ECONOMIC RESEARCH INSTITUTE
BULGARIAN ACADEMY OF SCIENCES

ИНСТИТУТ ЗА ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ НА БЪЛГАРСКАТА АКАДЕМИЯ НА НАУКИТЕ

ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ

ECONOMIC STUDIES

Volume 32, Issue 6, 2023

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Publication of this issue 6/2023 of Economic Studies journal is supported by the Bulgarian National Science Fund at Ministry of Education and Science.

ECONOMIC RESEARCH INSTITUTE AT BULGARIAN ACADEMY OF SCIENCES

ECONOMIC STUDIES
Volume 32(6), 2023

To be cited as *Economic Studies (Ikonomicheski Izsledvania), 32(6), 2023.*

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ISSN 0205-3292

ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
ECONOMIC STUDIES

Volume 32(6), 2023

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THE EFFECT OF FISCAL DEFICITS ON ECONOMIC GROWTH: EVIDENCE FROM EUROZONE COUNTRIES[4]

Over the last decade, no issue in economic policy has caused greater controversy than the effects of fiscal deficits on economic growth. Fiscal deficits have been a significant cause of worry for many developed countries, notably the Eurozone. Even if short stimulants were justified, particularly after the crises of 2008-2009 in response to the global financial crisis, they have resulted in chronic fiscal deficits, growing debt, and depleted fiscal buffers in the medium to long term. This paper investigates, using STATA econometrics, how fiscal deficits affect the economic growth rate in Eurozone Countries. We use annual data for Eurozone countries from 2001 to 2020, totalling 346 observations. The study relied on secondary data from the World Bank's databases. To estimate the effect of fiscal deficits on economic growth, we used a random effect model. The dependent variable GDP growth was analysed through the effect of Public and publicly guaranteed debt from publicly issued or privately placed bonds Inflation, GDP deflator, Unemployment, Foreign direct investment, net inflows as a percentage of GDP, Domestic credit to the private sector as a percentage of GDP. Our research findings reveal that the variable Inflation and Domestic credit to the private sector affect GDP growth and are statistically significant.
Keywords: Fiscal deficit; GDP growth rate; Inflation; Eurozone
JEL: F4; F43; H89

1. Introduction

The issue of high debt levels in countries within the Eurozone is a cause for concern as it can lead to economic instability and impede growth! The Eurozone debt crisis of 2009 serves as a reminder of how some countries in the region are susceptible to debt buildup. Data from Eurostat shows that at the end of 2021, the average government debt in the Eurozone was

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[4] This paper should be cited as: *Qehaja-Keka, V., Qehaja, D., Hoti, A. (2023). The Effect of Fiscal Deficits on Economic Growth: Evidence from Eurozone Countries. – Economic Studies (Ikonomicheski Izsledvania), 32(6), pp. 3-18.*

95.6% of the country's GDP, with the lowest ratios being seen in nations such as Estonia (18.1%), Luxembourg (24.4%), Bulgaria (25.1%), Denmark and Sweden (both 36.7%). Meanwhile, 14 countries had debt ratios exceeding 60% of their total economic output, with Greece having the highest at 193.3% and followed by Italy (150.8%), Portugal (127.4%), Spain (118.4%), France (112.9%), Belgium (108.2%) and Cyprus (103.6%).

In terms of macroeconomic factors, the fiscal deficit is among the most important ones because of its impact on economic growth. Fiscal policy can be used to maintain high levels of growth, and the proper level of taxation is a crucial factor in maintaining a stable economy. Fiscal deficits are an important factor affecting long-term economic growth since fiscal policy impacts consumption levels, savings behaviour, and private investment.

The relationship between fiscal deficits and economic growth has piqued economists' curiosity and sparked heated discussions. While some argue that fiscal deficits can boost economic growth, others contend that they might lead to weaker economic growth, inflation, and increasing public debt. In the context of the Eurozone, it is critical to understand the influence of fiscal deficits on economic growth, as many of the countries have struggled with large levels of public debt and weak economic growth in recent years.

The relationship between fiscal deficits and economic growth is complex and depends on a variety of factors, including the type of deficit and the size of the economy. In general, however, when countries have large budget deficits relative to their GDP, they tend to experience slower rates of economic growth. This is because government borrowing crowds out private sector investment, as businesses are less inclined to invest in projects due to higher interest rates caused by increased public debt. Furthermore, fiscal deficits can lead to inflationary pressures that reduce purchasing power and discourage investments in productive capabilities. Moreover, high levels of public debt can create a burden on future generations as governments are forced to raise taxes or increase borrowing in order to repay their debts (Qehaja, Gara, et al., 2022).

Fiscal deficits and surpluses impact GDP growth rates by increasing government spending on goods and services that boost productivity. The GDP growth rate's response to changes in the fiscal deficit is determined by how responsive aggregate demand is to fiscal policy instruments such as tax cuts/hikes and public spending increases/cuts. If Fiscal outlays are invested in growth-enhancing sectors, Fiscal policy can positively impact GDP growth rates. Fiscal austerity (lower Fiscal deficit) is not correlated with higher GDP growth rates. In fact, reducing the Fiscal deficit too quickly can choke off aggregate demand and lead to a decrease in economic activity. Therefore, governments must carefully manage their fiscal deficits to balance economic growth with long-term sustainability. By using both monetary and fiscal policy instruments together, governments can achieve the best outcome for their economies. In order to effectively manage public finances and stimulate economic growth, governments need clear policies that include a detailed spending plan as well as revenue sources (e.g., taxes). This will help ensure that debt levels are kept at manageable levels and that government spending is focused on areas that will have the most positive impact on GDP growth rates. Governments should also focus on structural reforms such as improving labour market efficiency, promoting competition in markets, and reducing red tape.

Despite similar levels of development and appropriate institutions, the effects of fiscal policies can differ across Eurozone countries. This is because the effects of fiscal policies are influenced by a variety of factors, including the state of the economy, assumptions about economic behaviour, the nature of spending or tax adjustments, and perceptions and realities about whether the policy is short-term or long-term in nature (Boskin, 2020). Furthermore, fiscal policies in the Eurozone are also constrained by a complex set of rules, such as the Stability and Growth Pact (SGP), that govern budgets across countries. The SGP is a complex set of rules that establishes ceilings on budget deficit and debt levels. As such, it limits the amount of fiscal stimulus that countries can use to respond to economic downturns. Finally, fiscal policies in the Eurozone are also constrained by broader macroeconomic conditions. In particular, the single currency requires governments to maintain price stability and ensure that their economies remain competitive relative to other Eurozone countries. This further limits the extent to which countries can engage in aggressive stimulus measures, as these could lead to higher inflation or a deterioration in international competitiveness.

However, as a response to the negative effects of the fiscal stimulus on the economy's slow recovery and long recession, Eurozone nations began to shift from fiscal expansion to fiscal consolidation in 2011 in an effort to lower the region's deficit and debt levels. At this time, fiscal policy was revived as the principal and practically exclusive government policy instrument for dealing with the financial crisis's implications when monetary policy interest rates had plummeted to near zero per cent lower limits (Ramey, 2019b).

EU and ECB have established rules to ensure that countries maintain their budget deficits and debt-to-GDP ratios under control. There are also funds in place to assist countries facing financial difficulties. The EU and ECB are advocating for reforms that will foster growth and decrease debt, such as changes to the labour market, educational programs, and infrastructure investments. Additionally, the ECB has employed monetary policies like quantitative easing and low-interest rates to stabilize the economy. The EU and ECB, have set up the European Stability Mechanism, a permanent bailout fund, to offer financial aid to countries during a debt crisis. They have also established a framework for debt restructuring to help countries gradually reduce their debt. Furthermore, to strengthen the financial sector, the EU and ECB are improving bank capital and liquidity, reducing the risk of financial contagion, and supporting economic growth and job creation through investments in infrastructure, education, and small and medium-sized businesses. The degree to which there will be a trade-off between decreasing the public debt and deficits through programs of fiscal adjustment and enhancing economic growth through fiscal stimulus in order to mitigate the adverse consequences will be determined by the magnitude of the fiscal multipliers in each activity (Bentour, 2020, 2021).

This article aims to analyze the impact of fiscal deficits on economic growth in Eurozone nations between 2000 and 2020. This study aims to analyze the link between fiscal deficits and economic growth, investigate the causal relationship between the two variables, and offer evidence of the effect of fiscal deficits on economic growth in Eurozone nations. Using the random effect model, the impact of budget deficits on economic growth was estimated. The research also took into consideration inflation, the GDP deflator, the unemployment rate, foreign direct investment, and domestic loans to the private sector as a proportion of the GDP.

The purpose of examining the influence of fiscal deficits on economic development in Eurozone nations is to gain a deeper understanding of the connection between government expenditure and economic performance. In recent years, the Eurozone nations have had substantial economic issues, including high levels of public debt and sluggish development. Understanding the impact of these nations' budget deficits on economic growth is essential for policymakers seeking to address these issues and maintain economic stability. In addition, this study will contribute to the larger macroeconomics and fiscal policy literature by giving evidence of the link between fiscal deficits and economic growth in Eurozone nations.

The outline of the paper is as follows: The first section is a literature assessment on the connection between fiscal deficits and economic growth. The second section discusses the study's methodology, including the data sources and econometric techniques employed. The third section discusses the empirical findings, while the last section analyses the findings and closes with policy suggestions for Eurozone nations regarding fiscal deficit management and economic growth.

2. Literature Review

Economists have debated the effects of fiscal deficits on economic growth for some time now, and one topic that has been at the forefront of their discussions is the relationship between fiscal deficit and economic growth. The findings of empirical studies on the connection between deficits and economic growth have led researchers to various conclusions. One school of thought in the academic literature asserts that large budget deficits are associated with increased economic growth, while another school of thought argues the exact opposite (Ahlborn, Schweickert, 2018).

Despite the potential drawbacks of large budget deficits, there are some cases in which deficits can be beneficial for economic growth. For instance, in times of recession or when an economy is facing structural problems, deficit spending can provide a boost to demand and help stimulate economic activity. Additionally, government spending on infrastructure projects such as roads, bridges and airports can create jobs and spur long-term economic growth. In these instances, countries' fiscal deficits can actually result in positive outcomes for their economies. Overall, the relationship between fiscal deficits and economic growth is complex and context-dependent; it cannot be reduced to simplistic assertions either way. While it may be true that high levels of public debt can have negative effects on a country's economy, the results of deficit spending will ultimately depend on how it is used and managed. Thus, while deficits can have both positive and negative implications for economic growth, governments should be aware of the potential risks before implementing any fiscal policies. By taking into account the macroeconomic environment and assessing the potential effects of their actions, countries can better ensure that their public finances are put to productive use in order to boost long-term economic growth.

There have been significant advances in theory, empirical methodologies, and data since the global financial crisis ten years ago, and these have had an impact on fiscal policy. There are theoretical advances in examining the consequences of sticky pricing, hand-to-mouth consumers, lower limits on policy interest rates, currency unions, the type of financing, and

macroeconomic variables' responses to fiscal policy (Ramey, 2019a). However, due to the disparity in approaches for assessing long-run impacts, emphasis is still focused on short- or medium-run consequences.

Long periods of high Fiscal deficits contribute to inflationary pressures. In contrast, long periods of Fiscal surplus result in lower GDP growth rates since there is comparatively less government expenditure to boost aggregate demand levels. Fiscal deficits can enhance GDP growth rates, but Fiscal policies must consider the stage of the business cycle in which Fiscal policy is applied (Ncanywa, Letsoalo, 2019).

In the theoretical and empirical literature, the role of the Ricardian equivalence theory, the Keynesian theory, the neoclassical theory, and the political budget cycle hypothesis in shaping the current discourse on budget deficits and their effects on other variables is highlighted as being particularly important. The neoclassical view of budget deficits is mainly based on the "crowding out effect". According to this perspective, an increase in public borrowing diverts private savings from investment and hence diminishes economic growth It can also lead to higher interest rates which further reduces investments in productive activities and shifts resources away from the private sector. Moreover, a strong government debt can also create an expectation of future taxation which will further discourage individuals from saving and investing.

In contrast to the Neoclassical and Ricardian schools, the Keynesian perspective emphasizes the short-run, and potentially providing a long-term stimulus to economic growth (Van & Sudhipongpracha, 2015). Keynesian view relies on the effectiveness of expansionary fiscal policy in increasing aggregate demand and output, income, employment, and economic growth, mainly when the economy is around the liquidity trap. According to this view, government spending can create jobs and growth in the economy during economic downturns since it increases aggregate demand. Furthermore, taxation can be used as a tool to influence consumer spending and investment decisions in order to achieve macroeconomic objectives like price stability, full employment, economic growth and balance of payments equilibrium (Ewaida, 2017).

(Marimon & Cooley, 2018) attempted to integrate Keynesian and Classical theories into his findings on the effect of fiscal deficits on economic performance. Their research focused on determining whether there was a relation between average fiscal deficit – GDP ratios for EU countries from 1975 to 2015 and the average real GDP growth rates over those same periods. He examined a total of 48 countries that were members of the EU from 1977 onwards – a sample that includes all 28 current members as well as 20 additional countries. As a result, they found no indication that fiscal deficits had a statistically meaningful relationship with overall economic performance in the European Union. This suggests that while there may be a long-term impact of government policies on growth rates, in the short-term fiscal policy is unlikely to be an effective tool for managing aggregate economic performance.

Recent attention has focused on the relationship between fiscal deficits and GDP growth, which has become increasingly controversial due to the global financial crisis of 2008 and the beginning of the Eurozone crisis. It is one of the most contentious issues affecting governments worldwide. The fiscal deficit will impact economic growth, boosting growth and contributing to the aggregate output. According to (Srithongrung, and Kriz, 2014), public

capital spending significantly impacts economic growth in both the short and medium term. According to other researchers, the European Union members' 1994-2012 fiscal deficit was unrelated to economic growth (Dudzevičiūtė et al., 2018). However, there is no consensus on the impact of the Fiscal Debt-to-GDP Ratio on Economic Growth. Some studies reveal that countries with higher Fiscal Debt-to-GDP ratios tend to have lower GDP growth rates. In contrast, others indicate that there is no statistically significant relationship between these two variables (Boussard et al., 2013; Corsetti et al., 2013; Blot et al., 2015).

It is important to note that fiscal deficits do not always have an immediate effect on GDP growth. It takes time for government spending and taxation decisions to take effect and therefore any changes in the deficit may not be immediately reflected in the economy's performance. Consequently, governments should ensure that their policies are geared towards long-term economic stability rather than short-term gains. Higher fiscal debt can have serious implications for a country's economic health and creditworthiness. Countries with high levels of public debt may face a greater risk of defaulting on their loans and seeing their currency depreciate in value. Furthermore, it can put pressure on interest rates and make it difficult for businesses to access financing. Therefore, governments must ensure that fiscal deficits remain under control so as not to threaten macroeconomic stability and hamper economic growth. In conclusion, while there is no definitive answer as to the exact impact of the Fiscal Debt-to-GDP Ratio on economic growth, there are certain risks associated with high levels of public debt that must be taken into consideration. Therefore, governments must carefully weigh their options when deciding on the appropriate level of fiscal deficits in order to support economic growth and maintain macroeconomic stability. In addition, it is important to note that the Fiscal Debt-to-GDP Ratio should be considered in conjunction with other economic indicators such as the unemployment rate and inflation. Countries must also focus on other measures such as economic reforms, prudent fiscal policies, investment in infrastructure and human capital, and trade liberalization in order to promote sustainable economic growth. Ultimately, governments should strive for a balance between maintaining macroeconomic stability and achieving positive economic growth. With proper management of public debt levels and complementary policies focused on structural reform, countries can ensure that their economies are able to reach their potential. Ultimately, the relationship between Fiscal Debt-to-GDP ratio and Economic Growth remains debatable (Van, Sudhipongpracha, 2015; Canzoneri et al., 2016; Wieland et al., 2016; Huidrom et al., 2019; Perdichizzi, 2017; Eyraud et al., 2017; Auerbach, Gorodnichenko, 2017; Afonso, Leal, 2019; Blanchard, 2019; Amusa, Oyinlola, 2019; Panjer et al., 2020; Broner et al., 2021; Amann, Middleditch, 2021).

A developed economy such as Eurozone experiences inflationary pressures due to rising aggregate demand. Monetary policies such as Central Bank interventions and Quantitative easing are also used to prevent serious recessions in the Eurozone. However, Fiscal policy becomes necessary for tackling Business cycles like economic recessions associated with rising unemployment rates and a slowdown in GDP growth rate. The Eurozone Fiscal policy calls for an increase in government spending on public services, infrastructure, education and research which help to stimulate economic growth. On the other hand, taxation reforms are used to finance these expenditures while raising additional revenues for deficit reduction measures if needed. In order to control inflationary pressures, monetary policies such as setting interest rates or controlling money supply are implemented. These two types of

policies must be coordinated effectively so that they do not interfere with each other's objectives or have a detrimental impact on the economy. Fiscal policy implementation in terms of taxation and spending depends upon Fiscal rules. Fiscal rules are set up that enforce Fiscal policies on the government to monitor Fiscal deficits for appropriate Fiscal corrective actions (Monastiriotis, 2015).

Al-Khedair (1996) conducted research on the VAR model by selecting data pertaining to G-7 nations for the years 1964-1993. In addition to this, he investigated at the ways in which the deficit has an adverse effect on the overall trade balance. The results of the study show that the budget deficit has a significant impact on both public and private investment, as well as the inflation rate. The research also shows that developing countries are more affected by budget deficits than developed economies, due to their lack of institutional capacity and resources. Furthermore, Al-Khedair (Al-Khedair, 1996) suggested that governments should focus on improving fiscal policy in order to increase government revenues while reducing deficits. The findings from the (Al-Khedair, 1996) study suggest that policymakers should be mindful of how the budget deficit can affect economic growth and take action accordingly. It is important for governments to ensure they maintain adequate levels of taxation and spending in order to reduce the burden on taxpayers while still keeping their budgets balanced.

Fiscal deficits impact economic growth through different channels: Fiscal multipliers, for instance, influence GDP levels by impacting Gross Investment, Private Consumption or Net Exports. A higher deficit, for example, can lead to increased government spending on goods and services that will stimulate economic activity. This increase in demand will have a positive effect on the economy as businesses produce more output and hire additional workers. Meanwhile, fiscal deficits also influence the level of national savings.

Higher deficits generally reduce the amount of discretionary savings available for investment purposes. This reduces capital formation which has an impact on labor productivity and long-term economic growth. Additionally, increased borrowing by the government can crowd out private firms from obtaining financing, further reducing potential investments and their potential returns. Overall, rising public debt due to large fiscal deficits can create longer-term macroeconomic imbalances that put pressure on inflation and exchange rates while reducing competitiveness in international markets. This can lead to an increase in the cost of living, reduced wages and rising unemployment rate. Lastly, large fiscal deficits can put pressure on a country's balance of payments since governments need to cover the debt by creating new money or borrowing from abroad.

The increased external financing requirements can lead to a current account deficit which can have negative implications for economic growth in the long run as it increases the risk of capital flight, reduces resource availability for domestic investment and leads to a depreciated exchange rate. In conclusion, although government spending financed by deficit spending may stimulate economic activity in the short-term, large and persistent fiscal deficits can have severe macroeconomic repercussions over time (Drautzburg, Uhlig, 2015; Canzoneri et al., 2016; Blanchard, 2019; Perdichizzi, 2017; Afonso, Leal, 2019). According to Monastiriotis (2015), fiscal deficits do not need to be incurred in the face of an economic recession or slowdown; instead, reducing fiscal deficits during boom times is more effective in sustaining growth than running up fiscal deficits during economic recessions.

Fiscal Consolidation Measures result in lower GDP growth rates through Fiscal Multipliers, Fiscal Consolidation Mechanisms, and Fiscal Rules. Fiscal multipliers measure the amount of change in GDP resulting from a unit-change in government spending. They reflect how effective economic policies are in stimulating growth. Fiscal multipliers indicate whether or not increases in public expenditure will lead to lasting economic gains. Fiscal multipliers can be classified into two broad categories: direct and indirect effects. Direct fiscal multipliers measure the immediate effect on GDP from an increase in public expenditure, and can either be positive (when greater government spending leads to higher output) or negative (when it reduces output). Indirect fiscal multipliers measure the subsequent effect of additional government spending on output after the initial impact has worn off. These are often considered more important for evaluating policy effectiveness as they focus on long-term outcomes rather than short-term impacts. Fiscal multipliers also vary depending on the type of expenditure, with investment and consumption more likely to have a greater impact than spending on defence or welfare payments (Miyamoto et al., 2018).

According to Afonso & Leal (2019), Fiscal Consolidation Measures can lead to Fiscal Multiplier values that are larger in Eurozone countries than non-Eurozone countries. The fiscal Consolidation Measure's impact on GDP levels is more significant in Eurozone countries than outside Eurozone, especially in countries with strong Fiscal Rules or where monetary policy has reached the zero lower bound (Canzoneri et al., 2016).

According to Perdichizzi (2017), if Fiscal Policy is used to promote economic growth, an expansionary Fiscal Policy with public spending focused on investment could be appropriate. Afonso & Leal (2019) found that Fiscal Multipliers mainly impact private consumption in Eurozone countries and private investment. Fiscal multipliers show that an increase in government spending raises GDP considerably more than one-for-one, while a decrease in taxes will have an even bigger effect. Fiscal multipliers vary depending on the state of the economy. For instance, fiscal multipliers tend to be larger during recessions or when there is a liquidity trap. Moreover, the size of Fiscal Debt Multiplier is believed to be higher in the short run and lower in the long run. The magnitude of Fiscal Debt Multiplier depends on a number of factors such as type of Expenditure, current macroeconomic conditions, nature of private sector balance sheets, and other institutional features. Fiscal policy makers must take into account this inverse relationship between fiscal deficits and economic growth when setting their fiscal policies in order to ensure substantial economic development.

The results of Huidrom et al. (2020) indicate that Fiscal Multipliers have favourable effects on different components of GDP across OECD countries, except in Japan, where Fiscal Multipliers seem to give rise only to government consumption expenditure (Miyamoto et al., 2018).

The second view is that fiscal deficit negatively impacts economic growth. According to Fischer (1993), Kosor et al. (2019), there is a long-term reciprocal causal relationship between fiscal deficits and economic growth. Economic recessions not only increase levels of fiscal overspending, but repeated deficits may have a detrimental influence on GDP growth. According to Risti et al. (2013), economic growth and fiscal deficits have a significant inverse relationship. They used a Consolidated General Budget Account as the independent variable and the Real Gross Domestic Product Growth Rate as the dependent

variable. According to Risti et al. (2013), similar to a spiral, the budget deficit ultimately leads to higher interest rates on government loans, a lower credit rating for the country, and rising inflation and public debt.

Fiscal Deficits are ineffective tools for stimulating economic growth because this effect depends on how much public spending is invested or consumed. Fiscal consolidation measures have a negative impact on GDP growth, and Fiscal Multipliers depend on Fiscal Policy measures. Fiscal deficits can only positively affect when Fiscal Consolidation Measures do not occur. Fiscal policy may be exacerbating recessions rather than ending them because fiscal stimulus would lead to crowding out private expenditure. The fiscal policy fails to stimulate demand due to its limited effectiveness as it cannot increase effective aggregate supply but only decreases production costs by reducing taxes (Dao, Bui, 2017).

Not many studies are available regarding the size of the Fiscal Debt Multiplier; however, it is assumed that Fiscal Multipliers depend on the size of the Fiscal Deficit and the magnitude of Fiscal Stimulus. Countries with a zero lower bound on their central bank's policy or Eurozone countries with binding Fiscal Rules tend to have larger fiscal multipliers (Qehaja, Zhushi, et al., 2022).

3. Research Methodology and Data Analysis

The study uses the economic growth rate variable, as the dependent variable, to assess the potential impact of the explanatory variables on the dependent variable, based on the research completed by various authors cited in the study. We use STATA econometrics to inquire into the relationship between fiscal deficits, Government debt, and other explanatory variables and GDP growth across the Eurozone.

Using panel data means we assume that we have some endogeneity and heterogeneity. Unobserved heterogeneity refers to the unobserved dependence of other independent variables. Conversely, endogeneity refers to the relationship between the independent variable(s) and the error term (i.e., the unobserved independent variables). After all, we have gathered data on the growth rate of GDP growth rate, which does not include the endogeneity problem because we have put here the key factors that will affect the variance of the GDP growth rate. Hence, we utilize the panel data approach to reduce the bias and obtain reliable estimates. Moreover, this technique allows us to control for unobserved heterogeneity across different time periods. In addition, panel data also provides increased precision in estimating economic relationships since it increases the number of observations within our sample. As a result, we are more likely to uncover true relationships between our independent and dependent variables that can be used for forecasting purposes. Furthermore, panel data has been utilized by many researchers who have studied GDP growth or other macroeconomic phenomena because it enables them to better understand complex relationships between various factors that impact outcomes.

If we had used the PooledOLS regression (which, based on our data, had to be an acceptable regression model), it would represent no correlation between unobserved, independent variables. The problem is that alpha (Individual Effects) might have a serial correlation over

time, which in our case was highly possible; thus, we have used simple regression, but we have tested for heteroscedasticity. So, consequentially, PooledOLS is primarily inappropriate for our model.

The individual effects are not fixed; dependencies can be observed within individuum and time. This kind of model allows heterogeneity to be existent within the model. While this is useful for the model parameters, it may lead to over-fitting and bias. As a result, the predictive power of the model may be hampered. Random effect (RE) models require more computational resources than fixed effect (FE) models. This is because they require more data and more iterations in order to achieve accurate results. Furthermore, RE models are less intuitive since they involve large amounts of mathematics that can be difficult to understand. In spite of these drawbacks, Random Effect models have some advantages when compared to Fixed Effect models, such as improved accuracy and robustness due to their ability to account for individual effects that may not be included in FE models. Additionally, RE models allow researchers to explore different types of relationships between variables.

Many studies have presented this case. For example, Ferrer et al. (Ferrer-i-Carbonell & Frijters, 2004), in their research on "How important is the methodology for the estimates of the determinants of happiness?" wanted to estimate the impact of wages on life satisfaction using fixed effects. However, numerous omitted factors, such as chronic illnesses (which we presume are partially time-varying), impact both; life satisfaction and earnings. In such circumstances, FE models do not yield estimates of causal effects, and we hypothesized that a comparable condition was included in our model. Based on the results of the Hausman test, the model used for data analysis is the Random Effect model.

Below is the economic growth rate linear regression model:

$$\boldsymbol{gdpg} = \alpha + \boldsymbol{\beta_1 inf_t} + \boldsymbol{\beta_2 unem_t} + \boldsymbol{\beta_3 fdi_t} + \boldsymbol{\beta_4 dcp_t} + \boldsymbol{\varepsilon}$$

gdpg – Central government debt, total (% of GDP);

inf – Inflation, GDP deflator (annual %);

unem – Unemployment, total (% of the total labour force) (modelled ILO estimate);

fdi – Foreign direct investment, net inflows (% of GDP);

dcp – Domestic credit to the private sector (% of GDP).

The study examines a variety of independent variables that influence the link between fiscal deficit and economic growth, including inflation, unemployment rate, foreign direct investment, and domestic lending to the private sector as a proportion of GDP. By taking into account these independent factors, the study can restrict their potential effect, on the Fiscal Deficit and Economic Growth relationship.

For a number of reasons, inflation is included as an independent variable in the econometric analysis. First, inflation may affect economic development, by diminishing the purchase power of money and distorting price signals within the system. When inflation is excessive, individuals and businesses may have diminished buying power, which can affect investment, consumption, and economic growth. Second, inflation can impact the availability and cost of credit in the economy. High inflation can result in increased interest rates, which can reduce

the availability of credit for firms and individuals, hence impacting on economic growth. Because inflation increases the nominal worth of debt, it can directly affect the nominal value of public debt. This may affect the sustainability of public debt and the capacity of governments to meet debt obligations. Inflation is impacted by a number of factors, such as monetary policy, exchange rate fluctuations, and supply-side shocks, and its impact on economic development can be complicated.

Unemployment is included as an independent variable in the research because it is a significant indication of labour market health, and its influence on consumer spending and investment can affect economic growth. When unemployment is high, individuals have less discretionary income to spend on goods and services, which might have a negative impact on consumer spending! This may result in a decrease in demand for products and services and a deceleration of economic growth. Increasing unemployment may also have a detrimental effect on investment. When unemployment is high, businesses may see a decline in demand for their products and services, resulting in reduced profits and lower investments in new enterprises.

Foreign direct investment is included as an independent variable in the study "The Effect of Public Deficits on Economic Growth: Evidence from Eurozone Countries" because it is a crucial source of capital for an economy. Foreign direct investment has the ability to stimulate economic expansion by boosting investment, productivity, and employment. By incorporating net inflows as a proportion of GDP into the research, it is possible to control the effect of this significant source of funds on economic growth. This differentiates the impact of the budget deficit on economic development, given that foreign direct investment can influence the quantity of investment and consumption.

Domestic credit to the private sector as a percentage of GDP is included as an independent variable in the econometric analysis since it is essential for promoting investment and consumption, which are both significant growth drivers. By analyzing domestic lending to the private sector as a proportion of GDP, the research can account for the availability of credit in the economy and its influence on economic growth. This aids in isolating the impact of fiscal deficit on economic growth, given that credit conditions can affect credit supply and demand, as well as borrowing rates.

4. Econometric Results

In Table 1 below, the summarized results of the four econometric models are presented, in addition to the execution of the OLS and OLS Robust models the two-panel data models were also executed, which give more reliable results; Fixed Effect and Random Effect. Based on the results of the applied tests (See Hausman Test), the model which is most suitable for data analysis is the Random Effect model. In this model, we have a coefficient of determination of 25.18%. In Table 1 we also see some tests executed, where according to the inflation factor variance test the data do not suffer from multicollinearity and from the result of the Breusch Pagan test the data are homoscedastic.

Table 1. Results of the coefficients

Model/Variable	OLS	OLSR	FE	RE
INF	0.760***	0.760***	0.538***	0.564***
	-6.95	-4.7	-5.83	-6.12
UNEM	-0.061	-0.061	-0.0888*	-0.0867*
	(-1.30)	(-1.26)	(-2.35)	(-2.28)
FDI	0.00241	0.00241	0.000482	0.000679
	-0.55	-0.54	-0.15	-0.2
DCP	-0.00746	-0.00746	-0.00328	-0.0037*
	(-1.38)*	(-1.33)*	(-0.77)	(-0.87)
_cons	0.524	0.524	1.845**	0.225*
	-1.89	-1.67	-2.84	-2.29
N	346	346	346	346
R^2	17.11	17.11	24.76	25.18
Prob>F	0.000	0.000	0.000	0.000
VIF	1.18			
Hettest	0.5335			
Hausman Test	0.3919			

Source: Author's calculations.

The findings shown in Table 1 indicate that a positive impact on GDP growth is provided by inflation, whereas an adverse impact is provided by domestic credit to the private sector (dcp). Foreign Direct Investment (*FDI*) and Unemployment (*unem*) are not significant factors in this study.

Due to their direct correlation with a nation's overall economic activity, both inflation and domestic credit have a major impact on GDP! Elevated inflation and huge fiscal deficits may reduce economic activity and GDP, however high domestic credit might increase economic activity and the GDP. When inflation is high, it may indicate a high demand for goods and services, which may lead to economic growth. However, high inflation diminishes the purchasing power of people and businesses, leading to a drop in economic activity and GDP. This is due to the fact that high inflation makes it more expensive for businesses to produce goods and services, which may ultimately result in a decline in production and GDP. In contrast, when domestic credit is low, enterprises and people may not have access to the money they need to undertake new projects, or make purchases, resulting in a decline in economic activity and GDP. When domestic credit is high enterprises and consumers have more access to capital, which may lead to an increase in economic activity. However, excessive domestic credit may also lead to an increase in inflation, since more money in circulation can lead to higher pricing for goods and services.

Long-term inflation is necessary when there are considerable budget deficits since it might lead to greater expenditure and decreasing income. When inflation is persistently high, prices for goods and services may increase, requiring the government to spend more on social assistance! Inflation may also diminish people's buying power, causing them to cut their spending and increase their savings. As a result of this, the government may get less money through taxes. Given that the actual worth of debt declines when inflation is high, long-term inflation may also cause the value of government debt to decrease. The debt-to-GDP ratio may increase as a consequence, making it more difficult for the government to service its

loans and raising the danger of default. High inflation makes it more difficult for firms and individuals to prepare for the future, which may erode confidence in the economy. As a consequence, individuals may be driven to spend and invest less, so reducing the expansion of the economy.

The findings in our study are in line with those found in previous research that used models that are comparable to those used in the study by (Nayab, 2013), the conclusions of which also demonstrate that there is a positive correlation between the deficit and the GDP ratio. His findings on co-integration methods, VAR, and the Granger causality test indicated that budget deficits considerably influenced economic growth, validating the Keynesian position on budget deficits.

Using the ARDL panel model to study five countries with low debt-to-GDP ratios and five countries with high debt-to-GDP ratios in the Eurozone from 2000 to 2011 (Adam, Bevan, 2005) and (Cinar et al., 2014), deficit policies have a positive impact on economic growth in the short run. Additionally, a study (Loizides, Vamvoukas, 2005) of Greece, the United Kingdom, and Ireland found that budget deficits impede economic development in all three nations.

According to the findings, a rise in the inflation rate enhances the degree of economic growth. At the 90% level of statistical significance, there is a statistically significant correlation between GDP growth and the unemployment rate.

5. Discussions and Conclusion

The Eurozone countries have faced significant economic challenges in recent years, including high levels of public debt and slow growth. This study provides evidence on the relationship between fiscal deficit and economic growth in Eurozone countries. The findings indicate that a positive impact on GDP growth is provided by inflation, whereas an adverse impact is provided by domestic credit to the private sector. Foreign Direct Investment and Unemployment are not significant factors in this study.

The results suggest that fiscal deficit has a positive impact on economic growth in these countries. This finding is in line with previous research that suggests that the use of fiscal deficits, can be an effective tool for promoting economic growth. However, the relationship between public debt and economic growth is complex and influenced by a range of other factors such as inflation, unemployment, foreign direct investment, and domestic credit to the private sector as a percentage of GDP.

The findings of this study highlight the need for policymakers to take a comprehensive approach when considering the use of fiscal policy, including the use of fiscal deficits, as a tool for promoting economic growth. It is important to consider not only the positive impact of fiscal on economic growth but also the potential impact on other key economic variables such as inflation and employment. Moreover, when implementing fiscal policies such as deficits, governments in Eurozone should consider their effect on all macroeconomic variables and ensure that the measures taken do not have an adverse effect on them. Transparency and accountability in public expenditures are crucial, as are a focus on

structural improvements that encourage long-term economic growth, a sustainable fiscal policy, and close engagement with the private sector. Government expenditure cuts, tax increases, and austerity measures may aid in reducing the budget deficit and public debt. However, these restrictions must not hinder economic development in their implementation. Monetary measures, such as increasing interest rates and adopting quantitative easing, may assist in stabilizing inflation and sustaining economic growth. In addition, monetary policies may be used to manage government debt and influence currency value. Economic growth and productivity may be boosted through structural policies such as labour market reforms, education and training programs, and infrastructure expenditures.

The findings can also inform future research in this field, as additional analysis is needed to understand the complex relationship between fiscal deficit and economic growth in Eurozone countries.

There are a number of limitations to this research. The research focuses on the Eurozone, all developed countries and does not address developing countries. We did not include the year 2021, which is within the effects of Covid-19, due to a lack of data, and we recommend that future research in this area consider this. The analysis of the effects of Covid 19 on the behaviour of GDP growth would enhance the Econometric model. Furthermore, our model might be enhanced if Unemployment were divided into male and female unemployment rates and for primary, secondary, and tertiary education levels. Finally, we did not include socio-political factors such as corruption, which might influence our econometric analysis.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
ECONOMIC STUDIES

Volume 32(6), 2023

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WEALTH INEQUALITY DETERMINANTS IN THE EU MEMBERS FROM THE CEE REGION, 1995-2021[4]

This paper models wealth concentration in 11 EU members from the CEE region using official data for the period between 1995 and 2021 and applies panel econometric methods. The analysis uses the world inequality database (WID.world) for deriving wealth distribution and inequality measures. Our results suggest that inequality and wealth concentration grow at the expense of the middle class and the poorer half of the population. Regression results suggest that the main contributors to wealth inequality are the Great Recession of 2008–2009, inflation, house prices, and bond prices, while GDP per capita, equity prices and various interest rates restore a more equal net wealth distribution. Other variables are also found to have direct or indirect (instrumental variables) associations with the wealth concentration (the dependent variables).
Keywords: wealth inequality; wealth determinants; GINI; CEE; panel regression
JEL: D31; E01; G51; D63

1. Introduction

Inequality studies are gaining popularity among economists around the world because of increasing evidence of its rise and its significant social and economic importance. However, the specific mechanisms of wealth inequality are understudied compared to income inequality or the results are mixed.

The relationship between income inequality and wealth inequality is twofold. On the one hand, higher incomes enable the accumulation of wealth, and on the other hand, the accumulated wealth – depending mainly on growth and saving rates and conditions in

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[4] This scientific publication contains results of a study financed with funds from a targeted subsidy for Scientific research activity of UNWE under contract "№ НИД НИ-16/2020".
This paper should be cited as: *Peshev, P., Stefanova, K., Mancheva, I. (2023). Wealth Inequality Determinants in the EU Members from the CEE Region, 1995-2021. – Economic Studies (Ikonomicheski Izsledvania), 32(6), pp. 19-40.*

financial and real estate markets – translates into higher incomes. Not only economic, but also social, institutional, and cultural factors influence this dynamic.

In this paper, we empirically examine the relationships between variables such as asset prices, interest rates and GDP on the one hand, and wealth inequality in the CEE region on the other.

Research on wealth inequality has been hampered by data limitations, particularly in CEE countries, as well as by tax optimization behaviours of corporations. Only a small fraction of corporate shares in the region are publicly traded, and national property registries do not allow conclusions to be drawn about the wealth held by individuals. Eurostat does not provide data on the distribution of wealth in Europe, therefore, survey data, administrative data or estimated (adjusted data) are used. Globally, the most widely used surveys are the US Survey of Consumer Finances (SCF) and the Eurosystem's Household Finance and Consumption Survey (HFCS). However, three CEE countries (incl. Bulgaria) do not participate in the Household Finance and Consumption Survey (HFCS: HFCN, 2020). Indirect estimates of the size and distribution of wealth have to be used instead. Because of the limitations described above, our paper is based on data from the World Inequality Database, and applies the methodology of Alvaredo et al. (2020), which relies mainly on capitalization of incomes, imputations of assets and Liabilities and regression results to draw conclusions about wealth distribution.

The study covers 11 post-socialist CEE countries: Bulgaria, Czech Republic, Croatia, Estonia, Hungary, Lithuania, Latvia, Poland, Romania, Slovakia, and Slovenia. These countries are characterized by very high levels of income inequality but relatively moderate wealth inequality. At the same time, they share common features such as a relatively short history of wealth accumulation, a high homeownership rate and relatively high net savings at the beginning of the transition, and a strong impact of severe episodes of financial instability afterwards[5]. It can be assumed that despite relatively high-income inequality, wealth inequality is lower compared to other EU countries, because of the shorter period of wealth accumulation. The effect of privatization which contributes to a faster rise of private wealth is somewhat mitigated by the high homeownership rate. Since these countries have similar traditions, institutions, and cultural values, the study focuses on the economic determinants of wealth inequality.

The aim of the study is to identify factors of wealth inequality, incl. factors of dispersion of the top decile and percentile, wealth of the middle class and wealth of the poor. The aim of the study is augmented by providing political implications. The study contributes to the growing literature on wealth inequality in two ways: First, it empirically evaluates the impact of selected determinants of wealth inequality in CEE countries which is an understudied problem. Second, this paper highlights some specific features and thus contributes to a better understanding of the interplay between income and wealth inequality.

[5] Bulgaria (1995-1997), Croatia (1995-996), Estonia (1992-1995), Latvia (1994-1999), Lithuania (1995-1996), Hungary (1991-1995), Czech Republic (1991-1995), Poland (1991), Romania (1990), Slovakia (1991), Slovenia (1993-94). *Source*: Reinhart and Rogoff (2013), based on Caprio and Klingebiel (2003).

Our study tests the following hypotheses: The growth and the convergence of GDP in PPS to the EU averages are expected to increase inequality; The 2009 crisis is expected to stimulate inequality; House prices and middle-class wealth is expected to be in a positive association since this is the largest asset component for the middle class; We expect stock prices and bond prices to increase wealth inequality and concentration; Higher interest rates on households' loans and deposits are expected to decrease wealth concentration by lowering prices of financial and real assets and increasing the cost of servicing debts. Lower government bond yields and higher bond prices are supposed to increase inequality. The consumer price change is expected to increase wealth concentration by transferring wealth from creditor to debtor and increasing financial and real assets' prices. Population growth is supposed to increase wealth concentration by allowing fewer individuals to take advantage of the growing population.

Data availability, unbalanced panels, insufficient sample size, missing of reliable information about the wealth distribution and the lack of sufficient previous research on the topic pose limitations to our research. The econometric methods we use reveal an association between dependent and independent variables and hint for possible causation.

The rest of the paper is organised as follows. Section 2 reviews the literature on the determinants of wealth inequality. Section 3 compiles data sources, describes their specifics and the chosen research methods and provides an analytical framework. Section 4 presents the results, and the last section concludes.

2. Overview of the Literature on the Determinants of Wealth Inequality

The study of the causes and factors of the unequal distribution of wealth is gaining popularity among economists worldwide due to the actuality of the issue. However, the roots of wealth inequality in emerging economies, including CEE countries, remain unclear due to a lack of sufficient data.

Scholars use a variety of data sources and methods to track wealth or try to infer the stock of wealth from income data. The methods of wealth estimation suffer from specific weaknesses which may be more pronounced in some CEE countries. In general, while surveys underestimate high income and wealth and the impact of fluctuations in asset market prices, national accounts data contain inaccuracies in mixed income and housing income, and the capitalization method (based on fiscal data) does not capture non-taxable income (For criticism of the different approaches see Garbinti, et al., 2021; Bricker, et al., 2016).

As for **CEE**, wealth inequality is relatively understudied. Brzezinski, et al. (2019) offer an interesting attempt to estimate inequality in the region with an adjustment for the underestimation of the upper tail of the wealth distribution in household surveys. Similar methods for addressing the problem of differential non-response in surveys were originally proposed by Vermeulen (2014) and other authors. Brzezinski, et al. (2019) apply a top-correction procedure using pooled data sets with imputed observations on missing rich individuals from the rich lists. After the adjustment, wealth inequality in countries covered (Estonia, Hungary, Latvia, Poland and Slovakia) reaches levels observed in Western Europe.

The Gini coefficient is corrected by 5.4 points on average. Other authors (e.g. Leitner and Holzner (2008), Peshev (2015), Peshev et al. (2019), Brzezinski and Sałach (2021)), consider different determinants of wealth inequality in CEE.

Globally, existing empirical research focuses on various determinants of wealth inequality and examines their influence. As a starting point, **income inequality** itself is a major driver of wealth concentration, but the relationship is not linear and involves other variables. Chancel et al. (2022) find a strong relationship between income inequality levels and wealth inequality levels, which allows for an estimation of wealth inequality through income capitalization. Piketty and Zucman (2014) find that **wealth-income ratios** in rich countries demonstrate a U-shaped pattern, suggesting that wealth inequality is driven by other factors such as economic growth, the saving rate, and rising asset prices (the snowballing effect). More specifically, they find that the wealth-income ratio has risen from about 200-300% in 1970 to a range of 400–600% in spite of slow economic growth. As an example of the inverse dependence, Milanovic (2019) and Berman and Milanovic (2020) find that so-called homoploutia (the overlapping of high capital-income earners and high labour-income earners) has been sharply increasing since 1985 and accounts for about 20% of the increase in total income inequality in the United States.

Further, different authors focus on individual determinants and seek to explain wealth inequality using a broader set of variables. Certain differences in the methodology used and the results of the studies conducted in different countries and with different objectives are observed, but nonetheless, some important factors contributing to wealth inequalities can be outlined in the literature review.

An important group of factors whose influence on inequality is studied in the literature are **inflation**, **interest rates and monetary policy**. **Inflation** is identified and demonstrated as an important factor in a number of studies in this field (Peshev, et al. (2019), Roine and Waldenström (2015), Berisha and Meszaros (2020), Colciago et al. (2019), Stewart (1939), etc.). The majority of research proves that **inflation leads to an increase** in wealth inequality (e.g., Peshev et al. (2019), Roine and Waldenström (2015), Colciago et al. (2019), Stewart (1939), etc.). In particular, Peshev et al. (2019) examine the influence of a very wide **range of factors** on the inequality in the distribution of deposits in Bulgaria as a measure of gross financial wealth, over the 2005:Q4-2017:Q4 period. The results of the study show that wealth concentration, as measured by the share of the richest decile and the Gini coefficient, is stimulated and positively influenced by inflation and also by **financial deepening, stock prices and interest rates**. Similarly, Roine and Waldenström (2015) conduct a descriptive and econometric analysis of inequality in the distribution of income and wealth in selected developed countries in Western Europe and the United States. Applying an econometric panel study of inequality in income distribution, Roine and Waldenström (2015) define **inflation and financial intermediation** as factors that positively affect income inequality as measured by the income of the top 1%. According to Roine and Waldenström (2015), the conclusions drawn about the factor determination of income inequality can easily be transferred to inequality in wealth distribution. Colciago et al. (2019) examine the relationship between **monetary policy** and inequality (income and wealth) in the context of dual causality: from macroeconomic variables to inequality and vice versa (from inequality to macroeconomic variables through monetary policy transmission channels). The study

concludes that the importance of conventional monetary policy for inequality is unclear, while inflation (at least above a certain level) is a factor for inequality. Stewart (1939) also assumes that inflation and artificially low long-term interest rates contribute to wealth concentration. Opposing this view, Berisha and Meszaros (2020) find that an increase in inflation and interest rates helps decrease wealth inequality. The study uses macroeconomic variables to examine wealth inequality in the USA over the periods 1929-2009 and 1962-2009 and applies the vector autoregression model (VAR), decomposes the variance (variation) and analyses the impulse response of each of several independent variables. Berisha and Meszaros (2020) also prove that **income growth** and interest rates have a negative and significant impact on wealth inequality in the USA.

The results from the research reviewed show that apart from inflation, **financial deepening, interest rates and financial intermediation** are also revealed as important factors having a significant positive effect on wealth inequality. **The interest rate** is primarily identified as an inequality-increasing factor (e.g., Peshev et al. (2019), Stewart (1939), Domanski et al. (2016), etc.). Berisha and Meszaros (2020) reach opposite conclusions in their study. They conclude that rising interest rates contribute to lower wealth inequality in the USA.

Banking crises are also identified as a factor that reduces wealth inequality by Peshev et al. (2019) and Roine and Waldenström (2015), despite the differences in methodology and territorial scope of the papers. Peshev et al. (2019) also prove that the **global economic crisis** reduced wealth inequality in Bulgaria, which is not confirmed by other studies. Galbraith and Lu (1999) examine the relationship between crises and wealth inequality. They find that economic crises can lead to rising inequalities in wealth and income.

Stock prices are demonstrated in the empirical literature as a factor that is positively related to wealth inequality, while **housing prices** have the opposite effect. (See Peshev et al. (2019), Domanski, et al. (2016), Davies et al. (2011), Kuhn et al. (2020), etc.). Domanski et al. (2016) examine the relationship between monetary policy and inequality in the distribution of net wealth, interest rates and real and financial asset prices. The authors use microdata from household surveys for six countries: France, Germany, Italy, Spain, the United Kingdom and the United States. The study uses a simulation of the dynamics and distribution of wealth based on the quintile distribution. The research shows that rising stock prices can lead to an increase in wealth inequality that is only partially offset by the recovery in housing prices, where the middle class is more exposed. Kuhn et al. (2020) assume stock prices increase the wealth share of the top decile in the US, while house prices reduce it. Peshev et al. (2019) prove that house prices have a small but negative impact on inequality in the long run in Bulgaria. Due to the high share of owner-occupied housing in Bulgaria, the rise in house prices led to an increase in the size of the middle class in the 2005-2017 period. Using reweighted Oaxaca-Blinder-like decompositions based on recentered influence function (RIF) regression, Brzezinski and Sałach (2021) show that the differences in homeownership rates account for up to 42% of the difference in wealth inequality in CEE measured with the Gini index. Baselgia and Martinez (2020) point out that **housing prices** have become an important driver of wealth accumulation. Using a panel regression framework and data for 12 countries over the period 1990-2018, they find that a one percent annual increase in housing prices is associated with a 0.31% increase in the wealth-income ratio (but not in Germany and Sweden). Interesting results in this area are also shown by Fuller et al. (2020)

for Western Europe and other OECD countries. The study demonstrated that real housing inflation leads to an increase in the wealth-to-income ratio. The dynamics of this ratio could be explained by various determinants, including the rate of return of various assets (Jorda et al., 2017), its relationship with economic growth, the rate of savings, the structure and distribution of the portfolios and the volatility of their prices. For example, Kuhn et al. (2017) proved that until the housing bust of 2007, the American middle class enjoyed substantial gains in housing wealth and thus suppressed the growth of wealth concentration. In general, housing prices have a mixed impact on wealth accumulation. This can be explained by waves of industrialization, deindustrialization (after the 1970s) and urbanization, as well as by differences in housing policies in individual countries (Maclennan and Miao, 2017).

There is some evidence in the empirical literature on the role of **public expenditure** in reducing income inequality. In the case of examining the role of total government expenditure on income inequality, different country samples, methods, time periods, etc. are used. Malla and Pathranarakul (2022) prove that government size is negatively associated with income inequality in developed countries. This relationship is also demonstrated by Fournier and Johansson (2016) for OECD countries. Moreover, some authors distinguish between the role of different types of expenditure on income inequality. After reviewing 84 separate studies with over 900 estimates of the effects of one or more measures of government spending on one or more measures of income inequality, Anderson et al. (2016) conclude that there is ample evidence that at least some types of government spending have tended to reduce income inequality in many countries. Examining developed countries, Alfonso et al. (2008) come to the conclusion that public redistributive spending (with the exception of pensions) and educational performance have a significant impact on income distribution. Malla and Pathranarakul (2022) prove that education and health expenditures are negatively associated with income inequality in developed countries. According to Johansson (2016) for OECD countries, social spending can reduce inequality as it increases redistribution and risk sharing. **Taxation** can also influence wealth inequality. The importance of this factor is explored in more detail in numerous studies (e.g., Hubmer et al. (2018), Brülhart et al. (2016), Gokhale et al. (2001) and Peshev et al. (2019)). Peshev et al. (2019) prove that in Bulgaria the introduction of proportional taxes with a uniform (flat) rate on income reduces wealth inequality. In contrast, in a study of inequality in the distribution of wealth in the United States, Hubmer et al. (2018) consider the reduction in progressive income tax rates that began in the late 1970s as the main factor behind rising inequality.

The relationship between **educational** and wealth inequality is examined in some research (e.g., Poterba et al. (2018), Pfeffer and Schoeni (2016), Lusardi et al. (2017), etc.), but it is unclear whether there is a causal relationship (except for financial education). Further, **inheritance** is considered an important factor with a positive impact on inequality in wealth distribution (e.g., Niimi and Horioka (2016), Elinder et al. (2016), Gokhale et al. (2001), etc.).

The influence of a wide range of factors on inequality in the distribution of wealth has been demonstrated in the literature. Determinants differ from country to country due to different traditions, demographics, political and economic systems. The study of the factor determinants of wealth inequality in the CEE countries is not sufficiently developed, but the literature review identifies some important factors such as inflation, interest rates, stock

prices, house prices, economic crises, public expenditure, taxation, etc., which will serve as a basis for the methodology of the econometric analysis.

3. Data and Methodology of the Research

Hypotheses testing and empirical literature review support the data selection process, however, although data availability and preliminary statistical tests narrow the choice of variables.

We use an unbalanced panel of data macroeconomic data of dependent and explanatory variables of 11 CEE countries, members of the EU (Bulgaria, Czech Republic, Croatia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia), for the period between 1995 and 2021, constrained by data availability. Table 1 presents information on the dependent and independent variables of the study. Dependent variables comprise: GINI, P0P50, P50P90, P90P100, P99P100, while explanatory variables encompass: D1, DEPOSITRATE, GDPPERCAPITAPPS_100, GOVBONDSYIELDS, INFLATION, LOANSRATE, LOG(HPR), LOG(STOCKINDEX), POPULATION, UNEMPLOYMENTRATE.

Various unit root test results (Fisher-ADF, Fisher-PP, Im, Pesaran et al., 2001) suggest that GOVBONDSYIELDS, POPULATION and UNEMPLOYMENTRATE variables do not have unit roots at levels while the rest of the variables have unit roots at the level and are stationary at their first differences. Another specific of our data is that T is larger than N, or the number of countries is smaller than the time series length.

Table 1. Dependent and independent variables

Variable	Type	Description
D1	independent	2009 Great recession dummy variable, accepting "0" values before 2009 and "1" afterwards
DEPOSIT RATE	independent	households' deposit rates source of data: national central bank and European central bank
GDPPERCAPITAPPS_100	independent	volume index of GDP per capita in Purchasing Power Standards (PPS), expressed in relation to the European Union average set to equal 100
GINI	dependent	Gini coefficient
GOVBONDSYIELDS	independent	yield to maturity of 10-year government bonds or the best substitute bond with the closest to that time to maturity
GOVEXPTOGDP	independent	consolidated government expenditures to GDP
INFLATION	independent	yearly change of CPI index
LOANSRATE	independent	households' mortgage loan rates
LOG(HPR)	independent	index of house prices
LOG(STOCKINDEX)	independent	major stock market benchmark values as of the end of the year
P0P50	dependent	bottom half of wealth distribution
P50P90	dependent	the wealth share of 50th to 90th percentiles
P90P100	dependent	the wealth share of the top decile, the source of data
P99P100	dependent	the wealth share of the top percentile
POPULATION	independent	the wealth share of end-of-year population value, in mln.
UNEMPLOYMENT RATE	independent	unemployment rate

Correlation matrix coefficients and p-values, placed in Table A4 and Table A5 in the Appendix, suggest the absence of multicollinearity and reveal that there is not strong association (negative or positive) between explanatory and dependent variables. Neither correlation coefficient is having a meaning above 0.5 or below -0.5, and most of the correlation coefficients have p-value above 5% level of significance.

Descriptive statistics

Data analysis confirms a wealth concentration process is underway, analysing the 1995-2021 wealth inequality data, revealed in Table A1 in the Appendix. The Gini coefficient advances from 0.73 to 0.752 on average during the period under review. The wealth share of the top decile and more considerably of the top percentile also grow, from 56.7% to 59.2% for the top decile and from 22.2 to 26.1% for the top percentile. On the contrary, the middle class and the bottom half of the population reduce their share of total net wealth, from 38.5 to 36.4% for the p50p90 percentiles, and from 4.9 to 4.45% for the bottom half, respectively.

Dependent variables' analysis suggests a heterogenous development path of wealth concentration and overall distribution measures. The Gini coefficient rises in Bulgaria, Czech Republic, Hungary, Poland, Romania, Lithuania, Slovakia, and Slovenia, while the indicator declines in value in Hungary, Estonia, and Latvia.

The Gini coefficient experiences a small dispersion, having a few percentage points change (up to 2-3 p.p.), while having a larger change in Hungary, Latvia, Slovakia, and Slovenia. The share of the top percentile advances for 10 of the countries but in Croatia, where it declines modestly. The wealthiest percentile owns on average 24% of total wealth, also experiencing a steady uptrend (see Table A1 in the Appendix). The Gini coefficient is having largest values in Estonia, Poland and Hungary, in the range between 0.80 and 0.85.

The highest surge in wealth concentration surge (measured by the wealth share of the top percentile) appears in Hungary (from 24 to 34%), Poland (from 24 to 30%), Slovakia (from 13 to 18%) and Slovenia (from 12 to 23%). The wealthiest decile owns on average 57.6% of total wealth, maintaining an upward dynamic and starting from 56.7% in 1995 and ending in 2021 with a 59.2% share (see Table A1 in the Appendix). In all countries, the wealth share of the top decile increases, except Latvia, Estonia and Croatia. The steepest upward dynamics are evident in Hungary, Slovakia and Slovenia rising by around 10 pp. The top decile owns above 60% of the total net wealth in Estonia, Poland, Latvia and Hungary.

The P50p90 percentile owns on average 38% of total wealth, representing the wealth share of the so-called "middle class". The wealth share of the P50p90 percentile declines on average, from 38.5 to 36.4% (see ibid.). Middle-class wealth is shrinking the fastest in Hungary, Slovenia, the Czech Republic and Poland, while increasing in Latvia, Estonia and Croatia.

The Gini coefficient values, the top percentile and the top decile values and dynamics signal for growing inequality for the CEE countries part of the EU, with few exceptions. Another confirmation of the growing wealth concentration is the value and the dynamics for the wealth share of the bottom half of the population, which owns on average below 5% of total

net wealth, declining from 4.9% at the beginning of the period to 4.4% as of the end, as shown on Table A1 in the Appendix. The indicators advance in Latvia, Estonia and Poland, and move sideways in Croatia and Lithuania, while deteriorating in Bulgaria, Czech Republic, Hungary, Romania, Slovakia and Slovenia. The net wealth of the bottom half of the population is negative in Poland and has a value of around 1% in Estonia. The indicators have the highest value for Slovakia.

Tables A6 to A8 in the Appendix reveal descriptive statistics for explanatory and dependent variables. Common sample calculations suggest P50P90, GDPPERCAPITAPPS_100, GOVEXPTOGDP, Log(HPR) have the chance to accept the null, i.e. their skewness and kurtosis matching a normal distribution. The median and the mean meanings are almost perfect matches for the GINI, P0P50, P50P90, P90P100, P99P100, GDPPERCAPITA, PPS_100, GOVBONDSYIELDS, GOVEXPTOGDP, GOVBONDSYIELDS, GOVEXPTOGDP variables. Following variables experience the largest dispersion around the mean: POPULATION, DEPOSITRATE, INFLATION, GOVBONDSYIELDS, P0P50, LOANSRATE and UNEMPLOYMENTRATE.

Methodology

We use linear-linear and linear-log regression, respectively Least squares equations and Generalized method of moments equations, laid out in the following section, eq. 2-11.

$$Yit\text{-}n=\beta_0+\beta_1 Xit\text{-}n+\beta_2 Zi+Uit \quad (1)$$

where:

Yit – dependent variable for i^{th} NUTS 2 region in t^{th} period;

β0 – constant;

β1 – kx1 a matrix of parameters representing the association between the independent variable Xit and dependent variable Yit;

β2 – matrix of parameters representing the association between the independent variable Zi (representing individual effects for a specific i^{th} country) and the dependent variable Yit;

Zi – variable for individual (fixed) effects for the i^{th} country, irrespective of time;

Xit – an independent variable Xit for i^{th} country in t^{th} period;

n – time period index notation, accepting values between 0 and T;

t – time period variable;

$U_{it}\neg$ – error term.

Since some of our data possess non-stationarity features, we decided to address potential heteroscedasticity and serial correlation issues by using the Generalized Method of Moments (GMM) under the Blundell and Bond approach (1998). The GMM approach uses the

following instrumental variables: LOANSRATE, GOVEXPTOGDP, GOVBONDSYIELDS, GDPPERCAPITAPPS_100, D1, LOG(HPR), INFLATION, LOG(STOCKINDEX), INVESTTOGDP, UNEMPLOYMENTRATE. Besides instrumental variables explained in Table 1, we add also government expenditures to GDP variable- GOVEXPTOGDP and gross capital formation to GDP variable- INVESTTOGDP. GMM results are meant to confirm or oppose Least squares results addressing unbalanced panel data with N>T. Individual coefficient significance and overall model reliability coefficient values as well support LS results.

4. Results

The current section of the study presents and analyses main findings from the econometric study. Least squares regression and GMM results are summarized in Table 2 in current section and detailed equations are revealed in the Appendix. Equations with the Gini coefficient as dependent variable come first, followed by the top percentile, top decile, the P50P90 percentiles, and the bottom half of the population dependent variables' regression equations.

The Gini coefficient maintains a negative association with interest rates on loans on mortgage loans and GDP per capita in PPS with EU average=100, assuming that higher GDP per capita and higher interest rates on loans restore equality, with their coefficient being significant at 1% level of significance(see eq. 2). On other hand, the Great recession dummy supports the hypothesis that the 2009 recession and its aftermath resulted in higher wealth concentration. Inflation and house prices have a positive association with the Gini coefficient, assuming that higher house prices and higher consumer prices support the wealth creation for the upper deciles and percentiles at the expense of the bottom deciles and percentiles from the wealth distribution. The GMM regression results reveal the same direction of associations between the same dependent and explanatory variables (see eq. 3). House prices, the financial crisis and inflation contributed to wealth inequality among the 11 analysed CEE countries. The underdeveloped capital market and its insignificant meaning in the CEE countries and the large component of real estate wealth make wealth inequality more dependent on real estate. Higher interest rates deteriorate debt servicing and house prices, leading to higher wealth equality in analysed countries. Real GDP growth and convergence to EU averages restore equality assuming that redistribution policies and effects benefit more equal wealth distribution.

Eq. 4 reveals that the top percentile has a negative relationship with the interest rates on mortgage loans of households, the GDP per capita in PPS terms and government bonds yields, with their coefficient being significant at a 1% level of significance. The 2009 recession dummy and the natural logarithm of house prices experience a positive association with the dependent variable, assuming that both variables support wealth concentration (see eq. 4). The same relationships are evident from the GMM regression presented in eq. 5. The top percentile's wealth share is supported by a higher house and bond prices (lower government bond yields), and by the 2009 crisis, while interest rates on loans and GDP real

growth and EU convergence decrease the top 1% wealth share. The same logic for interest rates and GDP per capita in PPS applies as in eq. 2 and eq. 3.

The wealth of the top decile is in positive association with house prices and the population, meaning, while having a negative relationship with interest rates on deposits and stock market prices, as can be seen in eq. 6. and eq. 7. Stock prices are supposed to contribute to wealth concentration, but our results oppose this hypothesis, as the coefficient for stock market prices is very small and has a negligible negative impact. All coefficients in eq. 7 are significant at a 1% level of significance, however in eq. 6, all coefficients are significant at a 1% level of significance, but the interest rates on deposits' coefficient which is significant at a 5% level of significance. The insufficient capital market penetration in the economy and the importance of the real estate component for wealth creation could partially explain the negative association between stock prices and the wealth of the top decile. Growth of the population stimulates wealth concentration, suggesting that the wealthiest individual takes advantage when the population grows.

The middle class, in our view, encompasses the population of the p50p90 percentile. Eq.8 and eq.9 reveal the association between the p50p90, as a dependent variable, and the explanatory variables. GDP per capita in PPS (EU average = 100) and the households' interest rate on deposits maintain a positive association with the dependent variable (see eq. 8 and eq. 9). On the contrary, house prices and the 2009 recession experience a negative association with the dependent variables. GDP real growth and interest rates on deposits seem to stimulate the growth of the wealth share of the middle class, while house prices and the 2009 structural break due to the recession seem to deteriorate it. The wealth of the middle class deteriorates with higher house prices and probably with lower interest rates which stimulated asset inflation. It could be assumed that the net real estate of the middle class grows much slower in value in comparison to the wealthiest decile and percentile and wealthier people better take advantage when interest rates in the economy fall. All coefficients in the Least squares and GMM equations are significant at a 1% level of significance.

The P0P50 dependent variable represents the bottom half of households' wealth. The dependent variable is in positive association with the GDP per capita in PPS (EU average = 100), interest rates on mortgage loans and stock prices (see eq. 10 and eq. 11). House prices decrease the wealth of the bottom half of the population. All variables' coefficients but the constants are significant at the 1% level significance (see eq. 10 and eq. 11). It should be noted that both equations don't possess normal distribution, since the p-value for the null hypothesis of the Jarque-Berra test equals zero. From another perspective, F-stat and Sargan-Hansen test J-stat value and p-valued support the overall models' significance. To put it differently, higher mortgage rates and lower house prices stimulate the wealth share for the bottom half of the households since they own a small portion of overall wealth, and probably it is due to an indirect association between dependent and independent variables. It could be because of the net wealth's faster deterioration for the upper half of the distribution. It should be noted that stock markets in the eleven CEE countries don't share many of the features of developed stock markets. Lower stock prices reduce the wealth share of the bottom half of households, and vice versa, which at first glance is not logical since the bottom half rarely owns stock or has direct exposure towards the stock market.

Our results are consistent with research that identifies GDP growth, housing prices, inflation and financial crises as the main determinants of inequality, but highlight different patterns. The main result of the research is related to the impact of house prices on inequalities.

In principle, housing wealth is more equally distributed than financial assets. Our result suggests that the increase in house prices has a negative impact on the wealth share of the middle class and the poorer households. In this respect, the study differs from Peshev (2019), according to which the rise in house prices leads to an increase in the size of the middle class. (We are not aware of any other similar studies for the region with which a direct comparison can be made.) Based on broader studies of housing wealth (e.g., Maclennan and Miao, 2017), it can be concluded that by the end of the 20th century, home ownership contributed to the savings of the poorer households and the middle class. In recent years, this dependence has been breaking down (supporting the observation of Kuhn et al., 2017) – especially in those countries and during those periods in which house price growth outpaced income growth. The different levels of home ownership which are higher in CEE compared to Western European countries (see Leitner and Holzner (2008) and Brzezinski and Sałach (2021)), as well as regional inequalities in the process of structural transformation of economies also matter.

As in Peshev et al. (2019), the impact of interest rates and inflation is mixed, especially in the longer term. On the other hand, the impact of stock prices does correspond to the predictions based on the literature review.

It is necessary to point out that wealth inequality in CEE is poorly studied (because of the lack of high-quality wealth data) and there is uncertainty in the obtained estimates, which also affects the results of the regression analysis.

Hypotheses tests suggest: 1. The growth and convergence of GDP in PPS to the EU averages actually decreases inequality rejecting the stated hypothesis that higher economic development leads to higher inequality, justified by eq. 2 to 5 and eq. 8 to 11. Our results rather support a Kuznets (1995) inverted U-shaped inequality curve; 2. The 2009 dummy variable is maintaining a negative association with the middle class's wealth and stimulates inequality, as shown in eq. 2 to eq. 5 and deteriorates the wealth of the middle class (see eq. 8 and eq. 9), failing to reject the hypothesis, stated in the introduction; 3. Wealth concentration and house prices are in positive association, while the middle class's wealth decreases with higher house prices, rejecting the hypothesis of the middle class's wealth positive association with real estate prices, see eq. 2 to 11. House prices appear to be the strongest wealth inequality determinant; 4. Stock prices are associated with lower wealth inequality, rejecting the stated hypothesis in the introduction (see eq. 6 and 7 and eq. 10 and 11); 5. We fail to reject the hypothesis that higher interest rates on households' loans and deposits are expected to decrease wealth concentration by lowering prices of financial and real assets and increasing the cost of servicing debts, as can be seen in eq. 2 to 11; 6. In the same, we fail to reject the hypothesis stating that lower government bond yields and higher bond prices increase inequality. (see eq. 4 and eq. 5.); 7. We also fail to reject the hypothesis that inflation leads to higher wealth inequality, evident from eq. 2 and eq. 3. Consumer price change is expected to increase wealth concentration by transferring wealth from creditor to debtor and due to increasing financial and real assets' prices. Population growth is supposed

to increase wealth concentration by allowing fewer individuals to take advantage of the growing population.

Table 2. Regression results

Equation	(eq.2)	(eq.3)	(eq.4)	(eq.5)	(eq.6)	(eq.7)	(eq.8)	(eq.9)	(eq.10)	(eq.11)
Method	LS	GMM	LS	GMM	LS	GMM	LS	GMM	LS	GMM
Dependent variable	GINI	GINI	P99P100	P99P100	P90P100	P90P100	P50P90	P50P90	P0P50	P0P50
Explanatory variables										
Constant	0.756	0.78	0.16	0.16	0.481	0.27	0.47	0.46	0.03	0.012
LOANSRATE	-0.003	-0.005	-0.002	-0.002				0.004	0.001	0.002
DEPOSITRATE					-0.002	-0.008	0.001			
GDPPERCAPITAPPS_100	-0.002	-0.002	-0.002	-0.002			0.001	0.001	0.001	0.001
GOVBONDSYIELDS			-0.003	-0.003						
LOG(STOCKINDEX)					-0.009	-0.026			0.005	0.005
LOG(HPR)	0.022	0.022	0.042	0.04	0.031	0.0377	-0.035	-0.036	-0.013	-0.013
D1	0.016	0.013	0.094	0.016			-0.011	-0.007		
INFLATION	0.002	0.001								
POPULATION					0.003	0.036				
Summarized results										
Adjusted R^2	0.23		0.37		0.13		0.26		0.11	
F-stat	13.3		24		9		20.3		7.44	
p-val	*0*		*0*		*0*		*0*		*0*	
The Sargan–Hansen test J-stat		6.22		6.28		7.29		7.7		6.28
p-val		*0.28*		*0.39*		*0.29*		*0.26*		*0.39*
Jarque-Berra test	0.71		4.04		2.17		4.56		4.04	
p-value	*0.79*		*0.13*		*0.33*		*0.11*		*0*	

Source: Own calculations.

5. Conclusions

This scientific article analysed wealth inequality dynamics drivers in the 11 EU countries from the CEE region (Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia) for the 1995-2021 period. After a brief literature review, a descriptive analysis was performed. Descriptive results suggest a common upward dynamic in inequality is underway, although a heterogeneous path of development for some of the countries is evident. Wealth concentration grows over the period under review, with the Gini coefficient, wealth shares of the top deciles and specifically the top percentile increasing in value, while the bottom half of the population and the middle classes' wealth deteriorates.

Least squares and GMM regression results suggest that real and financial assets, consumer prices, various interest rates, GDP per capita in PPS terms, and the Great Recession impact the wealth inequality (dependent) variables. House prices, Consumer prices, the 2009 Great Recession dummy and population count are among the contributors to higher wealth inequality. GDP per capita in PPS (EU = 100), interest rates on households' loans and deposits and government bond yields improve equality of net wealth distribution due to direct

and indirect effects in the economy and on asset prices. Stock prices in the CEE countries have a very small and positive impact on the bottom half of the population, despite the fact that the bottom half of the population (probably indirectly, through pension and other funds), usually has low exposure to the local stock market.

Rising wealth inequality in the CEE is in line with the global wealth inequality upward trend, which requires an appropriate response. Further analysis is needed, as in many countries the financial crisis coincided with the start of consuming the benefits of EU membership. The main findings of this paper can support the knowledge in the field but also can help addressing wealth inequality.

Drivers of wealth inequality can be subject to wealth inequality mitigating policy. Besides common policies for tackling wealth inequality, several policy implications could be derived from the results of the study. First, imposing a heterogenous and progressive tax on real estate wealth is in position to decrease wealth inequality in the CEE region, since housing wealth is in strong positive association with wealth concentration indicators analysed. Second, stimulating economic growth and achieving effective income redistribution among poorer society members has the potential to lower wealth inequality. Third, giving access of poorer households to equities, through mutual funds, mandatory private pension funds, mass privatization of minority shares of large state-owned companies meant for retail investors and other similar policies have the potential to increase the wealth of the middle class and of the bottom 50%. Fourth, economic crises caused by various events should be assigned policies for better supporting the middle class and the bottom half of households and individuals.

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APPENDIX

Table A1. Dependent variables averages (%)

YEAR	GINI	P90P100	P50P90	P0P50	P99P100
1995	73.4	56.7	38.5	4.9	22.2
1996	73.3	56.5	38.6	4.9	22.0
1997	73.3	56.5	38.6	4.9	22.0
1998	73.3	56.5	38.6	4.9	22.0
1999	73.3	56.5	38.6	4.9	22.0
2000	73.4	56.6	38.6	4.9	22.1
2001	73.4	56.6	38.5	4.9	22.1
2002	73.5	56.8	38.4	4.8	22.3
2003	73.5	56.9	38.3	4.8	22.4
2004	73.6	56.9	38.3	4.8	22.4
2005	73.7	57.1	38.1	4.8	22.6
2006	73.6	57.0	38.2	4.8	22.5
2007	73.8	57.2	38.0	4.8	22.8
2008	73.8	57.2	38.0	4.8	22.8
2009	73.6	57.0	38.2	4.8	22.5
2010	73.6	56.9	38.3	4.8	22.5
2011	73.8	57.3	38.0	4.7	23.0
2012	74.3	57.7	37.7	4.6	23.6
2013	74.6	58.1	37.5	4.4	24.2
2014	74.9	58.6	37.1	4.3	24.9
2015	74.9	58.6	37.0	4.4	25.2
2016	74.8	58.7	36.9	4.4	25.4
2017	74.6	58.5	36.8	4.7	25.5
2018	74.5	58.9	36.2	4.9	26.2
2019	75.1	59.1	36.5	4.4	26.0
2020	75.1	59.1	36.5	4.4	26.0
2021	75.2	59.2	36.4	4.4	26.1

Source: WID.world

Table A2. Explanatory variables averages

YEAR	GOVBONDS YIELDS	DEPOSIT RATE	INFLATION	LOANS RATE	GDPPER CAPITAPPS_100	UNEMPLOYMENT RATE
1995		10.56	23.41	10.48		
1996		9.84	26.70	11.30		
1997		9.30	118.36	11.02		10.98
1998		9.47	14.02	12.12		9.90
1999		9.62	8.64	11.65		11.19
2000		13.27	10.27	20.69	48.00	12.92
2001	8.12	9.51	8.19	16.62	49.82	13.16
2002	6.63	6.89	5.08	13.51	51.82	12.48
2003	5.60	4.98	3.84	10.58	54.55	11.55
2004	5.54	5.10	4.96	9.53	56.55	11.32
2005	4.29	3.30	4.08	6.82	58.91	10.19
2006	4.59	3.49	4.21	6.84	60.45	8.57
2007	4.96	4.17	5.16	7.17	63.18	6.95
2008	5.65	5.22	8.11	7.85	65.64	6.56
2009	7.46	4.84	2.62	7.51	63.91	10.05
2010	5.62	3.28	2.21	6.55	64.82	12.08
2011	5.36	3.30	3.71	6.03	66.36	11.39
2012	4.90	3.17	3.44	5.85	67.82	11.32
2013	3.91	2.30	1.68	5.19	68.64	11.05
2014	3.05	1.68	0.09	4.57	69.73	10.01
2015	2.01	1.19	-0.37	3.97	70.00	8.86
2016	1.78	0.80	-0.23	3.62	70.36	7.64
2017	1.70	0.61	2.14	3.34	71.73	6.42
2018	1.73	0.68	2.57	3.41	73.18	5.30
2019	1.25	0.69	2.47	3.37	74.45	4.62
2020	0.92	0.52	1.48	3.11	75.82	5.73
2021	1.03	0.43	3.79	2.84	76.91	6.00

Source: ECB, EUROSTAT, IMF, Investing.com, national Central bank and ministry of finance websites.

Table A3. Explanatory variables averages (continue)

YEAR	INVESTTOGDP	POPULATION	LOG(STOCKINDEX)	LOG(HPR)	GOVEXPTOGDP
1995	21.50	9.99	5.54		44.70
1996	23.22	9.97	5.74	3.78	43.66
1997	25.11	9.95	6.01	3.96	43.15
1998	25.99	9.92	5.74	4.09	42.93
1999	24.08	9.91	6.14	4.16	44.31
2000	24.62	9.85	5.95	4.25	43.67
2001	25.27	9.81	6.08	4.32	42.11
2002	25.35	9.73	6.16	4.38	42.16
2003	25.95	9.70	6.56	4.43	41.41
2004	27.02	9.68	7.00	4.46	40.25
2005	27.54	9.65	7.30	4.45	40.04
2006	30.17	9.63	7.51	4.52	40.01
2007	31.89	9.61	7.63	4.66	39.77
2008	30.64	9.56	6.75	4.74	41.09
2009	22.58	9.54	6.96	4.60	45.37
2010	22.40	9.51	7.08	4.57	43.96
2011	23.61	9.47	6.86	4.57	42.85
2012	22.71	9.45	6.97	4.55	41.88
2013	22.01	9.43	7.06	4.55	43.10
2014	22.44	9.41	7.07	4.58	42.56
2015	22.90	9.39	7.14	4.61	42.32
2016	21.54	9.37	7.26	4.66	40.35
2017	22.26	9.34	7.40	4.73	39.54
2018	23.45	9.32	7.34	4.81	40.09
2019	23.10	9.31	7.45	4.89	40.32
2020	22.26	9.30	7.41	4.95	46.30
2021	24.17	9.25	7.65	5.06	44.25

Source: ECB, EUROSTAT, IMF, Investing.com, national Central bank and ministry of finance websites

Table A4. Correlation coefficients

	GINI	P0P50	P50P90	P90P100	P99P100
DEPOSITRATE	-0.019	-0.008	0.083	-0.048	-0.136
GDPPERCAPITAPPS_100	-0.130	0.145	0.115	-0.148	-0.058
GOVBONDSYIELDS	-0.036	0.004	0.074	-0.049	-0.185
GOVEXPTOGDP	-0.176	0.197	0.203	-0.230	-0.176
INFLATION	0.091	-0.080	-0.156	0.140	0.067
LOANSRATE	-0.003	-0.022	0.034	-0.010	-0.096
LOG(HPR)	-0.067	0.094	-0.064	-0.008	0.069
LOG(STOCKINDEX)	0.277	-0.242	-0.326	0.331	0.325
POPULATION	0.438	-0.498	0.185	0.139	0.159
UNEMPLOYMENTRATE	-0.147	0.137	0.156	-0.170	-0.242
INVESTTOGDP	0.043	-0.026	-0.194	0.137	0.067

Source: Own calculations.

Table A5. P-values for accepting correlation coefficients

	GINI	P0P50	P50P90	P90P100	P99P100
DEPOSITRATE	0.791	0.915	0.247	0.499	0.056
GDPPERCAPITAPPS_100	0.068	0.042	0.107	0.038	0.417
GOVBONDSYIELDS	0.617	0.957	0.304	0.498	0.009
GOVEXPTOGDP	0.014	0.005	0.004	0.001	0.014
INFLATION	0.205	0.266	0.029	0.050	0.347
LOANSRATE	0.970	0.763	0.637	0.887	0.177
LOG(HPR)	0.349	0.189	0.372	0.912	0.336
LOG(STOCKINDEX)	0.000	0.001	0.000	0.000	0.000
POPULATION	0.000	0.000	0.009	0.052	0.026
UNEMPLOYMENTRATE	0.039	0.054	0.028	0.017	0.001
INVESTTOGDP	0.546	0.715	0.006	0.055	0.349

Source: Own calculations.

Table A6. P-values for accepting correlation coefficients

	GINI	P0P50	P50P90	P90P100	P99P100	GDPPERCAPITA PPS_100
Mean	0.7	0.05	0.4	0.6	0.2	68.0
Median	0.7	0.05	0.4	0.6	0.2	68.0
Maximum	0.9	0.1	0.4	0.7	0.3	93.0
Minimum	0.6	0.0	0.3	0.4	0.1	34.0
Std. Dev.	0.1	0.0	0.0	0.1	0.0	13.4
Skewness	-0.2	0.3	-0.1	-0.7	-0.5	-0.2
Kurtosis	3.8	4.7	3.0	4.0	3.9	2.5
Jarque-Bera	6.3	26.8	0.1	24.0	16.3	3.2
Probability	0.0	0.0	0.9	0.0	0.0	0.2
Sum	146.4	9.1	73.6	114.2	47.6	13403.0
Sum Sq. Dev.	0.7	0.2	0.3	0.6	0.4	34996.8
Observations	197	197	197	197	197	197

Notes: common sample calculations
Source: Own calculations.

Table A7. P-values for accepting correlation coefficients

	GOVBONDSYIELDS	GOVEXPTOGDP	INFLATION	LOANSRATE	DEPOSITRATE
Mean	3.7	42.2	2.9	5.4	2.4
Median	3.7	42.2	2.6	4.7	1.6
Maximum	14.0	60.3	15.3	15.2	12.9
Minimum	-0.1	33.2	-1.6	1.2	0.1
Std. Dev.	2.5	5.2	2.6	2.9	2.4
Skewness	0.7	0.2	1.2	1.2	1.5
Kurtosis	3.8	2.6	6.0	4.0	5.5
Jarque-Bera	19.3	3.6	123.0	52.7	127.7
Probability	0.0	0.2	0.0	0.0	0.0
Sum	724.5	8303.8	562.7	1069.7	481.6
Sum Sq. Dev.	1271.9	5296.2	1332.2	1622.7	1088.3
Observations	197	197	197	197	197

Notes: common sample calculations
Source: Own calculations.

Table A8. P-values for accepting correlation coefficients

	LOG(HPR)	LOG(STOCK INDEX)	POPULATION	UNEMPLOYMENT RATE	INVESTTO GDP
Mean	4.7	7.2	9.5	8.4	24.6
Median	4.6	6.9	5.4	7.4	23.6
Maximum	5.3	10.8	38.2	19.5	41.6
Minimum	4.1	5.3	1.3	2.0	12.7
Std. Dev.	0.2	1.3	10.2	3.6	4.9
Skewness	0.3	0.9	1.9	0.8	0.8
Kurtosis	3.5	3.2	5.6	3.3	4.0
Jarque-Bera	4.3	28.7	169.0	24.0	30.9
Probability	0.1	0.0	0.0	0.0	0.0
Sum	918.2	1425.7	1863.2	1651.0	4843.2
Sum Sq. Dev.	8.4	332.7	20386.3	2498.8	4649.2
Observations	197	197	197	197	197

Notes: common sample calculations
Source: Own calculations.

LEAST SQUARES AND GMM REGRESSION EQUATIONS

LS: GINI = 0.756*** – 0.003LOANSRATE*** – 0.002GDPPERCAPITAPPS_100*** + 0.016D1*** + 0.022LOG(HPR)** + 0.002INFLATION*** + [CX=R] (2)

where:

* is 10% level of significance; ** – 5% level of significance; *** – 1% level of significance; Summarized results: R-squared: 0.24; Adjusted R-squared: 0.23; F-statistic: 13.3; Prob. (F-statistic): 0.00. Jarque-Berra test value of 0.68 and p-value for the null hypothesis of the Jarque-Berra test of 0.71. The Hausmann test does not rule out the null, since the p-value is at 0.79, suggesting random effects models is appropriate.

GMM: GINI = 0.78*** – 0.005LOANSRATE*** – 0.002GDPPERCAPITAPPS_100*** + 0.013D1*** + 0.022LOG(HPR)** + 0.001INFLATION* + [CX=R] (3)

where:

* is 10% level of significance; ** – 5% level of significance; *** – 1% level of significance; Summarized results: The Sargan–Hansen test J-stat value comes at 6.22 with p-value of 0.28. Instrumental variables: LOANSRATE GOVEXPTOGDP GOVBONDSYIELDS GDPPERCAPITAPPS_100 D1 LOG(HPR) INFLATION LOG(STOCKINDEX) INVESTTOGDP UNEMPLOYMENTRATE

LS:P99P100 = 0.16*** – 0.002LOANSRATE** – 0.003GOVBONDSYIELDS*** – 0.002GDPPERCAPITAPPS_100*** + 0.094D1*** + 0.042LOG(HPR)*** + [CX=R] (4)

where:

* is 10% level of significance; ** – 5% level of significance; *** – 1% level of significance; Summarized results R-squared:0.39; Adjusted R-squared; 0.37; F-statistic: 23.97; Prob. (F-statistic): 0.00. Jarque-Berra test value of 4.04 and p-value for the null hypothesis of the Jarque-Berra test of 0.13. The Hausmann test does not rule out the null, since the p-value is at 0.31, suggesting random effects models is appropriate.

GMM: P99P100 = 0.16*** – 0.002LOANSRATE** – 0.003GOVBONDSYIELDS*** – 0.002GDPPERCAPITAPPS_100*** + 0.016D1*** + 0.04LOG(HPR)*** + [CX=R] (5)

where:

* is 10% level of significance; ** – 5% level of significance; *** – 1% level of significance; Summarized results: The Sargan–Hansen test J-stat value comes at 6.28 with p-value of 0.39. Instrumental variables: LOANSRATE GOVEXPTOGDP GOVBONDSYIELDS GDPPERCAPITAPPS_100 D1 LOG(HPR) INFLATION LOG(STOCKINDEX) INVESTTOGDP UNEMPLOYMENTRATE

LS:P90P100 = 0.481*** – 0.002DEPOSITRATE** + 0.003POPULATION*** – 0.009LOG(STOCKINDEX)*** + 0.031LOG(HPR)*** + [CX=R] (6)

where:

* is 10% level of significance; ** – 5% level of significance; *** – 1% level of significance; Summarized results R-squared: 0.15; Adjusted R-squared; 0.13; F-statistic: 8.98; Prob. (F-statistic): 0.00. Jarque-Berra test value of 2.17 and p-value for the null hypothesis of the Jarque-Berra test of 0.33. The Hausmann test does not rule out the null, since the p-value is at 0.99, suggesting random effects models is appropriate.

GMM: P90P100 = 0.27*** – 0.008DEPOSITRATE*** + 0.036POPULATION*** – 0.026LOG(STOCKINDEX)*** + 0.0377LOG(HPR)*** + [CX=R] (7)

where:

* is 10% level of significance; ** – 5% level of significance; *** – 1% level of significance; Summarized results: The Sargan–Hansen test J-stat value comes at 7.29 with p-value of 0.29. Instrumental variables: LOANSRATE GOVEXPTOGDP GOVBONDSYIELDS GDPPERCAPITAPPS_100 D1 LOG(HPR) INFLATION LOG(STOCKINDEX) INVESTTOGDP UNEMPLOYMENTRATE

LS: P50P90 = 0.47*** + 0.001GDPPERCAPITAPPS_100*** – 0.011D1*** – 0.035LOG(HPR)***+ 0.001DEPOSITRATE*** + [CX=R] (8)

where:

* is 10% level of significance; ** – 5% level of significance; *** – 1% level of significance; Summarized results R-squared:0.28; Adjusted R-squared; 0.26; F-statistic: 20.3; Prob. (F-statistic): 0.00. Jarque-Berra test value of 4.56 and p-value for the null hypothesis of the Jarque-Berra test of 0.11. The Hausmann test does not rule out the null, since the p-value is at 0.78, suggesting random effects models is appropriate.

GMM: P50P90 = 0.46*** + 0.001GDPPERCAPITAPPS_100*** – 0.007D1** – 0.036LOG(HPR)*** + 0.004DEPOSITRATE*** + [CX=R] (9)

where:

* is 10% level of significance; ** – 5% level of significance; *** – 1% level of significance; Summarized results: The Sargan–Hansen test J-stat value comes at 7.69 with p-value of 0.26. Instrumental variables: LOANSRATE GOVEXPTOGDP GOVBONDSYIELDS GDPPERCAPITAPPS_100 D1 LOG(HPR) INFLATION LOG(STOCKINDEX) INVESTTOGDP UNEMPLOYMENTRATE

LS:P0P50 = 0.03* + 0.001LOANSRATE*** + 0.001GDPPERCAPITAPPS_100*** + 0.005LOG(STOCKINDEX)*** – 0.013LOG(HPR)*** + [CX=R] (10)

where:

* is 10% level of significance; ** – 5% level of significance; *** – 1% level of significance; Summarized results R-squared:0.12; Adjusted R-squared; 0.11; F-statistic: 7.4; Prob. (F-statistic): 0.00. Jarque-Berra test value of 4.04 and p-value for the null hypothesis of the Jarque-Berra test of 0.00. The Hausmann test does not rule out the null, since the p-value is at 0.99, suggesting random effects models is appropriate.

GMM: P0P50 = 0.012 + 0.002LOANSRATE*** + 0.001GDPPERCAPITAPPS_100*** + 0.005LOG(STOCKINDEX)*** – 0.013LOG(HPR)*** + [CX=R] (11)

where:

* is 10% level of significance; ** – 5% level of significance; *** – 1% level of significance; Summarized results: The Sargan–Hansen test J-stat value comes at 6.28 with p-value of 0.39. Instrumental variables: LOANSRATE GOVEXPTOGDP GOVBONDSYIELDS GDPPERCAPITAPPS_100 D1 LOG(HPR) INFLATION LOG(STOCKINDEX) INVESTTOGDP UNEMPLOYMENTRATE

ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
ECONOMIC STUDIES

Volume 32(6), 2023

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INTRODUCING EDUCATIONAL REFORMS IN THE NEOCLASSICAL MODEL[5]

This paper extends the neoclassical model of economic growth by introducing human capital into production function and studies the impact of educational reform on economic performance. In the author's model, the government taxes consumption to reallocate the resources to educational needs, which is one of the most prominent ingredients of human capital. The tax increase has costly consequences for the economy in the short-run, regarding the slowdown of economic activity, and the consumption loss. Thereafter, the increase in education builds additional human capital, making people more productive, recovering economic activity and stabilizing consumption at even higher levels in the long run. Thus, in the longer term, it is beneficial for the economies with low human capital to devote resources in favour of educational reforms, even though it carries the risks of political capital loss due to short-run economic costs. In the short run political capital decreases as a result of the implemented reform costs, which, on the other hand, indicate the cumulative loss of consumption. In the long run, however, the policymaker regains its political capital. Governments with low reputation cannot implement structural reforms. Besides, the authors compare the impact of low-efficient educational reforms with the impact of highly effective ones and come to the conclusion that consumption is formulated at a lower level in the former case.

Keywords: neoclassical growth; fiscal policy; education expenditures; education reform
JEL: E13; E62; H52; I28

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1. Introduction

The term "Human Capital" was first mentioned in 1961 by Nobel-prize winner economist Theodore W. Schultz, in his article ''Investment in Human Capital''. Human capital includes many indicators such as education, health, skills, training, life expectancy and many others. Various theoretical and conceptual approaches have been used to explore the relationship between human capital and economic performance. There is a considerable amount of literature, which claims that human capital, in its all forms, has a positive impact on the economy. Human capital includes many indicators such as education, health, skills, training, life expectancy and many others. Being one of the prominent ingredients of human capital, education is a key determinant of economic well-being (Hanushek and Woessmann, 2010). In this article, the authors extend the standard real business cycle model by introducing the Government, which can tax consumption and allocate these resources to education financing. Spending on education increases human capital or productivity with a lag, because some time is required to accumulate skills. As a result, educational reforms increase human capital after almost 8 years. In this sense, the work relates to a class of endogenous growth models, more specifically, the model first introduced by Uzawa (1965) and Lucas (1988), known as the Uzawa-Lucas model. Solow (1956) constructs it like the neoclassical model of growth, where total output depends on physical and human capital and the saving rate is not exogenous but endogenously determined by the preference and technology parameters. Human capital in the Uzawa-Lucas model is built up by devoting time to education where the growth rate of human capital is a linear function of the time spent on education. In the model represented in this paper, the current consumption decreases, because of the reform in the education sphere, but later stabilises at a higher level. The short-run costs of the educational reforms make the low forward-looking people oppose them. As the less forward-looking public cannot see the long-run beneficial effects of reforms, the implementation of reforms and the uncertainty stemming from it decreases the government's political capital in the short run.

Political capital is generally used to describe the electorate's level of "trust" in policymaker politicians. Besides policy's long-run economic benefits, policymaker also takes into account political costs and benefits regarding applied policy. It is assumed that the policymaker has initial political capital which degrades during its political activity.

If the policymaker has initially high political capital, it can afford itself to implement tight economic policy by generating much more favourable results in the long run. As authorities govern for a short period of time and they are afraid of losing their political capital as a result of such reforms, the probability of implementation of this kind of policy is debatable. In the case of low initial capital, the most effective economic policies become almost impossible, leading to economic trade-offs. In these circumstances politicians may hold back on reforms, fearing they will be penalized and the only possible policy remains the accumulation of government debt or, in other words, surprise inflation, which creates short-run beneficial results by expanding economic activity.

Nevertheless, the benefits of such a policy are visible in the long run. When educational reforms have a positive impact after a while and build additional human capital, labour productivity is enhanced. Also, with the rise in labour not only does consumption and output recover from the implementation of reforms, but also consumption stabilises at a higher level

in the long run. Foreseeing the long-run beneficial effects of these reforms, high forward-looking people will require the government to implement this kind of policy. The authors also compare low effective educational reforms with baseline cases and conclude that when the efficiency of the reform in education is low, consumption is formulated at a lower level compared with the case of the highly efficient implementation of the reform. The rest of the paper is organised as follows: the second section presents the literature review; the third section introduces the model; the fourth section discusses results. Finally, the fifth section summarises all the above-mentioned.

2. Literature Review

Human capital plays a very important role in neo-classical literature featuring endogenous growth models. In contrast with the classical theory of economic growth where labour productivity is modelled exogenously and without taking into account the positive effect of education, the new literature models incorporate human capital into production function as an additional input. There is a large body of literature, implying that human capital impacts economic growth positively. Particularly, Syed Mohsin Kazmi, Kazim Ali and Ghamze Ali (2017) imply the long-run relationship between human capital and economic growth. Additional investment in the educational sector can maximize human capital, which leads to an increase in economic growth. Based on the study conducted in Indonesia for the period between 1984-2019, Widarni and Bawono (2021) have found a significant effect of human capital and technology on economic growth. According to them, human capital is effective in driving the economy in the long run with technology and labour as key factors driving economic growth. Moreover, according to Hess (2016), Human capital contributes also to an increase in GDP per capita and poverty reduction. Ricciardelli (2017) mentions human capital as a central driving force for the sustainable growth of the country. Vandenbussche (2004) constructs a model which shows that skilled labour has a higher growth-enhancing effect assuming that innovation is a relatively more skill-intensive activity compared to imitation. De la Fuente and Doménech (2000, 2006) obtain a positive significant correlation between production and human capital both in level and first-order differences. To explore the effect of education and training on individual earnings, Bundell et al (1999) believe that output growth depends on the rate of accumulation of human capital and innovation. By studying links between policy settings, institutions and economic growth from 1971 to 1998, Bassanini and Scarpetta (2001) obtained that a one-year increase in schooling raises GDP per capita by 6%. Michael Funke and Holger Strulik (2000) encompass an endogenous growth model in a standard neoclassical growth theory and build a model with physical and human capital. They obtain that while physical capital contributes to the growth of income per capita in the early stages of development, the accumulation of knowledge through continuous education and training leads to higher stages of growth. The proposed model shows the long-run beneficial effect of educational reform or human capital development on consumption and economic growth.

In the model, proposed by the authors, education plays a crucial role in the accumulation of human capital. There are many studies which support the idea that education is an important

mechanism in the formation of human capital (Ingsih et al., (2020), Mankiw, Romer, and Weil (1992), Lucas (1988), Burgess (2016), Calkin (2018), etc). Thus investing in education increases human productivity thus rising economic growth. Although educational reforms come with short-run costs which are often related to governments' political capital Furceri et. al (2019) argue that gains of reforms often take time to materialize and the associated electoral costs occur only when reforms are undertaken in the run-up to elections. This supports the idea that reforms are costly in the short run but are paid off in the longer horizon.

3. Methodology

The model economy is populated by households, who get the utility from consumption and leisure. On the expenditure side, they buy consumption and investment goods. On the other side, they supply labour and capital to firms and get wages and return on capital, respectively. Firms produce final goods by hiring labour and capital. Final goods are divided into consumption and investment goods. The authors introduce human capital into the model. The higher value of the human capital increases productivity and output. Besides, the government is also introduced into the model, which taxes consumption and spends those resources on education contributing to the accumulation of the human capital.

1.1. The Model Environment

There is a representative household in the model environment, which maximises its lifetime utility given by the form.

$$\max_{\{C_t, N_t, I_t\}} \beta^j \left(\frac{C_{t+j}^{1-\sigma}}{1-\sigma} - \frac{N_{t+j}^{1+\varphi}}{1+\varphi} \right) \tag{1}$$

In equation (1) C_t is the consumption, N_t is the labour supply, β is the discount rate, σ is the consumption intertemporal elasticity of substitution or risk aversion, and φ is the inverse of Frisch labour supply elasticity. The household has the following budget constraint.

$$(1 + \tau_t^c)C_t + I_t = W_t N_t + R_t K_{t-1} + Div_t \tag{2}$$

In equation (2) τ_t^c is the consumption tax rate. In addition to consumption, the household invests in the capital(I_t). Income is the composition of wages (W_t) and the return on capital (R_t) from previously lent capital (K_{t-1}). As households are the owners of firms, firms transfer their dividends to households (Div_t). Households hold the capital as well and rent out to firms. The law of capital accumulation is given by the following.

$$K_t = (1 - \delta)K_{t-1} + I_t \tag{3}$$

In equation (3) δ is the depreciation rate of capital. Substituting the investment expressed as a function of capital to the household's budget constraint, the utility maximization problem becomes (household chooses the optimal values of consumption, capital and labour supply).

$$\mathcal{L}_{t+j} = \max_{\{C_t, N_t, K_t\}} \beta^j \left(\frac{C_{t+j}^{1-\sigma}}{1-\sigma} - \frac{N_{t+j}^{1+\varphi}}{1+\varphi} \right) - \lambda_{t+j}\left((1+\tau_{t+j}^c) C_{t+j} + K_{t+j} - (1-\delta) K_{t-1+j} - W_{t+j} N_{t+j} - R_{t+j} K_{t-1+j} - Div_{t+j} \right) \quad (4)$$

In the above problem, λ_t is the Lagrange multiplier or the shadow price of consumption. Then the first-order conditions are calculated.

$$\frac{\partial \mathcal{L}_{t+j}}{\partial C_t}: C_t^{-\sigma} - \lambda_t (1+\tau_t^c) = 0 \quad (5)$$

$$\frac{\partial \mathcal{L}_{t+j}}{\partial N_t}: -N_t^{\varphi} + \lambda_t W_t = 0 \quad (6)$$

$$\frac{\partial \mathcal{L}_{t+j}}{\partial K_t}: -\lambda_t + \lambda_{t+1}(1-\delta) + \lambda_{t+1} R_{t+1} = 0 \quad (7)$$

Derivative of the problem with respect to consumption in the t+1 period has the form.

$$\frac{\partial \mathcal{L}_{t+j}}{\partial C_{t+1}}: \beta C_t^{-\sigma} - \lambda_{t+1}(1+\tau_{t+1}^c) = 0 \quad (8)$$

Using the above derived first-order conditions and doing some mathematical operations, the authors get the following equations of the household problem.

$$W_t = N_t^{\varphi} C_t^{\sigma} (1+\tau_t^c) \quad (9)$$

$$\frac{1}{C_t^{\sigma}(1+\tau_t^c)} = \frac{\beta(R_{t+1} + (1-\delta))}{C_{t+1}^{\sigma}(1+\tau_{t+1}^c)} \quad (10)$$

Equation (9) shows the intratemporal substitution of consumption and labour, and equation (10) depicts the intertemporal Euler equation of consumption.

Thus, it is assumed that the Government taxes the consumption and uses these resources for education financing.

$$Educ_t = \tau_t^c C_t \quad (11)$$

The increase in spending on education results in an accumulation of human capital. The accumulation of the human capital stock (H_t) follows the process.

$$H_t = {H_{t-1}}^{\rho_H} + \vartheta Educ_{t-32} \quad (12)$$

The current value is the function of the previous period's human capital stock and the spending on education. Some time is needed for today's spending on education to become efficient human capital. That's why, in the proposed model, spending on education transforms into human capital in eight years (Educ_{t-32}). ϑ is the efficiency parameter of the spending on education, which shows how efficiently the educational financing transforms into human capital and increases productivity.

Investing in education disrupts consumption from its steady state. We refer to the cumulative loss of consumption as the cost of educational reforms which is given by the following equation:

$$Refcost_t = \gamma_R \sum (C_t - C^{SS}) \tag{13}$$

Political capital, which can be described as the electorate's level of trust towards policymakers, follows an AR(1) process, simultaneously being a decreasing function from the cost of reforms. Moreover, it is assumed that policymakers have some initial level of political capital which depreciates through the course of their political activity if they don't commit to reform policies. Reform implementation on the other hand decreases policymaker's political capital in the short run following the reduction of consumption. The political capital is given by the following equation:

$$K_{p,t} = K_{p,initial} - \gamma_k K_{p,t-1} - \rho_k Refcost_t \ , \qquad \gamma_k > 0, \ \ \rho_k > 0 \tag{14}$$

The production is expressed by the Cobb-Douglas production function of the following form.

$$Y_t = A_t K_{t-1}^{\alpha} (H_t N_t)^{1-\alpha} \tag{15}$$

In equation (13) A_t is the exogenous productivity, which is modelled as a first-order autoregressive process ($A_t = {A_{t-1}}^{\rho_A} + \varepsilon_t^A$), α is the share of capital. $H_t N_t$ is the effective labour, which is the combination of human capital and labour. Firms maximise their profits by choosing the optimal values of labour and capital.

$$\max_{\{K_{t-1}, N_t\}} Div_t = Y_t - W_t N_t - R_t K_{t-1} \tag{16}$$

Then authors substitute the production function into the maximization problem and calculate first-order conditions. As a result, the following equation is represented.

$$\frac{\partial Div_t}{\partial K_{t-1}}: \alpha A_t K_{t-1}^{\alpha-1} (H_t N_t)^{1-\alpha} - R_t = 0 \tag{17}$$

$$\frac{\partial Div_t}{\partial N_t}: (1-\alpha) A_t K_{t-1}^{\alpha} (H_t N_t)^{-\alpha} - W_t = 0 \tag{18}$$

After some transformations, the authors get the following equations.

$$R_t = \frac{\alpha Y_t}{K_{t-1}} \tag{19}$$

$$W_t = \frac{(1-\alpha) Y_t}{N_t} \tag{20}$$

Equations (19) and (20) show that GDP is divided into two components, i.e. return on capital and total wage.

Market clearing condition requires that production equals expenditures. It is represented by the following equation (21).

$$Y_t = C_t + I_t + Educ_t \tag{21}$$

1.2. Analytical solution of the model's steady state

The deterministic steady state of the model assumes that all the variables are stable and constant over time. In the steady state, it is assumed that the tax rate is 0 ($\tau^{c,ss} = 0$), and the value of productivity is 1 ($A^{ss} = 1$).

Writing down the Euler equation in a steady state, the following one is presented.

$$\frac{1}{C^{ss^{\sigma}}(1+\tau^{c,ss})} = \frac{\beta(R^{ss}+(1-\delta))}{C^{ss^{\sigma}}(1+\tau^{c,ss})} \quad (22)$$

After some simple math, the authors stay with the return on capital in the steady state, which is a function of the economy's structural parameters.

$$R^{ss} = \frac{1}{\beta} - (1-\delta) \quad (23)$$

As it is not explicit for this model to write down the steady state, some techniques for the calculation are used. The authors take the capital return equation and write it in a steady state.

$$R^{ss} = \frac{\alpha Y^{ss}}{K^{ss}} \quad (24)$$

Substituting the production function ($Y^{ss} = A^{ss}K^{ss^{\alpha}}(H^{ss}N^{ss})^{1-\alpha}$) in equation (22), the following one is represented.

$$R^{ss} = \frac{\alpha A^{ss}K^{ss^{\alpha}}(H^{ss}N^{ss})^{1-\alpha}}{K^{ss}} \quad (25)$$

Some simple math allows us to have the capital/labour ratio in a steady state the following.

$$\frac{K^{ss}}{N^{ss}} = \left(\frac{\frac{1}{\beta}-(1-\delta)}{\alpha}\right)^{\frac{1}{\alpha-1}} \quad (26)$$

As the return on capital is already expressed as a function of structural parameters, the capital/labour ratio can be written as follows.

$$\frac{K^{ss}}{N^{ss}} = \left(\frac{R^{ss}}{\alpha}\right)^{\frac{1}{\alpha-1}} \quad (27)$$

The authors use the above ratio in the proceeding steps for the calculation of the model's deterministic steady state. Then the wage equation is taken ($W^{ss} = \frac{(1-\alpha)Y^{ss}}{N^{ss}}$). After some mathematical steps, wage in the steady state is expressed by the following.

$$W^{ss} = (1-\alpha)\left(\frac{K^{ss}}{N^{ss}}\right)^{\alpha} \quad (28)$$

Using the capital accumulation equation, investment in a steady state is equal to the depreciated capital $I^{ss} = \delta K^{ss}$. Then authors take the market clearing condition.

$$Y^{ss} = C^{ss} + I^{ss} + Educ^{ss} \quad (29)$$

Substituting the production function into it and doing simple transformations, the following expression is obtained.

$$C^{ss} + I^{ss} = \left(\frac{K^{ss}}{N^{ss}}\right)^{\alpha} N^{ss} \tag{30}$$

Deriving both sides of the equation by N^{ss} and using the investment equation ($I^{ss} = \delta K^{ss}$), authors get the consumption/labour ratio as a function of an already known expression.

$$\frac{C^{ss}}{N^{ss}} = \left(\frac{K^{ss}}{N^{ss}}\right)^{\alpha} - \delta \frac{K^{ss}}{N^{ss}} \tag{31}$$

The consumption/labour intratemporal equation written in the steady state has the following form.

$$W^{ss} = N^{ss\varphi} C^{ss\sigma} (1 + \tau^{c,ss}) \tag{32}$$

Further, the authors express the consumption from the above equation ($C^{ss} = \left(\left(\frac{K^{ss}}{N^{ss}}\right)^{\alpha} - \delta \frac{K^{ss}}{N^{ss}}\right) N^{ss}$), and put it into the consumption/labour equation. In addition, using the wage equation in steady state authors end up with the following expression.

$$(1-\alpha)\left(\frac{K^{ss}}{N^{ss}}\right)^{\alpha} = N^{ss\varphi}\left(\left(\frac{K^{ss}}{N^{ss}}\right)^{\alpha} - \delta \frac{K^{ss}}{N^{ss}}\right)^{\sigma} N^{ss\sigma}) \tag{33}$$

After some transformation, labour in a steady state is expressed as a function of structural parameters.

$$N^{ss} = \left[\frac{(1-\alpha)\left(\frac{K^{ss}}{N^{ss}}\right)^{\alpha}}{\left(\left(\frac{K^{ss}}{N^{ss}}\right)^{\alpha} - \delta \frac{K^{ss}}{N^{ss}}\right)^{\sigma}}\right]^{\frac{1}{\varphi+\sigma}} \tag{34}$$

At this point, there is sufficient information for the calculation of the steady state for the remaining variables of the model. Capital in steady state is expressed as a capital/labor ratio multiplied by labor($K^{ss} = \frac{K^{ss}}{N^{ss}} N^{ss}$). Steady states of other variables are below.

$$C^{ss} = \frac{C^{ss}}{N^{ss}} N^{ss} \tag{35}$$

$$I^{ss} = \delta K^{ss} \tag{36}$$

$$Y^{ss} = C^{ss} + I^{ss} \tag{37}$$

1.3. Calibration

The model's parameters are calibrated using the values commonly used in RBC literature. The model is in quarterly frequency. The discount parameter (β) is 0.99, which corresponds to a 4% annual real interest rate. The Frisch elasticity of labour supply (φ) is calibrated to 1.5 following Justiniano and Preston (2010) and the risk aversion parameter (σ) is also set to 1.5, considering the diverse estimates emerging from macro and micro studies (Christiano et al. (2011) use a logarithmic form of utility meaning that $\sigma = 1$ and Devereux et al. (2006) sets $\sigma = 2$. The share of capital in the production function (α) is 0.35, this is a conventional value, which is typically lower for advanced countries and higher for emerging economies.

The depreciation rate of capital (δ) is calibrated to 0.025, which corresponds to the 10% annual depreciation rate and is the standard value used in the macro literature, (Christiano et al. 2005). The persistence parameters of exogenous processes are set to 0.9.

4. Results and Discussion

To preserve the nonlinearities of the model, authors do not do any approximation and find the exact solution[6]. All the simulations start from a steady state. Starting from the 20th period, the Government started to implement the policy by taxing consumption and financing education (see Figure 1). As a result of the increase in tax, consumption reduces dramatically, households work less. The slowdown in economic activity results in a decrease in investments, which is insufficient to restore the depreciated capital and the stock of capital decreases. Spending on education starts to increase the human capital after 8 years from the implementation of the educational reform. Increasing human capital with the rise in labour increases effective labour, which starts to have a positive impact on GDP. Because of recovering economic activity, investments start to increase, accumulating more capital. Consumption returns to the pre-reform state and stabilises at a higher level distant future. Keeping the positive tax rate, spending on education and the accumulation of human capital accelerates in the long run as a result of the increasing consumption.

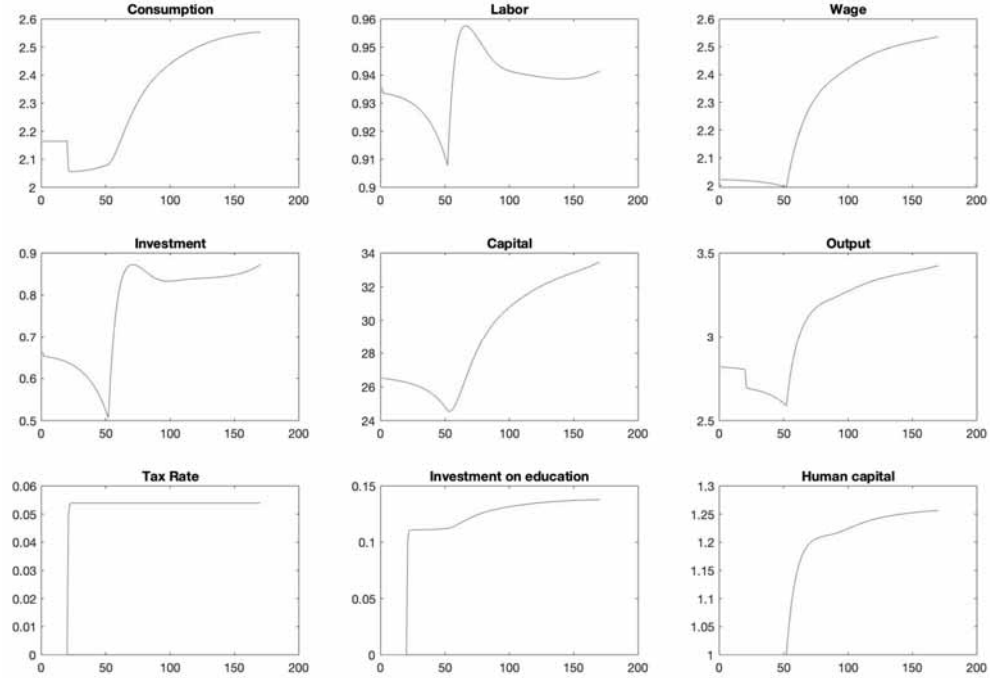
This policy yields an increase in long-term productivity, but decreases consumption in the short and medium runs, which means that it is not likely to be implemented by policymakers. Governments are selected for a short period of time, and they do their best to increase people's consumption to keep their reputation and to be elected again. Costly policies could be implemented by governments with very high political capital, which will not be depreciated significantly during the reform. On the other hand, societies with high forward-lookingness put pressure on the government to implement this kind of reform, because they see the potential future benefits of the reform and are ready to face lower consumption in the short run. Figure 1 presents how the model economy responds to the tax shock and education financing.

Figure 2 plots the policymaker's political capital in the case of three different initial values along with the cost of reforms. The simulations were obtained based on the results of Figure 1. As mentioned above, the costs of reforms indicate cumulative loss of consumption compared to its initial steady state. Political capital, on the other hand, is a stock which degrades from its initial value during the policymaker's political activity. Reform implementation reduces political capital as a result of cumulative loss in consumption. The intersection of political capital and the cost of reforms is the point where policymakers resign due to public demand. Thus it is important to keep implementing reforms up to that point. Afterwards, policymakers gain political capital in the long run due to the implementation of reforms. The lower the initial political capital, the sooner the intersection with reform cost happens. Thus governments which initially have low political capital, are constrained in their

[6] The simulations are implemented within the Dynare software platform. All the Matlab and Dynare codes are available upon request.

abilities to create reforms. They usually hold back on reforms and use alternative policies such as the accumulation of government debt or the creation of surprise inflation. Those policies, however, create only short-run beneficial results contrary to the implementation of educational reforms, whose benefits are harvested in the long run. Therefore governments with high initial political capital should implement reforms right from the start of their political activity despite the reduction of political capital in the short run.

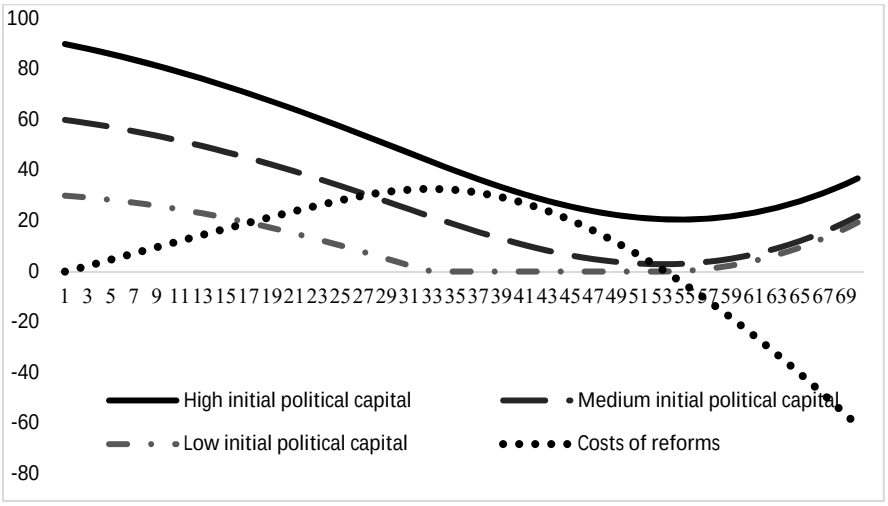
Figure 1. Impulse responses of the model variables to the tax shock and education financing



Source: Authors' calculations.

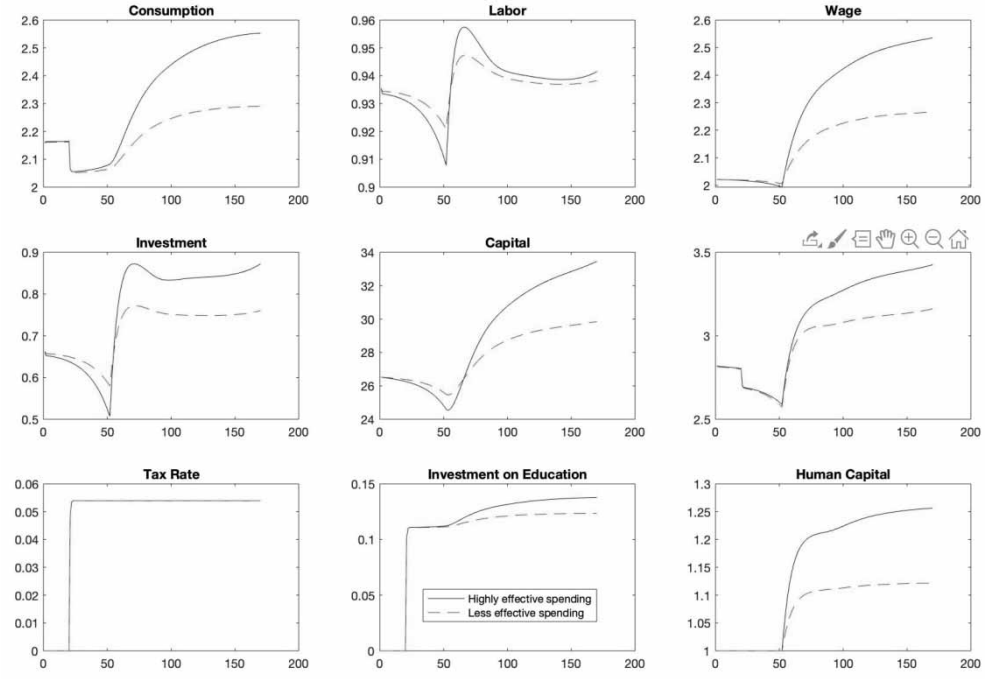
Figure 3 plots the comparison of the above-discussed scenario with the one with less effective reform. In the case of the less effective reform, consumption returns to the pre-reform level longer and stabilises at a low level compared with the case of the highly effective implementation of the reform. So, it is important to make effective spending and monitor that all the resources are targeted and contribute to the accumulation of knowledge.

Figure 2. Impulse responses of the costs of reforms and political capital to the tax reform and education financing



Source: Authors' elaboration.

Figure 3. Impulse responses to the high and low effective reforms



Source: Authors' elaboration

5. Conclusion

In this paper, a neoclassical model was built which relates to a class of endogenous growth models, specifically the famous Uzawa-Lucas model. The research introduces human capital as an input in the production function and explores its impact on economic performance. Similar to the existing large body of literature, this work also supports the idea that building human capital increases economic growth. This result operates through education, which happens to be one of the main contributors to human capital. Thus, the authors model human capital as a stock, which is an increasing function of education. By implementing the government's tax and allocating it to educational reforms, short-run economic costs are obtained. Particularly, tax increase reduces consumption sharply and a decrease in labour work slows economic activity. This leads to a decline in investments and as a result, capital stock decreases. These short-run economic costs carry the risk of loss in the government's political capital as people with low forward-lookingness will oppose these reforms. Particularly, by modelling the cost of reforms as a cumulative loss of consumption, we obtain the short-run increase of this cost. With the increase of reform costs electorates' trust level towards the policymaker starts to weaken, which is reflected in the reduction of the latter's political capital. Thus, it is unlikely that authorities willingly choose this kind of policy. Moreover, if the policymaker has initially a low level of political capital, it won't get the chance to create reforms and the only possible policy will remain the accumulation of government debt. Nevertheless, these short-run costs of educational reforms are paid-off in the long run and the economy ends up in a better place. Ultimately, increased education starts to have positive effects on building human capital. Along with an increase in productivity, the rise of labour brings economic activity back and consumption ends up at a higher level in the long term. And because of recovering economic activity, investments start to increase the accumulation of capital. People with high forward-lookingness can recognise the long-run benefits of this policy thus they require the government to implement reforms. Thus, it is essential for economies with the characteristics of low human capital to implement educational reforms, even though it carries the risks of loss in political capital due to short-run economic costs. Finally, comparing low effective reforms with the baseline case of highly effective reforms, authors conclude that in the first case, the economy recovers way slower and the main macroeconomic variables such as consumption, investment and output are formed at a lower level.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
ECONOMIC STUDIES

Volume 32(6), 2023

Violeta Dimitrova[1]

LABOUR PRODUCTIVITY GAPS IN THE TRADE INDUSTRIES IN BULGARIA AND SOME EUROPEAN COUNTRIES[2]

In recent years the question of labour productivity has gained new relevance as a result of digitalization and economic crises, and their effects on the transformation of distributive trade business. The purpose of this study is to make a comparative analysis of labour productivity in the wholesale and retail trade in Bulgaria and ten countries of Central and Eastern Europe that have made the transition to a market economy and to bring out the trends and reasons for the labour productivity gap. The analysis is descriptive and mainly uses the outpace ratio to measure the productivity gap between Bulgaria and each of the countries through a comparison of two main indicators: turnover and gross margin per person employed. The data from Eurostat are used with a focus on the period between the two economic crises in 2008 and 2020-2021.
Keywords: labour productivity gap; retail and wholesale trade; digitalization
JEL: M21

1. Introduction

The distributive trade sector (wholesale and retail) is subject to significant changes – the increasing share of e-commerce, digitalization of trade operations and level of concentration. These structural and digital transformational processes as well as the large relative share of labour costs in the sector, the increasing rates of inflation and the governmental employment-related measures to curb the impact of the Covid-19 pandemic, have raised with a new relevance the questions about the efficiency of resources used, especially the place and role of the labour force and its productivity. The study of productivity at the industry level and the comparative analyzes per countries are important for both economic theory and policies. Understanding changes in labour productivity is essential for analyzing the state of the market structure and its evolution.

The interest in labour productivity, especially in wholesale and retail trade, is determined by the place of the sector in the Bulgarian economy. Despite the fact that the total number of persons employed in trade decreased in 2020 and reached values lower than those in 2007, the sector retained the second place, after manufacturing in terms of employment compared

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[2] This paper should be cited as: *Dimitrova, V. (2023). Labour Productivity Gaps in the Trade Industries in Bulgaria and Some European Countries. – Economic Studies (Ikonomicheski Izsledvania), 32(6), pp. 54-75.*

to the total number of persons employed in the country's economy in 2020 – 16.88% (NSI, 2022). The share of the services sector in GVA in 2020 was 70.7%, and the trade sector accounted for 21.22% of gross value added in 2020 by factor costs in the country against 19.56% in 2007. Therefore, the changes in labour productivity in the trade sector have a wide impact on the country's economy as a whole. The structural and digital transformation of the trade industry in Bulgaria began with the creation of modern trade after 2000, it was further stimulated by the economic crisis in 2008 and the current economic crisis in the conditions of the Covid-19 pandemic.

The purpose of this study is to make a comparative analysis of labour productivity in the wholesale and retail trade in Bulgaria and countries of Central and Eastern Europe that have made the transition to a market economy and bring out the trends and reasons for the labour productivity gap. The brief review of publications and documents devoted to comparative analyzes of the distribution sector shows that developed countries were primarily the subject of such analyses, and studies of comparative labour productivity in distributive trade in Central and Eastern Europe were limited. The countries in the sample (Bulgaria, Czechia, Estonia, Croatia, Latvia, Lithuania, Hungary, Poland, Romania, Slovenia and Slovakia) went through the transition stage from a centralized to a market economy. Their functioning as market economies started from approximately the same economic development, incl. of wholesale and retail trade and their labour productivity. Regardless of some differences between the countries' pre-transition stages, they transitioned from generalized excess demand (or shortage) to macroeconomic balance (McHale, 2001). All countries are currently members of the EU. The period of study coincides with the period of Bulgaria's membership in the EU, a period of harmonization of legislation and economic policies. The research period was marked by the idea of the development of a single EU retail market. In the last two years of the study period the countries from the sample also implemented economic and employment-related measures to reduce the impact of the Covid-19 pandemic.

International comparisons of trade labour productivity make it possible to understand how markets work in order to search for appropriate economic policies. It is the task of policymakers to ensure that firms, workers and consumers have the right incentives to invest, work and consume. Labour productivity is influenced by factors of the external environment, macro and micro, as well as internal company factors. This macro analysis focuses on the basic drivers of labour productivity in the trade sector – concentration, digitization, investment, labour intensity and cost. The importance of labour productivity gap problem is increasing as the intensity of trade competition increases after computerization and the opening of retail markets. The changes in the market environment, the expansion of the share of e-commerce and the importance of internal consumption in the conditions of a disrupted supply chain determine the importance of comparative analyzes of labour productivity in the trade sector.

The empirical analysis is descriptive and mainly uses the outpace ratio to measure the productivity gap between Bulgaria and each of the countries on a comparison of two main indicators for measuring labour productivity: turnover and gross margin per person employed in the wholesale and retail trade. The analysis used data from Eurostat with a focus on the period between the two economic crises in 2008 and in 2020. Empirical data are also

presented and analyzed, as well as a content analysis of documents, on the development of the sector in the period of the Covid-19 pandemic and the economic crisis of 2020-2021.

The study is structured in an introduction, four parts and a conclusion. The introduction defines the purpose and reasons for the research. The second part makes a brief review of the research on the comparative analysis of labour productivity in the wholesale and retail trade. The third part discusses the methodology of research and some methodological problems in the assessment of labour productivity in trade activity. The fourth part presents the results of the comparative analysis of labour productivity in the wholesale and retail trade in Bulgaria and countries of Central and Eastern Europe that have made the transition to a market economy. The fifth part shows the transformation processes in the trade industry and the basic reasons for the labour productivity gap. The conclusion summarizes the main findings of the analysis.

2. Literature Review

The productivity of resources, including labour, has been the focus of the states' policy and field for research. In recent years there has been an increased interest in the development of the retail and wholesale industry, including their productivity. A number of European Commission documents examine the importance of the distribution services that the trade sector provides for the EU economy. After the financial crisis and the following economic crisis in 2008 with an impact on 2009 economic developments, the decrease in the productivity of the distributive sector was one of the reasons for the intensity of analyses, forums, preparation, discussion and adoption of reports, resolutions and a general plan for the development of retail trade. In 2010 the retail market monitoring report "Towards More Efficient and Fairer Retail Services in the Internal Market for 2020" was prepared (European Commission, 2010). In 2011, a resolution of the European Parliament for a more efficient and fair retail market was adopted (European Parliament, 2011).

Considering the role of trade in stimulating growth and creating jobs in the economies of EU countries and in line with the Europe 2020 strategy, the European Commission approved a new European Action Plan in the field of retail trade (European Commission, 2013). The plan includes a strategy to improve the competitiveness of the retail trade sector and increase its economic, environmental and social efficiency. It lays down main priorities, including the creation of a better working environment and better matching the needs of employers and the qualifications of employees. The priorities derived are a consequence of the realization that trade operates in a socioeconomic context in which strategic choices affect the wealth of many citizens. The single retail market expands the choice of consumers in Bulgaria. For local companies, it provides new opportunities, but it is also associated with numerous challenges – primarily resulting from the growing intensity of competition. It is the result, on the one hand, of the slow growth rates of sales after 2008, and on the other hand, of the entry of innovative foreign competitors, as well as the ever-increasing digitalization of trade and the entry of new market actors. The development of digital transaction platforms provides opportunities to sell in other countries, but also expands competitors' access to the domestic consumer goods wholesale and retail market.

It was pointed out at the World Retail Congress in September 2021 that small and large retailers suffered from historically low margins, they needed government support to invest in digitalization and achieve sustainable development (EuroCommerce, 2021). In 2021, at the request of the US Bureau of Labour Statistics, specialists from the National Academies of Sciences in the US prepared a report to assess changes in the retail trade sector, measures of employment and labour productivity (National Academies of Sciences, Engineering, and Medicine, 2021). At a conference of the National Retail Federation of USA (NRF) in January 2022, the main trends in the development of retail trade were discussed, including omnichannel, problems in the supply chain and labour wages (NRF, 2022).

Differences in distributive trade sector labour productivity between individual national economies have been the subject of research and assessment. The brief analysis showed that researches were mainly devoted to comparative analyzes of the distribution sector in developed countries. The distribution sectors of the USA and EU were more often the subject of research (Timmer et al., 2004). According to a report by the US Bureau of Labour Statistics, labour productivity in the USA increased and annual productivity growth for retail trade in 2020 was the highest since measurement began in 1987, while output in wholesale trade decreased for the first time since 2010 (US Bureau of Labour Statistics, 2022). There were differences in the rates of development of labour productivity in two related economies: Canada and the USA (Rao et al., 2008, p. 164) and a widening of the labour productivity gap. Although there are differences between the authors, they are united around the thesis that labour productivity in Canada was significantly lower than that in the USA. While there is a large body of research on the analysis of internal firm factors affecting productivity, the analyse of external ones is more limited. Some of them focused on specific local factors such as country population density, average store size within countries, foreign trade ratio, concentration, economic freedom and percentage of urban population (Roche et al., 2019, pp. 774-792), and in others, the subject of analysis were local competitive conditions (Hernant et al., 2007, pp. 912-935). These studies were related to the evaluation of the factors determining the attractiveness of a given country's retail and wholesale sectors for investment.

Griffith and Harmgart analyze UK’s productivity gap in the retail sector which shows that the UK lies well behind the US, France and Germany (Griffith, Harmgart, 2004). The UK's poor performance in terms of productivity compared to the US was the focus of government policy in the budget analysis. Comparative research on labour productivity in the retail sector in the UK, Germany, France, and the Netherlands (Cox et al., 2016) shows significantly higher levels in the UK and France compared to the average for the EU 28 and the rest of the countries in the sample. One of the reasons explaining the labour productivity gap in the commercial sector by country was the different development of e-commerce, the share of which among European countries during the study period was the highest in the UK. The UK has the most advanced e-commerce market in Europe. In 2022, the country was expected to have nearly 60 million e-commerce users (Statista, 2022). The rates of development of labour productivity in the trade sector differ significantly by sectors and countries. The lower level of productivity in the trade sector compared to other economic sectors is mainly explained by the labour-intensive nature of many distribution services, especially retail (Cox et al., 2016). The other explanation of weak labour productivity is the size of firms which make up the retail and wholesale sector, basically small and medium-sized enterprises (SMEs), which

have lower labour productivity with less managerial experience, lower opportunities for investment, implementation of new technologies and staff training. Another major factor that is the subject of research for differences in labour productivity between sectors is investment growth.

Unlike the many comparative studies of labour productivity in the wholesale and retail trade in developed countries, comparative analyzes for Central and East Europe countries were limited. Some evaluated the labour productivity in distributive trade in the process of accession of countries to the EU. For example, there was an analysis of labour trade sector productivity in Poland, Hungary, Czech Republic and Slovakia and EU-15 countries (Rozas and Diaz, 2003, pp. 7-24). The European Commission did a comparative analysis of sectoral productivity, including wholesale and retail, by EU countries (European Commission, 2001), (Murakozy et al., 2018). Changes in turnover per employee were the subject of research as part of the EU 27 wholesale and retail trade survey (Knezevic et al., 2011, pp. 34-49) and the EU-28 economic growth survey (Mladenovic et al., 2019, pp. 489-506). Usually, the comparative analyzes of research countries were for the service sector as a whole with a brief presentation of the trends in the distributive sector (Bauer et al., 2020).

3. Methodology of Research

Much research has been devoted to the methods and indicators of labour productivity analysis, particularly in the wholesale and retail trade. The measurement of productivity as a ratio between outputs to inputs raises three main groups of problems: 1) selection of indicators for measuring the output of trade activity; 2) selection and measurement of input resources; 3/ choice between applying indicators to evaluate the productivity of individual resources, including labour, and deriving relationships between them that show the efficiency of retail and wholesale activity and/or using multi-factor productivity indicators.

The scientific discussion of what the output of retail and wholesale trade is, and the related discussion of the statistical measurement of the economic output of trade at the national economy and economic sector level, dates back to the beginning of the last century. Many specialists support the statement "that, the definition and measurement of retail output cause more difficulty than retail input" (McAnally, 1963, p. 88). The problems stem from the difficulty in quantifying the distribution service that retail and wholesale trade provide. Defining the outcome of distributive trade continues to be an object of analysis by many authors (Rosenbloom, 2010, pp. 7-55; Ratchford, 2016, pp. 54-72; Zentext et al., 2017, pp. 3-23), and extensive research is currently being conducted by Betancourt (2004, 2020). The transformation process in commerce is resale or exchange. Trade firms are part of marketing institutions, but as an economic activity commerce is a broader concept than marketing, which is only one of the functions in a given trade business and one of the flows of the exchange. In order to make the purchase for the purpose of resale, it is necessary to implement various processes. The concept of channel flows (Rosenbloom, 2010, p. 8) describes the distribution channels as a system of eight flows: product, ownership, promotion, negotiation, financing, risk, ordering and payment flows. This broader understanding of commerce as an environment for conducting business is enshrined in the Commercial Law and the Law on

Electronic Commerce, according to which, electronic commerce is the provision of services to the information society. E-commerce is the integrating part of business processes.

The empirical analysis in the present research is descriptive and involves arranging, summarizing and presenting a set of data. Each of the indicators for measuring the economic effect of trade activity – turnover, gross margin, value-added and profit has advantages and limitations that make it more or less applicable at different levels of research – store, company, region and national economy. We use two main indicators for measuring labour productivity: turnover and gross margin per person employed in the wholesale and retail trade. Turnover presents the volume of sales. An advantage of the turnover is that it excludes VAT and other similar deductible taxes directly linked to turnover as well as all duties and taxes on the goods or services invoiced or it is not affected by policies in the field of direct taxes and fees. But the application of turnover in comparative analysis is limited by the differences between individual national and regional commodity markets. Within a regional market, differences can be observed in the volume of sales revenue by trade areas and, therefore, in labour productivity. The most important factors determining the specifics of supply and demand are the differences in the intensity of competition and the purchasing power of consumers. There are proposals to use the number of transactions instead of turnover in value terms as a measure of effect. Of course, this indicator suffers from the same imperfections as the volume of turnover in value terms (for example, the share of market consumption in different countries), but it also hides others such as the size of the consumer basket in one transaction.

Gross margin, or the difference between sales revenue and cost of goods sold, adjusted for changes in inventory, is a more reliable measure of business performance than turnover. The gross margin on goods for resale shows the market power of the retailers and wholesalers horizontally and vertically. It is the price of the commercial service. The production process in trade is resale. "The resale includes a number of actions which might be undertaken to make goods available for buying including negotiating transactions between buyers and sellers or buying goods from the manufacturer on own account, transporting, storing, sorting, assembling, grading, packing, displaying a selection of goods in convenient locations" (United Nations Statistical Commission, 2007, p. 15). These actions can be organized or combined in different ways, especially with the development of digitalization. In this way, the effects of digitalization deepen the discussion of what constitutes and how to measure the output of retail and wholesale activities.

One of the current active advocates for the development of the economics of retail and wholesale is Betancourt, who considers distribution service as composed of 5 main elements: location (access to the point of sale), selection and presentation of the assortment, information, delivery and ambience (Betancourt, 2004, pp. 17-20). This understanding of the product of trade activity supports the thesis that gross margin or the cost of trade service should be used as the main measure of the effect of wholesale and retail trade. Absent or largely weak competition, other things being equal, ensures that when a retailer does not invest in serving their customers and marketing costs are low, gross profit will be high. With strong competition, the merchant must show skill and effort to provide greater utility to their customers at a lower price at the expense of a lower level of gross profit. In this case, in comparative analyses, gross profit is not a sufficiently reliable measure of labour productivity

and other used resources. In the sectoral analyses, in addition to these indicators, value added (gross output minus the value of all inputs originating as the output of other firms) is also applied.

The other problem in performance evaluation is related to the measurement of input resources. Manpower is the main production resource that activates other resources and manages the process of production and distribution of goods and services. The labour market offers the ability to work under conditions determined for each specific situation. This ability to perform a certain labour activity is the property of a specific individual. Once acquired, labour property cannot be transferred to another entity as a result of an agreement, unlike intellectual property. Regardless of the presence of market relations, human capital is unsellable and remains the eternal property of its owner. When concluding an employment contract, the subject of negotiation is the workforce, or the ability to influence the other factors of production. Therefore, the most commonly used measures of labour input are the number of personnel and/or man-hours worked. Difficulties arise when trying to value the work involved. The initial costs of hiring and training the workforce do not represent the full amount of the investment. The US Bureau of Labour Statistics applies a multi-factor productivity index that includes capital and labour as inputs, "and costs of these inputs as a share of the total cost", as well as an index of labour productivity per hour worked (Ratchford, 2016, p. 55).

As a result of the above, for the purposes of this study, labour productivity is measured by the turnover and gross margin divided by the number of workers. Due to the use of temporary statistical series and the possible presence of autocorrelation in the data, the labour productivity gap is measured by the outpace ratio (labour productivity in the Bulgarian trade industry divided by the labour productivity of each country from the sample). When the values of the coefficient tend to be 1, this indicates a reduction in the labour productivity gap. The analysis used data from Eurostat with a focus on the period between the two economic crises in 2008 and 2020-2021. Transformations in trade industries with a focus on concentration, digitization, investments, labour intensity and costs are considered the main driver for changes in labour productivity. A coefficient of overtaking of investments in the trade industries in Bulgaria compared to other countries has been calculated.

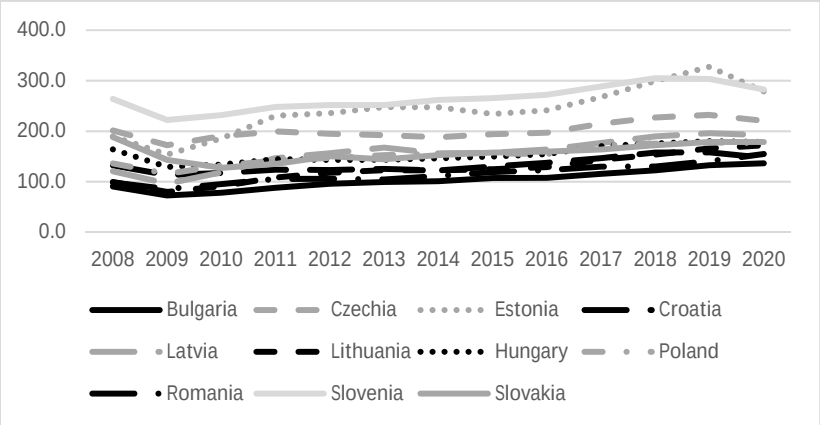
4. Comparative Analysis of Labour Productivity in the Wholesale and Retail Trade in Bulgaria and Some Countries of Central and Eastern Europe – Results

Data on turnover and employment in the trade sector demonstrate its role as an indicator of the economic cycle. After the crisis starting in Q4 of 2008 with an impact on 2009 economic developments, there was a decline in the indices. The deflated turnover (2015=100%) and volume of sales in the wholesale and retail trade (annual data) show that in the countries of the sample, the effects of the crisis manifested themselves mainly in 2009 and 2010, when a decrease in the volume of turnover was noted (Eurostat, 2022). Exceptions were Estonia and Hungary, where the decrease in the indicator had already been reported in 2008. Only Poland had almost continuous growth of the annual index of sales in the trade industry during the period. At the beginning of the period, Bulgaria, followed by Poland, had the lowest level of

retail trade concentration (see Figure 3). The crisis in the conditions of the Covid-19 pandemic was significantly less reflected in the trade sector in the sample countries compared to its effect in Greece, Spain and Italy, which relied to a significant extent on tourism revenues and related trade with consumer goods. The researched countries recorded significantly higher annual sales index of turnover in 2020 and 2021 (deflated 2015=100%) compared to the EU 27 average, except Czechia, which was with an index below the average throughout the studied period. Some of the reasons were the relatively less developed financial sector, higher growth rates, the lower dependence on foreign markets and the relatively high growth rate of e-commerce development. The sampled countries also registered a significantly higher average monthly index of retail turnover in 2020-2022 according to Eurostat.

The development of employment in the trade industry during the period under study differed significantly from that of sales. In six of the countries (Romania, Hungary, Slovenia, Poland, Estonia and the Czech Republic), the annual index in 2020 compared to 2019 remained positive with the highest rate in Romania (114%) and the lowest in the Czech Republic (101.5%). Its values were relatively lower than those of sales dynamics. The most significant was the decrease in the annual employment index in Latvia (-4.1%), followed by Estonia and Bulgaria (-3.4%). The biggest impact was undoubtedly the restrictions in the conditions of Covid-19 and the changes in the behaviour of consumers, leading to an increase in online sales and the closure of physical outlets. In 2021 Czechia, Poland and Slovakia, and in 2022, Bulgaria (-1.2%), Czechia (-0.4%) and Latvia (-0.3%) saw a reduction in staff, while in the others it remained at the same level or increased slightly as a result of the recovery of consumption and effectiveness of employment-related measures (see Table 2).

Figure 1. Labour productivity in the wholesale and retail industry (turnover per person, thousand euro)



Source: Eurostat and author's presentation.

In all countries, labour productivity in the sector fell in 2009, after which it slowly recovered. According to the values of the turnover per person in the wholesale and retail trade, the

countries of the sample could be divided into three groups. The first group with the lowest values of the indicator during the research period included Bulgaria 136.4 thousand euro and Croatia 147.6 thousand euro, followed by Romania 154.9 thousand euro. In five of the countries (Poland, Slovakia, Hungary, Latvia and Lithuania), the index had values between 172.0 and 192.4 thousand euro, and the highest was in the Czech Republic 220.6 thousand euro, Estonia 278.8 thousand euro and Slovenia 282.6 thousand euros. Regardless of the constant growth of labour productivity in Bulgaria's trade sector after 2009, its level remained the lowest compared to other sampled countries throughout the entire period (see Figure 1).

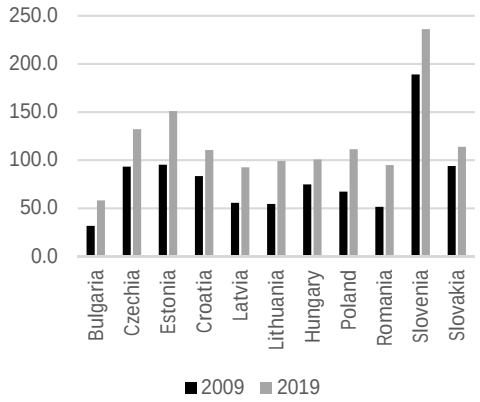
Some of the reasons were the size of the market and its competitive structure, characterized by a large number of small and medium distribution and retail firms (see Figures 2 and 3). The turnover per person employed in enterprises with 250 persons or more in Bulgaria almost reached the average for the studied countries (200.5 thousand euro) in 2020 and ranked after Czechia, Hungary, Poland and Slovenia. However, the labour productivity of small enterprises, for example from 2 to 9 persons employed, in the trade sector in Bulgaria (83 thousand euro) remained lowest in the sample countries. Despite the improved financial control, one of the reasons can be found in the actually reported revenues in small, especially family businesses.

Productivity levels in the wholesale and retail trade differ significantly. Labour productivity in retail trade declined in all countries until 2009, after which it slowly recovered (see Figure 2). An exception to this trend was observed in Slovenia, where productivity was twice the average for other countries, but in 2020 it returned to the 2008 level. The process of retail concentration continued during the study period. The level of concentration was highest in Slovenia, Croatia Estonia and Czechia, where the level of labour productivity was also higher. The large chains had the resources to attract consumers, implement new technologies and specialization in labour. The level of concentration was the lowest in retail trade in Bulgaria, however, its growth rate was much larger than the average (see Figure 2 and Figure 3).

Understandably, labour productivity in the wholesale trade was significantly higher due to higher turnover volumes. But here it should be pointed out that in terms of labour productivity in the wholesale trade, Bulgaria did not come last in the sample, in contrast to retail trade. In Bulgaria's wholesale trade, labour productivity was only 1.8 times lower than that of Estonia, the country with the highest level.

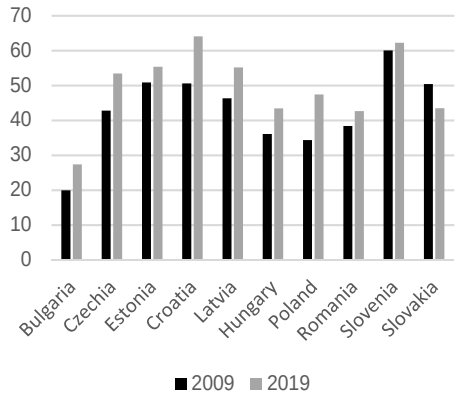
Through the outpace ratio, the relationship between labour productivity (turnover per person in the wholesale and retail trade) in Bulgaria compared to each of the countries was measured. The most significant were the differences between Bulgaria on the one hand and Slovenia, Estonia and the Czech Republic on the other. Labour productivity in the trade sector in Slovenia was about 3 times as high as that in Bulgaria at the beginning of the period (outpace ratio was 2.91 in 2009 and 3.05 in 2010), after which it gradually decreased and in the period of the current crisis in 2020 it reached 2.07. There was a convergence between the productivity levels in Bulgaria and the Czech Republic, the coefficient decreased from 2.67 in 2011 to 1.75 in 2020. In the recovery period between the two crises, the outpace ratio of labour productivity in Bulgaria compared to that in Estonia increased, but in the crisis period in 2020, it decreased to 2.04 and reached values characteristic of the beginning of the period.

Figure 2. Turnover per person employed in retail trade, thousands of euro



Source: Eurostat and author's presentation.

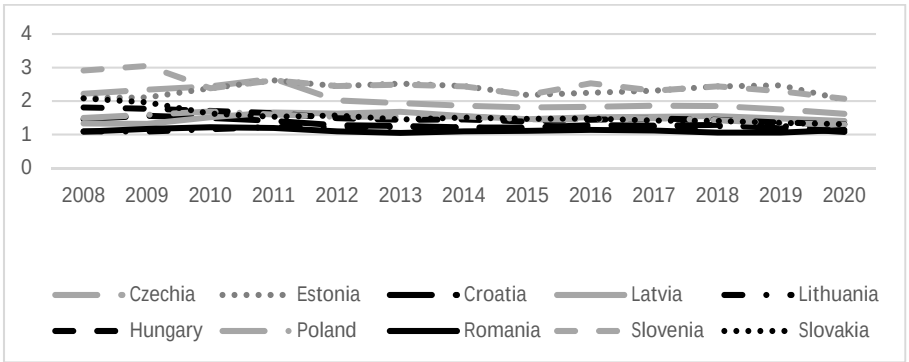
Figure 3. Percentage of turnover in retail firms with more than 250 persons



Source: Eurostat and author's calculations and presentation.

The growth rate of labour productivity in Bulgaria and Romania was approximately the same during the studied period, and thus the productivity gap is expected to remain. The outpace ratio was the lowest and ranged between 1.22 and 1.05. Compared to the rest of the countries, the values of the labour productivity gap were lower and, in general, showed a decreasing trend with fluctuation by year and country. It is clearly visible that the convergence increased during periods of economic crisis and decreased during economic recovery (see Figure 4). This can be explained by the greater integration of the markets of the more developed countries of the sample and the stronger effect of the crises on their trade sectors compared to those in Bulgaria. The latter was also influenced by policies undertaken by governments that were similar in their economic content (see Table 2).

Figure 4. Outpace ratio*of turnover per person employed in Bulgarian wholesale and retail trade compared to that in countries from Central and Eastern Europe



* *When the values of the coefficient tend to 1, this indicates a reduction in the labour productivity gap.*
Source: Eurostat, author's calculations and presentation.

The productivity of retail staff measured by a gross margin on goods for resale per person employed in Bulgaria was also the lowest by a significant margin among the countries in the sample, followed by Romania. With the highest values again, as well as according to the turnover per person employed indicator, were Slovenia – 42,258 thousand euros, the Czech Republic – 33,529 thousand euros and Estonia – 32,882 thousand euros. There was a positive trend in reducing the difference between Bulgaria and the most developed country, Slovenia, from 6.07 times in 2008 to 4.06 times in 2019. At the fastest pace, productivity on a gross margin basis was growing in Romania, followed by one in Bulgaria, with the difference between the two national retail sectors increasing.

The gross margin on goods for resale in the retail trade as a percentage of turnover grew during the period in all countries, which is proof of the importance, place and role of the trade industry (see Table 1). In 2008, this index was lowest in Bulgaria – 15.47% and Romania – 15.51%, and it was at its highest in Croatia – 23.92% and Lithuania – 23.86%. At the end of the period, the gross margin on goods for resale in retail trade, as a percentage of turnover was 26.25% in the retail trade in Lithuania, followed by the Czech Republic – 25.52%. The indicator showed the differences between the market power of the retailing in individual countries decreased. The growth of the index is the highest in Romania, followed by one in Bulgaria and reaching 24.82% and 20.18% respectively in 2019. Only Poland was an exception, where the index was 16.53% at the end of the period. The values of the index were the result of the differences in the size of the retail market, the level of concentration of the trade business and the fragmentation of the retail industry.

Table 1. Wholesale and retail trade productivity (gross margin per employee)

Country	Wholesale trade						Retail trade					
	gross margin %*		productivity (thous. €)		outpace ratio		gross margin %		productivity (thous. €)		outpace ratio	
	2008	2020	2008	2020	2008	2020	2008	2020	2008	2020	2008	2020
Bulgaria	11.25	13.54	20.28	38.20	1.00	1.00	15.47	19.83	5.86	12.13	1.00	1.00
Czechia	13.10	13.93	46.21	48.23	2.28	1.26	20.87	25.58	21.88	33.12	3.73	2.73
Estonia	13.18	13.64	40.29	72.28	1.99	1.89	19.00	22.50	20.02	34.26	3.41	2.83
Croatia	31.42	19.85	56.47	42.98	2.78	1.13	23.92	24.53	22.06	26.18	3.76	2.16
Latvia	14.99	15.89	34.61	64.63	1.71	1.69	19.80	25.29	12.92	24.07	2.20	1.99
Lithuania	20.32	21.44	36.14	68.17	1.78	1.78	23.86	26.32	14.63	27.10	2.50	2.23
Hungary	16.30	20.60	48.92	67.12	2.41	1.76	17.67	22.88	14.90	24.00	2.54	1.98
Poland	-	11.14	-	31.16	-	0.82	-	16.22	-	18.53	-	1.53
Romania	14.60	19.63	21.98	43.75	1.08	1.15	15.51	25.42	8.79	25.46	1.50	2.10
Slovenia	16.47	16.80	51.20	59.03	2.52	1.55	16.83	22.66	35.57	47.88	6.07	3.95
Slovakia	13.57	14.02	33.40	36.89	1.65	0.97	18.33	22.38	21.77	26.51	3.71	2.19

**gross margin (the difference between sales revenue and cost of goods sold) as a percentage of turnover.*
Source: Eurostat and author's calculations.

The gross margin on goods for resale in the wholesale industry showed growth in all studied countries. There was a tendency to decrease the labour productivity gap between Bulgaria and other countries. In 2008, the indicator in the wholesale industry in Bulgaria was 2.78 times lower than the indicator for Croatia, the country with the highest level of labour productivity, while in 2019 the outpace ratio compared to the first country, Latvia, was 1.82 times. At the end of the period, the indicator had the lowest value again in Bulgaria, followed

by Romania, but in the latter, the growth of the indicator was slightly higher, which led to an increase in the difference between the wholesale industries in both countries.

According to the total volume of turnover and gross margin, or the income from wholesale services, Bulgaria was in fifth place among the countries studied. The differences between the countries on the indicator gross margin as a percentage of turnover in the wholesale industry were significantly smaller compared to the retail trade sector, with the exception of Croatia, where the indicator was higher – 31.42 % at the beginning of the period, but after gradually falling to 19.42 %. The lowest level of the indicator was in Poland – 10.87 %, followed by Estonia – 12.10 % and Bulgaria – 12.78 %. The outpace ratio between Bulgaria and Hungary in 2019 was 1.61. The geographical location of Bulgaria and the development of transport and logistics determined the higher productivity of the wholesale trade.

5. The Transformation of the Trade Industry as a Basic Driver for Labour Productivity

Trade industry structural and digital transformation processes are at the heart of workforce restructuring in wholesale and retail trade. Those processes affect staffing requirements – volume, structure, qualification, work organization and income. After studying (in the previous part) the trends in labour productivity development, including the impact of trade industry concentration, in this part, the macro-analysis examines the drivers of labour productivity in the trade sector as digitalization, investment, labour intensity and governmental policies to overcome the impact of Covid-19.

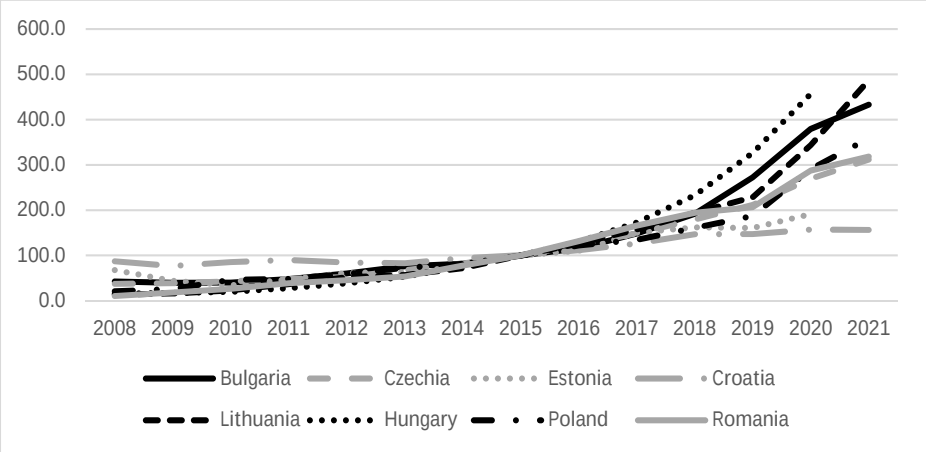
First digitalization goes deeper and deeper in trade operations and fundamentally changes exchange, buying and selling, and communication between market agents. Digital innovations lead to a restructuring of the economy, the emergence of new commercial intermediaries providing digital services, the interpenetration of existing forms of online and offline trade and the creation of new ones in an omnichannel environment, convergence and integration between economic sectors and functions in the business organization.

E-commerce is a major source of trade sector development and productivity for all countries in the sample. With the introduction of e-commerce, the size of the potential market and the range of products available to market participants, manufacturers, commercial intermediaries and consumers, are expanding. Figure 5 shows the significantly higher growth rates of retail sales of companies specializing in sales via mail order houses or via the Internet (G4791 according to NACE rev.2). The development of this subsector was faster than the one in the trade sector as a whole and the index was highest in Lithuania (486.7% in 2021 compared to 2015), followed by Bulgaria (433%). The labour productivity in e-retail is higher than in retail trade as a whole for most countries in the sample except Slovenia, Hungary and Latvia (Eurostat, 2022).

The increase in the share of consumers ordering via the Internet during the research period was significant, but in Bulgaria, it remained the lowest (see Figure 6). Changes in consumer demand as a result of the Covid-19 pandemic, problems in the supply chain of consumer goods and subsequent inflation, had a significant impact on the trends in the trade industry

over the last two years. The indicated factors led to an increase in electronic sales and the relative share of purchases from sellers[3] registered in Bulgaria from 90% in 2020 to 96.15% in 2021, with the lowest values of the indicator on an annual basis in 2011 – 72.7% (NSI, 2022). The reason for the latter was also the changes in the registration and control over the activity of electronic stores. In 2021, the share of the population in Bulgaria that purchased goods on the Internet from sellers from other EU member states decreased to 29.7%, while the highest value of this indicator on an annual basis was 49.2% in 2013. The relative share of purchases from non-EU sellers was also decreasing, in 2021 it was 16.5%, with the highest share at the beginning of the researched period in 2008 and in 2019 – 19.1%. Eurostat developed a data collection methodology for the EU labour force survey in the context of the Covid-19 crisis (Eurostat, 2020) and in 2021 new methodology for the EU labour force survey to increase its comparability across EU Member States (Eurostat, 2021).

Figure 5. Index of deflated turnover in retail via mail order houses or via Internet 2015=100%



Source: Eurostat and author's presentation.

The importance of e-commerce to GDP is measured by the indicator e-GDP. In Europe, the value of the indicator was highest in the United Kingdom (Statista, 2022). E-commerce spending as a percentage of total GDP in some countries from the sample was: Estonia – 8.22%, Poland – 4%, Czech Republic – 3.2%, Hungary – 3%, Romania – 2.56%, Bulgaria – 2.14, Slovakia – 2%. Comparing e-GDP with labour productivity in the retail sector shows that the countries with the highest productivity also achieved the highest share of e-commerce in GDP as Estonia, Czech Republic and Poland.

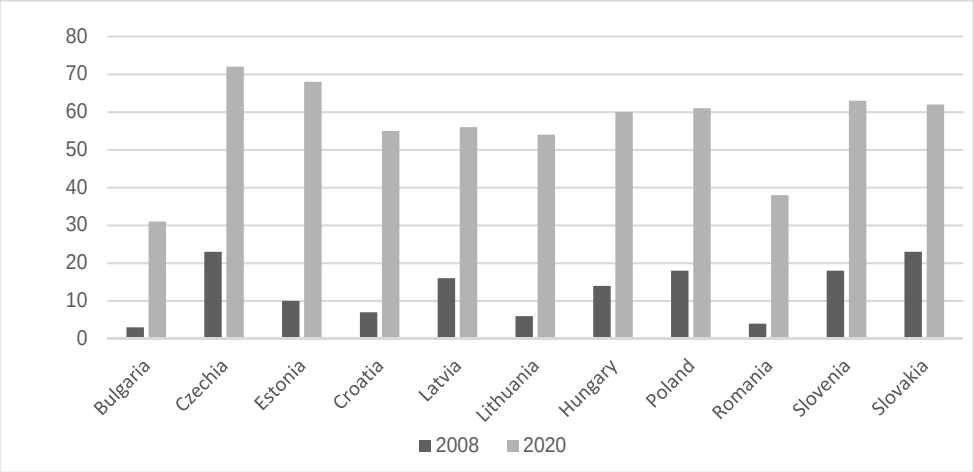
It should be noted that in the mentioned countries the share of ICT in GDP was relatively higher than the EU average of 4.89% in 2019 according to Eurostat. This share was highest in Bulgaria at 6.62%, Hungary at 6.13%, Estonia at 5.98% and Latvia at 5.41%. This can be

[3] The relative share was calculated on the basis of the number of persons who bought goods and services on the Internet in the last 3 months.

interpreted as an indicator of a decrease in the labour productivity gap between the trade sector in Bulgaria and the other countries. Therefore, the effects of the digital transformation of the trade industry and the economic crisis in the conditions of a pandemic overlapped and were interdependent.

Investments per person employed were another important factor in the development of the wholesale and retail trade industry. At the beginning of the period, the dispersion between countries was significantly greater and four of them had investments per person employed levels lower than those in Bulgaria, the outpace ratio was lower than 1 (see Figure 7). At the end of the period, all countries were ahead of Bulgaria (the outpace ratio was greater than 1), which may lead to preserving the labour productivity gap in the future.

Figure 6. Internet purchases by individuals (percentage of individuals)



Source: Eurostat and author's presentation.

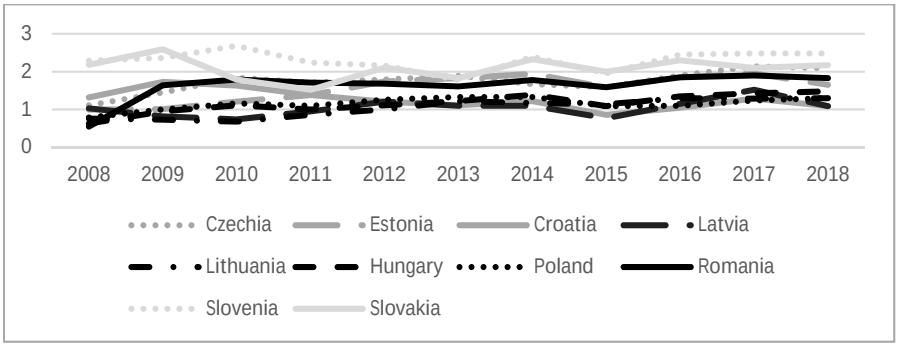
Digitalization promotes convergence and integration between retail and wholesale trade services, as well as their interaction with other services – financial, information, marketing and logistics, related to certification, conclusion and execution of transactions, which in the long term leads to changes in the retail and wholesale product. The development of commerce in a digital environment respecializes the provision of commercial services. On the one hand, digital service providers begin to perform distribution functions and become commercial intermediaries, and on the other hand, new trade intermediaries appear in the process of commercialization of innovations. Therefore, digitization affects the amount of gross margin and gross value added in the trade sector.

Retailers and wholesalers are beginning to include additional services to their core business of reselling goods. New supply chain intermediaries are emerging, providing omnichannel technologies and support services related to order fulfilment and other customer service activities. Some retailers are significantly reducing retail space and developing new store formats to offer less space for product display and consumer familiarization with the assortment at the expense of space to fulfil e-orders. In this way, retail outlets begin to act as

mini retail distribution warehouses (Snelling, 2022) to serve customers in the shopping area of the outlet.

The collaboration between retailers and wholesalers is growing. The big retail chains are commercializing their delivery platform and are starting to offer e-commerce platforms to small and medium-sized retail businesses (D'innocenzio, 2021). This is part of a partnership with digital technology providers. Retail chains transport products of competing retailers directly to their customers, making them competitors to logistics and courier service providers. Large retail firms are moving towards diversification of their product, and into advertising, financial services, information services, logistics, etc., as well as increasing the productivity of their existing sales space.

Figure 7. Outpace ratio*of investment per person employed in Bulgarian wholesale and retail trade compare to countries from Central and Eastern Europe



* *When the values of the coefficient tend to 1, this indicates a reduction in the labour productivity gap.*
Source: Eurostat, author's calculations and presentation

The digital marketplace platforms blur company boundaries and create a network effect – they connect customers, manufacturers, traders, lawyers and facilitate interactions between them. Marketplace, electronic platforms, change the logic of transactions in retailing and wholesaling and represent a higher form of cross-functional integration. Participants in electronic platforms have an advantage over other competitors in the retail sector in terms of access to a large number of customers, their research, the processing of large databases, as well as the use of logistics services, guaranteeing the quality of goods, payments, etc. Platforms themselves are a kind of business model and need marketing positioning. Blockchain technology and the so-called smart contracts built on top of it are transforming the way retailers and consumers interact – ordering, transacting and transferring ownership rights.

Second, the economic crisis is manifested by rising levels of consumer goods inflation and a reduced propensity to consume, which causes managers to put focus on cost reduction. In the retail industry, labour costs become second in total costs following costs of purchasing goods sold. During the period, the ratio between personnel costs and total purchases of goods and services in the trade of the sampled countries increased, with the exception of Estonia only. The average value of the indicator for the EU was 9.8% in 2019. The largest growth of this

share was in Bulgaria – 196% in 2019 compared to 2007 or twice, but nevertheless the ratio of the personnel costs in Bulgarian trade remained the lowest – 5.3% compared to the other countries. The share of personnel costs in total purchases of goods and services was highest in Croatia – 9.3%. The share of labour costs in the retail trade increased in all countries for the period under review, while those costs decreased in retail via mail order houses or the Internet for most of the countries, which indicates a decreasing labour intensity (see Figure 8 and Figure 9).

Figure 8. Share of personnel costs in total purchases of goods and services in retail (%)

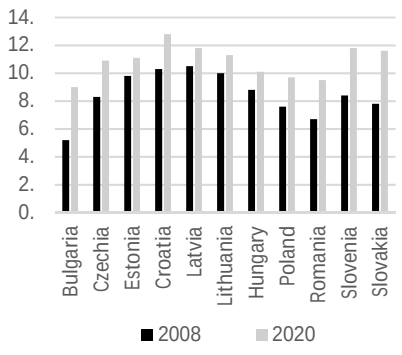
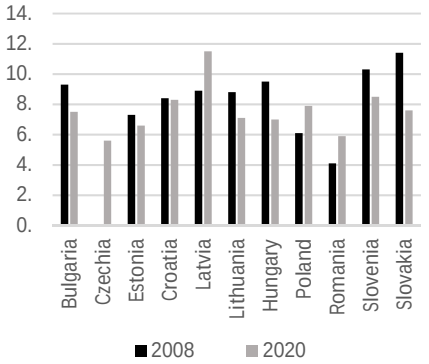


Figure 9. Share of personnel costs in total purchases of goods and services in retail via mail order or the Internet (%)



Source: Eurostat and author's calculations and presentation.

The difference between the countries regarding the indicator personnel costs per employee was significant, and again the Bulgarian trade industry had the lowest values within the entire studied period. The convergence trend was positive, as the outpace ratio for this indicator was decreasing. Again, as with the previous indicator, the growth of personnel costs per employee in the retail and wholesale trade in Bulgaria was the highest – 2.5 times. This allows Bulgaria to gradually catch up with the countries in the sample.

The percentage change of gross wages and salaries in the wholesale and retail trade in Bulgaria compared to the same period in the previous year was significantly above the average for the countries in the sample and remained positive compared to the EU-27 average -2.4%. The current economic crisis opened a debate in many countries about the level of wages. Many large retailers that employ hourly workers have announced significant percentage increases in the minimum hourly wage. It should be pointed out that the increase in labour wages in retail chains carries the danger of closing small retailers. Large retailers have opportunities to invest in reworking the retail shop format and the management of operations in them, improving the technological schemes for supplying the goods, retail sales and deliveries to customers. Innovations help them optimize costs, including, by the outsourcing of certain operations, for example, merchandising, and help them absorb the increase in the relative share of personnel costs.

Third, digitization is paving the way for a smaller number of personnel in wholesale and retail with enhanced functions, digital marketing and data analytics specialists, influencer roles and even fashion stylists. The workforce will need to master new technologies, necessitating the development of a retail and wholesale skills framework to upskill the workforce. One of the future new staff qualifications is in the field of omnichannel communication. By using platforms to enhance connectivity, trade workers can exchange information, share ideas and get instant updates. For example, the US National Retail Federation Foundation (NRF, 2021) was established in 2020 and is currently expanding a virtual mentoring program to support small businesses. Using on-air, digital and social platforms, it enables business owners to access the expertise of specialists.

The debate about self-service in retail outlets is growing (Adam, 2022). There are two opposing points of view. On the one hand, is automation due to the demographic crisis and the saving of personnel costs, and on the other hand is the concept of "just people taking care of people" due to better service and a growing share of the elderly population, for whom social contacts in retail are important. Because shopping is as important as the products themselves, regardless of the digitization processes the power of human relationships continues to drive people to retail. Traditional means of marketing communication are transformed into selling points by integrating content marketing and retail sales. A new type of business model is being created, the so-called content-driven commerce. Consumers expect the brands they patronize to deliver not only the products, goods and services they need, but also information and entertainment with them (CM Group, 2022).

Fourth, institutional economists point out that part of the reason for the labour productivity gap lies in the main sources of productivity growth – specific economic practices in individual countries and the effectiveness of institutions. As example of the latter is the various policies implemented in the field of regulation of wholesale and retail trade in the conditions of the Covid-19 pandemic (see Table 2). The packages of measures undertaken by the governments are similar in their economic content. They aim to support the trade sector, protect employment and also affect the convergence of the levels of labour productivity in the sample countries. In the last two years, there has been a decrease in the labour productivity gap in distributive trade in the sample country evident from the results in the previous part.

The behaviour of consumers is changing in the conditions of a pandemic and economic crisis, which are looking for fast delivery, competitive price and safety, incl. contactless service. The big winner is e-commerce, which will continue to be a driver of the economic development of the retail and wholesale sectors. There is also a renewed interest in local shops around the world. The growth of morbidity and the measures adopted in different countries to limit the Covid-19 pandemic led to the closure of large trade establishments and shopping centres, the introduction of requirements for certificates, and increased home-work. This limited travel for work and leisure, and thus limited visits to stores located along the way users travelled from their place of residence to their places of work and leisure. The share of in-home meals is growing, which trade experts believe will continue, resulting in growth in e-retail sales of groceries, which before the pandemic had a small share of total sales.

Table 2. Covid-19 economic and employment measures

Country	Economic-related measures	Employment-related measures
Bulgaria	• loan relief program based on Moratoria on bank loan payments; • loan guarantees and interest-free loans; • utilization of EU grants;	• part-time without consent of the employees; • paid leave without the consent of the employees; • payroll and social security subsidies; • tax and fine enforcement relief;
Croatia	• loan relief program; • loan guarantees; • low interest loans, especially for SME's;	• payroll subsidies; • job preservation subsidies for certain sectors (hospitality, F&B, culture, sport, recreation, etc.);
Czech Republic	• loan guarantee program; • lease subsidies; • tax enforcement relief;	• payroll subsidies; • compensation bonus for the self-employed and SMEs;
Estonia	• loan guarantees for existing and new working capital loans; • local governments' subsidies, including for road maintenance;	• persons registered as unemployed are allowed to accept temporary work (not exceeding 8 calendar days per month) without any influence to their unemployment status and compensations;
Hungary	• loan relief program and cap of the annual percentage rate (APR); • VAT and duty suspension for some products; • tax relief program;	• payroll subsidies for certain sectors (hospitality, F&B);
Latvia	• loan relief programs, including interest cuts; • loan guarantees; • tax relief program;	• subsidizing sick leaves; • payroll subsidies, including reduced hours;
Lithuania	• program for maintaining business liquidity and speeding up investment; • relocating EU funds to health, employment and business; • loan guarantee program;	• payroll subsidies, including for reduces hours; • universal basic income (UBI) for self-employed who have previously contributed to the social security system;
Poland	• price control tools imposing price and margin ceilings; • simplifying procedure for the extensions and/or cancellations of lease agreements; rent freeze; rent subsidies; • loan relief programs, including interest subsidies and credit holidays;	• payroll subsidies; • exemption for social security contributions for owners of SME's, social cooperatives and sole proprietorship; • limiting severance pay; • waiving the obligation to follow collective work agreements;
Romania	•rent subsidies; • raising the ceiling for credit guarantees for SMEs;	• payroll subsidies; • subsidies for working from home employees to purchase necessary technological equipment;
Slovakia	• mortgage payment relief program; • loan guarantees; • loan relief program; • short-term interest-free loans for SME's;	• payroll subsidies; • direct subsidies to self-employed; • subsidies for individuals who do not receive any income; • exemption from social and health payments and income taxes;
Slovenia	• loan subsidies; • tax enforcement relief;	• payroll subsidies; • partial exemption from social security, pension and disability contributions; • universal basic income (UBI) for some legitimates (certain self-employed workers);

Source: KPMG (2020) reports per countries and author's summary.

Merchants are moving to combine a variety of services that customers want, from issuing a credit or debit card to having groceries delivered to their doorstep. Retail companies are looking for means to diversify the traditional retail service, which requires hiring personnel with the relevant qualifications.

One of the directions for future development of retail marketing is the personalization of utility for the customer. Sailthru and Liveclicker (SAILTHRU, 2021) develop and implement the Retail Personalization Index. The survey on consumers shopping preferences, priorities and behaviours finds that consumers want a personalized shopping experience that matches their newfound focus on health, home and values. This will serve to build effective strategies for interacting with customers. Seeking to provide better customer service, some retail chain asks staff in their retail stores to also engage with customers in online chats (Harring, 2022). Building omnichannel retailing requires a different omnichannel and cross-functional competence from retail and wholesale workers.

6. Conclusion

Regardless of the digital changes and the resulting concept of eliminating middlemen (distribution services, performance by manufactures and companies specializing in the provision of information services, redirects gross value added to other sectors of the economy), the study showed preservation of the importance of the distributive trade sector. There were increasing levels of gross margin as a percentage of turnover (the price of retail and wholesale services) and labour productivity in the sampled countries. Regardless of the differences in the economic standard and the size of the domestic demand, labour productivity showed comparable trends during the studied period. Labour productivity measured by turnover and gross margin per employee in the retail and wholesale industry declined during periods of crisis and slowly increased during periods of recovery.

The labour productivity is the lowest in the Bulgarian trade industry during the studied period, but there is a positive trend to reduce the gap between the Bulgarian distributive trade and those of the other countries. The paper explored key factors determining the productivity gap – concentration of the trade industry, digitalization, labour intensity, investment and economic policies to protect the business. The level of labour productivity was higher in the countries with a higher concentration of trade. The concentration was the lowest in retail trade in Bulgaria, however, its growth rate was much larger than the average.

Comparing base growth rates through the outpaced ratio between rates in the mail, telephone, or Internet retailing and total retailing is indicative of the acceptance of e-commerce as a source of growth in the retail sector in Bulgaria. The indicator shows continuous growth over the years of the period. The digitization of commercial processes involves a labour force with a higher level of qualification, and employers should invest in retaining personnel in periods of crisis. There is a restructuring of the workforce and its direction towards the digitalizing sectors, with the goal of expanding the market share of e-business.

The ratio between personnel costs and total purchases of goods and services in retail trade increased in the sampled countries, but decreased in e-retailing in most of the countries,

which showed a trend of decreasing labour intensity. This ratio in Bulgaria remained the lowest at the end of the period compared to the other countries, however, the growth was the largest.

Based on the previous analysis the increase in the level of concentration in the retail trade and the share of e-commerce as well as the relative share of labour costs are a prerequisite for reducing the differences in labour productivity. Yet, the outpace ratio between investment per person employed in the trade sector in Bulgaria compared to other countries is growing, which will affect the preservation of the labour productivity gap in the future.

The reduction of the labour productivity gap contributes to the reduction of the income gap, as well as to the attraction and retention of capital, financial, physical and human, qualified personnel. Understanding the causes of the productivity gap is essential to effectively guide economic policies. The results of the analysis highlighted the main directions for policies to support investments in the trade sector – digitalization and labour force, which correspond with the basic recommendations proposed in a recent report of EuroCommerce on the development of the distribution trade in the EU until 2030 as largest private sector employer (EuroCommerce, 2022). The wholesale and retail sectors need support to transform digitally, implement new technologies and develop omnichannel operations in stores, warehouses, logistics, customer communications and interactions. The trade sector requires investment in employee training and development, up- and reskilling the labour force, to attract and retain skilled personnel. The institutions should create policies to sustain the effective operation of the SMEs, which are part of the local communities, especially in Bulgaria, and have lower labour productivity.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
ECONOMIC STUDIES

Volume 32(6), 2023

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COVID-19 IMPACT ON THE CAPITAL STRUCTURE OF COMMERCIAL BANKS: EVIDENCE FROM THE WESTERN BALKANS[3]

This study aims to measure the influence of COVID-19 on the capital structure of Western Balkans commercial banks, before and during COVID-19 using annual data for the period 2015 - 2020. Using pooled ordinary least squares regressions, the relationship between bank book leverage as the dependent variable and bank-specific explanatory variables such as profitability, Tier 1 capital, bank size, collateral, earnings volatility, and liquidity is investigated. COVID-19 as an independent variable is also presented in this paper. GDP and inflation are control (constant) variables that influence the outcome. By regressing the panel data, we conclude that the comparison of factors affecting the capital structure of the respective commercial banks, in the form of profitability, leverage ratio, size, collateral, earnings volatility and liquidity, before and during the COVID-19 pandemic, tend to have significantly different values.
Keywords: Capital structure; COVID-19; book leverage; banking sector; Western Balkans
JEL: G23; G30; G32

1. Introduction

COVID-19 had an impact on the banking sector, which was an important component of the economic development of the Western Balkans. The pandemic affected banking activity in various ways, including increased efforts and expenses to ensure the safety of staff and customers; the need to reorganize much of the movement to employ a remote work strategy; a decrease in income due to the slowdown in lending activity, especially during the first half of 2019, as well as an increase in loan provisions due to the deterioration of the borrowers' financial situation. Despite the unpredictability of growth, the banking sector remained stable and liquid throughout the COVID-19 epidemic, testing the resilience of the Western Balkans economy in general and the banking system in particular.

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[3] This paper should be cited as: *Kalimashi, A., Balaj, D. (2023). COVID-19 Impact on the Capital Structure of Commercial Banks: Evidence from the Western Balkans. – Economic Studies (Ikonomicheski Izsledvania), 32(6), pp. 76-88.*

Regarding the dilemma of whether COVID-19 is a financial crisis or not, there are different statements. Thus, Bonam & Smădu (2021) in their study stated that COVID-19 is not a financial crisis and we cannot compare this pandemic with past pandemics as times have changed, which caused changes in the size and structure of economies gripped by these pandemics. Other authors, reasoning empirically, found that COVID-19 is the main source of the economic crisis due to the reduction of productivity, disrupting the supply, which further created the demand during the financial crisis, thus also the economic disruption (Fuentes, Moder, 2021).

Other authors, while agreeing that COVID-19 is a type of crisis, presented another dilemma, namely, they gave conflicting opinions about what kind of crisis COVID-19 is. The possibilities of the impact of COVID-19 on the capital structure have been widely addressed in the literature. Firms aim for a specific capital structure and scale that achieves the firms' objectives, and deviation from this structure can cause systemically unhelpful distortions by forcing firms to make debt and equity decisions. In such cases, it is appropriate to apply numerous theories that have found support in the literature, about how firms choose their capital structures, such as the trade-off theory, the takeover theory, and the marketing theory. Authors Chauhan & Banerjee (2019) and Abbas et al. (2020) clarify this issue more than others. It is worth to mention that there was not available any same research topic, covering the developing countries from Southeast Europe.

As analyzed below, our paper adds to the literature related to the impact of COVID-19 on the capital structure by documenting convergence speeds with target leverage ratios in the context of COVID-19. This type of analysis is particularly important because capital structure decisions are critical to other economic decisions in the organization at different stages of a firm's life cycle. We also extend the literature on target capital structures by demonstrating that firms adjust to leverage targets faster during the COVID-19 economic crisis than in non-crisis times.

2. Literature Review

Bank capital structure refers to how banks finance their balance sheets, and its determinants are still poorly understood despite receiving considerable attention in the recent empirical literature. However, nonfinancial firms' capital structure decisions have been extensively covered in corporate finance literature. The trade-off and pecking order theories have been the most empirically tested of the many capital structure theories, with evidence in favour of both. Some notable studies (Rajan, Zingales, 1995; Benito, 2003; Hoque, Kashefi-Pour, 2015; Tran et al., 2020). Most research on this topic has focused on identifying the variables that influence corporate finance behaviour, particularly in American corporations. Rajan & Zingales (1995) made the first attempt in this manner when they discovered the same factors affecting the determinants of corporate financing in the US and the G-7. The following

research has focused on the United States or wealthy countries (Rajan, Zingales, 1995; Khaki, Akin, 2020).

Despite the fact that developed countries with similar institutional systems and features have received the majority of the attention, there has been less research on the factors influencing capital structures in developing countries. (Booth et al., 2001) carried out some of the most significant and pioneering research on testing capital structure theories in emerging nations. The study aimed to determine whether the factors influencing capital structures in industrialized countries might be applied to developing nations. Despite significant disparities in the institutional system, the findings showed that the same determinants drove business-funding behaviour in emerging nations and industrialized ones.

Short-term liabilities, long-term liabilities, company size, tangible assets, profitability, risk, company growth, interest coverage ratio, bank capital, asset quality, return on assets, liquidity, etc. are just some of the factors discussed in the capital structure literature and that theoretically and practically can affect the Leverage ratio (Sibindi, 2018; Kamil et al., 2020; Sriram, Khan, 2020; Gardi et al., 2020: Deneke, Gujral, 2021).

In contrast to non-financial institutions, several studies on the determinants of capital structure have been conducted in financial institutions, mainly from banks' perspectives. Banking literature has primarily attributed capital structure to regulatory requirements or bank-specific factors. The literature identifies bank-specific factors such as liquidity, profitability, size, asset tangibility, earnings volatility, tax rate, and growth. Theories predict contradictory effects of these factors on bank capital structure.

Using agency theory, Chechet & Olayowola (2014) evaluated the influence of capital structure on bank profitability in Nigeria. The results of the study showed a negative relationship between the capital structure and profitability of the banks studied, which contradicts the agency theory. The authors also failed to adequately describe the practical implications of their findings, which contradicts agency theory. In other words, their statistics show that increasing debt has no effect on reducing agency costs and thus increasing shareholder value. The authors provide no practical explanation for why the results were presented in this way. Sibindi (2018) examines the relationship between Leverage and the determinants of capital structure in a sample of 16 South African banks from 2006 to 2015, demonstrating that growth opportunities, risk, and size variables were positively related to Leverage, while profit and financial crisis variables were negatively related to Leverage.

Vishnu (2019) examines the impact of capital structure on the financial performance of small financial institutions in India over two years, from 2017 to 2018. The study investigates how capital structure influences bank financial performance and how financial Leverage influences that connection. The debt-to-total assets and debt-to-equity ratios evaluate the capital structure, whereas the return on capital employed, net profit ratio, and net interest margin assess financial performance.

Abeysekara (2020) investigates the capital structure determinants of nine Sri Lankan banks listed on the Colombo Stock Exchange between 2007 and 2019. Leverage was the dependent variable, while the independent variables were GDP growth rate, inflation, bank size, return on assets, taxes, profitability, and total debt-to-equity ratio. According to the study, the debt-

to-equity ratio is a critical driver of the capital structure of banks in Sri Lanka. However, GDP growth, inflation, bank size, return on assets, and profitability were discovered to have no statistically significant impact on the capital structure of Sri Lanka-listed banks.

Deneke & Gujral (2021) base their research on determining the impact of capital structure on the financial performance of Ethiopian commercial banks. Based on the data analysis, it is concluded that the capital structure significantly influences operational profit and net profit. Still, it has no significant effect on the return on assets, return on equity, and return on capital employed.

3. Methodology

The study is descriptive research that relies on secondary data sources, specifically from audited six-monthly financial statements of commercial banks in the Western Balkans (from 2015 to 2020). The study sample included 40 commercial banks, yielding 480 bank-year observations. The data were generated from financial statements of Commercial Banks for six countries of South East Europe: Albania, Bosna and Herzegovina, Kosovo, FYR Macedonia, Montenegro and Serbia. Regarding the Banks selected, no specific criteria were used. Bank data were used to allow the researcher to conduct an in-depth examination of the samples taken for the given time period in order to examine the determinants of capital structure and their movements during the study period including the COVID-19 period (2020). The study used existing literature definitions of variables for a relevant comparison of the findings with prior investigations. In accordance with the leverage definition, book leverage is chosen as a dependent variable to represent the banks' capital structure, just as Merve & Cevheroglu, 2018; Sibindi & Makina, 2018; Sriram et al., 2020; Deyganto, 2021.

The regressors chosen based on several empirical studies primarily correspond to empirically identified bank-level capital structure determinants in terms of independent variables. Profitability and the leverage ratio Capital structure is determined by bank size, collateral, earnings volatility, liquidity, and COVID-19. They were summarized and analyzed in various components in order to test the relationship between these variables with the multiple regression equation and SPSS. The variables gross domestic product (GDP) growth and inflation rate (INF) are used to control macroeconomic influence.

The following methods were used to empirically investigate the determinants of bank capital structure in this study:

Descriptive statistics were used to characterize the minimum, maximum, mean, and standard deviation values of the dependent (BLV), and independent and control variables (PROF, RCAP, SIZE, COL, EVOL, LIQ, COVID-19, GDP, and INF). The Pearson correlation test was used to assess the strength of the relationship between dependent, independent, and control variables. The variance inflation factor (VIF) examines whether or not the independent variables are multicollinear. A linear regression analysis for the entire sample was done to discover the critical component of work that contributed more to protecting the

bank's capital structure determinants and determine the impacts of COVID-19 on capital structure determinants.

Following (Assfaw, 2020; Guizani & Ajmi, 2020; Castro & Lopes, 2021; Oliveira & Raposo, 2021), book leverage has been used as a proxy for capital structure. The following regression model is applied for this purpose:

$$BLV_{i,t} = \alpha + \beta X_{i,t} + \varepsilon_{i,t}$$

where:

BLV is the book leverage,

X – vector of firm-specific variables,

ε – the error term.

The study adopted econometric models for the two periods involved. The first model evaluates the period before the COVID-19 pandemic (beginning with the year 2015) in the capital structure and the second model evaluates the period from 2015 – 2020 including the COVID-19 period:

$$BLV_{it} = \beta_0 + \beta_1 PROF_{it} + \beta_2 RCAP_{it} + \beta_3 SIZE_{it} + \beta_4 COLL_{it} + \beta_5 EVOL_{it} + 6\, LIQ_{it} + +\varepsilon_{it} \quad (1)$$

$$BLV_{it} = \beta_0 + \beta_1 PROF_{it} + \beta_2 RCAP_{it} + \beta_3 SIZE_{it} + \beta_4 COL_{it} + \beta_5 EVOL_{it} + \beta_6 LIQ_{it} + \beta_7 Covid + \beta_8 LnGDP_{it} + \beta_9 LnINF_{it} + \varepsilon_{it} \quad (2)$$

For our analysis of the impact of the COVID-19 pandemic on the capital structure of commercial banks in the Western Balkans, we have chosen six main variables such as profitability, leverage ratio (tier-1 capital), bank size, collateral, earning volatility, and liquidity, all of which to meet our objectives. Empirically, we use COVID-19 as a global crisis variable to see its impact on capital structure, risk behaviour, and financial stability. Therefore, based on (Moudud-Ul-Huq, 2020; Mohammad, 2021), we use Covid as a dummy variable to address the impact of COVID-19. Table 1 details the approved definitions and basis for the dependent, independent, and control variables.

The first variable is Book leverage – defined as the percentage of debt used by businesses to acquire additional assets. Rajan and Zingales (1995) proposed four alternative definitions for financial leverage, the ratio of total liabilities to total assets, the ratio of debt to total assets, the ratio of total debt to net assets, and the ratio of EBIT to interest expense. Among these definitions, the ratio of total liabilities to total assets is thought to be the broadest; it can be viewed as a better proxy for what is left for shareholders in the event of liquidation. This definition is also supported by (Ali et al., 2015). For these reasons, the ratio of total liabilities to total assets is used as an indicator in this paper.

The second variable is Profitability. Each capital structure theory predicts different effects of a firm's profitability (PROF) on its choice of debt and equity. For instance, the trade-off theory suggests that businesses with positive earnings before taxes aim for larger Leverage ratios to take advantage of tax breaks. Hence it anticipates that profitability and Leverage

will be positively correlated. Many authors prove this conclusion (Neves et al., 2019; Lutfi et al., 2020; Deyganto, 2021). On the other hand, the pecking order theory foresees a conflict between profitability and Leverage. According to this theory, more profitable firms borrow less because they have adequate internal funds for their capital investment programs.

Table 1. Measurements of Dependent and Independent Variables

Variables	Symbols	Proxy:
Dependent variable		
Book leverage	BLV	Computed as 1 - (book value of debt/book value of assets)
Independent variables		
Profitability	PROF	Computed as the ratio between the sum of pretax profit and interest expenses and the book value of assets
Bank size	Size	The logarithm of the book value of assets
Collateral	COL	Computed as the ratio between the sum of the following items: "total securities," "fixed assets," and "cash and due from banks" and the book value of assets
Earnings volatility	EVOL	The ratio of (profit after taxes t - profit after taxes t-1) to profit after taxes t-1
Bank Liquidity	LIQ	The loan-to-deposit ratio assesses a bank's liquidity by comparing its total loans and advances to its total deposits for the same period.
COVID-19	Covid	A dummy variable (0 for the period 2015-2019 and 1 for 2020)
Control variables		
GDP	LnGDP	Natural log of Economic Activity
Inflation	LnINF	Natural log of Inflation

The third variable is the Leverage ratio (tier 1 capital). A leverage ratio is one of several financial metrics that examines the amount of capital borrowed (via loans) and assesses a company's ability to pay its debts. The leverage ratio category is critical because businesses typically use a combination of debt and equity to fund their operations.

The fourth variable is Bank size (BSz) – the logarithm of total assets. According to trade-off theory, large firms often have a higher borrowing capacity, which leads to higher Leverage ratios. According to the pecking order theory, the largest firms with internal resources typically use these funding sources. Thus, this theory anticipates a negative relationship between firm size and leverage. According to agency theory, big firms with weak ownership use debt to reduce agency and transaction costs.

The fifth variable is collateral (COLL) – sometimes represented as a percentage of the entire book value of the assets divided by the book value of the physical assets that may be used as security.

The sixth variable is Earnings volatility. According to the trade-off theory, a firm's Leverage and earnings volatility (EVOL) are incompatible. Because the company is contractually obligated to fulfil debt-related obligations by issuing debt, it is predicted that an unstable company's earnings may reduce its borrowing ability. These payments may put you in financial trouble if the company's earnings are inconsistent. Additionally, a tax shield may not provide the obligated company with as many advantages during periods of poor revenues. Empirical data, however, shows a range of outcomes. Arsov & Naumovski (2016) and Merve & Cevheroglu (2018) for instance, found no correlation between changing wages and debt

ratios. However, the findings of (De Jong et al., 2008) were congruent with the hypothesis of the trade-off theory.

The seventh variable is Liquidity. Several studies employed liquidity (LIQ) as an independent variable to assess its possible influence on business Leverage. Simply put, liquidity is a company's capacity to satisfy its short-term obligations. According to (Ozkan, 2001), a high liquidity ratio indicates that a company has more ability to pay its debt when it falls due. This study defines liquidity as the ratio of total loans and advances to total deposits.

The last variable is COVID-19 – a dummy value that takes values of 1 (one) from 2020 and measures the impact of COVID-19. Other researchers have used this method to assess the impact of COVID-19 (Hauser et al., 2021; Mohammad, 2021).

Aside from the previously mentioned internal factors, several studies on banks and capital structure have used macroeconomic determinants as external factors (Mokhova, Zinecker 2014; Bashir et al., 2020). According to Mokhova and Zinecker (2014), the most commonly used external factors in capital structure design are GDP growth and inflation rate. As a result, the current study uses GDP growth and inflation as control variables to account for the impact of macroeconomic indicators on capital structure decisions.

4. Empirical Results and Discussion

This section presents the descriptive statistics of dependent and independent variables used in the study for the sampled banks in Western Balkan. The dependent variables used in this study were capital structure (Leverage). In contrast, the independent variables were profitability, bank size, earnings volatility, collateral, and liquidity of selected banks. Table 2 shows the mean, highest, lowest, and standard deviation of the dependent and independent variables, throughout the study,

Table 2. Summary statistics of the variables for the period 2015-2020

Variable typology	Variable	N	Minimum	Maximum	Mean	Std. Deviation
Dependent	BLV	240	0.079	0.964	0.843	0.107
Independent	PROF	240	-0.103	0.402	0.008	0.038
	RCAP	240	0.004	0.124	0.029	0.020
	Size	240	5.848	15.627	12.940	1.680
	COLL	240	0.011	0.753	0.267	0.162
	EVOL	240	-9.626	9.174	0.138	2.289
	LIQ	240	0.000	4.065	0.796	0.415
	Covid	240	0.000	1.000	0.195	0.397
	LnGDP	240	1.662	5.418	3.844	0.658
	LnINF	240	-2.632	2.775	0.764	0.822

Source: Authors' calculations.

The mean value for the dependent variable (BLV) for the study period was 0.843 percent, suggesting that 84.3 percent of the assets of Western Balkan banks were debt. In contrast, the standard deviation within this data set was 10.7 percent. This also demonstrates that most

banks in the Western Balkans have limited financial autonomy. This Leverage may be primarily due to Western Balkan banks, which mobilize and collect deposits from the public (Assfaw, 2020). The highest value of the total liabilities to total equity ratio is 96.4 percent, while the lowest number is 7.98 percent.

The following independent variables should be highlighted: Profitability (whose chosen proxy is PROF) provides a mean of 0.008, indicating that 0.8 cents before tax were created from a 1 Euro investment in bank assets. This conclusion is lower when compared to previous empirical investigations conducted on the US and other European banks (Gropp, Heider, 2010; Miles et al., 2012; Gibson et al., 2016). The standard deviation of profitability is 0.038, and the range is from -0.103 to 0.402. In addition,

Tier-1 Capital expressed as RCAP, has a mean of 0.029, with a standard deviation of 0.020, 0.004, and 0.124 minimum and maximum respectively. Bank size (SIZE) is measured as Ln of total assets and has a very high mean of 12.94 with a range from 5.848 at the lowest to 15.627 at the highest and a standard deviation of 1.685. The mean of collateral (COLL) is 0.267, the standard deviation is 0.162, and the range is from -0.115 to 0.753 for the minimum and maximum values. The mean of earning volatility (EVOL) is 0.138, and the standard deviation is 2.289. The minimum collateral is -9.626, and the maximum of 9.174. Liquidity provides a mean of 0.796, the least liquidity rate was minus 0.000, and the most considerable liquidity rate recorded throughout the research period was 4.065, which deviates from its mean value on both sides by 0.415 percent. The mean value of Covid is 0.195, with a minimum of 0.00, a maximum of 1.00, and a standard deviation of 0.397. Control variables, such as GDP and INF has a mean of 3.844 and 0.764 respectively.

The Pearson correlation quantifies the strength of the linear relationship between two variables. For clarity, Pearson's correlation coefficient determines the degree of the linear relationship between two continuous variables. Table 3 shows the findings of the correlation analysis, which is based on the connection between the dependent and independent variables. This point illustrates that all explanatory variables are interrelated. In other words, this is an attempt to avoid the problems associated with multicollinearity. All correlations between the independent variables are smaller than 0.80, as expected. As a result, it appears that there are suspicious examples of multicollinearity affecting the research variables. (Assfaw, 2020) The predictor variables' variance inflation factor (VIF) should not be greater than 5 to rule out multicollinearity.

Also, the reciprocal of the VIF is greater than 0.20. These numbers revealed the absence of multicollinearity.

At a substantial level of 75.1%, Leverage shows a positive connection with profitability ($r = 0.249$, $p = 0.00$).

Bank size also has a positive but not statistically significant link with leverage at 88.9 percent ($r = 0.111$, $p = 0.117$). Collateral shows a positive but not significant association with leverage at 99.7 percent ($r = 0.003$, $p = 0.970$), and earning volatility shows a negative significant correlation with BLV at 88.58 percent ($r =- 0.142$, $p = 0.045$). Liquidity has a negative correlation of 39.40 percent ($r = - 0.606$, $p = 0.00$), and crisis (COVID-19) as a

dummy variable has a positive correlation with leverage of 91.7 percent (r = - 0.083, p = 0.243). GDP and INF have a negative not significant correlation with BLV.

Table 3. Pearson Correlation Coefficients and VIF test

Variable	BLV	PROF	RCAP	Size	Coll	Evol	LIQ	Covid	LnGDP	LnINF	VIF	1/VIF
BLV	1											
PROF	0.249**	1									0.907	1.184
	0.000											
RCAP	-0.066	-0.019	1								0.946	1.058
	0.353	0.780										
Size	0.111	0.070	0.014	1							0.927	1.078
	0.117	0.327	0.849									
COLL	0.003	-0.085	0.134	0.013	1						0.771	1.296
	0.970	0.232	0.053	0.852								
EVOL	-0.142*	-0.182*	0.133	0.065	-0.013	1					0.932	1.072
	0.045	0.010	0.062	0.363	0.860							
LIQ	-0.606**	-0.159*	-0.136	-0.195**	-0.409**	0.050	1				0.743	1.347
	0.000	0.024	0.056	0.006	0.000	0.486						
Covid	0.083	-0.042	-0.060	0.044	0.018	-0.020	-0.028	1			0.962	1.039
	0.243	0.558	0.416	0.537	0.801	0.777	0.696					
LnGDP	-.025	-.027	0.020	-.084	-.125	-.082	-.029	-.089	1		0.923	1.083
	.728	.709	-	.235	.079	.249	.685	.208				
LnINF	-.021	-.009	-0.062	.128	-.045	.021	-.029	-.116	-.142*	1	0.936	1.068
	.767	.901		.071	.530	.766	.679	.101	.045			

*Notes: ***p < 0.01; **p < 0.05; *p < 0.10*
Source: Authors' calculations.

Two periods were used to estimate the Fixed Effect study model. An FE was used in this study to determine whether there is a statistically significant relationship between the independent variables and the dependent variable, allowing us to assess the impact of capital structure determinants on the leverage ratio of Western Balkan banks, a first for the period before COVID-19, and the second for the period from 2015 to 2020, including the period of COVID-19. Table 4 summarizes the results of these two periods:

Table 4. Estimations and Tests of Significances

Fixed effects, Huber – White Robust standard errors

Variables	Pre-COVID-19 (Model 1)			Including the COVID-19 Period (Model 2)		
	β (Std)	t	Sig.	β (Std)	t	Sig.
(Constant)	1.000	16.971	0.000***	3.685	4.115	0.000***
PROF	0.325	1.577	0.117	1.784	1.814	0.071*
RCAP	−0.065	−5.817	0.000***	−5.975	−1.715	0.088*
BSz	−0.001	−0.502	0.616	−0.019	−2.075	0.039**
COLL	−0.214	−4.598	0.000***	−1.444	−1.815	0.071*
EVOL	−0.001	−1.836	0.068*	0.003	0.865	0.387
LIQ	−0.190	−6.112	0.000***	−1.556	−2.239	0.026**
Covid				0.015	1.127	0.261
LnGDP				−0.225	−7.530	0.000***
LnINF				−0.110	−5.385	0.000***
R squared			0.517			0.465
Within R-squared			0.507			0.465
Durbin-Watson			2.006			1.970

Table 4 has two sections: The first period was the COVID-19 pre-pandemic period, during which model I was located. We incorporated the COVID-19 pandemic period into the pre-pandemic period, where model II is located, in the second period. We only included the bank-specific variables in model I. In Model II, we included macroeconomic control variables in addition to bank-specific variables to examine the impact of bank-specific variables and macroeconomic variables on banks' capital structure.

The coefficient of determination, R-squared, in model 1, has a value of 0.517. This means that our regression model accounts for approximately 52% of the variation in capital structure. As shown in Table 4 model 1, the model has no autocorrelation (Durbin-Watson d-statistic around 2).

Model 1 results show that bank leverage ratio, collateral, earnings volatility and liquidity all play a role in Western Balkan banks' capital structure decisions. According to Table 4, the results of Fixed effects in Model 1 show that the leverage ratio has a statistically significant negative coefficient (-0.065), as collateral with a coefficient of -0.214 and liquidity with a coefficient of -0.190, statistically significant at 1%. In addition, the p-value for earnings volatility is significant at a value of $0.068 < 0.1$ and negative at a coefficient of -0.001 with respect to capital structure. Profitability has a positive effect (0.325) on capital structure but is statistically not significant ($p = 0.117$), while bank size has a negative impact and statistically no effect on capital structure with a coefficient of -0.001 ($p = 0.616$).

In model 2 of Table 4, the results are given including the entire study period, including the variable of COVID-19 as a dummy variable and two control macroeconomic variables (GDP and Inflation). In this case, bank profitability has a positive effect (with a coefficient of 1.784) on capital structure. It is assumed that for each percent increase in profitability. The profitability value is 0.071, less than the 10 percent significance level. This relationship endorses the trade-off theory. The finding aligns with the other studies (Antoniou et al., 2008; Neves et al., 2019; Lutfi et al., 2020; Deyganto, 2021).

Unlike liquidity, the leverage ratio coefficient value is (-5.798). Each one percent decrease results in a 579.8 percent increase in book leverage. The RCAP conclusion is consistent with the data (Allegret et al., 2017), which shows that capital requirements induce a non-linearity in bank behaviour when capital falls to levels extremely close to the regulatory minimum. It is found that the leverage ratio has a significant impact on banks' capital structure before or during the Covid crisis.

Bank size, during the entire period, has a negative significant effect on book leverage at a 5% level on capital structure. The probability value of bank size is 0.039, which is less than the 0.05 percent significance level. The negative sign suggests a reduction in the size of the overall impact on the capital structure during the entire period (with the Covid period). Logically, the size of the bank should have a significant impact on capital structure, and our results confirm this. This relationship supports the trade-off theory. The current study's findings are similar to those of (Lutfi and Suyatno, 2019; Neves et al., 2019; Assfaw, 2019; Wardhani, Mongid, 2019).

Collateral has a significant negative relationship with book leverage at the level of 0.1, which means less than 10 percent. The coefficient of collateral is -1.444. The negative relationship

does not support the trade-off and pecking order agency theories that show a positive relationship between collateral and leverage. The results of the current study are similar to the findings of (Sheikh, Qureshi, 2017; Dakua, 2019; Doan, 2019). When the pre-COVID-19 period is compared to the entire period (including the COVID-19 period), the collateral has a greater impact on the capital structure in the pre-Covid period. This has influenced the reduction of the impact of collateral on the capital structure over the entire COVID-19 period.

The study depicts a negative relationship between liquidity and capital structure. The coefficient of liquidity is -1.556 Consistent with those (Güner, 2016; Ullah et al., 2017; Sakunasingha et al., 2018), the results reveal a negative and significant impact of liquidity on capital structure for Western Balkan banks. During the period before COVID-19, as well as including this period, the impact of liquidity was very significant on the capital structure. This means that the inclusion of the COVID-19 period in the entire period did not have any specific role in the impact of liquidity on the capital structure.

COVID-19 as a dummy variable has a positive but not significant effect on capital structure with a coefficient of 0.015 and probability value equal to 0.261. Earnings volatility as COVID-19, even has positive impact, does not affect capital structure.

Moving on to control macroeconomic factors, GDP has a -0.225 coefficient in relation to capital structure and p-value = 0.000. This finding is in line with (Elnahass et al., 2021) study of the impact of the pandemic on global banking stability. The significance of this variable could imply that a decrease in GDP necessarily implies a decrease in bank capital structure. The same finding applies to the other control variable, Inflation, despite the negative but insignificant impact on the capital structure.

Furthermore, with a coefficient of -0.110, INF (inflation) is negatively significant in relation to capital structure, implying that a 1% decrease in causes a decrease in capital structure of approximately 11 units. The findings are in line with the findings of (Boadi et al., 2016) who discovered that inflation has a negative and significant impact on capital structure when banks do not anticipate future inflation.

5. Conclusion

The objective of the study was to identify the impact of COVID-19 on the bank capital structure and its determinants, using as a sample 40 Western Balkans banks from 2015 to 2020. The significance of primary capital structure determinants including the COVID-19 crisis is also examined. A multiple linear regression model, through a robust fixed effect Huber/White model, was used in the analysis. The research looks at seven bank-specific factors (profitability, leverage ratio, size, collateral, earning volatility, liquidity, and Covid, as a dummy variable). To investigate their impact on capital structure, two control macroeconomic variables (GDP and Inflation) are used. In terms of correlation analysis, our findings are consistent with major theory predictions. Profitability, bank size, collateral, and Covid are all positively related to leverage. On the other hand, the leverage ratio, income volatility, and liquidity are all negatively related to leverage, which can be explained using the pecking order theory's predictions. By regressing the panel data through the Huber/White

Robust Fixed Effects model, we conclude that the comparison of factors affecting the capital structure of commercial banks in the Western Balkans, in the form of profitability, leverage ratio, size, collateral, earnings volatility and liquidity, before and during the COVID-19 pandemic, tend to have significantly different values. While profitability and bank size did not have a significant impact on the capital structure prior to the pandemic, profitability has increased its positive impact in the period including the period of Covd-19, while bank size has increased its negative impact on the capital structure. However, leverage ratio, collateral, earnings volatility, and liquidity had a more significant negative impact before the COVID-19 pandemic, compared to the entire period including the COVID-19 period, indicating that the negative growth of these factors has reduced the capital structure in the commercial banks studied. Despite the fact that Covid, as a dummy variable, has had no significant impact on capital structure, it has had an indirect impact through other factors; it has expressed its impact on this structure. A significant negative impact on the capital structure has also been shown by the two macroeconomic variables taken and the control variable.

In terms of future research, because this study only used 40 banks as a sample from 2015 to 2020 with six variables, it is expected to research the banking sector as a whole over a longer period and with more research variables to improve the quality of research results.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
ECONOMIC STUDIES

Volume 32(6), 2023

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THE INNOVATIVENESS AND VALUE OF QUICK RESPONSE CODE PAYMENT FOR MSMES: THE INFLUENCE OF SECURITY-RELATED FACTOR[7]

The implementation of QR code technology aims to make it easier for MSMEs and consumers to create a cashless society. However, many MSMEs still need to implement digital payment methods over time. This research aims to evaluate the acceptance of QR codes for MSMEs, especially regarding the role of innovativeness, security, and ease of use. This research targets MSMEs in Indonesia that have used the QR Code as a tool for making transactions. Questionnaires were distributed via Google form online, totalling 489 respondents who filled out. After the data is obtained, it is analyzed using a partial least square using smart-pls 4.0. Behaviour intention (BIQ) is the most influential construct on user behaviour (UBQ). The other most significant factors are convenience (PEUQ) and security (PSQ) for users. Meanwhile, other variables such as Personal innovativeness (PI), PEUQ, PSQ, and perceived usefulness (PUQ) can increase the positive impact on Perceived value (PVQ). Several factors, such as PEUQ and PSQ, can positively influence PUQ. However, there is a construct with few results: Perceived usefulness on intention to use. This is because MSMEs are more oriented toward consumer needs to buy products and services. So these findings provide insight for the government and service providers to improve security, convenience, and necessary QR code features that support MSME business activities.
Keywords: Innovativeness; perceived value; QR Code Payment; security; technology adoption
JEL: B26; D91; F65; G41; M21

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[7] This paper should be cited as: *Musyaffi, A. M., Johari, R. J., Wolor, C. W., Jamal, A. A. A., Santika, A. Z., Arifi, M. A. (2023). The Innovativeness and Value of Quick Response Code Payment for MSMEs: The Influence of Security-Related Factor. – Economic Studies (Ikonomicheski Izsledvania), 32(6), pp. 89-107.*

1. Introduction

Since COVID-19, everyone has had new habits because of the social restriction policy. The existence of restrictions makes social conditions also change. Both society and industry are affected by COVID-19. This can increase the use of technology to become increasingly rapid. In addition, the rapid penetration of mobile devices also influences digital payments by the public. Users are slowly changing traditional payment methods with paper money towards cashless payments due to the emergence of situations and increasing digital financial technology (Augsburg, Hedman, 2014). The adoption of digital payments has significantly increased since the arrival of COVID-19.

One of the digital payment models is mobile banking. E-banking can carry out banking transactions quickly and at low costs compared to transactions at branch offices (Abdulla, Al-Hassani, 2022; Samsudeen et al., 2020). However, complaints from e-banking users must be registered by the bank first and must transact via a smartphone with a SIM card (Musyaffi, Johari, et al., 2022). Another example of using digital payments is near-field communication (NFC), which can make payments without physical contact. However, the drawback of NFC is that it has to be near the device and requires certain devices that support the NFC feature (Jain, Dahiya, 2015; Tew et al., 2022). So other digital payment alternatives appear to overcome existing problems, one of which is using the QR Code. QR codes for payment can realize technology integration with everyday life by providing fast access via smartphones (Ashrafi, Easmin, 2023; Lou et al., 2017). The easier the information system is to use, the greater the tendency to continue using this technology (Musyaffi, Septiawan, et al., 2022). Therefore, the QR code payment method is widely used to attract customers for ease of payment, speed up transactions, reduce other costs (for example, using receipts), and reduce other operational costs (Hossain et al., 2018).

QR code is one of the popular trends to be used by consumers and sellers to get convenience and benefits in everyday life (Cheng, Huang, 2013; Musyaffi et al., 2021). Based on a survey conducted by Master card, Malaysia is the most significant number of e-wallet users, with a proportion of 40%. In contrast, by 64%, the use of cash transactions drastically reduced during the pandemic (Boon, 2020). The Philippines followed them at 36% and Thailand at 27%. Beck et al. found that using QR codes in financial services that use technology significantly impacts bank credit (Beck et al., 2022). Small businesses with no point-of-sale machine can carry out digital transactions using a QR code (Beck et al., 2022), so the QR code's role for small businesses is vital. Musyaffi, et al.'s research revealed that implementing digital payments for traders could significantly improve their business performance (Musyaffi, Gurendrawati, et al., 2022).

Indonesia has encouraged MSMEs to "go digital in 2020" since 2018 to become the most significant digital economy actor in Southeast Asia (Najib, Fahma, 2020). This ambition was realized long ago in 2015 when Indonesia published the Non-Cash National Movement (GNNT) program. As a result of this policy, a Digital Payment System (SPI) blueprint was created until 2025 to implement a cashless society by encouraging business actors, banks, the government, and the public to increase the frequency of digital payments. One of them is by applying the QR Code payment method. In Indonesia, the use of QR codes for payment

purposes has been regulated by Bank Indonesia to protect security in conducting transactions through the Quick Response Code Indonesia Standard (QRIS). The Indonesian government has implemented QRIS since 2020, where all parties utilizing the QR code payment mechanism are required to interface with QRIS. Even since 2021, the growth of using the QR Code for payment has increased sharply to 150% (Xendit, 2022).

However, there needs to be more knowledge of using the QR Code, resulting in differences in acceptance of QR Code technology by mobile (Ahmed, Damodharan, 2022; Alamoudi, 2022). This incident is due to the many cases of data abuse in Indonesia and globally. As many as 22% of digital payment users complained about cyber-attacks such as spam and data misuse. Research from Visa shows an essential connection between consumers and MSMEs when using digital payments, where as many as 80% of consumers are motivated by digital payments (Visa, 2020). Meanwhile, 54% of MSMEs have experienced an increase (15%) since using digital payments (Visa, 2020). However, as payment technology increases, risks arise when it cannot be appropriately managed (Mikkelsen et al., 2022). This can be seen during a pandemic where the risk of digital crime, including fraud and data misuse, is increasing (Mikkelsen et al., 2022). So, all stakeholders need to increase the digitization of MSMEs, primarily through implementing QR Code payments.

QR codes can also be used for visitors based on the relative benefit, observability, and compatibility aspects to measure visitors' attitudes toward using QR Code payments (Lou et al., 2017). The main factor that causes users to accept technology adoption is the ease of use and usefulness (Davis, 1989). These two factors support increasing the frequency of continuous use (Marakarkandy et al., 2017; Musyaffi et al., 2021; Shanmugavel, Micheal, 2022). In Thailand, QR code payments are used for retail transactions using the UTAUT and TAM model approach to measure acceptance of QR Code payments. Several studies have been conducted by other researchers regarding the acceptance of QR code payments in various fields, for example, mobile banking (Lin and Wu, 2021; Suebtimrat and Vonguai, 2021), mobile payment (Ashrafi, Easmin, 2023; Liébana-Cabanillas et al., 2015; Yan et al., 2021; Zhong, Moon, 2022), web-based (Rotsios et al., 2022), e-wallet (Osman et al., 2021; Senali et al., 2022), Transportation (Chen et al., 2020; Cheng, Huang, 2013), Retail (Rafferty, Fajar, 2022), and restaurant (Vuksanović et al., 2020). Based on the explanation above, this study aims to identify the factors influencing the acceptance of using QR Code payments through the TAM extension with the integration of Personal innovativeness, perceived value and security.

2. Literature Review

The successful implementation of technology has proven successful for both consumers and MSMEs when the users themselves accept the technology (Hanif, Lallie, 2021; Mohammadi, 2015; Musyaffi et al., 2021). Therefore, TAM is present to see users' acceptance level for using technology. PUQ shows that technology is free from strenuous effort (Alassafi, 2022). In other words, an indication of someone who has a high perception of the usefulness of technology is when they can use technology according to their needs. In comparison, PEOUQ shows the level of user perception in viewing technology as easier to use when it benefits

users, especially its features and functions that support everyday life (Ahmed, Damodharan, 2022; Musyaffi, Johari, et al., 2022).

The perceived value point of view is based on evaluating the costs and benefits offered (Sun, Qu, 2011; Zhong, Moon, 2022). Perceived value is also based on the customer's assessment, including the quality of services offered, features, brands, and prices. In the context of using the QR Code, this technology can offer value to users, especially contactless payments, which can be used quickly. In the case of use, security plays an essential role in increasing the value of technology for users (Ashrafi, Easmin, 2023). So that the safer the technology, the tendency of users to view technology as having higher value (Zhong, Moon, 2022). However, when using the QR Code is quite complex and complicated, it will affect the user's perception of the technology (Barbu et al., 2021; Yusof et al., 2021). So, it is imperative to simplify the technology for the users. This fact is supported by previous literature, which reveals substantial evidence of a positive relationship between PEUQ and PUQ with PVQ (Zhong, Moon, 2022). Based on this explanation, hypotheses 1, 2, 3, and 4, namely.

H_1: PI has a substantial positive influence on PVQ.

H_2: PEUQ has a substantial positive influence on PVQ.

H_3: PSQ has a substantial positive influence on PVQ.

H_4: PUQ has a substantial positive influence on PVQ.

Apart from making it easier for users to make transactions, using a QR code also requires transferring personal data. This causes vulnerabilities in data security, especially data misuse for specific purposes (Oliveira et al., 2016; Türker et al., 2022). So that users become worried, especially when they see a security risk. The impact users will think it is not very easy, so the process of use for these users takes work. Meanwhile, Lin & Kim (2016) state that there is a considerable association between security and anxiety toward PEUQ. So, the H_5 of this study is:

H_5: PSQ has a substantial positive influence on PEUQ.

A critical factor in continuously making someone adopt technology is its usefulness, especially inadequate features, and facilities. Venkatesh et al. (2012) revealed that the easier it is to use technology, the greater the possibility of experiencing the benefits and features received. While many researchers also support this statement, it is revealed that PEUQ is the most important antecedent in influencing PUQ (Joo, Sang, 2013; Kim et al., 2010; Türker et al., 2022). The same goes for the technology security factor. The safer, the greater the tendency to assume feature enhancements. At the same time, Türker et al. (2022) revealed that the more secure the data, the greater benefits of the product. The same thing was expressed by several researchers where PI was an essential factor in increasing user PUQ (Cheng, Huang, 2013; Liébana-Cabanillas et al., 2015).

H_6: PI has a substantial positive influence on PUQ.

H_7: PEUQ has a substantial positive influence on PUQ.

H_8: PSQ has a substantial positive influence on PUQ.

The more useful the technology used, the user will tend to continue using technology, especially QR Code technology (Ahmed, Damodharan, 2022; Musyaffi et al., 2021). Essential features such as the accessibility of the QR code without the help of tools such as point of sale (POS) allow users to use the QR code comfortably. They were, moreover, supported by ease of use. Users only need to scan the bar code on their respective smartphones to make transactions. The easier the technology is used, the user will tend to adopt the technology more frequently (Kejela, Porath, 2022; Yan et al., 2021). Some previous literature also supports this question where ease of use and usability can increase the potential of users to continue using technology (Abu-Taieh et al., 2022; Alshurideh et al., 2021; Hanif, Lallie, 2021; Tamilmani et al., 2021).

Previous literature proves that perceived security is an essential element that has a positive impact on users to continue using technology (Alshurideh et al., 2021; Mostafa, 2020; Senali et al., 2022). User perceptions of commercial product or service transactions increase sharply when they need time to evaluate the benefits of these products (Ashrafi, Easmin, 2023; Hanif, Lallie, 2021). Thus, making the acceptance process of the product depend on the value offering of the product. The existence of a high PVQ makes the intensity of the use of technology even higher (Gordon et al., 2018). In comparison, other researchers revealed that an increase in PSQ can make BIQ bigger (Chatterjee et al., 2020; Chopdar, 2022; Ibrahim et al., 2019; Semerikova, 2020) so that the critical role of the value offered in a product and service becomes an essential component.

PI is the desire of users to try new technologies (Suebtimrat, Vonguai, 2021). Generally, users are curious about new technology, so they want to try it. This fact was confirmed by Kim et al where users with high innovation generally tend to use technology (Kim et al., 2010). While various previous studies also found there is a positive impact of PI on BIQ (Liébana-Cabanillas et al., 2015; Shanmugavel, Micheal, 2022; Suebtimrat, Vonguai, 2021; Thakur et al., 2016), especially in the context of continuous adoption of QR Codes (Ahmed, Damodharan, 2022). Based on this explanation, hypotheses 9, 10, 11, 12, and 13 are:

H_9: PI has a substantial positive influence on BIQ.

H_{10}: PEUQ has a substantial positive influence on BIQ.

H_{11}: PUQ has a substantial positive influence on BIQ.

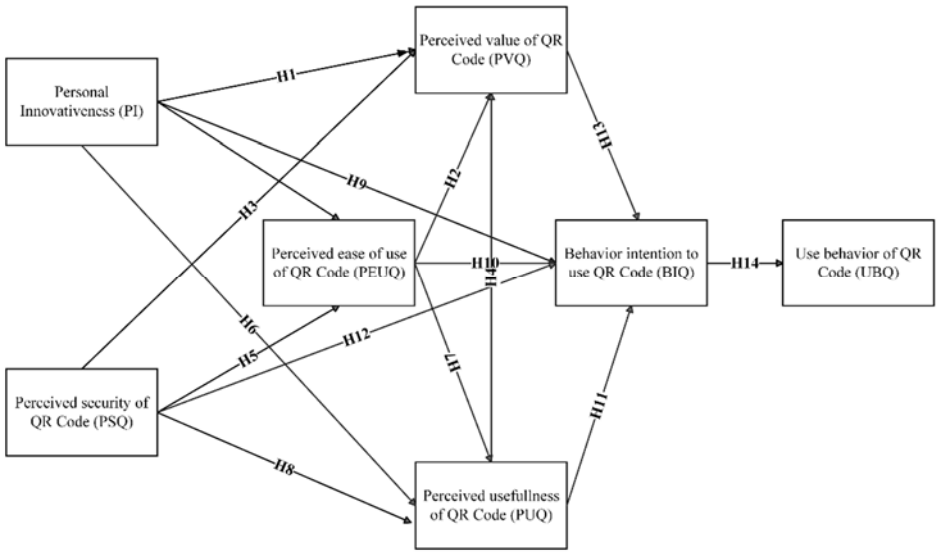
H_{12}: PSQ has a substantial positive influence on BIQ.

H_{13}: PVQ has a substantial positive influence on BIQ.

One indication of users adopting technology is the frequency to use it continuously. Users who use it regularly are satisfied with the technology. Previous studies have proven that the intention to use mobile payment with QR consistently increases the intensity of use (Ahmed, Damodharan, 2022; Martinez, McAndrews, 2022; Musyaffi, Johari, et al., 2022). So this intention point is crucial to maintain consistency in using technology (Venkatesh et al., 2012). From this presentation, the 14th hypothesis can be identified, namely:

H_{14}: BIQ has a substantial positive influence on UBQ.

Figure 1. Research model of QR Code



3. Material and Method

To conclude the results of the hypothesis more accurately, we must go through the proper methods and measuring instruments. This research targets users who use QR codes as payment methods when making transactions. A non-probability sampling method called convenience sampling was used to select respondents. The method was chosen because it follows the broad characteristics of the respondents. Researchers distributed questionnaires to SMEs that use the QR code payment instrument as one of their business transactions in various regions in Indonesia. In addition, the questionnaire was also made online and then distributed on social media to get a broader range of respondents. Researchers also disseminate online through the entrepreneur community so that targets according to the criteria can be collected. As a result, 512 respondents filled out the questionnaire. However, only 489 respondents filled out the entirely and according to the criteria. The selected sample is determined based on the sampling method of 5% resulting in a minimum sampling of 400 respondents. The researchers used this method because it followed the PLS-SEM method, which required a minimum sample. Therefore, this study also uses the G*power method in determining the minimum sample size. The sample size for this study was 0.95 (5%) larger than the minimum sample required, namely 0.8 or 111 respondents (Hair et al., 2019). Thus, the sample in this study met the minimum required criteria. The questionnaire consists of 28 questions, each of which has five answers. The author uses a Likert scale with a criterion value of 1 to 5. Respondents strongly disagree with a value of 1 to 5, which is very good. Meanwhile, based on the adapted questionnaire items, the researcher prepared question items based on previous researchers as shown in table 1 below.

Table 1. Measurement research

Variable	Item	Question	References
Personal Innovativeness to QR Code (PI)	PI1	I am always interested in updating the technology I use	(Kim et al., 2010; Liébana-Cabanillas et al., 2015; Lu et al., 2005)
	PI2	I want to know about various technologies related to my business.	
	PI3	I want to try new technologies that are interesting for developing my business.	
	PI4	I am one around my circle to exploit new technology.	
Perceived Security of QR Code (PSQ)	PSQ1	There is a low risk of third parties accessing my data	(Schierz et al., 2010; Türker et al., 2022)
	PSQ2	Using the QR Code carries no risk of data abuse (e.g., business partner name and payment information)	
	PSQ3	The risk of being billed is low (e.g., bank account data and credit card information) when using a QR code as a means of payment.	
	PSQ4	Use QR codes for secure transactions.	
Perceived Value of QR Code (PVQ)	PVQ1	I have good experience when using QR code because it provides good value	(Mou et al., 2019; Zhong and Moon, 2022)
	PVQ2	Experience using QR Code was worth the money	
	PVQ3	QR Code service providers provide a better service. I used it for payment.	
	PVQ4	Overall, I am delighted with all the value the QR Code payment method offers.	
Perceived Usefulness (PUQ)	PUQ1	Transactions using QR codes are easier to handle	(Musyaffi, Septiawan, et al., 2022; Schierz et al., 2010; Türker et al., 2022)
	PUQ2	The payment method using a QR code is helpful for my business.	
	PUQ3	Using QR codes as a means of payment makes me more flexible.	
	PUQ4	Using a QR code, I can quickly make transactions in my business.	
Perceived Ease of Use (PEUQ)	PEUQ1	The QR Code payment mechanism is effortless to use.	(Ha and Im, 2014; Michael Musyaffi et al., 2022; Zhong and Moon, 2022)
	PEUQ2	The QR Code payment mechanism is clear and simple to understand	
	PEUQ3	It is simple to learn how to pay using a QR Code	
	PEUQ4	Using QR codes to make a payment needs less work.	
Behaviour Intention to use QR Code (BIQ)	BIQ 1	I prefer to use QR codes in future	(Musyaffi, Septiawan, et al., 2022; Schierz et al., 2010; Türker et al., 2022)
	BIQ 2	I recommend using a QR code over other methods.	
	BIQ 3	I will implement QR codes in my business	
	BIQ 4	I want to continue to use QR Code as my mode of payment	
Use Behavior of QR Code (UBQ)	UBQ1	I have used the QR Code several times in my business transactions	(Ericska et al., 2022)
	UBQ2	I often use QR codes	
	UBQ3	I explore QR codes more often.	
	UBQ4	I use QR codes more often than other payment systems.	

This study uses SEM-PLS to test the hypotheses using Smart-PLS 4.0 software. The PLS-SEM stage consists of several stages: the evaluation of measurement models and structural models (Hair, Alamer, 2022; Musyaffi, Gurendrawati, et al., 2022). At the Measurement model stage, it was tested using construct validity to evaluate data (Average Variance Extracted (AVE) and outer loading) and internal consistency reliability (Cronbach's alpha (CA) and composite reliability (CR)). The aim is to measure the reliability of the data in each construct. In addition to measuring validity, the SEM-PLS also evaluates the discriminant

model through the Fornell-locker, Heterotrait-Monotrait Ratio (HTMT), and Cross-loading. The second stage is to evaluate the Structural model by evaluating R square (R2), Predictive relevance (Q2), path coefficient (to measure the relationship between constructs), and collinearity issue (VIF<5). The final step is to test the hypothesis by p-value to the error rate (five percent).

4. Result

4.1. Measurement Model

The initial stages of analysis using PLS must be carried out in the measurement model to test the validity with outer loading and AVE. Then proceed with measuring reliability by testing CA and CR.

Table 2. PLS algorithm results in evaluating QR Code payments

Item	Outer loading	VIF (<5)	CA	CR	AVE
Personal Innovativeness (PI)			0.850	0.897	0.686
PI1	0.807	2.092			
PI2	0.858	2.449			
PI3	0.799	1.981			
PI4	0.846	1.770			
Perceived Security of QR Code (PSQ)			0.849	0.898	0.688
PSQ1	0.825	1.804			
PSQ2	0.875	2.231			
PSQ3	0.820	2.001			
PSQ4	0.795	1.828			
Perceived Value of QR Code (PVQ)			0.828	0.886	0.660
PVQ1	0.835	2.053			
PVQ2	0.820	1.760			
PVQ3	0.834	2.040			
PVQ4	0.759	1.512			
Perceived Usefulness (PUQ)			0.879	0.917	0.735
PUQ1	0.882	2.789			
PUQ2	0.881	2.880			
PUQ3	0.884	2.639			
PUQ4	0.778	1.599			
Perceived Ease of Use (PEUQ)			0.799	0.866	0.618
PEUQ1	0.750	3.115			
PEUQ2	0.755	3.153			
PEUQ3	0.838	2.136			
PEUQ4	0.799	1.982			
Behavior Intention to use (BIQ)			0.840	0.893	0.676
BIQ 1	0.830	1.993			
BIQ 2	0.821	1.935			
BIQ 3	0.818	1.836			
BIQ 4	0.820	1.787			
Use Behavior of QR Code (UBQ)			0.776	0.858	0.615
UBQ1	0.868	2.000			
UBQ2	0.890	2.479			
UBQ3	0.752	1.110			
UBQ4	0.842	2.003			

The first step in conducting an analysis using SEM-PLS is to test validity (Hair and Alamer, 2022). The validity test evaluates the AVE and outer loading with a minimum recommended value of 0.5 and 0.7, respectively. If the value above is recommended, it means that each construct in this study meets the elements of good validity. Based on Table 1 above, the smallest outer loading value is 0.750 in the PEUQ1. The enormous outer loading value is in the UBQ2 construct (0.890). From the point of view of evaluating outer loading, all constructs in this study have above 0.7 (most minor 0.750). So the constructs in this study are valid. However, an AVE evaluation also needs to be carried out to strengthen this. The smallest AVE value is 0.615 in UBQ.

In comparison, the highest AVE value is in the PUQ construct (AVE value = 0.735). Thus, based on the evaluation of outer loading and AVE from all items meet the criteria for good validation. The next is to evaluate the reliability of each construct through CR and CA more than 0.7 (Hair and Alamer, 2022). The lowest CR value based on Table 1 above is 0.858 (CR). At the same time, the highest value of CR is in the PUQ (0.917). So based on the size of the CR parameters, it meets the reliability of the data. Then in the CA category, the highest score was 0.879 (PUQ), and the lowest score was 0.776 (UBQ). So that the construct in this study fulfils the CA aspect, based on this explanation, it caches constructs in this study fulfil the elements of good data reliability.

Table 3. Fornell-lercker of QR Code

	BIQ	PSQ	PUQ	PVQ	PEUQ	PI	UBQ
BIQ	0.822						
PSQ	0.584	0.829					
PUQ	0.196	0.110	0.857				
PVQ	0.568	0.578	0.259	0.812			
PEUQ	0.393	0.336	0.652	0.373	0.786		
PI	0.256	0.259	0.051	0.248	0.125	0.828	
UBQ	0.739	0.632	0.317	0.589	0.475	0.254	0.784

The next step in carrying out the measurement model is to analyze discriminant validity through fornell-lercker evaluation. Table 3 above shows the output results from SmartPLs 4 regarding fornell-lercker. To fulfill discriminant validity, the AVE square root value between the same constructs must exceed the value of the construct with other different constructs. For example, the fornell-lercker value BIQ – BIQ (0.822) must have a more excellent value than PSQ – BIQ (0.584), PUQ-BIQ (0.196), PVQ-BIQ (0.568), PEUQ-BIQ (0.393), PI – BIQ (0.256), UBQ-BIQ (0.739). The valuation of BIQ – Compared to other constructions, BIQ is the most valuable. Based on the description in Table 3, the construct values are PSQ – PSQ (0.829), PUQ – PUQ (0.857), PVQ – PVQ (0.812), PEUQ – PEUQ (0.786), PI – PI (0.828), and UBQ – UBQ (0.784) exceed the value of each construct with other constructs. Hence, all constructs in this study passed the Fornell-Lercker test of discriminant validity.

Table 4. Cross Loading of QR Code

	BIQ	PSQ	PUQ	PVQ	PEUQ	PI	UBQ
BIQ1	0.830	0.462	0.282	0.435	0.486	0.241	0.572
BIQ2	0.821	0.437	0.195	0.438	0.366	0.165	0.595
BIQ3	0.818	0.515	0.057	0.481	0.212	0.198	0.597
BIQ4	0.820	0.502	0.116	0.511	0.237	0.235	0.664
PEUQ1	0.029	0.052	0.676	0.162	0.750	0.010	0.171
PEUQ2	0.034	0.061	0.696	0.160	0.755	0.007	0.164
PEUQ3	0.463	0.388	0.439	0.361	0.838	0.152	0.493
PEUQ4	0.562	0.446	0.344	0.422	0.799	0.187	0.560
PI1	0.144	0.147	0.152	0.153	0.159	0.807	0.194
PI2	0.231	0.188	0.103	0.193	0.126	0.858	0.205
PI3	0.163	0.234	0.048	0.157	0.028	0.799	0.151
PI4	0.268	0.269	0.021	0.278	0.098	0.846	0.263
PSQ1	0.541	0.825	0.112	0.502	0.321	0.297	0.573
PSQ2	0.513	0.875	0.137	0.540	0.333	0.239	0.582
PSQ3	0.459	0.820	0.041	0.395	0.227	0.139	0.471
PSQ4	0.406	0.795	0.059	0.464	0.212	0.159	0.448
PUQ1	0.197	0.119	0.882	0.228	0.543	0.073	0.337
PUQ2	0.183	0.111	0.881	0.233	0.532	0.035	0.319
PUQ3	0.108	0.026	0.884	0.197	0.594	0.002	0.220
PUQ4	0.186	0.125	0.778	0.231	0.560	0.067	0.215
PVQ1	0.460	0.464	0.246	0.835	0.301	0.213	0.455
PVQ2	0.520	0.481	0.216	0.820	0.305	0.147	0.514
PVQ3	0.400	0.443	0.297	0.834	0.363	0.217	0.457
PVQ4	0.459	0.489	0.083	0.759	0.243	0.233	0.483
UBQ1	0.709	0.559	0.245	0.524	0.404	0.220	0.868
UBQ2	0.630	0.554	0.195	0.491	0.333	0.235	0.890
UBQ3	0.283	0.200	0.541	0.285	0.512	0.084	0.452
UBQ4	0.597	0.569	0.207	0.507	0.364	0.222	0.842

Next is to ensure the correlation between items has measurements with other items through cross-loading evaluation. When each item's cross-loading value against the construct exceeds the cross-loading value, the item meets good discriminant validity criteria through cross-loading evaluation. For example, based on Table 4, the BIQ construct values for items BIQ1 (0.830), BIQ2 (0.821), BIQ3 (0.818), and BIQ4 (0.830) are as follows: (0.820). While the value of BIQ1, BIQ2, BIQ3, and BIQ4 items against several constructs such as PSQ (0.462, 0.437, 0.515, 0.502), PUQ (0.282, 0.195, 0.057, 0.116), PVQ (0.435, 0.438, 0.481, 0.511), PEUQ (0.486, 0.366, 0.212, 0.237), PI (0.241, 0.165, 0.198, 0.235) and UBQ (0.572, 0.595, 0.597, 0.664) are more significant than BIQ. Meanwhile, the other constructs have a more excellent value than the other constructs. Thus, all items in this study meet the cross-loading criteria.

Table 5. Heterotrait-Monotrait Ratio (HTMT) of QR Code

	BIQ	PSQ	PUQ	PVQ	PEUQ	PI
PSQ	0.683					
PUQ	0.234	0.128				
PVQ	0.678	0.682	0.305			
PEUQ	0.467	0.362	0.814	0.431		
PI	0.286	0.288	0.113	0.282	0.188	
UBQ	0.886	0.739	0.466	0.727	0.623	0.293

Evaluation of the HTMT criteria serves to measure hetero-trait criteria with mono-traits. A good HTMT must have a value below 0.9 so that no correlation occurs (Henseler *et al.*, 2015). Based on Table 5 above, the range of HTMT values ranges from the smallest of 0.113 (PI – PUQ) to the largest with a value of 0.886 (UBQ – BIQ). The HTMT value in Table 5 is below 0.9. Hence, it may be argued that none of the constructs correlate.

Next is to evaluate the collinearity of a construct. A construct is free from collinearity when its VIF value is below 5 (Hair and Alamer, 2022). Based on Table 2 above, VIF values are in the range of 1.110 – 3.153, with the smallest VIF value in the UBQ3 item (VIF=1.110, <5) and the immense VIF value in the PEUQ2 item (VIF=3.153, <5). All constructs are free from collinearity because all items have a VIF value below 5.

4.2 Structural Model

The structural model serves to evaluate the model framework that has been made. Notes for predicting the model are through Predictive Relevance (Q2) and R Square (R2).

Table 6. Q2 and R2 evaluation

Construct	Q^2	R^2	Decision
BIQ	0.293	0.449	Moderate
PUQ	0.314	0.438	Moderate
PVQ	0.249	0.388	Moderate
PEUQ	0.058	0.113	Weak
UBQ	0.326	0.547	Moderate

The most of R2 squares in this construct are in the moderate category. While there is only 1 R2 that is categorized as weak, namely in the PEUQ construct (R2 = 0.113), there is only an 11.3% joint effect on the PEUQ construct. The most significant joint effect in this study was found in UBQ, with an R square value of 0.547. that is, there is a mutual influence between the BIQ and UBQ constructs of 54.7% based on the formula R2. At the same time, the other most enormous R2 value is at BIQ (R2=0.449). Thus, the PEUQ, PUQ, PSQ, and PVQ constructs influence BIQ by 44.9%. After evaluating R2, the next step is to conduct Q^2 to predict the model framework that has been built with a recommended value above 0 (Henseler *et al.*, 2015). Table 6 above shows the smallest value in PEUQ (Q2 = 0.058). While other construct values such as BIQ, PUQ, PVQ, and UBQ have a suitable model framework with a value range of 0.249 – 0.326.

4.3 Hypothesis testing

This section discusses the determination of the hypothesis that has been proposed following the output results from smart-pls according to the details in Table 7.

Table 7. Hypothesis result

Hypothesis		Path	P Values	Decision
H1	PI -> PVQ	0.098	0.002	Accepted
H2	PEUQ -> PVQ	0.108	0.020	Accepted
H3	PSQ ->PVQ	0.503	0.000	Accepted
H4	PUQ -> PVQ	0.128	0.003	Accepted
H5	PSQ -> PEUQ	0.336	0.000	Accepted
H6	PI -> PUQ	-0.004	0.457	Rejected
H7	PEUQ -> PUQ	0.693	0.000	Accepted
H8	PSQ -> PUQ	-0.121	0.001	Accepted
H9	PI -> BIQ	0.074	0.014	Accepted
H10	PEUQ -> BIQ	0.190	0.001	Accepted
H11	PUQ -> BIQ	-0.046	0.196	Rejected
H12	PSQ -> BIQ	0.333	0.000	Accepted
H13	PVQ -> BIQ	0.299	0.000	Accepted
H14	BIQ -> UBQ	0.739	0.000	Accepted

Based on the table above, there are 14 hypotheses proposed. However, there are 2 hypotheses that are rejected, namely H11 concerning PUQ with BIQ (0.196) and H6 concerning PI – PUQ (0.457). This is because the two hypotheses do not meet the criteria set out in determining the hypothesis; the p-value (0.05) must be smaller when compared to the p-value. H1, H2, H3, and H4 significantly positively affect PVQ. This is because the PI (0.002), PEUQ (0.020), PSQ (0.000), and PUQ (0.003) have a p-value below 0.5. So, it can be concluded that the fourth hypothesis is accepted. Next is the evaluation on H5 regarding PSQ with PEUQ. The p-value for hypothesis H5 is less than 5% (0.000), suggesting PSQ has a strong positive effect on PEUQ. The seventh and eighth hypotheses regarding the impact of PEUQ (0.000) and PSQ (0.001) on PUQ have a p-value below 5%. So it can be concluded that the seventh and eighth hypotheses, namely PEUQ and PSQ, have a positive impact on PUQ, likewise with hypotheses 9, 10, 12, and 13 regarding the relationship of several constructs such as PI, PEUQ, PSQ, and PVQ with BIQ. Based on the output of Table 7 above, the p-value at PI (0.014), PEUQ (0.001), PSQ (0.000) and PVQ (0.000) with BIQ have a value below 5% so that the four hypotheses are accepted-finally, the 14th hypothesis regarding the impact of BIQ on UBQ. The p-value on H14 (0.000) is below the specified error rate (5%), so it can be concluded that BIQ significantly impacts UBQ.

The highest path coefficient value is 0.739 in the 14th hypothesis (BIQ à UBQ). The BIQ construct has a significant positive relationship of 73.9% to UBQ. At the same time, the second largest relationship is in the second hypothesis regarding PEUQ -> PUQ, with a significance value of 69.3% (path=0.693). Another most considerable value is in the 3rd hypothesis regarding PSQ to PVQ with a significance level of 50.3% (path=0.503). At the same time, some other hypothetical relationship coefficients have coefficient values between 9.8% – 33.6%, for example, PI -> PVQ (path=0.098), PEUQ -> PVQ (path=0.108), PUQ ->

PVQ (path=0.128), PSQ – > PEUQ (path=0.336), PSQ -> PUQ (path=-0.121), PI -> BIQ (path=0.074), PEUQ -> BIQ (path=0.190), PSQ -> BIQ (path=0.333), and PVQ -> BIQ (path=0.299). Thus, it can be concluded that of the 14 hypotheses, 1 hypothesis (H8, PSQ->PUQ) has a negative effect, and two hypotheses do not have a significant effect (H11 and H6). in contrast. The rest had a significant positive impact.

5. Discussion

This study is extending the technology acceptance model by identifying other characteristics that influence QR Code adoption, notably PI, PSQ, and PCQ. The existence of the extended variable contributor is proven to strengthen TAM to measure technology adoption. BIQ is proven to be the variable that has the most positive effect on UBQ at 73.9%. This shows that MSMEs are aware that the use of the QR Code can be beneficial for the sustainability of their business. Venkatesh stated that the main factor in making users use technology is their desire to use it (Venkatesh *et al.*, 2012). The higher the intention of MSMEs, the greater the likelihood of continuing to use QR Code payments. This is also proven by previous research where the intention to use can continuously increase the use (Ahmed and Damodharan, 2022; Martinez and McAndrews, 2022).

This study demonstrates that the user's purpose to utilize QR code technology can improve the frequency of ongoing use. This is supported by other researchers, where the most significant factor for users when using the QR code intensely is when they plan to use the QR code application (Martinez and McAndrews, 2022). This fact is backed by other study findings indicating that the important element in embracing technology is the convenience and functionality of the technology to assist daily living (Hanif and Lallie, 2021; Musyaffi *et al.*, 2021; Tamilmani *et al.*, 2021). Users are optimistic that using QR codes can attract consumers to buy. Especially when there are transactions and consumers. Users experience a positive experience using the QR code because it is accessible and valuable. Users also feel that using the QR Code payment method is a good and convenient idea, thereby increasing usage behaviour on an ongoing basis. This study's findings do not support the perceived usefulness of QR Code technology on technology adoption. This is due to the role of MSMEs who view the use of the QR code to attract customers to come. Most MSMEs agree that the QR Code also has good features, but if there is no impact on sales or an increase in their brand, then MSMEs may not be interested in adopting the QR Code payment method. This fact also supports several other studies where PUQ did not produce a positive impact on BIQ (Osman *et al.*, 2021; Rafferty and Fajar, 2022).

In addition to the convenience factor and technological benefits users feel, another factor that has increased the adoption of the QR Code is PI. PI is a critical factor that can make someone continue to use QR technology in using payment methods (Ahmed and Damodharan, 2022; Ding, 2019; Lu *et al.*, 2005). Based on research (Li *et al.*, 2021), PI is an essential factor that forms the basis for the continued application of information technology. The higher the user's innovation, the more continuous application will be maintained. Some previous researchers even recommended more investigations regarding PI to BIQ because it is synonymous with continuous system implementation (Acuti et al., 2022; Alamoudi, 2022; Suebtimrat and

Vonguai, 2021; Suo et al., 2022). Users with high innovation are identical to accepting the technology (Liébana-Cabanillas *et al.*, 2015). Although the results of this study also produce things different from this hypothesis, where PI does not have a significant effect on PUQ. This is because the PI initiative does not see PUQ increasing technological innovation based on adopting QR codes. Lin & Wu [22] also supported the results of this research, where PI is not a reason for someone to increase PUQ.

This research also proves that the value contained in QR code technology is significant for MSMEs. Research from Zhong & Moon (Zhong and Moon, 2022) proves that convenience can increase the quality and value of the technology used. When the QR Code used by MSMEs has various convenient features, they view the QR Code as valuable and worth using. One of the conveniences experienced by MSMEs to operate QR Code is fast, and there is no need to bother making transactions because it has a self-service nature. Consumers can carry out their transactions by scanning barcodes so that it does not require much effort. Previous research also revealed that when many features are available according to needs, these users tend to perceive the technology used to be more valuable (Alnemer, 2022; Ashrafi and Easmin, 2023).

In addition, the security factor is also essential to maximize MSME acceptance of the use of the QR code. Maintaining data security, especially those related to MSME finance, is an essential factor that makes users feel safe. Users who make transactions using a QR code certainly have concerns about whether the money sent reaches their account. Moreover, there is a risk of data and password misuse so that it can break into user accounts. However, until now, QR code service providers have excellent service as call centres when users need help with QR codes. In addition, service providers also have QRIS as a more protected payment standard in Indonesia. This makes users confident that their data and transactions are guaranteed security. This was directly confirmed by Lin & Kim (Lin and Kim, 2016), where a strong relationship exists between security and privacy in increasing or decreasing one's perception of convenience. Previous literature proves that PSQ has an influence on BIQ, especially in adopting technology (Akinnuwesi et al., 2022; Alshurideh et al., 2021; Chang et al., 2022; Rafferty and Fajar, 2022).

6. Conclusion and Implication

Significant findings in this study indicate increased QR Code usage in SMEs. The most significant factor influencing this increase in usage is based on the intention to use the MSMEs themselves. The findings also show that the TAM model is developing with other constructs, such as personal innovativeness, perceived security, and perceived value, which are proven to strengthen the model. QR Code offers a fast payment process. In addition, the QR code has great value concerning the sustainability of MSME businesses. Consumers can process payments via QR Code in a self-service manner, using a smartphone to scan the barcode. So that MSMEs make a small effort. The results of this study show that the QR code's benefits do not influence the intention to use the QR code. This is because a more significant focus for MSMEs is business sustainability. MSMEs consider the QR code

payment model modern and up-to-date to attract consumers to buy MSME products and services. The security of the QR code is also strong evidence that can motivate and consider the QR Code valuable. An intrinsic factor is attached to the QR Code that can be controlled and accounted for. So MSMEs tend to recommend the QR Code payment method to consumers and other MSME partners.

The findings of this investigation show personal innovativeness has a considerable impact on QR Code adoption. Even though the most extensive construct comes from the MSMEs' intention, the encouragement of innovativeness to use the QR Code is also essential. Therefore, the role of socialization and technological literacy is needed for MSMEs to increase QR Code adoption. The impact of the results of this research on QR Code service providers is more towards adjusting features and layouts appropriate for MSME types with sufficient or limited technological literacy. Service providers can also provide various attractive features for MSMEs, such as discounts and point offer to attract consumers using the QR Code payment method. Another important thing is the guarantee of data security. The establishment of a QR code standard by the Indonesian government certainly increases user trust. However, the majority of MSMEs are still worried, especially about the in and out of transactions. So it is very important to develop several notification features that transactions have been entered. MSMEs also need a responsive call centre or simple guidance when there are problems using the QR Code. This research can be helpful for regulators such as the government to develop policies, especially regarding user safety. So that the government can create a cashless payment climate for sellers can accept, consumers, and digital payment managers who use the QR Code.

This research only targeted respondents who are given only include QR Code users in MSMEs. Suggestions for previous research should be to compare QR code users and those who are not users. So, it will be clear how the impact will occur. Then, in the context of the QR code, this research only focuses on MSMEs. So that only MSMEs or entrepreneurs can be generalized.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
ECONOMIC STUDIES

Volume 32(6), 2023

Hrabrin Bachev[1]

COMPETITIVENESS OF FARMING STRUCTURES IN BULGARIA[2]

There have been numerous assessment systems and publications for the competitiveness of farming enterprises around the globe due to the high academic, business and policy importance of this problem. Common shortcomings of most evaluating frameworks are that they are based on unlike competitiveness understanding, principles and criteria, traditional indicators of technical and accountancy efficiency, factors productivity, the profitability of activity, firms market share etc. Other deficiencies of dominating approaches are that they are focused on a certain (size, juridic, sectoral, territorial) dimension of farming structures, and the ignorance of a critical governance aspect of a farm's competitiveness. This paper suggests a holistic multi-pillar framework for assessing the competitiveness of farming structures and evaluating the absolute and comparative competitiveness of Bulgarian farms of major juridical types, economic sizes, product specialization, and ecological and geographical locations. A hierarchical system consisting of four pillars of farm competitiveness (Economic efficiency, Financial endowment, Adaptability and Sustainability), and appropriate four Criteria, seventeen particular and five integral indicators are used to measure the competitiveness levels. The study has found that the competitiveness of farms in the country is at a good level, but there is significant differentiation in the levels and factors of farms with different juridical types, sizes, specializations and ecological and geographical locations. Besides the juridical type, other dimensions of farming structures like economic size, product specialization, location, market or self-sufficiency orientation, are (sometimes more) important for determining their absolute and comparative competitiveness. Critical for maintaining the competitive positions of Bulgarian farms are their low productivity, income, financial security, and adaptability to changes in the natural environment. For the improvement of the later weaknesses are to be directed farm management strategies and public policy support measures. A large portion of farms of different types has low competitiveness, and if adequate measures are not taken in due time to improve management and restructuring farms, the efficiency of state support, etc., a significant part of Bulgarian farms will cease to exist in the near future.

Keywords: competitiveness; pillars; assessment; farms
JEL: D23; L22; M13; O17; Q13

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[2] This study has been funded by the Bulgarian Science Fund, the project "The Mechanisms and the Modes of Agrarian Governance in Bulgaria", Contract № КП-06-Н56/5 from 11.11.2021.
This paper should be cited as: *Bachev, H. (2023). Competitiveness of Farming Structures in Bulgaria. – Economic Studies (Ikonomicheski Izsledvania), 32(6), pp. 108-131.*

1. Introduction

There have been numerous assessment systems and publications for the competitiveness of farming enterprises due to the high academic, business and policy importance of this problem around the globe (Andrew et al., 2018; Falciola, Rollo, 2020; Dresch et al., 2018; Western, et al., 2020; Wisenthige, Guoping, 2016). Evaluating frameworks mostly focus on particular (small) sized holdings (Alam et al., 2020; Berti, Mulligan, 2016; Latruffe, 2010, 2013; Lundy, et al., 2010; Mmari, 2015; Ngenoh et al., 2019; Orłowska, 2019; Koteva, 2016), or juridical type (Andonov, 2013; Alexsiev, 2012), or an industry/subsector (Alam et al., 2020; Benson, 2007; Borisov, 2007; FAO, 2010; Jansik, Irz, 2015; Ivanov et al., 2020; Kleinhanss, 2020; Marques et al., 2011; Marques, 2015; Nivievskyi, et al., 2011; Ngenoh et al., 2019; Oktariani, Daryanto, Fahmi, 2016; Ziętara, Adamski, 2018), or a farming system (Marques, 2015; Orłowska, 2019; Koteva et al., 2021; Slavova et al., 2011), or a region (Marques et al., 2011; Nowak, 2016; Lundy, et al., 2010; Ngenoh et al., 2019), or a factor(s) (Berti, Mulligan, 2016; Mmari, 2015; Ngenoh et al., 2019; Oktariani, Daryanto, Fahmi, 2016; OECD, 2011).

Common shortcomings of most evaluating frameworks are that they are based on unlike competitiveness understanding, principles and criteria, traditional indicators of technical and accountancy efficiency, factors productivity, profitability of activity, firms market share etc. Other deficiencies of dominating approaches are that they are focused on a certain (size, juridic, sectoral, territorial) dimension of farming structures, and the ignorance of a critical governance aspect of the farm's competitiveness.

Interdisciplinary New Institutional Economics give new insights on many phenomena related to economic organizations in modern agriculture (Bachev, 2010, 2011, 2022; Bachev, Ivanov, Sarov, 2020; Ivanov, Bachev, 2023). Based on that rapidly evolving methodology, a novel comprehensive approach for understanding and assessing the competitiveness of farming structures was suggested, operationalized, experimented and gradually improved in the last decade (Bachev 2010; Bachev et al., 2022; Koteva, Bachev, 2011; Bachev, Koteva, 2021a, b, c). That new holistic framework takes into account the production and the financial, and governance aspects of farms' ("competitive") potential to compete on (certain) markets. In recent years, that new approach has been applied for the assessment of competitiveness levels of Bulgarian farms in general and holdings with different product specialization. Macro (agro-statistical) and micro (survey) economic data have been used and both evaluations have shown similar results (Bachev et al., 2022; Koteva, Chopeva, Bachgev, 2021; Bachev, Koteva, 2021b, c). Despite considerable progress in that prospective area, still there are no comprehensive assessments of the competitiveness of farms of different juridical types, sizes, extent of market orientation, ecological and geographical locations at the current stage of development. Neither there are studies for revealing the specific relations between and importance of legal, operational, sectoral, and territorial dimensions of farming structures competitiveness in the country.

The goal of this study is to fill the existing gap, and incorporate a holistic multi-pillar framework, and assess the levels of and correlations between the competitiveness of Bulgarian farms of different juridical types, economic sizes, product specialization, and ecological and geographical locations.

2. Methods and Data

In this study, a comprehensive and holistic framework for assessing the competitiveness of Bulgarian farms is incorporated including their production, financial and governance ability to compete. According to the suggested (more adequate) "new" understanding, the competitiveness of a farm means the capability (governance, production and financial potential) of an agricultural holding to maintain sustainable competitive positions on (certain) market(s), leading to high economic performance through continuous improvement and adaptation to changing market, natural and institutional environment (Koteva et al., 2021; Bachev, Koteva, 2021). The main "pillars" of farm competitiveness are: Economic efficiency (Production Pillar), Financial endowment (Financial Pillar), Adaptability (Governance Pillar for current efficiency) and Sustainability (Governance Pillar for long-term efficiency) (Figure 1). Subsequently, Good competitiveness refers to the state in which a farm (1) produces and sells its products and services efficiently on the market, (2) manages its financing efficiently, (3) is adaptable to the constantly evolving market, institutional and natural environment, and (4) is sustainable in time. On the other hand, a low or lack of competitiveness means that the farm has serious problems in efficient financing, production and sale of products due to high production and/or transaction costs, inability to adapt to evolving external conditions and/or insufficient sustainability over time.

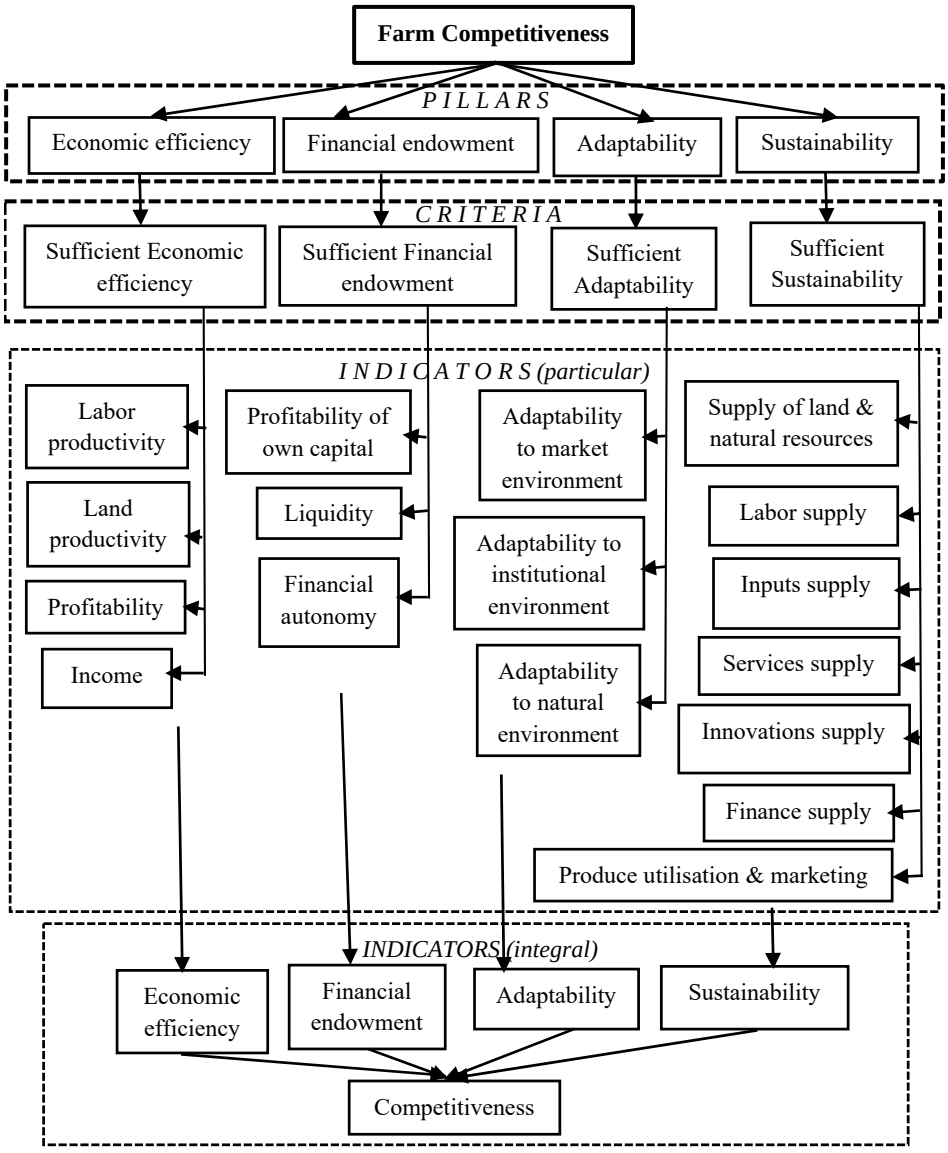
For assessing the level of competitiveness of Bulgarian farms, a system of 4 criteria for each Pillar, and 17 particular and 5 integral indicators are used (Figure 1). Detailed presentation and justification of the applied framework have been done in previous publications (Bachev et al., 2022; Bachev and Koteva, 2021).

There are no available statistical, report, etc. data for a comprehensive assessment of the absolute and comparative competitiveness of farming structures in Bulgaria. Therefore, the evaluation of farms' competitiveness is based on first-hand (survey) microdata collected in 2020 from the managers of 319 "typical" farms of different juridical types, economic sizes, production specializations, and ecological and geographical locations. Information was collected with the assistance of the National Agricultural Advisory Service and major Agricultural Producers Organizations in Bulgaria. The surveyed holdings accounts for 0.42% of the registered agricultural producers and their structure approximately corresponds to the real farming structure in the country. A summary of the legal, size, and territorial characteristics of surveyed holdings is presented in Table 1.

Surveyed farm managers were given the possibility to select one of the three levels (Low, Good, or High), which most closely corresponds to the condition of their holding for each specific competitiveness indicator. The qualitative assessments of farm managers were transformed into quantitative values, as the High levels were valued at 1, the Intermediate ones 0.5, and the Lows ones at 0. For each of the surveyed farms, an Integral Competitiveness Index is calculated for individual criteria and as a whole, as arithmetic averages. Competitiveness indices of farms with different types (legal status, size, region, product specialization, etc.) were calculated as an arithmetic average from the individual indices of the constituent holdings in the particular group. For assessing the overall level of farm competitiveness, the following benchmarks, suggested by the leading experts in the area, are

applied: High competitiveness 0.51-1, Good competitiveness 0.34-0.5, and Low competitiveness 0-0.32.

Figure 1. Holistic system for assessing competitiveness of Bulgarian Farms



Source: Author.

Table 1. General characteristics of surveyed farms in Bulgaria (%)

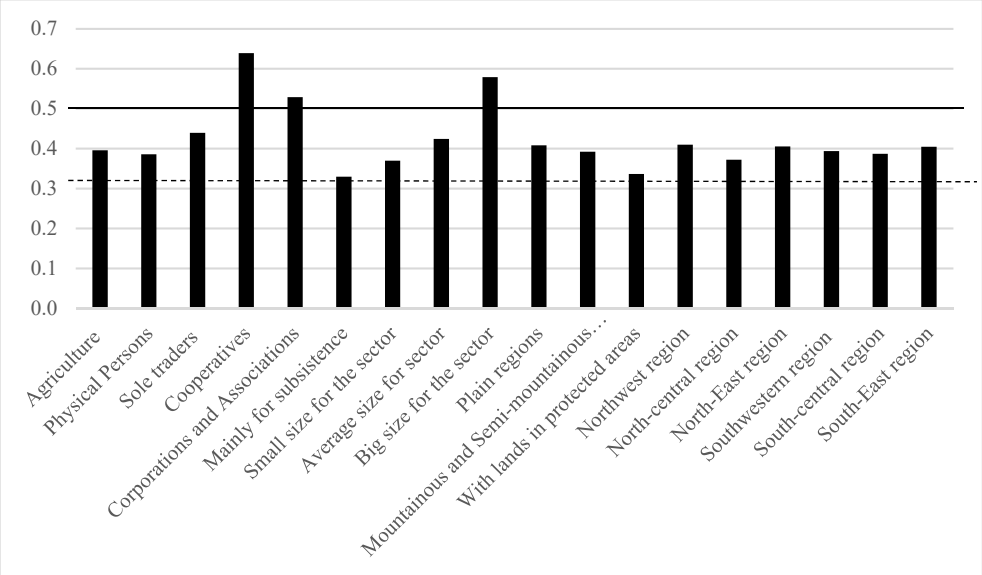
Juridical type, Economic size	Share in total number, %	Ecological and Geographical region	Share in total number, %
Physical Persons	94.30	Plain regions	58.31
Sole traders	2.22	Mountainous and Semi-mountainous regions	21.94
Cooperatives	0.63	With lands in protected areas	7.84
Corporations	2.22	Northwest region of country	17.87
Associations	0.63	North-central region of country	16.93
Mainly for subsistence	6.49	North-East region of country	16.61
Small size for the sector	61.69	Southwestern region of country	12.85
Average size for sector	29.87	South-central region of country	17.87
Big size for the sector	1.95	South-East region of country	17.87
Total number	319		100

Source: survey with agricultural producers, 2020.

3. Competitiveness of Farms of Different Juridical Type

There is considerable variation in the level of competitiveness of Bulgarian farms of different legal types (Figure 2). With the highest competitiveness are Cooperatives, Corporations and Associations. The level of competitiveness of Sole traders is good and above the industry average. The lowest is the competitiveness of Physical persons, which is at a good level, but below the agriculture average. This means that the trend of transfer of agrarian resources and activity from the less competitive farming structures of the Physical persons to cooperative, corporate and firm management with higher competitive advantages will continue.

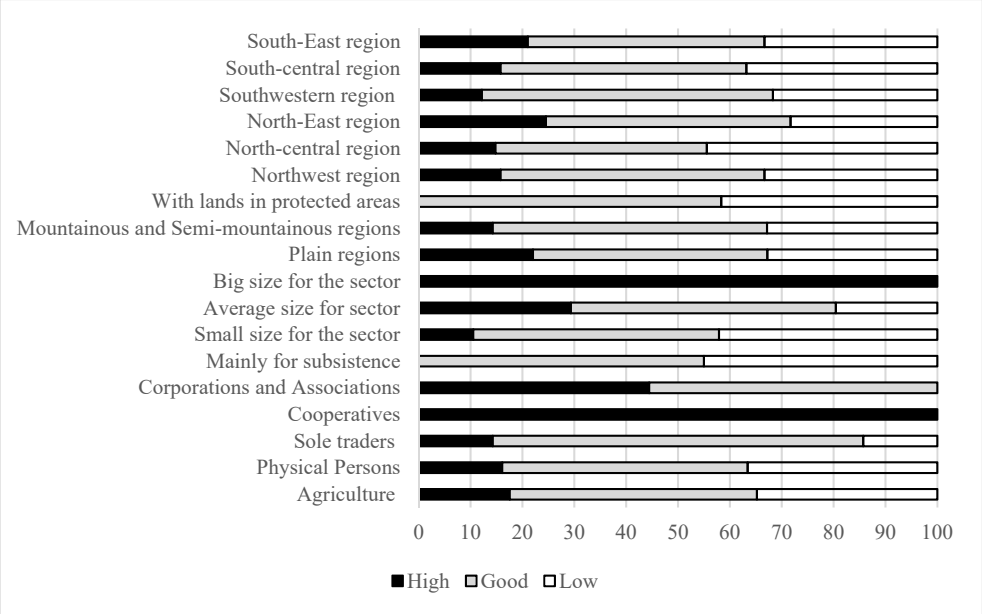
Figure 2. Competitiveness of farms of different types in Bulgaria



Source: Author's calculations.

All of the surveyed Cooperatives, Corporations and Associations have a good or high level of competitiveness, including every cooperative farm (Figure 3). The share of Sole trader with good and high competitiveness is also significant. At the same time, almost 37% of all Physical persons have low competitiveness. Moreover, only 48.7% of Physical persons have a level of competitiveness above the national average, and almost one in two with competitiveness below the average for the group of Physical persons (Figure 4). Along with this, the share of Cooperatives, Corporations and Associations, and Sole traders with competitiveness above the industry average is significant.

Figure 3. Share of farms with different levels of competitiveness in Bulgaria (%)



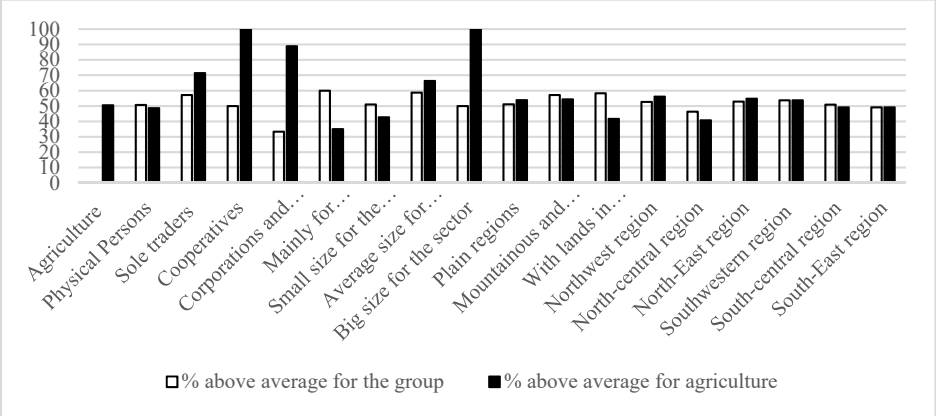
Source: Author's calculations.

This means that a significant part of the farms of Physical persons will cease to exist in the near future, if measures are not taken in due time to increase competitiveness by improving the management and restructuring of farms, adequate state support, etc. as a result of weak competitive positions, bankruptcies, transformation into companies and partnerships, acquisition by more efficient structures, etc. Two-thirds of Corporations and Associations also have below-average levels of competitiveness for this group, indicating a need for modernization to "align" with corporate governance and competition standards.

The analysis of the individual aspects (pillars) of the competitiveness of farms with different legal types shows that (relatively) low economic efficiency to the greatest extent contributes to the deterioration of the competitiveness of Physical persons and Sole traders, the low financial security of Physical persons, the low sustainability of Cooperatives, and the low adaptability of Corporations and Associations (Figure 5). At the same time, high economic

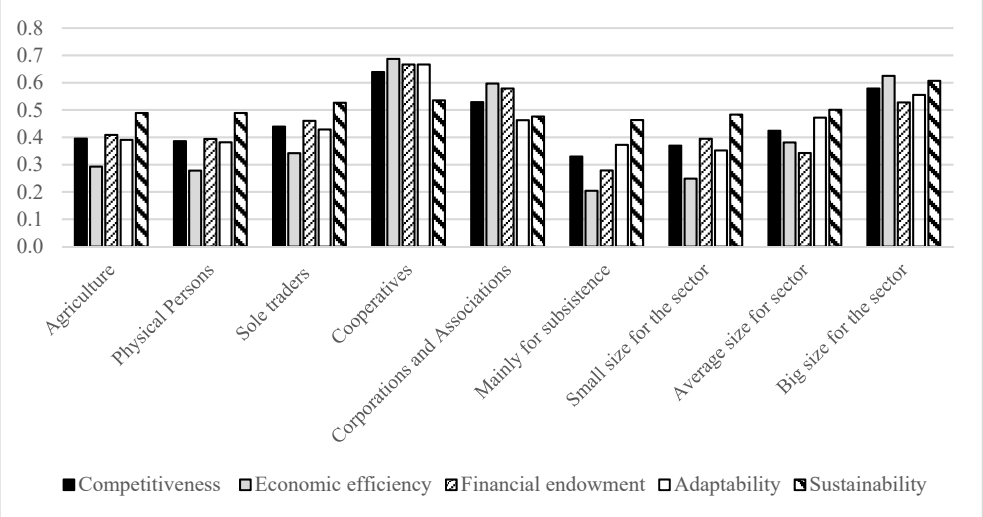
efficiency conditions the strong competitive positions of cooperatives, corporations and associations, and the high sustainability of sole traders.

Figure 4. Share of farms with a level of competitiveness above the average for agriculture and the respective group in Bulgaria (%)



Source: Author's calculations.

Figure 5. Level of competitiveness of Bulgarian farms with different juridical types and sizes according to basic competitiveness criteria

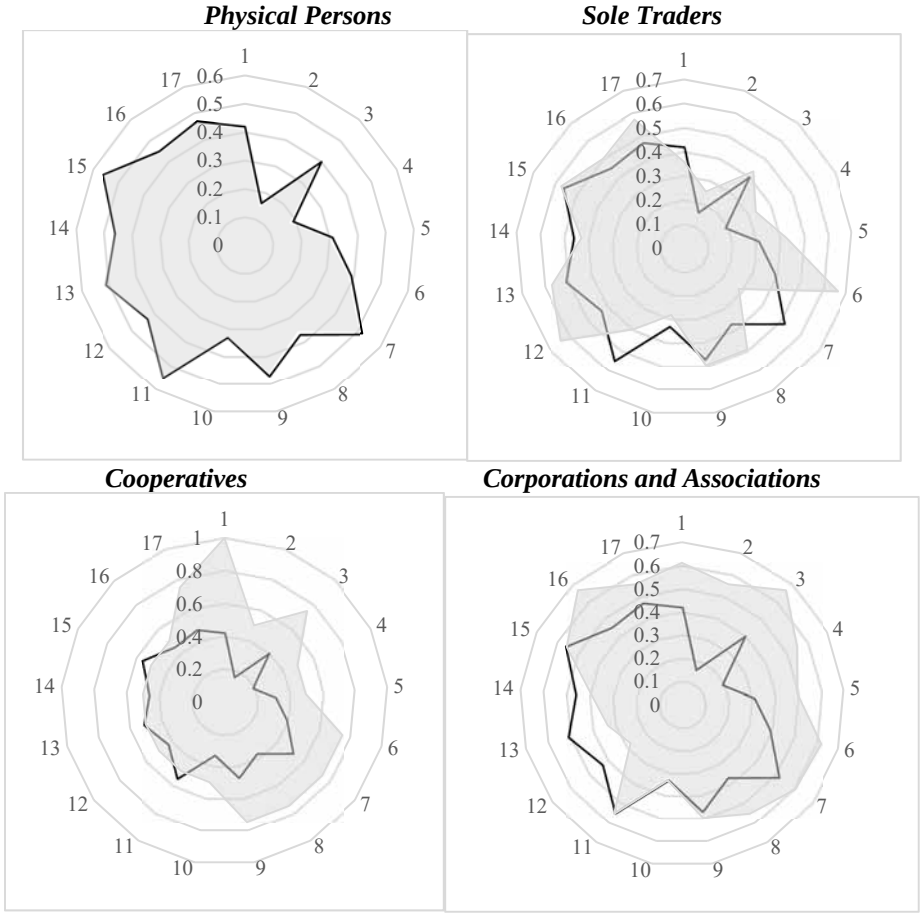


Source: Author's calculations.

Cooperative and corporate farms have the highest financial security and potential for adaptation to changes in the market, institutional and natural environment, and Cooperatives and Sole traders have the highest sustainability. Good sustainability also contributes to the greatest extent to maintaining the competitiveness of Physical persons in the country.

Most of the indicators of competitiveness of the farms of Physical persons have values lower than the average for the country (Figure 6). In terms of adaptability to the natural environment, supply of land and natural resources, labour force, finance and services, the competitiveness of Physical persons is like the sectoral average. Only in terms of supply of materials and equipment, these farms have competitive advantages compared to farms in the country.

Figure 6. Competitiveness indicators* of farms of different juridical types in Bulgaria (bold line – average for agriculture)



** 1 – Labor Productivity; 2 – Land Productivity; 3 – Profitability; 4 – Income; 5 – Profitability of own capital; 6 – Liquidity; 7 – Financial autonomy; 8 – Adaptability to the market environment; 9 – Adaptability of the institutional environment; 10 – Adaptability of the natural environment; 11 – Supply of land and natural resources; 12 – Labor supply; 13 – Inputs supply; 14 – Finance supply; 15 – Services supply; 16 – Innovations supply; 17 – Utilization and marketing of produce and services*
Source: Author's calculations.

The competitiveness of Sole traders is supported by (better) good liquidity, profitability and financial security, adaptability to the market and institutional environment, and advantages in terms of supply of services and innovations, and in the realization of production and services. Moreover, in terms of the supply of workforce and inputs, these holdings are superior to other legal types. The main factors for lowering the competitiveness of Sole traders are relatively low productivity, productivity, financial autonomy, potential for adaptation to the natural environment and weaker positions in the supply of land and natural resources, and finance.

Cooperative farms have comparative competitive advantages over other legal types in terms of levels of productivity, profitability, liquidity, financial autonomy, adaptability to the market, institutional and natural environment, in the supply of labour and finance, and in the realization of production and services. Another significant part of the Cooperatives' competitiveness indicators surpasses the average for the country. To the greatest extent, greater problems in supplying the necessary land and natural resources and services contribute to lowering the competitiveness of cooperative farms.

Corporations and Associations outperform other legal types with high levels of labour and land productivity, and advantages in terms of supply of land and natural resource, and innovations. In addition, most of the remaining indicators of competitiveness of these farms are above the average for the country. Critical to maintaining the competitiveness of corporative farms are problems in supplying the necessary labour, inputs, and finance, as well as average levels of adaptability to changes in the natural environment and efficiency in supplying the necessary services.

There is considerable variation in the competitiveness of farms depending on their product specialization[3] (Figure 7). Deviations from the average for the legal type are largest for Physical persons specialized in herbivores (-0.07), Sole traders specializing in mixed crop production (-0.16), and Corporations and Associations specialized in herbivores (-0.15) and bees (+ 0.26). These deviations are towards the average level for the sub-sector for Physical persons and Corporations and Associations specializing in herbivores. This shows that the production specialization of this group of farms is a more important factor for their competitiveness than their legal status.

On the other hand, for Sole traders specialized in mixed crop production and for Corporations and Associations specializing in bees, the deviations are in opposite directions from the average levels for the sub-sector. This shows the additional comparative competitive advantages (of Corporations and Associations) or comparative competitive disadvantages (of Sole traders) in certain sub-sectors of agriculture in the country – beekeeping and mixed crop production, respectively.

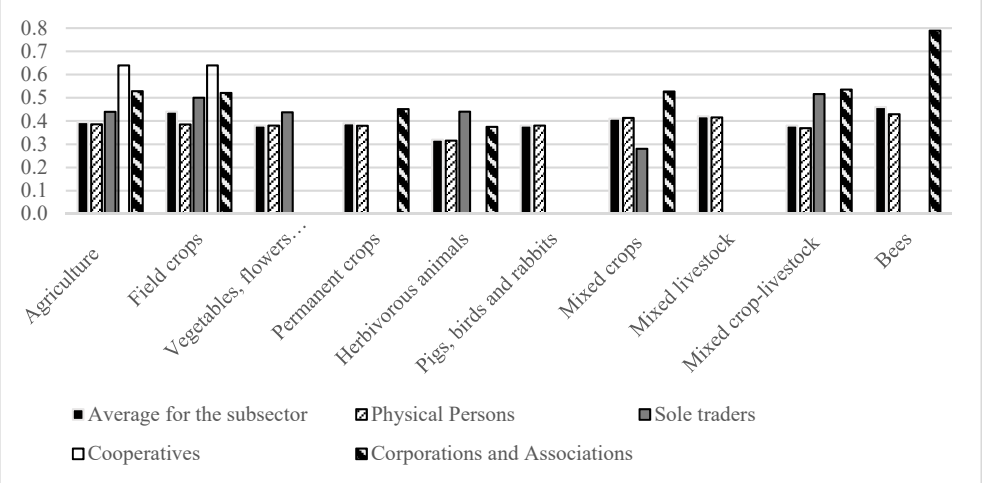
Finally, farms of Physical persons dominate in the major types of production such as vegetables, flowers and mushrooms, herbivores, pigs, poultry and rabbits, mixed crop production and mixed livestock production. In these sub-sectors, the levels of competitiveness of Physical persons predetermine the sub-sector level, while at the same time

[3] Detailed analisis of competitiveness of farms with different specialization is done in other publications (Bachev et al., 2021; Bachev, Koteva, 2021).

matching or being close to the average for this legal type of holdings. This means that there is an "optimal" (competitive) specialization for this type of farming organization and there is practically no competition with other legal types in these industries.

Thus, it is to be expected that the restructuring of holdings of different legal type will continue, through the concentration of resources in the most efficient groups, diversification and/or change of specialization, transformation of the legal type of the farms, etc.

Figure 7. Competitiveness of farms of different legal type and specialization in Bulgaria



Source: Author's calculations.

4. Competitiveness of Farms of Different Sizes

There is also differentiation in the levels of competitiveness of farms of different sizes (Figure 2). There is a strong positive correlation between the size of the farm and its level of competitiveness. Farms with large sizes for the industry have the highest competitiveness. The level of competitiveness of medium-sized farms is good and above the industry average. The level of competitiveness of small farms and subsistence farms is below the sector's average. This shows that the previous trend of transferring agrarian resources and activity from less competitive farms with small sizes and a semi-market orientation to those with medium and large sizes for the industry will be preserved.

All of the surveyed large-scale farms are highly competitive (Figure 3). The share of highly competitive medium-sized farms is also big. Along with this, however, a significant part of self-sufficiency farms and those with small sizes for the industry are of low competitiveness – respectively 45% and 42.1% of them. The share of medium-sized farms with an unsatisfactory level of competitiveness is also not small.

All of the large farms and two-thirds of the medium-sized ones have competitiveness levels above the industry average (Figure 4). Among self-sufficiency farms and those of small size,

the share of those with competitiveness below the national average prevails. At the same time, however, the majority of semi-market holdings and medium-sized farms have levels of competitiveness exceeding that of the respective group – 60% and 58.9%, respectively. Among small and large-scale farms for the sector, the share of holdings with a higher competitiveness than the average for the group is half.

All this means that the restructuring of farms of all sizes will continue through the transfer of resources to more efficient structures in the relevant group and/or in groups with bigger sizes, consolidation of farms, improvement of management, suspension or reduction of activity, etc. Along with this, however, there will continue to be a significant number of farms with good and high competitiveness in farm groups of all sizes.

Low economic efficiency to the greatest extent contributes to the deterioration of the competitiveness of semi-market farms and small farms, the low financial security of all farms except the largest, and the lower sustainability and adaptability of smaller farms (Figure 5). At the same time, high economic efficiency, financial security, adaptability and sustainability are the reason for the strong competitive positions of large-scale farms.

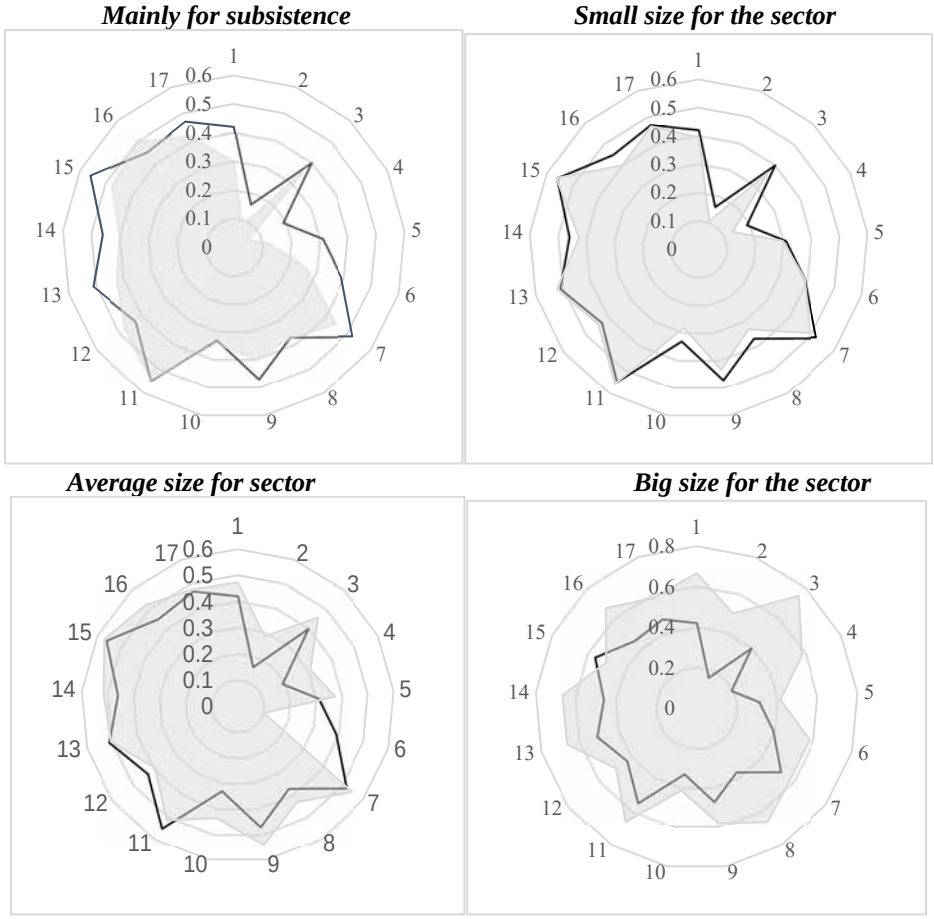
All indicators of competitiveness of large farms, with the exception of the supply of services, have values superior to the average for the country (Figure 8). The main areas that lower the (absolutely good) competitiveness of these farms are relatively low productivity, financial security, adaptability to the natural environment, and supply of labour and services.

The competitiveness of farms of average size for the industry is supported by best-in-industry adaptability to the natural environment and efficiency in the supply of services, and many other indicators superior to those of agriculture as a whole. The main factors for lowering the competitiveness of medium-sized farms are the lowest for the sector liquidity and positions in terms of labour supply.

Small farms have comparative competitive advantages over industry averages only in terms of the supply of land and natural resources, labour and inputs. Many of the indicators of competitiveness of these farms are below the average for the industry, and the most critical for the deterioration of their competitive positions are low productivity, profitability, adaptability to the natural environment, and financial security.

Most of the indicators of competitiveness of farms mainly for self-sufficiency are below average and/or among the lowest for the sector. Only in terms of adaptability to the natural environment and labour supply, this type of farm has levels superior to the industry average. Particularly critical for the competitiveness of these holdings are extremely low productivity, profitability, financial security, liquidity, and productivity.

Figure 8. Competitiveness indicators* of farms of different sizes in Bulgaria (bold line – average for agriculture)

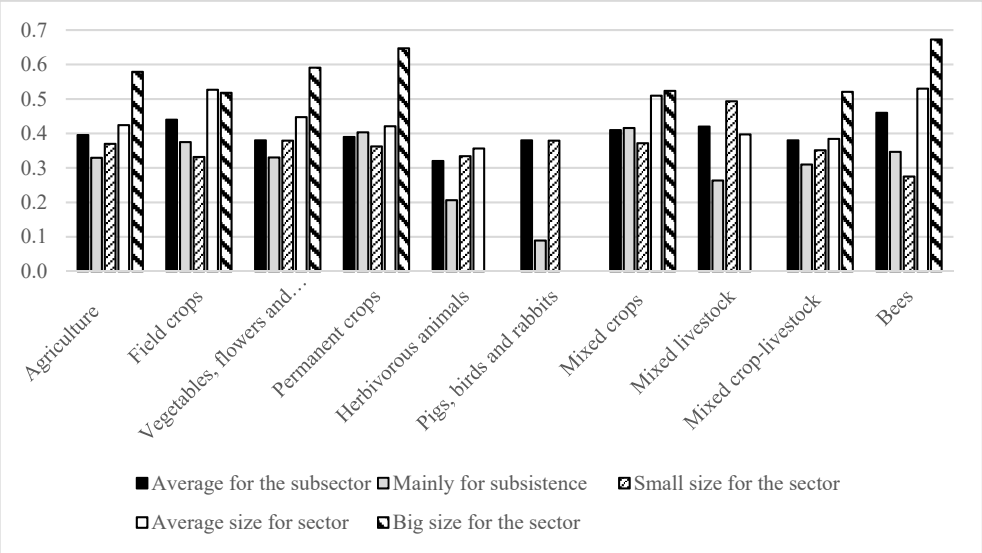


Source: Author's calculations.

There is considerable variation in the competitiveness of farms of different sizes depending on their product specialization (Figure 9). The level of competitiveness of large farms exceeds the sub-sectoral level in all types of specialization in which these farms operate. The situation is similar for most categories of medium-sized farms. Therefore, there are clear competitive advantages arising from the larger scale of operation – economies of scale and scope of production and transactional activity, potential for investment and innovation, etc.

In most categories of small farms, the levels of competitiveness are close to or coincide with the group and sub-sector averages. Exceptions are small farms with mixed livestock and those keeping bees, where the minimum size is a competitive advantage or disadvantage, respectively.

Figure 9. Competitiveness of farms of different sizes and specialization in Bulgaria



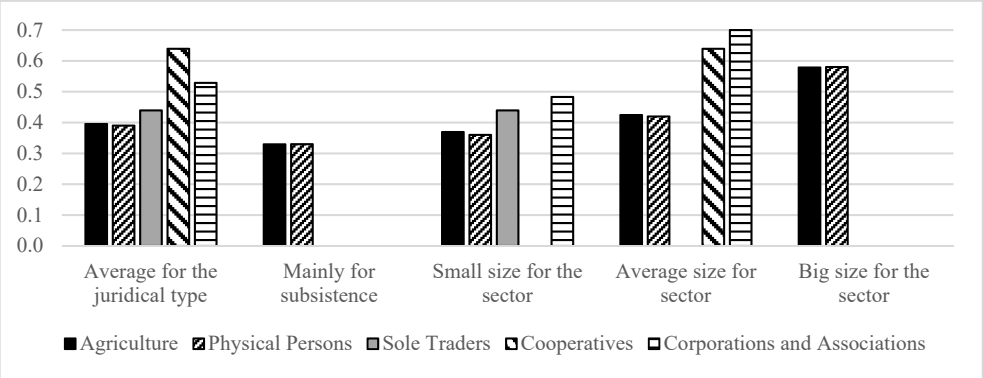
Source: Author's calculations.

Subsistence farms have a lower level of competitiveness than the average for the main sub-sectors and farms of other sizes. The exception is the semi-market farms in permanent crops and mixed crop production, which have above-average competitiveness for these sub-sectors and therefore comparative advantages over some groups of larger farms. Semi-market holdings specializing in herbivores, pigs, poultry and rabbits, and mixed livestock have strong competitive disadvantages compared to larger farms.

All these data show that the process of specialization and/or restructuring of farms will continue, depending on the competitive advantages or disadvantages caused by the respective size (small, medium, large) and nature (semi-market, market) of the activity in the production of different types and combinations.

In the case of farms of Physical persons, and Corporations and Associations, there is a positive correlation between the level of competitiveness and the increase in the size of the activity (Figure 10). All of the surveyed Sole traders are in the group of small farms and have a level of competitiveness exceeding both the average for this size group and the industry. The same applies to Cooperatives, all of which are in the medium-sized group. Therefore, an optimal size has been reached for realizing the maximum competitive positions of these legal types of holdings. The situation is similar with Corporations and Associations, which are divided into only two groups – small and medium in size. The competitive advantages of this form of economic organization are fully realized in small and/or medium sizes depending on production (specialization, etc.), management (need for a coalition of resources, etc.), or other reasons.

Figure 10. Competitiveness of farms of different sizes and juridical type in Bulgaria



Source: Author's calculations.

5. Competitiveness of Farms with Different Ecological Locations

There are also differences in the competitiveness of agricultural holdings in different ecological regions of the country (Figure 2). Farms in plain areas are more competitive than those in mountainous and semi-mountainous areas of the country. With the lowest absolute and comparative competitive positions are farms that operate with land in protected areas and territories. This requires long-term public support for this category of holdings to maintain their viability and the agricultural activity in such territories and zones.

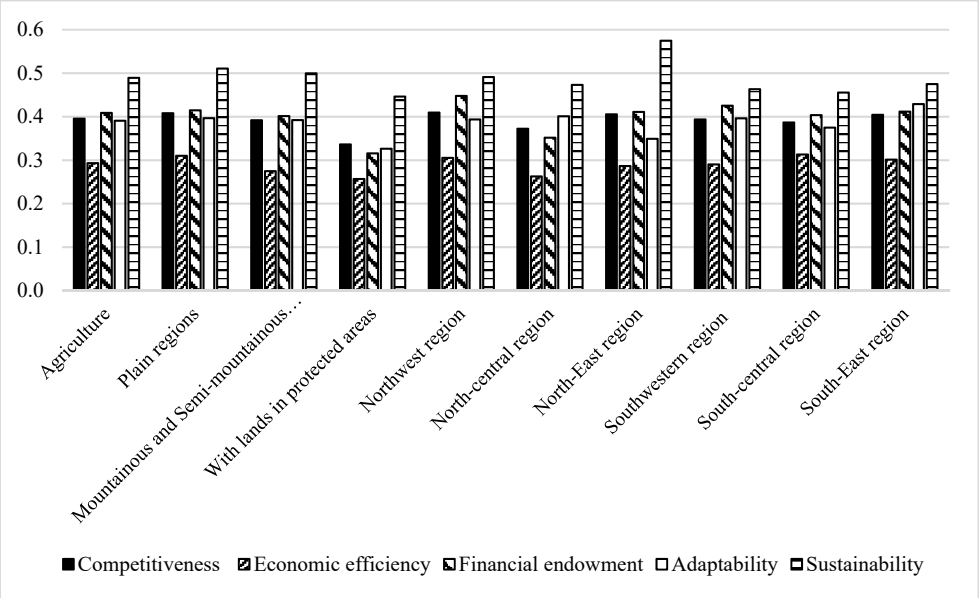
The share of farms with good and high competitiveness in plains, and in mountainous and semi-mountainous regions is almost the same – about two-thirds of all farms (Figure 3). However, over 22% of all farms in plain areas are highly competitive, while among those in mountainous and semi-mountainous areas, this share is significantly lower (14%). Nevertheless, almost every third farm in these areas is of low competitiveness and threatened with extinction. Among farms with lands in protected areas and territories, there are no farms with high competitiveness, and the share of those with low competitive positions is almost 42%.

The share of farms with levels of competitiveness above the average for the sector and for the group in mountainous and semi-mountainous areas is higher than that of farms in plain areas (Figure 4). The highest is the segment of farms with better competitor positions for the territorial-ecological group in the protected zones and territories. In all ecological regions, however, there is a significant share of farms with higher competitiveness than the industry average and the group, and their activity is likely to be discontinued or transferred to farms with better competitive positions in the respective region.

In all aspects of competitiveness, the farms in the plain regions of the country are superior to those of the other ecological regions, and the most critical for their competitiveness is the low economic efficiency (Figure 11). In the mountainous and semi-mountainous regions, the competitiveness of holdings is similar to the average in the country in all aspects, as the most

critical factor here is also the low economic efficiency. Farms with lands in protected zones and territories only have high values in terms of their sustainability, while according to the other criteria, their competitiveness is at low levels.

Figure 11. Level of competitiveness of farms with different ecological and geographical locations according to main competitiveness criteria in Bulgaria



Source: Author's calculations.

All indicators of competitiveness of farms in the plain areas are equal to or superior to the national average (Figure 12). To the greatest extent, maintaining and increasing the competitiveness of these farms contribute to high financial autonomy, efficiency in the supply of land and natural resources, services and innovations, and in the realization of production and services. The main areas that reduce the competitiveness of farms in plain regions are low productivity, profitability, and financial security.

Most indicators of the competitiveness of farms in the mountainous and semi-mountainous regions are close to the average for the country. Most important for the competitive positions of these farms are the high financial autonomy, and efficiency in the supply of land and natural resources, workforce, inputs, and services. Critical for the competitive positions of these farms are their low productivity, profitability, and financial security.

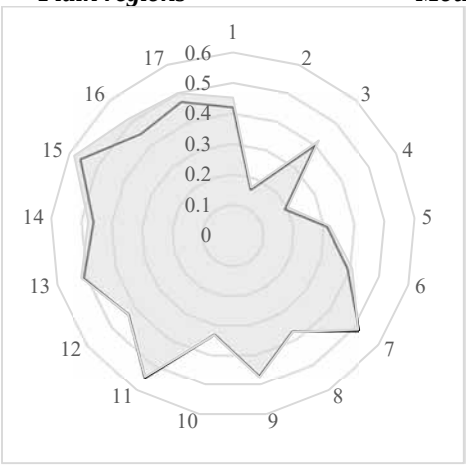
The majority of indicators for the competitiveness of farms with land in protected zones and territories are below the average for the country. Exceptions are low and equal to the industry profitability, and exceeding the national average efficiency in the supply of land and natural resources, inputs, and services. To the greatest extent, low levels of productivity,

profitability, income, financial security, liquidity, and adaptability to the market and the natural environment contribute to lowering the competitiveness of these farms.

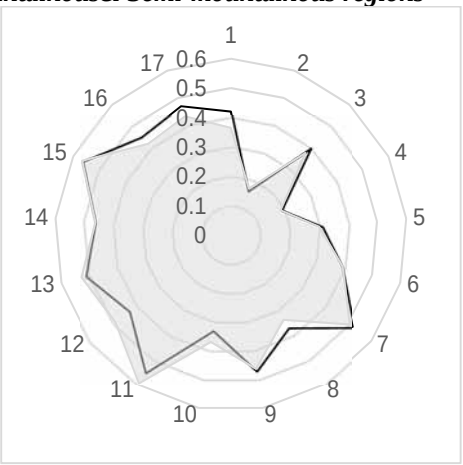
There are differences in the levels of competitiveness of farms with different specializations in individual ecological regions (Figure 13). Farms in the plains demonstrate significant competitive advantages over the rest of the country in field crops, perennials, mixed crop production, mixed livestock, mixed crop-livestock and bees. Farms in mountainous and semi-mountainous areas are the most competitive among those specializing in vegetables, flowers and mushrooms, and those with lands in protected areas and territories for herbivores.

Figure 12. Competitiveness indicators* of farms with different ecological locations in Bulgaria (bold line – average for agriculture)

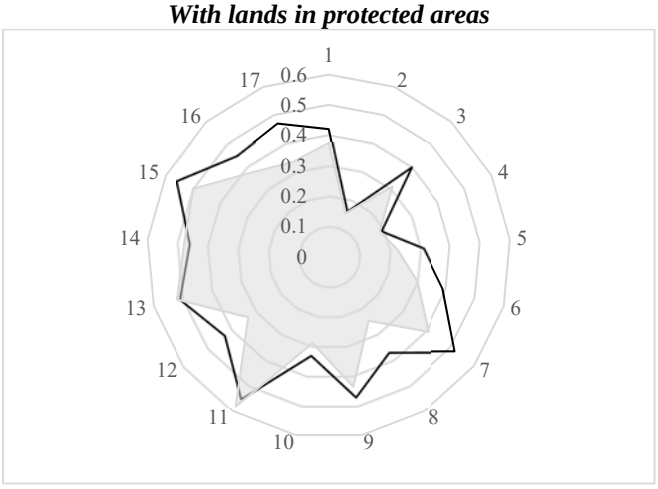
Plain regions



Mountainous& Semi-mountainous regions

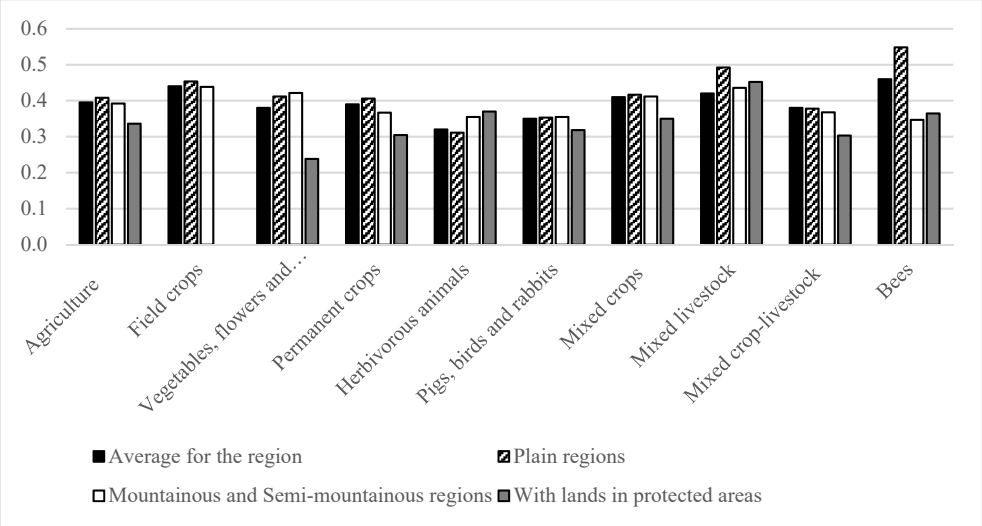


With lands in protected areas



Source: Author's calculations.

Figure 13. Competitiveness of farms in main ecological regions with different specialization in Bulgaria



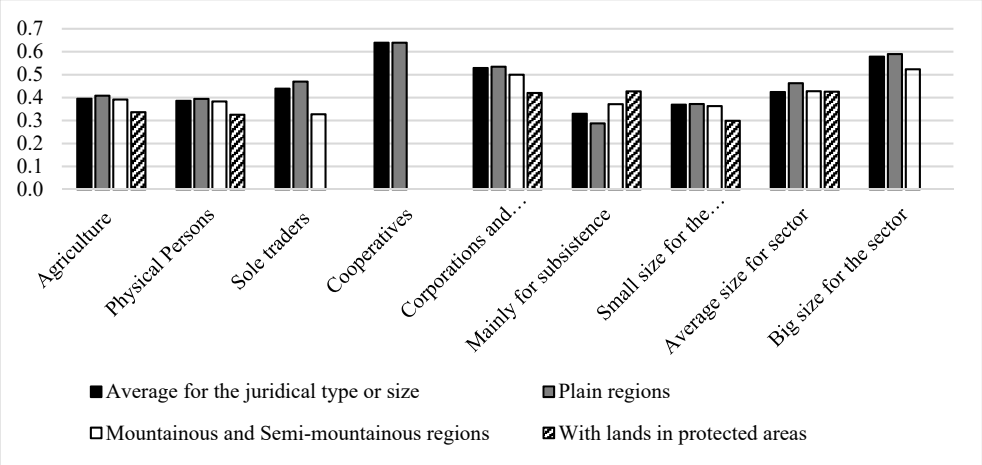
Source: Author's calculations.

The level of competitiveness of specialized farms in plain areas exceeds that of other ecological areas in all areas except vegetables, flowers and mushrooms, and herbivores. Farms operating in protected areas and territories have significant competitive disadvantages (much lower than sub-sectoral and regional competitiveness) in a number of key areas such as vegetables, flowers and mushrooms, perennial crops, pigs, poultry and rabbits, and mixed crop-livestock farming. In this ecological region, there are no holdings specialized in field crops due to low competitiveness, unacceptable efficiency, technological, institutional, etc. restrictions.

In the plain regions, farms with any legal status have a higher competitiveness than the rest of the country's regions, while preserving the differences reviled for the individual legal types (Figure 14). Only Physical persons, Corporations and Associations operating in the protected zones and territories have the lowest competitiveness. This shows that the specific ecological location is an additional critical factor that benefits or impairs the competitiveness of farms in the country.

Semi-market farms located in protected areas and territories, and in mountainous and semi-mountainous areas have significant competitive advantages over those in plain areas (Figure 14). For all sizes of market farms, the plain layout provides an opportunity to realize higher competitiveness. Due to numerous restrictions and poor competitiveness, large-scale farms do not invest and operate in protected areas and territories.

Figure 14. Competitiveness of farms in main ecological regions with different legal types and sizes in Bulgaria



Source: Author's calculations.

6. Competitiveness of Farms Located in Major Agrarian Regions of the Country

There are differences in the competitiveness of agricultural holdings in different agrarian regions of the country (Figure 2). The competitiveness of farms in the North-West and North-East regions is higher than the national average, while the farms in the North-Central Region, South-West, and South-Central Regions are lower than the industry.

The share of farms with good and high competitiveness in the North-East and South-East regions of the country is the largest – respectively every fifth and every fourth of them (Figure 3). The North-East and South-West regions have the smallest share of farms with low competitiveness. The largest number of low-competitive farms are located in the North Central region – over 44% of the total number.

The largest number of farms with levels of competitiveness above the national average are in the North-West region, followed by the North-East and South-West regions (Figure 4). In all agrarian regions, there is a significant number of farms with higher competitiveness than the average for the country and for the respective region. This means that the process of restructuring farms in all regions will continue through the transfer of management of activities and resources to farms from the same and/or other regions of the country.

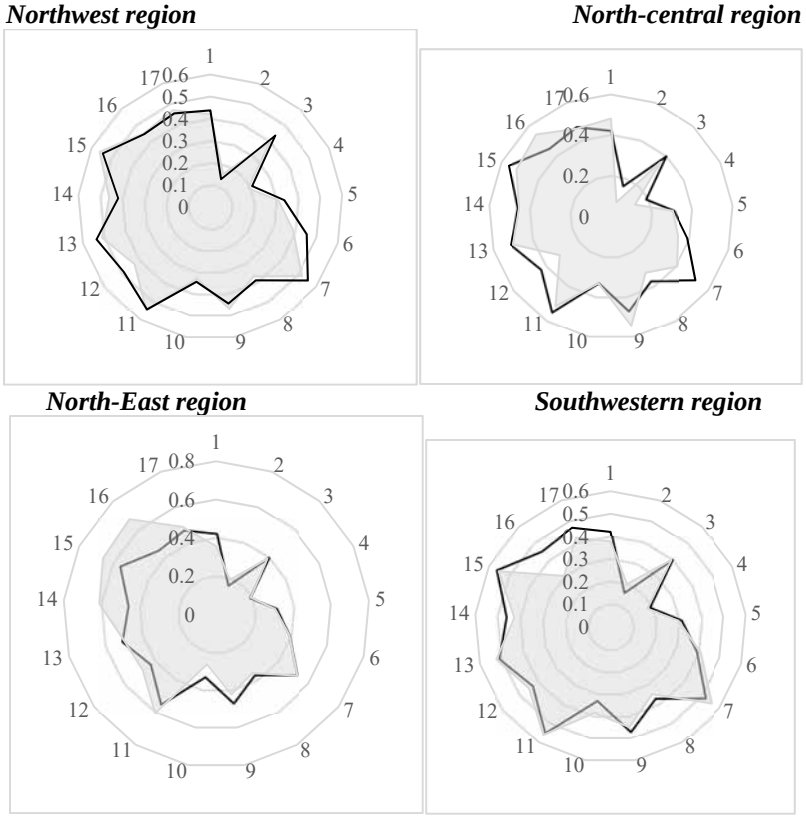
In the individual agrarian regions, there is a significant differentiation of the levels according to the main criteria of competitiveness (Figure 11). Farms in the North-West region have the highest financial security and higher than most of the other regions (equal to the South Central region) economic efficiency. Farms in the North Central region have relatively high values in terms of adaptability and sustainability. Farms in the North-East region have the highest sustainability, but are with lower adaptability than other regions.

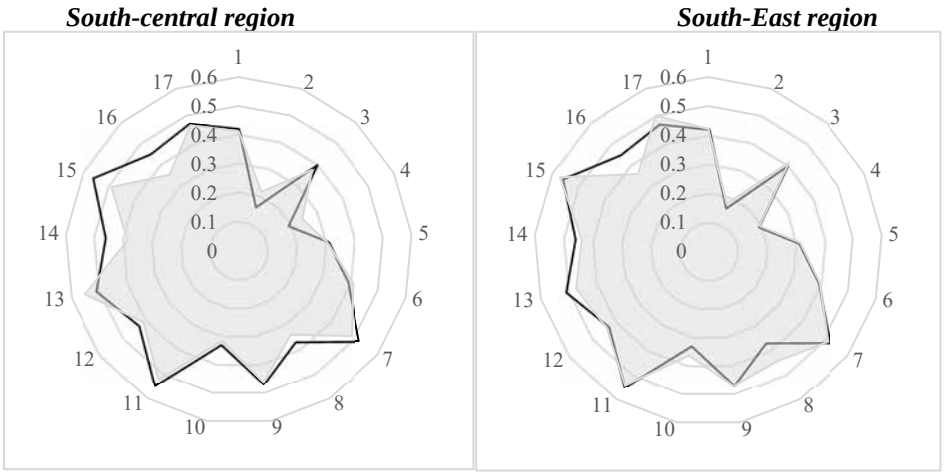
Farms in the South-West region have relatively better levels of financial security and adaptability, but with low sustainability for the sector. The farms in the South Central region have comparatively the highest levels of economic efficiency, but with lower levels than the other regions for the other competitiveness criteria. And finally, farms in the South-East region have the highest adaptability and are close to the national average economic efficiency, financial security and sustainability.

High productivity, profitability, liquidity, financial autonomy, efficiency in the supply of land and natural resources, labour force, materials and equipment, services and innovations contribute the most to maintaining and increasing the competitiveness of farms in the North-West region (Figure 15). At the same time, their low productivity and income are critical for the competitiveness of farms in this region.

Farms in the North Central region have good competitive positions in terms of productivity, adaptability to the institutional environment, and high efficiency in the supply of land and natural resources, inputs, and innovations. Farms in this area, however, have very low indicators of productivity, income, and labour supply problems.

Figure 15. Competitiveness indicators* of farms located in different regions in Bulgaria (bold line – average for agriculture)





Source: Author's calculations.

Farms in the North-East region have higher than the national average liquidity, financial autonomy, and efficiency in the supply of land and natural resources, workforce, finance, services and innovations, and better positions in the realization of production and services. Critical to the competitiveness of these farms are low productivity, income, financial security, and adaptability to the natural environment.

Farms located in the South-Western region of the country are superior to others in terms of liquidity, financial autonomy, and efficiency in the supply of land and natural resources, labour, and inputs. The most important areas that lower the competitiveness of farms in this region are low productivity, income, financial security, and efficiency in supplying innovations.

Most of the levels of indicators for the competitiveness of farms in the South Central region are lower and similar to the average for the country, and they have better meanings of unity in terms of liquidity, efficiency in the supply of inputs, productivity and profitability. The most important factors worsening the competitiveness of farms in this area are low productivity, income, financial security, and adaptability to changes in the natural environment.

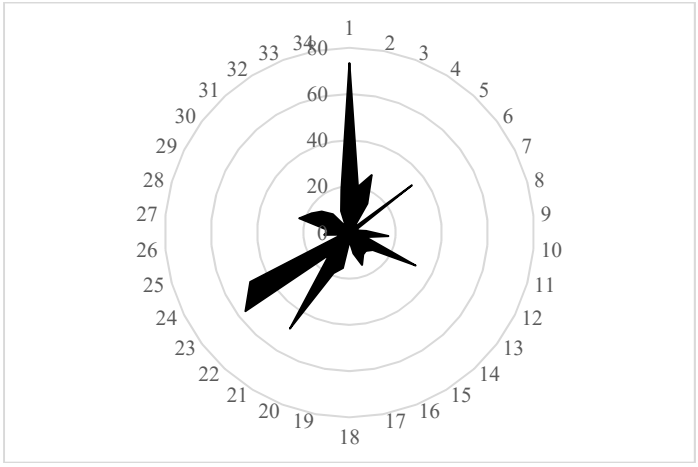
Farms in the South-East region have better than the national average productivity, profitability, income, financial security, adaptability to the market and natural environment, efficiency in the supply of labour force and services, and realization of production and services. Critical to improving the competitiveness of these farms are an increase in their productivity, income, financial security, and lower efficiency in supplying innovations.

The detailed analysis of the relationships of the level of competitiveness with the legal status, sizes, specialization and ecological location of the holdings in the different agrarian regions of the country did not establish specifics different from those already established and described in the previous parts of the paper.

7. Factors Determining the Competitiveness of Farms of Different Types

Significant factors for increasing competitiveness for all types of farms are: market conditions (demand and supply, prices, competition), received direct state subsidies, access to knowledge, consultations and advice, participation in state support programs, available information, financial opportunities, and the opportunities for benefits in the near future (Figure 16).

Figure 16. Factors that contribute the most to increasing the competitiveness of farms in Bulgaria* (%)



** 1 – Market conditions (demand and supply, prices, competition); 2 – The opportunities for benefits for you at the present time; 3 – The possibilities of benefits for you in the near future; 4 – The possibilities of benefits for you in the more distant future; 5 – The immediate benefits for other persons and groups; 6 – The available information; 7 – Interest group initiatives and pressure; 8 – The initiatives and pressure of the community in the area; 9 – Availability of cooperation partners; 10 – Private contracts and agreements; 11 – The initiatives of other farms; 12 – Your financial capabilities; 13 – Innovations available for implementation; 14 – The existing problems and risks in the farm; 15 – Existing problems and risks in the region; 16 – Existing problems and risks in the country; 17 – Existing problems and risks on a global scale; 18 – The integration with the supplier of the farm; 19 – The integration with the buyer of the products; 20 – Your and employed workers professional training; 21 – Access to knowledge, consultations and advice; 22 – Regulatory documents, standards, norms, etc.; 23 – Received direct state subsidies; 24 – Participation in state support programs; 25 – The existence of a long-term contract with a state institution; 26 – Control of compliance with laws, standards and rules; 27 – State control and sanctions; 28 – State policy; 29 – The positive experience of other farms; 30 – EU policies; 31 – Registration and certification for products, services, etc.; 32 – The public recognition of your contribution; 33 – Tax preferences; 34 – Your personal conviction and satisfaction.*

Source: Survey with agricultural producers, 2020.

Furthermore, Opportunities for current benefits is a specific factor for the competitiveness of the majority of corporations and associations, subsistence farms and large-scale farms, and farms specializing in perennials, mixed cropping and crop-livestock farming, while Opportunities for benefits in a distant future for corporations and associations.

Private contracts and agreements are an important factor in the competitiveness of a large part of sole traders and cooperatives, and small-sized farms, while Available for

implementing innovations for cooperatives, commercial companies and associations, and for medium and large farms in the sector.

The Existing problems and risks in the region and the country and Regulatory documents, standards, norms, etc., the Control for compliance with laws, standards and rules, the State control and sanctions, the State policy and Tax preferences are critical factors for cooperatives, and the EU policies, and the Registration and certification of products, services, etc. for cooperatives and corporations and associations.

8. Conclusions

This study has demonstrated the needs and given insights on directions for reexamining the competitiveness of farming structures in the modern economy. The multi-criteria assessment of the level of competitiveness of farming enterprises in Bulgaria found that it is at a good level, but there is significant differentiation in the level of competitiveness of holdings with different juridical types, sizes, product specialization, ecological and geographical location. Besides the juridical type, other dimensions of farming structures like economic size, product specialization, location, market or self-sufficiency orientation, are (sometimes more) important for determining their absolute and comparative competitiveness.

The low adaptive potential and economic efficiency to the greatest extent contribute to lowering the competitiveness of Bulgarian agricultural producers. Especially critical for maintaining the competitive positions of farms are the low productivity, income, financial security and adaptability to changes in the natural environment. For the improvement of the later weaknesses are to be directed farm management strategies and public policy support measures at the current stage of development and EU CAP implementation. A large share of farms of different types has a low level of competitiveness, and if measures are not taken in due time to increase competitiveness by improving the management and restructuring of farms, adequate state support, etc., a large part of holdings will cease to exist in the near future.

The suggested and successfully tested approach for assessing the competitiveness of farms should be improved and applied more widely and periodically. The precision and representativeness of the information used should also be increased by increasing the number of farms surveyed, which requires close cooperation with producer organizations, national agricultural advisory service, and other interested parties, and extending and improving the system for collecting agro-statistical information in the country and the EU.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
ECONOMIC STUDIES

Volume 32(6), 2023

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MISUNDERSTANDING OF CORPORATE INSOLVENCY AND SOLVENCY ASSESSMENT METHODOLOGY – HOW DID THE LOGIC RUN AWAY?[4]

The paper shows that there is a need in most of the Balkan countries to change the law governing the insolvency issue by clearly defining insolvency and thereby removing the confusion surrounding it from the legislation. It is also essential to harmonize the legal provisions so that the term insolvency is used consistently throughout the legal text. The paper also shows the need to define solvency properly in textbooks and present the correct methodology to assess solvency. In this way, it can be expected that neither the term (in)solvency nor the (in)solvency indicator(s) will be incorrectly used by scholars from the Balkan region.
Keywords: insolvency law; solvency; solvency ratio; solvency analysis; firm performance
JEL: K22; M41; G32; G33

1. Introduction

While the effect of the crisis caused by the COVID pandemic has not yet been fully explored and understood, a new global crisis has been spreading across the globe from the Ukraine battlefield. At this moment, it is clear that no one can predict the effect of this crisis on the world economy. Each crisis highlights the insolvency topic among business people, regulators, and scholars, and this topic will likely be actual for a while.

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[4] The work has been funded by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia.
This paper should be cited as: *Pavlović, V., Knežević, G., Callado, A. A. C. (2023). Misunderstanding of Corporate Insolvency and Solvency Assessment Methodology – How Did the Logic Run Away?. – Economic Studies (Ikonomicheski Izsledvania), 32(6), pp. 132-144.*

Still, there is a widespread misunderstanding about the meaning of corporate insolvency, i.e., corporate solvency, and consequentially about the assessment of solvency in Roman law countries, particularly those from former communist East-European countries and especially from those from the Balkan Peninsula (Pavlović et al., 2022).

The inadequate semantic content of words leads to misunderstanding in communication and the loss of the language's cognitive, expressive, accumulative, and communicative functions. When such a term represents a fundamental corporate law, accounting, and business finance term, which is the case with (in)solvency, the potential confusion could have very significant consequences.

Since there is a misunderstanding among university professors about (in)solvency and how to assess it, it is essential to point out this issue. The fact that the effect of this misunderstanding spreads out in the legislation of the Balkan Peninsula's countries makes this task even more significant. The appropriate changes in the legislation and the awareness of business people about the meaning of solvency and the methodology to assess it could be done only after the education of scholars and relevant changes in the university textbooks.

While the confusion on the semantic content of solvency has been explained (Pavlović, Milačić, 2013; Pavlović et al., 2022), it seems that there is a need to explain the purpose and the methodology of the solvency analysis. That is because the inadequate methodology for assessing solvency contributes to the incorrect understanding of solvency, i.e., to the solvency conundrum.

2. The Solvency Conundrum

Recently, an analysis grounded on papers published in journals indexed in the Web of Science (WOS – SSCI) revealed that scholars from Common Law countries (USA, UK) generally do not use the term (in)solvency in another context than in the bankruptcy and failure context. Contrary, among authors from Roman law countries, particularly those from former communist East-European countries, (in)solvency is widely used in a non-failure context. It appears that these scholars used solvency to describe "a firm characteristic," "an indicator of credit capacity," "a variable for the economic value calculation," or an "objective of business operation." (Pavlović et al., 2022) The solvency conundrum has spread out from the definition field to the solvency assessment area as well. All in all, solvency ratio(s) appears among several other financial indicators used to assess the firm's health.

Solvency is an accounting term, i.e., a company law term, but also a term used by insolvency law because bankruptcy or restructuring occurs when a company becomes insolvent. Therefore, (in)solvency should be defined in both laws.

Like all accounting terms, the term (in)solvency should be defined by Law on Accounting or Company Law in countries where provisions on financial reporting are not given in a separate law. In all Balkan countries, provisions on accounting are given in a separate law, named Law on Accounting or Law on Accounting and Auditing. However, in countries where the International Financial Reporting Standards (IFRS) are applied instead of the national

accounting regulation, which is the case in all Balkan countries, definitions of the terms are not given in the Law of Accounting but are prescribed by the International Accounting Standard Board (IASB). Because only accountants are familiar with IFRS, scholars from other fields are unaware of how solvency is defined. But accountants could face the problem of what solvency is as well. That is because contrary to the former Framework for the Preparation and Presentation of Financial Statements (IASC, 1998), the revised Conceptual Framework (IASB, 2018) does not define the term solvency even though it mentions it three times. Probably because most IASB members are from the Anglo-Saxon system, they are not even aware that different attitude on the meaning of (in)solvency exists. The additional problem is that the Conceptual Framework for Financial Reporting (IASB, 2018) is primarily intended for the IASB members. In some countries applying the IFRS, the Conceptual Framework for Financial Reporting is not even translated, or the translation occurs with a significant delay. Therefore, most scholars from the Balkan region, even from the accounting and corporate finance field, are unfamiliar with the Conceptual Framework for Financial Reporting (IASB, 2018) and the former Framework for the Preparation and Presentation of Financial Statements (IASC, 1998).

Thus, neither Law on Accounting nor IASB defined solvency, although IASB (2018, 1.12-1.13) claims that the general purpose of financial reports is to provide information about the financial position, which should help assess the entity's liquidity and solvency (1.12-1.13), and that information about cash flows helps users assess entity's liquidity or solvency (1.20).

As Pavlović et al. (2022) suggested, the nonawareness of the legal meaning of insolvency lay in the fact that the laws on insolvency in most of these countries do not contain the term insolvency in the title, nor is adequately used in the text of the law, contrary to the Common Law countries, where that law is called "Insolvency Law."

Namely, the name of the laws governing companies insolvency is "Zakon za stečaj" in North Macedonia, "Zakon o stečaju" in Serbia, "Zakon o stečaju" in Montenegro, "Stečajni zakon" in Croatia, "Zakon o stečaju" in the Republic of Srpska, "Zakon o stečaju" in the Federation of Bosnia and Herzegovina.

The term "stečaj" is officially translated as "bankruptcy" in the English translation of these laws in all the mentioned above states, and this fact contributes to the huge misunderstanding of the term "insolvency." That is because, even though the official translation of "stečaj" is bankruptcy, "stečaj" is not a synonym or could be a translation of "bankruptcy." The term "stečaj" refers to a process in the case of a company's insolvency. But, in the case of insolvency, a company must not go bankrupt; it could also be restructured. That means the process of "stečaj" could end with bankruptcy or restructuring. The common point of these two processes is a company's insolvency. Since bankruptcy is not the adequate translation of the word "stečaj," the term "stečaj" will not be translated henceforward.

The regulations mentioned above have in common that they do not contain the definition of insolvency, although these laws apply in the event of a company's insolvency. The confusion is even bigger because the term solvency is sometimes mentioned in these laws but inappropriately.

Instead of explaining that the law applies to entities facing insolvency and defining what insolvency is, the Law in Croatia mentions the term "insolvency" only in some articles related to EU regulations (Directive 2019/1023 of the European Parliament and of the Council of June 20 2019 on preventive restructuring frameworks, on discharge of debt and disqualifications, and on measures to increase the efficiency of procedures concerning restructuring, insolvency and discharge of debt, and amending Directive 2017/1132 – Directive on restructuring and insolvency) and articles concerning data collection, and the effect of exemption from remaining obligations; in the Republic of Serbia, Republic of Srpska and Montenegro, only in the chapter relating to the "international stečaj"; in the Federation of Bosnia and Herzegovina the term "solvency" is mentioned in an article concerning the goal of a financial and operational restructuring of a company and another one concerning the expert opinion (the term insolvency is not even mentioned as it is not a low applying on insolvent entities); and in North Macedonia only once in the title of the article "Simultaneous insolvency of heirs ".

Furthermore, the regulator in Croatia has not decided whether to use the term "insolventnost" or "nesolventnost"; Therefore, both are used in the same Law. One could get the impression that different translators translated different provisions incorporated in the Law.

However, not all countries in the Balkans fell into insolvency's terminological trap. For example, in Slovenia (Zakon o finančnem poslovanju, postopkih zaradi insolventnosti in prisilnem prenehanju) and Bulgaria (Търговски закон, Част четвърта – Несъстоятелност), the laws regulating insolvency have the term "insolvency" in the very title of the Law.

The case of Montenegro is quite interesting. Although a law governing bankruptcy issues was enacted in 2002, which under the influence of Anglo-Saxon law had been called "Company Insolvency Law," insolvency was neither defined nor mentioned in the first article, which prescribed the conditions and procedure for insolvency (Pavlović et al., 2022). Parliament passed a new law in 2006 repealing the previous Insolvency Law, which paradoxically avoided the term "insolvency" not only in the title of the Law but throughout the text of the Law, except for the chapter "International stečaj" (Pavlović et al., 2022).

The legislative paradox regarding (in)solvency in these countries is even more emphasized by the fact that insolvency is mentioned in some other laws that do not treat bankruptcy issues, such as the Company law. This phenomenon that, a legal term is widely present in the legislation of a Balkan state but not in the law that regulates the issue directly, is not only specific to insolvency (Pavlović et al., 2022). This phenomenon is present mainly as the consequence of accepting provisions from the Anglo-Saxon regulations in the national legislation of these countries. Scholars use the term harmonization, mostly unconsciously, to describe integrating some legal solutions from more developed and powerful states. However, "harmonization" comes from "harmony," which does not mean acceptance but means mutual coordination of two or more parties or compliance with some agreed-upon standards (Pavlović, Knežević, 2021).

As a consequence of the practice of translating provisions from the English language, which are to be incorporated into national laws of the member states and candidate countries as part of the EU legal harmonization, it seems that lawmakers in the analyzed countries are unaware of the meaning of (in)solvency. That conclusion derives from the fact that the interpreted

insolvency laws do not mention the term (in)solvency where it should but mentions it in additional added provisions. However, the lack of defining (in)solvency does not affect the legal proceedings. The bankruptcy procedure is clear, as well as the procedure in the case of restructuring. As a consequence of harmonizing the legal system with the EU, those procedures align with the developed countries' bankruptcy and restructuring procedures, and therefore, foreign investors and creditors can rely on them.

Despite the Law on Accounting, and the Insolvency Law of the analyzed countries, as well as the IASB, do not define the term (in)solvency, looking at the provisions where in(solvency) are mentioned reveals that lawmakers and the IASB consider (in)solvency in the same manner, equal with the Anglo-Saxon laws where (in)solvency is defined. However, this is expected since two laws cannot define a term differently. That means that scholars who define the term (in)solvency differently from what laws consider (in)solvency are not defining this term correctly. That is, (in)solvency is not a term with different meanings in different scientific fields. Some scholars use this term properly, and others do not.

However, since the laws do not define (in)solvency, scholars and business people suffer from misusing the term (in)solvency and, consequently, solvency assessment methodology. In most Balkan countries, the term solvency is widely used in university corporate finance and accounting textbooks and, thus, among business people. Still, it is not used appropriately in legislation and many accounting and corporate finance textbooks. Defining (in)solvency contrary to its legal sense led to the nonsense of considering a company to be solvent even though a court had declared the insolvency of that company. (Pavlović, Milačić, 2013)

Not mentioning insolvency in the title of the Insolvency law nor defining it, and giving multiple nonsensical definitions of insolvency in various textbooks (Pavlović, Milačić, 2013) resulted in a huge misunderstanding of the meaning of (in)solvency. Pavlović et al. (2022) suggested that a misunderstanding stemming from the financial analysis contributed to the solvency conundrum among scholars from East-European countries by defining solvency in terms of the solvency ratio that they used.

Namely, many textbooks, particularly in the Balkan region, mention "the solvency ratio," Probably adopted from textbooks, many scholars from the Balkan region use it, and therefore this ratio appears as well in scientific journals, including those indexed in WOS and Scopus.

3. The Insolvency Assessment as the Root of the Solvency Conundrum

Pavlović et al. (2022) noted that in articles published in journals indexed in WOS – SSCI (Social Science Citation Indexed), which is widely considered with Scopus as the most prominent index base, various indicators are used to assess a company's solvency. Their results show that some scholars mention the solvency ratio while some use a set of ratios to evaluate a company's solvency. Among them, some use a set of solvency ratios based on balance sheet items, while others use a set of solvency ratios based on the balance sheet and income statement items.

Most of those using the solvency ratio use a ratio based on balance sheet items. That means these scholars, together with scholars utilizing a set of solvency ratios based on balance sheet items, assess solvency without considering the firm's profitability.

Furthermore, some scholars use the solvency ratio, or a set of solvency ratios, to evaluate the ability of a company to cover its long-term obligations; some use it in bankruptcy and failure context, some mention it in none bankruptcy and failure context, while the majority does not explain the context.

Table 1. Solvency assessment in papers published in WOS – SSCI categories "Economics," "Business," Business Finance," and "Management"

Set of solvency ratios	Solvency ratios based on balance sheet items	Total assets/Total equity; Total liabilities/Total assets; Current liquidity and Indebtedness
	Solvency ratios based on the balance sheet and income statement items	Interest coverage ratio; Debt-to-equity ratio; Short-term-debt-to-total-debt ratio
Solvency ratio	Solvency ratio based on balance sheet items	Total liabilities to total assets
		Equity to total assets
		Equity to total liabilities
	Solvency ratio based on the balance sheet and income statement items	(Net Income + Depreciation) / Liabilities

Source: According to Pavlović et al., 2022.

Pavlović et al. (2022) found a link between the incorrect definition of solvency and the solvency ratio(s) used. They found that Anglo-Saxon scholars, in the papers published in SSCI-indexed journals, speak about insolvency only in the bankruptcy context and do not mention the solvency ratio(s). On the other hand, scholars from developed Roman Law countries sometimes use the solvency ratio(s) but are completely clear about the meaning of (in)solvency. It appears that scholars from former communist East-European countries, particularly authors from the Balkan Peninsula, mention the solvency ratio(s) and inappropriately define (in)solvency. Pavlović et al. (2022) concluded that these scholars have incorrectly understood the meaning of (in)solvency as the consequence of the incorrect interpretation of the leverage ratio, which was a long time ago used for assessing (in)solvency and was therefore known as the solvency ratio.

Defining (in)solvency from the leverage ratio naturally leads to misunderstandings of this term.

4. Is the (In)Solvency Analysis Really Needed To Declare Insolvency?

Before explaining if the solvency analysis is needed to declare insolvency and the methodology for assessing solvency, it is necessary to clarify when a company has to be declared insolvent. International legislation, national legal regulations, and professional accounting regulations unambiguously define insolvency as a state of being unable to pay debts as they come due. Therefore, an entity is considered insolvent in the case of (a) illiquidity (Liquidity insolvency) and (b) future illiquidity (Balance sheet insolvency/ Accounting insolvency) (Pavlović et al., 2022). The etymology of the word solvency also

indicates that illiquidity leads to insolvency. Namely, the term solvency comes from the Latin legibus solvi – to settle obligations; pecuniam solvere – to pay (Gaffiot, 2000, p. 1476).

There is no need to assess illiquidity in the insolvency context. Namely, if a company fails to meet its obligations within the prescribed period, which can be differently determined by national legislation, the entity is considered insolvent.

That indicates that only future illiquidity has to be assessed. That is probably the cause of why numerous textbooks define solvency as the ability to pay long-term debts, particularly among European Continental scholars. Numerous scholars seem to have adopted the definition of solvency based on the purpose of the solvency analysis, which relates only to the ability to meet long-term obligations.

Since the future is always uncertain and insolvency assessment is not time-constrained, assessment of insolvency is not an easy task. The more turbulent global conditions are, the more difficult it is to predict local macroeconomic factors, which means assessing the probability of a company's future illiquidity is more complicated. The actual world situation makes predicting future illiquidity an extremely challenging task. However, although future illiquidity refers to the foreseeable future, the Going concern principle, which represents the fundamental principle for compiling financial reports, restricts this period to one year from the financial statement issue date, according to the Financial Accounting Standards Board – FASB (ASU No. 2014-15), or the date of the financial statements, according to the International Accounting Standards Board – IASB and the International Auditing and Assurance Standards Board – IAASB (Pavlović, Knežević, 2022).

Despite limiting the foreseeable future to 12 months and using advanced models for bankruptcy predictions, auditors have never had much success warning their clients about insolvency, even in the most accounting-advanced countries (Kuruppu et al., 2012; Clikeman, 2018; Pavlović, Knežević, 2022).

Declaring that future illiquidity will occur in a situation where it is not highly probable is unacceptable because this declaration will lead to a self-fulfilling prophecy. That is why only the case of negative net worth is legally valid as a reason for insolvency caused by future illiquidity.

However, insolvency is not needed to be assessed in this case as well. The situation where the liabilities exceed the value of assets, i.e., the net worth is negative, is presented in the Statement of financial position (Balance sheet); therefore, no assessment is needed. Truly, insolvency occurs when the total liabilities exceed the fair value of the firm's assets, and the earning power determines that fair value (Altman, 1968, p. 595). However, in the case of insolvency, due to the impairment principle, the fair value will, at the same time, be the book value of assets.

Still, numerous stakeholders are deeply interested to know if the firm might face difficulties meeting its liabilities, i.e., if it might face liquidity problems.

Analysis conducted to assess whether the company might face difficulties meeting liabilities due within a year is commonly referred to as a liquidity analysis. On the other hand, an

analysis of whether the entity may have difficulty meeting liabilities that will be due in a period longer than a year is not mentioned uniformly in the scientific literature.

Furthermore, in contrast to the analysis of liquidity, where general agreement exists on the methodology used to assess it, the assessment methodology for evaluating the capacity to meet long-term liabilities differs significantly in the literature.

5. How to assess solvency?

As Pavlović et al. (2022) pointed out, Anglo-Saxon authors rarely and unwillingly use the term solvency in their research papers. Therefore, solvency assessment and solvency ratios are almost not mentioned by them.

A logical assumption is that scholars use concepts and terminology learned in accounting and corporate finance textbooks. Therefore a look into these textbooks is needed.

Consulting the Anglo-Saxon accounting and corporate finance textbooks, we find out that only Horngren et al. (2002, p. 575) mention the solvency analysis. In contrast, other scholars in textbooks discuss the ability to meet debts when due (Higgins, 2007), the analysis of short and long-term liquidity risks (Damodaran, 2005), the analysis of long-term solvency (Alexandar, Nobes, 2007), the ratio analysis for the long term creditors (Garrison et al., 2006), the analysis of long term liquidity risk (Weil, Schipper, 2006), or the financial structure analysis (Palepu et al., 2007) and the financial leverage analysis (Peterson, Fabozzi, 2006; Harper, 2002). Although those scholars mention different analyses, they all assess the likelihood of being illiquid in the foreseeable future, i.e., the likelihood of being insolvent. In Anglo-Saxon textbooks, the term "solvency ratio" is avoided, even among the authors who mentioned the term "solvency." So, the assumption that Anglo-Saxon textbooks do not mention the solvency analysis has been principally confirmed.

It does not matter if the syntagma "solvency analysis" is used or not; in all cases, the likelihood of being illiquid in the foreseeable future is assessed using the coverage and debt indicators. That is, a company is likely to be liquid in the foreseeable future if it can cover interest expenses with the earnings generated by the business operations and if it has a lower leverage ratio. In other words, a company is exposed to a lower risk of not generating enough cash to pay its debts on time.

Although, the indicators used in the analysis are not uniform in those textbooks. Many Anglo-Saxon authors measure the ability to pay long-term debts using interest coverage ratios and debt ratios. However, the interest coverage ratio exists in several forms simultaneously. Some textbook authors (Horngren et al., 2002; Alexander, Nobes, 2007; Palepu et al., 2007; Peterson, Fabozzi, 2006) use a ratio with EBIT (Earnings Before Interest and Taxes) as the numerator and Interest expense as the denominator (EBIT/Interest expense), while some others, like Damodaran (2005), add the principal amount to the interest expense (EBIT/ interest expense + principal). In line with this perspective, Higgins (2007) points out that both coverage ratios should be used, while Brealey et al. (2007) add an additional coverage ratio

in which EBITDA (Earnings Before Interest, Taxes, Depreciation, and Amortization) is used in the numerator while interest expense is in the denominator (EBITDA/Interest expense).

Almost all authors use traditional debt ratios based on financial statement items. In contrast, Higgins (2007, p. 396) introduces debt ratios based on the market value of capital and the market value of debts. That is not surprising, as Higgins (2007) is the only textbook author among the analyzed Anglo-Saxon scholar who mentions and defines solvency in his textbook in line with legal text and professional accounting regulation. But even Higgins (2007), who mentions solvency in his textbook, does not mention the solvency analysis. According to the legislation, a company is insolvent if the market value of assets cannot cover the debts. However, as it is explained, in the case of insolvency, the fair values of assets are simultaneously their book values. But, if the company generates a sufficient operational profit, the book values will be less than their fair values in several balance sheet items. Yet, that kind of analysis cannot be run by most stakeholders who cannot obtain the market values of capital and debts.

The various coverage ratios based on earnings encourage the debate on the appropriateness of using each of them.

In other words, why do so many textbook authors assess the ability to meet long-term obligations by analyzing the coverage of interest expense by EBIT, while others consider the coverage of the interest expenses together with the principal amount by EBIT or even EBITDA? The question is how to interpret these differences in the instruments used to assess the company's ability to meet long-term obligations. The answer to this question can lead to a more profound understanding of the solvency concept itself.

EBIT must cover the interest expenses. Otherwise, the company will undoubtedly face liquidity problems if it lasts for some time. That is the logic behind the EBIT/interest expense ratio.

Still, as previously pointed out, solvency means the ability to pay obligations as they come due, and the obligations consist of the principal amount and interest. Therefore, a coverage ratio using the sum of principal plus interest as the denominator might seem logical.

Following that logic, Van Horne and Wachowicz (2007, p. 139) find that the coverage ratio, which considers EBIT's coverage of interest and principal on all long-term loans and other fixed obligations, is a more realistic measure of solvency than the coverage ratio, which only considers coverage of the interest expense.

However, considering the ability of a company to cover only its interest expenses is quite logical as well. Although solvency means meeting all obligations (principal amounts and interest) when they come due, a company could be treated solvent if it could pay interest on the debt. That is because companies are trying to optimize the debt structure, meaning that long-term debts that come due will be substituted by a new loan or by issuing additional bonds to maintain the set rate of indebtedness. Namely, companies are interested in constantly revolving long-term loans used to finance net working capital and long-term assets, and banks have the same interest in lending money. Therefore, a constant substitution of long-term obligations is common in business practice. However, that is possible only if

the company's ROCE (Return on Capital Employed) exceeds the average interest rate, which means the company is profitable.

That evidence suggests that the solvency concept can be seen from another perspective when ROCE exceeds the average interest rate. It turns out that the main question is whether the company can pay interest, not whether the company can repay the principal amount on long-term borrowings. That is why the distinguished French dictionary "Le Robert & Collins Business" (Duval, 2006, p. 455) considers an entity solvent not only if it pays its debts but also if it can re-draw another debt". That is also why solvency (la solvabilité) is in this dictionary translated in English as "creditworthiness" (Duval, 2006, p. 638).

However, the mechanism for maintaining the determined financing structure does not work simultaneously with the maturing of the annuities. That is, substituting the mature principal amount with a new loan cannot be made at the time when the annuities are due. That means that a company should generate enough cash from the business to cover not only the interest but also the principal amount. Furthermore, it is unlikely that a company that does not generate enough cash over the long term to cover the mature principal amount and interest would be able to borrow money to substitute the loan due with a new one.

So, even if the paid-back principal amount is not an expense, it must also be repaid to the lender, and the company should also earn that amount. Otherwise, it is unlikely that the company would be able to borrow again to maintain the projected financial structure.

Brealey, Mayers, and Marcus (2007) state in their textbook that solvency should be evaluated using the third type of coverage ratio: EBITDA/ Interest expense.

The logic behind that cover ratio is that depreciation and amortization do not generate a cash outflow and, therefore, should not be considered when a company's ability to service debt has been evaluated. Therefore, EBITDA is often used to approximate (operating) cash flow. However, for all the arguments mentioned above, in a long-term perspective, EBITDA should exceed the interest expenses. If EBITDA just covers the interest expenses, that means that the company ran with operational losses in the amount of the amortization and depreciation costs and would not be able to renew its fixed assets. If the company cannot renew the due principal amount, it will not be able to pay the entire annuity but only the interest, i.e., it would suffer illiquidity.

The textbook authors do not explain which ratio number of various ratios should indicate that a company will face problems meeting long-term obligations, probably due to their conviction that the readers know the basics of financial analyses. Namely, precise ratio numbers which indicate insolvency do not exist, and these ratios could not even be used to determine a company's ability to meet obligations precisely. All of these ratios are useful for identifying the variations and magnitude of risk to which long-term creditors are exposed. All mentioned ratios should be understood in that context. An isolate ratio number usually means nothing, which is why the trend has to be observed.

An isolated ratio could mean something exclusively if it shows that earnings could not cover the interest expenses. But in that case, the company is facing a loss, so no ratios are needed to know that the company is facing potential problems in meeting obligations. A company's ability to meet its long-term obligations when they come due depends on how long the

company is unprofitable, whether shareholders are willing to invest additional funds, and how long creditors are willing to lend it money.

Among European Continental textbook authors mentioning a leverage ratio as a solvency ratio is quite common. That is because, back in time, when the term solvency appeared, accounting was not developed enough to analyze the ability to meet long-term obligations based on the earning approach (Pavlović, Milačić, 2013; Pavlović et al., 2022). Consequently, even today, the most diverse solvency definitions exist among them (Pavlović, Milačić, 2013; Pavlović et al., 2022).

But while textbook authors from developed European countries whose legal systems emphasize that mentioning the leverage ratio as the solvency ratio is a consequence of inertia in corporate financing and, therefore, cannot be justified (Vernimmen et al., 2010), in a considerable number of textbooks from the Balkan region, the leverage ratio is incorrectly referred to as the solvency ratio with the firm conviction that that indicator really shows solvency.

As the leverage ratio appears in various forms (Debt to assets ratio; Debt to equity ratio; Debt to capital ratio; and Asset to equity ratio), the solvency ratio also appears under these forms, additionally contributing to the vast misunderstanding of solvency. And that is why scholars from the Balkans used to mention solvency in a non-failure context, describing that term as "a firm characteristic," "an indicator of credit capacity," "a variable for the economic value calculation," or an "objective of business operation." Namely, when they declared the leverage ratio as the solvency ratio, they naturally could not state that the firm's ability to meet long-term obligations could be assessed by observing that ratio(s).

However, the solvency conundrum in the Balkan region could be surprising when it is known that the vast majority of scholars primarily read Anglo-Saxon literature. As it is shown, Anglo-Saxon scholars rarely use the syntagma "solvency ratio(s)." The answer could be that this syntagma is often present on the accounting and corporate finance websites from the Anglo-Saxon region (Investopedia; AccountingTools; Financial Modeling Guide; My Accounting Course; Ready Ratios; Intuit QuickBooks; The Balance; Value Based Management; etc.). It seems that websites influenced more non-Anglo-Saxon scholars, particularly from the Balkan region, than Anglo-Saxon textbooks. In every case, it is much easier to google "solvency ratio(s)" than to find and read Anglo-Saxon textbooks, particularly considering their prices and the purchasing power of scholars from the Balkan region.

6. Conclusions

As a Roman law heritage, the solvency conundrum is present in European Civil law countries (Vujović, 2017; Pavlović et al., 2022). Still, the solvency confusion is far more significant in the Balkan countries, where it extends to the field of legislation and textbooks from the accounting and corporate finance fields

An overlook of the papers published in WOS-indexed journals reveals a new paradox in the Balkan area. Scholars from the Balkan region consider solvency even differently than in

textbooks written by Balkan authors. While in textbooks, all definitions of solvency refer to default, but with a different explanation when insolvency occurs (Pavlović, Milačić, 2013), in scientific papers, the term solvency starts to be used in the non-default context. Obviously, the misuse of leverage ratio(s) as solvency ratio(s) has additionally contributed to the solvency conundrum, giving (in)solvency new meanings that are not even present in textbooks where the confusion already exists.

Our paper highlights several points.

First is the necessity of adding an article at the beginning of the laws governing the default and bankruptcy issues, stating that "stečaj" is related to insolvency entities and using the term insolvency consistently in all articles where it should be used.

Second is the necessity of correcting the accounting and corporate finance textbooks. The (in)solvency concept should be clearly and unambiguously defined according to its legal meanings. We highlight the need to not consider the leverage ratio(s) as the solvency ratio(s) in accounting and corporate finance textbooks. We also recommended omitting the solvency analysis and introducing the analysis, which could be alternatively called: Analysis of short and long-term liquidity risks, the ratio analysis for the long-term creditors, or the analysis of long-term liquidity risk.

If the textbook authors would rather keep the name "solvency analysis," we strongly recommend explaining the purpose of the solvency analysis and the methodology for evaluating the likelihood of being insolvent and emphasizing that earnings primarily and indebtedness secondly determine the risk of being insolvent.

Keeping in mind that the confusion with (in)solvency will not disappear quickly and easily, we strongly recommend that textbook authors pay adequate attention to explaining the (in)solvency concept, making it clear that insolvency leads to bankruptcy.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
ECONOMIC STUDIES

Volume 32(6), 2023

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THE INFLUENCE OF EXTERNAL FACTORS AND MODERN MANAGEMENT ACCOUNTING TECHNIQUES ADOPTION ON ORGANIZATIONAL PERFORMANCE[4]

Since 2016, large-scale industrial operations in Jordan have declined. Modern Management Accounting Techniques (MMATs) may aid in the execution of strategic plans, the completion of tasks, and the performance of a firm. Improving firm performance may necessitate monitoring the compatibility between MMATs and contextual variables that determine performance. This study investigated the influence of external factors on MMATs and OP. It also identifies the influence of MMATs on OP and their mediating influence on the relationship between external factors and OP. The cross-sectional survey included responses from 46 different firms that are traded on the ASE. The results revealed that there are positive influence of external factors in MMATs adoption. Also, external factors have a positive influence in improve OP. In addition, MMATs adoption leads to improve OP. Furthermore, MMATs adoption is a significant mediator between external factors and OP.
Keywords: external factors; intensity of market competition; modern management accounting techniques; organizational performance; perceived environmental uncertainty
JEL: M41

1. Introduction

Modern business is characterized by a large number of variables that challenge industry, service, and commercial organizations (Chand, Sharma, 2021). Each firm and institution faces unique risks (Adu-Gyamfi, Yusheng, Ayisi, Pekyi, 2021). Organizations should adopt a suitable design to adapt to market competition factors (Shahzadi, Khan, Toor, Haq, 2018).

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[4] This paper should be cited as: *Alkhasawneh, S., Endut, D. E., Rashid, N. M. N. N. M. (2023). The Influence of External Factors and Modern Management Accounting Techniques Adoption on Organizational Performance. – Economic Studies (Ikonomicheski Izsledvania), 32(6), pp. 145-168.*

Increasing global competition has managers and consultants worried about Management Accounting's (MA) ability to maintain its connection and meet all changes (Cuzdriorean, 2017). These factors have led to the widespread adoption of Modern Management Accounting Techniques (MMATs), demonstrating that TMA is inadequate to serve the information needs of modern management (Hussein, 2018; Al-Bawab, 2018).

Management's interaction with external variables in organizations leads to management control system design, which -contains vital financial and nonfinancial information to enhance the organization's overall objectives (Cuzdriorean, 2017).

Today's competitive business environment requires updated, reliable, and timely accounting information (Pavlatos, 2018). An influencing MA system gives managers this information (Nartey, Poll, 2021). Ogundajo and Nyikyaa (2021) argued that industrial firms need sophisticated MAS techniques to manage resources and make short- and long-term decisions to achieve their goals. This shows how important MA is to industrial firms' performance and competitiveness. MMATs can prevent industrial firm failure (Nartey, Poll, 2021).

Few researchers have paid attention to MMATs in the past, especially in less developed regions (Ogungbade, Idode, Alade, 2016; Adu-Gyamfi et al., 2021). Nouri and Soltani (2017) emphasized the need for additional research into the relationship between external factors and MMAT usage because earlier studies did not fully explore this relationship and their findings were inconclusive. Previous research also highlighted contingency variables as key Organizational Performance (OP) drivers (Kihara, Ngugi, Ogollah, 2016; Obura, Mise, 2018). Empirical evidence shows that contingency factors lack precision and consistency, with no clear influences on OP. Alshbiel (2017), Mita, Ochie'ng, and Mwebi (2017), and Obura and Mise (2017) provide evidence (2018). Despite the long use of contingency theory in MA research, more is needed to understand potential contingency variables. Previous empirical studies were unable to describe the relationship between contingent factors, MMATs, and OP because they did not examine all factors or produce coordinated results (Alimoradi, Borzoupour, 2017; Nouri, Soltani, 2017).

Jordan's accounting limits MA is the least-used MMAT in firms of all sizes (Al-Mawali, 2015; Al-Bawab, 2018; Jbarah, 2018). Jordan's organizational difficulties have lowered industrial profitability (WB, 2016). Large-scale industrial operations in Jordan have been stagnant and losing money for five years, according to World Bank statistics (WB, 2020). Real GDP growth has been slow in recent years due to eroding productivity and a slowdown in capital accumulation, even before the COVID-19 crisis (WB, 2020). This study examines the influence of MMATs on ASE-listed industrial firms' performance. Examines external factors' influence on MMATs and OP. MMATs are examined as a mediator between external factors and the OP of ASE-listed industrial organizations. The study's objectives are:

1. Examine the influence of external factors on the utilization of MMATs by ASE-listed industrial firms.
2. Examine the influence of external factors on the OP of ASE-listed industrial firms.
3. Examine the influence of MMATs on the OP of ASE-listed industrial firms.
4. Examine the role of MMATs as mediators in the relationship between external factors and the OP of ASE-listed industrial firms.

2. Literature Review

2.1. Definitions of Management Accounting

MA helps managers manage organizations (Endenich, Brandau, Hoffjan, 2011). Internal reports help management plan, control, and make decisions for current operations by presenting accounting information at various levels (Drury, 2013). Three accounting bodies defined MA, showing its history. Institute of Management Accountants (IMA), Chartered Institute of Management Accounting (CIMA), and International Federation of Accountants (IFAC).

Institute of Management Accountant (IMA): The IMA developed MA concepts to provide advanced accounting information to management. IMA defined MA in 1981 as monitoring and evaluating firm operations, ensuring and calculating resource use by collecting, identifying, evaluating, planning, interpreting, and transferring financial information to top management. MA financial reports benefit regulators, shareholders, and creditors. IMA (2008) defined MA as a method that includes participation in decision-making, the creation of planning and performance management systems, and financial and control reports for management, all of which help design and implement business plans to achieve intended outcomes. The changes in the definition of managerial accounting show the shift in the managerial accountant's role from collecting financial information and obeying top management orders to formulating strategies through internal control and providing financial information.

Chartered Institute of Management Accounting (CIMA): According to CIMA (1987), MA is the supply of required information to management for policy-making, preparing and managing firm activities, making decisions on different courses of action, and disclosing to employees and outside agencies (shareholders and others), whereby that information has an influence on the achievement of objectives via the adoption of long-term plans and short-term plans to carry out operational activities, follow-up transaction activities, etc (statement). According to CIMA (2005), MA is one of the most important components of leadership because it clarifies, creates, presents, interprets, and uses information for adopting and disclosing business strategies, formulating short, medium, and long-term plans, defining and financing capital structure, creating strategies to reward shareholders and executives, disclosing operational decisions, and monitoring activities. CIMA definitions show that managerial accounting has simulated top management's tasks by participating in strategic planning to achieve efficiency and create value for organizations.

International Federation of Accountants (IFACs): IFACs (1989) define MA as a method for identifying, calculating, collecting, evaluating, planning, explaining, and reporting operational or financial information that management uses to prepare, analyze, monitor, and safeguard its resources. After only nine years and due to the evolution of the business environment, IFAC redefines MA as a method for managing interlocking processes in all departments of the organization. Its primary goal is to offer value to customers and organizations through the most influenceive use of resources to remain competitive (IFAC 1998). All of the above definitions have evolved from a conventional managerial perspective to one that supports top management activities, including value creation.

2.2. Modern Management Accounting Techniques

Ittner and Larcker (2002) defined MMATs as practices adopted by industrial firms to help management optimize resource use for maximum return. MA includes strategy analysis, decision-making info, performance evaluation, and budgeting (Alleyne, Marshall, 2011). Ittner and Larcker (2001) argued that modern techniques, which add value to practices, have changed the essentials of MA. Burns and Scapens (2000) cite the competitive economic environment, globalization of markets, increased competition, and revolutionary changes in information and industrial technology as drivers of MA.

Traditional MA's flaws are limited financial data and dysfunctional results. Short-term thinking, financial measure manipulation, and timely information aggregation (Lasyoud, Haslam, Roslender, 2018). MMATs provide more relevant, timely, and sensitive information (AbdelKader, Luther, 2008; Suranatthakul et al., 2020). In response to accusations about the industry's inability to adapt to changing economic and commercial conditions, MA improved its focus, strategies, functions, and tasks (Mahfar, Omar, 2004; Erokhin et al., 2019). National and global markets require new types of assessments (Sleihat et al., 2012; Al Refai, Poornima, 2021). Many modern behaviours are influenceive MA tools (McLellan, 2011; McLellan, Moustafa, 2013; Al Refai, Poornima, 2021). MMATs and advanced systems also benefit the study's industrial firms (AbdelKader, Luther, 2008; Nimtrakoon, Tayles, 2010; Al-Mawali, 2015).

2.3. External Contingency Factors

External factors are external phenomena that affect the organization (Albalaki, Abdullah, Kamardin, 2019). The external business environment in which firms operate may be stable, volatile, simple, or uncertain (Amara, Benelifa, 2017). Outdoor work reflects uncertainty, according to Amara and Benelifa (2017). In an unpredictable business environment, firms need more advanced accounting management information (Shahzadi et al., 2018). The following sections detail each factor.

Perceived Environmental Uncertainty (PEU): PEU refers to top managers' perceived inability to predict an organization's external environment in a given area, for instance, supplier market actions, customer preferences, and economic changes (Shahzadi et al., 2018). Despite accounting's unpredictable environment, authors must continue to consider environmental uncertainty in models and hypotheses (Amara, Benelifa, 2017). PEU is one of the first conditional variables studied in relation to management accounting growth (Shahzadi et al., 2018). If uncertainty is low, management can make accurate market forecasts (Shahzadi et al., 2018). Environmental unpredictability influences the level of accounting management development in high-protection firms (Amara, Benelifa, 2017). Perceived environmental uncertainty affects the design of MA systems and the adoption of advanced accounting practices, according to Ayadi and Affes (2014), Ojra (2014), and Albalaki et al. (2019).

Intensity of Market Competition: Level of market rivalry affects MAPs as firms face changes in productivity, cost, quality, distribution channels, and customer satisfaction (Sarchah, Yazdifar, Pifeh, 2019). High competition helps management monitor costs and analyze manufacturing, finance, and marketing processes, according to Khandwalla (1972). Tarigan,

Devie, and Putri (2015) identified five structure forces for assessing competitive intensity: industry rivalry, threats of alternative goods, consumer negotiating power, supplier negotiating power, and new competitor threats. New competitors entering the industry pose a threat. The easier it is for new competitors to enter an industry, the greater the firm's challenge. While suppliers' negotiating power affects the firm's productivity and general well-being. Consumers' negotiating power affects the firm's productivity and well-being. The difficulty with replacement items is buyers' access to physically identical, structural and functional products with the same generic purpose. Rivalry strength is the extent to which firms in this sector engage in outwardly articulated competitive actions and reactions to gain a market advantage (Purnama, Subroto, 2016). Highly competitive markets focused on quality and customer service were key in developing and implementing the new MA system (Albu, Albu, 2012; Ahmad, Zabri, 2015; Sarchah et al., 2019).

2.4. Organizational Performance (OP)

The management literature has found that performance assessment systems show whether a corporation is successful at putting its strategy into practice through positive activities to attain its goals (Anna, 2015; Sreekumar, 2015). Practitioners and academicians have studied the antecedents, operations, and different elements that can improve OP (Lay, 2014). Due to the importance of OP in the real world, numerous researchers concentrate on this field, which allows top management to evolve and advance (Gavrea, Ilies, Stegerean, 2011). Despite being widely used in academic literature, researchers couldn't agree on how to define OP (Gavrea et al., 2011). Academics and practitioners argue about the best way to measure OP (Jusoh, Ibrahim, Zainuddin, 2008). Ittner and Larcker (2003) said performance measures can help with resource allocation, measuring strategic goals, and assessing management efficiency. Performance measurement systems assign tasks, ensure independent decision-making, formulate performance objectives, and improve performance (Lee, Yang, 2011). Murphy, Trailer, and Hill (1996) identified 71 nonfinancial and financial measures of OP. Each method of measuring firm performance has its own consequences (Hubbard, 2006). The contingency view of performance promotes evaluating both financial and non-financial OP (Ojra, 2014; Sreekumar, 2015). Environmental uncertainty boosts OP, say Bastian and Muchlish (2012). Where environmental uncertainty is high, performance benchmarks focus on non-financial external and future-oriented aspects. Market rivalry intensity boosts firm performance, according to Al-Rfou (2012). This is consistent with the statement that they produce high-quality products to attract consumers in a competitive market.

3. Theoretical Framework and Hypotheses Development

This study examines MA's mediating impact on OP using a Cartesian type and a mediation model (Chenhall 2003; Gerdin, Greve 2004). The impact of MMATs and contingent external factors on the performance of ASE industrial firms is evaluated using the mediation model and contingency approach. Relationships are discussed using this theoretical framework.

3.1. Relationship between PEU and Usage of MMATs

As firms face environmental limitations in meeting employee or top management goals, environmental uncertainty must be studied (Ayadi, Affes, 2014; Atout, 2017). Unpredictability affects MA techniques (Amara, Benelifa, 2017). AbdelKader and Luther (2008), Ayadi and Affes (2014), Amara and Benelifa (2017), Shahzadi et al. (2018), and Lucianetti, Jabbour and Gunasekaran (2018) presented evidence to support the idea that complex MAPs and environmental uncertainty are positively correlated. More sophisticated accounting information systems are needed by businesses functioning in highly uncertain environments in order to deliver superior financial, non-financial, and external data during the course of ongoing iterations. Fauzi, Hussain, and Mahoney (2011), Albu and Albu (2012), and Erserim (2012) found negative relationships between PEU and MA Systems. Given the relationship between PEU and MA techniques, the following is an assumption about the influence of PEU on MMAT use:

H1: The PEU has a positive influence on the usage MMATs.

3.2. Relationship between Intensity of Market Competition and Usage of MMATs

Contingency theorists argue that the rising demand for accounting information will lead businesses to adopt MA (Anderson, Lanen, 1999). Khandwalla (1972) and Baines and Smith (2003) both found that competition increases MA system complexity. Several studies, including those by Abdel-Maksoud et al. (2012), Albu and Albu (2012), Ahmad and Zabri (2015), Ghasemi et al. (2015), and Adu-Gyamfi et al. (2021), found that increased market competition is a significant variable in the use of sophisticated MAPs in a number of countries. Amara and Benelifa (2017), Nair and Nian (2017), Shahzadi et al. (2018), and Pham et al. (2020) found no correlation between MAPs and market competition. This leads to our research hypothesis.

H2: The intensity of market competition has a positive influence on the usage of MMATs.

3.3. MMATs Usage and OP

This section tests the third hypothesis and confirms the link between MMAT adoption and OP. MA's influenceiveness in helping firms achieve their goals is a hot topic. MAPs provide firms with relevant data. Formulating corporate strategy, preparing and tracking operations, ensuring influenceive use of resources, protecting intangible and tangible assets, decision making, maximizing value and improving performance are MA's functions (Horngren et al., 2002). Reviewing empirical evidence helps understand the influence of MA techniques on firm performance (Horngren et al., 2002). MAPs' performance influence has been quantified extensively. Modern MA techniques improve business performance, according to Hoque (2011). Baines and LangfieldSmith (2003) said modern MAPs have improved firm performance. Modern MAPs rely more on non-financial accounting information (i.e. customer satisfaction, on-time delivery, market share, employee satisfaction, and employee training) to improve firm performance. This result is consistent with those of McLellan and Abdel AL (2011), Tuanmat and Smith (2011), Ajibolade (2013), Tuan Mat and Smith (2014),

Ayedh and Eddine (2015), Al-Naser (2017), Alimoradi and Borzoupour (2017), Lucianetti et al. (2018), Alzoubi (2018), Bransah (2019) and Adu-Gyamfi, who emphasized a strong link between advanced MA methods and This research assumes an MMAT-success link. Consequently, we propose the following hypothesis:

H3: Usage of MMATs is positively correlated with OP.

3.4. Relationship between PEU and OP

Contingency theory found a link between managers' perceptions of environmental uncertainty and firm performance (Kwock, 1999; Hwang, 2005; Bastian, Muchlish 2012; Uyar, Kuzey, 2016). MA is changing to include more systems of strategies that define, assess, and manage key drivers for achieving financial and non-financial goals, according to Ittner et al. (2003). Hoque (2004) argued that environmental uncertainty affects performance indicators. When environmental uncertainty is high, firms may rely more on non-financial indicators to develop all firm divisions (Kaplan, Norton, 2001; AbdelKader, Luther, 2008).

Gordon and Narayanan (1984) found that a high PEU is associated with financial and non-financial indicator knowledge. Firms that focus on financial and non-financial indicators like sales growth and return on assets, and that face a constantly changing market environment, perform better than those that rely solely on financial measures (Ittner et al., 2003; Hall, 2011). Chenhall and Morris (1986), Gul (1991), and Hoque emphasized the positive relationship between PEU and performance metrics (200). Schulz, Wu, and Chow (2010) found a positive relationship between PEU and financial and non-financial performance metrics. Jusoh (2008) found a negative link between PEU and OP. Based on past research, we can hypothesize:

H4: PEU has a positive influence on OP.

3.5. Relationship between Intensity of Market Competition OP

Businesses often offer many products or services to compete in a crowded market. The market competition allows firms to sell new services and products at a reasonable price (Mia, Clarke 1999; Alomiri, Drury 2007). When firms face great competition, they manufacture high-quality products to drive firm performance (Chong & Rundus 2004). According to Otley (1999), maintaining a competitive edge requires high-quality and satisfied customers.

Many MA studies ignore the link between market competition density and firm performance. These works have mixed results. Mia and Clarke (1999) found a link between market competition and firm performance. Konings (1998), Brown and Earle (2000), Chong and Rundus (2004), Nickell (2006), Zhu and Sarkis (2007), and Al-Rfou (2012) revealed a strong link between market rivalry and company performance. Khandwalla (1977) and Purnama and Subroto (2016) competitiveness and performance were found to be negatively correlated. The literature is ambiguous regarding the relationship between competitiveness and performance.

H5: The intensity of market competition has a positive influence on OP**.**

3.6. Mediation Role of MMATs in the Relationship between External Factors and OP

Organizations can use new MA practices to generate useful resource decision-making information for dynamic management and competitive advantage (Ayadi, Affes, 2014). Abugalia (2011) said that firms should adopt modern MA techniques to provide managers with the necessary information to make rational decisions. Few studies, especially in developing countries, have explored MMATs' role in mediating external factors and OP (Ogungbade et al., 2016).

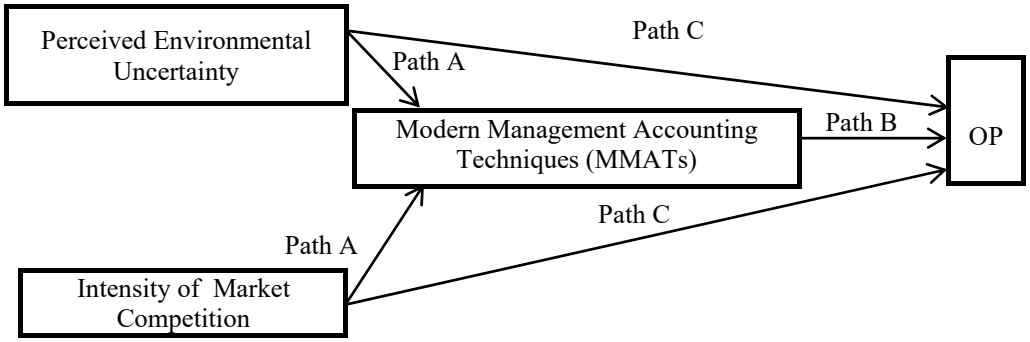
This study compares external factors, MMATs, and OP. In addition to mediating the relationship between external factors and OP, it also affects MMATs and OP. Chong and Chong (1997) tested the influence of PEU with MAS on performance. They found that PEU had a large indirect influence on performance based on how much businesses use MAS knowledge. Jusoh (2008) found that BSC mediates PEU and OP. Pavlatos (2018) noted the mediating role of strategic cost management in PEU and OP. According to Anh (2016), MAS mediates market competition intensity and OP. Albalaki et al. (2019) found that ABC adoption mediates external contingencies and OP. Wahyuni and Triatmanto (2020) noted that MA methods can mediate the link between environment and performance. Ngo (2021) found that large-scale MA systems fully mediate market orientation and performance.

H6: MMATs usage mediates the relationship between PEU and OP.

H7: MMATs usage mediates the relationship between the intensity of market competition and OP.

Figure 1 shows a model involving PEU, market competition, MMATs as a mediator, and OP.

Figure 1. Theoretical Framework



4. Methodology

The industrial sector is better for MA studies than other sectors, according to Smith et al. (2008). Due to globalization, MMATs in the industry should be studied (Chelliah et al., 2010). ASE industrial businesses provided the study's empirical data. Due to the study's complex variables and multiple correlations, the researcher focused on the industrial sector to reduce confusion in analyses and measurements (Naranjo, Hartmann, 2006). Several Jordanian studies, for instance, Nassar et al. (2011) and Alsoboa et al. (2015), investigated the adoption level of MA techniques, their results, and the factors that influence their adoption in the industry. According to the ASE website, 46 of the 192 listed firms are industrial. According to Barreiro and Albandoz (2001) and Zikmund (2003), a population of less than 500 people is considered small; in this case, it is common to adopt the entire population at 100% as the study sample or census sample, by sending questionnaires to all the population concerned in the study.

The current study analyzes Financial Business Units (FBUs) in ASE-listed industrial firms. Finance employees in the ASE-listed industrial sector are expected to examine high-quality data planned by senior management to carry out their activities and meet their objectives, for instance, financial and non-financial performance improvement. Respondents for this study include financial managers, accounting managers (chief accountants), management accountants, cost accountants, and internal auditors due to their high level of authority and expertise in the field.

Part (A) of this study's instrument collects respondent background information like education, work position, and qualifications, as well as firm information like industry, years in operation, and sales revenue. The current study used the same instrument as Al-Mawali (2015), Andesto (2016), and Alshbiel (2017), which was modified from Govindarajan (1984). PEU was measured using eight items in Part (B) of the questionnaire (B1-B8). To measure market competition, this study used a modified version of Al-Rfou (2012) and Alshbiel (2017) (1972). Part (C) of the questionnaire measured market competition with five items (C1-C5). The current study used the same instrument as Al–Bawab (2018) and Alzoubi (2018). In Part (D) of the questionnaire, 12 items measured MMATs adoption (D1-D12). The current study used a modified version of Ojra (2014) and Ahmad (2017)'s instrument to measure financial and non-financial indicators in firms (2000). In Part (E) of the questionnaire, seven items measured financial and non-financial indicators (E1-E7). The seven-point Likert scale ranged from "one" (very low extent) to "seven" (very high extent) to get participants' responses about MMATs in their firms. The participants rated previous variables on a seven-point Likert scale from "one" (very low extent) to "seven" (very high extent).

5. Analysis

The researcher hand-delivered surveys to respondents and asked them to respond within a certain timeframe. One month after the questionnaire was distributed, unfinished responses were called. From April to June 2019, data was collected. The effort yielded 128

questionnaires. 12 of 128 surveys were removed because more than 50% of questions were unanswered (Hair et al., 2010). This yields 116 valid surveys with a 76.3% response rate. Saunders et al. (2012) recommend a 30-50% response rate for self-administered business surveys. This study used SPSS and PLS to model routes.

Table 1. The Responding Industry Firms Profile (N=116)

Variables	Category	N	%
Position	FM	37	31.9
	CA	41	35.3
	MA	4	3.4
	CAcc	6	5.2
	IA	17	14.7
	Others	11	9.5
Experience in the current position	Less than 1 year	16	13.8
	1 – 5 year	22	19
	6 – 10 year	42	36.2
	11- 15 years	21	18.1
	16 – 20 years	15	12.9
	21 – 25 years	0	0.0
	More than 25 years	0	0.0
Experience in the current firm	Less than 1 year	22	19.0
	1 – 5 year	35	30.2
	6 – 10 year	20	17.2
	11- 15 years	30	25.9
	16 – 20 years	9	7.8
	21 – 25 years	0	0.0
	More than 25 years	0	0.0
field of degree	Accounting	85	73.3
	Business administration	14	12.1
	Economics	2	1.7
	Finance	15	12.9
	Other	0	0.00
Annual Sales Turnover	Less than 1M	6	5.2
	1M - 10M	30	25.9
	11M - 20M	38	32.8
	21M – 30M	8	6.9
	31M – 40M	17	14.7
	41M - 50M	0	0.0
	More than 50M	17	14.7

35.3% of respondents were chief accountants, 31.9% were financial managers, 14.7% were internal auditors, and 5.2% and 3.4% were cost and management accountants, respectively. Respondents accurately described firm practices. 36.2% of respondents had 6-10 years of job experience, 19.0% had 1-5 years, 18.1% had 11-15 years, 13.8% had less than 1 year, and 12.9% had 16-20 years. No respondent had more than 21 years of experience. The summary also shows that 30.2% of respondents have 1 to 5 years' experience in the current firm, 25.9% have 11 to 15 years' experience, 19.0% have less than 1 years' experience, 17.2% have 6 to 10 years' experience, and 7.8% have 16 to 20 years' experience. No one had 21-25 years of experience in their current firm. 87.9% of respondents have a bachelor's degree, 6.0% a master's, and 3.4% a diploma. 1.7% of respondents have accounting-specific training. This shows that the respondents are knowledgeable about their firms and the studied practices.

32.8% of respondent firms have annual sales between 11M and 20M, 25.9% have sales between 1M and 10M, and 14.7% have sales between 31M and 50M. 6.9% of respondents have 21M to 30M in annual sales, and 5.2% have less than 1M. No firm has 41M-50M in annual sales.

5.1. Descriptive Statistics

The results of the seven-point Likert scale dimensions of the constructs are shown in Table 2, and the total mean ranges from 4.70 to 5.14. This range indicates that all dimensions are reasonably high.

Table 2. Descriptive Statistics of the Constructs (N=116)

Variables	N	Mean	Std.dev
PEU	116	4.70	1.05
INMCOM	116	4.91	1.21
MMATs	116	5.14	1.04
OP	116	5.13	1.18

Both the PEU and the market competition intensity have mean values of 4.70, and their standard deviations are 1.05 and 1.21 respectively. This demonstrates that companies who react to environmental uncertainty and market competitiveness prefer to do so in a proactive manner. Taking action to address these variables can help lessen the impact of external factors on company objectives. A high standard deviation indicates that companies have varying assessments of how change-responsive they are. The manufacturing companies do not have the same resources and competencies. According to Table 2, the number of students who took the MMAT was rather high, with a mean score of 5.14 and a standard deviation of 1.04. Most responders utilize MMATs. The fact that the respondents' companies have a mean value of 5.13 and a standard deviation of 1.18 in Table 2 demonstrates that these companies are operating better than their rivals on average. This indicates that the majority of firms are prosperous and well-managed.

5.2. Quality Model Evaluation

PLS-SEM 3.0 was used in order to conduct the evaluation of the quality model (Ringle, Wende, Becker, 2014). Several researchers have used this program in accounting and strategic management (Bodoff, Ho, 2016). Advanced analyses that expand on the main PLS-SEM findings are needed to fully understand the results. The current study used a two-step procedure: first, assessing the measurement model, then assessing the structural model to test and analyze the PLS path model (Hair et al., 2014). The evaluation of the quality model, the testing of the measurement model, and the evaluation of the structural model are shown below.

5.3. Measurement Model Evaluation

As a means of guaranteeing the analytical validity and reliability of the results, PLS-SEM was used to evaluate the quality of the measurements. Before putting the model to the test, this investigation looked at its capacity to discriminate between groups, to converge on a common understanding of those groups, to be internally consistent, and to provide reliable indicator results.

5.3.1. Indicator Reliability

Utilizing the outside loadings of each measure, the indicator's reliability was evaluated, where the product loading factor must be above 0.70. (Hair et al., 2014). 4 of the 32 items were removed because their loadings were below 0.70, which are B8, H10, H11, and H12. Table 3 shows that only 28 items with loadings above 0.70 were retained for further analysis. In conclusion, the model measurements' indicator reliability was established because all the items reached 0.70 and were significant.

Table 3. Factor Loadings

Construct	Items	Loadings	Standard Error	T-value	P-value
PEU	B1	**0.957**	0.056	13.699	0.000
	B2	**0.956**	0.028	31.528	0.000
	B3	**0.914**	0.038	21.525	0.000
	B4	**0.732**	0.015	59.658	0.000
	B5	**0.929**	0.029	28.283	0.000
	B6	**0.952**	0.019	46.842	0.000
	B7	**0.918**	0.028	29.737	0.000
INMCOM	C1	**0.880**	0.028	31.568	0.000
	C2	**0.793**	0.039	21.585	0.000
	C3	**0.816**	0.032	26.095	0.000
	C4	**0.813**	0.021	40.966	0.000
	C5	**0.892**	0.03	28.012	0.000
MMATs	H1	**0.752**	0.031	27.628	0.000
	H2	**0.882**	0.03	27.432	0.000
	H3	**0.855**	0.034	25.486	0.000
	H4	**0.774**	0.031	26.949	0.000
	H5	**0.764**	0.044	18.756	0.000
	H6	**0.803**	0.029	28.86	0.000
	H7	**0.871**	0.038	16.294	0.000
	H8	**0.788**	0.038	20.648	0.000
	H9	**0.887**	0.043	18.562	0.000
OP	I1	**0.770**	0.037	22.063	0.000
	I2	**0.856**	0.025	33.989	0.000
	I3	**0.859**	0.019	47.153	0.000
	I4	**0.709**	0.022	40.294	0.000
	I5	**0.723**	0.028	29.674	0.000
	I6	**0.860**	0.025	34.512	0.000
	I7	**0.885**	0.042	18.719	0.000

PEU= Perceived Environmental Uncertainty; INMCOM = Intensity of Market Competition;; MMATs=Modern Management Accounting Techniques; OP= OP

5.3.2. Internal Consistency Reliability

Cronbach's alpha and Composite Reliability (CR) are used to measure internal consistency in studies (Peterson, Kim, 2013). Cronbach's alpha depends on the number of test items, so it tends to underestimate internal consistency. It's a conservative way to gauge internal consistency (Hair et al., 2014). Both CR and Cronbach's alpha must be 0.70 to 0.95. (Lin, Huang, Othman, Luo; 2020; Hair, Howard, Nitzl, 2020). Table 4 shows that all constructs' Cronbach's alpha values ranged from 0.904 to 0.939. All the constructions' CR values were above 0.70, which was acceptable; they ranged from 0.929 to 0.949. The internal consistency of the measurements has probably been tested and validated.

Table 4. Convergent Validity

Variables	Items	F/L	Alpha	CR[a]	AVE[b]
PEU	B1	**0.957**	0.926	0.940	0.693
	B2	**0.956**			
	B3	**0.914**			
	B4	**0.732**			
	B5	**0.929**			
	B6	**0.952**			
	B7	**0.918**			
INMCOM	C1	**0.880**	0.904	0.929	0.723
	C2	**0.793**			
	C3	**0.816**			
	C4	**0.813**			
	C5	**0.892**			
MMATs	H1	**0.752**	0.939	0.949	0.674
	H2	**0.882**			
	H3	**0.855**			
	H4	**0.774**			
	H5	**0.764**			
	H6	**0.803**			
	H7	**0.871**			
	H8	**0.788**			
	H9	**0.887**			
OP	I1	**0.770**	0.927	0.942	0.698
	I2	**0.856**			
	I3	**0.859**			
	I4	**0.709**			
	I5	**0.723**			
	I6	**0.860**			
	I7	**0.885**			

5.3.3. Convergent Validity

To determine whether or not convergent validity exists at the concept level, Hair et al. (2017) suggested employing the AVE statistic. Convergent validity requires an AVE of 0.50 or higher for each latent variable (Hair et al., 2017). Table 4 shows that each AVE value is within the range of 0.674 to 0.723, which is the range that is allowed, which is evidence of the validity of convergent measurement. Convergent validity may be attributed to the present investigation.

5.3.4. Discriminant Validity

Discriminative validity of the test was demonstrated using item cross-loadings and the Fornell-Larcker criterion. In order to measure cross-loading, the outer loading of objects must be larger on the relevant structure than on any other structure. For an item to be put on the weighing structure, it must weigh more than all the others there, but less than the structure itself (i.e. the cross-loads). Due to the fact that item loadings are much larger than cross-loads, Table 5 provides proof of discriminative validity.

Table 5. Item Loadings

Construct	Items	PEU	INMCOM	MMATs	OP
	B1	**0.957**	0.252	0.270	0.320
	B2	**0.956**	0.358	0.424	0.479
	B3	**0.914**	0.298	0.427	0.487
PEU	**B4**	**0.732**	0.345	0.417	0.412
	B5	**0.929**	0.305	0.372	0.442
	B6	**0.952**	0.392	0.440	0.458
	B7	**0.918**	0.297	0.318	0.302
	C1	0.198	**0.880**	0.591	0.501
	C2	0.159	**0.793**	0.542	0.473
INMCOM	**C3**	0.267	**0.816**	0.637	0.567
	C4	0.484	**0.813**	0.377	0.659
	C5	0.403	**0.892**	0.670	0.629
	H1	0.378	0.170	**0.752**	0.600
	H2	0.332	0.560	**0.882**	0.632
	H3	0.410	0.624	**0.855**	0.682
MMATs	**H4**	0.382	0.608	**0.774**	0.678
	H5	0.383	0.656	**0.764**	0.602
	H6	0.340	0.619	**0.803**	0.680
	H7	0.310	0.560	**0.871**	0.570
	H8	0.331	0.559	**0.788**	0.677
	H9	0.393	0.272	**0.887**	0.682
OP	**I1**	0.391	0.585	0.598	**0.770**
	I2	0.410	0.622	0.372	**0.856**
	I3	0.428	0.573	0667	**0.859**
	I4	0.425	0.534	0.663	**0.709**
	I5	0.401	0.646	0.271	**0.723**
	I6	0.402	0.546	0.645	**0.860**
	I7	0.461	0.538	0.663	**0.885**

Table 6. Correlation

	INMCOM	MMATs	OP	PEU
INMCOM	0.848			
MMATs	0.774	0.820		
OP	0.683	0.708	0.853	
PEU	0.384	0.446	0.494	0.849

5.4. Structural Model Evaluation

In the PLS path modelling study, the structural model was tested after the measurement model (inner model). Hair et al. (2013) suggest looking at the model's (R^2) values, influence size (f2), and predictive relevance. Bootstrapping was used to evaluate the model's predicted association's significance.

5.4.1. R-square (R^2)

PLS-SEM needs R^2 criteria to evaluate the structural model (Hair et al., 2012). The R-squared statistic can be used to estimate the proportion of the total variance in the dependent variable that can be attributed to each predictor (Hair et al., 2010). 0.75, 0.50, and 0.25 R^2 are significant, moderate, and weak, respectively (Hair et al., 2014). Figure 3 displays that the study model accounts for 97.3% of OP and 89.7% of MMATs' total variance. Acceptable R-square values were found for the endogenous latent variables in this analysis.

5.4.2. Influence Size (F^2)

According to Cohen (1988), an F2 value of 0.35 is considered large, while 0.15 is considered medium, and 0.02 is considered small. Figure 3 shows that the research model can account for 68.3% of the total variance in OP while explaining 97.3% of the variance in MMATs. According to Hair et al. (2014), the R-square values for the latent variables endogenous were satisfactory.

Table 7. Effect of F^2

Relationships	**F^2**	**Result**
PEU ⟶ MMATs	0.244	Medium
PEU ⟶ OP	0.152	Medium
INMCOM ⟶ MMATs	1.316	Large
INMCOM ⟶ OP	0.107	Small
MMATs ⟶ OP	2.054	Large

Table 7 shows the influence size of PEU in MMATs and OP were 0.244 and 0.152 respectively. Also, the influence size of INMCOM in MMATs and OP were 1.316 and 0.107 respectively. In addition, the influence size of MMATs in OP was 2.054. According to Cohen, the influence sizes of this exogenous latent variable are large (1988).

5.4.3. Construct Cross-Validated Redundancy

Predictive relevance indicators (Q2) include redundancy and community (Hair et al., 2014). When it comes to predicting data, it's best to employ both the structural and measurement models, therefore cross-validated redundancy is a better option than cross-validated communality (Hair et al., 2014). Hair et al. (2014) claim that a predictive research model has a cross-redundancy value over zero. As can be seen in Table 9, OP and MMAT redundancy

values have been cross-validated. The predictive ability of the model is shown by the fact that all cross-redundancy values for the two endogenous variables in the research are more than zero.

Table 9. Q^2 Test

Construct	SSO	SSE	C/C
OP	1044.000	429.184	0.589
MMATs	812.000	301.299	0.629

5.5. Direct Effects Testing

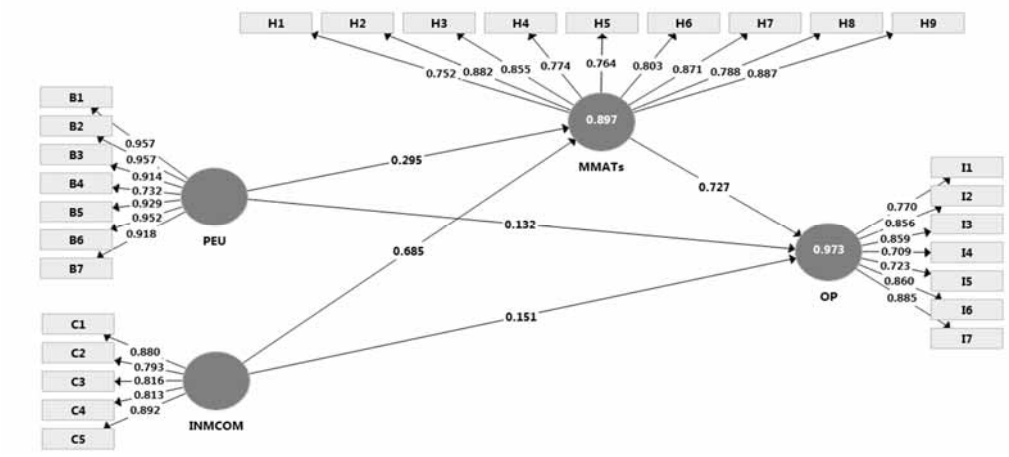
After validating the measurement and structural models, PLS-SEM route modelling tested the proposed associations. The researcher used the PLS algorithm and 5000 bootstrap samples and 116 cases to test path coefficients (Hair et al., 2014). The proposed relationship between PEU (β= 0.295, t=2.671, p ≤0.01) and market competition (β= 0.685, t =6.404, p ≤0.01) had a strong positive influence on MMATs, supporting H1 and H2. Table 10 shows that PEU (β= 0.132, t=2.638, p ≤0.01) and market competition (β= 0.151, t=2.263, p ≤0.05) had a positive and significant influence on OP, supporting H4 and H5, respectively. MMATs positively affect OP (β=0.727, t=8.044, p ≤0.01), supporting H3.

Table 10. Direct Relationships

Hypo.	Hypothesis	Std. Beta	T-value	P-value	Decision
H1	PEU -> MMATs	0.295***	2.671	0.008	Supported
H2	INMCOM -> MMATs	0.685***	6.404	0.000	Supported
H3	MMATS -> OP	0.727***	8.044	0.000	Supported
H4	PEU -> OP	0.132***	2.638	0.008	Supported
H5	INMCOM -> OP	0.151**	2.263	0.024	Supported

*Note: *** p<0.01; ** p<0.05.*

Figure 1. The Results



5.6. The Mediating Relationships Testing

After evaluating exogenous and endogenous factors' direct influence, researchers examined mediator links (indirect influence). In evaluating the mediation influence, numerous statistical methods are available for drawing conclusions and calculating confidence intervals (CIs), for instance, Sobel's (1982) causal step, Baron and Kenny's (1986) coefficients process, and bootstrapping (Falk, Biesanz, 2016). Baron and Kenny's causal step approach neither quantifies nor allows inferential testing (Hayes, 2013). Given that indirect influence is not normally distributed, the Sobel test weakens it, requires non-standard path parameters, and lacks statistical strength, especially with small sample sizes (Hair et al., 2014). The coefficients methods conclusion is based on the assumption of normally distributed indirect influence sampling and the standard error formula, but there is no clear criterion for choosing one over the other (Hayes et al., 2011).

Bootstrapping was selected because it is more powerful and accurate than other approaches. Bootstrapping using 5000 samples and 95% CI assessed indirect impacts, following Preachers and Hayes (2008). PLS produces the CI values of the indirect impact a*b, and when a 95% CI excludes 0, mediation is established. Preachers and Hayes (2008) state that mediation does not need the mediator M "c" route to affect the independent variable X on the dependent variable. Mediation power should be determined by indirect impact pathways a*b, not path c's negligible direct effect (Zhao et al., 2010; Hayes, 2013). Zhao et al. (2010) state that mediation occurs when "a*b" is substantial and "c-" is not. When a, b, and c have comparable signs, complimentary partial mediation occurs; otherwise, competing partial mediation occurs.

The study model proposes MMATs as a mediator between external factors and OP. Mediation tests were conducted to determine if MMATs mediate the relationship between external factors (PEU and market competition) and OP of ASE industrial firms. Table 11 shows the bootstrapped results of MMATs mediating the link between external factors and OP. The results show that direct influence c- is significant and the signs of paths a, b, and c- are positive, indicating that MMATs are a partial mediator (complementary) between INMCOM, PEU and OP. The indirect influence of PEU (β=0.415, 95% CI= 0.023 to 0.353) on OP does not include zero, indicating that MMATs mediate this relationship. MMATs are a partial mediator (complementary) in this relationship because their direct path c- is significant. This supports H6. In addition, the confidence interval of INMCOM on OP (β=0.498, 95% CI= 0.343 to 0.688) does not include zero, confirming that MMATs are a significant mediator in the relationship. MMATs are a partial mediator (complementary) in the relationship between INMCOM and OP because c- is significant. This supports H7.

Table 11. The Results of the Mediating

Relationships	Std.Beta	Std. Error	t-values	p-values	Indirect Influence 95% CI Lower	Upper	Decision
INMCOM -> MMATs -> OP	0.498***	0.089	5.596	0.000	0.344	0.688	Partial Mediation "Complementary"
PEU -> MMATs -> OP	0.415**	0.085	2.530	0.011	0.023	0.353	Partial Mediation "Complementary"

5.7. Discussions

The study examines how external factors affect MMATs. Three hypothesis tests were shown before. All composite variables indicate external factors affect MMATs. When viewed as a composite variable, hypothesis testing doesn't support outside MMATs influence. The change increases MMATs acceptance to 89.7%. It answers the question. This study found that understanding external business influences increases MMATs adoption. External factors directly affect MMATs adoption:

5.7.1. PEU and Usage of MMATs

PEU was discovered to affect MMAT adoption. This indicates that PEU induces ASE firms to adopt MMATs. Lucianetti, Jabbour, and Gunesekaran concur with AbdelKader and Luther (2008), Ayadi and Affes (2014), Amara and Benelifa (2017), Shahzadi et al. (2018), and AbdelKader and Luther (2008). (2018). This indicates that industrial firms should prioritize PEU to increase MMAT utilization. PEU is a critical external factor that influences the design of the MA system and advanced MA techniques. The researchers Fauzi et al. (2011), Albu and Albu (2012), and Erserim (2012) discovered a negative correlation between PEU and MA practices. This may be due to the inability of top executives to predict external conditions. This indicates that PEU is essential for MMATs implementation and knowledge of supplier actions, customer demands, tastes, and preferences, as well as competitor market activities.

5.7.2. Intensity of Market Competition and Usage of MMATs

The degree of market competition affects MMAT adoption. This result empirically supports the hypothesis. Abdel-Maksoud et al. (2012), Albu and Albu (2012), Ahmad and Zabri (2015), Ghasemi (2015), and Adu-Gyamfi et al. (2012) all support this conclusion (2021). Amara and Benelifa (2017), Nair and Nian (2017), Shahzadi et al. (2018), and Pham et al. (2020) all contradicted one another. Industrial enterprises can enhance MMATs by swiftly reacting to market developments for instance price competition and the introduction of new products. Firms that perceive intense competition are more likely to implement new MA techniques to collect more data, according to studies (Albu, Albu, 2012; Shahzadi et al., 2018).

5.7.3. Usage of MMATs and OP

The first step in determining whether MMATs mediate the relationship between external factors and OP. MMATs affect the OP of industrial firms listed on the ASE. This finding is consistent with previous studies that discovered a strong relationship between the two variables in industrial businesses, for instance, Baines and Langfield-Smith (2003), Hoque (2011), McLellan and Abdel AL (2011), Tuanmat and Smith (2011), Ajibolade (2013), Tuanmat and Smith (2014), Ayedh and Eddine (2015), Al-Naser (2017), Alimoradi and Borzoupour (2017), Lucianetti et al. (2018), and Alzoubi (2021). This finding demonstrates

that MMATs can improve the performance of organizations. According to Nuhu, Baird, and Appuhami, MMATs improve processes, cost driver analysis, costs, efficiency, quality, and performance (2016). According to Huynh (2017), MA techniques are essential for businesses because they help to control expenses and improve performance. MA is a management tool that aids in the planning, organization, execution, and evaluation of business operations and firm performance (Kaplan et al., 1998). Industrial finance departments listed on the ASE should have the knowledge to enhance their organization's performance. They should be familiar with advanced MA techniques and support efforts to use MMATs influenceively in their organizations to improve performance.

5.7.4. PEU and OP

PEU is one of the external factors influencing the OP of ASE industrial firms. In line with Hwang (2005), Bastian and Muchlish (2012), Abdallah and Persson (2014), and Uyar and Kuzee (2009). (2016). To enhance OP, industrial firms should prioritize PEU. Unpredictability in business affords firms the opportunity to adapt to shifting conditions and enhance performance. A firm's competitiveness and performance can be enhanced by external documents. Unpredictable business environments influence OP (Mia & Clarke, 1999). In unpredictable business environments, managers must be knowledgeable about firm operations in order to respond swiftly to alterations. This could enhance business performance (Ajibolade et al. 2010). This demonstrates that PEU boosts OP. In contrast to Jusoh (2008), Pavlatos (2018) found no correlation between PEU and OP. This may be a result of financial employees' inability to anticipate external conditions.

5.7.5. Intensity of Market Competition and OP

Same PEU, market competition intensity affects OP. Positively, according to Konings (1998), Brown and Earle (2000), Chong and Rundus (2004), Nickell (2006), Zhu and Sarkis (2007), and Al-Rfou, market competition influences OP (2012). Anh (2016) disagreed. According to Khandwalla (1977) and Purnama and Subroto (1996), competition and performance are negatively related (2016). Given Jordan's favourable investment climate, this result is predictable. Therefore, Jordanian firms have demonstrated their ability to compete with multinationals. Firms are under pressure to provide consumers with high-quality products. Overall performance improves.

5.7.6. The Mediating Influence of MMATs on the Relationship between External Factors and OP

The bootstrapping analysis demonstrates that MMATs mediate the relationship between external factors and OP. According to Zahu et al. (2010), MMATs are a complementary (partial) mediator between external factors and OP. This study discovered that MMAT adoption awareness is a crucial link between external factors and OP. Numerous researchers have found evidence of the intervening influence of MA practices in the literature. According to the findings, PEU indirectly affects OP via MMATs. Chong and Chong (1997) found that

PEU indirectly affected OP through managers' use of comprehensive MMATs. Jusoh (2008) found that "balanced scorecard" mediates PEU and OP. Pavlatos (2018) found that strategic cost management mediates the PEU-performance relationship. Albalaki et al. (2019) found that ABC adoption mediates external contingent factors and OP. Wahyuni and Triatmanto (2020) noted that management accounting techniques can mediate environmental changes and performance.

The high PEU indicates that Jordan's environment is stable, which may be due to the market's small size. The pegged dinar, technical breakthroughs, political instability, and substantial changes in government policies and regulations may have given managers the impression that the economic environment is stable and predictable. As a result of these conditions, managers may have more access to decision-making information (as seen by the increased use of MMATs) and be able to accurately assign probabilities to decision outcomes. Given the low level of uncertainty in Jordan, managers can forecast the external environment using MMATs, resulting in improved performance. MMATs had a significant indirect (partially mediated) influence on OP as a result of market competition intensity. This result is comparable to those of Anh (2016), Rasid et al. (2011), and Ngo (2021), who discovered that MAS mediates the connection between market competition intensity and OP. MMATs are necessary to improve the performance of organizations in the modern world. MMATs can reduce market competition by increasing the competitiveness of businesses. MMATs can also increase market competition by providing a vast array of data that can result in improved decision-making and OP.

6. Conclusion

Based on relevant literature, the study developed a testable industrial model. External factors, MMATs, and performance are included. The model validates the influence of external factors on MMATs and OP. Overall, the researcher considers this study to have provided empirical evidence on MMATs adoption drivers and OP. According to this study, MMATs are the most important variables and strategies that can help firms increase performance and gain a competitive advantage. It is believed that these variables affect the performance of ASE-listed firms. The primary contribution of this study is evidence of the interaction influence of external factors and MMATs on the financial and non-financial performance of ASE-listed industrial enterprises. In the context of industrial firms listed on the ASE, the partial mediating influence of MMATs on the relationship between external factors and OP provides insight into the exploratory research, which asserts that there is no universally acceptable MAS that is applicable in all situations. The partial mediating influence of MMATs on the relationships suggests that external factors and MMATs should be combined to improve industrial firm performance, and that external factors can enhance MMAT adoption and OP. MMATs showed the indirect influences of external variables on industrial firm performance, despite their lack of absolute influence.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
ECONOMIC STUDIES

Volume 32(6), 2023

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IMPACT OF FINANCIAL RATIOS ON STOCK PRICES OF MANUFACTURING COMPANIES: EVIDENCE FROM INDIA[3]

The present study examines the impact of financial ratios on the stock prices of Indian manufacturing companies. Since the manufacturing sectors play an essential role in the economic development of an emerging market like India, the study results can be helpful for investors looking to invest in India, and, in particular the manufacturing companies operating in the country. The study consists of a balanced panel dataset of selected manufacturing companies from fourteen manufacturing sectors listed on the NIFTY 500 index. The study employs the Prais-Winsten panel regression technique, which uses panel-corrected standard error estimators to analyze the data and derive the necessary empirical outcomes. The results reveal that the valuation ratios, namely market-to-book value, enterprise value multiple, and earnings per share, along with asset efficiency, exhibit a positive and significant relationship with the share prices. On the other hand, dividend payout and leverage exhibit an insignificant relationship with the share prices.
Keywords: financial ratios, share prices; Prais-Winsten panel regression; Panel corrected standard errors; manufacturing companies; India
JEL: B26; C23; G10

1. Introduction

The implementation of capital market reforms in 1991 saw the opening of Indian capital markets to global companies and investors. These reforms also paved the way for entrepreneurs operating in the private sector to set up new companies and take advantage of better economic prospects. This period witnessed phenomenal growth in the services and industrial production sectors of the country owing to the policy measures taken by the government. These reforms enabled the Indian securities market to become more efficient and competitive with its global peers and drew the attention of both domestic and international investors to look at the Indian capital markets more closely (Ahmad et al., 2005).

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[3] This paper should be cited as: *Kuntamalla, V. R., Maguluri, K. J. (2023). Impact of Financial Ratios on Stock Prices of Manufacturing Companies: Evidence from India. – Economic Studies (Ikonomicheski Izsledvania), 32(6), pp. 169-181.*

The emergence of new tools and techniques for investment analysis and the promise of huge rewards are some of the reasons for emerging markets like India to continue to be popular investment destinations. While investors are interested in reaping the gains from identifying the right emerging markets to invest in, they are also interested in determining the risks involved in such actions.

Stock market volatility is a matter of concern not just for investors, who are concerned about the risk element associated with investing in equity markets. It is also a subject matter for academics and researchers interested in determining which internal and external factors significantly contribute to the fluctuations in the equity markets. Some researchers have pointed out in their studies that fundamental corporate factors such as earnings-to-price (Ou and Penman, 1989; French and Poterba, 1991), cash flow-to-price (Campbell and Hamao, 1992), dividend-to-price, book-to-market equity (Griffin, 2002) and leverage (Cai and Zhang, 2011) are important determinants of share prices. However, other researchers have determined in their studies that the same variables had an insignificant or reverse impact on the share prices (Conroy et al., 2000; Kumar and Sehgal, 2004; and Dörner, 2005). Thus, the empirical studies on the impact of firm-specific factors on share prices have yielded inconclusive and sometimes contradictory results.

There needs to be more consensus on which financial variables significantly impact the company share prices. Also, few studies were conducted on Indian manufacturing stocks in the literature. The current study attempts to determine the empirical relationship between company-specific financial variables and the NIFTY 500 indexed manufacturing companies' stock prices from 2009 to 2021. The reason for choosing the Indian manufacturing industries for this study is their vital role in shaping the Indian economy regarding the investments they attract and the employment opportunities they provide. A panel dataset of 225 companies in India's manufacturing sectors has been chosen for this study. Panel data is preferred to time-series data because it is information-rich, can identify and highlight statistical effects better than pure time-series data, and minimizes estimation biases. For the above reasons, a panel data regression model has been employed in the study to obtain the desired results.

2. Literature Review and Hypotheses Formulation

Several empirical studies have been conducted in different regions to determine how financial ratios influence stock prices. This section of the study aims to shed light on some of the studies by researchers to determine the nature of the relationships between various microeconomic factors and market prices.

The instrumental research carried out by Ball and Brown (1968) provided empirical evidence that the financial statements contained information that could influence a firm's share returns. Their study paved the way for several studies to determine how accounting variables could influence stock prices.

Omran and Pointon (2004) used multiple regression analysis to determine the impact of financial variables on the share prices of listed Egyptian firms. The findings of the study revealed that capital gearing, Tobin's Q, and retained earnings significantly impacted the

stock prices of actively traded Egyptian firms. However, dividend payout significantly impacted the stock prices of non-actively traded firms. Gallizo and Salvador (2006) investigated the impact of accounting variables on the share prices of New York stock exchange (NYSE) listed firms using a hierarchical Bayesian model. The study results revealed that company size and asset turnover efficiency were significant in explaining the share price movements of the NYSE-listed companies.

Nisa and Nishat (2011) Investigated the relationship between financial and economic ratios and the stock prices of Karachi Stock Exchange listed firms using the dynamic panel Generalized Method of Moments (GMM) technique. The findings revealed that leverage, market-to-book value, earning per share, share turnover, and firm size positively and significantly impacted stock prices. On the other hand, liquidity ratios had a positive but insignificant impact on stock prices. Muhammad and Scrimgeour (2014) investigated the relationship between accounting variables and the stock returns of Australian firms using panel regression analysis. The results of the study revealed that cash flow return on investment, market-to-book value, Tobin Q, and price-to-earnings had a significant relationship with Australian stock returns. In contrast, return on assets and dividend payout had an insignificant relationship with the stock returns. Zaheri and Barkhordary (2015) studied the relationship between financial variables and stock returns of firms in Tehran using panel regression analysis. The results revealed that firm size, asset efficiency, and book-to-market were positively and significantly related to stock returns. In contrast, the return on equity was negatively related to the stock returns.

Aveh and Awunyo-Vitor (2017) studied the impact of firm-specific financial variables on the stock prices of Ghana Stock Exchange-listed firms using panel regression analysis. The results revealed that return on equity, earnings per share, book-to-market value, and market capitalization positively and significantly affected the Ghana stock exchange market prices. Also, a significant negative relationship was found between market prices and dividend yield. Nautiyal and Kavidayal (2018) investigated the influence of financial variables on the share prices of NIFTY 50 listed firms using both static and dynamic panel regression models. The study findings determined that earnings per share and debt had no significant relationship with stock prices. However, dividends exhibited a negative and significant relationship with the share prices. Arshad et al. (2020) studied the impact of company and macroeconomic variables on the stock returns of South Asian companies using panel fixed effect regression analysis. The results revealed that earnings-to-price and book-to-market had a negative and significant effect on the stock returns of South Asian companies. In contrast, the market risk was insignificant in influencing the stock returns.

Akhtar (2021) studied the impact of financial ratios on the Association of Southeast Asian Nations (ASEAN) and European stock returns using the panel fixed effects and the GMM regression techniques. The study findings revealed that price-to-sales, price-to-dividend, price-to-cash flow, and price-to-book value had a positive relationship with the stock returns of both markets. Dividend growth and Price-to-earnings had a negative relationship with the ASEAN stock returns. Dividend growth exhibited a positive relationship with the European stock returns, while price-to-earnings was insignificant. Sareen and Sharma (2022) used panel regression analysis to study the impact of various financial variables on Indian automobile stock prices. The findings of the study revealed that the EBITDA-to-total assets

and market value of equity to total liabilities had a positive and significant relationship with the automotive sector stock prices.

Based on prior literature covering this area of research, we posit the following hypotheses to study the relationships between the financial variables and stock prices:

H_0: Financial ratios have no significant effect on the share prices of manufacturing companies listed on the NIFTY 500 index.

H_1: Financial ratios have a significant effect on the share prices of manufacturing companies listed on the NIFTY 500 index.

3. Research Methodology

The data for the study pertains to the Indian manufacturing firms listed on the S&P CNX NIFTY 500 Index. According to the Centre for Monitoring Indian Economy (CMIE) classification, this index represents companies that are the leading members of various industrial segments of the Indian economy. The financial, information technology, healthcare services, and general services sectors are quite different from the manufacturing sectors regarding reporting their assets, functions, and regulatory requirements. Hence, the companies belonging to these sectors are excluded from the study. A few manufacturing sectors have also been excluded from the estimation process because of the limited number of companies that constitute these sectors and missing data. The final sample size consists of 225 companies. These companies are categorized into fourteen sectors based on the classification given by CMIE, including Automobile and Auto Components, Capital Goods, Chemicals, Construction and Construction Materials, Consumer Durables, Fast Moving Consumer Goods, Pharmaceuticals, Metals & Mining, Oil & Gas, Power, Realty, Telecommunication, and Textiles sectors. The breakdown of the companies into different industries is given in Table 1.

Table 1. Sample Distribution by Sector Classification

Sector	Number of Companies
Automobile and Auto Components	16
Capital Goods	39
Chemicals	26
Construction and Construction Materials	17
Consumer Durables	20
Fast Moving Consumer Goods	28
Pharmaceuticals	27
Metals & Mining	14
Oil & Gas	13
Power	8
Realty	7
Telecommunication	3
Textiles	7
Total	225

The data, relevant to the variables, are collected from secondary sources, namely the CMIE Prowess database and the annual reports from various company websites from 2009 to 2021. The period of 13 years has been chosen for the current study to explore how the various economic variables vary with time and how these variables can affect the company's stock prices.

The companies' annual adjusted closing stock prices (MP) are taken to be the dependent variable for this study, and six firm-specific financial variables are the regressors. The reason for including the adjusted closing price over the regular closing price is that corporate announcements relating to new stock offerings, dividends, and stock splits, are usually made post-market hours, and their effects are not reflected in the regular closing prices. In other words, the adjusted closing price factors in corporate decisions relating to dividends, stock splits, and new stock offerings to arrive at the final stock price and thus serves as a better and more accurate measure of stocks' value.

The definitions for the six regressors are mentioned in Table 2. The dependent variable, along with the regressors, namely the earnings per share, enterprise value multiple and market-to-book value, have been converted to their natural log values. On the other hand, dividend payout, asset efficiency, and leverage are calculated as percentages and expressed in their level values for the duration of the study.

Table 2. The explanatory variables used for the study

Variable Name (Symbol)	Description
Earnings per Share (EPS)	Calculated as the ratio of a firm's net income to the outstanding shares of its common stock.
Enterprise Value Multiple (EVM)	Calculated as the ratio of a firm's enterprise value to its earnings before interest, taxes, depreciation, and amortization (EBITDA).
Market-to-Book Value (MBV)	Calculated as the ratio of a firm's market value to the book value of its equity.
Dividend Payout (DIV)	Calculated as the ratio of dividends paid out by the firm throughout the year to its net income.
Asset Efficiency (EFF)	Calculated as the ratio of a firm's net income to its total assets.
Leverage (LEV)	Calculated as the ratio of a firm's total debt to its total assets.

As the data used in the study comprises both time-series and cross-sectional data, it is desirable to use panel data regression models, which consider both time-series and cross-section effects and control for individual heterogeneity and the multicollinearity problem.

For carrying out the present study, we use the following equation to estimate our model:

$$MP_{it} = \beta_0 + \beta_1 EPS_{i,t} + \beta_2 EVM_{i,t} + \beta_3 MBV_{i,t} + \beta_4 DIV_{i,t} + \beta_5 EFF_{i,t} + \beta_6 LEV_{i,t} + \varepsilon_{it}$$

where,

MP_{it} = The stock price of company (i = 1, . . ., 225) at year (t = 2009, . . ., 2021).

β_0 = intercept
$\beta_{1\text{-}6}$ = model coefficient parameters.
ε_{it} = residual term

The pooled Ordinary Least Squares estimator is rarely ideal for panel models since it assumes that the cross-sections have no individual heterogeneity. The fixed-effects models estimated using the Least Squares Dummy Variable estimators, and the random-effects models estimated using the Generalized Least Squares estimators consider the heterogeneity among the cross-sections. However, these models do not account for heteroskedasticity, serial correlation, and cross-sectional dependence, which may lead to biased estimations. The problems of endogeneity, unobservable heterogeneity, and simultaneity have been tested for the current data set and are found to be significant. Thus, to circumvent the above problems, the Feasible Generalized Least Square (FGLS) model developed by Parks (1967) can be utilized to study the impact of financial variables on stock prices. Beck and Katz (1995) highlight in their study that the FGLS model results tend to be biased because of underestimated standard errors. Instead, they proposed the Panel Corrected Standard Error (PCSE) model. This model corrects contemporary correlations, heteroscedasticity, and even serial autocorrelation. The results of the PCSE model rely on more accurate standard error estimates and have almost the same efficiency as the FGLS. Reed and Ye (2011) support using the Beck and Katz methodology for research purposes, highlighting its robustness in many situations and its ability to capture the endogeneity that may exist among the study variables. Thus, for this study, the Panel Corrected Standard Error (PCSE) econometric technique was employed to measure the extent to which financial variables can impact the share prices of companies in various manufacturing sectors.

4. Results

Table 3 shows the mean, standard deviation, minimum and maximum values of the study variables. The market prices (MP) of the manufacturing companies listed on the NIFTY 500 index range from 3.49 to 9.12 and have a standard deviation of 1.19. The earnings per share (EPS) of the manufacturing companies range from 0 to 6.67, which suggests that some companies were profitable during the period covered in the study compared to others. Since the EPS for the companies is taken in the log format, companies having EPS values less than one or having negative earnings reported for the year are taken to be 0.

The enterprise value multiple (EVM) compares a company's total value to its financial performance. Financial and investment analysts generally consider a low EVM to signal that a stock is potentially undervalued, and a high EVM implies that the company is overvalued. The EVM for the companies ranges from 0 to 5.08, indicating that some of the manufacturing companies are overvalued by the market compared to the other companies. Since the EVM for the companies is taken in the log format, companies having EVM values less than one are taken to be 0.

The market-to-book value (MBV) ratio is another metric used to determine a company's overall value by comparing its current market value to its book value. Generally, analysts consider a low MBV value to indicate that a company’s stock is undervalued, and a high ratio could mean that the stock is overvalued. The market-to-book value (MBV) for the companies ranges from 0 to 7.08, indicating that some of the manufacturing companies are overvalued

by the market compared to the other companies. Since the MBV for the companies is taken in the log format, companies having MBV values less than one are taken to be 0.

Table 3. Descriptive statistics

Variable	Mean	Min	Max	Std. dev.
MP	6.34	3.49	9.12	1.19
EPS	2.16	0	6.67	1.17
EVM	2.76	0	5.08	0.94
MBV	2.15	0	7.08	1.19
DIV	21.45	0	59.82	14.95
EFF	8.49	-33.23	115.83	7.67
LEV	14.38	0.00	65.08	13.26

Source: Authors Calculations.

The dividend payout (DIV) ranges from 0 to 59.82%, indicating that some firms reward their shareholders with dividends, while others do not distribute their earnings to their shareholders. DIV has a standard deviation of 14.95%, indicating significant variation in how much of the earnings are distributed as dividends to their shareholders by the firms. The mean DIV indicates that the manufacturing firms payout 21.45% of the earnings to the shareholders on average while retaining 78.55%.

The companies' asset efficiency (EFF) ranges from -33.23% to 115.83%, indicating that some firms can convert their assets into earnings while others cannot. The mean EFF value is 8.49%, which indicates that, on average, the firms have been able to convert their assets into profits. A standard deviation of 7.67% for EFF indicates significant variation in how the firms utilize their assets to generate earnings. The leverage (LEV) for Indian manufacturing firms ranges between 0 and 65.08%, and the mean LEV value is 14.38%. The standard deviation for LEV is 13.26%, which indicates that firms differ significantly in how they employ debt in their capital structure.

A correlation matrix has been constructed to determine the correlation coefficients among the study variables and is displayed in Table 4. High correlation coefficient values of 0.70 and above between two or more independent variables are usually taken as an indication that multicollinearity might be present in the estimation model. Multicollinearity is a particular problem in regression analysis as it makes it much more challenging to determine the regressors that impact the dependent variable.

Table 4. Correlation matrix

Variable	MP	EPS	EVM	MBV	DIV	EFF	LEV
MP	1						
EPS	0.4916	1					
EVM	0.5199	-0.0496	1				
MBV	0.5223	-0.206	0.6294	1			
DIV	-0.0078	0.0754	-0.0042	-0.0231	1		
EFF	0.1690	0.4409	0.1028	0.1729	0.1289	1	
LEV	-0.1478	-0.1237	-0.1667	-0.1714	-0.0189	-0.3084	1

Source: Authors Calculations.

The results from Table 4 reveal that the dependent variable (MP) is positively correlated with all explanatory variables except for DIV and LEV. These two variables are negatively correlated with the dependent variable. The maximum correlation coefficient from the above table is 0.6294, which is observed between EVP and MBV. Since the maximum correlation coefficient from Table 4 is less than 0.70, we can confirm that multicollinearity will not be a concern in the estimation process.

In order to test whether a unit root exists in the panel data set, the Im et al. (2003) unit root test has been selected, which is a modified version of the classic Dickey-Fuller procedure. The null hypothesis for this test is the presence of a unit root in the time series data, and the alternative is that the series has no unit root. The unit root test is essential because if regression analysis is carried out on a non-stationary series, the results obtained can be spurious, which means that the regression results obtained will have incorrect magnitude and parameter signs for the regressors, leading to wrongly inferred implications. The Im, Pesaran and Shin (IPS) test results are presented in Table 5.

Table 5. IPS Unit Root Test Results

Variable	Level	Order of Integration
MP	-2.211** (0.014)	I(0)
EPS	-7.637* (0.000)	I(0)
EVM	-4.513* (0.000)	I(0)
MBV	-5.563* (0.000)	I(0)
DIV	-20.075* (0.000)	I(0)
EFF	-12.976* (0.000)	I(0)
LEV	-29.471* (0.000)	I(0)

***Note:** * and ** indicate significance at 1 and 5 percent level, respectively. P-values are indicated in parentheses.*

The results from Table 5 indicate that at the 1 percent significance level, all variables are stationary at the level except for the dependent variable (MP), which is stationary at the 5 percent significance level. The above results indicate that all variables used in the study are integrated of order zero and suggest that the regressors and the dependent variable do not share a significant long-run relationship.

To ensure the reliability and validity of the statistical results and to deal with the problems of heteroskedasticity and autocorrelation in the model, the study uses the Beck and Katz estimator. This method extends the standard version of ordinary least squares (OLS) with the panels' corrected standard errors (PCSE) estimators. Moundigbaye et al. (2018) determined that the Beck and Katz proposed PCSE regression model is the best estimator for hypothesis testing among the estimators considered in their study. The results of the Prais-Winsten regression model with PCSE estimators are reported in Table 6.

Table 6. PCSE Regression results

Prais-Winsten Regression (Dependent Variable – MP)	
EPS	0.316* (0.000)
MBV	0.336* (0.000)
EVM	0.430* (0.000)
DIV	-0.261e-03 (0.539)
EFF	0.018* (0.000)
LEV	-0.240e-04 (0.986)
Constant	3.888* (0.000)
Number of Firms	225
Number of Observations	2925
Wald Prob(χ^2)	0.0000
R^2	0.8483

** indicate significance at 1 percent. P-values are indicated in parentheses.*

The above table results reveal that the Wald chi-square coefficient for the PCSE estimator is significant at the 5 percent level, which means that the model chosen for the present study is adequate for regression analysis and hypothesis testing. The R-squared for the PCSE regression is 0.8483, which means that the company variables explain 84.83 percent of the variation in stock prices.

The regression results from Table 6 show that a positive and significant relationship exists at the one percent significance level between the financial ratios, namely the earnings per share (EPS), market-to-book ratio (MBV), and enterprise value multiple (EVM), and the market prices.

The regression results also reveal a negative and insignificant relationship between share prices and the dividend payout (DIV). Share prices are positively and significantly impacted by asset efficiency (EFF) at the 5 percent significance level. Also, share prices share a negative and insignificant relationship with leverage (LEV).

5. Discussion

This study uses the Prais-Winsten regression technique with panel-corrected standard error estimators to determine whether the firm-specific financial ratios affect the share prices of NIFTY 500 indexed manufacturing companies. The results from Table 6 indicate that earnings per share (EPS) has a positive and significant relationship with share prices. The null hypothesis that EPS has no significant relationship with the market prices is rejected. This implies that when the EPS of manufacturing companies increases, their respective share

prices also increase. The results are supported by the findings of Srinivasan (2012), who found that the share prices of companies belonging to various manufacturing sectors in India are positively impacted by the EPS. Similarly, Masril and Martha (2020) found that the share prices of Indonesia Stock Exchange (IDX) listed pharmaceutical companies are positively impacted by the EPS.

The null hypothesis that enterprise value multiple (EVM) has no significant relationship with market prices is rejected as the results from Table 6 confirm that EVM has a positive and significant relationship with market prices. This implies that when the EVM of manufacturing companies increases, their respective share prices also increase. The results are supported by the findings of Shittu et al. (2016) and Yamin and Gulzar (2020), who found that EV multiples positively and significantly influenced the Nigerian and Pakistani firms' stock prices, respectively.

Similarly, Table 6 confirms that market-to-book value (MBV) has a positive and significant relationship with the share prices. Thus, the null hypothesis that MBV has no significant relationship with the stock prices is rejected. This implies that when the market-to-book value of manufacturing companies increases, their respective share prices also increase. The results are supported by the findings of Chiek and Akpan (2016), who determined that the stock prices of Nigerian oil and gas companies, which increased their dividend payments during the study period and also those companies that did not issue dividends, were significantly and positively impacted by the MBV. For those companies that decreased their dividend payments during the period, MBV had a positive but insignificant impact on the share prices. Similarly, Bustani et al. (2021) found that the Indonesian food and beverage companies' stock prices were significantly and positively impacted by the MBV.

The findings from Table 6 reveal a negative but insignificant relationship between the share prices and the dividend payout (DIV). Thus, the null hypothesis that DIV has no relationship with stock prices fails to be rejected. The results align with the findings of Gupta and Modise (2012), who found that the impact of dividend payout on South African companies' share prices was insignificant. Hashim and Shahrumzaki (2020) also found that the impact of dividend payout on Malaysian food and beverage companies' share prices was negative and insignificant.

The results from Table 6 indicate that the Indian manufacturing companies' market prices are positively and significantly impacted by asset efficiency (EFF). Thus, the null hypothesis that EFF has no significant relationship with market prices is rejected. This implies that when the asset efficiency of manufacturing companies increases, their respective share prices also increase. The results are supported by the findings of Ligocká (2018), who determined that the Prague stock exchange-listed companies' share prices were significantly impacted by asset efficiency. Also, Indrajaya et al. (2019) found that asset efficiency positively and significantly affected Indonesian share prices.

The findings from Table 6 reveal that the relationship between leverage (LEV) and the share prices is negative and insignificant. Thus, the null hypothesis that LEV has no significant relationship with stock prices fails to be rejected. The findings of the study align with the findings of Barakat (2014) and Astutik et al. (2015), who found a negative but insignificant

relationship between leverage and stock prices of Saudi Arabian firms and Indonesian manufacturing firms, respectively.

6. Conclusion

This study attempted to determine the relationships between certain firm-specific financial variables and manufacturing companies' stock prices. The empirical findings from the study revealed that financial ratios, namely earnings per share, market-to-book, asset efficiency, and enterprise value multiple, positively and significantly influenced the Indian manufacturing companies' stock prices. The relationship between dividend payout and the share prices was revealed to be negative and insignificant, suggesting that the market prices of manufacturing companies were not significantly influenced by the dividend decisions taken by management. A similar relationship was uncovered between leverage and market prices.

The findings of this study can serve as a guide for potential investors looking to invest in Indian capital markets, particularly the stocks of Indian manufacturing companies. Such investors should pay considerable attention to valuation ratios such as earnings per share, market-to-book value, and enterprise value multiples, as these variables have been revealed to influence the share prices significantly. Value investors should look for those companies having low valuation ratios because such companies could turn out to be undervalued by the market. Growth investors can consider adding companies with high asset efficiency to their portfolio because the study has confirmed asset efficiency to influence the share prices of these companies positively.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
ECONOMIC STUDIES

Volume 32(6), 2023

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ECONOMIC AND SOCIAL CHALLENGES, RISKS AND CONSEQUENCES IN OVERLAPPING CRISES CONDITIONS[2]

The article reviews the results of recent multidisciplinary research on economic development, challenges and risks in the contemporary conditions of overlapping crises in national, European and global context presented at the scientific conference with international participation, organised by the Economic Research Institute at the Bulgarian Academy of Sciences.
Keywords: overlapping crises; inflation; growth; economic, social, sectoral and regional policy; uncertainty; EU integration; labour market; demographic development; inequalities and poverty; sustainable development; company's performance
JEL: E00; F00; J00; M00; O1; Q00; R1

Economic Research Institute at the Bulgarian Academy of Sciences (ERI-BAS) was an organiser and host of the traditional annual scientific conference "*Economic Development and Policies: Realities and Prospects"*, held on November 21-22, 2022 in Sofia. The 2022 edition of the forum is focused on the topic exciting scientists from all over the world, namely "*Challenges and Risks in the Conditions of Overlapping Crises*"[3].

More than 90 researchers from Bulgaria, France, Romania and the Czech Republic participated in the forum with 62 presentations discussed the problems of economic and social development of Bulgaria, the European Union, in regional and global context in the specific conditions of overlapping crises of different nature – a new phenomenon in world economic history. Among them were academics and university lecturers with rich research and expert experience from the BAS, Romanian Academy, Europe-Eurasia Research Centre Inalco – Paris, Bulgarian, French and Czech high schools, business, as well as a significant number of young scientists and doctoral students from Bulgaria and abroad, who have demonstrated a high level of competence.

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[2] This paper should be cited as: *Kirova, A. (2023). Economic and Social Challenges, Risks and Consequences in Overlapping Crises Conditions. – Economic Studies (Ikonomicheski Izsledvania), 32(6), pp. 182-201.*
[3] *The collection of articles presented at the conference is published by the renowned international "Prof. Marin Drinov" Publishing House of Bulgarian Academy of Sciences (ERI-BAS, 2023).*

The presentations reflected achieved results, practical proposals and policy suggestions in recently implemented and current research and applied projects related to up-to-day trends, challenges and risks for the development of the economy in the context of crisis conditions. They were systematized into seven panels: Plenary kea speaker session; Endogenous and exogenous restraints of growth and adaptability of economic policy during crises; The new realities and uncertainty in the economy; Global uncertainty and EU integration; Labour market, demographic development, inequalities and poverty – adaptability of policies in crisis conditions; Sectoral and regional economic policy, changes in competitiveness and sustainable development; The companies in crisis conditions.

The forum was opened with a welcome speech by the Director of the Institute *Prof. Irena Zareva*. In it, she noted that in the last years, the world has been faced with unique phenomena that have a significant impact on the development of the economy. In the conditions of overlapping crises, the search for new non-standard solutions is necessary to overcome the complex economic problems. Therefore, the focus of this year's Institute conference is precisely on these challenges, and she hopes that the results of the recent research of both Bulgarian and foreign scientists, guests of the conference, will provide a topic for reflection and discussion and will cause public interest.

The conference started with the **keynote presentation *"2022 Inflationary Trend: The Geostrategic Hypotheses in the era of Ukraine's Invasion"*** by *Prof. Laurent Estachy* from the French KEDGE Business School. He analysed the inflation raise in the USA and in Europe during the last years regarding the prices of oil, gas, food, maritime transportation costs, global value chain restrictions, as well as the factors for that process – the spread of coronavirus pandemic, financing COVID-19 emergency measures and relief and stimulus; public debt raise; war invasion in Ukraine; gas war situation; economic shocks. The policy of the Fed and of the European Central Bank to let inflation overshoot was discussed. Finally, the question of a possible new world order was posed: what awaits us in the future – state capitalism or private capitalism, authoritarianism/totalitarianism or democracy? The geostrategic hypotheses by Prof. Estachy set the tone for further discussions over both days of the conference.

The relationship between sectoral and industrial changes and the formation of the competitiveness of the economy were examined in the next **keynote speech *"Economic structure, competitiveness and comparative advantages of Bulgarian economy in crisis conditions"*** by *Prof. Stoyan Totev* from ERI-BAS. He emphasized that the comparative advantages of our economy are in the export of products in the field of food, textile, sewing and metalworking industries, as well as in the export of non-metallic mineral products. The comparative advantages of products in the branches of the chemical and furniture industries and in the production of plastic and rubber products are also great. The changes of the indicators for the comparative advantages were tracked for the Bulgarian economy in the last 20 years, with an emphasis on the changes in the periods of crisis. The changes for individual sectors, industries and product groups were analysed. It was discussed what are the expected shifts of the observed indicators and their impact on the economic development in the conditions of the current turbulent economic environment caused by the war in Ukraine. The most important conclusions of the study were the following: the consequences of the crisis in Bulgaria and the negative economic consequences caused by the military conflict in

Ukraine are expected to be smaller or similar to those in the EU; the expectations for Bulgaria are that there will be no entire sectors that will be seriously affected by the crisis, and that there will be no significant changes in the country's comparative advantages, although with a continued stagnation in Europe as a result of the current crisis, certain industries and productions may be affected; due to the low elasticity of substitution of food products, the agricultural sector should be affected to the least extent, unlike the development of high-tech industries; as long as they do not have a large participation in the processing industry in our country, the industry will probably be less "affected" by the crisis compared to the average indicators for the EU countries; a disturbing factor for Bulgaria could be the longer duration of the crisis, especially in tourism and transport; one of the serious problems facing the Bulgarian economy is that it is the least competitive of the EU countries and is generally too energy intensive, therefore in the short term the war in Ukraine is expected to have a negative impact on industries that use natural gas, and more specifically in the realization of their production, but since similar difficulties will be experienced by other EU countries, Bulgaria cannot be expected to have serious problems at least on the European market. Based on the research findings some views on what it is desirable to comply with economic policy in the attempt to achieve favourable structural changes were presented (Totev, 2023).

The conference proceeded in accordance with the scheduled panel sessions with a wide range of thematic fields of presentations grouped into relevant problem areas.

Endogenous and Exogenous Restraints of Growth and Adaptability of Economic Policy During Crises

During this panel session, the results of scientific research on various growth factors and policies with an emphasis on problem areas in their development with the risk of becoming growth restraints in the modern conditions of accumulating crises were presented.

Garabed Minassian discussed the ***monetary impacts and effects***. According to him, macroeconomic management in Bulgaria should be dealing with several essential features of the monetary processes. Firstly, the increase in monetary circulation in our country leads mainly to an increase in inflation, not an increase in economic growth, and the factors for the adverse effect are primarily institutional. The improvement of the investment environment requires and implies significantly greater predictability of institutional regulatory measures. It also requires the intentional creation and maintenance of material infrastructure as a prerequisite for activating investments. Secondly, the essential effect of the increase in money circulation is a decrease in the speed of money circulation in our country. Thus an increasingly large money supply accumulates among the population and economic agents. Part of this accumulated supply can spill over into the commodity and money market and cause unpredictable prices and structural shocks. Thirdly, the country's inclusion in the Eurozone will shed light on current liquidity problems, which may reveal "unexpected" in the sense of chaotic and adverse price and production effects (Minassian, 2023).

The presentation by *Anton Ivanov* was refered to the adaptability of economic policy during crises through ***price regulation of energy prices***. The analysis and evaluation of the change in the contribution of pricing factors for electric energy in a period of crisis, compared to the

period before 2020 were carried out. On this basis, conclusions were made about the sustainability of the electricity market model introduced in the European Union, as well as regarding the existence of a free market for electricity: firstly, that the economic instruments of incentives and restrictions used so far do not yet find the form to participate in the process of planning a response to price shocks for end users, and secondly, that the existence of diverse practices in the formation of final prices in the Member States leads to the application of different tools to deal with current challenges and creates a variety of possible solutions that have been tested in practice (Ivanov, 2023).

The ***reengineering of human resources*** in the conditions of modern economic development was an object of the presentation by *Bojidar Hadziev, Vesela Dicheva* and *Reneta Kabzeva*. They underlined that ineffective human resources management becomes an endogenous and exogenous constraint to growth. It is through human resources reengineering that this growth constraint could be overcome. The presented research was focused on both radical, drastic and fundamental changes associated with classical reengineering, as well as on complex reengineering, which allows to manage the human resources and through process improvement to achieve balanced benefits for business, nature and society (Hadziev et al., 2023).

Elka Pirimova tried to answer the question of ***whether education and human capital are limits or sources of economic growth in Bulgaria***. As the role of the human factor in achieving and increasing the results of economic development is changing over the years, this is explored in detail in some of the more well-known and established growth models. In that context, the presentation was focused on an analysis of the peculiarities in the manifestation of the relationship between education and economic growth in Bulgaria, based on a set of relevant indicators and trends in their dynamics. The main goal was to point out some basic parameters of the role of certain structural components of human capital investments related to education for economic growth in the country in recent years (Pirimova, 2023).

Alexander Apostolov studied the ***stability of non-bank financial intermediation as a factor for economic growth***. The growing role of this type of intermediation for stability, focusing on key structural features, interactions, and the spread of risks, from a financial system-wide perspective was presented, viewed through the lens of recent episodes of severe financial market dysfunction. The potential interplay of vulnerabilities, interlinkages, and their implications for the liquidity of the global financial system were assessed. The main channels propagating liquidity imbalances in the global financial system were identified and quantified. Market practices, macroprudential policy, behavioural responses, and interactions between different parts of the financial system under stress, as well as the resulting prospects for realizing economic growth, were interpreted (Apostolov, 2023).

Mladen Dilov investigated *the* ***reasons for postponing Bulgaria's membership in the Eurozone***. He pointed out that on the 10th of July 2020, along with Croatia, Bulgaria was officially welcomed to participate in Exchange Rate Mechanism II, which may be considered as a final stage before the decision for membership in Eurozone. The in-depth comparative financial analysis has shown, however, that the adopted anti-crisis measures distance Bulgaria from participation in the Eurozone (Dilov, 2023).

Velimira Chupetlovska explored the opportunities for ***optimization and control of managing public funds*** and possible problems in financing in the health sector in times of crisis. The beneficial moves of funders and recipients of funds were examined. An analysis of the unified public procurement system was carried out to follow up their procurement by public institutions engaged in the health sector and their limitations and opportunities during a crisis. The created prerequisites for illegal spending of public funds under the influence of crises in the country have been traced. Opportunities for optimization and control were highlighted (Chupetlovska, 2023).

The ensuing discussion focused on the issues raised by the speakers related to the main characteristics of the national policy in conditions of European integration; the efficiency of the different sources of electricity in the general system and the specifics of their pricing and in particular of the hydroelectric power stations; the possibilities of another, more efficient model of interconnections with the energy system; the system for measuring the importance of the human resources reengineering system.

The New Realities and Uncertainty in the Economy

The panel was realized with the assistance of The Bulgarian National Science Fund at the Ministry of Education and Science under the project carried out by the Institute on the topic "Fiscal and Monetary Instruments for Regulating Uncertainty in the Economy" won in the Competition for financial support for projects of junior basic researchers and postdocs – 2020.

Rossitsa Chobanova argued that ***increasing labour productivity and efficiency of resource use*** is the main economic problem that has not found an adequate solution in the transition period and in the established new (market) statutory mechanism for the operation of the Bulgarian economy. This thesis was proved by theoretical and statistical arguments. Emphasis was placed on the crucial role that has a normative framework for the functioning of the economic system. Data and its analysis were provided showing a low level of performance and of the rate of increase in labour productivity and efficient use of resources compared with other EU countries since 2000. Special emphasis was placed on the neglect of the use of resources of knowledge for more than a quarter century. The thesis was formulated that the transition period so far in Bulgaria is not counted in full specifics of noneconomic conditions – accelerated change in technology, globalization, and the accompanying change in the social regulation of distribution relationships (Chobanova, 2023).

Viktor Yotzov analysed ***fiscal policy challenges*** after COVID-19. He noted the fact that while dealing with the challenges of the pandemic, the economy entered a new phase of uncertainty caused by the energy crisis and the consequences of the war in Ukraine. This requires a clear position on the revenue target and the priorities in the distribution of spending, which will depend on how the economy copes with these challenges. Thus the effect of the fiscal policy stance on public spending was examined and the validity of some established practices in the new environment was tested (Yotzov, 2023).

Sonya Georgieva, Tsvetomir Tsvetkov and their colleague from the Czech Republic *Iva Vendolska* studied the issue of ***monetary policy in the Eurozone*** in a condition of inflation. They made an attempt to assess the effectiveness of the impact of the monetary policy pursued by the European Central Bank on rising inflation in the Euro area. The aim of their study was to answer whether the tools used by the European Central Bank in its fight against inflation will have a significant impact on inflationary increases in the Euro area. In the analysis of inflationary processes in the Eurozone, attention was paid to the dynamics of labour and non-labour (mainly energy) costs and the effects of the policy of quantitative easing within the currency bloc. Thus, the main conclusion was reached that the observed inflation is cost-structural, and not so much as a result of the conducted monetary policy. It was reported that the European Central Bank's delayed response to inflationary processes in the Eurozone would produce results in the medium and long term, but not in the short term (Georgieva et al., 2023).

Stefan Simeonov and *Vladislav Lyubenov* presented the results of a detailed analysis of ***investment activity with major stock exchange assets*** during the period of COVID-19 restrictions and the war in Ukraine. The dynamics and dependencies between the price movements and investment activity of the European, UK and US stock markets, oil and gold, through the broad index ETFs (index-based Exchange-traded funds) were analyzed. The broad ETF funds of the European, UK and US capital markets experienced a sharp drop in prices at the start of the COVID pandemic. The investment activity, as measured by trading volumes, has shown increased intensity during price crashes and remains unaffected over the entire period. These findings deny the existence of a so-defined crisis in the capital markets during this period. Since the start of the Russian invasion in Ukraine, a decline in prices, most pronounced for the gold ETF and weaker for the US and European ET Funds was observed. The return of the broad index of the American stock exchange – S&P500 Return and the price dynamics of oil, as well as the trading activity in the European STOXX 600, reflected a strong dependence on the prices and volumes of the other studied instruments. Price dependencies between stock markets were less pronounced. The value of the US ETF has shown a strong dependence on the price of oil at three lags (Simeonov, Lyubenov, 2023).

The aim of the presentation by *Teodora Dimitrova, Daniel Nikolaev* and *Teodor Todorov* was to apply and evaluate the ***models for evaluation of financial derivatives*** (European style call and put option) prior to the acceptance of Black & Sholes (BS) model as the standard (1973). The five models predating BS, namely – the Bachelier model (1900), Bachelier modified model, Sprenkle model (1961), Boness (1964) and Samuelson model (1965) were the object of the study. Different algorithms for calculation, dependent on the model, considering the purpose of the models' components (factors of the premium) in the specialized literature were applied. The result of the empirical application of the models was compared with the factual premiums of the options using a variety of statical methods and through specific empirical data, and their applicability in modern conditions was tested (Dimitrova et al., 2023).

Kamelia Petkova explored questions about ***access, skills and benefits of digitalization*** in the context of COVID-19 and the changing labour market. An attempt was made to answer the question of how the business responds to the new challenges associated with the rapid entry of digital technologies into the economy and work processes, and what are the opportunities

and risks for low- and highly-skilled workers and employees in the conditions of the dynamically changing labour market. Based on the results of in-depth interviews conducted within the framework of the project "Digital divide and social inequalities: levels, actors and interactions", funded by the Bulgarian National Science Fund, the benefits of using the Internet and the need for certain digital skills needed for a more successful realization of the representatives of different ethnic communities in the labour market were outlined (Petkova, 2023).

The panel session was finalised with two presentations of PhD students at Sofia University „St. Kliment Ohridski" *Liliana Georgieva* and *Radostina Ivcheva* devoted to the problem of ***tax morale in Bulgaria***, which is shown to be an essential component of social capital and has a significant impact on tax compliance and tax collection as a factor linked to the shadow economy and to economic development. Results of a questionnaire survey in Bulgaria conducted among 1280 employed persons who work in enterprises – representative of the country's economy in terms of economic activity, size and geographical location were presented. The tax morale of the respondents was assessed by means of a set of questions revealing their attitude to certain events that damage public funds or, in other words, activities that are done in the shadow economy. The obtained results have shown that tax morale in Bulgaria is heterogeneous and that a relatively large part of the population in Bulgaria has average or low tax morale.

The ensuing discussion was focused on several issues of particular interest related to the monetary policy by the European Central Bank; the tax morale in the country, as well as digital skills as a means of realizing in the labour market and a basic condition for inclusion in the workforce.

Global Uncertainty and EU Integration

The presentations made in this panel focused on three thematic areas.

The first area treated a series of issues related to the ***EU economic development and policies in specific areas***, and economic challenges facing Bulgaria, Central and Eastern Europe and Europe as a whole. *Iskra Christova-Balkanska* presented the issue of the *EU single market* as a manifestation of a higher stage of EU integration and influence on European industry. She stated that the EU's Single Market (SM) has contributed to improving the competitiveness of European industrial companies operating in a broad market without trade barriers and in this sense, the SM is a manifestation of deepening economic integration between EU member states. The purpose of the study was the SM's contribution to the development of industrial production in the EU, as well as the structure of foreign trade with processed products. The emphasis was on the industrial structure of EU member states from Central and Eastern Europe. Some of the factors affecting the slowdown of the industrial development of the intra-community market were highlighted, as well as the attempts of the European Commission to improve the influence of the SM in favour of EU industrial and trade development (Christova-Balkanska, 2023). *Tatiana Hubenova-Delisivkova* examined the prospects for implementing the *EU Recovery and Resilience Facility* (RRF*)* and the economic challenges facing Bulgaria with the "twin transition" to a climate-neutral and

digital economy. The new sustainability paradigm – economic, social and environmental, was interpreted in the context of: 1) the challenges to green transition and to the greening of public and private investment in times of high inflation; 2) the transition to restructuring the integration process in the EU and reforming the old fiscal rules. The complementarities and differences in the interpretation of "sustainability" and "sustainable development" as economic categories were discussed in the context of the ongoing crisis. The implications of the RRF for Bulgaria's economy and policy reforms were assessed as a further area of debate with regard to the opportunities and threats in medium term (Hubenova-Delisivkova, 2023). *Emil Panusheff* analysed current changes in the *international specialization of the EU.* He argued that the EU's economic potential is significantly affected by changes in the global environment and the Union's internal problems. The main factors that have reduced the international competitiveness of the EU are the COVID crisis and the restructuring of world trade flows. Changes in global supply chains have affected the international specialization of the EU and its position in world trade. The departure of Great Britain did not affect the integration options for exiting the crisis and determined the need to develop new commercial approaches to fulfil the ambitious plans of the "green deal" (Panusheff, 2023). *Eduard Marinov* studied the process of the developments, measures and challenges of the *competition policy and competitiveness of the EU.* He emphasized that the EU has one of the strongest competition protection systems in the world, which also applies to non-EU companies operating in the Single Market. The new structural challenges faced by competition policy require a reassessment of its role in transforming European industry and addressing new issues arising from the specifics of the digital economy. In addition, the pandemic crisis also requires an answer. The structural challenges faced by EU competition policy were outlined based on the study of several cases from practice. An attempt has been made to summarize the new challenges related to the pandemic crisis, digitalization and the green transition, systematizing the new measures related to them (Marinov, 2023). *Iana Paliova* examined the *environmental and social sustainability of Bulgaria in the EU* among global uncertainty. She noted that after the two successive global crises of 2008 and 2020, and with energy uncertainty, following the military conflict in Ukraine, public spending and financial instruments of the European Union for 2021-2027 continue to become an important source of support and promotion of environmental and social sustainability in the member states. The presented study assessed the effectiveness of the EU Emission Trade System and European climate change risk prevention and management programs in promoting environmental and social sustainability. The main research task was to assess the challenges for the fiscal policy to promote environmental and social sustainability through the policies for green and social Bulgaria, laid down in the Recovery and Sustainability Plan and the Partnership Agreement of Bulgaria for 2021-2027, as well as the policies of the EU to ensure the objectives of the EU and Bulgaria under the Green Deal (Paliova, 2023). *Angel Petrov* discussed the problems and prospects of the *harmonization of accounting and tax legislation,* as well as the opportunities for solving economic challenges in the EU which require broad expertise, political will and a desire to unify legislation and uniform tax systems (Petrov, 2023).

The second thematic area dealt with some ***specific economic issues in international perspective.*** *Virginia Zhelyazkova* asked the question of whether agenda modification is needed in view of *climate policy* and provided the author's perspective on this important

issue. She underlined that it is important because climate change is currently an undisputed phenomenon of anthropogenic nature. Global uncertainty, which has grown enormously as a result of the COVID-19 pandemic and then the war in Ukraine, and the subsequent geopolitical tensions are intensifying the global recession and raising the question of the need to modify the agenda on which to implement climate policies. *Iulia Monica Oehler-Sincai* (Romanian Academy) estimated explicit and implicit motivations behind the *central bank's digital currencies.* She argued that currency internationalization and recovering lost ground to non-state players, as well as avoiding the risks of new forms of private money creation are other major motivations for considering, testing and adopting a central bank digital currency (Oehler-Sincai, 2023).

The last round of problems discussed the ***development of individual economic spheres/sectors in selected countries in crisis conditions***. *Alina Ligia Dumitrescu* (Romanian Academy) analysed the adaptability of the *Romanian labour market* in the context of the COVID-19 pandemic. The evolutions of the main indicators that characterize the labour market were analysed, such as the employment rate, the unemployment rate, the share of underemployed workers and the additional workforce. Also, a series of measures which were implemented by the Romanian government to support the economic environment and employment were presented comparatively. The conclusions regarding the effectiveness of the measures that were taken to reduce the negative impact of the COVID-19 pandemic on the labour market in Romania were presented in the form of a SWOT analysis. PhD student from France *Dmitry Volkov* treated the consequences of the War in Ukraine on the *Russian IT Sector*. He argued that the strengthening of neo-prebendal elements of Russia's state capitalism has become an important factor in the choice of strategies of Russian IT firms adopted according to their target market – international or domestic, customer strategy and product specialization. The war in Ukraine has reinforced some of the sector's existing trends with important implications on the dominant sources of finance and demand, further hindering the country's ability to achieve technological sovereignty.

Labour Market, Demographic Development, Inequalities and Poverty – Adaptability of Policies in Crisis Conditions

According to the general content, the nature of the problems and the proposed policies displayed in two sessions, the presentations were grouped under the following topics.

The first group was mainly concerned with questions about the ***substantive and structural characteristics of the labour market***. *Maria Ivanova* examined the *state of the labour market in the conditions of a multifaceted crisis.* The changes and tendencies of the labour market in the conditions of a multifaceted crisis were established based on the results of a comparative analysis of official statistical data for Bulgaria by years, sectors and economic activities. The relationship between market levels of remuneration and work engagement of the workforce was explored. The common conclusion was made that the optimal development of the labour market requires the state to make constant efforts to stimulate employment and limit unemployment, as well as to achieve a balanced social protection of the interests of workers, taking into account the priorities of business development and the state's goals for stimulating

economic growth in the face of avalanche health, economic and spiritual crises (Ivanova, 2023). *Iskra Beleva* presented in detail *active labour market policies* and their adaptability in conditions of crisis. She emphasized that labour market equilibrium is hardly exposed to external impacts caused by heterogeneous crises (financial crisis, overproduction crisis, fuel crisis, as well as health crisis, emigration crisis, demographic crisis, etc.). The Bulgarian labour market in the last twenty years experienced the negative effects of almost all the above-mentioned crises. That is why the answer to the question about the extent to which active labour market policies, as an instrument for balancing labour demand and supply, managed/succeeded to mitigate/decrease these negative effects is of high importance mainly because of the lessons, which should be drawn out and which will contribute for increasing the efficiency and the adaptability of this policy (Beleva, 2023). *Pobeda Loukanova* continued with the examination of the state and perspectives on the *flexibility of the labour market in Bulgaria*. The aim of the presentation was to assess the different forms of flexibility in the labour market in the period 2000-2020 based on the analysis of the influence of external factors on the labour market and its response to changes in GDP and labour productivity, as well as of the labour market ability to change – internal flexibility, only on the basis of status mobility and mobility in employment – so-called job-to-job mobility (Loukanova, 2023). *Rumiana Jeleva* analysed the *participation of older people in the labour market in Bulgaria* based on the results of a nationally representative sociological survey conducted in 2022. Indicators related to the labour market participation of older people were analysed for different age groups. Informal care-taking activities such as caring for children/grandchildren and/or another adult were also analysed. The main conclusion was that managing the process of active ageing and the participation of older people in the labour market in Bulgaria remain serious challenges that have been brought to public attention by the academic community for years, but no significant progress has been made (Jeleva, 2023).

The main highlights of the discussion on this topic were: the content and effectiveness of active labour market policies in the conditions of superimposed crisis influences; the measures and opportunities for a higher degree of flexibility in the labour market; the possibilities of increasing the digital skills of the workforce with the existing structure of the economy (developed agrarian sector) and some specific features (ethnic, age and other) of the workforce in Bulgaria.

The second thematic area covered ***characteristics of the labour force in Bulgaria and demographic issues***. *Margarita Atanasova* treated the matter of the dynamics of the *educational structure of the working-age population in Bulgaria*. In the conditions of a decrease in the population of working age and increasing demands of the labour market for the competences of the employed, attention was directed to the quality of the workforce. The main objective was to study and present trends in the educational structure of the working-age population with an emphasis on youth groups and to outline potential challenges to increasing the quality of the workforce. The results of the research have shown that in the period 2016-2020, there was a decrease in the relative share of persons with secondary and higher education and an increase in the relative share of persons with primary and lower education in the age groups 15-24 and 25-34 (Atanasova, 2023). *Silvia Toneva* presented the main results of an empirical research of the attitudes towards the *implementation of the dual system of education* which was focused on the subjective perceptions regarding the advantages and disadvantages of the implementation of the dual system according to

individuals who are familiar with its features and apply it in the organizations they represent. She pointed out that the findings of the study should contribute to the analysis of the state of use of this specific education form, as well as to its differentiation among other forms as a means of reconciling the demands of the dynamic labour market and the catch-up nature of formal education in relation to technological development and changes in the nature of professions (Toneva, 2023). Assessment of the needs for *increasing the digital skills of employed persons in Bulgaria* and some methodological aspects of organizing and conducting a nationally representative survey were presented by *Milena Angelova*. Her study was focused on suggesting a reliable methodological approach for collecting trustworthy primary data about the current state of the digital skills of employed persons in Bulgaria and about the needs for increasing them to meet the requirements of the professions they practice and jobs they occupy – at national and at sectoral level (Angelova, 2023). The *correlation "minimum wage – unemployment" in the conditions of the transition to a digital economy* was presented by *Shteryo Nozharov* and *Petya Koralova-Nozharova*. The research was done in the context of the upcoming introduction of new European legislation for the first time for regulation of minimum wage at the European level. Its purpose was to identify the direction and strength of the correlation between changes in minimum wage and unemployment rate in the context of conflicting findings of the scientific literature being used statistical data for Bulgaria for the period 1991-2021. It was accented that the significance of the research is related to the transition to a digital economy and the necessity for a complex transformation of the minimum wage functions in the context of the new socio-economic reality (Nozharov, Koralova-Nozharova, 2023). *Maria Brestnichka* presented *investment in children as a factor for demographic growth and addressing inequality* in crisis conditions. According to her, very often the public resources do not reach the most vulnerable children in an efficient way. Analysis of data on the public investment in children in a Bulgarian context shows the need for quantitative evaluation, which would in turn allow an assessment of the efficiency and the efficacy of the policies for human development, including from the point of view of economic growth (Brestnichka, 2023). *Ralitza Pandurska* presented the *active ageing index* as a measurement of the independent lifestyle of elderly people which is considered as a universal indicator for comparing the level of integration of the elderly people into society. The measurement and assessment of the active ageing of people allow us to assess their independence in terms of their participation in employment, in public life, their health status, a favourable environment for independent living, and the active ageing index is an appropriate measure of this process (Pandurska, 2023). During the emotional presentation by *Desislava Koleva-Stefanova* the *integration of Ukrainian refugees in the country* and the challenges facing the Bulgarian institutions and society were presented as a social, but also as a demographic problem. A brief analysis of the situation in Europe and Bulgaria related to the Ukrainian refugee wave was made. Attention has been paid to more significant problems and difficulties that Ukrainian citizens face during their integration into our country. The development examined the main challenges facing Bulgarian society and institutions in this dynamic age of global economic and social crisis. Conclusions and recommendations have been made based on the conducted study (Koleva-Stefanova, 2023).

The discussion on this thematic area developed on the concretization of the following problems: the main policies for increasing the educational level and the quality of the workforce in the context of the new European goals; weaknesses in social policy to reduce

inequality and their impact on children and the elderly; the challenges of the migration wave from the war in Ukraine and the contradictory reactions of Bulgarian institutions and society in general.

Thematically, the third group was referred to some ***social problems in the conditions of the overlapping influence of the two crises – the Covid-19 pandemic and the energy crisis***. *Georgi Chopov* examined the *approaches and mechanisms for adapting social assistance in crises*. The objective of his study was to discuss the adaptability of social assistance in Bulgaria in the context of crises. Research tasks were the following: firstly, to prepare a synthesized analytical review of the approaches and mechanisms applied to adapt social assistance in the form of cash social transfers and services in the context of long-lasting health and economic crises after 2020; secondly, to propose assessments and recommendations regarding the adaptability of social assistance in crises (Chopov, 2023). *Maria Mancheva* dealt with the contemporary *challenges to the struggle against poverty and social exclusion*. The purpose of the presentation was to outline some main problems facing the struggle against poverty and social exclusion in the countries of the European Union in the context of the new economic and social conditions caused by the transformations of the labour market and the COVID-19 pandemic. Based on the analysis, conclusions were drawn to overcome the negative factors affecting the problem under study (Mancheva, 2023). *Teodora Peneva* focused on a *new mechanism for the identification and protection of energy-poor households in Bulgaria*, examining the features of the mechanism (access criteria, administration process, support process), as well as the opportunities and limitations of its possible application. The advantages of the mechanism for reflecting the dynamics in consumer prices, poverty level and the range of households that actually need protection and support to improve the energy status of households were presented. The limitations were considered mainly in the application of the mechanism in the conditions of the current social protection system and administrative structure (Peneva, 2023). *Lyudmila Vekova* examined the main trends and challenges of *unemployment insurance in Bulgaria* in the period before and after the global crisis due to the COVID-19 pandemic. Changes in the legislation regulating unemployment insurance were studied and evaluated, and indicators characterizing the dynamics of unemployment benefits for the period 2017-2021 in close connection with active labour market measures were analyzed. The main challenges in the legal framework and the organization of determining and paying unemployment benefits related to the impact of crises on the labour market were systematized (Vekova, 2023). The presentation by *Ekaterina Tosheva* and *Dragomir Draganov* was about the *impact of COVID-19 pension supplements on poverty and inequality in Bulgaria*. Having in mind that the mechanical adding of the "COVID-19 supplements" to the pension amounts will require a huge amount of public funds in the near future, the authors tried to answer the question what is the hypothetical macrosocial impact of these supplements by analyzing the changes in the level and the distribution of disposable household incomes. The analysis was based on the EU microsimulation tax-benefit model "EUROMOD" and data from the Survey of Income and Living Conditions of the EU (Tosheva, Draganov, 2023). *Vassil Kirov* and *Desislava Yaneva* discussed the *role of social dialogue* (based on measurable indicators) in the coordination and solution of social problems in crisis conditions as a key factor for dealing with the challenges. In the Bulgarian context, however, social dialogue doesn't rely on data and measurable indicators on which base the social partners can take informed decisions. The

analysis of the results of an author's research with semi-structured interview and survey have shown the expectations of the social partners and formulated examples of indicators to lead to an evidence-based dialogue.

The discussion in this thematic area focused on: the possibilities of Bulgaria's social institutions to implement an integrated policy in the conditions of superimposed crisis influences; dimensions of energy poverty and possible solutions; the state of social dialogue in the conditions of political crisis; the dimensions of inequality; the manifestations of social exclusion of vulnerable groups, such as children and the elderly; the changes in unemployment benefits in the conditions of the Covid pandemic.

Sectoral and Regional Economic Policy, Changes in Competitiveness and Sustainable Development

The presentations and discussions in this panel were focused on highly topical issues related to overlapping crises and fluctuating economic policy, as well as on the main factors and problems in regions and individual sectors with an emphasis on new European policies and their application in Bulgaria, the perspective of sustainable development, the green transition and the reforms related to it.

The panel began with an analysis of the ***contemporary crises in the context of behavioural economics and "nudge" policies*** by *Plamen Tchipev* and *Aygun Erturk-Mincheva*. The opinion was expressed that the growing negative economic and social processes such as climate change, energy crisis, high inflation, worsening demographics, crises in education, health care, etc. require adequate solutions from economic theory. The dominant neo-classical paradigm focuses mainly on economic policy decisions, but these could be successfully complemented by other types of decisions from alternative/heterodox schools. Behavioural economics develops the idea of "nudge" policies – such as encouraging „green"behaviour, stimulating energy efficiency and recycling, promoting savings by giving automatic defaults and pre-commitment systems and using social influence in the educational environment. In that context, the possibility of applying a potential set of such policies in the conditions of overlapping crises in Bulgaria was examined and a more active policy in the field of environmental behaviour and energy saving was recommended (Tchipev, Erturk-Mincheva, 2023).

Agriculture and ***food security concepts*** were in the focus of a large part of the presentations. *Ognian Boyukliev* examined the *overlapping crises and food security* 2020-2022 – the dependence of the price of production or import of the main food products in Bulgaria on changes in the market situation as a result of the emerging crisis of COVID-19 and the war between Russia and Ukraine. The change in the production costs of grain production, production of oil, wheat, bread, some fruits and vegetables was analysed using the primary results of the study carring out under the current research project of the ERI-BAS named "Sectoral analysis of the food sector in Bulgaria". On this basis, a forecast was made for the change in production prices, retail prices and the creation of food security, and a package of measures in the field of agrarian policy was proposed to mitigate the negative effects of the crisis for agricultural producers and consumers (Boyukliev, 2023). *Sasha Grozdanova* and

Petia Branzova identified issues and trends related to *food and nutrition security*. The focus was on basic food products, the availability of which is available to all, at all times and under all conditions, defining food security as a permanent strategic objective. The irrational structure of need from the point of view of food security was assessed as a problem. The relationship of food security with a pattern of production and consumption of useful rather than harmless food products was argumented. The use of an approach with accentuation and priority attention to the production of healthy food products whose biological value is directly related to complete nutrition, i.e. with food security, was justified. Views on the importance of bioproduction/bioagriculture for the formation of a sustainable resource for feeding and consumption of foods with high nutritional value were formulated (Grozdanova, Branzova, 2023). *Ivan Byanov* examined the *agricultural development in Bulgaria* in the last decade of the 21st century. He underlined that agriculture is a structurally defining part of the primary sector of any country's economy. It is directly linked to the food security of the population, which is part of national security. The changes and development (positive or negative) of Bulgarian agriculture through a series of macroeconomic indicators available in Eurostat, NSI and the Department of agro statistics at the Ministry of Agriculture were traced under the pointed limitation of the study – the temporal nature and the availability of relevant databases for the period. The author concluded with possible hypotheses for the future development of Bulgarian agriculture, based on the examined trends of the indicators (Byanov, 2023). *Darina Ruscheva* and *Ani Dimitrova* discussed, in the context of the overlapping crises, the development and innovations in *grain production in Bulgaria* which is of key importance for agriculture and national food security. The development of grain production was studied from the point of view of the conditions under which it is carried out, its quantitative dimensions and structural changes, and its trends and issues were outlined. The innovations used in grain production were examined and their impact on the sector was assessed. A classification of the types of innovations was made and the most preferred by grain producers were justified (Ruscheva, Dimitrova, 2023).

The next round of problems was related to the ***regional themes*** in a wide range. The *viability of mono-industrial economic structures in the mountain regions of Bulgaria* was an object of the study by *Dimitar Sabev*. He noted that the population of mountain regions traditionally relies on a web of complementary activities designed to utilize the limited livelihood chances in a demanding physiographical environment. Economic development in the form of single mass-scale industries, sometimes represented by a single dominant enterprise, distorts this complex economic structure and thus, demographic and social conditions in the mountains. This is even more valid for industries vulnerable to global market volatility. Three examples from the economic history of Mountain Bulgaria – tobacco growing until 1988, lead and zinc extraction after the 1950s, and mass ski tourism in Bansko after 2001, reveal that single-industry structures (SIS) deliver middle-term economic benefits, but in the long run, impede the added-value creating potential of whole regions. Mountain regions tend to increase their monetary and heritage value and thus require complex economic development policies (Sabev, 2023). *Yana Kirilova* and *Dochka Velkova* continued with a description and review of *EU financial instruments to support local development*, which are a comparatively new source for financing municipal projects and gained particular importance in the period 2014-2020. The authors presented the nature and development of the financial instruments to support the local development in Bulgaria since their creation until now. The activity of the

funds, the volume of financing and absorption, the sectoral scope of the funds, the types of beneficiary municipalities and other were analyzed. The achievements of the financial instruments to support local development were summarized (Kirilova, Velkova, 2023). *Regional aspects of green energy* and its peculiarities in Bulgaria were discussed by *Maria Kotseva-Tikova*. The results of the installation of various renewable energy (RES) technologies for electricity production in the regions of Bulgaria were analyzed. She underlined that different green electricity capacities are installed in the regions, as some regions apply most of the existing RES technologies and others show minimal achievements. Green energy is a link between operationalizing policies for sustainable development (green and bioeconomy), which looks for resource efficiency and environmental friendliness. Using statistical methods, the regions were compared and ranked in order to highlight the features and to identify prerequisites and opportunities for their future development (Kotseva-Tikova, 2023).

The diversity of regional topics catalyzed interest and provoked discussion, in which ***decentralized regional development and policies*** were supported by successful experiments in some regions, such as the *Plovdiv Industrial Zone*, presented by *Yuliyan Mollov*. He noted the fact that *the* Plovdiv region has succeeded in becoming an attractive city with a high quality of life, an attractive business centre and a leading tourist destination. His case study proved that the successful development of the city of Plovdiv and its agglomeration area, related to the rapid development of industry, the information technology sector and cultural tourism, is entirely due to the implementation of local strategies and decentralized policies initiated by the local community (Mollov, 2023). *Galia Bardarska* and *Emil Bournaski* considered the case of Dospat-Vacha Cascade defined as a sustainable solution for the *water supply of the districts of Plovdiv and Haskovo*. They stated that the contamination of the drinking water of the settlements along the Maritsa River with manganese, uranium and nitrates requires the implementation of new strategic water supply options in order to improve the health status of the population and the protection of the environment in the face of climate change.

The Companies in Crisis Conditions

The last conference panel was dedicated to various problems and challenges facing Bulgarian companies in the crisis summarized into two distinct groups.

The first one concerned problems of ***management and strategies of the companies themselves***. *Pavlinka Ilieva-Naydenova* focused on the *crisis as a challenge to innovation potential*. She examined aspects and interpretations regarding the nature and role of the crisis as a risk and an opportunity; change and a chance for development. The emphasis was on understanding that the crisis can be seen as an innovation challenge or motivation to build innovation potential in the organization. The view was substantiated that the permanent crisis (turbulent) environment requires the creation, maintenance, and development of the innovation potential in the organisation (Ilieva-Naydenova, 2023). *Nedyalko Nestorov* discussed the peculiarities of the *foreign trade activity of Bulgarian companies*. The aim was to reveal the roles of companies of different sizes in realizing the Bulgarian export. The

conclusion was made that this activity can be characterized by indicators of the participation of different groups of companies in the realization of exports from the country (Nestorov, 2023). *Management of hospitals* was the object of two presentations. *Spartak Keremidchiev* made an attempt to answer the question of why private hospitals are more successful than public ones. He noted that there are numerous empirical studies in the economic literature showing that private enterprises perform better than state-owned enterprises. The traditional argument used to explain the difference in performance between the two types of enterprises is that SOEs must pursue not only financial but also public policy goals. The results of a case study of two hospitals were presented. The thesis that state-owned hospitals have worse performance due to the lack of appropriate governance mechanisms to distribute income to their staff was defended (Keremidchiev, 2023). *Valentina Nikolova-Aleksieva* and *Petia Chankova* treated the issue of reengineering of the business processes in hospitals. They underlined that in the contemporary world of economic, political and value crises, healthcare becomes crucial for the development of every society. Thus, the need for effective and expedient management of business processes in hospitals is created. It is a matter of radical, fundamental and drastic improvement of the business values and of the material resources related to the commercial healthcare processes. The re-evaluation of business activities in private hospitals in conditions of deepening crises was highlighted (Nikolova-Aleksieva, Chankova, 2023). *Irina Danailova* analyzed the *digital skills/competencies needs in the sector "Construction of facilities"* in the context of the digital business transformation and identified digital skills gaps. A survey was conducted among enterprises and employed persons from the researched sector. The aim of the study was to explore and identify the needs for general and specific digital skills and to formulate conclusions about the current and expected future shortages of occupations/jobs in the context of digital skills/competencies sought in the sector (Danailova, 2023).

In the second thematic direction, issues of the ***analysis and reports of the company's performance*** were touched upon. *Radostina Bakardjieva* treated *the social dimensions of non-financial disclosure of Bulgarian enterprises* through monitoring and evaluation of the social parameters of the Bulgarian companies in the context of disclosing their sustainability. Based on a statistical database and systematic observation, conclusions were formulated regarding the social dimensions of the companies in Bulgaria in a sectoral and dimensional aspect. The obtained results allowed some recommendations to businesses and government institutions to be formulated (Bakardjieva, 2023). *Krasimir Yordanov* and *Adriana Atanasova* substantiated the *impact of the independent financial audit*, carried out in accordance with the quality requirements, *on economic growth*. The quality of the audit guarantees added value for society through the publicity of the opinion expressed on the financial information of economically significant enterprises, emphasizing the complementation and development of the elements of the system as a mechanism (Yordanov, Atanasova, 2023). The issue of audit quality caused a reaction from the audience and became the subject of lively discussion. *Marko Timchev* explored *models for improving the scientometrics, methodology and organization of accounting business analysis*. An unconventional model "Accounting business analysis in a balanced system of indicators" was offered with opportunities for market positioning, analysis of business risk, financial stability and competitiveness (Timchev, 2023).

The professional discussions held at the end of each panel were useful in clarifying pressing issues, finding solutions to overcome them, and sharing good academic practices and new methodologies which proved that this year's conference demonstrated a growing capacity of researchers not only to explain processes, but also to identify challenges and formulate policies in different fields of the economic development.

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SUMMARIES

Vesë Qehaja-Kekaë, Driton Qehaja, Arber Hoti

THE EFFECT OF FISCAL DEFICITS ON ECONOMIC GROWTH: EVIDENCE FROM EUROZONE COUNTRIES

Over the last decade, no issue in economic policy has caused greater controversy than the effects of fiscal deficits on economic growth. Fiscal deficits have been a significant cause of worry for many developed countries, notably the Eurozone. Even if short stimulants were justified, particularly after the crises of 2008-2009 in response to the global financial crisis, they have resulted in chronic fiscal deficits, growing debt, and depleted fiscal buffers in the medium to long term. This paper investigates, using STATA econometrics, how fiscal deficits affect the economic growth rate in Eurozone Countries. We use annual data for Eurozone countries from 2001 to 2020, totalling 346 observations. The study relied on secondary data from the World Bank's databases. To estimate the effect of fiscal deficits on economic growth, we used a random effect model. The dependent variable GDP growth was analysed through the effect of Public and publicly guaranteed debt from publicly issued or privately placed bonds Inflation, GDP deflator, Unemployment, Foreign direct investment, net inflows as a percentage of GDP, Domestic credit to the private sector as a percentage of GDP. Our research findings reveal that the variable Inflation and Domestic credit to the private sector affect GDP growth and are statistically significant.
Keywords: Fiscal deficit; GDP growth rate; Inflation; Eurozone
JEL: F4; F43; H89

Petar Peshev, Kristina Stefanova, Ivanina Mancheva

WEALTH INEQUALITY DETERMINANTS IN THE EU MEMBERS FROM THE CEE REGION, 1995-2021

This paper models wealth concentration in 11 EU members from the CEE region using official data for the period between 1995 and 2021 and applies panel econometric methods. The analysis uses the world inequality database (WID.world) for deriving wealth distribution and inequality measures. Our results suggest that inequality and wealth concentration grow at the expense of the middle class and the poorer half of the population. Regression results suggest that the main contributors to wealth inequality are the Great Recession of 2008–2009, inflation, house prices, and bond prices, while GDP per capita, equity prices and various interest rates restore a more equal net wealth distribution. Other variables are also found to have direct or indirect (instrumental variables) associations with the wealth concentration (the dependent variables).
Keywords: wealth inequality; wealth determinants; GINI; CEE; panel regression
JEL: D31; E01; G51; D63

Mikayel Melkumyan Haykaz Igityan, Maria Sahakyan, Frida Baharyan

INTRODUCING EDUCATIONAL REFORMS IN THE NEOCLASSICAL MODEL

This paper extends the neoclassical model of economic growth by introducing human capital into production function and studies the impact of educational reform on economic performance. In the author’s model, the government taxes consumption to reallocate the resources to educational needs,

which is one of the most prominent ingredients of human capital. The tax increase has costly consequences for the economy in the short-run, regarding the slowdown of economic activity, and the consumption loss. Thereafter, the increase in education builds additional human capital, making people more productive, recovering economic activity and stabilizing consumption at even higher levels in the long run. Thus, in the longer term, it is beneficial for the economies with low human capital to devote resources in favour of educational reforms, even though it carries the risks of political capital loss due to short-run economic costs. In the short run political capital decreases as a result of the implemented reform costs, which, on the other hand, indicate the cumulative loss of consumption. In the long run, however, the policymaker regains its political capital. Governments with low reputation cannot implement structural reforms. Besides, the authors compare the impact of low-efficient educational reforms with the impact of highly effective ones and come to the conclusion that consumption is formulated at a lower level in the former case.

Keywords: neoclassical growth; fiscal policy; education expenditures; education reform
JEL: E13; E62; H52; I28

Violeta Dimitrova

LABOUR PRODUCTIVITY GAPS IN THE TRADE INDUSTRIES IN BULGARIA AND SOME EUROPEAN COUNTRIES

In recent years the question of labour productivity has gained new relevance as a result of digitalization and economic crises, and their effects on the transformation of distributive trade business. The purpose of this study is to make a comparative analysis of labour productivity in the wholesale and retail trade in Bulgaria and ten countries of Central and Eastern Europe that have made the transition to a market economy and to bring out the trends and reasons for the labour productivity gap. The analysis is descriptive and mainly uses the outpace ratio to measure the productivity gap between Bulgaria and each of the countries through a comparison of two main indicators: turnover and gross margin per person employed. The data from Eurostat are used with a focus on the period between the two economic crises in 2008 and 2020-2021.

Keywords: labour productivity gap; retail and wholesale trade; digitalization
JEL: M21

Albina Kalimashi, Driton Balaj

COVID-19 IMPACT ON THE CAPITAL STRUCTURE OF COMMERCIAL BANKS: EVIDENCE FROM THE WESTERN BALKANS

This study aims to measure the influence of COVID-19 on the capital structure of Western Balkans commercial banks, before and during COVID-19 using annual data for the period 2015 - 2020. Using pooled ordinary least squares regressions, the relationship between bank book leverage as the dependent variable and bank-specific explanatory variables such as profitability, Tier 1 capital, bank size, collateral, earnings volatility, and liquidity is investigated. COVID-19 as an independent variable is also presented in this paper. GDP and inflation are control (constant) variables that influence the outcome. By regressing the panel data, we conclude that the comparison of factors affecting the capital structure of the respective commercial banks, in the form of profitability, leverage ratio, size, collateral, earnings volatility and liquidity, before and during the COVID-19 pandemic, tend to have significantly different values.

Keywords: Capital structure; COVID-19; book leverage; banking sector; Western Balkans
JEL: G23; G30; G32

Ayatulloh Michael Musyaffi, Razana Juhaida Johari, Christian Wiradendi Wolor, Amer Azlan Abdul Jamal, Anaya Zahra Santika, Muhammad Arifsyah Arifi

THE INNOVATIVENESS AND VALUE OF QUICK RESPONSE CODE PAYMENT FOR MSMES: THE INFLUENCE OF SECURITY-RELATED FACTOR

The implementation of QR code technology aims to make it easier for MSMEs and consumers to create a cashless society. However, many MSMEs still need to implement digital payment methods over time. This research aims to evaluate the acceptance of QR codes for MSMEs, especially regarding the role of innovativeness, security, and ease of use. This research targets MSMEs in Indonesia that have used the QR Code as a tool for making transactions. Questionnaires were distributed via Google form online, totalling 489 respondents who filled out. After the data is obtained, it is analyzed using a partial least square using smart-pls 4.0. Behaviour intention (BIQ) is the most influential construct on user behaviour (UBQ). The other most significant factors are convenience (PEUQ) and security (PSQ) for users. Meanwhile, other variables such as Personal innovativeness (PI), PEUQ, PSQ, and perceived usefulness (PUQ) can increase the positive impact on Perceived value (PVQ). Several factors, such as PEUQ and PSQ, can positively influence PUQ. However, there is a construct with few results: Perceived usefulness on intention to use. This is because MSMEs are more oriented toward consumer needs to buy products and services. So these findings provide insight for the government and service providers to improve security, convenience, and necessary QR code features that support MSME business activities.
Keywords: Innovativeness; perceived value; QR Code Payment; security; technology adoption
JEL: B26; D91; F65; G41; M21

Hrabrin Bachev

COMPETITIVENESS OF FARMING STRUCTURES IN BULGARIA

There have been numerous assessment systems and publications for the competitiveness of farming enterprises around the globe due to the high academic, business and policy importance of this problem. Common shortcomings of most evaluating frameworks are that they are based on unlike competitiveness understanding, principles and criteria, traditional indicators of technical and accountancy efficiency, factors productivity, the profitability of activity, firms market share etc. Other deficiencies of dominating approaches are that they are focused on a certain (size, juridic, sectoral, territorial) dimension of farming structures, and the ignorance of a critical governance aspect of a farm's competitiveness. This paper suggests a holistic multi-pillar framework for assessing the competitiveness of farming structures and evaluating the absolute and comparative competitiveness of Bulgarian farms of major juridical types, economic sizes, product specialization, and ecological and geographical locations. A hierarchical system consisting of four pillars of farm competitiveness (Economic efficiency, Financial endowment, Adaptability and Sustainability), and appropriate four Criteria, seventeen particular and five integral indicators are used to measure the competitiveness levels. The study has found that the competitiveness of farms in the country is at a good level, but there is significant differentiation in the levels and factors of farms with different juridical types, sizes, specializations and ecological and geographical locations. Besides the juridical type, other dimensions of farming structures like economic size, product specialization, location, market or self-sufficiency orientation, are (sometimes more) important for determining their absolute and comparative competitiveness. Critical for maintaining the competitive positions of Bulgarian farms are their low productivity, income, financial security, and adaptability to changes in the natural environment. For the improvement of the later weaknesses are to be directed farm management strategies and public policy support measures. A large portion of farms of different types has low

competitiveness, and if adequate measures are not taken in due time to improve management and restructuring farms, the efficiency of state support, etc., a significant part of Bulgarian farms will cease to exist in the near future.
Keywords: competitiveness; pillars; assessment; farms
JEL: D23; L22; M13; O17; Q13

Vladan Pavlović, Goranka Knežević, Antônio André Cunha Callado

MISUNDERSTANDING OF CORPORATE INSOLVENCY AND SOLVENCY ASSESSMENT METHODOLOGY – HOW DID THE LOGIC RUN AWAY?

The paper shows that there is a need in most of the Balkan countries to change the law governing the insolvency issue by clearly defining insolvency and thereby removing the confusion surrounding it from the legislation. It is also essential to harmonize the legal provisions so that the term insolvency is used consistently throughout the legal text. The paper also shows the need to define solvency properly in textbooks and present the correct methodology to assess solvency. In this way, it can be expected that neither the term (in)solvency nor the (in)solvency indicator(s) will be incorrectly used by scholars from the Balkan region.
Keywords: insolvency law; solvency; solvency ratio; solvency analysis; firm performance
JEL: K22; M41; G32; G33

Shadi Alkhasawneh, Wan Anisah Binti Endut, Nik Mohd Norfadzilah Bin Nik Mohd Rashid

THE INFLUENCE OF EXTERNAL FACTORS AND MODERN MANAGEMENT ACCOUNTING TECHNIQUES ADOPTION ON ORGANIZATIONAL PERFORMANCE

Since 2016, large-scale industrial operations in Jordan have declined. Modern Management Accounting Techniques (MMATs) may aid in the execution of strategic plans, the completion of tasks, and the performance of a firm. Improving firm performance may necessitate monitoring the compatibility between MMATs and contextual variables that determine performance. This study investigated the influence of external factors on MMATs and OP. It also identifies the influence of MMATs on OP and their mediating influence on the relationship between external factors and OP. The cross-sectional survey included responses from 46 different firms that are traded on the ASE. The results revealed that there are positive influence of external factors in MMATs adoption. Also, external factors have a positive influence in improve OP. In addition, MMATs adoption leads to improve OP. Furthermore, MMATs adoption is a significant mediator between external factors and OP.
Keywords: external factors; intensity of market competition; modern management accounting techniques; organizational performance; perceived environmental uncertainty
JEL: M41

Venugopala Rao Kuntamalla, Krishna Jyotreddy Maguluri

IMPACT OF FINANCIAL RATIOS ON STOCK PRICES OF MANUFACTURING COMPANIES: EVIDENCE FROM INDIA

The present study examines the impact of financial ratios on the stock prices of Indian manufacturing companies. Since the manufacturing sectors play an essential role in the economic development of an emerging market like India, the study results can be helpful for investors looking to invest in India, and, in particular the manufacturing companies operating in the country. The study consists of a balanced panel dataset of selected manufacturing companies from fourteen manufacturing sectors listed on the NIFTY 500 index. The study employs the Prais-Winsten panel regression technique, which uses panel-corrected standard error estimators to analyze the data and derive the necessary empirical outcomes. The results reveal that the valuation ratios, namely market-to-book value, enterprise value multiple, and earnings per share, along with asset efficiency, exhibit a positive and significant relationship with the share prices. On the other hand, dividend payout and leverage exhibit an insignificant relationship with the share prices.

Keywords: financial ratios, share prices; Prais-Winsten panel regression; Panel corrected standard errors; manufacturing companies; India
JEL: B26; C23; G10

Alla Kirova

ECONOMIC AND SOCIAL CHALLENGES, RISKS AND CONSEQUENCES IN OVERLAPPING CRISES CONDITIONS

The article reviews the results of recent multidisciplinary research on economic development, challenges and risks in the contemporary conditions of overlapping crises in national, European and global context presented at the scientific conference with international participation, organised by the Economic Research Institute at the Bulgarian Academy of Sciences.

Keywords: overlapping crises; inflation; growth; economic, social, sectoral and regional policy; uncertainty; EU integration; labour market; demographic development; inequalities and poverty; sustainable development; company's performance
JEL: E00; F00; J00; M00; O1; Q00; R1