3.22%			
	Mean: 3.62			
Rationality (Quoquab et al., 2019)	RAT_1	I purchase product that I really need	0.504	3.81
	RAT_2	I purchase the product that is within my budget	0.515	4.03
	RAT_3	I avoid being extravagant in my purchase	0.493	3.87
	RAT_4	I purchase only to fulfil my basic needs and wants	0.570	3.84
	Cronbach's Alpha: 0.832			
	Variance: 7.75%			
	Mean: 3.89			

Table 2: Results of exploratory factor analysis (continues)

Variables and source	Item	Item statement	Communality	Mean
Environmental concern (Paul et al., 2016; Piligrimiene et al., 2020)	EC_1	I am very concerned about the environment	0.558	3.74
	EC_2	It is important to change our consumption patterns in order to prevent the environment	0.634	3.98
	EC_3	I would be willing to reduce my consumption in order to protect the environment	0.609	3.84
	EC_4	It is important to me that the products I use don't harm the environment	0.594	3.79
	Cronbach's Alpha: 0.860			
	Variance: 3.67%			
	Mean: 3.84			
Attitude (Chan, 2001)	ATB_1	I like the idea of purchasing sustainable products	0.706	3.84
	ATB_2	Purchasing sustainable products is a good idea	0.785	3.95
	ATB_3	I have a favourable attitude toward purchasing sustainable version of a product	0.785	3.91
	Cronbach's Alpha: 0.918			
	Variance: 2.26%			
	Mean: 3.90			
Subjective norm (author's construction)	SN_1	My friends think I should buy sustainable products	0.629	3.15
	SN_2	My family thinks I should buy sustainable products	0.686	3.34
	SN_3	People around me think I should buy sustainable products	0.660	3.16
	Cronbach's Alpha: 0.885			
	Variance: 2.63%			
	Mean: 3.22			
Personal norm (Onwezen et al., 2013)	PN_1	I feel a moral obligation to protect the environment	0.725	3.81
	PN_2	I feel that I should protect the environment	0.740	3.93
	PN_3	I feel it is important for people in general to protect the environment	0.597	4.09
	Cronbach's Alpha: 0.881			
	Variance: 1.43%			
	Mean: 3.94			

Table 2: Results of exploratory factor analysis (continues)

Variables and source	Item	Item statement	Communality	Mean
Perceived Behavioural Control (Paul et al., 2016)	PBC_1	I believe I have the ability to purchase green products	0.621	3.65
	PBC_2	I see myself as capable of purchasing green products in future	0.672	3.71
	PBC_3	I have resources to purchase green products	0.572	3.40
	PBC_4	I have time to purchase green products	0.523	3.50
	Cronbach's Alpha: 0.858			
	Variance: 3.48%			
	Mean: 3.57			
Intention (adapted based on: Paul et al. (2016)	INT_1	I will consider switching to sustainable products for environmental reasons	0.687	3.66
	INT_2	I intend to buy a sustainable product in the coming months due to its positive impact on the environment	0.728	3.41
	INT_3	I definitely want to buy sustainable products in the near future	0.794	3.57
	INT_4	I will definitely recommend buying sustainable products to my friends and acquaintances	0.794	3.48
	INT_5	I will do my best to buy more sustainable products in the near future	0.722	3.41
	INT_6	In the future, I plan to buy sustainable products because they are more environmentally friendly	0.742	3.53
	Cronbach's Alpha: 0.946			
	Variance: 34.48%			
	Mean: 3.51			

Source: Authors' calculation

As presented in Table 2, a total of 10 factors were extracted, each with satisfactory factor loadings (> 0.4) (Costello and Osborne, 2005). In addition to factor loadings, reliability testing was conducted using the Cronbach's alpha coefficient, confirming that all measurement scales meet the minimum required threshold (> 0.70) (Lavrakas, 2008).

4. Results

In the process of obtaining results based on a conceptual model, CFA was conducted. Table 3 provides a comprehensive overview of reliability and validity indicators to ascertain discriminant validity.

Table 3: Convergent and discriminant validity of constructs

	CR	AVE	MSV	ALT	HC	GEN	RAT	EC	ATB	SN	PN	PBC	INT
ALT	0.791	0.561	0.262	0.749									
HC	0.855	0.595	0.249	0.288	0.772								
GEN	0.806	0.511	0.345	0.391	0.441	0.715							
RAT	0.833	0.556	0.249	0.347	0.499	0.356	0.745						
EC	0.863	0.611	0.590	0.512	0.395	0.587	0.480	0.782					
ATB	0.920	0.794	0.578	0.494	0.336	0.518	0.320	0.666	0.891				
SN	0.885	0.720	0.320	0.193	0.375	0.445	0.301	0.404	0.514	0.848			
PN	0.885	0.719	0.590	0.442	0.371	0.573	0.393	0.768	0.760	0.522	0.848		
PBC	0.858	0.603	0.461	0.380	0.365	0.425	0.203	0.498	0.679	0.566	0.590	0.777	
INT	0.947	0.748	0.421	0.307	0.312	0.437	0.182	0.574	0.640	0.547	0.607	0.649	0.865

Note: CR – composite reliability, AVE – average variance extracted, MSV - maximum squared variance, ALT – altruism, HC – health consciousness, GEN – generativity, RAT – rationality, EC – environmental consciousness, ATB – attitude towards behaviour, SN – subjective norms, PN – personal norm, PBC – perceived behavioural control, INT – intention.

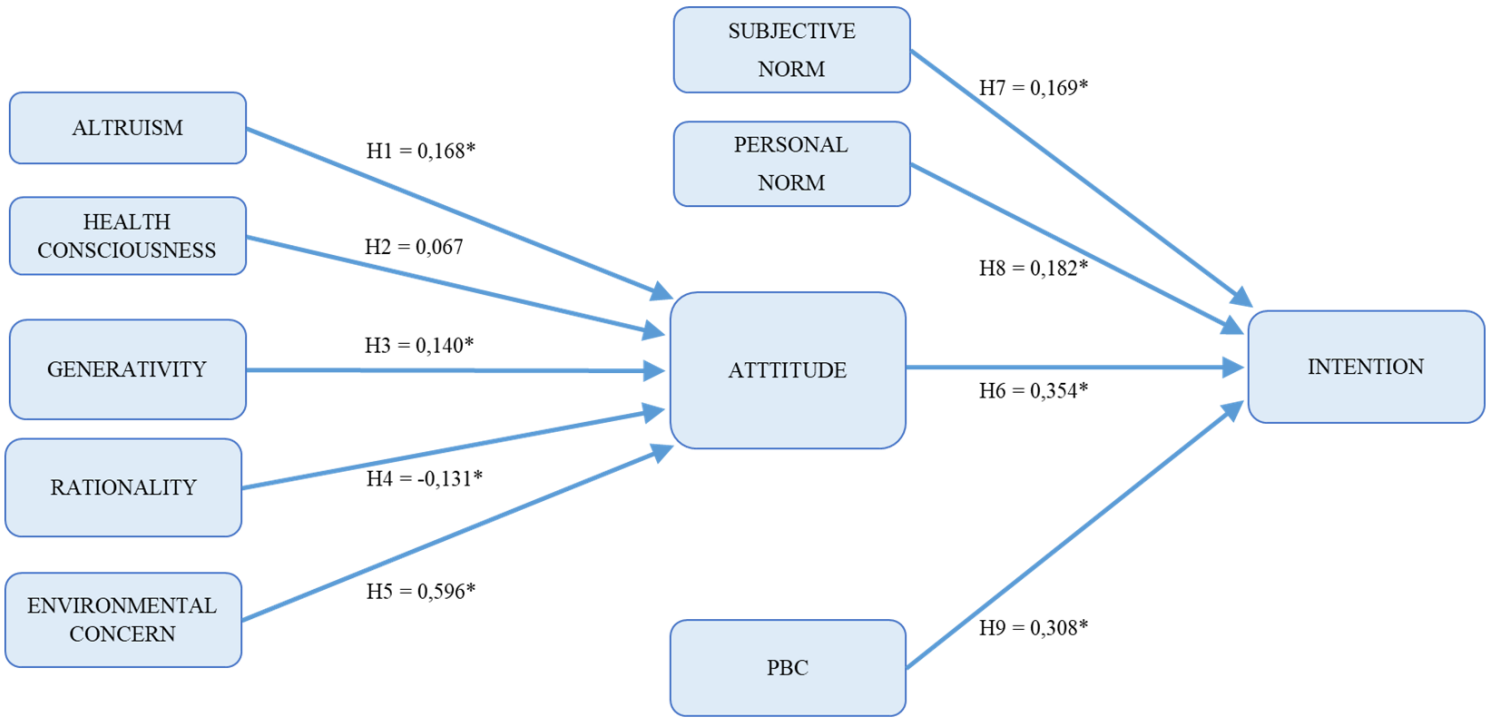
Source: Authors' calculation

The data presented in Table 3 confirms that the Composite Reliability (CR) for each construct exceeds 0.70, affirming the reliability of the constructs (Malhotra and Dash, 2016). Additionally, the Average Variance Explained (AVE) for all constructs surpasses the satisfactory level of 0.50, indicating the presence of convergent validity (Malhotra and Dash, 2016). Furthermore, in the correlation matrix, the values marked in blue along the diagonal represent the square root of the AVE, which, according to Fornell and Larcker (1981), must be greater than the correlation coefficients for discriminant validity to be met. Given that all the square root values of AVE are higher than the correlation coefficients, it can be concluded that discriminant validity is achieved.

Given that all criteria for reliability and validity of the model were met, testing of the structural model could be performed. The results showed that tested model represent a good model fit, according to the thresholds suggested by Hooper et al. (2008), Hu and Bentler (1999) and Kline (2005). All model fit indices are within the recommended or acceptable ranges affirming that the model is valid and can be interpreted (χ^2 = 1,185.74; χ^2/df =1.888; $p < 0.001$; CFI = 0.943; SRMR = 0.057; RMSEA = 0.047; TLI = 0.936; IFI =0.944).

Figure 2 presents the relationships tested in the model, including p-values and standardised regression weights. Based on Figure 2 it can be observed that all hypotheses except H2 were supported.

Figure 2: Results of the tested model



*statistically significant impact ($p < 0,05$)

Source: Author's construction

Finally, the research findings are interpreted using the percentage of variance explained, or squared multiple correlations (R^2), which indicate the extent to which the variance of a variable is explained by the latent factor (Hair et al., 2010). In the tested structural mode, the percentage of explained variance (R^2) for the dependent variables, attitudes towards purchasing, and intentions to purchase sustainable products are presented in Table 4.

Table 4: Explained Variance Values in the Model

	Attitude	Intention
R^2	0.58	0.52

Source: Authors' calculation

The model explains 58% of the variance for attitudes towards buying sustainable products and 52% for the intention to buy sustainable products.

5. Discussion and conclusion

The present research extends TPB in the context of sustainable consumer behaviour and examines the effect of some potentially important factors whose influence has so far been insufficiently investigated. This refers primarily to personal motives and their role in predicting the purchase of sustainable products. Based on the extensive review of relevant literature, five types of personal motives were identified, and their impact on the attitude toward purchasing sustainable products was examined. Besides investigating the influence of personal motives on attitudes towards the purchase of sustainable products, the present research also confirms the influence of inherent constructs of the TPB with the addition of personal norms, which have also often been neglected in previous research.

The results revealed that altruism, generativity, and environmental concern significantly positively influence the attitude toward purchasing sustainable products. These results validate the hypothesized relationships previously identified in the literature review section of the paper. This means that consumers who are concerned for the well-being of others (whether from present or future generations) and willing to put someone else's benefit ahead of their own will demonstrate a greater propensity towards purchasing sustainable products. Additionally, consumers more concerned about the environment will be more likely to show concern by purchasing sustainable products.

Furthermore, the negative impact of rationality (in the sense of frugal behaviour) on the attitude toward purchasing sustainable products was proven. This is in line

with the results previously presented by Wang et al. (2021), confirming their view that although pro-environmental behaviour could be viewed as frugal behaviour in the sense of rational use of resources, frugality may have a negative impact on the attitude towards purchasing sustainable products if consumers perceive sustainable products as more expensive.

On the other hand, the impact of health consciousness on the attitude towards the purchase of sustainable products was found to be insignificant, which led to the rejection of the proposed hypothesis. This is also in contrast to different previous research extensively analyzed in the literature review. This result could be explained by the fact that consumers may not perceive sustainable products as a general category to be healthier. This variable is probably category-specific and could exert different influences on different product categories (food products, cleaning products, cosmetics, household appliances, apparel products, cars, etc.).

The results of the present research also confirmed the impact of inherent factors in the TPB model, confirming once again the applicability of this theoretical framework for explaining sustainable consumption behaviour. Also, the results empirically confirmed the hypothesized positive impact of personal norms on the intention to purchase sustainable products, which has been proposed by researchers previously (Blankenberg and Alhusen, 2019), indicating that personal norms should be included in the conceptual model along with social norms.

The research limitations refer primarily to the sample, which consisted only of respondents from five Slavonian counties. Conducting research on a broader sample from different countries could lead to results that are more generalizable. Therefore, in future research, theory robustness could be evaluated by conducting transnational or intercultural research. Furthermore, based on the proven negative impact of frugality on the attitude towards the purchase of sustainable products (which contradicts some previous research), in future research, different types of frugal behaviour could be investigated, differentiating between rational or frugal behaviour towards own resources and common resources of the planet. Also, the insignificant impact of health consciousness indicates the need to further investigate this factor and its role in predicting attitudes and behaviours in sustainability purchases. One approach could be to measure the mediating role of the perceived effectiveness of sustainable products in achieving health-related objectives.

In a methodological and empirical context, the scientific contribution is presented by expanding and complementing the existing theory based on the theoretical framework of TPB by testing the impact of different personal motives that have previously been under-investigated, as well as through empirical confirmation of the importance of personal norms. Also, by adapting and testing measurement scales from different research settings and theoretical frameworks, a measurement instrument is proposed that can be used for future research in the domain.

The applicative contribution of the research on the purchase behaviour of sustainable products will benefit various stakeholders, including marketers, policymakers, managers, and entrepreneurs. It is expected that by understanding the behaviour of consumers in purchasing sustainable products, they will have more knowledge about the ways to encourage them. For example, for business entities, understanding personal motives, attitudes, norms, and perceptions of control over behaviour could help in the process of creating sustainable products that are in line with consumer values and increase demand for these products. Based on this knowledge, it is possible to adjust the product as well as the messages to consumers to fulfil the needs of consumers and thus attract a larger number of environmentally conscious consumers. Furthermore, policymakers can use the results to create policies that promote sustainable consumption, which would include incentives for companies to adopt environmentally friendly production methods, as well as incentives for consumers to purchase sustainable products.

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Utjecaj osobnih motiva i osobnih normi na kupnju održivih proizvoda

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Sažetak

Ovaj rad istražuje osobne motive i njihovu ulogu u predviđanju kupnje održivih proizvoda. Identificirano je i testirano pet vrsta osobnih motiva primjenom modeliranja strukturnim jednadžbama. Ovo istraživanje također potvrđuje utjecaj inherentnih konstrukata Teorije planiranog ponašanja i istražuje ulogu osobnih normi, koje su također često bile zanemarene u prethodnim istraživanjima. Rezultati pokazuju da altruizam, generativnost i briga za okoliš značajno pozitivno utječu na stav prema kupnji održivih proizvoda. Nadalje, utvrđen je negativan utjecaj racionalnosti (u smislu štedljivog ponašanja) na stav prema kupnji održivih proizvoda. Ovo potvrđuje stajalište da iako se pro-ekološko ponašanje može smatrati štedljivim ponašanjem zbog racionalnog korištenja resursa, štedljivost može imati negativan utjecaj na stav prema kupnji održivih proizvoda ako potrošači održive proizvode doživljavaju skupljima. S druge strane, utjecaj zdravstvene svijesti na stav prema kupnji održivih proizvoda pokazao se beznačajnim, što se može objasniti činjenicom da potrošači održive proizvode kao opću kategoriju ne percipiraju zdravijima, što ukazuje da je ovo varijabla je specifična za kategoriju. Konačno, empirijski rezultati potvrdili su pozitivan utjecaj osobnih normi na namjeru kupnje održivih proizvoda, ukazujući na to da bi osobne norme trebale biti uključene u konceptualni model uz društvene norme.

Ključne riječi*: održivi proizvodi, osobni motivi, Teorija planiranog ponašanja (TPB), osobna norma*

JEL klasifikacija: *D91, M31, Q0, Q21*

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Exploring customer preferences to drive successful food supplement placement in Croatia*

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Abstract

This study examines the preferences and influences on the decisions of Croatian customers when purchasing food supplements. A survey of 312 customers of food supplements in Croatia found that distribution channels and pharmacies significantly influence the purchasing process, attributed to the value added by pharmacists. The most important aspects that customers consider are the type and amount of active and auxiliary ingredients (excipients) of the product. Brand-conscious customers consider the manufacturer and the product's country of origin important. The greatest influence is the recommendation of family members or friends. People prefer to choose a food supplement that offers value for money, but those without previous experience with the product are more price sensitive and buy on sales promotions such as discounts and packaging at a promotional price. Based on the results of this study, manufacturers and distributors of food supplements can create strategies in which, through co-creation with consumers, they achieve a competitive edge, encourage loyalty, and improve business results.

Keywords: *co-creation, consumer behavior, food supplements, marketing activities, OTC products*

JEL classification: *M31, I11, D12*

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1. Introduction

By 2024, the OTC market is valued at USD 137.39 billion, projected to reach USD 163.10 billion by 2029, with a growth rate of 3.49% annually (Mordor Intelligence, 2024). Notably, food supplements hold the largest share (30%) of the OTC market (Nicholas Hall, 2020), growing at an average rate of about 4% annually (Nicholas Hall, 2019). Since 2002, European regulation has categorized food supplements as foodstuffs, encompassing vitamins, minerals, amino acids, herbs, and herbal extracts, supplementing the typical diet (EFSA, 2024). While regulated similarly to food, their application and effects align more closely with drugs, albeit under a somewhat less stringent legislative framework. Croatia has aligned itself with European regulations concerning declarations, health claims, permitted ingredients, additives, and their respective quantities (Starling, 2013).

The European OTC market, primarily focused on Western Europe, exhibits saturation in overall trends and consumption per capita (Tisman, 2019), making Eastern European countries more promising. In 2015, the Croatian OTC market was valued at approximately 100 million USD, with a consistent growth rate of around 3% annually, and food supplements comprised 27% of the share (Nicholas Hall, 2016). By 2019, the per capita value of these products reached 56 euros, aligning with the average of Central and Eastern European countries, with an annual growth rate of 5% (Tisman, 2019). Worldwide, including in Croatia, consumers predominantly opt for food supplements containing vitamins and minerals, enabling a degree of generalization and comparison across studies conducted in different countries (Fadi Sekošan, 2016; Okleshen Peters et al., 2003; Wangcharoen et al., 2013).

Despite uncertainty in predicting trends, indications suggest that the OTC industry fares better than others. For instance, immune protection products containing vitamins C and D experienced robust growth during the COVID-19 pandemic (Nicholas Hall, 2021), while an increase in demand for sleep and stress supplements is anticipated due to the global economic downturn (Nicholas Hall, 2020).

Food supplements are readily available in pharmacies and predominantly offered by domestic companies with strong local and regional presence (Nicholas Hall, 2016; Starling, 2013). Pharmaceutical firms concentrate on developing new products and technologies, with smart devices promoting self-medication among consumers, while online sales of OTC products are rapidly expanding (Memişoğlu, 2018; Tisman, 2019). Within the next decade, online sales are forecasted to reach 19.2% of the total OTC market, doubling the current 9.4% (Nicholas Hall, 2020).

In an increasingly competitive market, customers autonomously select what makes their information crucial, prompting further investments in marketing activities. Therefore, this study aims to investigate Croatian customers' preferences and decision-making influences regarding food supplement purchases. Specifically,

it seeks to identify the role and importance of various factors in the information process and purchasing decisions, facilitating the successful implementation of strategies for enhanced product placement.

The impact of individual dimensions through which the four main constructs are operationalized was examined: the product, its price, sales channels, and primary sources of customer information about the products. This was done to understand consumers' behavior and decision-making better when choosing and buying a particular food supplement.

This paper aims to explore the preferences and influences on the decisions of Croatian customers when purchasing food supplements. Therefore, the paper sets out four hypotheses and four sub-hypotheses related to constructs that have proven significant for making purchasing decisions regarding food supplements. The hypotheses address the following research questions:

RQ1: Are the most important dimensions for customers when buying food supplements related to the product itself, and how do they prioritize aspects such as composition, brand, manufacturer information, and country of origin? (H1, H1.1, H1.2)

RQ2: Are food supplements predominantly bought in pharmacies, and is this related to the knowledge, expertise, and guidance pharmacists provide? (H2)

RQ3: What is the role of promotional activities in buying food supplements, and do recommendations, especially from familiar sources (friends and family), have a greater influence? (H3, H3.1)

RQ4: How do customers evaluate value for money versus the overall price when choosing food supplements, and how does previous experience with the product affect their price sensitivity and tendency to buy on sale? (H4, H4.1)

The following chapter presents the previously conducted research that served as the basis for formulating the hypotheses of this paper. Given the literature volume, the chapter is divided into sections addressing individual significant constructs. The empirical research section is presented, starting with an explanation of the research methodology, followed by the research results. Finally, the conclusions are presented along with the limitations of our research and recommendations for further studies on this topic.

2. Literature review and research hypotheses

The previous research review, which forms the basis for the hypotheses in this chapter, is structured around the fundamental constructs and dimensions that customers consider when buying food supplements. In addition, personal factors

related to demographic, geographic, psychographic and behavioral factors affecting the perception and behavior of customers in various countries are also important when making a purchase: Estonia (Villako et al., 2012), the Czech Republic (Veselá et al., 2018), Ireland (Walsh and Wright, 2016), Japan (Hayashi et al., 2015), Canada (Taylor et al., 2023), Malaysia (Sulaiman and Masri, 2017), Germany (Keuper and Seifert, 2024), Poland (Piecuch and Kozłowska-Wojciechowska, 2013), Romania (Cîrstea et al., 2017), the USA (DeLorme et al., 2012), Sweden (Roos et al., 2024), Thailand (Wangcharoen et al., 2013) and Great Britain (Lodorfos et al., 2006). Studies that dealt with demographic characteristics (Greger, 2001; Steinhauser and Hamm, 2018) showed that gender, age, level of education, and socioeconomic status are significant factors in the preference for these products because although their use is widespread at all socioeconomic levels, a greater consumption is evident with women with a higher level of education, higher income, and higher age.

2.1. The concept of product/brand

Satisfaction with a product often depends on the combination of elements, adequate ingredients, design, and practicality of the packaging, a well-known brand with which customers have already had a good experience, the service accompanying the product, and even the manufacturer (Belch and Belch, 2004). Satisfaction with respect to safety and information about an OTC product significantly impacts consumer trust, with packaging having a significant role (Kauppinen-Räisänen et al., 2012). Unlike other markets, differentiation through unique features of OTC products should play a major role here (Ferrier, 2001; Melovic et al., 2020). Therefore, hypothesis H1 was defined.

H1: When deciding to buy food supplements, the most important dimensions for customers are those related to the product itself.

When choosing a product, food supplement customers pay attention to the type and amount of active ingredients (Wangcharoen et al., 2013). Similar can be observed in the functional food category, where many customers are concerned about product additives and their impact on the human body (Karelakis et al., 2020). The sub-hypothesis H1.1 was defined as the basis of these studies.

H1.1: Within the product construct framework, customers prioritize the composition aspect, focusing on the type and quantity of active ingredients and excipients.

Several studies indicate that consumers of OTC products may not prioritize brands significantly (Cîrstea et al., 2017; Lodorfos et al., 2006). Instead, the product itself takes precedence within the overall mix, prompting pharmaceutical companies to focus on product development, positioning them slightly behind the FMCG industry in terms of branding (Memişoğlu, 2018). However, research also underscores the importance of brand loyalty in OTC products compared to FMCG

items (Kotagiri et al., 2023). Due to their implications for health and perceived risk, consumers of OTC products often assess quality based on internal attributes like taste and scent, as well as external factors such as packaging and manufacturer reputation, especially impacting consumers with lower health literacy (Kauppinen-Räisänen et al., 2012). Various studies (Lodorfos et al., 2006; Piecuch and Kozłowska-Wojciechowska, 2013; Shohel et al., 2013) emphasize that reliability or brand trust (Veselá et al., 2018), alongside prior experience with the OTC product, significantly influence whether consumers repurchase the same brand or switch (Cîrstea et al., 2017). Furthermore, a globally recognized manufacturer or brand can serve as a quality guarantee (Wangcharoen et al., 2013), particularly notable in the Asia-Pacific region, where brand loyalty tends to be stronger (Shah et al., 2020). Conversely, consumers in Europe and the USA are increasingly regarding well-known and private brands as equals, leading to the latter gaining market share (Kotagiri et al., 2023; Shah et al., 2020). These insights form the foundation for defining sub-hypothesis H1.2.

H1.2: Customers who consider the brand as a signal of product quality also value information regarding the manufacturer and the product's country of origin.

2.2. Distribution and its added values

Food supplement sales channels vary from country to country, including pharmacies, specialty retail stores, specialty retail chains, supermarkets, direct mail, and online sales (Lodorfos et al., 2006; Tisman, 2019; Walsh and Wright, 2016). Their wide availability enables the beneficiaries to define themselves, instead of as patients, as individuals who actively care for their lives (Tan, 2001; Pilarczyk, 2011). Customers view products sold in supermarkets differently than those sold in pharmacies (Belch and Belch, 2004). However, customers can often be turned away from pharmacies by queues and lack of privacy due to the presence of other customers (Piecuch and Kozłowska-Wojciechowska, 2013). Pharmacy chains with competitive pricing are replacing standalone pharmacies, while online pharmacies, offering a distinct product range, are experiencing rapid growth (Tisman, 2019). Walsh and Wright (2016) point out that online sales lack customer advice, so customers mainly use these channels for research and information about products. Roos et al. (2024) found that the typical online customer is mostly female and motivated by hedonic values and self-realization. Individual studies emphasize that advice provided at pharmacies is often the most important source of information, the most important aspect being the expertise of the person advising and selling, who is usually a pharmacist (Cîrstea et al., 2017; Hayashi et al., 2015; Lodorfos et al., 2006; Šapić et al., 2019; Walsh and Wright, 2016). The recommendation of experts, especially pharmacists, is often crucial for the decision to buy at pharmacies (Piecuch and Kozłowska-Wojciechowska, 2013; Veselá et al., 2018; Villako et al., 2012), and they are primarily guided by the product composition and

scientific evidence of efficiency rather than economic factors (Kennedy and Moody, 2000). It is estimated that 40% of purchase decisions change after a consultation at a pharmacy (HUPBR, 2017). All the aforementioned research has led us to propose one more hypothesis, H2.

H2: Food supplements are predominantly bought in pharmacies due to the added value associated with the knowledge, expertise, and guidance accessible from pharmacists.

2.3. The construct of promotion and word of mouth recommendation as a significant dimension

When deciding to purchase food supplements, consumers are introduced to products and brands through advertising, personal selling, public relations, events and sponsorships, point-of-purchase promotions, samples and rewards, and direct and digital marketing (Memişoğlu, 2018); family members and friends are often sources of information (DeLorme et al., 2012). Advertising in this context has been examined by many authors (Hayashi et al., 2015; Okleshen Peters et al., 2003), and Shohel et al. (2013) conclude that the role of advertising is mainly informative and instructive and observable only before sampling a specific product. Advertising and information from the media are most relied upon by individuals who take more food supplements (Okleshen Peters et al., 2003), with ads oriented more toward health claims than brand image (DeLorme et al., 2012).

Healthcare professionals and end consumers are more sensitive to branding activities when they are supported by clinical evidence (Memişoğlu, 2018), which is more relied on by customers with a lower level of education (Steinhauser and Hamm, 2018). Technological advancements and shifting consumer habits in the OTC market drive increased internet communication, facilitating consumer education (Pilarczyk, 2011). The internet fosters interactivity, with social media, mobile apps, and online communities enabling users to create brand content and share experiences with others (Memişoğlu, 2018). Kantar Media research found that 84% of food supplement users use the internet for health and wellness, of which 71% are on a mobile device, 67% of them are careful about which websites they use for accessing health-related information, 44% consider online communities or support groups and 35% use health-related apps (Natural Products Insider, 2018). These facts were the basis for defining hypothesis H3.

H3: Promotional activities' role is mainly informative and instructive, so recommendations have a greater influence on purchasing food supplements.

The influence of purchasing OTC products was examined by Cîrstea et al. (2017), who found that students rely more on the advice of relatives while working adults rely more on their own knowledge. The most effective information often comes

from personal, experiential, and other independent sources, and word of mouth can have a strong influence on customer behavior because recommendations from friends, family, colleagues, and other consumers are more trusted than information from commercial sources (Kotler et al., 2014). Levine (2015) found that 47% of consumers trust advertising, 72% trust family and friends, and an equal number of trusted online reviews. Therefore, sub-hypothesis H3.1 was also defined.

H3.1: A purchase recommendation has the greatest impact if it comes from friends and family members.

2.4. The construct of price and consumer price sensitivity

Given that the price of food supplements is not regulated, there are often many different prices for the same product or products with the same purpose on the market. This issue is very complex, especially due to customers with lower purchasing power. Namely, although greater regulation would ensure that even financially weaker customers buy high-quality products and protect them from potentially harmful products, regulation could ultimately negatively impact customer choice and prices by reducing competition (Rathmann and Seifert, 2024). Some studies claim that the higher price of OTC products does not significantly concern customers or affect their purchase choice (Shohel et al., 2013) and that high brand trust reduces price sensitivity, especially among older customers (Lodorfos et al., 2006). In recent trends, other factors, such as expert recommendations or previous experience and attitudes towards the product, often influence the purchase decision more than the price itself (Belch and Belch, 2004; Cîrstea et al., 2017). Although selling outside pharmacies allows price reductions and greater availability, this cannot compensate for the services in the form of professional information provided by pharmacies, which customers need (Szigeti and Jozsa, 2023). The price is planned as part of the overall promotional mix, as it can be adjusted by means of sales promotions such as discounts and packaging at a promotional price (Pilarczyk, 2011). Some studies show that price is less related to purchasing food supplements than product quality or advertising (Wangcharoen et al., 2013) and that consumers attribute higher prices to higher product quality, making price less important to them (Shohel et al., 2013). Obviously, for the successful positioning of the product, it is important to adjust the price in accordance with other marketing elements, which is why hypothesis H4 was defined.

H4: Customers prefer to choose the food supplement offering the best value for money rather than the product with the lowest overall price.

Other research has shown that customers in the OTC market are price sensitive, where their price sensitivity is usually determined by their experience with the brand or product (Sulaiman and Masri, 2017; Šapić et al., 2019). Therefore, sub-hypothesis H4.1 was also defined.

H4.1: Customers without previous experience with the product are more price-sensitive and buy on sales.

3. Empirical research

The formulated hypotheses served as the basis for conducting primary research to test their validity on a sample of respondents in Croatia. This section presents the details of the research methodology, followed by the results.

3.1. Research methodology

The data collection instrument was a questionnaire created according to instruments used in similar research (Melovic et al., 2020; Nguyen et al., 2015; Sulaiman and Masri, 2017). The questionnaire comprised 19 multiple-choice questions, a 5-point Likert scale, and a relevance scale. It was distributed via e-mail, Facebook, and WhatsApp from April 11 to 20, 2021. The customers forwarded the questionnaire themselves, generating a convenience or snowball sample. Melovic et al. (2020) propose that well-informed users are more likely to provide precise responses, forming an expert sample on the subject matter. This fact contributes to the quality of the research through a sample that includes users of food supplements who, as a result, are well-informed and can provide higher-quality feedback.

In the final data processing, 312 food supplement customers were included. They were chosen based on the initial question, which acted as both an elimination and selection criterion regarding purchase frequency. Respondents over 20 were included, considering that young people seldom purchase food supplements independently. Microsoft Excel and SPSS Ver 26.0 were used for data processing. The collected data was analyzed using descriptive statistics, and the correlation between the observed variables was examined using the Pearson correlation coefficient.

3.2. Research results

Most respondents (45.5%) use food supplements almost all year round, 18% use them several times a year, 26.9% only when they feel the need, and 9.6% have tried food supplements several times. The largest number stated that they use vitamins and minerals (86.9%). They could give more answers, followed by bee products (37.5%) and microorganisms (34.9%), fish oil and fatty acids (20.8%), herbs and herbal substances (12.5%), amino acids (7.4%), fibers (6.7%) and other (2.9%).

Of the 312 respondents, 30.8% were male, and 69.2% were female, which was expected because previous research found that women use and buy food

supplements more often (DeLorme et al., 2012; Greger, 2001; Wangcharoen et al., 2013). The average age of the respondents is 38.16 years, with the largest share encompassing highly educated people employed full-time and with an above-average income (>1,060 EUR) (Table 1).

Table 1: Demographic features of the respondents

	N	%		N	%
Sex			Employment status		
M	96	30.8	Unemployed	9	2.9
F	216	69.2	Student	21	6.7
Age			Employed, full-time	252	80.8
20-29	49	15.7	Employed, part-time	6	1.9
30-39	154	49.4	Self-employed	19	6.1
40-49	64	20.5	Retired	5	1.6
50-59	34	10.9			
> 60	11	3.5			
Level of education			Personal average monthly income		
Elementary	0	0.0	< 530 EUR	30	9.6
Secondary	47	15.0	531 EUR – 800 EUR	19	6.1
Undergraduates	42	13.5	801 EUR – 1,060 EUR	77	24.7
Graduates	150	48.1	1,061 EUR – 1,320 EUR	59	18.9
Postgraduates	73	23.4	1,321 EUR – 2,000 EUR	74	23.7
			> 2,001 EUR	53	17.0

Source: Author's calculation

The respondents believe that all the mentioned dimensions influence their purchasing behaviour (Table 2). When the entire constructs are observed, the average of the arithmetic means of the distribution construct is the highest and amounts to 3.71±1.07, while the average of the arithmetic means of the product construct is 3.61±1.11. The dimensions within the distribution construct were rated with a very high average rating: expertise 4.06±1.01, know-how 3.97±1.06, advice 3.90±1.04 and independent study of the product's composition 3.70±1.01.

Based on the highest value of the arithmetic mean (4.11±1.10), the most important aspect that customers consider when buying food supplements is the type and quantity of the product's active ingredients (Table 2). When it comes to a recommendation to buy a certain food supplement, the recommendation of a family member or friend (3.67±1.05) is more important than the recommendation of a pharmacist (3.35±1.11); the lowest value of the arithmetic mean was recorded for promotional messages (2.48±1.00).

Table 2: Importance of certain dimensions of constructs that influence the purchase of food supplements (arithmetic mean ($\bar{x}$) and standard deviation (SD))

Constructs and their dimensions	$\bar{x}$*	SD*
Product/brand		
Type and quantity of the product's active ingredients	4.11	1.10
Previous experience with the product	3.92	1.11
Health impact claims	3.88	1.04
Type and number of excipients of the product	3.50	1.19
Manufacturer	3.39	1.09
Country of origin	3.24	1.19
Brand	3.24	1.07
Price		
Price of the food supplement	3.28	1.05
Distribution		
Expertise of pharmacists or other sales staff	4.06	1.01
Know-how of pharmacists or other sales staff about food supplements	3.97	1.06
Advice from a pharmacist or other sales staff	3.90	1.04
Quick completion of the purchase	3.39	1.15
Possibility of independent study of the product's composition	3.70	1.01
Privacy when shopping	3.25	1.15
Promotion		
Recommendation of a family member/friend	3.67	1.05
Pharmacist's recommendation	3.35	1.11
Promotional message for food supplements	2.48	1.00

*Scale of relevance from 1 – 5, where: 1=not relevant; 5=very relevant

Source: Author's calculation

In order to additionally test sub-hypothesis H1.1., Pearson's correlation coefficient (r) was used to examine the relationship between the type and amount of active ingredients of the food supplement and the type and amount of excipients, where a medium-strong positive correlation was recorded ($r=0.504$; $p<0.01$), which shows that the more important the type is to the customer and the amount of active ingredients of the product, the more important are the types and amounts of the product's excipients (Table 3).

Table 3: Pearson's correlation coefficient for the product's composition (N=312)

		1. Type and amount of active ingredients of the product	2. Type and amount of excipients of the product (preservatives, sweeteners, etc.)
1. Type and amount of active ingredients of the product	r	1	0.504**
2. Type and number of excipients of the product	r	0.504**	1

Note: **Correlation is significant at levels of 0.01 (two-tailed test) ($p<0.001$)

Source: Author's calculation

Table 4 shows a positive correlation between the variables brand and manufacturer ($r=0.827$; $p<0.01$), followed by manufacturer and country of origin ($r=0.585$; $p<0.01$), and brand and country of origin ($r=0.471$; $p<0.01$).

Table 4: Pearson's correlation coefficient for the examined variables of the construct product (N=312)

		1. Brand	2. Manufacturer	4. Country of origin
1. Brand	r	1	0.827**	0.471**
2. Manufacturer	r	0.827**	1	0.585**
3. Country of origin	r	0.471**	0.585**	1

Note: **Correlation is significant at levels of 0.01 (two-tailed test) ($p<0.001$)

Source: Author's calculation

Respondents most often buy food supplements in pharmacies (57.1%), in combination with the importance they attach to the expertise, know-how, and advice of pharmacists or other sales staff (Table 2). Other sales channels are pharmacies (16%), online (9.3%), health food stores (7.1%), directly from the manufacturer or distributor (6.7%), retail stores/supermarkets (2.8%), and others (1%).

There is a strong positive correlation between the importance of the know-how of pharmacists or other sales staff and their expertise ($r=0.908$; $p<0.01$), which shows that customers attach almost equal importance to these aspects and that, in this case, they also value their advice ($r=0.807$; $p<0.01$ and $r=0.788$; $p<0.01$) (Table 5).

Table 5: Pearson's correlation coefficient for the importance of pharmacists or other sales staff (N=312)

		Q1	Q2	Q3
Q1: Know-how of pharmacists or other sales staff on food supplement	r	1	0.908**	0.788**
Q2: Expertise of pharmacists or other sales staff	r	0.908**	1	0.807**
Q3: Advice of pharmacists or other sales staff	r	0.788**	0.807**	1

Note: **Correlation is significant at levels of 0.01 (two-tailed test) ($p<0.001$)

Source: Author's calculation

The largest share of respondents collects information about food supplements through online portals and specialized websites (39.1%), followed by friends and family members (26.9%), pharmacists or other sales staff (21.5%), from social networks (5.5%), through magazines (1.3%), TV shows (1%), TV and radio commercials (0.6%), leaflets (0.3%) and other sources (3.8%). It is obvious that when it comes to informing customers, online and word-of-mouth recommendations have a big influence; when it comes to buying recommendations, the customers value family members or friends the most (Table 2). Yet the greater the importance of the recommendation of a family member or friend, the greater the importance of the pharmacist's recommendation (Table 6) because a moderately strong correlation is evident ($r=0.523$; $p<0.01$).

Table 6: Pearson's correlation coefficient for the importance of recommendations when purchasing food supplements (N=312)

		1. Recommendation of pharmacist	2. Recommendation of family member/friend
1. Recommendation of pharmacist	r	1	0.523**
2. Recommendation of family member/friend	r	0.523**	1

Note: **Correlation is significant at levels of 0.01 (two-tailed test) ($p<0.001$)

Source: Author's calculation

Most respondents buy food supplements with the best value for money (4.06±0.89), not the one with the lowest total price (2.15±1.01) (Table 7).

Table 7: Effect of pricing on selecting food supplements

	$\bar{x}$*	SD*
I buy a food supplement with best value for money	4.06	0.89
If a certain product is on discount, I prefer to buy it rather than others	3.06	1.12
The price of the food supplement is very important to me when I buy a product that I have not used before	3.20	1.07
The price of the product is more important to me than the brand	2.55	1.17
I buy a food supplement with the lowest overall price	2.15	1.01

*Likert scale from 1 – 5, where: 1=totally disagree; 5=totally agree

Source: Author's calculation

Pearson's correlation coefficients for the Price construct (Table 8) show that there is a moderately strong positive correlation between the variables *The price of the food supplement is very important to me when I buy a product that I have not used before,* and *The price of the product is more important to me than the brand* (r=0.540; p< 0.01) and the variable *I buy a food supplement with the lowest overall price* and *If a certain product is on discount, I prefer to buy it rather than others* (r=0.509; p<0.01). For price-sensitive customers, price is more important than brand when they buy a product for the first time. Also, customers who buy at the lowest total price will prefer to buy the product at a discount.

Table 8: Pearson's correlation coefficient for the dimensions of the construct price (N=312)

		Q1	Q2	Q3	Q4	Q5
Q1: I buy a food supplement with the lowest overall price	r	1	0.509**	0.145*	0.389**	0.404**
Q2: If a certain product is on discount, I prefer to buy it rather than others	r	0.509**	1	0.309**	0.453**	0.444**
Q3: I buy a food supplement with the best value for money	r	0.145*	0.309**	1	0.354**	0.257**
Q4: The price of the food supplement is very important to me when I buy a product that I have not used before	r	0.389**	0.453**	0.354**	1	0.540**
Q5: The price of the product is more important to me than the brand	r	0.404**	0.444**	0.257**	0.540**	1

Note: *Correlation is significant at levels of 0.05 (two-tailed test) (p<0.05), **Correlation is significant at levels of 0.01 (two-tailed test) (p<0.001)

Source: Author's calculation

4. Discussion and conclusions

Research indicates that the demographic profiles of food supplement consumers in Croatia resemble those in other countries (DeLorme et al., 2012; Greger, 2001; Villako et al., 2012; Wangcharoen et al., 2013), with a preference for products containing vitamins and minerals (Fadi Sekošan, 2016; Okleshen Peters et al., 2003; Wangcharoen et al., 2013).

Although the first hypothesis, *H1: When deciding to buy food supplements, the most important dimensions for customers are those related to the product itself,* is based on the research done by Ferrier (2001) and Melovic et al. (2020), *it cannot be accepted as true*, given that the distribution proved to be a more important construct.

This is supported by claims that products should offer new benefits, as confirmed by scientific evidence, to increasingly aware and engaged consumers (Tisman, 2019) who are also interested in the product's excipients. Customers prioritize active ingredient composition, echoing findings by Wangcharoen et al. (2013), with excipients also influencing purchase decisions, thus sub-hypothesis *H1.1: Within the product construct framework, customers prioritize the composition aspect, focusing on the type and quantity of active ingredients and excipients*, can be *fully accepted as true*. The importance of brand, manufacturer, and country of product origin aligns with loyalty research (Kotagiri et al., 2023) and quality assurance (Kauppinen-Räisänen et al., 2012; Wangcharoen et al., 2013), *confirming sub-hypothesis H1.2: Customers who consider the brand as a signal of product quality also value information regarding the manufacturer and the product's country of origin.*

Buying food supplements in pharmacies is highly prevalent due to the valued expertise and guidance provided by pharmacists and sales staff, thus *confirming hypothesis H2: Food supplements are predominantly bought in pharmacies due to the added value associated with the knowledge, expertise, and guidance accessible from pharmacists.* This finding is consistent with numerous previous studies (Lodorfos et al., 2006; Cîrstea et al., 2017; Piecuch and Kozłowska-Wojciechowska, 2013; Veselá et al., 2018; Hayashi et al., 2015; Šapić et al., 2019; Walsh and Wright, 2016; HUPBR, 2017; Szigeti and Jozsa, 2023).

Hypothesis H3: Promotional activities' role is mainly informative and instructive, so recommendations have a greater influence on purchasing food supplements is accepted as true because the respondents mostly use online sources as a medium for gaining information about the offer, while the recommendation of a family member or friend is the most important when making the purchase. Therefore, hypothesis *H3.1 is also accepted: A purchase recommendation has the greatest impact if it comes from friends and family members.* This is consistent with the results obtained

by Cîrstea et al. (2017) and Levine (2015). Our research has shown that the greater the importance of a recommendation from a family member or friend, the greater the importance of a pharmacist's recommendation. The mentioned sources of information are independent, so for the best results, promotion should be primarily based on online recommendations, in which consumers can be included in the co-creation process in the form of reviews, user experiences, and other content.

Hypothesis H4: Customers prefer to choose the food supplement offering the best value for money rather than the product with the lowest overall price, confirming that customers prioritize value for money over the lowest price when choosing food supplements. Previous studies indicate that price does not heavily influence purchase decisions, with consumers associating higher prices with better quality (Lodorfos et al., 2006; Shohel et al., 2013). Other factors, such as brand perception, often outweigh price considerations (Belch and Belch, 2004; Cîrstea et al., 2017; Wangcharoen et al., 2013).

Typically, food supplement consumers, predominantly women of higher socioeconomic status, prioritize health over price, while price-sensitive customers prioritize discounts, particularly for first-time purchases, as *confirmed by sub-hypothesis H4.1: Customers without previous experience with the product are more price-sensitive and buy on sales.* Research has shown that price sensitivity is usually determined by experience with a brand or product (Sulaiman and Masri, 2017; Šapić et al., 2019).

Although there are significant reasons why this sample can be considered highly relevant, as it consists of 312 very well-informed and experienced users who can provide higher-quality feedback (Melovic et al., 2020), this research has limitations. These include a sample biased towards interconnected users of specific tools rather than representing the entire population. Therefore, future research can use a random sample of respondents based on probability. It is also worth noting that this research was conducted solely for the Croatian market.

Despite this, our research has provided a lot of valuable information that can serve as a foundation for future scientific studies in strategic marketing for food supplements or, specifically, their promotion and brand management. Since key factors and constructs have been identified here that can contribute to the better marketing of food supplements in general, it would be beneficial to conduct this research more broadly in other countries as well. For example, our research indicates that customers who view the brand as a signal of product quality also value information regarding the manufacturer and the product's country of origin. It would be useful to investigate this relationship further and see the importance of domestic brands, well-known global brands, similar factors, and the types of products for which they are used. Additionally, how customers can be encouraged to participate in the co-creation process through promotional activities should be

explored further. Furthermore, it has not thoroughly explored whether pharmacists are perceived as independent experts or sales staff. Future studies should delve into this aspect. With the projected growth of online sales for food supplements (Nicholas Hall, 2020), it would be valuable to analyze how word-of-mouth, a crucial dimension, can be effectively integrated into this new distribution channel. Nonetheless, this research sheds light on aligning strategic projects with customer preferences. Manufacturers and distributors of food supplements can leverage these insights to develop tailored products and activities, fostering engagement, loyalty, and improved business outcomes through collaboration and co-creation with consumers. These research findings can also be useful for businesses outside Croatia that are in similar environments, such as transitional countries or South-East European countries. Our research has shown that distribution is extremely important, particularly the dimension related to the assistance and recommendations provided by pharmacists or sales staff. Users highly value word-of-mouth recommendations, which can come from a family member, friend, or pharmacist. Therefore, manufacturers and distributors should place significant emphasis on these aspects. The independence of the source proves to be crucial. Considering new trends in digital media and networks, there is significant potential for new ideas in creating online content in which consumers can participate through the co-creation process. Therefore, it should be considered how to involve them more actively in providing positive feedback through reviews, user experiences, and other content.

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Istraživanje preferencija kupaca za uspješno plasiranje dodataka prehrani u Hrvatskoj

Maja Martinović[1], *Ivana Čolak*[2], *Zoran Barac*[3]

Sažetak

Ova studija ispituje preferencije i utjecaj na odluke hrvatskih kupaca prilikom kupnje dodataka prehrani. Anketa među 312 kupaca dodataka prehrani u Hrvatskoj pokazala je da distribucijski kanali i ljekarne značajno utječu na proces kupnje, što se pripisuje dodanoj vrijednosti koju pružaju ljekarnici. Najvažniji aspekti koje kupci razmatraju su vrsta i količina aktivnih i pomoćnih sastojaka proizvoda. Kupci svjesni marki smatraju važnima i proizvođača i zemlju podrijetla proizvoda. Najveći utjecaj ima preporuka članova obitelji ili prijatelja. Kupci preferiraju odabrati dodatak prehrani koji nudi vrijednost za novac, ali oni koji nemaju prethodno iskustvo s proizvodom osjetljiviji su na cijenu i kupuju na akcijama unaprjeđenja prodaje kao što su popusti i promotivne cijene pakiranja. Na temelju rezultata ovog istraživanja proizvođači i distributeri dodataka prehrani mogu stvoriti strategije u kojima kroz sukreiranje s potrošačima postižu konkurentsku prednost, potiču lojalnost i poboljšavaju poslovne rezultate.

Ključne riječi*: sukreiranje, ponašanje potrošača, dodaci prehrani, marketinške aktivnosti, OTC proizvodi*

JEL klasifikacija*: M31, I11, D12*

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Zbornik radova Ekonomskog fakulteta u Rijeci: časopis za ekonomsku teoriju i praksu/Proceedings of Rijeka Faculty of Economics: Journal of Economics and Business međunarodno je recenziran časopis, otvoren za suradnju znanstvenicima iz cijelog svijeta iz različitih područja ekonomske teorije i prakse. Tekstovi se objavljuju, u pravilu, na engleskom jeziku. Međutim, časopis može objavljivati tekstove i na ostalim svjetskim jezicima.

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Uredništvo zaprima sve rukopise. Glavni i odgovorni urednik tekstove, nakon pregleda i prihvaćanja, upućuje u postupak prosudbe ("assessment process") članovima Uredništva, ali i ekspertnim stručnjacima izvan Uredništva u slučaju specifičnog sadržaja teksta. Poslije prosudbe, glavni i odgovorni urednik predlaže Uredništvu odluke za daljnji postupak i to: (a) koje se rukopise, u slučaju potrebe, vraća autoru sa sugestijama, preporukama i primjedbama radi poboljšanja, prije svega, metodološke prezentacije građe istraživanja; (b) koje rukopise uputiti u postupak recenzija ("reviewing process"); (c) koje rukopise odbiti, budući da:

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Postupak recenziranja

Svi znanstveni članci obvezno se recenziraju. Za svaki članak predviđena su dva recenzenta, jedan iz inozemstva i jedan iz Hrvatske, a oba su anonimna. Imena autora također su za recenzente anonimna. Recenzenti pišu recenziju prema dobivenim uputama i na propisanom formularu. Ukoliko članak, prema stajalištu recen zenta, ne udovoljava međunarodnim standardima i kriterijima časopisa, Uredništvo članak ne prihvaća. Ukoliko pak recenzent članak pozitivno ocijeni, može ga kate gorizirati u jednu od kategorija vrsnoće:

Izvorni znanstveni članak (Original scientific paper) je originalno znanstveno djelo u kojem su izneseni novi rezultati fundamentalnih ili primijenjenih istraživanja. Informacije iznesene u članku potvrđuju da je moguće:

a) reproducirati metodološki i računski postupak i dobiti rezultate s jednakom točnošću ili unutar granice stupnja slobode, kako to navodi autor; ili
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Prethodno priopćenje (Preliminary communication). Taj znanstveni članak obavezno sadrži jednu ili više znanstvenih informacija, ali bez dovoljno pojedinosti koje bi omogućile čitatelju provjeru iznesenih znanstvenih spoznaja.

Izlaganje sa znanstvenog skupa (Conference paper). Može biti objavljeno samo kao cjeloviti članak koji je prethodno referiran na znanstvenom skupu, a u obliku cjelovitog članka nije objavljeno u zborniku skupa.

Pregledni rad (Review article). Sadrži poseban problem o kojem je već publiciran znanstveni rad, ali mu se pristupa na nov način.

Stručni članak (Professional paper). Sadrži korisne priloge iz struke i za struku.

Nakon primljenih recenzija, Uredništvo analizira recenzije. Ukoliko je to potrebno, rad vraća autoru koji ga je dužan prilagoditi zahtjevima recenzenta. Rad se dostavlja autoru nakon primitka obje recenzije. Međutim, u slučajevima gdje se ne dovodi u pitanje kvaliteta i autoriziranost teksta, Uredništvo također može intervenirati. Nakon što autor ponovno dostavi rad, Uredništvo utvrđuje usklađenost članka s primjedbama recenzenata.

Objavljuju se samo kategorizirani radovi koji imaju dvije pozitivne recenzije.

Glavni i odgovorni urednik, nakon završetka postupka recenziranja te izmjena i dopuna tekstova od strane autora i Uredništva, predlaže redoslijed prihvaćenih članaka u sadržaju. Kriteriji redoslijeda jesu:

(1) kategorizacija sukladno stupnju znanstvene vrsnoće;
(2) u slučaju dva različita stupnja kategorizacije članka od strane recenzenata, glavni i odgovorni urednik predlaže odluku Uredništvu, u pravilu, u prilog autora, tj. višu kategoriju;
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U okviru ciljeva povećanja kvalitete i broja objavljenih radova Uredništvo se obvezuje da će nastojati odgovoriti autorima o statusu poslanog rada u okviru od deset radnih dana. Također, od 2018. godine, objavljivat će se radovi u najavi na web stranici Časopisa koji će biti tiskani u redovnom polugodišnjem tiskanom izdanju. Okvirni rok završetka **recenzentskog** postupka, tehničkog uređivanja te online objave rada je dva mjeseca.

Osim tradicionalnog fokusa na empirijske radove, časopis poziva autore da dostave teorijske radove koji bi trebali pokriti nedostatak temeljnih istraživanja i meta-analize literature s ciljem pružanja temelja za kvalitetnija empirijska istraživanja, kao i razvoj novih ideja i uvida u ekonomskoj teoriji i praksi. Posebno pozivamo autore s radovima s visokom razinom teorijske argumentacije (ali za većinu ljudi razumljive) s jasnom analizom / porukama / preporukama usmjerenom na preporuke i buduća istraživanja; studije koje se usredotočuju na međuovisnost različitih, osobito aktualnih, ekonomskih kretanja; studije usmjerene na trans-disciplinarni i interdisciplinarni karakter ekonomskih analiza (tehnička, pravna, socijalna, ekonomska i druga područja).

Časopis crpi metodologiju za teorijske radove iz časopisa Journal of Economic Perspectives (https://www.aeaweb.org/journals/jep), sa sličnim ciljevima: sintetizirati i integrirati naučene lekcije iz najrelevantnijih područja i dilema suvremene ekonomske teorije i prakse; prezentirati ekonomske analize vezane za dileme javnih politika; poticati međusobnu razmjenu ideja među pojedinim znanstvenim područjima; ponuditi čitateljima dostupan izvor za najsuvremenija ekonomska promišljanja i predložiti smjerove za buduća istraživanja. Fokus teorijskih članaka trebao bi biti na razumijevanju središnjih ekonomskih ideja, koje su postojeće dileme i neistražena područja, zašto su navedena pitanja posebno važna, koja su najnovija dostignuća i koje aspekte treba ispitati.

U slučaju predaje teorijskog rada umjesto cjeline *Empirijski podaci i analiza*, autori trebaju obraditi poglavlje *Teorijska/konceptualna analiza* gdje bi autori trebali dati argumentaciju na temelju predložene metodologije/koncepta istraživanja. U ovom dijelu autori trebaju dati novu analizu područja/teme, dati teorijsku argumentaciju koja svoju hipotezu dokazuje korištenjem različitih dostupnih alata kao što su matematički, grafički ili bilo koji drugi koji jasno prikazuju i otkrivaju ekonomske odnose u odnosu na određeno znanstveno područje.

Sadržaj članka

Rad treba biti relevantan za međunarodnu znanstvenu i stručnu javnost s jasno naznačenim ciljevima i rezultatima istraživanja, zaključkom, referencama u tekstu i bibliografskim jedinicama na kraju rada. Ideje u radu moraju biti originalne i trebaju značajno doprinositi razvoju predmeta istraživanja, a metodologija mora biti jasno opisana.

Autori u članku moraju posebnu pozornost obratiti na odgovarajuće strukturiranje teksta sukladno priznatim standardima znanstvene metodologije u ekonomskim istraživanjima, kako je navedeno:

Posebna stranica treba sadržavati: naslov članka, ime i prezime autora ili ako je više koautora za svakog ponaosob znanstveno zvanje, stručnu spremu, znanstveni interes, odnosno područje kojim se autor bavi, naziv i adresu institucije u kojoj je autor zaposlen, broj telefona, broj faksa, e-mail adresu i osobnu web stranicu. Svi navedeni podaci moraju biti napisani:

– na jeziku članka,
– na hrvatskom jeziku,
– na engleskom jeziku ako izvorni jezik članka nije engleski.

Prva stranica članka treba sadržavati: naslov članka, sažetak, JEL klasifikaciju i ključne riječi na jeziku članka.

Na kraju članka isti podaci daju se na:

– hrvatskom jeziku, te
– na engleskom jeziku ako izvorni jezik članka nije engleski.

Tekst članka mora početi uvodom, a sadrži još glavna poglavlja, fusnote, tablice, grafikone, slike, reference u tekstu, zaključak i popis korištene literature.

Tehničko uređivanje članka

Tekst rada piše se u programu Microsoft Office Word (inačica 95 i viša). Opseg rada smije iznositi **do 8.000 riječi**, što je oko 16 stranica A4 formata, a tekst je pisan vrstom slova Times New Roman (veličine 12 točaka), s jednostrukim razmakom, poravnan s obje strane, pisan od početka reda (bez uvlačenja prvog retka pasusa), s marginama od 2,5 cm. Ukoliko je u tekstu potrebno posebno označiti neku riječ ili rečenicu koriste se pisana kosa slova (italic), nikako ne podebljana (bold). Za odvajanje pasusa koristi se dvostruki razmak. Opseg rada može biti veći samo u dogovoru s glavnim i odgovornim urednikom.

JEL klasifikaciju predlaže autor u skladu s Journal of Economic Literature klasifikacijom koja je dostupna na web stranici: http://www.aeaweb.org/journal/jel_class_system.html.

Fusnote se rabe samo za dodatna pojašnjenja osnovnoga teksta. One se ne koriste kao poziv na Literaturu. Označavaju se na dnu stranice, u kontinuitetu, kroz cijeli članak, arapskim brojevima počevši od 1.

Naslovi poglavlja (od Uvoda do Zaključka) moraju biti kratki i jasni, te redom numerirani arapskim jednocifrenim brojevima. Poglavlja mogu imati i podpoglavlja koja se obavezno numeriraju s dvocifrenim odnosno trocifrenim brojevima. (primjer: 1; 1.1.; 2.; 2.1.; 2.1.1. itd.), ali ne više od toga.

Tablice, grafikoni i slike moraju imati, broj, naziv i izvor podataka. Numeriraju se u kontinuitetu arapskim brojevima (posebno grafikoni, posebno slike).

Važna napomena: Ukoliko tablica, grafikon ili slika sadržavaju posebne znakove te su rađeni u posebnom programu dostavljaju se u posebnom dokumentu s točno navedenim i označenim položajem na kojem dolaze u tekstu.

Članak mora zadovoljavati sve tehničke propozicije navedene u ovim uputama.

Stil i organizacija teksta

Autori se obvezno moraju pridržavati znanstvene metodologije prezentacije građe u pisanju tekstova koja je uobičajena u znanstvenim publikacijama ("Harvard style"). To zahtijeva sljedeći pristup:

(1) Naslov i organizacija prezentacije građe:

Naslov je najvažniji sažetak rada koji mora održavati sadržaj i svrhu rada. Ne smije biti "opisan" niti sadržavati riječi poput "analiza" ili "metoda", i sl. Građu se raspoređuje u dijelove kao što su:

- *Sažetak (Abstract)* **–** ispod naslova
- *Ključne riječi*
- *JEL klasifikacija.*

Iza toga slijedi glavni dio rada podijeljen u odlomke:

- *Uvod*
- *Pregled literature*
- *Metodologija/metoda/model/koncepcija analize* (treće poglavlje)
- *Empirijski podaci (dokumentacijska podloga) i analiza* (četvrto poglavlje)
- *Rezultati i diskusija* (peto poglavlje)
- *Zaključci* (šesto poglavlje).

(2) Sadržaj pojedinih dijelova prezentirane građe:

a. Sažetak – ispisuje se u 100-250 riječi, a obvezno treba sadržavati:

- utvrđeni cilj istraživanja,
- metodu/model/koncepciju analize,
- glavni rezultat istraživanja (analize),
- temeljni zaključak istraživanja.

Sažetak se ne smije pisati u odlomcima!

b. Ključne riječi – moraju odražavati suštinu sadržaja rada, a navodi se do pet takvih riječi.

c. JEL klasifikacija – autor svoju temu mora razvrstati sukladno kodu časopisa The Journal of Economic Literature (JEL).

d. Uvod – sadrži definiranje problema i predmeta istraživanja s pozivom na recentnu literaturu odnosno rezultate istraživanja. Taj se dio može istaknuti i u posebnom, tj. 2., poglavlju kao *Literature review*. Pri kraju uvodnog dijela treba utvrditi radnu pretpostavku (hipotezu) istraživanja o kojoj se treba očitovati (kasnije) na početku poglavlja *Zaključak*. *Uvod* treba završiti s naznakom organizacije teksta.

e. Pregled literature – prethodi istraživačkom dijelu, a pruža čitateljima pregled referentne literature s ključnim točkama dosadašnjih spoznaja

temeljenih na relevantnim rezultatima aktualnih istraživanja. Pregled literature ne smije biti taksativno navođenje prethodnog znanstvenog doprinosa, već autori trebaju izvršiti sintezu dosadašnjih istraživanja kako bi dokazali opravdanost teorijskog i empirijskog doprinosa vlastitog rada.

f. **Metodologija/Metoda/Model/Koncepcija** – obično se prezentira u trećem poglavlju; metoda/model/koncepcija analize mora biti transparentno istaknuta radi eventualnog ponavljanja testiranja rezultata od strane zainteresiranih istraživača (to je jedno od temeljnih pravila znanstvene metodologije).

g. **Empirijski podaci i analiza –** sadržavaju dokumentacijsku podlogu i rezultate empirijske analize. Potrebno je opisati i prikazati uzorak podataka korišten u analizi te prezentirati i objasniti statistička te ekonometrijska obilježja dobivenih rezultata uz tumačenje njihova ekonomskog sadržaja.

h. **Rezultati i rasprava –** autor objašnjava rezultate, osobito njihovo ekonomsko značenje i poruke. U ovom dijelu očekuje se argumentacija znanstvenog doprinosa, povezivanje rezultata rada s rezultatima te zaključcima dosadašnjih empirijskih istraživanja te preporuke za promjene javnih i drugih politika.

i. **Zaključci –** treba imati u vidu da taj dio teksta nije i ne smije biti sažetak! Zaključci su autorovo originalno mišljenje (ocjena) o dobivenim rezultatima i obvezno sadrže:
   - očitovanje o polaznoj hipotezi – je li ili nije dokazana;
   - ocjenu rezultata istraživanja/analize, novine, te koji je doprinos znanosti;
   - osvrt na ograničenja i probleme u istraživanju;
   - smjernice za buduća istraživanja;
   - utvrđivanje institucionalno-sustavnih implikacija dobivenih rezultata istraživanja (kao npr. prijedlozi za promjene u ekonomskom sustavu, ekonomsko-financijskoj i razvojnoj politici, instrumenti, mjere i sl.).

   Preporuka je da se Zaključak ne piše u odlomcima.

(3) Literatura – navesti samo one naslove (izvore) koji su korišteni u tekstu!

TABLICE dolaze unutar teksta. Svi podaci u tablici stavljaju se u redove i kolone odvojene jednostrukim tankim linijama. Svaka kolona sadrži naziv i uključuje numeričku jedinicu koja se odnosi na cijelu kolonu. Tako se za višecifrene brojeve rabe jedan ili dva broja, a u nazivu za određenu kolonu označuju se numeričke jedinice u tisućama, milijunima i sl. Tablice se numeriraju u kontinuitetu arapskim brojevima (Tablica 1, Tablica 2, itd.), a pored broja i naziva, moraju imati i izvor podataka.

Mole se autori da se pridržavaju sljedećih pravila:

- iza godine nikad ne dolazi točka;
- tisuće, milijuni i sl. odvajaju se zarezom: 2,000; 250,000; 3,555,284 i sl.; milijarde se označavaju s bn (billion); decimalni brojevi odvajaju se točkom: 2.32; 0.35 i sl.

GRAFIKONI I SLIKE dolaze unutar samog teksta. Moraju imati broj, naziv i izvor podataka. Numerira ih se u kontinuitetu arapskim brojevima (posebno grafikoni, posebno slike). Izvori podataka navode se ispod grafikona odnosno slika.

Napomena. U tekstu se ne prepričavaju i ne ponavljaju rezultati koji su navedeni u tablicama i grafikonima, već se rabe referentne oznake koje upućuju na podatke u tablicama ili grafikonima.

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LITERATURA obuhvaća sve korištene izvore i potpune podatke o djelima koja se spominju u referencama u tekstu. Popis literature piše se bez broja poglavlja i dolazi na kraju rada (poslije Zaključka). Literatura se ne numerira. Uređuje se abecednim redom autora te kronološki za radove istog autora. Preporuča se autorima kao literaturu što više koristiti časopise referirane od strane ISI (Institute of Science Information).

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• **Knjige:** Prezime, Inicijali (godina) *Naslov,* Mjesto izdavanja: Ime izdavača. Primjer:

Mohr, L. B. (1996) *Impact analysis for program evaluation,* 2nd ed., London: Sage.

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Ridderstrale, J., Nordstrom, K. (2004) *Karaoke Capitalism Management for Mankind,* Harlow: Pearson Education Ltd.

Perišin, I., Šokman. A., Lovrinović, I. (2001) *Monetarna politika,* Pula: Sveučilište u Rijeci, Fakultet ekonomije i turizma "Dr. Mijo Mirković".

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Norton, M. B. et al. (1981) *A People and a Nation – A History of the United States,* Boston: Houghton Mifflin Company.

• **Časopisi:** Prezime, Inicijali (godina) "Naslov članka", *Naziv časopisa u kojem je objavljen,* volumen, svezak, broj, stranice. Primjer:

Fox, S. (1994) "Empowerment as a Catalyst for Change: An Example from the Food Industry", *Supply Chain Management,* Vol. 2, No. 3, pp. 29–33.

Ukoliko je više autora (četiri ili više), navodi se prezime prvog autora nakon čega slijedi et al. Primjer:

Di Noia, C. et al. (1999) "Should Banking Supervision and Monetary Policy Tasks be Given to Different Agencies?", *International Finance*, Vol. 2, No. 3, pp. 285–361.

Ukoliko je više radova istog autora objavljenih iste godine, uz godinu se rabe oznake "a, b, c":

Quah, D. T. (1993a) "Empirical Cross-section Dynamics in Economic Growth", *European Economic Review*, Vol. 37, No. 2-3, pp. 426–434.

---------- (1993b) "Galton's Fallacy and Tests of the Convergence Hypothesis", *Scandinavian Journal of Economics*, 95, Vol. 95, No. 4, pp. 427–443.

---------- (1994) "Exploiting cross Section Variation for Unit Root Inference in Dynamic Data", *Economics Letters*, Vol. 44, No. 1-2, pp. 9–19.

---------- (1996a) "Empirics for Economic Growth and Convergence", *European Economic Review*, Vol. 40, No. 6, pp. 951–958.

---------- (1996b) "Regional Convergence Clusters across Europe", *European Economic Review*, Vol. 40, No. 6, pp. 951–958.

Autor za svaku referencu treba navesti **Digital Object Identifier (DOI)**, ukoliko postoji. DOI je dostupan na adresi CrossRef-a http://www.crossref.org/ u obliku https://doi.org/10.5468/ogs.2016.59.1.1.

DOI autor upisuje na kraju reference prema primjeru:

Hall, J. K., Daneke, G. A. Lenox, M. J. (2010) "Sustainable Development and Entrepreneurship: Past Contributions and Future directions", Journal of Business Venturing, Vol. 25, No. 5, pp. 439–448, https://doi.org/10.1016Zj.jbusvent. 2010.01.002.

• **Izvori preuzeti s Internet stranica:** Prezime autora/urednika, Inicijali imena (godina) "Naslov članka", *Naslov Časopisa,* datum publikacije, godište, broj, stranice, Internet adresa [datum pristupa].

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