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ECONOMIC CHALLENGES IN THE CONTEXT OF PANDEMIC AND WAR CIRCUMSTANCES

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Main accent on the 8th Annual Conference was the economic challenges in the context of pandemic and war circumstances. Researchers and professionals from more than 10 countries took part.

The present book consists papers in English language.

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GEORGIA'S CONVERGENCE WITH THE EUROPEAN UNION: EXPORT CHALLENGES

Nino Papachashvili[1]
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Marine Tavartkiladze[3]

Abstract: *The paper aims to identify Georgia's export challenges in the context of Deep and Comprehensive Free Trade Area (DCFTA) and to present the theoretical findings for the assessment the results of the Georgia's convergence to the EU under the free trade conditions. In order to assess its impact on export, the paper provides a comparative analysis of the results of the sociological survey of Georgian exporters conducted in 2016 and 2022 and also, an experimental study on the impact of institutional distance on export. Among the important findings are: exporters with more than 5 years of experience (mostly considering sanitary and phytosanitary standards) were positively affected by institutional proximity and export flows are in positive correlation with the state effectiveness (according to the WGI) in partner countries.*

Keywords: *Trade Policy, Institutional Distance, Regional Integration, EU-Georgia Trade, DCFTA.*
JEL: *F13, F14, F15, O43.*

1. Georgia's Progress in Institutional Harmonization and Export Challenges

The Deep and Comprehensive Free Trade Area between the European Union and Georgia as the principle pillar of the EU-Georgia Association Agreement (AA) defines regulatory alignment with EU rules in trade-associated issues. AA signed in June 2014 and it entered into force in July 2016 (Chronology of major events of EU-Georgia cooperation).
It should be noted that the DCFTA was the main trade-related component of the European Neighborhood Policy (ENP) and its preparation, ratification and implementation were preceded by in-depth reforms such as changes implemented in standardization, accreditation, conformity assessment, technical regulation and metrology and in various directions:

- Technical and construction supervision agency was established;
- Code on product safety and free movement of goods was adopted;

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• Thousands of international and European standards were adopted, and hundreds of standards were removed from the register of Georgian standards, some of which contradicted European standards; Internationally recognized metrological services and services of European certification bodies became available;
• A comprehensive strategy of competition policy was developed and a competition agency was established;
• A new customs code was developed and many changes were implemented, including information technology development projects, implementation of trade facilitation and integrated border management systems (NCTS computer program) and others.
• Significant changes were made in the direction of intellectual property protection etc.

A number of institutional reforms have continued and are being implemented within the framework of the Association Agreement (in detail see DCFTA, Georgia's Action Plans and Annual Reports, 2015-2022).
According to the implemented action plan of 2022, the field of trade statistics was improved, specific steps were taken in the direction of diversification of export products in the territory of the European Union (promotion of Georgian companies in international events, exhibitions and trade missions). A universal industrial program was developed and support for small and medium enterprises in terms of access to finance and/or technical support was increased; The training of export managers of small and medium-sized businesses is underway; the participation of entrepreneurs in the European Entrepreneurs' Network (EEN) is stimulated; the Trade with Georgia platform has been launched. The legislative and institutional sphere in the field of technical barriers to trade has been brought closer to the relevant legislation and best practices of the European Union, including the development of technical regulations on radio equipment, medical devices, electromagnetic compatibility, construction products and others. A risk assessment system was implemented for the market supervision agency; An electronic information system on dangerous products was created; introduced in the Standards Department in accordance with ISO 9001:2015; Work is underway to offer services in accordance with SO 17034:2016; new methods of laboratory diagnostics were introduced in the sanitary and phytosanitary direction; The scope of accreditation has been expanded; In the fields of telecommunications, e-commerce and postal services, a legal framework corresponding to European best practices was developed and the development of the postal market was promoted; The unified electronic system of state purchases (e-Procurement) and others were introduced.
According to the Association Implementation Report on Georgia (12 August 2022) the process of aligning national law with EU law as part of the DCFTA is well on track. All core institutions in charge of the DCFTA's implementation in Georgia are in place and operational.
Despite the progressive implementation of the planned measures, envisaged by the AA /DCFTA, there are a number of challenges for Georgian exports to enter the EU market.

Institutional harmonization plays an important role in the process of rapprochement between Georgia and the European Union, but the growth of Georgian exports to the EU market is modest.
Researchers give different assessments of the weak growth of Georgian exports to the EU market. For example, some of them (Akhvlediani et al. 2022) point out that trade flows between

the EU and Georgia have remained largely unchanged since the provisional entry into force of the DCFTA. They explain the given circumstance by the fact that Georgia has traditionally had a very low overall trade barrier. This implies that the liberalisation of trade barriers on the Georgian side should also not be expected to have a significant impact on Georgia's imports from the EU.
Georgia's export prospects require proper assessment in order to implement the right policy; also, the study of the issue is interesting from the theoretical point of view to assess the consequences of free trade agreements.

In order to identify barriers of Georgia's trade with the European Union, we conducted sociological studies of the Georgian exporters twice in 2016 (Papachashvili et al. 2016) and in 2022[4] based on the specially designed questionnaires. More than two hundred exporters participated in-depth interviews. So, *Methodology* covers analysis of appropriate scientific literature, statistical analysis based on the relevant national and international databases, and the survey of Georgian exporters on the basis of a questionnaire on non-tariff barriers. Comparative analysis is given on the bases of the results of the survey of Georgian exporters, and also, an experimental study is represented on the impact of institutional distance on export.

2. Exporters' Survey Results

According to the data of the National Statistics Service of Georgia in 2020, the export of Georgia amounted to 3,344.5 million dollars, and the share of the European Union is 21.5%. Representatives of the main export sector participated in our research. We mainly interviewed exporters of the following products: grape and wine products, fruit and vegetable processing, pharmaceutical products, metals, non-alcoholic and alcoholic beverages, tea, production of spices and seasonings and others.
The respondents participating in the research were quite familiar with the export process and related procedures, due to the fact that they have been exporting their products to different countries for years. According to the majority's assessment, the export of Georgian products is proceeding without interruptions, although certain difficulties have been identified, among which it should be noted: ensuring the continuity of the supply of products; difficulties in meeting EU technical requirements and certification; low awareness of Georgian products, transparent system of customs brokers, more electronicization of services related to export and others.
The study revealed that there is positive progress in meeting sanitary and phytosanitary measures. Only 16% of exporters (24% according to the previous survey) believe that these requirements are either hindering or prohibitive. 75% of the respondents indicate that their biggest costs in fulfilling the requirements related to sanitary and phytosanitary measures are: time, financial costs and costs related to complex regulations. Given the circumstances that 75%

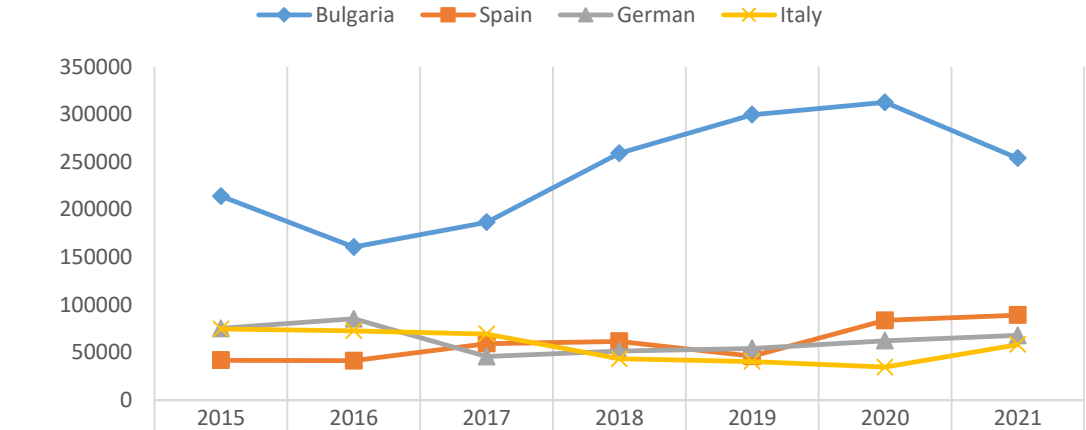
[4] The scientific research is being carried out by the Institute for Development Studies at Sulkhan-Saba Orbeliani University, Georgia, 2022.

of the surveyed exporters are small and medium enterprises, it is more difficult for them to comply with sanitary and phytosanitary measures.
8% of respondents (16% as of 2016) believe that the measures defined by technical standards (bans, authorization delays, registration requirements, other prohibitions/restrictions) are hindering or prohibitive. There is also a positive trend in the mentioned indicator compared to the results of the previous research. 52% of the exporters state that they have to meet the standards related to product identification, packaging and marking mostly from the technical standards.
8% of the surveyed exporters were subjected to retaliatory measures from the EU, among which the most prominent were: anti-dumping measures, countervailing duties, special agricultural protection measures. This indicator is also improved compared to the previous survey (12%).
Despite a number of reforms and the simplification of procedural standards, 47% of exporters (according to the 2016 survey - 65%) cannot meet any international or EU standards, nor do they possess relevant certificates. 18% of exporters have ISO 22000 (food product safety), and 20% have HACCP system (sanitary and phytosanitary norms).
99% of respondents benefited from state programs, exporters' guides and/or various measures designed to bring them closer to the European Union. They mostly participate in events organized by state agencies; in grant and export promotion/stimulation programs; fair-exhibitions; with the events of the branch association. It should be noted that some measures are associated with financial costs, which creates an additional obstacle for exporters.

3. Experimental Assessment of the Institutional Approximation Impact on the Export Flows

Among the countries of the European Union, Bulgaria, followed by Spain, Germany and Italy stand out in terms of the value of the export flows from Georgia.
In 2016-2020, exports to Bulgaria were growing noticeably. In 2021, it decreased sharply. Exports with the other three countries are stable and characterized by a slightly increasing trend.

Table 1. Dynamics of Georgia's Export Flows in Selected Countries, 1000 USD



	2015	2016	2017	2018	2019	2020	2021
Bulgaria	214247.1	160760.03	186856.27	259166.25	299702.41	312735.58	253948.46
Spain	41938.05	41364.57	59342.2	61780.36	46032.75	83751.69	89328.21
German	75327.11	85486.56	45678.67	51393.9	54317.42	62436.34	67902.35
Italy	74605.64	72735.64	69488.91	43340.63	40493.88	34648.92	58342.89

Source: National Statistics Office of Georgia.

We suppose that the dynamics of the country's State Efficiency Index may have some correlation to the export flows insofar as it reflects the overall institutional orderliness. For example, in table 2, in which the State Efficiency Indices are given, we see that in 2020, Bulgaria's state efficiency index has suddenly dropped sharply, from 0.26 to -0.07. It is highly likely that this is what caused the sharp drop in exports from Georgia to Bulgaria in 2021.

In Spain, Germany and Italy, these indices show a decreasing trend in 2015-2020, although we do not have sharp fluctuations, as in the case of Bulgaria. Export flows in the direction of these countries are also stable.

Table 2. State efficiency index

Country	2015	2016	2017	2018	2019	2020
Georgia	0.40	0.52	0.58	0.61	0.83	0.79
Bulgaria	0.11	0.21	0.19	0.20	0.26	-0.07
Germany	1.69	1.70	1.65	1.56	1.53	1.36
Italy	0.52	0.58	0.53	0.44	0.48	0.40
Spain	1.19	1.13	1.04	1.00	1.00	0.89

Source: The Worldwide Governance Indicators.

We believe that the index of Georgia's rapprochement with the European Union may have a significant impact on export flows. The dynamics of index values in 2015-2021 are given in Table 3.

Table 3. Index of Georgia's Approximation to the European Union

Index	2015	2016	2017	2018	2019	2020	2021
Approximation	0.67	0.67	0.64	0.98	0.98	0.65	0.65

Source: Eastern Partnership Index.

Among the selected indicators, let's evaluate the Pearson correlation coefficient, in particular, between the state efficiency index of Georgia, the total value of exports to the mentioned four EU countries and the approximation index of Georgia to the European Union.

Table 4. Pearson Correlation Coefficients Among State Efficiency, Export Value and Approximation Index

Correlation coefficients	Efficiency	Export	Approximation
efficiency	1.00	0.70	0.44
export	0.70	1.00	0.22
approximation	0.44	0.22	1.00

We found that the correlation coefficient is high between the efficiency index of the state and the total value of exports. Let's check its statistical significance.
t = 1.9351, df = 4, p-value = 0.1251
alternative hypothesis: true correlation is not equal to 0
95 percent confidence interval: -0.2667258 0.9633024
sample estimates: cor. = 0.695355
The coefficient is statistically significant. This gives us the opportunity to deepen the research in the direction of searching for a cause-and-effect relationship between Georgia's state efficiency and export flows. Also, this fact supports the assumption that when the country's state efficiency index falls, its trade reputation is significantly damaged and the volume of trade flows with the country decreases, and vice versa.

Limitation of the study: Obviously, we are aware of the limitation of the time interval and therefore the results of the given study. However, we think that this experimental approach has a perspective from a methodological point of view. Time series data retrieval is limited not only for Georgia, but also for a number of post-socialist countries. It should be noted that the identification of relevant long-term observation variables to assess the institutional effect by economic sectors is a future task. Nevertheless, it is clear that there is a gap between the planned transposition of the European regulations and the actual effects.

4. Conclusions:

Based on the analysis of the research results, we can formulate certain conclusions:

- The deep and comprehensive free trade agreement promotes the growth of Georgian exports in the European Union through the institutional harmonization, but the results of export growth is modest;
- General institutional arrangements have an impact on export flows;

- Deep and Comprehensive Free Trade Agreement is an additional tool for trade promotion;
- For Georgia's export growth, it is important to find sources of its development beyond institutional harmonization;
- Full access to the EU market is possible through the harmonization of non-tariff regulatory instruments, but compared to tariffs, their change is gradual, which suggests that trade policy reform is still an unfinished process;
- On the one hand, institutional differences in the business environment are reduced, which should reduce informational asymmetries and transaction costs for economic agents, and on the other hand, have a positive effect on the quality and awareness of export goods;
- Companies with long-standing partnerships with the EU find EU non-tariff measures less of a hindrance.

Based on the results obtained, we consider it important to consider the following recommendations:

- Development of medium and long-term strategies for each sector by assessing its export potential and determining the sectors in which Georgia may have a competitive advantage;
- Development of targeted sectoral programs and initiatives in fields with competitive advantages;
- Assisting in certification procedures for meeting the requirements established by non-tariff measures, conducting consultations, increasing the role of farmers' houses, training centers, etc.;
- Formation of specific measures of convergence with the standards of developed countries (ISO, IEC, EN, ENELE) on the basis of the formation of targeted organizations;
- Creation of partnership funds of entrepreneurs, which will replace the ring of intermediary companies.

The creation/development of the relevant legislative base of Georgia's international standards and technical regulations will have a positive impact on Georgian exports in the sense that companies will be focused on the production of products with standards that will have sales prospects on the markets of the European Union and other developed countries, and at the same time, high standards will limit low-quality imported products into Georgia.

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MONETARY POLICIES IN RESPONSE TO COVID-19 CRISIS IN THE BALKANS. CHALLENGES TO CENTRAL BANKS

Tsvetelina Marinova[1]
Nikolay Nenovsky[2]

Abstract: *In the Balkan countries (Bulgaria, Romania and Serbia) the coronavirus pandemic has had serious economic and social repercussions. While in Bulgaria there are a number of formal, legal constraints to pursuing expansionary fiscal and monetary policies, as well as those stemming from the participation of the Bulgarian lev in the exchange rate mechanism 2 and the EU Banking Union, in Romania and Serbia the government and the central bank dispose of more policy tools and opportunities to react to crises. This is evidenced by the applied monetary easing strategies, including quantitative easing as well as other unconventional monetary policy and liquidity measures during the pandemic. In this regard the aim of the paper is to demonstrate to what extent the type of monetary regime determines the scope and nature of reactions in the event of a shock and crisis associated with systemic uncertainty and the possibilities for economic recovery in the three Balkan states.*

Key word: *monetary policy, fiscal policy, central banks, Covid-19, Balkans, monetary regimes, crisis*

JEL codes: ***H12, H50, E42, E52, E58***

Introduction

COVID-19 has had a disruptive economic impact in 2020 causing a severe global recession, significant increases in unemployment, income inequality, state budget deficits and public debt-to-GDP ratios in the developed and developing countries. How long its impact will persist remains unclear (Emmerling et al. 2021). Moreover, the Russia-Ukraine war, which has started in February 2022, has been among the major drivers of soaring energy and food prices and inflation and has further worsened economic performance and prospects in Europe and in the world (IMF 2022). During the coronavirus pandemic, the economic policy response (fiscal,

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monetary and regulatory) encompassed various compensatory mechanisms across countries[3]. Similarly to the global financial crisis from 2008, the Covid-19 crisis has led to a remarkable state intervention in the economy through massive fiscal policy measures and further expansion of the lender of last resort of the major central banks. Big central banks has acted as classic lender of last resort (Bagehot concept), buyer of last resort (QE) and third and perhaps the most radical step was that some of the biggest central banks became a lender of last resort even to nonfinancial firms and companies (Bernanke et al. 2022).

During the pandemic, central banks' stimulative monetary policy of low and negative interest rates (in the eurozone) included direct purchases of government debt to finance fiscal stimulus, which in turn led to a strong increase in their balance sheets. Central banks provided unlimited liquidity to commercial banks, at a subsidised cost and at a significant reduction in the quality of the collateral. Supervisory and regulatory policies in the banking sector included temporary reductions in the risk weights of certain exposures, and a uniform framework for temporary moratoria (private or public) on bank loan payments was established in the European Union (EU) (English, Forbes & Ubide (eds) 2021). Central banks aimed to limit the economic consequences of lockdowns and stabilizing the economy. Administrative restrictions and containment measures during the pandemic determined the central banks' monetary policy measures and interventions (Brzoza-Brzezina et al. 2021)

In the Balkan countries (Bulgaria, Romania and Serbia), whose economies are highly open and integrated into the European economy, the coronavirus pandemic has had serious economic and social repercussions. The fiscal and monetary policies have been mobilized to combat the crisis, with various instruments being applied within the existing local constraints and conditions. While in Bulgaria there are a number of formal, legal constraints to pursuing expansionary fiscal and monetary policies, as well as those stemming from the participation of the Bulgarian lev in the exchange rate mechanism 2 (ERM2) and the EU Banking Union[4], in Romania and Serbia the government and the central bank have more policy tools and opportunities to react to crises. This is evidenced by the applied monetary easing strategies, including quantitative easing as well as other unconventional monetary policy and liquidity measures during the pandemic. In this regard the aim of the chapter is to demonstrate to what extent the type of monetary regime determines the scope and nature of reactions in the event of a shock and crisis associated with systemic uncertainty and the possibilities for economic recovery in the three Balkan states.

The first part of the paper discusses the theoretical framework of monetary regimes applied in the Balkan countries and an explanation of their relation and/or dependence on the EU and in particular on the European Central Bank's (ECB) monetary policy. The second part focuses on the fiscal, monetary and macro prudential policy measures implemented during the pandemic. The third part explores the impact of monetary policies on the price stability and economic

[3] See Bighelli, Lalinsky & Vanhala 2022 and also Deb et al. 2021

[4] As of 10 July 2020, the Bulgarian lev has been included in the ERM2 at the existing fixed exchange rate within the Currency board (1 euro = 1.95583 levs). On 1 October 2020, Bulgaria became member of the EU Banking Union.

recovery. We draw conclusions on the role of monetary regimes for economic recovery and stabilisation.

1. Theoretical framework for understanding monetary regimes in the Balkan countries during Covid-19 crisis

First, we focus on the theoretical and legal characteristics of the different types of monetary regimes implemented in Bulgaria, Romania and Serbia. Unlike the other Central and Eastern European countries, Bulgaria implemented floating exchange rate and independent monetary policy in the beginning of the transition (after 1989). After a period of banking crisis, hyperinflation and loss of foreign reserves, under the pressure of the International Monetary Fund (IMF), it introduced currency board in July 1997. The currency board is a monetary regime based on rules that bring discipline in macroeconomic policy through market discipline and capital movement. It relies on two main effects: discipline effect (legal constraints on monetary policy) and the credibility effect stemming from the fixed exchange rate (1 euro = 1.95583 levs) and the coverage of monetary base. It maintains 100% foreign exchange coverage for the total amount of the Bulgarian National Bank (BNB) monetary liabilities (banknotes, coins and deposits). These are government deposits and commercial banks' reserves. Hence, no monetary policy is carried out (Nenovsky & Rizopoulos 2003). The currency board constraints do not allow the government to rely on money issuance in order to finance budget deficits and it enforces prudent and conservative fiscal policy. Strict fiscal limitations apply to all the economic agents who have to bear the costs from their action alone (Marinova 2016). Under the currency board regime the BNB can perform a strictly limited function of lender of last resort. It is allowed to refinance private banks only in case of a systemic risk and the amount of extended loans should not exceed the deposit (bank reserves) of the Banking Department placed with the Issue Department. Moreover, the BNB may provide loans only to solvent banks experiencing pressing need for liquidity only against collateral of liquid assets. The currency board is a conservative and dependent monetary regime (pursuing the monetary policy of the ECB) having limited opportunities for reactions to shocks and systemic crisis[5] .

Unlike Bulgaria, Romania and Serbia have been implementing monetary policy of inflation targeting. In fact, both countries pursue the monetary policy of the ECB despite preserving their monetary independence and the execution of discretionary monetary policy. Starting in 2013, Romania has applied inflation targets which are formulated in terms of the annual change in the consumer price index and are set as midpoints within a target band of ±1 percentage points. The inflation target is set at 2.50% with variation band of ± 1pp. The National Bank of Romania (NBR) has announced that this is an intermediate stage meant to ensure the transition towards the phase of long-term continuous inflation targeting in line with the ECB's definition of price stability[6]. The main monetary policy instruments available to the NBR are: open market operations, standing facilities and reserve requirements.

[5] Dependent monetary regimes in the Balkans are studied by Nenovsky & Magnin, 2022
[6] https://www.bnr.ro/Inflation-Targets-3241-Mobile.aspx

The National Bank of Serbia (NBS) has been implementing a managed floating exchange rate regime since 1st January 2009. The inflation target is set for three years ahead until the process of nominal, real, and structural convergence to the EU is finished. Headline inflation target from January 2021 to December 2023 is set at the level of 3%, with a tolerance band of ±1.5 percentage points. The NBS strives to achieve the targeted rate of inflation by changing its key policy rate[7] .

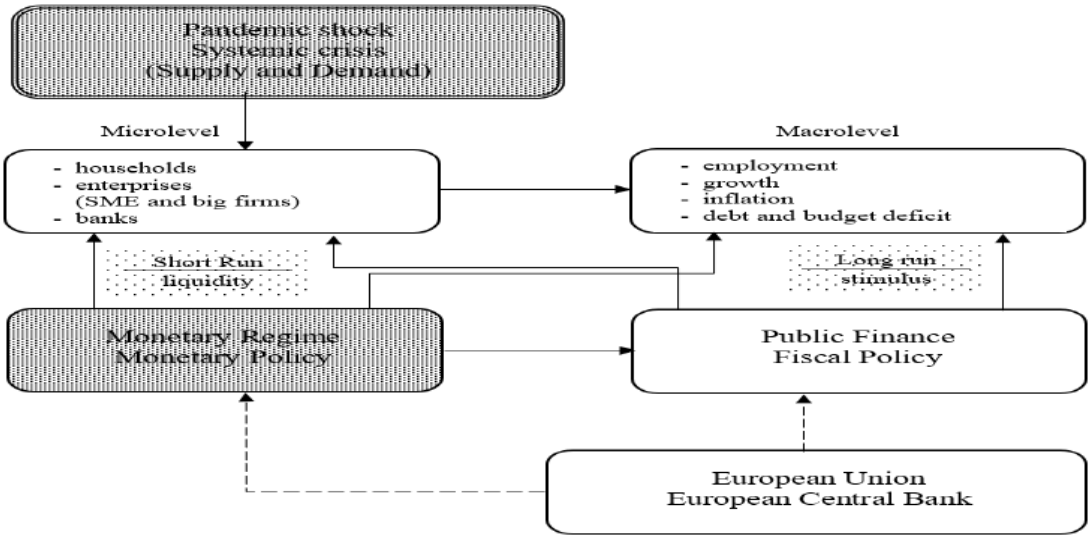
Unlike inflation targeting rule in other contexts, central banks are allowed to apply all the tools of conventional and non-conventional monetary policy to react to economic shocks and crises. Moreover, there are no institutional restrictions to fiscal policy. Hence, governments have bigger fiscal space and can execute expansionary fiscal policy.

Figure 1 illustrates the dependence of the monetary regimes and the monetary policies in Bulgaria, Romania and Serbia on the ECB's common monetary policy executed in the eurozone as well as their direct relation, interaction and impact on the fiscal policies and the state of the public finances in the countries. We reveal the short term implications of the monetary policy as well as the long term implications of the fiscal policy for the Balkan economies. Bulgaria and Romania are not yet part of the eurozone and Serbia is a candidate country for EU membership. Bulgaria applies currency board and a fixed exchange rate of the lev against the euro as well as it participates in ERM2. Romania and Serbia, on the other hand, pursue a monetary policy of inflation targeting based on the ECB's definition of price stability.

The pandemic has brought to the fore the need for timely and proper coordination and interaction between countries' fiscal and monetary policies. In the short term, monetary policy measures relate to the provision of liquidity to households, firms and banks, while in the long term, banking regulations and fiscal measures are of paramount importance to sustainable growth. At the same time, Bulgaria and Romania have to respect the rules for sound public finance set out in the EU institutional framework (Maastricht Treaty, Stability and Growth Pact) and they have to avoid excessively high budget deficits and public debt[8]. While for Bulgaria there are both internal and external constraints to monetary and fiscal policy, for Romania and Serbia these are mostly external, coming from the EU.

[7] National Bank of Serbia's Memorandum on Inflation Targets until 2023
[8] See Nenovsky, Turcu & Tochkov 2013

Figure 1. Theoretical framework for understanding monetary regimes in the Balkan countries during Covid-19 crisis



Source: Sahling, Nenovsky & Chobanov (2021), p. 279

2. Fiscal and monetary policies reactions to Covid-19 crisis

Before the pandemic, the three Balkan countries had stable growth, decreasing unemployment, moderate inflation and stable fiscal positions (budget surpluses in Bulgaria and Serbia and lower public debt in the three countries compared to the other EU countries). The Covid-19 pandemic led to a sharp decline in economic activity and a rapid deterioration in the budgetary positions of the three countries. In 2020, Bulgaria experienced the biggest decline in the economic activity among the three countries. The Bulgarian economy contracted by 4.4% and the Romanian[9] and the Serbian economies by 3.9% and 0.9% respectively. Slight increases in the unemployment rate were recorded in Bulgaria and Romania. In Bulgaria, the unemployment rose from 5.9% in 2019 to 6.7% while in Romania it increased from 2.9% in 2019 to 3.4% in 2020. It is noteworthy, that in Serbia the unemployment rate declined from 11.2% in 2019 to 9.7% in 2020. The governments increased public expenditure mostly in Serbia where it reached 49.4% of GDP in 2020, while in Bulgaria and Romania it was 41.8% and 42.0% of GDP respectively. The fiscal measures to address the effects of the pandemic have worsened the budgetary positions. The budget deficit in Bulgaria grew to 4.0% of GDP and the public debt rose to 24.7% of GDP. Nevertheless, the Bulgarian sovereign debt is still among the lowest in

[9] For the impact of the pandemic on the export-import activities of the companies see Belu 2021

the EU27[10]. In Romania, the budget deficit doubled (9.3% of GDP) and the public debt reached 47.3% of GDP. In Serbia, the budget deficit was 8.3% of GDP and the government debt rose to 57% of GDP.

In the three Balkan countries, the financial stability has been sustained and further strengthened due to the monetary and regulatory policy measures. Moreover, the banking system has remained excessively liquid. Furthermore, the delayed consumption and investment by economic agents have led to a significant accumulation of savings and credit decline for households and non-financial companies in 2020.

2.1 Fiscal policy measures during Covid-19

According to the analysis of the IMF (2021) governments have implemented two types of fiscal measures worldwide: demand-support measures and emergency lifelines. Demand support measures have been applied to boost demand and households/firms' disposable income which included: wage subsidies and targeted transfers to households, enhancement of unemployment benefits, paid sick leave and support to parents for school closures; tax relief measures for firms and households, and deferrals of tax and social security payments for firms and households, etc. This group of fiscal measures have exacerbated fiscal imbalances, the government debt and the borrowing needs have risen in the short run. They are considered as above-the-line measures. Meanwhile, emergency lifelines refer to liquidity measures which provided sustained cash flow support to firms and households, especially during the lockdown phase of the pandemic, when firms needed to shut down production in order to maintain social distancing. Such measures include loans to firms and households, state guarantees, government provisions of loans, and equity injections. These measures have no upfront impact on the fiscal deficit but they increase debt or liabilities in the long-term and are considered to below-the-line measures.

Similary to the other European countries, the governments of the three Balkan states have pursued countercyclical fiscal policies by increasing transfers to economic agents, programmes to preserve employment and boost government consumption and investment. The demand support measures and health spending became a major part of the fiscal packages and fiscal stimuli. In Bulgaria, total government spending was Bulgarian lev (BGN) 10.9 bn or USD 6.4 bn. According to the IMF estimations (2021) the demand support measures and health spending amounted to 5.3% of GDP (BGN 6.3 bn or USD 3.7 bn). The fiscal measures included subsidised employment programmes (60/40 programme), payment of pension supplements, health spending, including for frontline medical staff, credit guarantees from the state-owned Bulgarian Development Bank, and tax relief (reduction of the VAT rate on certain goods and services, extension of corporate tax payment deadlines and increase in the amount of personal tax allowances).

[10] For economic trends and risks during the pandemic see Yotsov et al. 2022

In Romania, the demand support measures and health spending constituted 3.4% of GDP Romanian leu (RON) 36 bn or USD 8.5 bn) They also included: partially covering the wages of parents staying home during school closure as well as partially covering the wages of self-employed and workers in danger of being laid off, partially subsidizing the wages of those returning to work, deferral of utilities payments for SMEs (small and medium enterprises), bonus for corporate income tax payments, grants for the businesses which totaled 2.5% of GDP (RON 26 bn or USD 6.1bn). In addition, the government has rescheduled the payment of certain taxes for companies in difficulty. Other measures included: faster reimbursement of VAT, suspending foreclosures on overdue debtors, suspending tax authorities' control, discounts for paying corporate income taxes, postponement of property tax by three months, exempting the hospitality industry from the specific tax for 90 days, changes in the insolvency legislation. The possibility to reschedule tax payments was extended in 2021 (IMF 2021).

In Serbia, the demand support measures and health spending introduced by the government amounted to 12.2% of GDP Serbian dinar (RSD) 664 bn or USD 6.4 bn). The fiscal measures announced in 2020 included: wage subsidies (RSD 93 bn): (i) Payment of three minimum wages for all employees in SMEs and entrepreneurs; (ii) Payment of 50% of minimum wages to big companies for employees who were not working; one-off payment to all pensioners (RSD 7 bn); new loans to SMEs from the Development Fund (RSD 24 bn); universal cash transfer of EUR 100 to each citizen over 18 years old (about RSD 71bn); support to 14,000 most vulnerable women in 50 municipalities across Serbia in hygiene packages and essential foods (RSD 12 bn); one-off fiscal support to help city hotels through a fixed subsidy per room and per bed, with an estimated cost of RSD 1.3 bn. Most of these measures were prolonged in 2021: three additional months of wage subsidies (RSD 73bn); payments for employees in travel and hospitality; universal cash transfers to all adult citizens paid in May and November (RSD 43bn); pension bonus (RSD 8.5bn); support for the transport sector and for city hotels (RSD 3bn); one-off financial assistance to all the registered unemployed people, of EUR 60; a one-off payment to vaccinated citizens (RSD 9 bn).

In Bulgaria the limited capacity of the government to use fiscal policy to tackle the crisis was partly offset by EU funds. The financial support measures utilizing national and EU resources amounted to 3.9% of GDP (BGN 4.6 bn or USD 2.7 bn). They consisted of capital increase in the Bulgarian Development Bank (BGN 700 mn) as well as liquidity provided through state-owned entities and other EU institutions. The Bulgarian Development Bank, the Fund of Funds, the JEREMIE initiative ("Joint European Resources for Micro to Medium Enterprises") and Urban Development Funds executed quasi-fiscal operations on behalf of the government which amounted to 2.5% of GDP (BGN 3 bn or USD 1.8 bn).

Unlike Bulgaria, the Romanian government provided loan guarantees and state guarantees for SMEs and big companies which amounted to 4% of GDP (RON 42 bn or USD 10 bn). The IMF (2021) estimated that below the line measures corresponded to 4.2% of GDP (RON 44 bn or USD 10.4 bn).

In Serbia state guarantees amounted to 3.2% of GDP (RSD 175 bn or USD 1.7 bn). In 2020 a state guarantee scheme for bank loans to SMEs was approved (RSD 56.5bn). In 2021 the existing scheme for state guaranteed bank loans to SMEs was expanded by EUR 500 mn (1% of GDP) and a new EUR 500 mn scheme for vulnerable companies was implemented. Quasi-fiscal operations totaled EUR 200 mn (0.4% of GDP), including subsidized loans (1% interest rate) to SMEs from the Development Fund (IMF 2021).

2.2 Monetary and macro financial policy measures

The monetary and macro prudential policy tools during the Covid-19 pandemic can be divided into four categories: interest rate cuts, asset purchases, liquidity provision and credit support as well as regulatory easing. The specific tools used by each central bank depended on local macroeconomic conditions, the state of the banking system and the financial sector as well as of the institutional constraints of the applied monetary regime.

In March 2020, the **Bulgarian National Bank** adopted an anti-crisis package for the banking sector which totaled BGN 9.3 bn. Its main objectives were to further strengthen the resilience of the banking sector and to temporarily ease payments to businesses and households on bank loans. The regulatory measures included:

- Prohibition on distribution of retained earnings from previous years to strengthen the capital base;
- Restrictions on the level of concentration and quality of assets in which banks can invest their liquid assets;
- Repeal of the planned increases in the countercyclical capital buffer;
- Private moratorium on bank loan payments.

In March 2020, the BNB adopted a decision to cancel the increases in the countercyclical capital buffer applicable to domestic credit risk exposures scheduled for the second quarter of 2020 and the first quarter of 2021 and maintaining its 0.5% level during 2020-2021. In September 2021, the BNB decided to increase the countercyclical capital buffer applicable to credit risk exposures to 1.0%, effective from 1 October 2022. The main reason for this measure was the accelerated growth rates of housing loans and the risks of increasing indebtedness and non-performing loans, with a negative change in economic conditions. The countercyclical capital buffer will be raised to 1.5% with effect from 1 January 2023. In December 2021 the BNB confirmed 3% systemic risk buffer of 3% (BNB 2021). The measures taken do not inject liquidity into the banks. They preserve and reallocate available resources within the banking system, as the currency board rules prohibit the BNB from creating money and financing the government through securities purchase programmes. Nevertheless, the ECB can provide liquidity through swaps and repo transactions. In April 2020, for the first time, the ECB and the BNB set up a swap line of EUR 2 bn which was in place until end-2020[11].

[11] https://www.eCurrency board.europa.eu/press/pr/date/2020/html/eCurrency board.pr200422~962a743486.en.

Unlike the BNB, the Romanian and Serbian central banks implemented almost all monetary policy instruments during the pandemic. Foreign exchange interventions were undertaken to smooth excessive volatility and stabilise the exchange rate in order to further strengthen financial stability The Romanian and Serbian central banks acted as lender of last resort and applied quantitative easing. **The National Bank of Romania (NBR)** reduced the monetary policy rate by 1.2 percentage point to 1.25% and narrowed the corridor defined by interest rates on standing facilities around the monetary policy rate to ±0.5 percentage points from ±1.0 percentage points. The NBR purchased government securities on the secondary market and implemented measures to ensure the smooth functioning of payment and settlement systems. The NBR performed open market operations and provided liquidity to credit institutions via repo transactions (repurchase transactions in government securities). The repo transactions stood at around RON 42 bn in 2020 and more than RON 2 bn in 2021. The total volume of leu-denominated government securities purchased on the secondary market in the period April 2020-March 2022 amounted to RON 5.895 bn[12]. The banks deferred loan repayments for households and businesses affected by COVID-19 for up to nine months (applicable until March 2021). The ECB set up a euro repo line with NBR worth a maximum of €4.5 bn. Extended until March 2022 (IMF 2021).

On 11th March 2020 the **National Bank of Serbia** cut main interest rates. The key policy rate was lowered to 1.75%, the deposit facility rate to 0.75% and the lending facility rate to 2.75%. The main interest rates were further lowered and the terms of financing became even more favourable than before the beginning of the pandemic. In April, June and December the NBS Executive Board further trimmed the key policy rate by a total 0.75 pp, to its historical low of 1.00%, while the deposit facility rate was decreased to 0.10% and the lending facility rate set at 1.90%[13].

During Covid-19 the NBS continued to promote the use of the dinar in the national financial system (*dinarization*). The domestic financial sector was supplied with additional dinar and FX liquidity to sustain unhindered flow of credit to local businesses and households. From March to May 2020, the NBS provided to banks additional dinar liquidity worth RSD 41.1 bn and FX liquidity amounted to EUR 96.0 mn via additional FX swap auction, regular swap auctions and three repo securities purchase auctions. The commercial banks were given the opportunity to tap two dinar liquidity lines – additional FX swap purchase auctions and repo securities purchase auctions. The NBS supplied additional liquidity to banks which totaled RSD 145.1 bn (repo purchase amounted to RSD 101.4 bn and FX swaps worth RSD 43.7 bn) (IMF 2021). In July 2020, dinar loans were approved under the guarantee scheme at lower interest rates. Moratorium on debt payments was introduced during 2020-2021. Housing loan requirements were facilitated[14].

[12] Leu-denominated government securities purchased by the NBR on the secondary market in 2020: RON 1,882.9 mn in April; RON 1,611.5 mn in May; RON 533.1 mn in June; RON 748.5 mn in July; RON 504.3 mn in August.
Leu-denominated government securities purchased by the NBR on the secondary market in 2021 and in the first quarter of 2022: RON 112.7 mn in March; RON 134.7 mn in April; RON 367.3 mn in March 2022 (NBR 2020, NBR 2022)

[13] See Martin 2020

[14] https://nbs.rs/en/drugi-nivo-navigacije/pres/covid19/

In May 2020, for the first time, local-currency denominated corporate bonds became eligible for open market operations and as collateral for banks to receive daily liquidity loans and short-term liquidity from the NBS. Thus, the NBS acted as lender of last resort also for the non-financial companies. On 17th July 2020 the ECB and the NBS set up repo line to provide euro liquidity extended until end-March 2022.

The NBS has intervened heavily in the foreign exchange market to maintain a relatively stable exchange rate during the crisis[15].

Table 1 Central banks' policy measures during Covid-19 (2020-2021)

Tool type	Measures	Bulgaria	Romania	Serbia
Interest rate	Policy rate cut		X	X
Lending operations/liquidity provision and credit support	Liquidity provision Use of swap line/repo line (with ECB) FX operations	X	X X X	X X X
Asset purchases	Government bonds/sovereign debt Corporate bonds		X	X
Reserve policy/regulatory easing	Capital requirements Countercyclical capital buffer Systemic risk capital buffers Easing collateral eligibility rules	X		 X

Source: Bulgarian National Bank, National Bank of Romania, National Bank of Serbia, IMF, Authors

2.3 The effects of fiscal and monetary measures on the Balkan economies

In this part we refer to Figure 1 on the theoretical framework of monetary policy regimes to analyze the effects of the monetary and fiscal measures implemented by the national institutions. In 2021, the three Balkan economies have started to recover from the crisis. In Bulgaria, the GDP growth reached 4.2% and private consumption was the main driver of growth. The unemployment rate declined to 4.8%. The major causes of inflation were the price hikes of primary energy commodities (oil, natural gas and electricity) and food in international markets, as well as the rising consumption expenditure of households and the higher consumer goods prices in Bulgaria's major trading partners. To curb inflation the government imposed a moratorium on regulated prices of electricity, water and sewerage services and heating in December 2021 which expired on 31 March 2022. For the first quarter of 2022 the CPI rose to 10.5% while the CPI compared to the previous period reached 4.3%. In March 2022, the CPI was 12.4% year-on-year. The harmonised index of consumer prices (HICP) reached 8.9% on an annual basis. The continuation of fiscal stimulus in 2021 resulted in further increase in the

[15] https://nbs. rs/en/other-navigation/pres/covid19/

budget deficit and government debt while the fiscal reserve which provides some scope for stimulative fiscal policy, remained at high levels during the pandemic.

The banking system continued to be liquid and stable in 2021. The commercial banks' reserves on the BNB's balance sheet more than doubled. The Banking Department's deposit with the Issuance Department also continued to grow, which has further strengthened the confidence and stability of the financial system because it enables the BNB to serve, albeit in a limited capacity, as a lender of last resort in the event of a systemic crisis.

In 2021, the deposit growth slowed in comparison to 2020 due to the retention of very low deposit interest rates coupled with accelerating inflation which stimulated economic agents to redirect part of their savings to consumption as well as to seek investment opportunities as alternatives to deposits. At the same time, lending to households and businesses almost doubled in 2021.

Table 2 Macroeconomic and financial indicators for Bulgaria

Indicators	2018	2019	2020	2021	2022	2023
GDP growth, %	2.7	4.0	- 4.4	4.2	2.1	3.2
Private consumption growth, %	3.1	3.9	1.2	8.0	2.7	3.0
Total deposits, lei million, annual change %	7.3	9.7	9.7	9.1	7.2	7.0
Household deposit growth, %	7.7	8.0	9.7	9.0		
Non-financial corporations deposit growth, %	5.2	14.3	10.5	8.5		
Financial corporations deposit growth, %	16.9	2.4	2.0	16.9		
Foreign direct investment, % of GDP	2.7	3.2	5.2	2.6		
Gross capital formation, % of GDP	18.8	18.6	19.2	16.6		
HICP, %	2.3	3.1	0.0	6.6	9.6	3.9
Unemployment rate, %	6.1	5.9	6.7	4.8	5.2	4.9
Public sector expenditure, % of GDP	36.9	35.5	41.8[16]	43.1		
Gross external debt, % of GDP	66.1	61.3	64.9	61.8		
Government debt, % of GDP	22.1	20.0	24.7	25.1		
Budget deficit/surplus, % of GDP	1.7	2.1	- 4.0	- 4.1		
Average monthly wage in euro	573	633.5	695.5	775.5		
Money supply, % of GDP	84.8	85.1	94.7	94.8		
Monetary base, million BGN	32 590.2	32 477.6	43 810.5	47 779.7		
Central bank balance sheet, BGN thousand	51 264 563	50 881 190	62 539 687	69 964 089		
Key interest rate	0.00	0.00	0.00	0.00		
Deposit of the Banking Department, BGN thousand	5 721 320	6 150 286	6 909 195	8 963 406		
Commercial banks reserves, BGN thousand	15 267 214	14 462 625	23 518 532	24 313 910		
Fiscal reserve at BNB, thousand BGN, as at 31 December	10 719 427	8 853 715	8 646 875	9 531 918		
Gross international foreign reserves, million BGN	49 036.9	48 574.2	60 333.9	67 666.3		
Loans to non-government sector, annual growth, %	8.4	9.3	4.4	8.7		
Household loans, annual growth, %	11.2	9.5	6.6	13.4		
Loans to non-financial corporations, annual growth, %	5.4	5.9	3.0	4.6		
Loans to financial corporations, annual growth, %	23.7	26.9	3.6	15.0		
House Price Index, total	6.6	6.0	4.6			
Current account balance, % GDP	0.9	1.9	-0.1	-0.4	- 5.4	- 2.8

Source: BNB, Eurostat

According to the BNB analysis (2022) risks to lower GDP growth are mainly associated with the military conflict in Ukraine and the emergence of additional disruptions in the supply of prime and raw materials from the countries involved in the war. There are risks to the inflation forecast of a stronger increase in prices. These risks are associated mainly with international commodity price dynamics. Other risks stem from possible changes in the regulated prices of electricity, water and sewerage services, and heating for household consumers in line with substantial rise in energy prices.

The European Commission Spring forecast (2022) reveals that annual inflation will rise to 11.2% in 2022 and starting to decline in 2023. The unemployment rate is expected to remain at 5.4% in 2022. The budget deficit will exceed 3% of GDP in 2022 while the government debt will remain at 25% of GDP.

In Romania, economic growth reached 5.9% in 2021. The unemployment fell to 2.7%, a level lower than before the pandemic. The HICP accelerated to 4.1% on an annual basis, with the main contributors again being the increase in private consumption and rising food and energy prices in the international market. In 2021, the budget deficit declined to 7.1% of GDP. As a result of expansionary monetary policy, the NBR balance sheet has substantially grown. While in 2019 total assets amounted to RON 194,556.1 mn, in 2020 it grew to 231,794. 0 mn and continued to rise in 2021. In February 2020 net foreign assets amounted to RON 203,671.7 mn that augmented to RON 231,314.8 mn in 2021 (NBR 2021, 2022).

Since the beginning of 2022, the NBR has continued to tighten monetary policy, raising the monetary policy rate by 0.50 percentage points, to 2.50%. Moreover, it decided to raise by 0.50 percentage points both the lending facility rate and the deposit facility rate, to 3.50% and 1.50% respectively, as well as to maintain firm control over money market liquidity. Furthermore, the NBR decided to keep the existing levels of minimum reserve requirement ratios on both leu- and foreign currency-denominated liabilities of credit institutions at 8% and 5% respectively[17]. In March 2022 the annual inflation reached 10.15%. This was mainly due to the increase in production costs, as a combined result of the energy crisis triggered in mid-2021 and the shock wave generated by the Russia-Ukraine war on the commodities markets. On 5th April 2022 the NBR decided to increase the monetary policy rate from 2.5% to 3% per year to counter the rising inflation (NBR 2022).

According to the European Commission (2022) Romania's economy is set to slow down to 2.6% in 2022 as high inflation erodes disposable income and Russia's war of aggression against Ukraine affects economic sentiment, supply-chains and ultimately investment. Unemployment is projected to stay at 5.5% while price level growth will peak in 2022. The general government deficit is forecast to reach 7.5% of GDP before decreasing to 6.3% in 2023, bringing the debt-to-GDP ratio up to 52.6% by 2023.

[17] https://www. bnr. ro/Reserve-requirements-3658-Mobile. aspx

Table 3 Macroeconomic and financial indicators for Romania

Indicators	2018	2019	2020	2021	2022	2023
GDP growth %	4.5	4.1	-3.9	5.9	2.6	3.6
Private consumption growth, %	7.7	3.9	- 5.1	7.9	2.9	3.5
Total deposits, annual change %	5.9	5.4	10.5			
Household deposit growth, annual change %	6.0	7.5	11.3			
Non-financial corporations deposit growth, annual change %	5.1	3.3	11.6			
FDI, % of GDP	3.0	2.9	1.4	3.7		
Gross fixed capital formation, % of GDP	- 1.1	12.9	4.1	2.3	4.8	8.1
HICP, %	4.1	3.9	2.3	4.1	8.9	5.1
Unemployment rate, %	3.3	2.9	3.4	5.6	5.5	5.3
General government expenditure, total % GDP	34.9	36.3	42.0	39.9		
External debt, total, % of GDP	48.8	49.2	57.7			
Government debt, % of GDP	34.7	35.3	47.3	48.8	50.9	52.6
General government balance % GDP	-2.8	-4.3	-9.3	- 7.1	- 7.5	- 6.3
Money supply (M3), % GDP	40.0	39.9	46.2			
Reserve money, lei million, December	100,349.8	108,249.3	132,624.8	143,265.2	Feb. 134,648.0	
Central bank balance sheet, lei million, December	190,252.5	194,556.1	231,794. 0	258,265.5	Feb. 262,029.5	
Monetary policy rate, % p.a	2.50	2.50	1.50	18/01/2021 - 1.25%; 06/10/2021 - 1.50%; 10/11/2021 - 1.75%	11/01/2022 - 2.00%; 10/02/2022 - 2.50%; 06/04/2022 - 3% 07/07/2022 – 4.75% 08/08/2022 – 5.50%	
Lending facility rate, % p.a	3.50	3.50	2.00	18/01/2021 - 1.75%; 06/10/2021 - 2.00%; 10/11/2021 - 2.50%	11/01/2022 - 3.00%; 10/02/2022 - 3.50%; 06/04/2022 - 4.00% 07/07/2022 – 5.75% 08/08/2022 – 6.50%	
Deposit facility rate, % p.a	1.50	1.50	1.00	18/01/2021 - 0.75%; 06/10/2021 - 1.00%; 10/11/2021 - 1.00%	11/01/2022 - 1.00%; 10/02/2022 - 1.50%; 06/04/2022 - 2.00% 07/07/2022 – 3.75% 08/08/2022 – 4.50%	
Due to domestic credit institutions and other financial institutions lei thousand	38, 67,447	43, 57,228	48, 93,048			

Current account of the State Treasury lei thousand	37, 424,485	23, 01,090	40, 318,645			
International reserves, total million euro	36,800.2	37,450.4	42,517.6	45,830.7		
Loans to the private sector - total, annual change %	1.9	3.6	2.4			
Loans to households, total, annual change %	4.5	3.8	3.4			
Loans to non-financial corporations, total, annual change %	-1.3	3.1	0.9			
Current account, balance, % of GDP	-4.6	-4.9	-5.8	-7.0	- 7.5	- 6.3

Sources: National Bank of Romania, NBR Annual reports 2019, 2020, Eurostat, NBR Monthly bulletin December 2019, 2020, February 2022, European Commission Spring 2022 Economic Forecast

The Serbian economy recorded a strong rebound in 2021. Real GDP growth reached 7.4%, mostly driven by private consumption, gross fixed capital formation and public consumption. The unemployment rate slightly increased in 2021. It is expected to decline in 2022 and 2023. The general government deficit and the debt-to-GDP ratio, after decreasing to 4.1% of GDP and 57.1% respectively in 2021, are expected to decrease in 2022 and 2023.

Banking sector stability has been preserved and further reinforced in 2021. At the same time, the central bank's balance sheet has grown due to the expansionary monetary policy. It expanded from RSD 1,789,983 mn in 2019 to RSD 1,935,018 mn in 2020 and to RSD 2,211,996 mn in 2021. The foreign assets rose from RSD 1,584,736 mn in 2019 to RSD 1,598,360 mn in 2020 and to RSD 1,947,103 mn in 2021. The net foreign assets were RSD 1,287,399 mn in 2019, and then increased to RSD 1,347,165 mn and RSD 1,744,488 mn in 2021.

Similar to Bulgaria and Romania, the European Commission's forecast (2022) reveals that the Serbian economy will grow more moderately by 3.4% in 2022 and by 3.8% in 2023. The inflation has accelerated since the second half of 2021. In March 2022 it rose to 9.1% and it is projected to peak in the middle of 2022. In May 2022, the NBS decided to increase the key policy rate by 0.5 pp to 2.0% due to the inflationary pressures in the global and domestic markets.

Table 4 Macroeconomic and financial indicators for Serbia

Indicators	2018	2019	2020	2021	2022	2023
GDP growth, %	4.5	4.3	-0.9	7.4	3.4	3.8
Private consumption growth, %	3.1	3.7	-1.9	7.6	3.6	3.8
Deposits, total, annual change %	8.77	8.80	8.54	8.76		
Household deposits, total, annual change %	9.2	8.9	8.9	8.8		
Deposits from non-financial corporations, total, annual change %	8.1	8.6	8.0	8.7		
Foreign direct investment, % of GDP	8.0	8.3	6.5			
Gross fixed capital formation, % of GDP	17.5	17.2	- 1.9	12.5	4.4	4.8
CPI, %	2.0	1.7	1.6	4.0	8.5	4.6
Unemployment rate, %	13.7	11.2	9.7	11.0	10.0	9.3
General government expenditure total % GDP	40.9	42.3	49.4			
Government debt % of GDP	53.6	51.9	57.0	57.1	54.5	52.5
General government balance % GDP	0.6	0.2	-8.3	-4.1	- 3.1	- 1.8
Monthly average wage in euro	419.8	466.0	510.9	560.2		
M3, annual change %	14.5	8.4	18.1	11.8		
Total reserve money, in million RSD	776,599	810,724	1, 009,731	1, 074,875		
Central bank balance sheet, in million RSD	1, 558,164	1, 789,983	1, 935,018	2, 211,996		
Key policy rate, %	3.0	2.25	1.00	1.00	1.50 (April) 2.00 (May) 2.50 (June) 2.75 (July) 3.00 (August) 3.50 (September)	
Discount rate, %	3.00	2.25	1.00	1.00	1.50 (April) 2.00 (May) 2.50 (June) 2.75 (July) 3.00 (August) 3.50 (September)	
Deposit facilities interest rate	1.25	0.75	0.10	0.10	0.50 (April)	

					1.00 (May) 1.50 (June) 1.75 (July) 2.00 (August) 2.50 (September)	
Lending facilities interest rate	4.25	3.50	1.90	1.90	2.50 (April) 3.00 (May) 3.50 (June) 3.75 (July) 4.00 (August) 4.50 (September)	
Banks' reserves with the NBS, million RSD	549,295	566,902	705,596	731,690		
Government deposits, million RSD	237,890	361,455	365,857	471,652		
Foreign exchange reserves, in million RSD	1, 331,088	1, 573,213	1, 586,352	1, 934,756		
Loans to the private sector - total, annual change %	9.15	9.21	9.10	9.20		
Loans to households, total, annual change %	8.9	9.2	8.9	9.0		
Loans to non-financial corporations, total, annual change %	9.4	9.3	9.2	9.3		
Loans to financial organisations, total, annual change %	- 11.4	8.5	9.3	- 10.5		
Current account, balance, % of GDP	-4.8	-6.9	-4.1	-4.4	-6.5	-6.4

Source: National Bank of Serbia, NBS Statistical bulletin January 2022, Eurostat, Macroeconomic developments in Serbia May 2022, European Commission Spring 2022 Economic Forecast

Conclusion

Based on the reactions and measures of the monetary and fiscal authorities during the pandemic, we can draw the following conclusions:

First, the nature of the measures and the scale of the interventions by the governments and the central banks in the three Balkan countries depend mostly on the monetary regime in place and the constraints it imposes on monetary and fiscal policy. Our analysis confirms the limited capacity of Bulgaria's conservative currency board regime to respond to external shocks. Unlike Bulgaria, the two inflation-targeting countries have used both conventional and unconventional monetary policy tools to mitigate the negative effects and recover from the crisis.

Second, under currency board regime, the central bank cannot influence interest rates, cannot create liquidity through the purchase of securities, through quantitative easing, and cannot carry out open market operations. Therefore, the creation of a monetary base and the growth of the central bank's balance sheet is tied to the balance of payments. Unlike the currency board arrangement in inflation targeting regimes, central banks acted as a lender of last resort for banks and the government and increased their balance sheets significantly during the pandemic. Furthermore, the NBS was also a lender of last resort to non-financial corporates, as local-currency denominated corporate bonds became eligible for open market operations and they could be used as collateral for banks to receive daily liquidity loans and short-term liquidity from the central bank.

Third, the constraints on fiscal policy under currency board have led to limited government intervention and have resulted in the smaller fiscal package in Bulgaria compared to those in Romania and Serbia. The limited fiscal space in Bulgaria is partly compensated by payments from EU funds and programmes. Despite the maintenance of a high fiscal reserve, which provides some opportunities for a government response, the fiscal policy has been restrictive and conservative in order to maintain the fixed exchange rate and the stability of the financial system.

Fourth, unlike in Romania and Serbia, where central banks used almost all conventional and unconventional monetary policy tools, in Bulgaria only supervisory and regulatory measures to the banking sector were implemented. In Bulgaria these measures included a ban on the distribution of retained earnings from previous years to strengthen the capital base, restrictions on the level of concentration and quality of assets in which banks can invest their liquid assets, maintaining the level of the countercyclical capital buffer, and a private moratorium on bank loan payments. The regulatory measures applied in the three countries broadly follow those taken by the ECB and the European Banking Authority.

Fifth, although in all three Balkan countries the banking system was highly liquid and stable before the pandemic, national central banks entered into precautionary swap (Bulgaria) and repo lines (Romania and Serbia) with the ECB to further strengthen financial stability in the crisis. The main reason is that the BNB cannot act as a lender of last resort. In Romania and Serbia, central banks have further increased their capacity to act as lender of last resort.

Sixth, as regards to the effects of monetary and fiscal measures on growth, employment and inflation, it is noteworthy that during the pandemic the two countries with inflation targeting achieved a lower decline in GDP than Bulgaria in 2020. In 2021, the Romanian and Serbian

economies have achieved a faster recovery, recording higher growth and lower inflation. However, Romania and Serbia have increased their budget deficits and public debt significantly during the Covid-19 crisis, while Bulgaria continues to be among the EU member states with the lowest deficit and government debt.

In the light of these finding we can deduce that now inflation control has become a major challenge for central banks in the post-pandemic time in the context of increased consumption and rising global energy and food prices, supply problems as well as the Russia – Ukraine war. Since the beginning of 2022 the inflation has rapidly surged in the three Balkan countries mainly due to geopolitical tensions and the negative developments in the world economy, imported inflation.

Since the beginning of the year, inflation has been growing rapidly in the three countries under consideration, with the strongest growth in Bulgaria. In Bulgaria, for August the general inflation on an annual basis reached 17.7%, or a monthly rate of 1.2% (for July, 17.3% and a monthly rate of 1.1%), and for food it was even higher, or 24.1% for August and 23.8% for July. Housing and utilities also grew significantly, or 26.8% for August and 18.5% for July. In Romania the numbers were lower, the general inflation on an annual basis for August was 15.32% (monthly 0.56%) and 14.96% for July (monthly 0.89%), and for food it was 18.22% for August and 16.05% for July. In Serbia, the figures for general inflation on an annual basis were even lower, namely, 13.2% for August and 12.8% for July. For food, it was higher, or 20.4% for August and 19.7% for July.

While the BNB does not have the tools to react to soaring prices, the NBR and NBS have started tightening monetary conditions by raising key monetary policy rates as well as lending and deposit facilities interest rates. From the beginning of 2022, the central banks of Romania and Serbia raised 6 times the key interest rates, which reached 5.5% in Romania and 3.5% in Serbia, respectively. The corridors of the marginal lending and deposit facilities rates have a margin of 1% around the key rate.

The monetary authorities in Bulgaria have little choice, and interest rates in Bulgaria follow those of the ECB. For now, the exchange rates in Romania and Serbia are relatively stable, and in Bulgaria the exchange rate is fixed within the framework of the currency board. The inflationary challenge to monetary policies is very strong, both in Romania and Serbia it will require a significantly higher rise in interest rates than in the euro area, as well as efforts to maintain the level of the exchange rate, which could become a major factor in pass-through inflation. In Bulgaria, things are more unpleasant, and only regulatory measures remain at the disposal of the monetary authorities, and above all an increase in capital buffers, - anti-cyclical, systemic and, under certain conditions, sectoral (greater provisioning for real estate loans). In any case, apart from inflation, it is clear that bank balance sheets will deteriorate, and this requires pre-emptive action by regulators.

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POST COVID-19 RECOVERY AND NEW CHALLENGES FOR CENTRAL AND EASTERN EUROPEAN COUNTRIES

Gergana Mihaylova-Borisova[1]

Abstract: *Following the severe pandemic crisis related to the spread of a new virus to humanity, the coronavirus COVID-19, economies are beginning to recover at different rates depending on the extent to which they have been affected by the crisis. The aim of the study is to analyse to what extent the Central and Eastern European (CEE) countries have been able to recover from the pandemic crisis and reach pre-crisis levels of their main economic indicators. Despite the successful recovery of most of them, the countries face new challenges posed by a number of internal and external factors such as accelerating inflation, expansionary monetary policies of central banks, declining bank profits as a result of increased costs, and the outbreak of war between Russia and Ukraine.*

Keywords: *economic growth, monetary policy, pandemic crisis, CEE countries*
JEL: *E22, E23, E31, E58*

1. Introduction

After a series of crises over the past two decades, in 2020 the whole world faces a new challenge posed by the spread of a new deadly and unknown virus to humanity. This gives rise to another crisis, the so-called pandemic crisis, which differs significantly from previous financial, banking, currency and debt crises, having a direct effect on specific markets and the economy as a whole. Initially, this crisis does not affect economies because of its nature. This crisis is a health crisis, a crisis affecting the health and lives of many people. However, in order to limit the spread of this deadly virus and to protect the lives of people all over the world, a number of measures are being taken, limiting direct communication and people meeting in one place, closing many businesses, digitising economies so that they can continue to function in a pandemic environment. This inevitably has an impact on the economic development of countries around the world, including those in CEE. Gradually, as the strength of the coronavirus weakens, people's lives are normalising, economies are beginning to recover and to report positive economic growth rates, after the negative ones reported at the end of 2020 because of the pandemic crisis. However, to what extent are economies able to recover from the pandemic crisis and are new obstacles to their economic development emerging?

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This study seeks to analyse to what extent CEE countries have been able to recover from the pandemic crisis and to identify new obstacles and challenges to their further recovery.

The countries covered are Bulgaria, Romania, Slovakia, Slovenia, Hungary, Czech Republic, Poland, Estonia, Lithuania and Latvia. The period of analysis is from 2018 to 2022 to cover the period before and after the pandemic crisis. Official statistical information, published by the Eurostat, is used.

The study argues that CEE countries have been able to recover from the COVID-19 crisis and maintain higher growth rates compared to the EU average. Convergence to the EU, the monetary regimes in place and the monetary policy applied, also taking into account the specificities of the economic development in most of them, as well as the attracted investments have positively influenced this. However, a number of external factors are confronting Central and Eastern European countries with new challenges, which will affect their future economic development.

The study is structured in several parts. In the second part, a literature review is carried out in relation to research on the economic development and factors for the economic growth in CEE countries. In the next part, the post-crisis recovery of Central and Eastern European countries is analyzed by examining the dynamics of several macroeconomic indicators such as economic growth, unemployment rate, consumption, investments and industrial production. The last part outlines the main challenges faced by the CEE countries.

2. Review of the literature

In reviewing the literature on the economic development of CEE countries, two groups of studies can be distinguished. The first group of studies includes those that are devoted to the economic development of an individual CEE country (Chobanov, 2019; Reichardt, 2011; Borisov, 2021a).The second includes studies that analyze economic development for the whole set of countries or several countries of CEE or look for the economic development determinants and/or the relationship of GDP growth with banking sector development for the countries covered (Pece et al., 2015; Yemelyanova, 2021; Umantsiv and Ishchenko, 2017; Pokrivcak et al., 2016; Setiawan et al., 2021; Borisov, 2022).

Pece et al. (2015) examine and estimate the determinants of long-term economic growth in three CEE countries - the Czech Republic, Poland and Hungary - using country-specific regression models. The authors demonstrate a positive relationship between innovation and economic development in the countries under consideration, using a number of indicators such as R&D expenditures, number of patents, etc. to capture innovation. The time period is from 2000 to 2013, covering also the period of the financial crisis.

A study of the relationship between the development of capital markets, the banking sector and economic growth in CEE countriesis done by Yemelyanova (2021). The researcher assesses the direction and strength of the relationship between financial development and economic growth for two periods 1999-2012 for 8 CEE countries (Hungary, Poland, Lithuania, Latvia, Estonia,

Slovakia, Czech Republic, Slovenia) and for the period 1999-2015 for 5 CEE countries (Slovakia, Czech Republic, Hungary, Slovenia, Poland). It is shown that there is an impact of both capital market development on the economic development of CEE countries and banking system development on economic performance for the period 1999-2015. However, the relationship between domestic credit to the private sector and economic growth in the countries studied is negative, which is explained by the financial crisis in 2007-2008.

Umantsiv and Ishchenko (2017) analyze the banking sector in several Central and Eastern European countries, namely Romania, Poland, Bulgaria, Ukraine and Belarus. The authors also investigate the role of the banking sector in the economic development of the analysed countries. The results of the banking sector analysis show both similarities and differences in the development of the banking sector in these countries. The positive relationship between real sector development and banking investment is also highlighted.

Setiawan et al. (2021) also examine the relationship between financial sector development and economic growth in ASEAN and CEE countries over the period 2002-2019. They argue that economic growth is influenced by the development of capital markets, and therefore recommend that policymakers should support the development of financial markets.

When analyzing the economic development of CEE countries, it is striking that a part of them refers to the performance of the countries during the global financial crisis of 2007-2008 and the post-crisis recovery from this crisis (Yemelyanova, 2021; Kozub-Idzkowsk et al., 2011; Badulescu et al., 2019; Brada et al., 2021; Curea et al., 2019; Miklaszewska and Kil, 2016; Nenovsky et al., 2010;). Among the diversity of studies, however, few stand out in the post-crisis recovery of Central and Eastern European countries from the COVID-19 crisis (Brada et al., 2021).

Kozub-Idzkowsk et al. (2011) analyse key macroeconomic indicators characterising the CEE countries, summarising the reasons for the crisis and the anti-crisis measures in these countries. It is found that the main causes of the crises in these countries after the financial crisis in the United States are external, such as the high dependence on capital in countries like Romania, Bulgaria and the Baltic countries, the decline in exports and the relationship with foreign banks. Of course, there are also internal factors for the crises, such as the rapid increase in wages, credit bubbles, high budget deficits, and weak institutional systems.

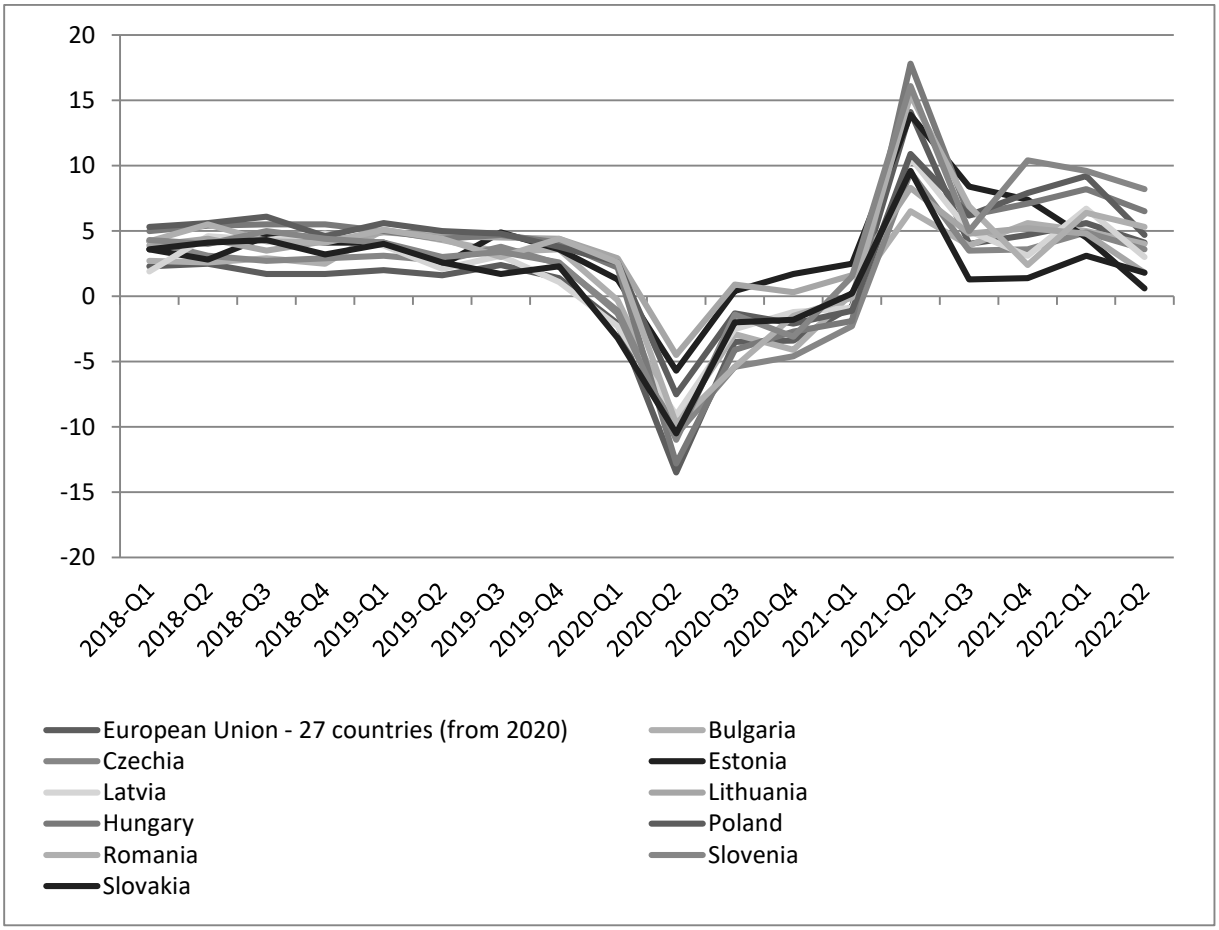
Given the limited research on the impact of the 2020 pandemic crisis on CEE countries, this study focuses specifically on the post-crisis recovery of CEE countries and identifying the main challenges they face.

3. Recovery from the COVID-19 crisis in CEE countries

To analyse the degree of recovery of the CEE economies, a set of indicators is used, such as real GDP growth, unemployment rate, consumption, investments and industrial production.

When tracking the dynamics of real GDP growth in the CEE countries, there were no significant deviations in the growth rates of individual countries before the crisis (Figure 1). Economic growth in the second quarter of 2019 was lowest in Latvia (2.1% annual growth) and highest in Poland (5% annual growth). The pandemic crisis and the closure of economies to stop the spread of the virus led to a more substantial performance differences among the CEE countries, with the highest decline reported by Hungary (12.8% annual decline in Q2 2020) and the lowest in Lithuania (4.5% annual decline in Q2 2020) and Estonia (5.7% annual decline in Q2 2020).

Figure 1. GDP growth rate, real, annual, %

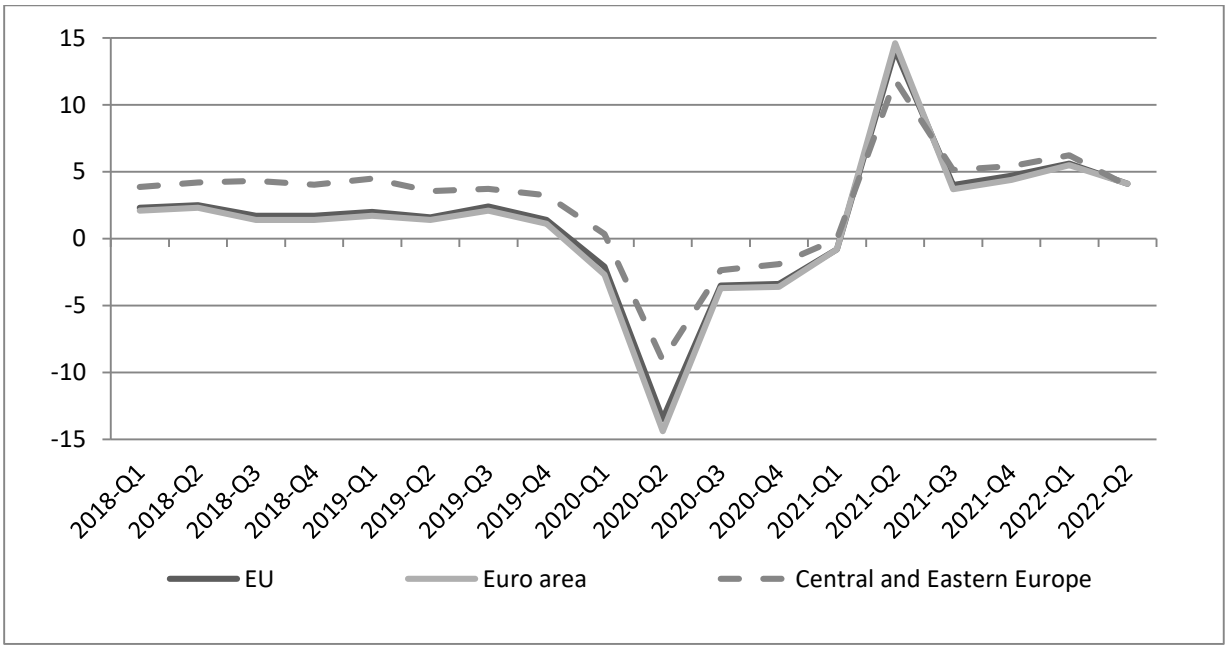


Source: Eurostat

With the loosening of restrictions and the opening up of economies in the second quarter of 2021, economies are recovering, but it is the countries with the biggest decline in the previous year that are more likely to grow because of the low base recorded a year earlier. The post-crisis recovery in CEE is characterised by larger differences in the economic performance of countries compared to the pre-crisis period. The difference in economic growth performance in the second quarter of 2022 ranged from 0.6% growth in Estonia to 8.2% in Slovenia.

Comparing the achieved economic growth in CEE countries on average with EU and Euro area countries, it is found that they also managed to maintain higher economic growth rates in the post-crisis period as well as in the pre-crisis period (Figure2). This is due to convergence and the need for these countries to converge more rapidly with EU countries in terms of income and prices.

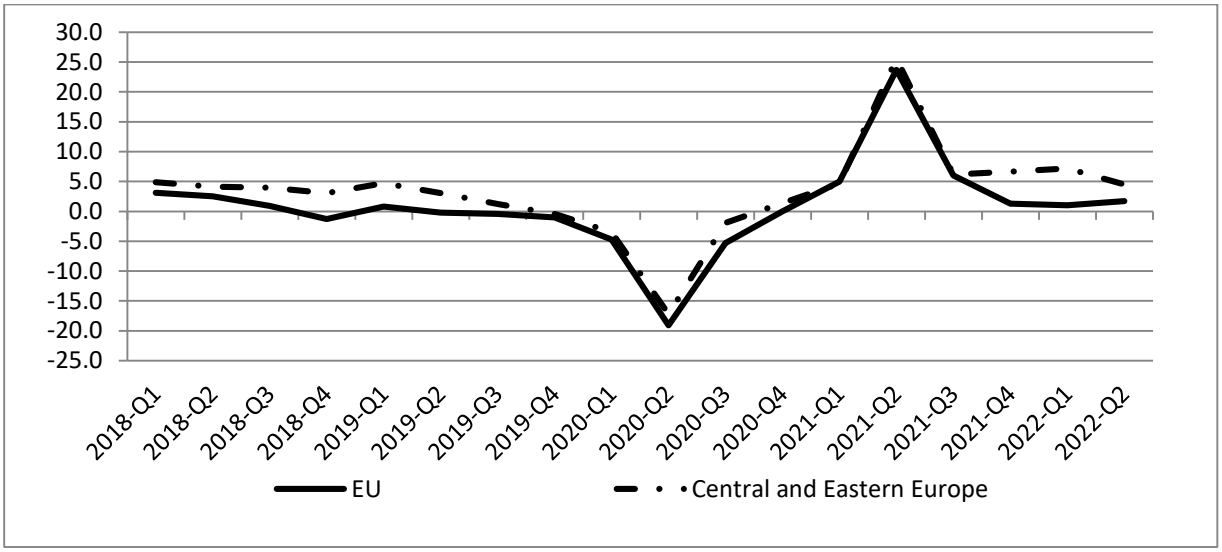
Figure 2. GDP growth rate in the EU, euro area and CEE countries, %



Source: Eurostat, own calculations

Economic growth in the post-crisis period in CEE, which has been higher than in the EU, has also been boosted by the faster recovery of industry in the post-crisis period. In CEE countries, industry grew at an average annual rate of around 7% in the recovery quarters, compared to an average growth rate of around 4% before the pandemic crisis (Figure 3). The pandemic had a positive impact on some industry sectors such as basic pharmaceuticals, coke and refined petroleum products, textile industry.

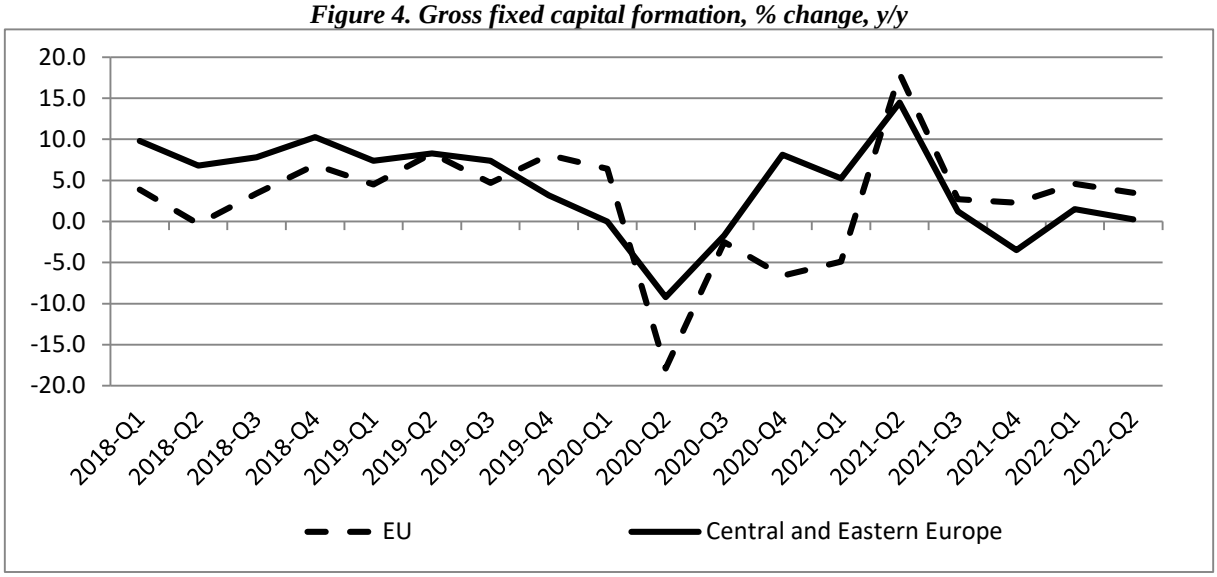
Figure 3. Industrial production, % change, y/y



Source: Eurostat, own calculations.

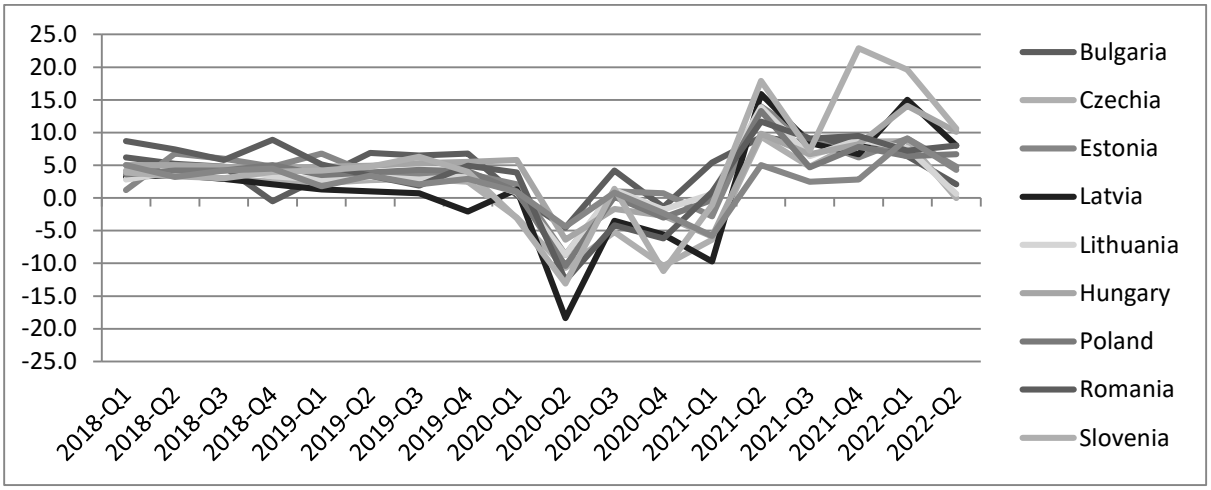
In the second quarter of 2022, however, the average economic growth in CEE is reported to be lower than the EU and euro area average. This weaker performance is due to a substantial contraction in fixed capital investment in the second quarter of 2022 in Central and Eastern European countries, where it grew by only 0.2% year-on-year, while in EU countries the reported average growth was 3.5%, marking a slight decline of 1.1 percentage points from the previous first quarter of 2022 (Figure 4). Household consumption also contributed to the slowdown in economic growth in CEE countries in Q2 2022, with all countries except Romania and Poland reporting a decline of more than 5 percentage points in household consumption growth in Q2 compared to Q1 2022 on an annualised basis (Figure 5). Countries are reaching consumption growth rates below those recorded in the pre-crisis years, partly due to household incomes being constrained by rising inflation rates.

Figure 4. Gross fixed capital formation, % change, y/y



Source: Eurostat

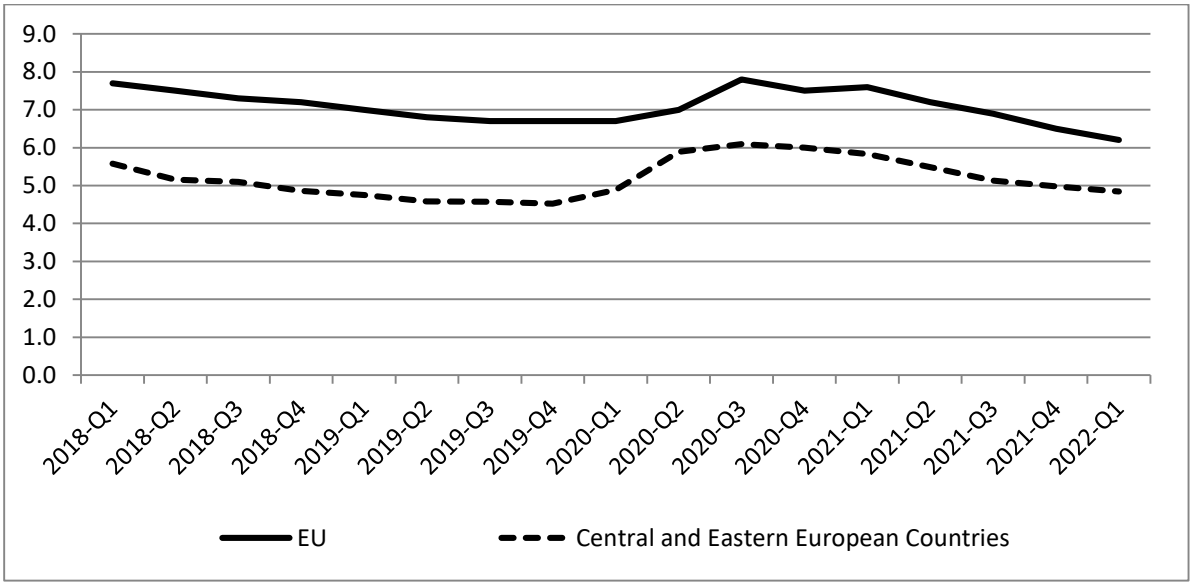
Figure 5. Fixed consumption expenditures of households, % change, y/y



Source: Eurostat

The better performance of CEE countries in terms of economic growth is also associated with lower unemployment rates. Unemployment rates in these countries before the COVID-19 crisis were below 5%, which is very close to the understanding of a natural rate of unemployment (Figure 6). Economies are using their potential to produce more and to converge more rapidly to EU countries. In the pandemic crisis, unemployment increased not only in the EU but also in the CEE countries due to the closure of businesses and economies, but unemployment remained much higher in the EU countries. In the post-crisis recovery, the gap between the average unemployment rate for EU countries and CEE countries is narrowing, which is also consistent with economic growth figures.

Figure 6. Unemployment rate, %



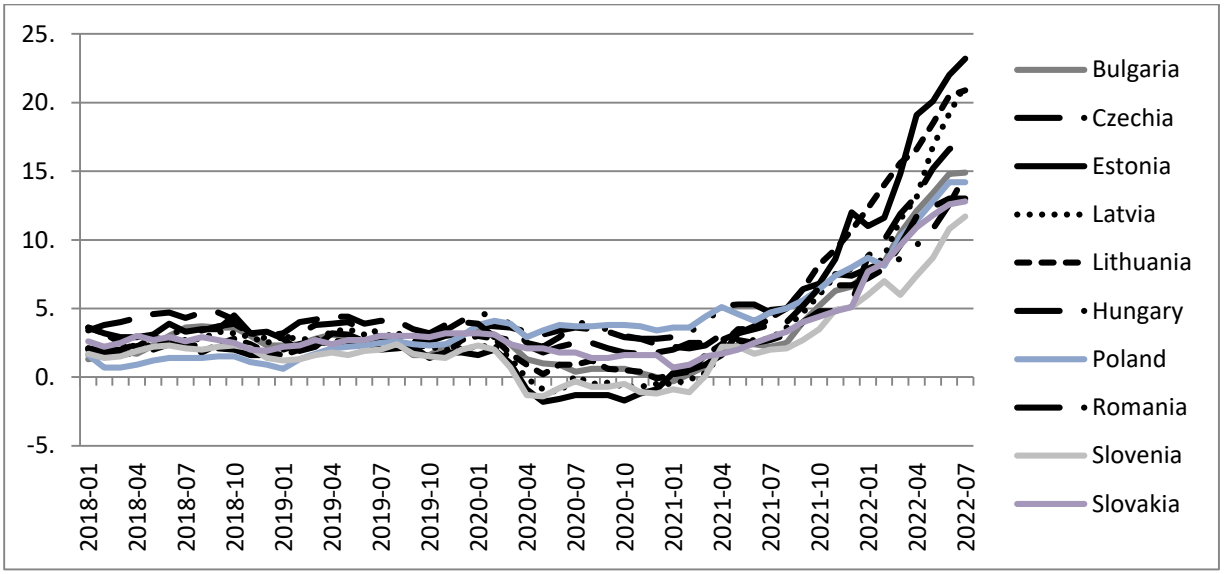
Source: Eurostat, own calculations

4. New challenges

The post-crisis recovery of the CEE countries is faster than that of the EU underlined in the analysis of data on economic growth, industrial production, unemployment. But, in the last quarter of 2022, the countries of Central and Eastern Europe face new challenges, as does the whole world.

On a global scale, the outbreak of war between Russia and Ukraine is leading to a significant restriction of trade relations between countries in the world, including between Russia and Europe, due to the sanctions imposed by the EU and the US against the aggressor. This is also affecting the growth of CEE countries, which for the first time recorded lower growth than the EU average in the second quarter of 2022. These are countries that are heavily dependent on imports of energy raw materials and products such as gas and oil. The suspension of gas and oil supplies from Russia as a countermeasure by Russia against the sanctions imposed is leading to a significant rise in the prices of these energy raw materials in Europe, and to a greater extent in the countries of CEE. In the absence of alternative sources of energy raw materials and the need for more time to diversify sources, energy prices are rising dramatically, which is putting CEE countries into shock. The countries with the highest inflation in August 2022 are Estonia, the Czech Republic, Latvia Lithuania and Bulgaria, where year-on-year inflation reaches 25.2%, 17%, 20.8%, 21.1% and 15% respectively (Figure 7). These are inflation rates not reached since the transition to a market economy in these countries. The situation is similar in large economies such as the US, the UK, where as early as the end of 2021 inflation rates are reaching levels that have not been seen in the last 30-40 years (Borisov, 2021b).

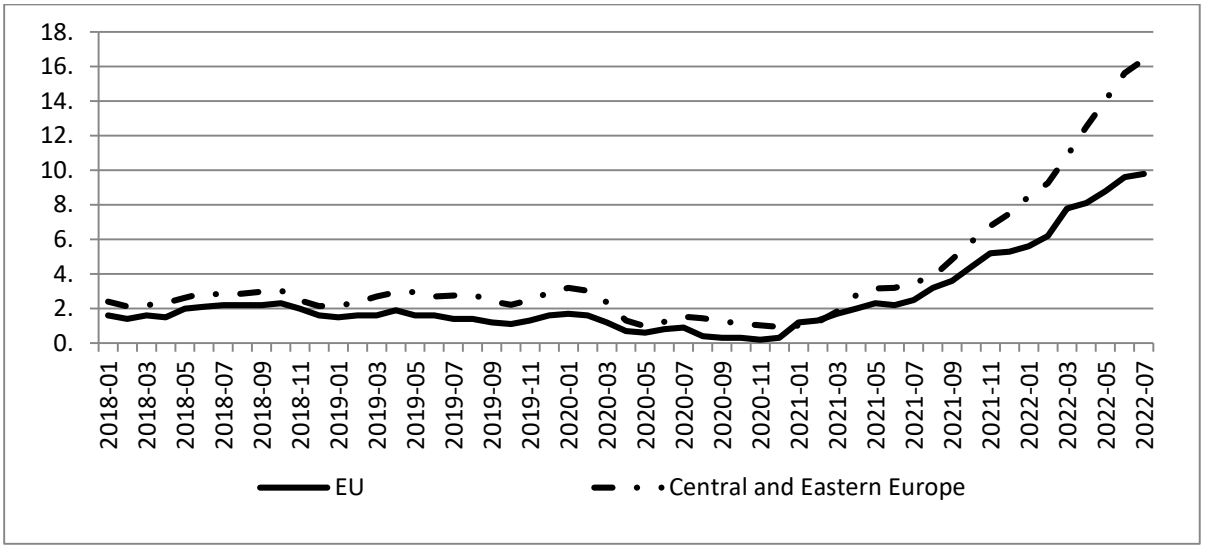
Figure 7. Inflation, HICP, %



Source: Eurostat, own calculations

When comparing the average inflation in the CEE countries and the EU countries, the acceleration of inflation in the first group of countries is more significant. It is this rising inflation in CEE countries that presents them with new challenges for their economic development. This also calls into question not only the nominal convergence, but also the real convergence of some of the CEE countries that have not yet joined the euro area. It should be borne in mind that this inflation is not only due to the incorrect policies of the central banks in these countries or the monetary regimes applied, because inflation is not only caused by the central banks' overly expansionary monetary policy, but also by external factors such as the war between Ukraine and Russia and the limited supply of energy raw materials.

Figure 8. Inflation in EU and Central and Eastern European countries, %



Source: Eurostat, own calculations

Often, accelerating inflation in countries like Estonia and Lithuania, for example, is associated with the departure of a hard monetary regime under strict rules - a currency board that contributes to stabilising inflation and bringing it from the anchor country. Estonia and Lithuania became members of the euro area by leaving the currency boards introduced in the early 1990s (Nenovsky et al., 2001), and succeeded in stabilising their economies after severe financial crises (Fabis and Rodic, 2013). In the current situation, however, accelerating inflation is not associated with these countries leaving the currency boards and joining the euro area. If that were the case, why is Bulgaria, which is currently in a currency board, also reporting some of the highest inflation rates that are not commensurate with the EU average of 10.1% in August 2022?

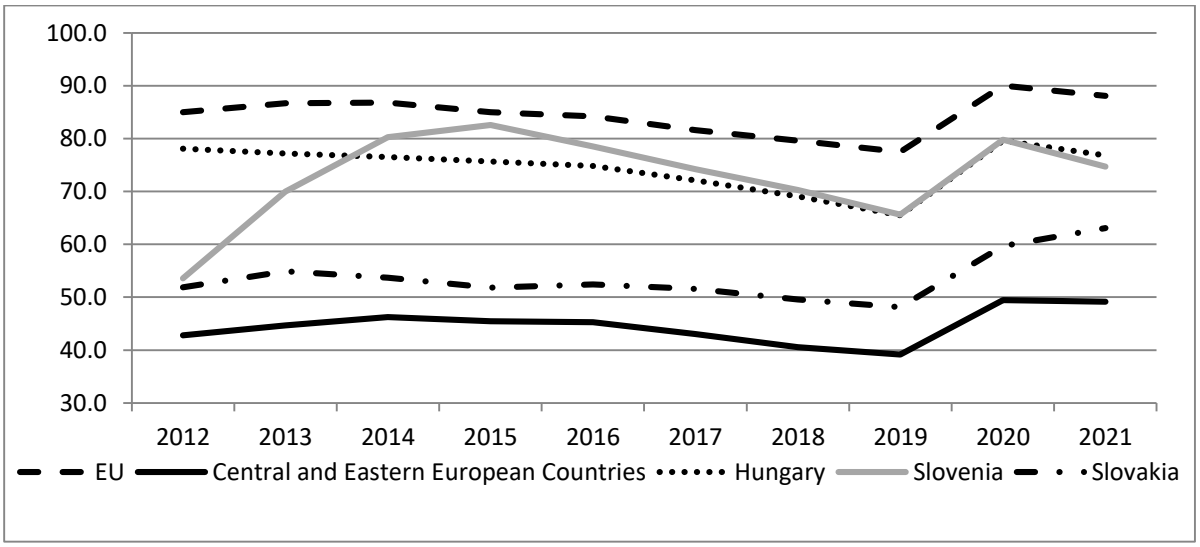
Before drawing any conclusions on whether the monetary regime and central bank actions have led to an increase in inflation, price increases of major groups in the consumer basket should be tracked. Central bank actions at the onset of the pandemic crisis were aimed at injecting additional liquidity through asset purchases in certain markets (Mihaylova- Borisova, 2021a; Mihaylova-Borisova, 2021b), with excessive liquidity injections leading to some acceleration in inflation since the second half of 2021. But, in 2022, additional external factors influence the accelerating inflation, which reaches over 20% in some countries. In the consumer basket of Estonia and Lithuania, there is a substantial increase of over 100% y-o-y in electricity prices, leading to a significant increase in inflation.

Another challenge countries face is the need to change the course of central banks' monetary policy. While after the global financial crisis, the question was whether countries would fall into a deflationary spiral (Mihaylova-Borisova, 2016), after the pandemic crisis, the question was whether the countries would fall into an inflationary spiral and how this inflation should be contained. After the global financial crisis, leading central banks such as the ECB and the

Fed launched massive asset purchase programs in various markets and cut interest rates to stimulate countries' economies by increasing incentives for lending and investment. In the current situation of accelerating inflation, central banks are starting to raise interest rates after more than ten years at zero interest rates. These actions have been taken by the ECB, the Polish Central Bank, the Hungarian Central Bank and the Romanian Central Bank, and the countries' banking systems will be faced with the need to increase the cost of providing credit, which will also affect their volumes, and hence, additionally, consumption, investment and economic growth, which is already slowing significantly. The risk of the CEE countries falling into recession is very high, with investment growth reported at almost zero already in the second quarter of 2022.

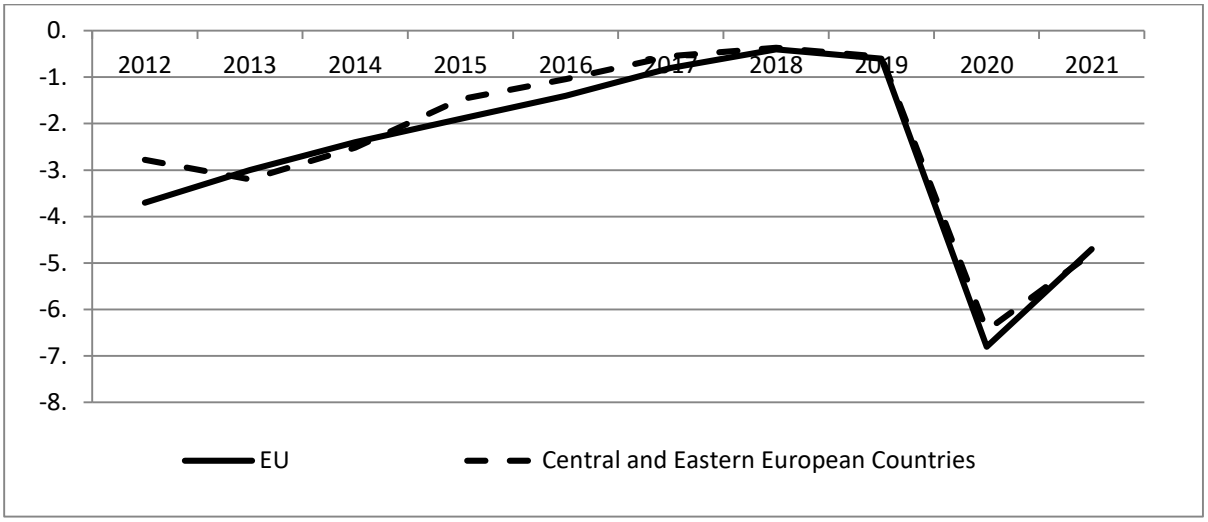
Last but not least, the high levels of government debt and the budget deficits realised in the CEE countries have to be taken into account. High levels of government debt in some countries such as Hungary, Slovenia and Slovakia (Figure 9) and rising interest rates will lead to higher debt servicing costs for these countries, which in turn puts greater risk and pressure on the realised budget deficits of these countries, which are above 5% of GDP in 2021.

Figure 9. Government debt, % of GDP



Source: Eurostat, own calculations

Figure 10. Government deficit, % of GDP



Source: Eurostat, own calculations

5. Conclusions

The study analysed the economic development of CEE countries, namely Bulgaria, Romania, Slovakia, Slovenia, Czech Republic, Hungary, Poland, Estonia, Lithuania and Latvia. The period of analysis is from 2018 to 2022, for the purpose of covering the period before and after the pandemic crisis.

The analysis showed that the CEE can recover from the pandemic crisis and reach their pre-crisis levels of key economic indicators. Convergence towards the EU, the monetary regimes in place and the monetary policy applied, which also takes into account the specificities of the economic development of most of them, as well as the attracted investments have positively influenced this. However, a number of external factors, such as accelerating inflation, expansionary monetary policies of leading central banks, the outbreak of the war between Russia and Ukraine, present the countries of CEEe with new challenges, which will affect their future economic development. The first signs of the looming recession are already visible with the registered significantly lower GDP growth in the CEE countries. The need to tackle rising inflation globally, including in the CEE countries, will inevitably push countries to the brink of recession.

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THE DISTRIBUTION PHASE AND THE SHORT-TERM RISKS FOR THE UNIVERSAL PENSION FUNDS IN BULGARIA

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Abstract

The newly adopted legislation that regulates the pay-out phase for the universal pension funds in Bulgaria and the continuously rising minimum amount of the pension benefit due by the first pillar of the system started to distort the incentives for the insured individuals in a surprising way. Those with small amount of savings are more interested to stay within their pension fund than those who were able to accumulate bigger amount during the accumulation period. The current research is trying to put some light on this strange situation. The first part of the paper describes some specific moments from the new regulation that concern the distribution phase and the second part provides some estimates about individuals from different income groups and the probability of choosing to stay in their pension fund and not to transfer their savings into the first pillar of the system. The paper concludes with some recommendations about future reforms that could strengthen the pension system in the country.

Key words: *pension funds, distribution phase, investment results, risks*

JEL: *G11, G12, G22, G23*

1. The Pay-out phase for the universal pension funds in Bulgaria – specifics and short-term challenges

The universal pension funds in Bulgaria have been gradually entering the mature state of their development. After two decades of accumulating resources, they went into the distribution phase in the late 2021. The start of this new stage is marked with some new risks and challenges both for the pension funds and for the insured individuals. According to Blake (2006) insured individual bears a number of risks in the phase of distribution: interest – rate risk, inflation risk, income risk. Rocha and Vittas (2010) define some other risks, among them – longevity risk (the risk of outliving the accrued resources), investment risk, liquidity risk, bequest risk and bankruptcy risk. Asher and Nandy (2006) point also as a specific problem survivors' benefits

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and disability insurance since "life-time labour force participation of women is relatively low" in developing countries such as India. Szczepanski and Brzeczek (2013) mention also market liquidity risk regarding those countries with developing financial markets. All these risks, if realized, could affect adversely the amount of pension benefit granted to the insured individual. In case of mandatory insurance, as it is in Bulgaria, the State also bears specific responsibility. It must introduce right regulation and then constantly monitor pension funds to observe and keep the rules. In this sense, Pandurska (2018) rightly notes that after the reform made in 2015[2] many insured individuals have faced the dilemma whether to stay in their chosen pension fund or to transfer their accumulated resources into the first pillar of the system. That is a typical example of a normative change that raises the risks and concerns about the system, though the initial idea is to make the system more flexible and protect those insured individuals with minor savings. Daneva (2018) also stresses on the right regulation concerning the individuals' freedom of choice on the risk profile of the portfolio of managed assets. The so called multifund pension system has been discussed for many years in the country but still not introduced in practice. The reform made in Bulgaria in the early 2000's followed the example of several countries in Central Europe, mostly that of Hungary (1998) and Poland (1999). Gochev and Manov (2003) point that the new structure of the pension system should incentivise young generations to take care of their own future. Unfortunately two decades after the reform, pension insurance is not so popular among the new generations as it was expected. The fact that people are allowed to save for a supplementary pension benefit in a specially structured institutions is not enough to popularize this type of insurance. There are also some other drawbacks that should be taken into account when assessing the overall performance of second and third pillars of the pension systems. Zukowski (2013) acknowledged that a few countries that reformed their pension systems in the late 1990's scaled back to a certain extend their fully funded pillars. Hughes (2013) also notes that the example of Ireland of introducing fully funded personal pension accounts is not satisfying. In addition, Bielawska (2015) stresses on some difficulties that these types of systems have in many of the countries. In this sense are also the remarks of Casey (2013), Vostatek (2013) and Sebo and Virdzek (2013). However, despite the various obstacles in the accumulation period, Bulgarian fully funded universal pension funds reached the state of paying pension benefits to the insured individuals. But at this stage it is expected some new challenges to appear, and their right addressing would be crucial for the future of this type of pension schemes. The basic aim of the current paper is to identify and describe these new risks and challenges in the Bulgarian case, to evaluate them and to recommend certain policy changes that could made the funds viable in the middle term. The methods used in the research are mainly descriptive, comparative and statistical analysis.

[2] In 2015 the insured individuals were given the option to transfer their accumulated resources from the second pillar pension fund into the pay-as-you-go part of the pension system.

The beginning of the pay-out phase in Bulgaria has been accompanied by a very dynamic economic environment. The pandemic crisis, Russian invasion in Ukraine, energy crisis and high inflation are factors that affect seriously public finances and the pension system which accounts for almost a quarter of the public expenditures in Bulgaria. The second pillar of the pension system in the country was thought to be a supplementary part of the whole pension system thus making many of the decisions taken about pay-as-you-go part of the system strongly affect the fully funded part of it. Distribution phase of the pension funds concerns the payment of the benefit. The last depends strongly on the amount accumulated into one's individual account towards the date of retirement. However, the exact amount of the benefit is influenced by many factors, for example, the way, the technical interest rate is determined; whether individual's sex influences the pension amount (women live longer than men); whether accumulated resources are inherited if individual dies soon after he/she is granted the benefit etc., etc. These are details that had to be regulated by the new legislation and they are common to all defined contribution pension schemes that operate around the World. In Bulgaria, however, there is one specific element that concerns only the system in the country – it is the way the pension benefit due by the pay-as-you-go part of the system is reduced. That is an important factor because it has a potential to ruin the whole structure of the pension system if the amount taken from the benefit due by the state is higher than the one determined as a supplementary benefit by the universal pension fund. It's worth mentioning that the role of the universal pension funds in Bulgaria is considered to be twofold still from the very beginning of the pension reform made in the early 2000's. First, they are seen as institutions that provide additional payment towards insured individuals and in this way, they support the process of reaching replacement ratios more adequate to the preretirement income of the pensioners in the long term (Gochev, Manov 2003), (Kirov 2010). Second, they are assumed as structures that are expected to waive part of the financial burden laid on the pay-as-you-go pillar of the system[3] (World bank, 1994). The last has been experiencing constant deficits for decades mainly due to the deteriorating demographic structure and the aging of the population – two factors that are detrimental to the pay-as-you-go part of the system. The wish to gradually relax the financial condition of the first column of the system is in the base of the adopted controversial procedure of reducing the pension benefit to those individuals who have individual account into a pension fund. The initial regulation required the pension benefit due by the pay-as-you-go pillar to be reduced by a coefficient roughly equal to the ratio between the amount of the contribution due for the second and that for the first pillar of the system. That was a regulation considered by pension fund industry as quite unfair especially for the first cohort of retirees[4]. There are at least two reasons for this assertion. First, those who were born during the first half of 1960's were in

[3] The Social security code (the main normative act that regulates the whole pension system in Bulgaria) has determined the exact way of reducing the pension amount due by the first pillar of the system since its first issue in 1999

[4] The first cohort of retirees are women born in 1960

their 40's in 2002, when universal pension funds started activity. This means that a significant part of their insurable period had been passed before they started to pay contributions into their pension fund. Second, the adopted procedure of estimating the ratio between the contribution due for the second pillar of the system and that for the first one doesn't take into account the huge deficit of the state pension system.

Table 1. Budget of the State PAYG Pension Fund (thousands of euro)

Year	Revenue	Expenses	Deficit	Year	Revenue	Expenses	Deficit
2002	1 053 438	1 507 915	-30,14%	**2012**	1 500 770	3 564 282	-57,89%
2003	1 236 585	1 600 872	-22,76%	**2013**	1 692 897	3 850 580	-56,04%
2004	1 285 491	1 763 583	-27,11%	**2014**	1 723 721	3 974 404	-56,63%
2005	1 236 399	1 946 351	-36,48%	**2015**	1 780 841	4 095 209	-56,51%
2006	1 187 306	2 129 118	-44,23%	**2016**	1 941 680	4 271 086	-54,54%
2007	1 317 640	2 293 997	-42,56%	**2017**	2 230 717	4 382 906	-49,10%
2008	1 560 631	2 597 717	-39,92%	**2018**	2 610 417	4 657 449	-43,95%
2009	1 716 268	3 216 613	-46,64%	**2019**	2 980 829	4 934 954	-39.87%
2010	1 333 735	3 448 400	-61,32%	**2020**	3 052 245	5 296 494	-42.37%
2011	1 576 099	3 440 775	-54,19%	**2021**	3 611 917	6 557 836	-44.92%

Source: National Social Security Institute, www.noi.bg

The figures of the above table show that the deficit of the state pension system is significant for each of the years between 2002 and 2021. The registered shortage is financed by a generous subsidy transferred from the state budget. This means that the "real" contribution for the first pillar of the system is several times higher than the one used for the estimation of the reduction coefficient. Before the start of the distribution phase in Bulgaria, the regulators took into account the first mentioned factor and they changed the legislation so that to reflect the shorter period of time for which women born in 1960's have been insured into a private pension fund but they didn't pay attention to the second mentioned one. However, the reduction coefficient was lowered from roughly 20% to a level of around 10%. That was a crucial change that made possible pension funds to enter the pay-out phase without turbulence. Those insured individuals without missing periods of paid contributions are motivated to stay in the pension fund and not to transfer their resources into the first pillar. The decision was important because it showed that pension funds can fulfill their rule if legislation treats them fairly. The proper regulation is of utmost importance if the state really wishes to encourage people to save and to rely on these savings during their retirement.

At the start of the distribution phase another much more complicated issue appeared on the surface. It is well known that one of the most important risk factors for the fully funded pension system is the rate of inflation. Keeping purchasing power of money is important for all types of pension schemes but it is expected that pay-as-you-go pension systems tend to manage this type of risk easier (Davis 1995). Fully funded pension schemes are supposed to realize yield higher

than the reported inflation in order to increase the savings of the insured individuals in real terms. The start of the pay-out phase in Bulgaria coincided with globally unstable economic environment where inflation started to create troubles for policymakers after a prolong period of extremely loose monetary policy followed by the main central banks (mostly Fed and ECB). At the same time, in Bulgaria, the unstable situation was fostered additionally by the political crisis which hit the country in 2021. The mixture of rising inflation and extremely volatile political environment provoked unprecedented rise in pension benefits in a period of couple of months. It's interesting to note that pension benefits that rose the most are those with the minimum amount.

Table 2. Minimum, average and maximum amount of length of service and old age pension benefit due by the state pay-as-you-go pension system

Period	**Min. amount of length of service and old age pension benefit (in levs)**	**Min. amount of length of service and old age pension benefit (in euro)**	**Rise:**
01.01.2021 – 24.12.2021	300	153.39	
25.12.2021 – 01.07.2022	370	189.18	18.92%
01.07.2022	467	238.77	20.77%
Period	**Average amount of length of service and old age pension benefit (in levs)[5]**	**Average amount of length of service and old age pension benefit (in euro)**	**Rise:**
01.01.2021 – 24.12.2021	486,50	248.74	
25.12.2021 – 01.07.2022	573.00	292.97	15.10%
01.07.2022	580.50	296.80	1.29%
Period	**Max. amount of length of service and old age pension benefit (in levs)**	**Max. amount of length of service and old age pension benefit (in euro)**	**Rise:**
01.01.2021 – 24.12.2021	1 440	736.26	
25.12.2021 – 01.07.2022	1 500	766.94	4%
01.07.2022	2 000	1 022.58	25%

Source: ww.noi.bg (National Social Security Institute), own calculations

The factors that influenced this significant increase of the first pillar pension benefits are: the rise of the minimum and maximum amount of the benefit and the serious increase of the weight of one year[6] of insurable period in the formula, used for estimating the exact amount of the

[5] The average amount of the pension benefit in 2022 is based on preliminary estimations

[6] The weight of each year of insurable period in the formula used for the estimation of the pay-as-you go benefits is raised from 1.2% to 1.35%

benefits. The rise of the pension benefits due by the pay-as-you-go pillar of the pension system could have some unexpected consequences for the fully – funded part of it. Surprisingly it stimulates the insured with small accumulations to stay in their pension fund and those with larger accumulations to flee and transfer their resources into the first pillar of the system. The basic reason for this is that the increase of the minimum amount is done mostly on populist grounds, provoked by the inflation rate, but far away from the level of contributions paid by the insured individuals throughout their working careers.

2. The Choice between fully funded and pay-as-you go pension system in Bulgaria – short-term incentives for individuals from different income groups

The choice between fully funded part of the system and the pay-as-you-go one is very serious for all individuals whose retirement is coming close. The choice must be made at least 5 years before reaching pension age and it depends strongly on the amount of the pension benefit due by the first and by the second pillar. Under the current normative rules, it is possible the combined pension benefits due by both pillars to be in smaller amount than benefit granted only from the first pillar. In this case, the insured individual must have transferred the accumulated resources from the pension fund into the pay-as-you go pillar.

If estimated on the adopted pension formula, the amount of the benefit for individual who has contributed on the minimum amount of insurable income throughout his/her whole working life cannot exceed 262 levs per month (133.96 euro per month). The exact assumptions are shown in the next table:

Table 3: Estimated pension amount of individual who have contributed on the minimum insurable income[7]

Start of working career	**01.01.1985**
End of working career	**31.12.2021**
Insurable period	**36 years**
Weight of each year in insurable period for estimating the benefit	**1.35%**
Individual coefficient	**0.46**
Reduced individual coefficient	**0.417**
Weighted average national insurable income for the last 12 months before retirement	**1 161.23 levs**
Pension amount	**261.97 levs**

[7] The example concerns the retirement of a woman born after 31.12.1959 and completely corresponds to the adopted normative rules laid in the Social Security Code.

Reduced pension amount	**235.54 levs**
Difference between full pension amount and reduced pension amount	**26.43 levs**

Source: own calculations

The estimated pension amount shows that it is not even closer to the minimum amount approved by the government in 2022 and valid since 01.07.2022. (467 levs) The difference with the full pension amount is 205.03 levs (78.26% higher than the amount corresponding to the paid contributions). The difference with the reduced pension amount is 231.46 levs (98.27% higher than the amount corresponding to the paid contributions). These individuals have strong motivation to stay into the pension fund because their first pillar pension amount cannot be granted in amount of less than 467 levs. In this case the pension received from the second pillar is not expected to fulfil any difference caused by a reduction of the amount of pay-as-you-go part of the benefit. It is going to be a pure bonus for these individuals. On the other hand, individuals who have contributed on the maximum level of insurable income[8] during their whole working period have strong incentive to cancel their insurance into the second pillar and to transfer their accumulated resources into the pay-as-you-go part of the system.

Table 4: Estimated pension amount of individual who have contributed on the maximum insurable income

Start of working career	**01.01.1985**
End of working career	**31.12.2021**
Insurable period	**36 years**
Weight of each year in insurable period for estimating the benefit	**1.35%**
Individual coefficient	**3.46**
Reduced individual coefficient	**3.08**
Weighted average national insurable income for the last 12 months before retirement	**1 161.23 levs**
Pension amount	**1 949.98 levs**
Reduced pension amount	**1 738.33 levs**
Difference between full pension amount and reduced pension amount	**211.65 levs**

Source: own calculations

[8] In Bulgaria, there is maximum amount of insurable income which is approved every year with the adoption of the Social security budget act. 3 400 levs (at around 1 700 euro) per month is the maximum amount in 2022

The figures in the table above show that individuals who have contributed on the maximum amount of the approved insurable income must be granted at least 211.65 levs by their pension fund to stay in it. The calculations for the different pension funds indicate that depending on the realized yield throughout the years the pension amount varies between 126.96 levs and 149.71 levs. The significant increase of pay-as-you-go benefit is caused by both the rise of the weight of one year of insurable period (from 1.20% to 1.35%) and the increase of the maximum amount of the benefit due by the state (from 1 440 levs to 2 000 levs). These normative rule changes raise once again the question of how exactly to estimate the reduction coefficient for the benefits due by the first pillar of the system. The deficit of the state pension system is expected to rise significantly in 2022 and to exceed 50%. The pay-as-you-go scheme cannot afford such increase of pension benefits if it relies solely on the contributions paid by the current workers. It's fairly to admit that the resources collected via the general taxation and transferred into the state pension system must be taken into account when estimating the amount of reduction. If there is no change in the normative rules about this specific coefficient, pension funds are going to lose the individuals with the highest accumulations into their accounts.
The situation is quite the same for individuals who have contributed on the average amount of insurable income throughout their working careers.

Table 5: Estimated pension amount of individual who have contributed on average insurable income

Start of working career	**01.01.1985**
End of working career	**31.12.2021**
Insurable period	**36 years**
Weight of each year in insurable period for estimating the benefit	**1.35%**
Individual coefficient	**1.00**
Reduced individual coefficient	**0.897**
Weighted average national insurable income for the last 12 months before retirement	**1 161.23 levs**
Pension amount	**564.36 levs**
Reduced pension amount	**506.35 levs**
Difference between full pension amount and reduced pension amount	**58.01 levs**

Source: own calculations

The figures in the table above show that after the last changes in the pension legislation, second pillar pension funds have been put in quite unfavorable position. The estimated difference expected to be covered by them is 58.01 levs. The various pension funds, depending on the yield realized throughout the accumulation period, can offer benefits in the range between 40.27 levs and 47.37 levs. So, it is really crucial pension legislation to be changed in a way that fully reflects the proportions of the paid contributions for the first and for the second pillar. Otherwise, insured individuals have strong incentive to abandon the fully funded part of the system and in this way to lose part of their benefits. The problem has a moral aspect too. Those insured that are within the low-income group of the society receive 205.03 levs per month more than they would have if the benefit were estimated in accordance with the paid contributions. At the same time they are not obligated to transfer their accumulated resources into the first pillar. For a period of 17.87 years (the average life expectancy after retirement in Bulgaria) and 2% technical interest rate per year the total amount granted by the state is 36 942.21 levs. One could easily speculate on this gift by asserting that these are money accumulated by individuals in high income group of the society who have transferred their resources into the state pension system. Depending on the yield realized by the various pension funds, the amount accumulated by an individual who has contributed on the highest possible insurable income throughout the accumulation period ranges between 26 398.63 levs and 29 656.51 levs. The issue with the regulation that creates right incentives for the insured individuals appears on the surface once again. The fundamental question is: does Bulgarian pension system need fully funded component at all? For the first cohort of retirees the amount accumulated into their individual account is comparatively small. This is mostly due to three basic factors: first, the accumulation period is at about half of that, what would be for individuals who started to contribute from the first day of their working careers; second, both the contribution rate and insurable income were significantly lower at the beginning of 2000's than they are in the last years (the contribution rate initially was 2% and it was raised to 5% in 2007, the average insurable income in 2002 was 259.75 levs, in 2021 it was 1 169.23 levs - 450% higher); third, the yield realized by pension funds on average was adversely influenced by two things: very conservative investment limits at the beginning of their activity and extremely low interest rates introduced and supported by the main central banks after the Global financial crisis of 2008 and the pandemic crisis of 2020. The influence of these tree factors is expected to gradually diminish in the next years. First, for the new retirees the insurable period in the second pillar is going to be longer with each consecutive year. Second, the income on which contributions are due is not expected to reach the low levels of 2002, although the pace of increase would be slower. And last, but not the least, interest rates could hardly go into a negative territory once again, something unseen in the monetary history and contrary to the economic logic. So, under certain normal circumstances, the accumulations into individual accounts are supposed to increase in the next years and the second pillar pension funds are expected to provide significantly higher benefits

than they currently can. At the same time the financial health of the pay-as-you-go part of the pension system is expected to deteriorate even further. Bulgarian population is among the fastest aging populations in Europe. Old age dependency ratio is continuously increasing mostly due to comparatively low birth rates, rising life expectancy and emigration rates that exceed immigration ones.

Table 6: Bulgarian population old-age dependency ratio for the period 2012 – 2021 (%)

2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
27.8	28.5	29.3	30.2	31.1	31.8	32.5	33.2	33.8	34.1

Source: Statistics | Eurostat (europa.eu)

The negative trend in population dynamics is obvious and there is no sign of forthcoming significant improvement. The pay-as-you-go pension system will continue to struggle with constant deficits in foreseeable future and the burden on public finances is expected to rise further in next years. But there is one even more serious problem with the pay-as-you-go structure of the pension system in Bulgaria. It is related to the constant attempts of the existing political parties to buy votes through it. Organized in this way, the pension system is a kind of a hostage in the hands of politicians. It is not a pure coincidence that the biggest rise in pension benefits for decades took place in the years of strong political turbulence and three successive rounds of elections. Each ruling party, no matter how long the period for which it exerts its power, has been trying to convince pensioners to vote by generous promises for pension increases. The consequences of this policy are increasing state budget deficits that could disrupt public finances especially in an environment of currency board monetary system where the fiscal discipline is of utmost importance.

Table:7 State budget deficits as a % of GDP for the period 2015-2021 in Bulgaria[9]

2015	2016	2017	2018	2019	2020	2021
-1.9	0.3	1.6	1.7	2.1	-4.0	-4.1

Source: www.nsi.bg

The reported deficit is not due only to the increased pension benefits but surely, they play an important role for it. From this point of view, the answer to the question, whether fully funded second pillar of the pension system must be supported in future, is "yes". The capital pension scheme is a supplementary part of the pension system, and it must continue to exist, not least because it gives unvaluable insight of how much the pay-as-you-go system has deviated from sound finances and how much it costs to the taxpayers including to the pensioners themselves. At the same time, second pillar needs some further reforms that would strengthen it and would

[9] "+" means surplus, "-" is for deficit

raise the probability pension funds to provide benefits in correspondence with individuals' expectations. First, it is urgent to change the procedure, currently used for reducing the benefits due by the first pillar of the system. The pension formula must take into account not just the ratio between the contribution paid for the first and for the second pillar but also the subsidy transferred from the state budget. This would remove the hesitation among insured individuals whether to stay in the second pillar or to transfer their resources into the first one. Second, it is crucial to allow universal pension funds to structure portfolios of assets with different risk profile. The Global financial crisis in 2008, the pandemic crisis and the turbulence on the financial markets caused by the Russian invasion in Ukraine are events that caused financial asset values to drop significantly for a short period of time. The recovery processes could continue for a prolong period of time which could ruin the trust of the insured individuals towards the funded pension system. This is much more true for those individuals who are very close to their retirement. They must be allowed to transfer at least part of their resources into conservative type of portfolio some years before reaching pension age. Third, the insured individuals must be allowed to transfer their resources into the first pillar of the system until the date of retirement, not until 5 years before reaching pension age. This would make system more flexible and insured individuals would be confident that they would not be put in disadvantage just because of improper choice.

Conclusion

Bulgarian universal pension funds entered distribution phase in 2021. After months of discussions on the exact normative rules, pension fund industry and the Financial supervisory commission reached an agreement on how exactly to start pay-out phase. However, months after beginning, it became clear that some future reforms are needed to strengthen additionally the funded component of the pension system in the country. The first and second pillar of the system are interrelated and populist decisions concerning pay-as-you-go column strongly affect the capital part of the pensions too. The wish of many politicians to trigger positive feelings among voters, make them neglect the financial health of public finances and approve expenses that deteriorate seriously the balance of the state budget. The funded component of the pension system needs a support in a form of regulations that create right incentives among insured individuals. Additional savings in a country with continuously worsening demographic structure can soften the expected hit on the public finances in the next decades. The pension system in Bulgaria even now absorbs almost a quarter of the resources collected via social security contributions and taxes. The situation is expected to deteriorate further in the next years. Strong funded pillar can raise the probability for the future generation retirees to receive pension benefits adequate to their pre-retirement income. However, some future research is needed to show how exactly this could be realized in the middle and in the long term.

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IMPACT OF PANDEMICS – AN ECONOMIC PERSPECTIVE

Diyana Miteva[1]

Abstract: *Recent COVID-19 pandemic surprised society and state leaders with its sudden appearance finding countries unprepared for common lockdown, travel restriction and high infection rates. It affected heavily society, business and state governance around the world causing unprecedent drop and changes in economic indicators. Therefore, the paper aims to outline the main impact pandemics have on economies. An analysis of the overall economic indicators affected by the Covid-19 pandemic is given where results show that sharp increase of government debt, inflation, financial sector leverage and other indicators are reported following 2020. Data proves the serious crisis that countries are facing because of Covid-19 pandemic and also how vulnerable the world economy is towards pandemic.*

Keywords*: pandemic, impact, crisis, covid-19, economic stability.*
JEL codes*: G01, E66, E43, E63.*

Introduction

The recent COVID-19 pandemics showed the significant magnitude of impact of pandemics on the economy and human life not only on national but also on a worldwide basis. It also proved that besides the fact of a rich history and many investigations and information that had been in place not a single country was prepared to face such an event, no crisis management plans had been written to help to choose appropriate reaction neither knowledgeable experts were in place. All this actually worsen the period during and after the pandemic, but also made its impact more severe than it could have been. The purpose of this paper is to investigate how vulnerable is the economy when exposed to pandemics. Because of the highly globalized world and intensive movement of people the risk of rapidly spreading infectious diseases is higher today than ever before (Brown, 2018). The most affected countries become more isolated in terms of travelling and trade. The economic productiveness and trade decline when many employees leave work. Recent COVID-19 pandemic first of all caught all countries unprepared. A lockdown was in force for many countries around the globe. Some of the main results caused by the lockdown are shown on Figure 1. Many businesses providing services stopped working like for instance restaurants, transport providers, hotels etc. There were travelling restrictions which made

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actually most of the transport services to fall sharply, especially in the beginning of pandemic. Education switched to online lessons immediately which continued for more than one year and had a bad effect on students social life, communication and health. The stress and panic on the average person caused by COVID-19 lead to new diseases, worsen social life and deepen depression for those suffering of it. The majority of business which were able introduced immediately after the start of the pandemic home-office working. That continued quite a long time – more than 2 years and allowed people to live and work in different places. Employers are fighting to get back employees to offices offering different incentives as social activities, free or discounted meals, transportation subsidies and child care support – and at the end of 2022 there is a slight increase of office attendance (Partnership of NY, 2022). The social distance measure and shutting down many public places led to an increase in online shopping. More than 25% is the increase of the number of online buyers in 2021 compared to 2016 (Statista, 2021). More online shopping means and more electronic payments combined with more delivery services.

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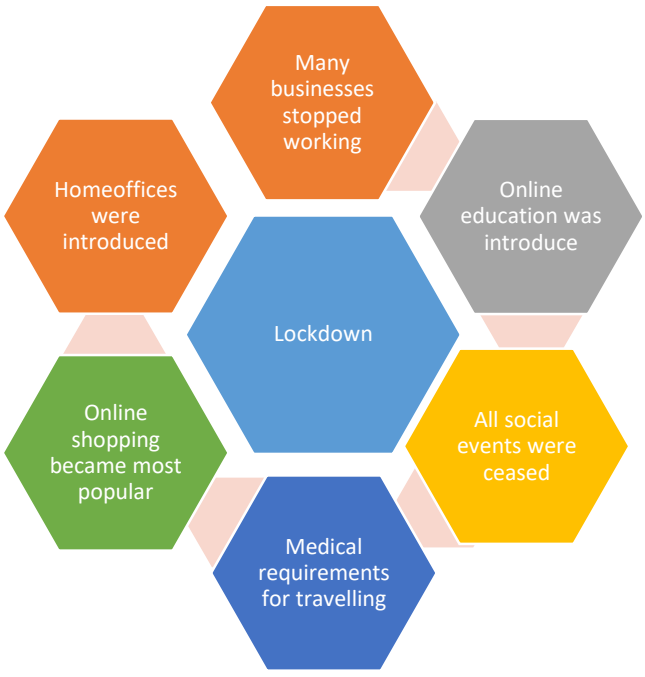
Fig. 1



It is difficult to cover all affected parties and outcomes. The major impact of one pandemic shows how important it is to understand it in detail in order to react adequately. In this paper an accent on the economic impact is given, therefore others above are just mentioned in terms of their influence. Nevertheless, economy comprises all factors of life and correspondingly they have their influence especially on a long term basis.

Pandemics' impact has been investigated and analyzed widely. There are different approaches in terms of the above dimensions of impact. Yoldascan E, et. al (2010) for example try to measure the economic impact of SARS in 2003 in the case of Turkey, calculating the actual costs born by the pandemic proving it has a significant effect on the economy bringing costs between 1.364 billion dollars and 2.687 billions dollars for Turkey.

Significance of impact and costs depends on the magnitude of the pandemic. Milder ones bring smaller costs but they seem to increase the harder the pandemic is (Smith, R., Keogh-Brown, M.,2013). The same study argues that it is very difficult to estimate the impact of pandemics because of the lack of data or if in place it is on an annual basis which does not allow extracting the individual impact of pandemics and is rather mixed with other factors. Also, authors conclude that the unavoidable absence from work caused by morbidity and mortality could have a more damaging impact to low-income countries compared with more developed countries. Another research (Gong et. al, 2021), shows that H1N1 cases is positively associated with loan spread, while negatively associated with loan amount.

On the demand side, a pandemic is likely to affect consumer confidence and change consumption and social patterns. It will also affect investor confidence, which can have important long-term consequences[2].

Pandemic significantly affected SMEs in EU (Ali S. et al, 2021) leading to a decline of 10% of their number.

Differences between pandemics

While it is important to know how pandemics impact economy it is necessary to make distinction between them. First of all, the time and power of the pandemic is vital for its influence, but also the social reaction and state measure against it.

COVID-19 was the first global pandemic of 21st century that affected the whole world and practically leaded to a global lockdown and also continued quite a long time almost two and half years of serious measures. That led to more long-lasting effects. Whereas in shorter pandemic events less measures are taken and less affected the economic participants are, which does not mean that additional costs are not triggered.

If the mortality is high and the health system does not have tools to fight with the disease than the measures and outcome tend to be much heavier.

[2] https://www.adb.org/sites/default/files/publication/28082/pb042.pdf

COVID-19 pandemic

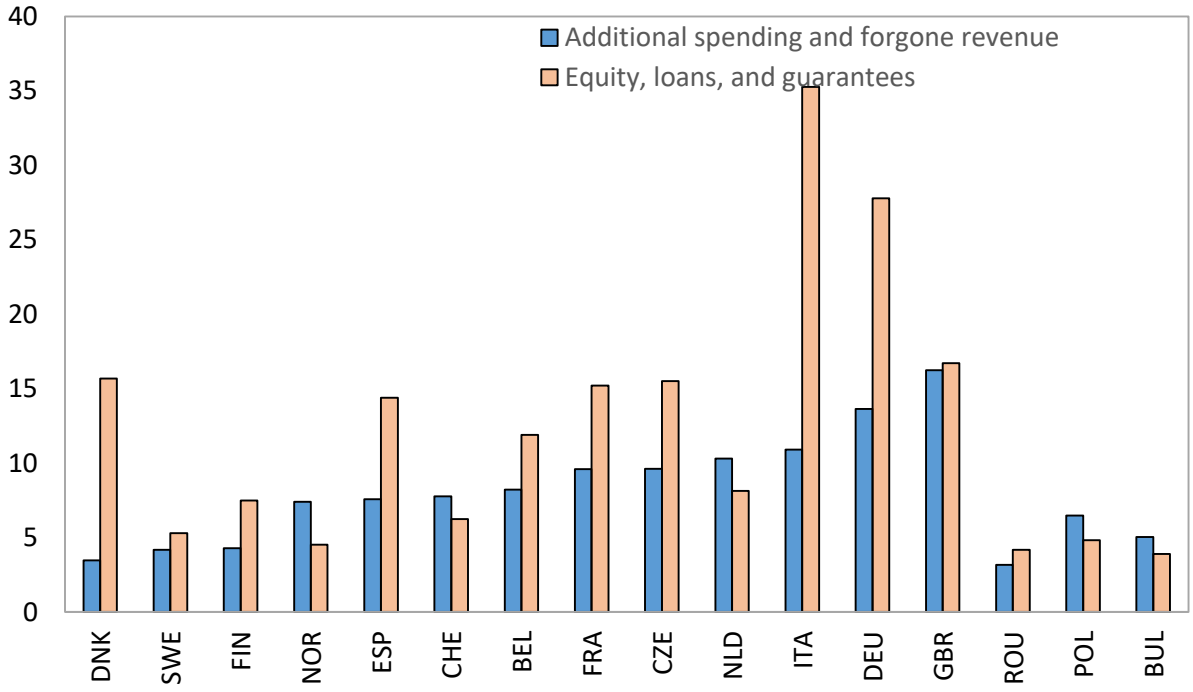
Covid-19 pandemic was different than SARS, TORS, H1N1 which also caused economic hardens in some regions, but being more resistible and contagious Covid-19 was more difficult to be focalized.

Covid -19 pandemic is therefor more important to investigate as it lasted longer and caused many changes in economic and social behavior and overall economic performance.

This paper reviews several main effects of the last pandemic on public finance and companies' debt structure. First of all, *government measures* and stimulus for the economy, while many sectors were shut down or restricted, brought huge costs for the state budgets which inevitably affected the government debt. These measures were introduced in order to save companies of default and also to lighten the impact of government health-related restrictions. This concerns different regimes for loans and guarantees, direct corporate and household transfers, which on the other hand maintained the consumption, also a variety of stimulus programs were introduced. Monetary policy measures provided liquidity which was necessary for the outlined measures. Easing of macro-prudential requirements can make it easier for financial intermediaries to provide loans to households and firms (Wieland, 2022). According to IMF data (IMF, 2021) the total amount of measures taken by the EU was 10.2% of GDP. The fiscal response by countries as a percentage of GDP is given on Figure 1 for selected EU countries. Equity, loans, and guarantees were prevailing for the majority of the countries.

Fig. 1

Discretionary fiscal response to Covid-19 crisis in selected European countries



Source: IMF, Fiscal Monitor Database of Country Fiscal Measures in Response to the COVID-19 Pandemic.

Huge economy stimulus, energy prices global supply chain reflected on the inflation value. In the begging of the pandemic, there was a decline of inflation as the world aggregate demand collapsed, but with 2021 inflation starts rising and increased to historically high levels after many years of low inflation rates that were below the targets pursued by central banks (Wieland, 2022). Energy prices, in particular, dropped quickly. They are very flexible and quickly incorporate changes in expectations. However, the start of 2021 witnessed a rebound of inflation due to global supply chain troubles, transport hurdles, shifts in consumption towards durable goods instead of services requiring social contact contributed to soaring inflation. The beginning of the war in Ukrane further worsen the situation and boosted inflation. In 2022 and next couple of years this is going to be the most complicated and urgent challenge for governments to fight with as the ultimate raise of goods and services prices brings a lot of pressure to households and business.

As pointed out one of the main negative outcomes of the pandemic is the ultimate increase of the countries' debt. On Table 1 data for the gross government debt as a share of GDP is shown for EU countries for the period of 2017 to 2021. Data shows clearly an increase in all countries of the government debt reported by the end of 2020 compared with a year before. On overall basis the average increase is 23%, where more than half of the countries increased their debt by more than 20%. This is the biggest increase for the last 23 years, where only in 2009 because of the world financial crisis there was a similar increase of the government debt (19% on average for the EU) while all other years data shows slight changes of several percentages.

Table 1. General government gross debt for EU countries (2017-2021) as a share of GDP

	2017	2018	2019	2020	2021	Annual Change 2020	Annual Change 2021
European Union - 27 countries (from 2020)	81.7	79.7	77.5	89.8	87.9	16%	-2%
Euro area - 19 countries (2015-2022)	87.9	86.0	83.9	97.0	95.4	16%	-2%
Belgium	102.0	99.9	97.6	112.0	109.2	15%	-3%
Bulgaria	25.1	22.1	20.0	24.5	23.9	23%	-2%
Czechia	34.2	32.1	30.0	37.7	42.0	26%	11%
Denmark	35.9	34.0	33.7	42.2	36.6	25%	-13%
Germany	64.6	61.3	58.9	68.0	68.6	15%	1%
Estonia	9.1	8.2	8.5	18.5	17.6	118%	-5%
Ireland	67.6	63.0	57.0	58.4	55.4	2%	-5%
Greece	179.5	186.4	180.6	206.3	194.5	14%	-6%
Spain	101.8	100.4	98.2	120.4	118.3	23%	-2%
France	98.1	97.8	97.4	115.0	112.8	18%	-2%
Croatia	76.5	73.2	71.0	87.0	78.4	23%	-10%
Italy	134.2	134.4	134.1	154.9	150.3	16%	-3%

Cyprus	92.6	98.1	90.4	113.5	101.0	26%	-11%
Latvia	38.9	37.0	36.5	42.0	43.6	15%	4%
Lithuania	39.1	33.7	35.8	46.3	43.7	29%	-6%
Luxembourg	21.8	20.9	22.4	24.5	24.5	9%	0%
Hungary	72.1	69.1	65.3	79.3	76.8	21%	-3%
Malta	47.8	43.7	40.7	53.3	56.3	31%	6%
Netherlands	57.0	52.4	48.5	54.7	52.4	13%	-4%
Austria	78.5	74.1	70.6	82.9	82.3	17%	-1%
Poland	50.8	48.7	45.7	57.2	53.8	25%	-6%
Portugal	126.1	121.5	116.6	134.9	125.5	16%	-7%
Romania	35.3	34.5	35.1	46.9	48.9	34%	4%
Slovenia	74.2	70.3	65.4	79.6	74.5	22%	-6%
Slovakia	51.5	49.4	48.0	58.9	62.2	23%	6%
Finland	66.0	64.9	64.9	74.8	72.4	15%	-3%
Sweden	41.0	39.2	35.2	39.5	36.3	12%	-8%
Average	69	67	64	77	74	**23%**	**-3%**

Source: https://ec.europa.eu/eurostat/databrowser/view/sdg_17_40/default/table?lang=en

Higher government debt means higher government costs on a long term basis. The increase in the same time has different effect for each country as it does matter what the initial status of its debt condition is. For example, countries which had debt of 100% or more suffer much more difficult situation then countries with low level of debt like for instance Bulgaria, Baltic countries, Scandinavian countries etc.

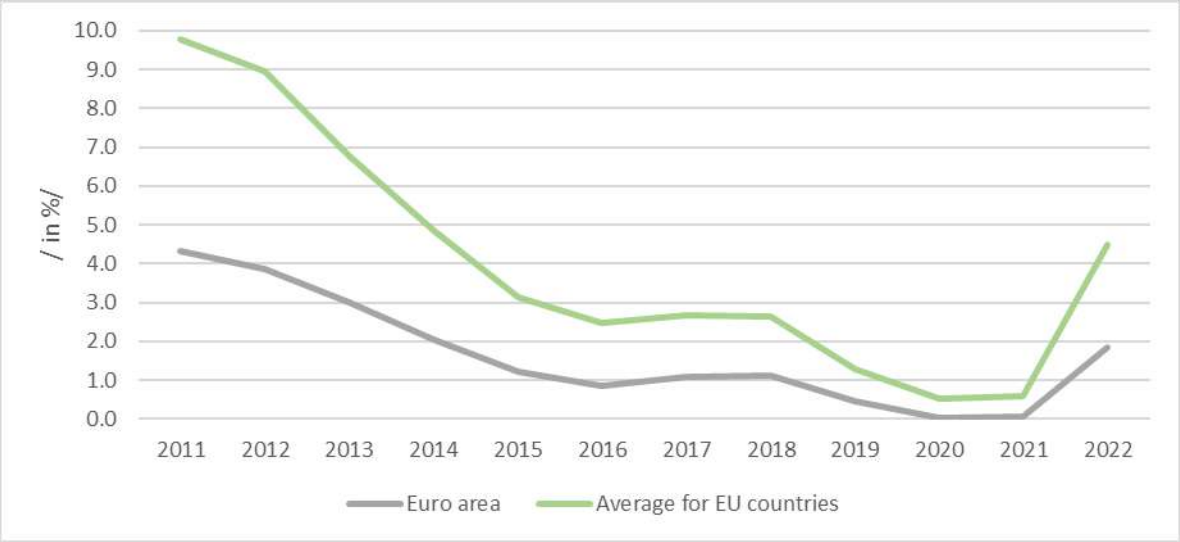
May be the sector that suffered the most from the pandemic was tourism. Countries with a higher share of the tourism sector in the economy suffered, at least initially, more severely than those with a higher share of manufacturing (Wieland, 2022) but manufacturing significantly dropped in the second quarter of 2020 and with time when households expenditure switched from contact intensive services to more durable goods, the manufacturing sector recovered more quickly. Unfortunately, the increase of debt was followed by a period with increased inflation and interest rates after almost a decade of historically lowest interest rates. The increase of intereset rates impact directly the yield to maturity of government bonds (the price of the debt) where they jump out of zero levels t for a few months in 2022 to reach levels of a decade ago. That means when the new debt will have to be paid in several years most probably this will be by issuing new one at a higher price. The pace of debt increase should be very carefully taken estimating many factors that will influence the future repayment of the debt.

Wieland (2022) pays special attention to this problem where the author calculate three scenarios for the future price of debt with raise of 1,2 and 3 percentage points prediction will lead to 4% of GDP interest payment for Italy in the worst scenario, while in Spain and France it would stay below 2%. On Figure 2 is shown the ten-year government bond yield curve for Euro area and

the average for EU countries. After a decade of decline there is a steep increase синце the pandemic reaching levels of over 4% interests. Some countries have significant increase of more than 3 percentage points as Hungary, Poland and Romania. The sharp increase may lead to more difficulties for debt issue as governments may consider the price of debt asked by the market too high as it was the case for Bulgaria and its last auction in September, 2022 which was canceled by the government after receiving too high offers of the market players.

Fig. 2

10-year government bonds yields for Euro area and average for EU countries



Source: Eurostat database: EMU convergence criterion series - annual data, author's calculations.

Looking at the financial data another problem that can be indicated is the raise of financial sector leverage (debt to equity) in 2020 and afterwards (Eurostat, 2021) in comparison to 2019 and the period before, again much higher increase compared to the previous years and valid for most of the EU countries, which is not good indicator for the stability and liquidity of the sector. Higher leverage rates can be a factor of default problems for companies exposed to additional shocks. Not only did business faced external problems with consumption, lockdown and health measures but financial burdens and external financing were additional management challenges.

Conclusion

The short analyses above show the huge magnitude of impact one global pandemic can have on economy. Not only serious health consequence for people all over the world are caused by pandemics, but also severe social and psychological effects appeared and have serious impact to the quality of living

and economic prosperity. The more global and sever one pandemic is the higher costs and impact it has on the global economy. It was observed that countries' indebtedness increased uncomparable high and also the cost of debt sharply increased which will be a long-term problem for the state government and especially for countries with higher debt.

In the same time the financial structure of companies balance sheet also was affected increasing the level of leverage which also will be a long-term challenge. Inflation and new work situation are more of the consequences of pandemic.

One recommendation that some authors draw (Al-Dabbagh Z., 2020) is to work towards and achieve sustainable development which can contain the occurrence and emerging crises.

The one thing that is certain is that the consequences of the pandemic will spread their shadow and effects for the years to come and there will be years necessary to recover. Most important are the lessons of such crisis that taught companies to better prepare their crisis management plans and always be flexible in finding decisions for different work and life conditions. For sure governments will have to not only reassess the importance and stability of health systems but also to prepare better recovery and emergency plans for a proper and sustainable response to future pandemic crisis.

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Statista, 2021, Number of digital buyers worldwide from 2014 to 2021 (Visited on 1.02.2023)

https://www.statista.com/statistics/251666/number-of-digital-buyers-worldwide/

THE EVIL PAYMENTS TRILOGY: PUSH PAYMENT FRAUD; ABOLITION OF CASH AND DEDUCTIONS FROM FACE VALUE WHEN PAYMENT IS MADE BY CARDS

Gordon Kerr[1]

Abstract: *Initiatives in accounting, central banking supervision of banks, bank stability and payments which incept in the UK are generally copied throughout the EU. The Bank of England are, it is believed, determined to abolish cash and replace it with a CBDC (central bank digital currency) already trendily named "Britcoin". Riding the general wave of enthusiasm for tech and "digitisation", rapid changes are planned late 2022 early 2023 to the UK payments system. All of these changes, proposed by regulators as 'modernisation' to be embraced and worshipped on the altar of tech, tech and more tech, should be paused. The real agenda of the Bank of England (and ECB) is to abolish cash to enable deeply negative interest rates despite rising inflation. This will be retrograde for UK and European societies; will lead to mass poverty and will reduce democratic accountability of governments. Moreover, the desire to abolish cash has incentivised the Bank of England via its subsidiary regulator, the Payment Services Regulator, to do nothing to address rising frauds and charges for card use, since they will claim that this Britcoin replacement of cash will be easier to use and cheaper than cards and less exposed to fraud. The present payments landscape in the UK is dystopian, marred by three easily fixable problems causing massive consumer harm. They are each presented here and collectively termed the 'evil payments trilogy'.*

Keywords: *Cash, payments, cards, payment fraud, CBDC, central banks, Bank of England, Payment Services Regulator, Visa Mastercard, stress tests, IFRS accounting rules, zombie banks*

JEL: *G18, G21*

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Objective. *A public call for all UK and EU new digital initiatives in payments to be suspended pending the establishment of a genuine, independent committee of experts to evaluate the costs and benefits of the preservation or abolition of cash*

1. Executive Summary

Simply because all citizens of UK and Europe are using less cash – physical shops, bars sports venues and marketplaces are increasingly refusing cash and demanding card payments – it is vital to the preservation of democratic societies that citizens' rights to withdraw all their funds from banks in cash are preserved. It is syllogistic to suggest, as proponents of cash abolition always do, that because we all use less cash then it logically follows that central banks should feel able to abolish cash and replace it with central bank digital currencies (CBDCs). There is not one iota of any logic linking this premise with the conclusion. If CBDCs are designed to replace cash, and if we don't need cash, then CBDCs are not needed either. But as set out herein, we do need the power to withdraw our funds from banks, and the power not to deposit our funds in banks; and these powers are impossible to preserve unless we preserve also cash.

There has been much research on the topic, some of this with different simulation models of impacts of CBDC (Leonov, 2022), (Ozturkcan , et. el 2022) whose findings suggest there are benefits of CBDC. For example, the study of Leonov (2022) concludes that CBDC impacts the economy beneficially through changes in the monetary base, strengthening the structural liquidity deficit, banking disintermediation, and increasing fiscal policy capabilities.

Most of this research concentrates on the technical issues of CBDC. They neglect to analyse the core issue problems of the dramatic change to people's control over their lives and spending.

The media in the UK and the general public have been fooled into believing that, after the spectacular GFC banking collapse of 2007-09 our banks have been recapitalised. The UK is dominated by 5 large banks who control 96% of all UK banking business including all account holders: retail, business, NGOs municipal, government, education, utilities and charities. This is false, all SIFI banks remain zombified and on central bank life support. There is no functioning interbank market for funding and the Bank of England operates as the lender of first resort (not last resort) and at ultra-low interest rates (not at penalty rates) on a permanent basis (not for the provision of temporary liquidity). Late in September when the Bank of England announced it was planning to reduce quantitative easing to banks, the market reaction was sufficiently strong to result in the resignation of the then new Prime Minister Truss. Since then the B of E has openly acknowledged its subordination to 'the markets' and its fragile attempts to compel banks to stand on their own two feet have been quickly abandoned.

Consequently, the context to each limb of the 'evil payments trilogy' as set out below, is a concerted effort by the UK government, central banks and the Visa/ Mastercard duopoly to abolish cash. This trend is spreading to Europe where the payment landscape is notably different but not so different as to fail to be exposed to the same three problems. These are powerful forces, and sadly the public and elected politicians understand few of these points.

The context of this paper is the UK (and European, but the paper is short and focuses on the UK) reduction in the availability of cash.

2. The Colossal Problems Caused by 'Digitised payments' in the UK

The common thread behind the three problems which will be summarised in this section is the remarkable weakness of the specific regulator, The Payment Services Regulator, which was set up as a limb of the Bank of England as recently as 2014. At every juncture it has acquiesced to the wishes of Visa and Mastercard, ignored EU laws limiting deductions from payments (such laws being enshrined automatically pre-Brexit in the UK legal code), and sat idly by as the banking industry has succeeded in leaving liability for weaknesses in banking technology with their customers. This latter point has been a massive encouragement to fraudsters who prey on everyone with access to online banking and of course in particular on the vulnerable and elderly. As a child of the 60s I have now lost both my parents, but nearly all my friends, lucky enough to still have living parents, have removed their parents' access to online banking and to the internet itself. Removal of the internet, owing to email pressure, obviously increases the sense of loneliness and reduces quality of life, and inability to use online banking is a particular inconvenience to elderly UK citizens given the substantial reduction in physical bank branches. There is simply no alternative course of action for these middle-aged children since their parents would otherwise be scammed multiple times each week. Almost all of this would have been avoided had the regulator been willing to regulate, as opposed to cheering on Visa and Mastercard from the side-lines.

It is precisely this relaxed, casual regulatory approach that has inspired banks and the Visa Mastercard duopoly to ignore laws and nakedly promote their own interests at the expense of their customers (basically all of us, we all need to make payments all the time) in defiance of the rules. This has resulted in a relentless reduction in the quality of service by banks, the closure of swathes of physical branches, and the promulgation of dishonest banking spin to justify this; banking PR teams claim that these closures reflect the wishes of their customers: "our customers prefer to do banking on their phones than in branches". Nonsense.

3. Each Leg of the Trilogy; Problem and Obvious Solution

a) Failing Access to Cash

Not only are bank branches being closed, but the banking industry has rejected entirely sensible proposals from the ATM industry, who obviously are synonymous with the pro cash lobby, for ATMs to be rolled out which not only dispense cash but also enable merchants to deposit cash. No UK ATMs allow this; the regulators in typically supine fashion have acceded to the specious argument by the anti-cash lobby that to allow deposits of cash via ATMs would somehow facilitate fraud and money laundering. Clearly the deposit instruction would be to pay the cash to an account which has already passed all the KYC and anti-money laundering checks else it would not exist as a bank account in the first place.

Before setting out the perfectly sensible proposal to solve this problem, a few words about the pending financial collapse of the cross- bank UK ATM system called LINK. I quote the ultimate expert on whose work this entire paper is based, Bob Lyddon (see References):

"*LINK is the payment scheme, regulated by the PSR, under which cardholders can withdraw cash from ATMs where the ATM operator is not their card issuer. Before LINK NatWest cardholders could only draw cash from NatWest branches for example".*

In August 2022, Lyddon continues, the CEO of LINK predicted cash will end within five years because this infrastructure is collapsing. The fixed costs of LINK are £5 billion each year. No data is available for the number of bank branches in the UK (this data exists but is not revealed to the public by the banking industry); but as a reasonably sharp observer of our high streets the author estimates that 60 – 70 per cent of bank branches have closed since the Great Financial Crisis (GFC). This underlines the point in the Executive Summary, that the claims of the Bank of England that banks are 'fixed' or 'recapitalised' are false.

Solution

The solution to this 'Access to Cash' problem is to change the rules regarding the fees that banks pay to this LINK system called the "interchange fee". This should be banded. This could ensure the continuation of a network of free to use cross bank ATMs.

The solution is set out in the paper but, put simply, involves amending the present interchange fees which banks pay for each cash withdrawal at a different bank's ATM. Presently this is a fixed GBP 0.30 pence. Merely by increasing this pro rata to branch closures and reducing it for branch openings, the problem can be solved.

b) **Authorised Push Payment (APP) Fraud**.

In the UK all bank accounts are identified by two numbers; one is a six-digit bank branch identifier called the "Sort Code", common to thousands of customers of that branch, and the

second is an eight-digit account number which no other customer ***of the same branch*** will have, but which customers of other branches and of other banks will have. As readers will know, given that all credit card numbers have been sixteen digits for decades, eight digits is exponentially much smaller. For this reason, in the UK it is false to assert that there is any such thing as a "unique customer identifier". The shocking problem set out below has happened because of the general move to digitisation, which the Payment Services Regulator (PSR) has blithely nodded through.

Data published by two trade associations UK Finance, and Financial Fraud Action UK, showed that APP fraud in H1 2018 was £145 million, up 44% on H120172. Although these gross numbers are small, the average loss per customer (GBP 4,000) is much larger than for card fraud (GBP 300). Estimates for 2022 are that customers will be defrauded of £2 billion.

There are many APP variants. A common example is where the criminal induces the bank customer to send a typically quite large payment- for example a deposit to purchase an apartment – to a bank account controlled by the criminal. Property purchase deposits are a typical use case. The customer is excited about buying his home, there is time pressure, he has not previously made an online payment to his solicitor (many solicitors are today provided "free" by mortgage lenders) so when he receives an email purporting to emanate from the lawyer in identical font and format to what he is used to, correctly identifying the apartment, the date the payment is due and stating the correct amount he is easily persuaded to press the button on a transfer of say GBP 25,000.

Consumer groups are worried, particularly because unlike card fraud, where the loss is usually borne by the bank, the significance of this rapidly growing APP fraud is that the loss is typically borne by the customer. This is different from the established practice for card payments. When a customer disclaims liability for a card transaction in the UK, the bank must demonstrate on the balance of probabilities that the customer has been reckless with his PIN number and stewardship of the card. If it cannot, the bank should bear the loss. However, the cybersecurity measures and rules which banks have established regarding online payments concentrate on the physical hardware. As a result, if a device (laptop/ phone) which has been accredited by the customer as his own is used during an APP scam or spoof, the customer will usually bear the loss.

Solution – Confirmation of Payee

The central flaw in the present online payment system is the lack of a name check in the messaging system which is at the heart of the UK's online payments system known as "Faster

[2] http://www.ukfinance.org.uk/criminals-steal-500m-through-fraud-and-scams-in-the-first-half-of-2018/

Payments"[3]. How was this allowed to happen? This absence can be viewed as a side door to the system which was opened when the present Europewide Point of Sale (PoS) payments architecture was established some 20 years ago. For PoS to work, the payments system had to generate a fast and accurate response from the purchasing customer's bank as to whether a) she had enough funds in her account to pay for the item; b) whether the debit / credit card was valid and not reported lost or stolen. Authentication was initially based on a visual check of the signature strip which later was replaced by Personal Identification Numbers. So these card based PoS purchases were the first payment processes requiring the payer's bank to receive a message and respond to it within a few seconds. The payee's identification information was never required to be captured by such a messaging system since that information was contained in the PoS device which initiated the message/ payment request.

As each new iteration of payments technology was adopted, the payments architecture was further constructed, but around this side door flaw. Today the Faster Payments architecture uses the IS08583 data protocol, the same as for card payments, throughout Europe. In Europe, and a few countries beyond Europe's borders, a similar fast payments architecture is in place, known as SEPA INST. This is an instant credit transfer system, in any major currency, which can be conducted using just an IBAN number, so again the payee's name is not required and the side door to APP fraud is wide open.

The obvious solution to APP fraud is for the system not to make the payment unless the payee's account details match the payee's name which the customer types into her tablet or other device. The payments industry has been talking about implementing such "Confirmation of Payee" (CoP) protection for years. The PSR constantly assures the Government's Treasury scrutiny committee that CoP will soon be in 'in place' but there is little chance of a working CoP protocol being established before 2023 -5, if at all, because the UK is at the start of a project to completely overhaul the non-card payments infrastructure. The project is labelled the New Payments Architecture (NPA) and aims to rip out and replace this infrastructure. The new architecture will facilitate the replacement of the old, slow, costly (to banks) payment methods such as cheques and encourage retail customers to make greater use of irreversible online payment tools which are beloved of APP fraudsters.

[3] APP fraud can also occur in one of the UK's other main payments system called BACS. This supports cheque clearing and customer initiated payments over the slower, paper form based system called CHAPS. For brevity we will consider only Faster Payments here.

c) Deductions from Face – Card Payments

A perfectly sensible piece of EU legislation was enacted in 2015, the Interchange Fee Regulation (EU 2015/751). Pre Brexit it automatically became UK primary law, and this law has survived Brexit. The law specifies the maximum deductions from the 'Face Value' of the transaction:

i) Debit Cards – 0.2%
ii) Credit Cards – 0.3%

So if a lady buys a pair of shoes costing £100 the shoe shop is legally entitled to receive no less than £99.80 if she pays by debit card or £99.70 is she pays by credit card.

But once again the sleepy PSR regulator has proved spineless, and this law is ignored by the entire card industry. Obviously, giants such as Amazon can negotiate Visa and Mastercard down to relatively small deductions, but small merchants are today facing deductions of 3% to 8%. This is scandalous.

Moreover, there is always a minimum deduction of £0.30, which of course equates to 30% if the item costs £1. To be clear, this interchange fee deduction is only the fee allowed to the hierarchy of actors in the card business. Another level of deductions is permitted to merchant sources such as Elavon, Sumup and Barclaycard.

Solution – Enforce the Law

Interchange Fee Regulation (EU 2015/751) should be enforced and the deductions limited to 0.2% and 0.3% as set out above.

4. Conclusion

The author has assisted the payments expert Bob Lyddon prepare a 100-page paper on this subject which he has sent to the Treasury, to the PSR, to the Bank of England, and to several members of Parliament. The short form of the message is that the Bank of England should ice its two major pro digitisation projects until the colossal problems caused by each of the three legs of the 'evil trilogy' set out above are solved. The two projects are:

a) The "New Payments Architecture" project, intended to transpose SEPA euro data payment standards (ISO20022XML) into UK retail payments.
b) Open Banking: the legislation allowing new fintech startups to demand via API links all bank customers' data in order to pitch to them. This was supposed to engender competition and encourage the big 5 banks to sharpen up their act. But this aim has already failed. Instead, the data is purely being used by sloppy payments actors and finding its way into the hands of fraudsters.

The urgency from the Bank of England is to protect its own reputation by abolishing cash so that as the true dire financial condition of the big 5 becomes apparent to the public, they will be unable to withdraw their funds and cause bank runs. All present CBDC design work is being done by the same digital industry actors responsible for the 'evil trilogy' and therefore these companies have a vested interest in not fixing these colossal problems.

On top of these problems, as set out in the 'Deductions from Face' section, the Visa/ Mastercard duopoly sense that now is the time to seize the opportunity to push hard for cash abolition which will push so much more business their way. They have succeeded in swamping the two relevant Bank of England 'committees of experts' with their own people. These committees are supposedly 'evaluating' the pros and cons of keeping cash versus abolishing cash, but the decision to abolish cash has already been doubtless taken by these conflicted placemen of Visa/Mastercard. This is unacceptable and these committees should be re-established with unconflicted experts.

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MONETARY STABILITY AND REGIONAL *CURRENCY BOARD:* TOWARDS A TWO-TIER SYSTEM TO ACCELERATE REGIONAL INTEGRATION IN THE HORN OF AFRICA. (A POLICY PROPOSAL)

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Summary

The last few decades have been marked by a proliferation of currency union projects in Africa. In a context of exchange rate instability and poorly convertible currencies, the authorities in most of the countries of the Horn of Africa are looking for an exchange rate regime that can stabilise and develop their economies. To achieve monetary stability in this sub-region, which is at the crossroads of some of the busiest sea and land routes, this paper reflects on the potential benefits of a monetary system that is characterised by a two-tiered architecture: national currencies and a common currency governed by a regional Currency Board.

***Keywords**: monetary regime, Currency board, Central Bank, Horn of Africa*

***JEL Classification**: C01, E41, E5, F32, O17*

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Introduction and motivations

The Horn of Africa Initiative was launched in October 2019 by the finance ministers of Djibouti, Ethiopia, Eritrea, Kenya and Somalia with the support of three development partners: the African Development Bank, the European Union and the World Bank. The initiative calls for investments to support the development of economic corridors (transport, energy and digital), trade, and the creation of regional value chains in order to accelerate regional integration in the Horn of Africa.

Regional economic integration is an advantage for a member country because it affects the competitiveness of firms in that country, leads to lower prices and increases consumer choice, which in turn leads to consumption and hence growth (Balassa, 1964). The latest Africa Regional Integration Index report[3] 2020, reveals that, from a trade integration perspective, most of the countries in the Horn of Africa, with the exception of Kenya, which is ranked as the most developed integrated country in the Horn of Africa and the second most integrated country in the whole of Africa, perform poorly (Somalia and Eritrea) or moderately (Djibouti and Ethiopia).

In order to remove the current obstacles to effective regional and trade integration in the sub-region, which is at the crossroads of maritime and land routes, a stable currency would be needed. The common currency could ensure the stability of the common market and could attract FDI from non-member countries, which has advantages of bringing more competition and enlarging the investment and consumer choice. In fact, all the benefits and costs of common currency that we know from other monetary unions and from the literature apply here too.

More specifically, providing a monetary integration zone for the economy of this sub-region is crucial not only to ensure market enlargement and pacify the region, highly volatile due to political and ethnic conflicts, but also to limit the geopolitical influence of the monetary policies of the main partner countries. For example, in the context of sovereign lending that serves the internationalisation of the renminbi, the countries of the Horn of Africa have taken on massive debts to China to finance their infrastructure while their anchor currency is the dollar[4]. Thus, the idea of creating a common currency at parity with a basket of currencies, which would be added to the various national currencies and which would serve as a unit of account, a settlement and reserve instrument in trade within the zone could be justified.

We propose a monetary system that is characterised by a two-tier architecture: national currencies and a common currency at the regional level governed by a *Regional Currency Board* (hereafter RCB). There will be no exchange controls between member countries and

[3] A multidimensional index developed jointly by the European Union Commission, the United Nations Economic Commission for Africa and the African Development Bank, analyses the current state of integration in African countries with respect to trade, as well as in four additional areas, namely: 1) regional infrastructure, 2) productive integration, 3) free movement of people and 4) financial and macroeconomic integration.

[4] On China's rising power in the region, see for example Le Gourielleg (2018, 2022).

with the rest of the world. This will increase cross-border trade by removing the costs of foreign exchange operations that hamper free movement in the region; enhance the competitiveness of businesses; and facilitate the financing of regional investment projects.

Historically the region has had a positive experience with the *Currency Board* system, as it belonged, during the period of the gold standard and convertibility of the pound, to the *East African Currency Board* [5], in which monetary relations between Britain and its East African territories were established; the *Cassa per la Circolazione Monetaria della Somalia* in 1950 for Italian-administered southern Somalia and the colonial *Currency Board* for French-occupied Djibouti. In general, the principles of the Currency Board and the separation of issuing from banking activities have been applied historically in the countries of the area under consideration during different phases and periods[6]. The Currency board, though having many critics, is universally acknowledged to lead to credibility and discipline, limiting the power of politicians and the government. It is particularly suited to weak and unstable states (Hanke and al., 1993, Hanke, 2002).

A number of empirical studies have recently been devoted to the development of trade, particularly between China and the countries of the Horn of Africa, but to our knowledge, no literature has been written on the monetary integration of the sub-region. The issue of integration, and monetary integration in particular, also has an important geopolitical dimension due to political, ethnic and religious instability in the region, as well as the competing interests of the leading global powers in the struggle for resources and the global currency wars.

The paper is organised in three parts. The first part provides a basic macro-monetary diagnosis of post-conflict or unstable states in the Horn of Africa to motivate monetary reforms. The second part describes the solution of a two-tiered monetary infrastructure to address monetary instability and stimulate foreign trade without foreign exchange risk. The third part discusses the technical issues related to the adoption of the regional *Currency board* (the choice of cover, the level of fixing, the exchange rate between the two co-circulating currencies etc.)

1 Macro-monetary diagnosis of the countries of the Horn of Africa

Across the Horn of Africa region, states are often characterised as 'fragile', 'unstable' or even 'collapsed', which has implications for exchange rate stability and capital flight. The monetary regimes are relatively different: Ethiopia has an inflexible regime that penalises its economy; Somalia's monetary system has failed since the collapse of the state in 1991; the credibility of the new Eritrean currency is undermined by a dictatorial regime that controls the financial

[5] Body responsible for issuing and supervising the currency of the British colonies in British East Africa from 1919 to 1966. For the British colonial monetary policy see Clauson (1944), Greves (1953), Schenk (1992) and Uche (1997, 2011), и Gnosh and al. (2020).

[6] See some basic titles such as: for Ethiopia and Eritrea - Mauri (1997, 1998, 2010), Wasserman (1946), Pankhurst (1963), Schaefer (1992) for Somalia - Caroselli (1922), Abdurahman, 2005), for Djibouti - Chauleur (1955), Dubois (1997), for monetary institutions and attempts for monetary integration in the Horne of Africa in general - Dubois (1999). A survey of colonial monetary regimes is given in Schuller (1999).

sector; and finally, the irrevocable fixity of the Djibouti franc deprives its economy of useful capital for its development.

Ethiopia, a major economic power with an inconvertible currency

Ethiopia, 115 million strong and multi-ethnic, is the second largest country in Africa (after Nigeria) and the centre of the area under consideration. After years of high growth (between 8 and 10%), it is now experiencing a decline (around 3%, and mostly due to a drop in transport revenues, of Ethiopian Airlines). Created in 1945, the current Ethiopian currency (Birr) follows an inflexible exchange rate regime. Its value against the dollar has almost reduced twice in the last ten years, but is maintained by the central bank[7] . From 2018 to today, the money supply has almost doubled. To contain this depreciation and limit inflationary pressures (44% in 2008 and 32% in 2011), the Central Bank of Ethiopia intervenes in the foreign exchange market by drawing on its foreign currency reserves and has simultaneously put in place capital controls. In 2018, the Bank of Ethiopia raised the interest rate from 5 to 7 percent.

But this context of exchange rate instability and limited convertibility constrains economic operators in their international financial transactions and severely handicaps the financing of the Ethiopian productive system. The Ethiopian authorities are considering a transition to a more flexible exchange rate regime that is more appropriate to support the new growth strategy. The latter is based less on an economic model centred on public investment financed by Chinese debt than on a strategy of opening up to foreign capital: restrictions on foreign investment are suspended and public enterprises are privatised in order to attract foreign capital (BNPParibas, 2020). In fact, China is Ethiopia's main trading partner with which it has a trade deficit. China ranks first in imports as it accounts for about 30% and only 3% of Ethiopian exports are to China. Capital inflow from China is extremely high[8].

In order to guarantee external and internal stability that will encourage both trade and investment, without abandoning the monetary sovereignty that the Ethiopian authorities have taken in the past[9], the establishment of a *Regional Currency Board* seems to be a natural solution.

Somalia, exchange rate volatility and inflation in the absence of effective state authority

Having gone through a period of Marxist socialism, like Ethiopia, Somalia now is a highly unstable country politically, ethnically and religiously. Currently, part of its territory is not officially recognised (Somaliland[10]). Since the collapse of the state in 1991 and the subsequent crash of the national currency, the Somali economy has lacked the means to facilitate economic recovery. Somalia is the only African country that has allowed its currency to float freely. In

[7] In what follows, we use the statistics that have been communicated to the IMF, as well as the analyses of the international section of the French Treasury, and the database on the website https://tradingeconomics.com/.
[8] Overall, due to its size, Ethiopia is a closed economy, openness around 6% of GDP.
[9] See literature cited in note 4.
[10] For Somali land see the interesting article by Azam (2010).

fact, the economy is highly informal and dollarized. In the prolonged absence of an effective state authority and central bank, warlords ensured the issuance of coins and notes until 2012 (Mubarak, 2002). To maximise their seigniorage income, they created a huge amount of paper money, creating inflation with negative repercussions on household living standards (Abdurahman, 2005; Luther, 2016).

As a result, the agents' choice of alternative monetary instruments, particularly the US dollar, was made. But what prevents a complete dollarisation of the Somali economy is the unavailability of low-value coins in dollars. Somalia's conventional banknotes therefore continue to circulate especially for low value transactions[11] and this is despite the continued importation of counterfeit notes into the country.

To address the issue of exchange rate volatility and inflationary pressures, Somali economists support the idea of creating a new currency (Nor and Masron, 2020) but without thinking about the framework within which this currency should evolve (with the exception of the former Director General of the Central Bank of Somalia Mohamed Dalmar Abdurahman). The widespread use and acceptance of the US dollar by the public limits the options available to the government. Either a sound and credible currency, fully backed by foreign exchange reserves, is provided, or the US dollar becomes legal tender in the country. If the Currency board is not adopted, the alternative is de facto dollarisation. For this reason, Currency board is recommended, as it brings the same benefits as dollarisation, plus it yields a substantial amount of seigniorage and provides a means of retaining the national currency (Abdurahman, 2005).[12]

In line with these reflections, we believe that as Somalia is a small open economy in a post-conflict period, credibility and confidence in the national currency will be further restored as the establishment of a *Currency Board* at the regional level is expected to limit the ability of inefficient authorities to monetise the public deficit at the local level.

The limits imposed on political leaders and the rule of covering the monetary base with a volume of reserves in regional currency will give a strong signal to the foreign exchange market and will allow for an increased credibility and a high degree of confidence in the Somali monetary regime[13] . Historically Somalia has had a positive experience with the Currency Board system, as it once belonged to two colonial *currency boards*: the *Cassa per la Circolazione Monetaria della Somalia* in 1950 for Italian administered southern Somalia and the *East African Currency Board* for British occupied northern Somalia. These two *Currency boards* remained in existence until the independence of reunified Somalia[14].

[11] See for more details Abdurahman (2005), Luther (2012), Nor and Masron (2014)
[12] Former Director General of the Central Bank of Somalia.
[13] At the same time, when the money supply contracts and interest rates are higher, this will lead to a decrease in incomes resulting in a weakening of aggregate demand which, in turn, will lower the prices of domestic goods. This deflation will reduce demand for imported goods and improve Somalia's structurally deficit current account trade balance.
[14] See literature in footnote 4.

Thus, unlike the configuration envisaged for Ethiopia, we propose here the creation of a new currency that will be pegged to the hard currency at a fixed exchange rate.

Eritrea, a closed country with an unsustainable deficit

Eritrea, independent from Ethiopia in 1993 after more than thirty years of war, was to issue the nakfa in 1997. Officially, the aim was to resolve the problems between two states using the same currency but with different monetary policies: the currency market was free in Eritrea but controlled in Ethiopia, where all imports were made through a letter of credit (Styan, 2000).

However, the financial sector is under state control and credibility in the nakfa is compromised by the monetisation of the budget deficit. The structural deficit of the state is mainly explained by military and social spending. Eritrea's public debt is extremely high at 190% of GDP, of which about 60% is external debt. Thus, these discretionary policies have thus led to a very high inflationary bias and instability in the banking system (Debesay, 2021).

The greatest advantage of the currency board system is the "depoliticisation" of the money creation process. The configuration that can be envisaged for the Eritrean case is in all respects identical to that of Somalia, with one notable change: Eritrea can retain its currency upon adoption of the regional *Currency board*. By prohibiting the monetisation of public deficits, the currency board system limits corruption and imposes fiscal discipline. By extension, this implies that external debt must be kept stable. This will lead to low inflation which in turn will lead to a stable exchange rate encouraging both trade and investment. It should be noted that, like other countries in the region, Eritrea is heavily dependent on China for both imports and exports (China is Eritrea's number one partner for its exports, mainly of resources, while Eritrea is China's 7th most important trading partner for its imports). Eritrea is also home to the region's largest Chinese cultural institute, the Confucius Institute. Despite, the peace with Ethiopia made before 2018 and the lifting of sanctions by the UN, tensions with Ethiopia and other countries have not been fully resolved.

The *Currency bord* system is extremely important in the case of Somalia and Eritrea, as the involvement of politicians is undoubtedly at the root of the financial chaos that has inflicted so much damage on the economy and the population (Abdurahman, 2005 and Debesay, 2021).

Djibouti, a regional financial centre to support trade and logistics development

Djibouti has operated a *Currency Board* through which the stability of the Djibouti franc has been assured since 1949[15]. Djibouti's success has inspired the paper and will serve as a model for the operation and development of the RCB.

In a regional context of exchange rate instability and poorly convertible currencies, it is difficult for most countries in the Horn of Africa to develop trade across their borders without taking advantage of the unlimited convertibility and fixity of the franc. Most Ethiopian and Somali

[15] For Djibouti, see footnote 4 as well as Aman (2018), Aman and Nenovsky (2021).

private operators have found Djibouti to be an opportunity to conduct international financial transactions in a short time[16] . The absence of exchange controls and capital movements reinforces Djibouti's centrality in the sub-region's financial flows (AfDB, 2011).

Djibouti's success has inspired the paper, but the irrevocable fixity of the Djibouti franc has a price: it deprives the local economy of useful capital for development even in times of massive capital inflows (Aman, 2018). Consequently, the country needs to move towards a more flexible exchange rate regime to combat unemployment and the severe poverty that affects 18% of families, a priority project of the president of the republic (Jeune Afrique, 2022). Financial inclusion is also crucial, which is at an extremely low level due to the structure and policies of commercial banks. It is no coincidence that a new national strategy for financial inclusion and integration is being adopted. The configuration envisaged for Djibouti could therefore make it possible to establish discretionary margins within which to ensure the prerogatives of the central bank.

There are many reasons for the establishment of a national *currency board on the one* hand and a common currency governed by a regional *Currency board on the* other. At the national level, the currency board system will lead to "depoliticisation" in the process of money creation. At the regional level, the CBR will (i) increase cross-border trade and develop the regional market by combating the costs of foreign exchange operations, which hinder free circulation in the region (ii) contribute to the monetary stability of the region (iii) constitute a response to counteract the growing renminbi and dollarisation of this sub-region Indeed, in their cross-border or foreign relations, the countries of the sub-region cannot engage in trade without using the dollar every time (iv) to facilitate and make transparent the financing of regional investment projects, particularly through the creation of a *Special Purpose Vehicle* (SPV) (v) and finally to calm regional and ethnic conflicts.

2 Creation of a two-tiered monetary infrastructure

In order to avoid the mistake of the CFA zone[17] (as well the eurozone), it is important to preserve the sense of existence and monetary sovereignty and not to destroy the national currency but rather to link the two monetary circuits. This is mostly dictated by practice, and by political constraints, but confirmed by institutionalist monetary approaches. In a regional integration between countries, there are at least two large and complementary "monetary communities" (to use G. Simmel's terminology), - the regional monetary community and the

[16] Ethiopian private operators, fleeing the limited convertibility of the birr, take advantage of the Djibouti banking system to make international transfers with confidence. Somali economic operators have also turned to banks in Djibouti to take advantage of banking facilities essential to their trading activities. Because of the control or weakness of the banking system in their countries, Ethiopian and Somali traders hold deposit accounts in Djibouti to conduct their transactions.

[17] Criticisms of the CFA zone are numerous and have been going on for decades, see one of the most recent publications, that of Nobukpo and al. (2016).

national monetary community. While the regional community is based on trade and bank money creation, the national community is primarily fiscally determined.

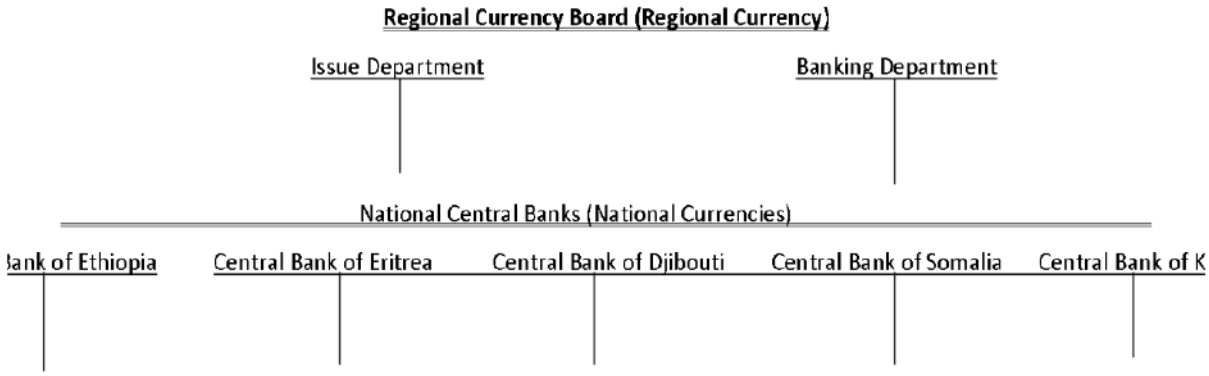
In our case, the common currency will be strong, stable and will be used in particular for cross-border transactions without any exchange rate risk, while the national currency (rather flexible currency) will be attached to the strong currency at a fixed exchange rate and will allow for monetary discretions at the local level without any risk for monetary stability. The two tiers of the monetary system would represent the two monetary communities, the two currencies. They would be primarily complementary, i.e., would coexist serving two monetary circuits. The retention of discretionary elements at the national level is dictated by the countries different evolution of the economic cycle, the asymmetric shocks, and the possibilities of pursuing independent economic policies and priorities at the national level. Let's consider the two levels in particular.

2-1 A regional *Currency Board* to preserve monetary stability

In order to strengthen intra-regional trade and economic integration in the sub-region, while adopting optimal management of foreign currency deposits, it would be appropriate to establish a common currency (HORN/HRN)[18] with a pegging system based on a basket of currencies, namely the renminbi, the US dollar and the euro, the fixity of which will be preserved within the framework of a *Regional Currency Board*. If the latter is not adopted, the alternative is de facto dollarisation or renminbisation. For this reason, the RCB is recommended, as it brings the same advantages as dollarisation, and in addition it yields a substantial amount of seigniorage while offering the means to preserve monetary stability.

The regional currency, without becoming legal tender in the member countries, will be used for cross-border transactions by central banks and all commercial banks.

Figure 1. Two-tiered monetary infrastructure



Let us specifically present the structure of the RCB balance sheet. Following the classical model of the Bank of England created by the Peel Act of 1844, later practically all colonial

[18] For the sake of simplicity and to comply with the international standard with a three-letter abbreviation (HRN).

Currency Boards, or more recently the Estonian and Bulgarian model, two distinct departments will be established within the structure of the regional *Currency Board*, an *Issue Department* and a *Banking Department* (see Nenovsky and Hristov, 2002, Magnin and Nenovsky, 2022).

The balances of the two departments are as follows.

No 1 Balance sheet of the Issue Department

Assets	**Liabilities**
1 Liquid foreign currency assets 2 Monetary gold 3 Foreign currency securities	1 Monetary base 11 Regional banknotes 12 Reserves of Centrals banks of Ethiopia, Somalia, Eritrea and Djibouti 13 Reserves of the systemic commercial banks of the region 2 Deposits of the Banking department (Net assets of the Regional Currency Board)

Source: the authors

No 2 Balance sheet of Banking Department

Assets	**Liabilities**
1 Monetary gold 2 SPV HORN 3 Claims on Reserves of Centrals banks of Ethiopia, Somalia, Eritrea and Djibouti 4 Claims on systemic commercial banks of the region 5 Deposit at the Issue Department	1 Regional Loans from IMF, European Union, African Development Bank 2 Regional debt to International Financial Institutions 3 Capital and Reserves

Source: the authors. SPV HORN is a SPV for which will mobilize investment in the region

RCB will be subject to strict rules. The change in the quantity of the regional currency issued will follow exactly and automatically the change in the foreign assets of the issuing department, i.e., the foreign currency inflow and outflow deposited by the central banks of the region and the commercial banks. The residual foreign exchange reserves in the issuing department present the assets of the Banking department providing the accounting link between both departments. This deposit represents the positive net worth of the RCB, i.e., the excess of official foreign exchange reserves over the monetary base (monetary base consists of the regional currency in circulation and the reserves of the central banks and some systemic commercial banks). If the

banking department has sufficient reserves, it can lend to central banks in the event of a systemic liquidity crisis in the banking system of a member country, playing the role of limited LOLR (claims on central banks and systemic commercial one). The primary role of the RCB will therefore be to ensure monetary stability and to intervene in case of a liquidity or exchange rate problem with a local currency.

It is appropriate to consider digitalization of the currency of the *Regional Currency Board*. This will give an opportunity to expand the financial inclusion of the population in the region, which is at a very low level (for example, the authorities of Djibouti are concerned about this state). China's experience in digitizing the yuan, in this regard, comes in very handy.

With the objective of external stability of their currency ensured by the RCB, the central banks of each country will be able to carry out monetary discretion (easing or tightening) at the local level to manage the national liquidity and domestic economic activity their economies without eroding the credibility of their national currency.

At the regional level, monetary regulation is based on a quasi-automatic mechanism for adjusting the supply of the regional currency to the balance of payments of member countries, i.e., to the demand for the regional currency. Thus, the money supply of the member country must adjust automatically when there is disequilibrium in the balance of payments, following partly the example of the gold standard (this is debatable question, but nevertheless see the mechanism exposed in Hanke and al., 1993). However, to avoid too large imbalances within the region, the country in disequilibrium can compensate the loss of regional currency by creating temporarily and in some limits domestic, national currency (ex. in buying limited volume of domestic securities).

2-2 Local monetary discretion without great risk to monetary stability

To guarantee the convertibility of the base of currency at the national level, a fractional cover rule will be put in place, *i*.e., only a fraction of the stock and flow of local currency of each country is covered by reserves in regional currencies. More precisely, the coverage rule obliges the issuing institution to keep on the asset side of the balance sheet a volume of reserves in regional currencies equivalent to 50% of the national monetary base and on the other hand a limited volume of securities in national assets (advances to the Treasury and debt securities)[19] (see balance sheet No 3).

This translates into a capacity to alter the ratio of foreign currency reserves to domestic liabilities, thus giving the central bank a certain capacity to carry out discretionary sterilisations. Central banks can thus combine conventional (lowering or raising reserve requirements) and unconventional (increased liquidity injections, purchases of government securities, or

[19] We take the 50% coverage rule from the practice of the past when such a percentage of the Treasury's paper currency was covered by metal reserves. The percentage chosen may be different. In balance sheet 3, cash base 1 should be covered by 50% of the sum of assets (1 + 2 + 3).

inversely) discretionary measures without the risk of inflation since the emission of local currency is limited.

The conversion of regional currency into local currency - and vice versa - is automatic. It takes place on simple request to the banks[20], which will put local currency into circulation by making foreign currency available to the RCB, which will deposit regional currency in their accounts at the RCB (see the balance sheet No 3). Only the central banks will have a monopoly on the emission of local, national currency, which alone is legal tender within a country and will give seigniorage from which the national states can benefit.

No 3. Balance sheet of the National central bank

Assets	**Liabilities**
1 Reserves in regional currency 2 Cash and foreign currency deposits 3 Monetary gold 4 IMF related elements 5 Claims and loans to the State 6 Claims on commercial banks 7 Fixed assets and investment securities	1 Local currency (banknotes and coins) 2 External liabilities related to IFIs 3 Government accounts payable 4 Accounts payable to financial institutions 5 Capital and reserves

Source: the authors

Thus, the RCB is able to ensure monetary and banking stability at the regional level, and by safeguarding the national currency (in the form of banknotes and coins) it provides dual sources of seigniorage and a sense of existence and monetary sovereignty. This model, has much in common with the ideas of monetary federalism that became popular after the 2008 crisis (see, for example Théret and Coutrot, 2018).

The model presented so far is only the most general, it requires specification and the solution of a number of technical problems that are in a sense crucial for the whole system. Let us consider some of them.

3. Technical aspects of the regional *Currency Board*

The RCB imposes a double constraint: a fixed parity against a basket of currencies and the full coverage of the monetary base by foreign exchange reserves. In this section, we will address the technical issues related to its implementation: the choice of the coverage and its level of the exchange rate, the ratio between the local currency and the regional currency, and finally the subscription to the RCB capital.

[20] All commercial banks will be able to exchange their currencies into regional currencies at the CBR without the intermediation of the NCB. The level of exchange rates between the regional currency (HRN) and the basket of currencies, and between the Horn and the national currencies will be discussed in the following section.

It should be noted that new regional currency appears in the nude, it is not an extension of a previous monetary institution, and therefore there are a number of conceptual and technical difficulties with determining its volume and its exchange rate (in fact, a similar problem is observed with the emergence of others regional currency, such as the CFA franc and the euro). However, it is necessary to start from somewhere, bearing in mind that even with the wrong initial conditions, if the Curency Boards rules are respected, the economic activity will adapt to them and they will integrate, endogenize into the agent behaviours. When significant deviations and disequilibria are firmly established, then an amendment to some basic elements of the Currency Board is always possible. In fact, the history of Currency Boards that have existed and that exist today shows that the initial conditions (exchange rate, coverage, etc.) are very quickly integrated by the economic agents and do not have a major impact on the rules of the game.

The breakdown of the currency basket and foreign reserves composition

In principle, the eligible assets of a currency board should be denominated in the reserve currency, to limit exchange rate instability against a third currency. The more the country trades with the reserve currency issuing country, the greater the credibility.

As the geography of the global economy changes, the configuration of the international monetary system is also changing. Since the integration of the yuan into the Special Drawing Rights (SDRs), the Chinese authorities have been promoting the use of SDRs as a real currency, a settlement currency for natural resources, as more and more partner countries are abandoning the dollar in bilateral trade with China in favour of the yuan. The digital version of the renminbi, which is undergoing promotion, also sees widespread adoption in Africa. Most countries in the sub-region have signed agreements on the establishment of national clearing houses that allow economic operators to trade without using their reserve currency. The establishment of these clearing houses is crystallised by the setting up of large Chinese banks that convert national currencies into Yuan to facilitate exports and imports between China and the countries of the Horn of Africa region. Also, in the framework of sovereign loans that serve the internationalisation of the renminbi, the Horn of Africa countries have massively indebted themselves to China to finance their infrastructures while their anchor currency was the dollar and negotiate trade relations with the euro zone. Thus, the growing integration of the sub-region with China is a major concern, even if for some countries the internationalisation of the economy and the banking sector in the dollar zone mitigates the scope of the dollar peg conflict.

This new situation could change the relationship between the main world currencies and their hierarchies on the monetary regimes of the countries of the Horn of Africa region, which are still part of a global monetary hierarchy with a dominated position, and could ultimately increase the weight of the renminbi in the deposits of the banking system. For optimal management of foreign currency assets in the sub-region's economy, it would therefore be preferable to set up a pegging system based on a basket of currencies reflecting the main partners, i.e., the renminbi, the euro and the US dollar. Thus, this configuration will make it possible to take into account the geopolitical dimension of the monetary policies of the main partner countries.

In concrete terms, for the calculation of the weight of each currency in the basket of currencies, the trade criterion must be used, i.e. the weight of each country's data in the overall result must depend on the relative share of each country in intra-regional trade weighted by the relative share of the currencies in foreign trade (table 1).

Table 1: Relative share in intra-regional trade and relative share of foreign exchange in foreign trade (2019)

Share of intra-regional trade	Ethiopia (49.5%)			Kenya (28%)			Djibouti (9%)			Somalia (8%)	Eritrea (5.5%)
Share of foreign exchange in foreign trade	CNY 21%	EURO 22%	UDS 57%	CNY 22%	EURO 14%	UDS 62%	CNY 21%	EURO 14%	USD 65%	n. a. (Mainly USD)	n. a. (Mainly USD and CNY)

UNCTAD/African Trade Statistics, our calculations

The reconciliation between the various data available has made it possible to conclude for the time being that the sub-region's transactions in goods with the rest of the world remain predominantly in dollars with a weighted average of 50%, followed by the share denominated in yuan with 25% and the euro (20%). It can be rounded up to the following values: 50% in dollars, 25% in yuan and 25% in euros. The basket can be called URE (US dollar, Renminbi, Euro). After a certain period, five years for example, the weights will be revised depending on the region's trade and capital exposures (the phenomenon of de-dollarisation can be expected to increase in favour of the yuan).

As regards the choice of cover, the law of convertibility should allow monetary liabilities to be covered by a basket of monetary assets denominated according to this distribution: 50% in dollars, 25% in yuan and 20% in euros and the remaining 5% by other currencies and cold which intervene marginally in the invoicing of commercial exchanges. The coverage, i.e., the composition of foreign exchange reserves in general, should follow, of course with minor deviations, the structure of the basket. In the coverage there will also be a higher specified percentage for foreign exchange assets in gold. The management of foreign exchange reserves, the structuring of its liquidity and investment part, will be done strategically according to the current and expected dynamics of exchange rates and interest rates of the three currencies of the basket, as well as the gold price.

The level of the exchange rate between the regional currency and the basket

Under the two tiers monetary system the exchange rate adjustment is not possible at the regional level, so the decision on the level of the exchange rate between the common currency and the basket is important. In economic theory, there are different approaches to determine the initial exchange rate (purchasing power parity or real effective exchange rate[21], via the level of a certain period before the introduction of the Currency Board, determination of the exchange rate as a fraction of the foreign exchange reserves and monetary base, etc.). In our case, because regional money has no history, it is possible to restrict ourselves to some form of purchasing power parity derived by approximation.

Our proposal is to posit two price indices P*, composite index of foreign prices (*i*: USD, EURO, CNY) и P: composite index of regional HRN prices (*j*: Ethiopian Birr, Somali Shilling; Djibouti Franc; Eritrean Nakfa; Kenyan Shilling) weighted by each country's relative share of intra-regional trade. That is:

$P^* = \sum_{i=1}^{3} \alpha_i p^*_{hp\,i}$

$P = \sum_{j=1}^{4} \gamma_j p_{hpj}$

The exchange rate is then the ratio of the external to the domestic price level:

$$e = P^*/P = \sum_{i=1}^{3} \alpha_i p^*_{hp\,i} \; / \sum_{j=1}^{4} \gamma_j p_{hpj}$$

To determine P and P* we first calculated the average, over the period 1993-2020 (or using *HP* filter), of each country's CPI (based on a weighted average of the prices of products belonging to the national baskets). Then, the weight of each country's data in the overall result must depend on the relative share of each country in intra-regional trade (for the *P* index) or the relative share of currencies in foreign trade (for the *P** index).

After the calculations we did, the exchange rate estimated by the purchasing power parity method is equal to 1HRN = 0.287 URE or 1URE = 3.485 HRN. The latter quotation is determinant, and it indicates how much regional money must be given to obtain a unit of the composite currency, the basket. To give room for real appreciation, and for easier calculation one can round the initial rate to 1URE = 3.5 HRN, or 1URE = 4 HRN and even **1URE = 5 HRN (1 HRN = 0.20 URE)**. Since the new regional money is not only covered, but also convertible to the basket, it must be taken into account the existence of transaction cost of decomposing the basket into the three constituent currencies (whose cross-exchange rates will move, and the demand for the three currencies will also change). This will require careful

[21] This method is used by international organisations and one of the main advantages of PPPs is their relative stability over time (OECD, 2002).

liquidity management by the RCB and all agents who will undertake the conversion/convertibility of the new money.

Once the exchange rate is determined, and taking into account the foreign exchange reserves that may be transferred from the four countries, or borrowed by the IFIs, then the new regional monetary base is to be determined. That is, the initial foreign exchange reserve should be multiplied by the exchange rate. In this sense, the logic is the reverse of introducing a monetary board with existing money (here the monetary base is primary, since its past dynamics are known).

The exchange rate between the common currency and the national currency

The common currency issued by the RCB, which would be in addition to the various national currencies, must be complementary and not in competition. To simply link the two circuits, the common currency will be strong, stable and used in regional transactions without becoming legal tender in the member states. National currencies will be legal tender and they will be pegged to the common currency at a fixed exchange rate. The fact that the national currency will be the only legal tender in a given country, and especially for paying taxes and for paying the salaries of civil servants and various kinds of social benefits, will create a demand for this money, which will be different from the demand for money at the regional level[22].

The exchange rate that central banks will impose cannot be considered as a conversion rate that could vary according to the forces at play in the foreign exchange market and central banks will not be allowed to manipulate it as part of monetary policy at the risk of compromising monetary credibility. Change should be as difficult as possible and any change in the exchange rate should require a parliamentary decision and not a decision by the Council of Ministers. However, it is also possible to discuss the possibility of disciplining monetary policy through a flexible exchange rate between the regional currency and the national currencies. Over time, as the new system becomes operational, the two circuits will become increasingly separate and linked in a stable and predictable way.

Thus, in general, the fixed exchange rate, the fractional coverage of national currencies by reserves in regional currencies and the prohibition to exceed a limited volume of securities in assets (advances to the Treasury and debt securities) will force the issuing institution not to finance public deficits.

Subscription of RCB capital and foreign reserve consolidation

To get started and provide the necessary capital for the establishment of the CBR, the national banks of all member states can allocate part of their foreign exchange reserves according to the relative share of the country in the total population and the gross domestic product of the region (the rules are similar in the euro area). These two determinants have equal weight. As with the

[22] Similar ideas are contained in the proposals of Théret and Coutrot (2017, 2018, 2019) and Bossone and al. (2015, 2918), rightly in the context of monetary federalism in Europe.

currency basket, the CBR must adjust the shares every five years and whenever there is a change. The CBR is responsible for issuing the banknotes in cooperation with the national central banks of all member states. As the demand for regional banknotes can be met either by commercial banks or national central banks, there is no need to set up branches in each country and city. However, it will be necessary to create a regional structure (headquartered in Addis Ababa, and representative offices in each country) which will be in charge of establishing the guidelines and procedures for supervising the management of foreign exchange reserves and in which the governors of each Central Bank will reside to establish the decision rules.

The seigniorage gains will be partly transferred to the banking department (for example *20% of the benefit*) to act as a stabiliser and the remaining net gains will be distributed to the national central banks according to their share in the RCB capital. The central banks, in turn, can transfer this income to the State after deducting operating costs and making the necessary provisions.

Due to the low level of foreign exchange reserves, and the need to service heavy external debts (Eritrea for example), an alternative scenario for the launch of the RCB should be envisaged. In this configuration, the initial foreign exchange reserves could be given, in the form of a loan or grant from the IMF, African Development Bank, or other strategic partners (China, for example) who would help with expertise to counter the new monetary system.

Conclusion

In this paper, we have presented the main elements of the project for the organization of the monetary system of the Horn of Africa at two levels - regional and national. The model proposes the participation of Ethiopia, Eritrea, Somalia, Djibouti and possibly Kenya and Tanzania, but in reality, it is only about those countries that have the political conditions and will to adopt the model.

The two-tiered monetary infrastructure proposed in this article has a dual purpose, stability at the regional level and flexibility at the national level.

The first objective is therefore a factor of monetary stability, credibility and discipline necessary to intensify cross-border trade without exchange risk. At the regional level, adjustment by the exchange rate is made impossible and is replaced by the rules of the *Regional Currency Board*: the variation in the quantity of the regional currency issued follows exactly the variation in the trade balance/current account.

The second objective is a factor of both monetary easing and fiscal disciple, insofar as it limits the authorities' ability to monetise the public deficit and increase public debt. Indeed, the introduction of a *flexible currency board* at the national level aims both to discipline the budget deficit and introduces discretionary room for manoeuvre to manage the liquidity and finance the economy without risk to monetary stability.

Of course, many issues remain to be elucidated, both fundamental (about the level of the exchange rate and the convertibility of the basket, as well as the relationship between the two

types of currency) and technical and organisational (banknotes and settlement, the organizational structure and the governance of the monetary system, etc.).

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WHAT HAPPENED TO BULGARIA AND THE EUROZONE

Yanko Hristozov[1]

Abstract: *The topic of the adoption of the euro in Bulgaria is as well-worn as it is relevant with each subsequent year because the country is on the threshold of the euro zone, but something is still missing. Expectations for admission at the beginning of 2024 turned out to be impossible because Bulgaria did not meet the requirements for inflation levels, although it was exemplary in this indicator in recent years. It turned out that all efforts were in vain, but there is still hope that within one to two years the economic indicators will stabilize and the country will become a full member of the Eurozone. The purpose of this report is to examine the state of convergence indicators in Bulgaria, Croatia and Romania for the period 2020-2022 and to try to trace the reasons for our not being admitted to this monetary union, which is so important to us.*

Key words: *euro, euro zone, inflation Bulgaria, Croatia, Romania*

JEL: *E3, E4, E5*

I am almost convinced that the subject of the euro adoption in Bulgaria is one of the most researched in the field of monetary theory and policy, together with the currency board. The topic is interesting, incredibly significant and always relevant. Especially in the last 3 years, because after enormous efforts, Bulgaria was accepted into ERM II. Expectations and hopes for admission in January 2024 will not be fulfilled. The reasons for this failure are many, but the most obvious is the failure of the state to deal with one of the main criteria for convergence – the inflation level. Another reason is the lack of a clear and consistent policy on the subject, the non-adoption of key laws that precede the euro, especially the lack of will and responsibility caused by the political crisis in Bulgaria since 2020.

Nobel laureates in economics, Joseph Stiglitz and Paul Krugman, draw gloomy predictions for the future of the Eurozone, built on its fundamental inconsistencies with Robert Mundel's theoretical formulation of the "optimal currency area". They highlight two main groups of reasons for this: first, the deep differences in the economic structure and level of development of the Eurozone countries, and second, the impossibility of conducting a unified fiscal policy. In particular, Paul Krugman (2016) believes that the creation of a "working Eurozone" requires reforms in two main directions: reforming the structure of the European Union; and "crisis policy" reforms. Thus, the

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question is to what extent a political consensus will be reached between the countries of the Eurozone, which will allow the implementation of radical reforms and the gradual harmonization of the fiscal policies of the countries of the Union. (Gechev, R., Beev. I, Hristozov, Y., 2020). We are still waiting for these fundamental reforms in the Eurozone, which will make it an even stronger monetary union. I have done a lot of research on the subject and the following is a critical analysis of some of my previous comments.

In one of my articles from 2015, "Bulgaria's way to the Eurozone. With or without a currency board" (Hristozov, Y., 2015) I have made the forecast that our country will join the waiting room within three years, and the Eurozone within five. Turns out I was wrong. I have a few more experiences on the subject, mostly as a fierce defender of the thesis that the adoption of the euro does not in itself lead to high inflation, especially if this act is accompanied by the right measures. Inflationary uncertainty is considered to carry risks for the real economy. In the article “Does the introduction of the euro lead to high inflation? Myth or fact?', I look at one of the most frequently asked questions when countries join the eurozone and adopt the single currency, which is: will this process lead to higher prices? (Hristozov, Y., 2019). Similar is my research on "The Baltic states joining the eurozone and its effects on inflation" (Hristozov, Y., 2018). In both, the weak influence of the adoption of the single European currency on inflation is unequivocally proven, as the studied countries have all adopted the euro after 2007. Even most experienced deflation in the months following adoption. People with non-expert understanding do not understand that even if inflation is observed, firstly it is not excessive, secondly it is certainly not a consequence of the euro.
Our most serious study on the subject is from 2020 with the title "Expected effects of the euro adoption in Bulgaria" (Gechev, R., Beev, I., Hristozov, Y., 2020). The article interprets facts related to the accession to the Eurozone of selected (representative) EU member states and the expected effects on Bulgaria's economy. The main contribution is the derivation of the "critical zones" of impact from the possible negative effects, made on the basis of a careful study of the experience gained in the countries that have already introduced the single currency. In this publication, we have made a forecast for admissions in the waiting room in 2020 and in the Eurozone at the earliest in 2023. It turns out that we are forecasting too optimistically.

The next part of the report compares the fulfillment of the convergence criteria of three countries (Bulgaria, Croatia and Romania) for three years, from 2020 to 2022 inclusive. At the date of the analysis, all three countries are outside the Eurozone. Two of them (Bulgaria and Croatia) are in ERM II, while Romania is not, and Croatia joined the euro area in January 2023. The choice of these countries is dictated by the fact that they follow a close policy towards the EU and the Eurozone. Croatia was admitted to the EU much later than Bulgaria and Romania but managed to outrun them significantly. Bulgaria and Romania are walking hand in hand on the road to European

integration. The convergence criteria are clearly defined, the analysis will compare the data according to Eurostat. For inflation and interest rates, the data are real, according to Eurostat statistics. For state surplus/deficit and for state debt, the data for 2022. are estimated according to the ECB, due to the lack of statistics yet in Eurostat. The following table shows the values of the convergence indicators.

Table 1. Economic indicators of Convergence

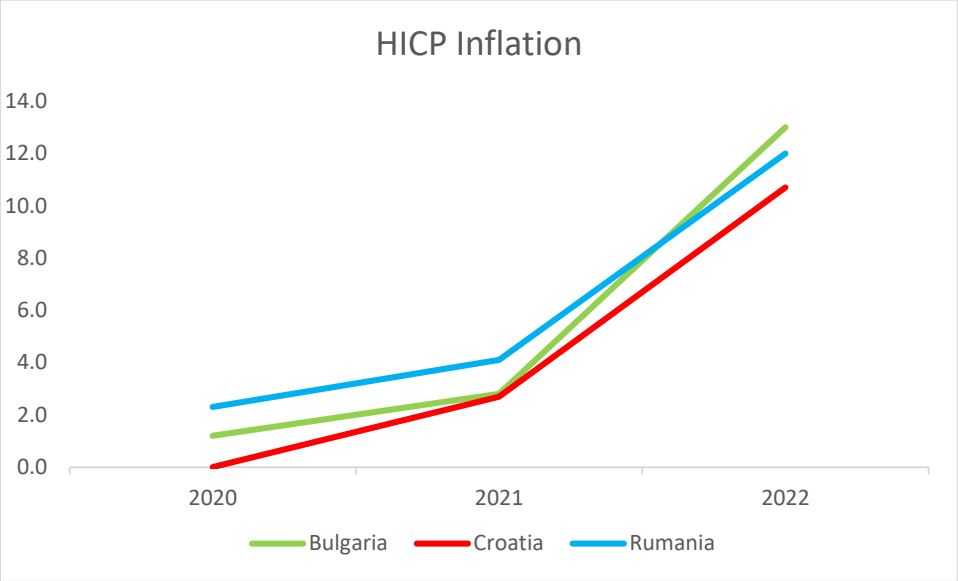
		HICP inflation	General government surplus (+)/ deficit (--)	General government debt	Long term interest rate
Bulgaria	2020	1,2	-4,0	24,7	0,3
	2021	2,8	-4,1	25,1	0,2
	2022	13,0	-3,7	25,3	1,5
Croatia	2020	0,0	-7,3	87,3	0,8
	2021	2,7	-2,9	79,8	0,4
	2022	10,7	-2,3	75,3	2,7
Rumania	2020	2,3	-9,3	47,2	3,9
	2021	4,1	-7,1	48,8	3,6
	2022	12,0	-7,5	50,9	7,5

Source: Eurostat, ECB, own calculations

1. HICP-Inflation.

Figure 1 compares the levels of inflation for the three countries for the period 2020-2023. It is noteworthy that the highest levels of accumulated inflation for the entire period are observed in Bulgaria, followed by Croatia and lastly Romania.

Fig. 1. Average annual percentage change of HICP Inflation



Source: Eurostat, ECB, own calculations

Inflation rates in Croatia for the period were between 0% and 10.7%. At the time of the April 2022 Convergence Report, the 12-month average rate of HICP inflation in Croatia as of April 2022 was 4.7%, i.e., below the reference value of 4.9% under the price stability criterion. But the levels at the end of 2022 turned out to be higher - 10.7%. This did not prevent Croatia from adopting the euro, i.e., a compromise on the part of the ECB is observed. In the last ten years, the rate of inflation in Croatia fluctuated in a relatively wide range - from -0.8% to 4.7%, with an average of 1.1% for the period.

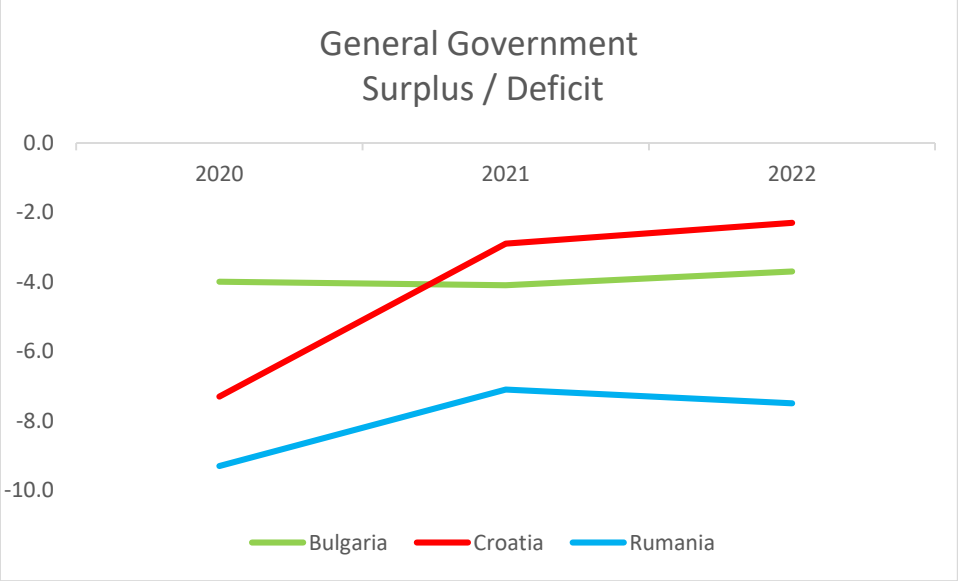
Bulgaria has higher inflation rate than Croatia, but lower than Romania. In 2022, the 12-month average rate of HIPC inflation in Bulgaria 13%, i.e., well above the price stability benchmark of 4.9%. The interesting thing is that Bulgaria overtakes Croatia and Romania for 2020. One of the main reasons is the huge dependence of the Bulgarian economy on Russian energy resources. The ECB's April 2022 data on a year-ago basis was for 5.9% inflation, but inflation ended up being double by the end of the year. Over the past ten years, this rate has fluctuated in a fairly wide range – from -1.7% to 5.9%, with an average of 0.9% during the period. The rate of inflation is expected to hold and remain high until at least mid-2023, and in my opinion until the end of the year. The state is trying to implement an effective policy against speculation, but at this stage the effects are not visible. The measures taken are expected to have some impact after the middle of the year.

Romania has the highest inflation of the three countries, except in 2022, when Bulgaria overtakes it. ECB data in April 2022 for the 12-month average rate of HICP inflation in Romania was 6.4%, i.e., well above the price stability benchmark of 4.9%. But at the end of the year, it turned out to be a much higher 12%.

2. General Government Surplus/ Deficit.

Due to the lack of data for 2022 at the time of preparation of the analysis for the year, the forecast data of the European Commission, which are also included in the convergence report, are used.

Fig. 2. General government surplus/deficit as % of GDP



Source: Eurostat, ECB, own calculations

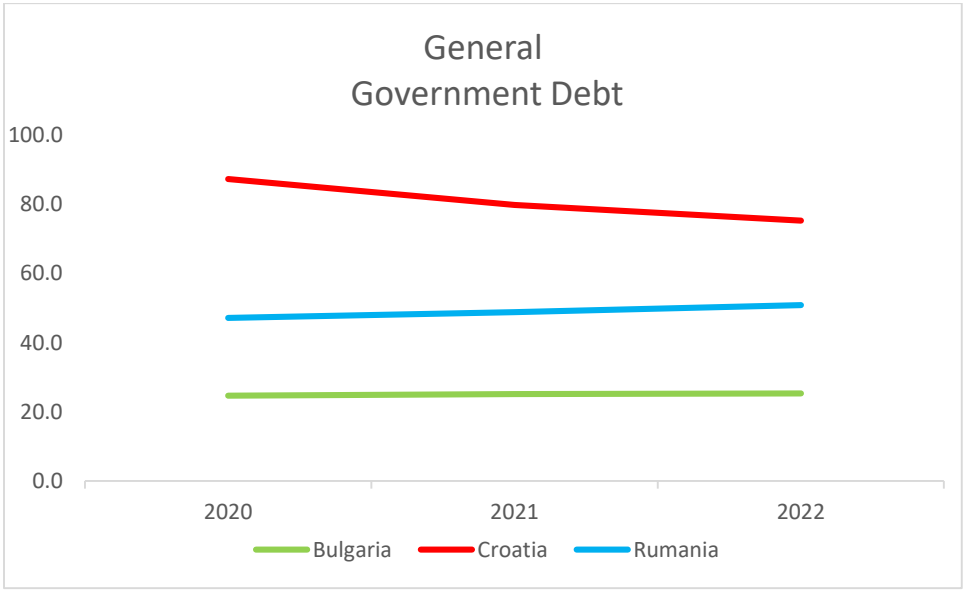
Croatia's budget balance is above the reference value in 2020, -7.3. In 2020, the budget balance of the general government sector in Croatia was slightly below the 3% deficit reference value. In 2021, it is again below the reference value in the amount of 2.3.

The situation in Bulgaria is different. In the three years researched, the budget balance was above the reference value, but with exceedingly small changes, while the situation was more serious in Romania, where a deficit in the range of -7.1 to -9.3 was observed. Figure 2 clearly shows how Romania overtakes Bulgaria and Croatia in this indicator in a negative order. One of the reasons for Croatia's handling of the indicator is the pledge to adopt the euro and the safeguards of the Stability and Growth Pact, although Bulgaria and Romania are much earlier subject to measures under the Pact. Exceeding the reference values in Bulgaria are considered extraordinary and temporary.

3. General Government Debt

Due to the lack of data for 2022 at the time of the preparation of the analysis for the year, the estimated data of the European Commission are used, which are also included in the convergence report.

Fig. 3. General Government Debt as % of GDP



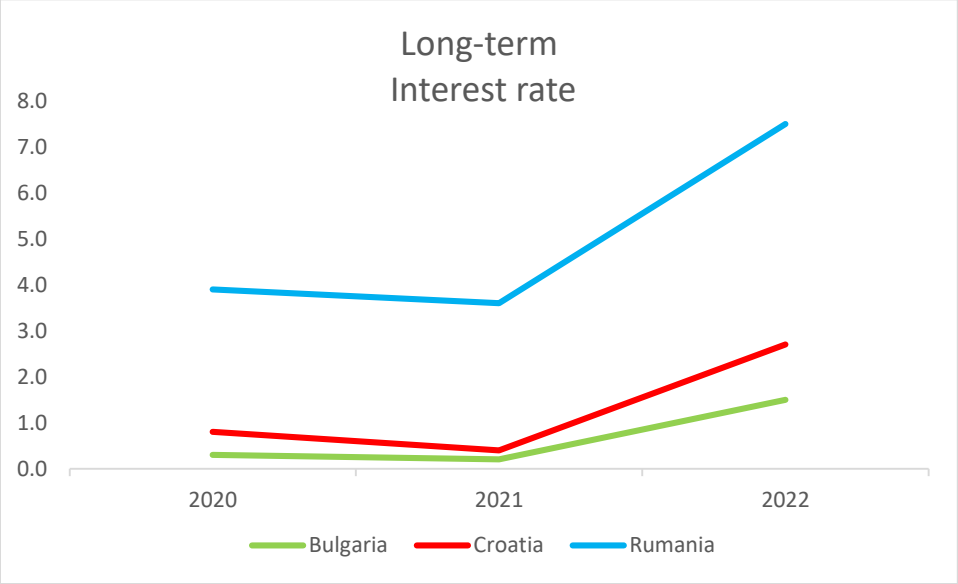
Source: Eurostat, ECB, own calculations

Croatia's debt ratio is above the benchmark of 60% but trending downward. In 2021, the debt ratio is 79.8% of GDP, but this represents a decrease of around 7.5 percentage points from the peak of 87.3% of GDP recorded in 2020 and is in line with the reduction benchmark of debt, which meant compliance with the debt criterion. According to this indicator, Croatia is in last place.

The best values for this indicator are of Bulgaria. The debt ratio is in the range of 24-25%, which is well below the benchmark of 60%. Bulgaria is one of the leaders in the EU in terms of the indicator. In Romania, the situation is also within the recommended value. Values from 47 to 51% are observed there. The levels of this indicator are once again an example of the compromise made towards Croatia.

4. Long-term Interest Rate

Fig. 4. Average annual Long-term Interest Rate



Source: Eurostat, ECB, own calculations

According to data from the Convergence Report, during the reference period from May 2021 to April 2022, long-term interest rates in Croatia averaged 0.8%, which is below the reference value of 2.6% under the interest rate convergence criterion. Long-term interest rates in Croatia have been declining since 2012, with 12-month average rates falling from just below 7% to below 1.0%. The average levels of long-term interest rates in Bulgaria are the lowest – 0.3 to 1.5% in 2022. Long-term interest rates in Bulgaria have been decreasing since 2012. Only Romania does not meet the requirements of this criterion to date, where the levels are 3.9% in 2020, to an impressive 7.5% in 2022. The data are from Eurostat.

Conclusion

Although they were admitted together in ERM II in 2020, Croatia managed to adopt the euro, while Bulgaria is still unable to meet this challenge. Although no striking differences are observed regarding the convergence criteria. A compromise was made with Croatia, but not with Bulgaria. What is worse in this case is that there is no longer any hope for Bulgaria's accession in 2024. An optimistic option is 2025, but it all depends on the economic and financial state of the country.

Perhaps Bulgaria will overtake Romania, which is not yet a member of ERM II, and both countries will not join the eurozone at the same time. The reason for Bulgaria's backwardness lies in the

incompetent financial and budget policy in recent years and the indiscriminate pouring of money into the economy, the allowing of speculation and cartels, which led to excessive inflation in the country.

A sound economic policy and structural reforms are needed to lead to a stable and sustainable convergence. Perhaps the moment for the adoption of the euro in this economic and political instability should be shifted by one or two years and this will be for the good of Bulgaria. This time should be used to convince the public of the benefits of the euro and stop speculation on the subject.

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TRANSITION TO PAYMENTS FOR RUSSIAN GAS IN RUBLES: ONE STEP BEYOND

Vasily Tkachev[1]

Abstract: *Russia has long dominated in the supply of gas to many European countries, at the same time being heavily dependent on the foreign currency revenues from gas exports to cover its foreign currency demand. Therefore the Russia-Europe gas trade was considered mutually beneficial. Geopolitical tensions of spring 2022 changed this status quo. Russia required gas to be paid in rubles. The paper lays out an analytical framework for understanding the reasons and consequences of this drastic move based on the combination of macro- and micro-level challenges. We argue that the new mechanism of the Russian gas payments introduced in 2022 should be considered transitional to a potential future radical overhaul of the payments for Russian exports.*

Keywords: *gas, international trade, payments.*
JEL: *E42, F14, F32*

1. Introduction.

Western sanctions in spring of 2022 posed big problems for Russian trade: many Russian banks became disconnected from the international banking payment system SWIFT, foreign accounts of many Russian companies and banks were frozen. This in turn led to the worsening situation on the Russian financial markets and provoked devaluation of the ruble. The crisis situation in the foreign exchange market forced the Ministry of Finance and the Central Bank of the Russian Federation to made Russian exporters sell 80% of their foreign exchange earnings since February 28 2022. The subsequent sale of foreign exchange earnings by exporters helped ease the pressure on the ruble, but did not solve the fundamental problem of the increased vulnerability of Russian exporters to sanctions imposed on them. To support one of the largest Russian exporters playing a key role in the Russian economy, Gazprom, a special decree of the President established the transfer of payments for Russian gas supplies for export to "unfriendly" countries into Russian rubles. Some buyers of Russian gas agreed to switch to a new gas payment scheme. For those who refused, gas supplies were cut off.

The ongoing changes have caused great discussions in scientific and business circles. The opinions of the participants in the discussions of this problem were divided. Some see the new payment mechanism as a revolution, believing that from now on, Russian participants in

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foreign economic activity will be completely protected from foreign sanctions. Others, at the same time, believe that nothing fundamentally new has happened.

The purpose of this paper on a micro-level is to demonstrate the impact of the ongoing changes in the procedure for Russian exporters to receive revenue from Russian gas supplies abroad on the balance sheets of all the participants in these deals in comparison with existing, new, and also promising methods. This will allow a better understanding of the complex nature of the ongoing changes and a more detailed understanding of this important topic. On a macro-level the paper addresses the issue of a dedollarization of Russian trade and the international use of ruble.

Russian gas export to Europe.

Over the past decades Russian gas has been an important part of Russian exports. Though its export volume and value have varied significantly (Table 1). The biggest total volume of Russian gas exports was recorded in 2018 at 223 bln cubic metres, the smallest in 2014 at 174,3 bln cubic metres. Since gas price varied a lot too, the highest value of Russian gas exports was recorded in 2008 at 69107,1 mln USD the lowest in 2002 at 15897,3 mln USD. What is constant during these years is that the bulk of Russian gas exports went to countries other than the Commonwealth of Independent States (CIS).

Table 1. Natural Gas Exports of the Russian Federation in 2000-2020

	Exports				Growth rate in % to previous period				*Memorandum: average export price , USD/1000 cubic metres*
	Total		of which:		Total		of which:		
			to non-CIS countries	to CIS countries			to non-CIS countries	to CIS countries	
	volume, bln cubic metres	value, mln USD	volume, bln cubic metres	volume, bln cubic metres	volume	value	volume	volume	*Total*
2000	193,9	16644,1	134,0	59,9	94,4	146,6	102,2	80,6	*85,84*
2001	180,9	17770,0	131,9	48,9	93,3	106,8	98,5	81,7	*98,25*
2002	185,5	15897,3	134,2	51,3	102,6	89,5	101,8	104,8	*85,69*
2003	189,4	19980,9	142,0	47,3	102,1	125,7	105,8	92,3	*105,51*
2004	200,4	21853,2	145,3	55,1	105,8	109,4	102,3	116,4	*109,05*
2005	209,2	31670,5	161,7	47,5	104,4	144,9	111,3	86,3	*151,36*
2006	202,8	43806,2	161,8	41,0	96,9	138,3	100,0	86,3	*216,00*
2007	191,9	44837,4	154,4	37,5	94,6	102,4	95,4	91,4	*233,66*
2008	195,4	69107,1	158,4	37,0	101,8	154,1	102,6	98,6	*353,69*
2009	168,4	41971,4	120,5	47,9	86,2	60,7	76,1	129,5	*249,27*
2010	177,8	47739,3	107,4	70,4	105,6	113,7	89,1	147,1	*268,48*
2011	189,7	64290,1	117,2	72,5	106,7	134,7	109,2	102,9	*338,88*
2012	178,7	62253,3	112,7	66,0	94,2	96,8	96,1	91,1	*348,33*
2013	196,4	65971,6	138,0	58,4	109,9	106,0	122,5	88,4	*335,87*
2014	174,3	54685,1	126,2	48,0	88,7	82,9	91,5	82,3	*313,81*

2015	185,5	41778,7	144,7	40,7	106,4	76,4	114,7	84,8	*225,26*
2016	198,7	31189,7	164,7	34,0	107,2	74,7	113,8	83,4	*156,95*
2017	213,0	38660,7	178,7	34,3	107,2	124,0	108,5	100,9	*181,49*
2018	223,0	49752,9	186,4	36,6	104,7	128,7	104,3	106,7	*223,11*
2019	220,7	41460,8	182,5	38,2	99,0	83,3	97,9	104,4	*187,86*
2020	202,5	25682,9	167,3	35,2	91,7	61,9	91,7	92,1	*126,84*

Source: CBR (2022b).

Russia has long dominated in the supply of gas to many European countries, which made it a powerful actor in the European gas market in spite of changes in the Russian national market and geopolitical tensions of the last decade. Lunden, Lars Petter et al. (2013) state that Gazprom has long remained the leading gas producer and exporter in the Russian federation and though the Russian gas market was undergoing some transformations and non-Gazprom gas producers (NGPs) increased their share of the Russian domestic gas market, the interests of Gazprom and the NGPs may be complementary or may be pitted against each other, but those of the Russian Federation were in any case likely to be better fulfilled than in the past. Finn Roar Aune et al. (2017) pointed out the conflict of interests between Russia and EU in gas relations in which Russia wanted to sustain, or increase, its exports to Europe, whereas the EU wanted to make sure that the market functioned well and that no country became vulnerable to pressure from Russia. The recent IMF Working paper (Galen Sher et al. (2022) estimates that the potential impacts on the German economy of a complete and permanent shutoff of the remaining Russian natural gas supplies to Europe could lead to serious gas shortages, reduced GDP and higher inflation.

At the same time Russia had been heavily dependent on the hard currency revenues from gas exports to cover its hard currency demand - over the past decades, Russian gas had been sold abroad for foreign currency. For a long time it had been sold to Europe predominately in dollars. Gradually it started to be sold in Euros, the remaining part in dollars. The exact composition of the currency choice for Russian foreign gas contracts remains confidential business information and is not publicly disclosed in any official Russian statistical publications.

Only recently international standard setting bodies started to promote the need for upgrading Balance of payments statistics to include the currency composition of international trade in goods and services accounts (IMF (2021). The Central bank of Russia (CBR) provides such information since year 2013. CBR's data shows that the role of euro is indeed rising as a means of payment for Russian goods and services sold to Europe (table 1).

Table 2. Currency composition of settlements for Russian exports of goods and services (percent of total)

	2013	2017	2021
EU countries total	100	100	100
Russian Ruble	6,8	10,4	11,0
US Dollar	73,0	51,8	42,2
Euro	18,1	34,0	45,5
Other	2,1	3,8	1,3

Source: CBR (2022a).

Demertsiz M. and Papadia F. (2022) describe the details of payments for Russian gas up to spring 2022 as follows: an EU buyer was able to pay for Russian gas in euros through a direct transfer from its designated account in a European bank to a Gazprom's designated account in a European bank, acting as a correspondent bank for Gazprombank; payment was considered completed once the euros in question had been credited to Gazprom's account in the European bank. Alternatively, an EU buyer was able to pay through a direct transfer to Gazprom's euro account in Gazprombank itself.

The Russia-Europe gas trade had been therefore considered mutually beneficial. Geopolitical tensions of spring 2022 changed this status quo. Western financial sanctions levied on Russia threatened the future of Russian exports in general and gas exports in particular. Though EU did not go as far as blocking payments for Russian gas through Gazprombank, in which Gazprom has its accounts Russian authorities decided to implement some precautionary measures. Russian President signed the decree March 31 2022 requiring EU buyers to pay in rubles for Russian gas via a new currency conversion mechanism.

2. Mechanism of transition to settlements in rubles.

Financial terms of contracts in international trade include many important aspects, such as the procedure for determining the currency in which prices are set and in which payments are made, forms of payment, and various currency clauses. Typically, prices are set in the most stable currencies. Moreover, many markets have established the practice of setting prices in certain currencies, most often in US dollars or Euros. The currency of payment is the currency in which payment for goods and services under the contract is made. Due to various features of transactions, the "payment currency' may differ from the "price currency" (see Crowley, M. A. et al. 2020. and Andres Drenik et al. 2018).

There is, however, another important financial aspect of international trade of, which is purely professional in nature, falls within the competence of the financial management of the company and is rarely reflected in macroeconomic analysis - the place of storage of funds received from the export of goods, namely, accounts in national banks or accounts abroad. Though technical in nature, this aspect may become crucial for the overall financial stability of the exporter.

In order to better understand the possible risks and vulnerabilities of the current practice, we will consider five options for obtaining export earnings: the three most common options; the scheme introduced in the spring of 2022 and, finally, the scheme, which, in our opinion, would ensure the independence of Russian export supplies from foreign sanctions to the greatest extent.

For the convenience of analysis, we will assume that post-payment by a simple bank transfer is used as a form of payment (typically Gazprom demands payments through letters of credit). According to the first three methods, we will assume that the currency of the price and the currency of payment are euros. According to the fourth method, the currency of the price and

the currency of payment under the contract are euros, but at the request of the Russian authorities, the final payment must be made in rubles. According to the fifth method, the currency of payment under the contract is rubles, the price currency is either euros or rubles.

Here are the options (scenarios) for crediting proceeds to the account of a Russian gas exporter to Europe: 1. In euros in a foreign bank.
2. In euros in a Russian bank.
3. In rubles in a Russian bank (traditional).
4. In rubles in a Russian bank (payment option for gas in rubles, spring 2022).
5. In rubles in a Russian bank (the option of paying for gas in rubles, promising).

Let's start our analysis with the simplest way for a Russian exporter to receive foreign exchange earnings for gas sold abroad - the proceeds are credited to the Russian exporter's euro account in a foreign bank. Let's reflect the movement of money in this option on the balance sheets of the participants in this operation (fig. 1). After receiving the goods, the foreign importer will instruct his bank to make a payment in Euros to the Russian exporter. To do so, a foreign bank will debit the foreign importer's account and credit the account of the Russian exporter. There will be a change in assets in the balance sheet of the Russian exporter - instead of gas, there will be funds in Euros on its account in a foreign bank.

Figure 1. First scenario of receiving payment for Russian export of gas

Russia		**Foreign Country**			
Russian exporter (RE)		Foreign Bank (FB)		Foreign Importer (FI)	
assets	liabilities	assets	liabilities	assets	liabilities
Gas ↓ € account at FB ↑			€ account of the FI ↓ € account of the RE ↑	€ account at FB ↓ Gas ↑	

Source: compiled by the author.

It is obvious, that this option of receiving foreign exchange earnings leaves them abroad. Less obvious is the impact of this operation on Russia's balance of payments (BOP). Many believe that selling goods abroad always results in money flowing into the country. The paradox of this case is that there is an outflow of funds from the financial account of the BOP. The funds, not arriving in Russia, immediately "materialize" abroad on the bank account of the Russian company[2]. In the Russian international investment position (IIP), there is an increase in assets (foreign claims of Russian residents to non-residents). If a Russian exporter is disconnected from the SWIFT system, it will be more difficult for him to manage his funds in a foreign bank, and if sanctions are imposed on them, these funds will be frozen or lost. Such option of receiving foreign exchange earnings was not used in real life since Russian financial regulations required all export proceeds to be transferred to Russia (though now Russian authorities consider this option to be allowed too).

[2] A more understandable analogy can be given - as if a Russian exporter collected several million euros in cash, brought them to Germany and deposited them in a German bank account. This situation is more intuitively understandable as an outflow of capital from the Russian Federation than the transfer of export earnings to a foreign account, but in fact both of them are basically the same in terms of their impact on the Russian BOP.

Let us now analyze the second way for a Russian exporter to receive foreign exchange earnings for gas sold abroad - the proceeds are credited to the Russian exporter's foreign currency account (in euros) in a Russian bank (fig. 2). After receiving the goods, the foreign importer will instruct its bank to make payment to the Russian exporter. To do this, a foreign bank will debit the account of a foreign importer and credit a correspondent account of a Russian exporter's bank. In the Russian exporter's bank, these funds will appear in assets, and at the same time they will also be reflected in bank's liabilities on the foreign exchange account of the Russian exporter. This particular option can be used in real business practice if the exporter is not required to exchange foreign exchange earnings for gas into rubles.

Figure 2. Second scenario of receiving payment for Russian export of gas

Russia				**Foreign Country**			
Russian exporter (RE)		Russian Exporter's Bank (RB)		Foreign Bank (FB)		Foreign Importer (FI)	
assets	liabilities	assets	liabilities	assets	liabilities	assets	liabilities
Gas ↓ € account at REB ↑		€ corresp ac. at FB ↑	€ account of the RE ↑		€ account of the FI ↓ € corresp ac. of REB ↑	€ account at FB ↓ Gas ↑	

Source: compiled by the author.

Note that with this option of obtaining foreign exchange earnings, it is no longer so obvious where the "real" money is – in Russia or abroad. However, this is easy to find out. In case of imposition of sanctions on the corresponding account of the Russian exporter's bank in a foreign bank, it will not be able to use these funds. The impact of this operation on the financial account of the BOP and IIP of Russia will be similar to the previous case.

In the third option for receiving foreign exchange earnings by a Russian exporter, the currency of the price and the currency of payment are euros, but the proceeds themselves will be credited in rubles to the ruble account of the exporter in a Russian exporter's bank (fig. 3). This particular option is used in real business practice if the exporter has to exchange its foreign exchange earnings for gas into rubles either voluntarily or mandatory by law. It is clear that even in the absence of the mandatory exchange, the exporter is forced by standard business practice to convert a significant part of his foreign exchange earnings into rubles to pay for his ruble expenses.

For the convenience of analysis, let's introduce some numbers. Suppose, the value of goods according to the contract is 50 million euros. We will take the euro to ruble exchange rate at 70 rubles per euro. The first transaction will almost completely repeat the previous options we have just considered (only the exporter's revenue will not be on the euro account, but on his transit currency account). Next, the Russian exporter's bank needs to sell the received currency on the Russian foreign exchange market (transaction 2). To do this, it instructs its foreign correspondent bank to transfer the currency from its correspondent account to the correspondent bank account of the second Russian bank (the one who buys euros, probably in the interests of a Russian importer). To buy euros the second Russian bank will transfer to the first one its reserves in rubles in the Central Bank (the balance of the Central Bank is not

reflected in the table). We believe that "real money" is still abroad and subject to sanctions pressure since it is sitting in a corresponding account of a second Russian bank.

Figure 3. Third scenario of receiving payment for Russian export of gas

Russia						**Foreign Country**			
Russian exporter (RE)		Russian Exporter's Bank (REB)		Russian Bank 2 (RB2)		Foreign Bank (FB)		Foreign Importer (FI)	
assets	liabilities	assets	liabilities	assets	liabilities	assets	liabilities	assets	liabilities
Gas in RuR (1) – 3500 € transit account at REB (1) +50 (2) -50 RuR account at REB (2) +3500		€ corresp ac. at FB (1) +50 (2) – 50 RuR corresp ac. at CBR (2) +3500	€ transit account of RE (1) +50 (2) -50 RuR account of the RE (2) +3500	€ corresp ac. at FB (2) +50 RuR corresp ac. at CBR (2) -3500			€ account of the FI -50 € corresp ac. of REB (1) +50 (2) - 50 € corresp ac. of RB2 (€) (2) +50	€ account at FB -50 Gas in € +50	

Source: compiled by the author.

Let's now consider a new option for a Russian exporter to receive foreign exchange earnings for gas sold, approved in Russia in the spring of 2022. Recall that the currency of the price and the currency of payment remain are euros (previously concluded contracts do not change), but the proceeds themselves will be credited in rubles to the ruble account of the exporter in a Russian bank directly by the foreign importer (which is de-facto a new add-on to the existing contract).

As Yafimava, Katja (2022) puts it, the Russian presidential "decree has changed the payment mechanism by mandating several additional steps both by an EU buyer and Gazprombank. It required the EU buyer to open two new "K" accounts in Gazprombank – one in euros and another one in rubles – and make payment in euros to the buyer's new euro account. It also required Gazprombank, acting on instructions from the buyer, to convert these euros into rubles (by selling euros and buying rubles at the Moscow Exchange), credit them to the buyer's new ruble account, and make a transfer to Gazprom's ruble account in Gazprombank. Once all of these steps have been made, payment is considered completed".

Let's track the changes on the balance-sheets. As fig. 4 shows, after receiving the goods, the foreign importer will instruct its bank to make a payment from his account in euros to his euro account in a Russian exporter's bank (called type "K-euro" in the new regulations). To do this, a foreign bank will debit funds from the bank account of the foreign importer and credit them to the corresponding bank account of the Russian exporter's bank. In a Russian exporter's bank, these funds will appear in assets, which will also be reflected in Russian exporter's bank's liabilities on the euro account of the foreign importer (which the foreign importer has to open). Next (transaction 2), the foreign importer must exchange euros for rubles on the Russian foreign exchange market. To do this, the Russian exporter's bank will sell euros on the market to the second Russian bank. Funds on the correspondent accounts of

the Russian exporter's bank in a foreign bank in euro will be transferred to the second Russian bank, and its funds in rubles from a correspondent account in the Central Bank - to the first.

After that the funds will be transferred from the foreign importer's account type "K-euros" to the account type "K-rubles". Finally (transaction 3), the foreign importer must transfer funds from its ruble account to the ruble account of the Russian exporter. This will be considered the final payment for the export supply of Russian gas to a foreign importer.

Figure 4. Forth scenario of receiving payment for Russian export of gas (Spring 2022)

Russia						**Foreign Country**			
Russian exporter (RE)		Russian Exporter's Bank (REB)		Russian Bank 2 (RB 2)		Foreign Bank (FB)		Foreign Importer (FI)	
assets	liabilities	assets	liabilities	assets	liabilities	assets	liabilities	assets	liabilities
Gas in RuR (3) – 3500 RuR account at REB (3) +3500		€ corresp ac. at FB (1) +50 (2) -50 RuR corresp ac. at CBR (2) +3500	account type "K-€" of FI (1) +50 (2) -50 account type "K-RuR" of FI (2) +3500 (3) -3500 RuR account of the RE (3) +3500	€ corresp ac. at FB (2) +50 RuR corresp ac. at CBR (2) -3500			€ account of the FI (1) -50 € corresp ac. of REB (1) +50 (2) -50 € corresp ac. of RB2 2) +50	€ account at FB (1) -50 account type "K-€" at REB (1) +50 (2) -50 account type "K-RuR" at REB (2) +50 (3) -50 Gas in € (3) +50	

Source: compiled by the author.

However we still believe that "real money" is still abroad - on the correspondent account of the second Russian bank. The effect of this transaction on the financial account of the BOP and IIP of Russia will be similar to the previous ones.

What then is the fundamental difference between the new procedure for paying for Russian gas and the option of selling export earnings by a Russian exporter on the currency exchange, which we considered in the third option for obtaining export earnings? Yes, technically, the new option does not provide tangible advantages as a protection against the freezing of Russian accounts abroad. But, firstly, the problem of controlling illegal capital outflows is eliminated in cases where exporters hide part of their proceeds abroad and do not report on it to the tax authorities. Secondly, and more importantly, we believe that the Russian authorities are gradually accustoming foreign companies to work with the ruble in this way. And not far off is the transition to the next option of paying for the export deliveries of Russian gas, in which not foreign importers, but foreign banks will have to open accounts in Russia.

Let us now consider the option of paying for Russian gas in rubles, in which not importers, but their banks will have to open their accounts in Russian banks. That is a completely mirror version of what existed for a long time when paying for Russian gas in euros. Let's see how it will work. Under this scenario for gas payments, the foreign importer will instruct his bank to

make a payment from his account in euros (or even rubles) to the Russian gas exporter's ruble account in a Russian bank. To do this, the foreign bank will debit funds from the importer's account and at the same time instruct the Russian bank to debit its ruble corresponding account at the Russian bank in favor of the Russian exporter.

Figure 5. Fifth scenario of receiving payment for Russian export of gas

Russia				**Foreign Country**			
Russian exporter (RE)		Russian Exporter's Bank (REB)		Foreign Bank (FB)		Foreign Importer (FI)	
assets	liabilities	assets	liabilities	assets	liabilities	assets	liabilities
Gas ↓ RuR account at REB ↑			RuR corresp ac. of FB ↓ RuR account of RE ↑	RuR corresp ac at REB ↓	€/RuR account of the FI ↓	€/RuR account at FB ↓ Gas ↑	

Source: compiled by the author.

As we can see, with this option of obtaining export earnings, Russia will not have any funds abroad, therefore, there is will be no threat of their freezing. Moreover, foreign banks will have to accumulate ruble balances in their correspondent accounts in order to be able to fulfill the payment orders of their clients. The effect of this operation on the financial account of the BOP and IIP of Russia will be as follows: a decrease in liabilities to foreigners on the financial account of the BOP and IIP.

3. Conclusion

The established practice of international settlements of Russian exporters is characterized by significant vulnerability to external shocks. First of all, disconnecting exporters and their banks from the SWIFT system will not allow them to manage their funds in foreign banks. A possible solution here is the active development of the Russian analogue of the SWIFT system. But in the short term, one should hardly expect the functioning of the Russian analogue of SWIFT in Western countries. A more serious threat is that the freezing of foreign accounts of Russian exporters and banks continues.

The current version of the transition to paying for Russian gas in rubles will, to a certain extent, increase the protection of Russian exporters from external shocks, but will not completely eliminate the problems noted above, since interbank payments between Russian and foreign banks will continue to go through correspondent accounts in foreign banks.

Only a complete transition to settlements in rubles, in which foreign banks will have to open ruble correspondent accounts with Russian banks, can completely eliminate the problem of freezing foreign accounts of Russian exporters.

In the long run, the transition to ruble settlements for Russian exports and imports could lead to fundamental changes for the Russian economy and the financial sector. Through the growing use of the ruble in the foreign economic activity of Russian companies will the ruble acquire a status of an important global reserve currency.

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CONVERGENCE OF THE GDP STRUCTURES OF CEE COUNTRIES TO THE EURO AREA

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Abstract: *This paper attempts to find out to what extent CEE countries are converging towards the euro area in terms of their GDP structures. To achieve our objectives, we use a beta-convergence econometric approach that relies on fixed effects panel data estimation. We estimate a simple equation for all GDP structures and compare the results between two groups of countries. The results obtained from the empirical analysis indicate that there is a process of beta convergence in the GDP structures of the CEE countries towards the euro area. The intensity of this process shows certain specifics both in relation to the countries in and outside the euro area, and in relation to individual structural components. The increasing structural similarity does not exclude the manifestation of certain negative influences on macroeconomic dynamics, which could reduce the intensity of the real convergence process.*

Keywords: *economic integration, euro area, structural convergence*
JEL: *E20, F02, F45, F62, L16*

1. Introduction

The subject of convergence is of increasing relevance in the context of the European economic integration process. Its highest embodiment in various forms is represented by the Economic and Monetary Union (EMU) of the EU. One of the leading challenges related to the construction of the EMU and its effective functioning has to do with the degree of similarity between the individual Member States. In this sense, convergence processes occupy a principal place in the overall framework of the implementation and deepening of integration processes.

The need for similarity between economies in the common European currency area is reflected in the predetermined formal criteria for membership, known as the Maastricht Convergence Criteria. However, the specified criteria are related to different dimensions of nominal convergence, which are not a sufficient condition for the synchronization of business cycles and convergence of the main characteristics of economies, which would ensure the effectiveness of the common monetary policy and the coordination of national economic policies. In this regard, the achievement of structural convergence is of much greater importance for the euro area's resilience to external shocks and the deepening of the integration

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process. Along with the continuing expansion of the euro area, recent changes in economic conditions around the world have once again highlighted the questions about the differences in the effects of these developments on individual countries and the ability of the European Central Bank (ECB) to effectively pursue its policy objectives.

At the moment, five EU member states from CEE have the status of EMU member state without the right of derogation, i.e., euro area member states (Estonia, Lithuania, Latvia, Slovenia and Slovakia). Six of the EU member states from CEE have the status of EMU member state with the right of derogation, i.e., are not euro area member countries (Bulgaria, Croatia, Czech Republic, Hungary, Poland and Romania). From the latter, two (Bulgaria and Croatia) participate in the European Exchange Rate Mechanism II (ERM II).

There are some significant remaining differences between "core" EA members and these CEE countries. For example, in some CEE economies the share of the agricultural sector is still more than double the euro area average. Others have industrial sector shares that exceed that of the eurozone by more than a third.[3] In addition, in some of the CEE countries the share of investment and capital income in GDP is considerably higher than that of the euro area. Moreover, for these countries higher levels of imports compared to exports are typical for the majority of the period, while the opposite is true for the euro area as a whole. These issues are the specific focus of the present paper. We examine the process of structural convergence of the new EU member states (as described) from Central and Eastern Europe towards the euro area (EA19) to find out how quickly their production, income, and expenditure structures are evolving over the past 20 years. Additionally, we divide the 11 CEE countries into the two groups mentioned above – of those that have already joined the EA and of those that are yet to join it – in an attempt to find out whether there are any significant differences between them in terms of the speed of the convergence process.

There are several aspects of the importance of the convergence of production (output) structures between the members of a single currency area. The process has been shown to be related to the convergence of real GDP levels, that is to the real convergence between economies (*Angeloni, et al., 2005*; *Palan, Schmiedeberg, 2010*; *Zarotiadis, Gkagka, 2013*). The latter is itself a factor for the ability of prospective eurozone members to fulfil the formal requirements for joining the currency area. On the other hand, *MPC task force of the ESCB (2004)* claim that output structure convergence has a positive effect on business cycle synchronization within the EU and is strongly linked to the effectiveness of the ECB's monetary policy. This may be explained by the impact of the composition of an economy's output on the transmission mechanism of monetary policy as well as its effects on inflation. Additionally, for many of the new EU members the relatively low shares of high value-added industries in their GDPs have often been pointed out as one of the reasons for their lower overall income levels. In light of this, a faster convergence process can be expected to bring the benefit of a faster economic growth in these countries.

The factors that affect the convergence of production structures are not studied in this paper, but they have been the subject of many reviews over the years. *Barro, Sala-i-Martin (1992)* explore the importance of the rate of investment and the rate of growth of labor for the process,

[3] For a more detailed study of these developments, see Raleva, Damyanov (2019).

while *Wacziarg (2004)* focuses on the role of the initial factor endowment of countries and the influence of international trade on it. Market size and structure are studied by *Krugman, Venables (1995)* and *Brülhart, Torstensson (2007)*, while the impact of institutional quality is examined by *Raleva, Marikina (2021)*.

Traditionally, similarities in the GDP expenditure and income structure have been perceived as a minor reflection of structural convergence, due to the lack of fundamental analyses of their role in the course and synchronization of the business cycle for groups of countries. This is also the reason for the more limited number of studies that focus on these two dimensions of structural convergence. However, this should not be an explanation for underestimating the importance of convergence in the GDP expenditure and income elements for the sustainable functioning of the EMU. The reason is that the GDP expenditure structure is strongly tied to the short-term and long-term dynamics of macroeconomic activity and is related to the factors that largely determine it. At the same time, certain interrelationships between the GDP expenditure and income structure can be highlighted, which are a source of additional information revealing certain characteristics of economic development. Some empirical studies focus on the synchronization between the expenditure components of GDP in individual CEE countries and those in the euro area (*Darvas, Szapary, 2004*; *Stattev, Raleva, 2006*). A similar approach is used by W. Buiter and C. Grafe, but their analysis focuses on inventories (*Buiter, Grafe, 2002*). Correlation relationships between certain expenditure elements in specific countries and the euro area are also the subject of research by Agresti and Mojon (*Agresti, Mojon, 2001*). Their analysis applies to countries that currently use the euro as their official currency.

Some more recent studies focus on a comparative analysis of the convergence processes in the different GDP structures in selected CEE countries which have not yet adopted the euro to those of the euro area, highlighting some specifics between the studied countries and in the behavior of individual structural components. Velichkov and Damyanov (*Velichkov, Damyanov, 2021*) analyzed the expenditure and production structure of GDP in three CEE countries (Bulgaria, Romania and Croatia), while Raleva (*Raleva, 2021*) included in the analysis the income structure of GDP, limiting the study to Bulgaria and Roma. Both studies are based on the sigma (σ) convergence approach, using respectively the divergence index (*Velichkov, Damyanov, 2021*) and the Krugman specialization index and the index of structural inequality (*Raleva, 2021*).

To achieve our objectives, we use a beta-convergence econometric approach that relies on fixed effects panel data estimation. We estimate a simple equation (described below) for all GDP structures and compare the results between the two groups of countries.

2. Model and Estimation Methodology

For the purposes of this paper, we define the process of structural convergence between economies as the reduction of the differences between the percentage shares of the components of their output, income, and expenditure structures. A beta-convergence approach is applied in

order to determine the existence of structural convergence between the selected economies and the euro area. The equation that will be estimated has the following form:

$$\Delta y_{ijt} = \alpha + \beta y_{ijt-1} + \varepsilon$$

In this, y_{ijt} is the difference between the share *s* of component *i* of the GDP of country *j* during year *t* and the share of the same component in the euro area, that is $y_{ijt} = s_{ijt} - s_{iEAt}$, while Δy_{ijt} is the change of this difference during year *t* compared to the previous year, that is $\Delta y_{ijt} = y_{ijt} - y_{ijt-1}$. Therefore, a negative sign of the β coefficient would be an indication of the existence of a structural convergence process between the selected countries and the eurozone.

The period that we study is from 2000 to 2019. Annual data from Eurostat is used for all GDP structures, providing approximately 100 observations for each estimation. Specifically, for the production structure we apply the standard disaggregation of economic gross value added (GVA) among a total of 13 economic activities (or groups of economic activities). The agricultural sector is studied as a single economic activity (A), there are five economic activities (industries) in the secondary sector (B – F), and seven economic activities (industries) in the services sector (G – U).[4] This appears to be appropriate despite the differences in the sizes of the individual groups since it allows for a relatively detailed analysis without going into too much detail that would not be relevant to the overall objectives of the study. An alternative approach would be to use employment shares for the output convergence estimations instead of the GVA data as in *Stefanova (2020)*. However, this would not correspond to the rest of the present study where such alternatives are not available.

The study of convergence processes in the GDP expenditure structure distinguishes the following four components: final consumption; investment; exports; and imports. Final consumption includes consumption expenditure of households and non-profit institutions serving households and government expenditure for individual and collective consumption. Investment is equated with gross capital formation. Exports and imports are an expression of the foreign exchange of goods and services.

To evaluate the beta convergence referring to the GDP income structure, three elements are formed: compensation of employees; gross operating surplus and mixed income; and other income components. The first two elements are an expression of income from the two main production factors – labor and capital, and the third element includes all other components of the income structure.

The economies that are studied are as follows: in the first panel we include the countries that have joined the EU since 2004 and have also become members of the eurozone since then – Estonia, Latvia, Lithuania, Slovakia and Slovenia (also referred to below as EA members, EA countries); the second panel consists of the remaining EU members from Central and Eastern

[4] The industries (industry groups) are as follows: A – Agriculture, forestry and fishing; B – Mining and quarrying; C – Manufacturing; D – Electricity, gas, steam and air conditioning supply; E – Water supply; sewerage, waste management and remediation activities; F – Construction; G-I – Wholesale and retail trade, transport, accommodation and food service activities; J – Information and communication; K – Financial and insurance activities; L – Real estate activities; M-N – Professional, scientific and technical activities; administrative and support service activities; O-Q – Public administration, defense, education, human health and social work activities; R-U – Arts, entertainment and recreation; other service activities; activities of household and extra-territorial organizations and bodies.

Europe that are yet to join the euro area – Bulgaria, Croatia, Czechia, Hungary, Poland and Romania (also referred to below as non-member countries, non-EA countries). The comparison between the results of the two panels could provide information about the differences in the speed of adjustment of the two groups to the eurozone. We define the euro area as consisting of 19 countries for the entire period covered by this paper, ignoring changes of the actual membership status of individual countries. Alternative definitions of the euro area result in very similar shares of the components of GDP and have a negligible influence on the estimation results.

3. Estimation results

Following the methodology described above, here we present the results from the panel estimations. They are interpreted in light of the importance of structural convergence described above.

3.1. Convergence of GDP production structure

Starting with the production (output) structure, we find evidence that confirms the existence of a convergence process between CEE countries from both groups and the euro area. With only a couple of exceptions, the estimation results, presented in *Table 1* below, show β coefficients that are statistically significant at the 5% level, while all of them have a negative sign. More specifically, the agricultural industry in euro area member countries from the CEE region appears to show one of the highest convergence rates of all industries, which is a positive development, given the shares of the sector in these countries at the start of the period. The small overall size of the sector, however, means that the impact of this development on the process as a whole is rather limited. Contrary to that, the same industry in non-member states converges at a pace which is one of the slowest among all industries. This is somewhat unfavourable for their potential role in the euro area in the future since these countries currently show the largest gaps to the single currency area in terms of the share of this sector.

Industries in the secondary sector (B – F) in both groups of countries also show an overall tendency to converge towards the euro area average as indicated by the statistically significant negative coefficients in all panel models below (Table 1). As it was in the previous sector, the process appears to be slightly stronger in the countries that are already members of the eurozone, primarily because they converge faster in the two largest industries – *Manufacturing* and *Construction*. The two groups differ most significantly in the rate of convergence of the *Electricity and gas* industry (D), with a much faster increase of the similarity to the eurozone for non-member CEE countries than for the representatives of the region that are part of the bloc. These developments may have certain negative effects on the overall growth rate of some economies as this finding reflects the shrinking of the *Manufacturing* industry both in the euro

area as a whole and in most of the CEE countries studied here.[5] Many of the latter start with manufacturing shares that exceed those in the euro area initially and decline more quickly thereafter.[6]

When it comes to the two smallest components of GVA in the secondary sector – *Mining* (B) and *Water and sewerage* (E), the non-EA CEE countries show a stronger convergence towards the eurozone. Again, however, because of the size of these industries (on average they form around 2% of GVA), this too has a limited impact on the overall process.

Similar results are obtained for the industries in the Services sector. A strong convergence process is found in non-member countries in the *Trade, transport, and accommodation* industry (G-I) with its estimated β coefficient being one of the highest of all industries. The same industry in EA members converges at a much slower pace. The opposite is true for the *Financial and insurance activities* and to a certain extent for the *Professional, scientific, and technical activities*, where member countries show a considerably faster rate of convergence compared to non-members. The rest of the industries in this sector appear to be converging at relatively similar rates in both groups of CEE countries. This means that the sector as a whole converges at similar rates in the two country groups. It appears, however, that the EA members are converging faster in industries that are characterised by higher value-added levels. Given the initial industry shares in the sector, this implies a faster growth rate of these industries and, therefore, a more positive growth outlook for the EA member countries from the CEE region.

Table 1. Estimation results: β-convergence of the components of the GDP production structure

	CEE Countries Group	Variable	Coefficient	Std. error	t-Statistic	Prob.	Adj. R^2	F-stat.	Obs.
A	EA	α	0.586	0.117	5.001	0.000	0.226	6.491	95
		β	-0.400	0.073	-5.448	0.000			
	Non-EA	α	0.249	0.144	1.737	0.085	0.084	2.738	114
		β	-0.133	0.040	-3.296	0.001			
B	EA	α	0.047	0.015	3.093	0.003	0.112	3.368	95
		β	-0.238	0.064	-3.721	0.000			
	Non-EA	α	0.265	0.063	4.193	0.000	0.134	3.926	114
		β	-0.320	0.068	-4.695	0.000			
C	EA	α	0.569	0.132	4.309	0.000	0.168	4.790	95
		β	-0.382	0.079	-4.859	0.000			
	Non-EA	α	1.005	0.207	4.853	0.000	0.152	4.375	114
		β	-0.300	0.061	-4.912	0.000			
D	EA	α	0.200	0.090	2.230	0.028	0.056	2.118	95
		β	-0.211	0.068	-3.097	0.003			
	Non-EA	α	0.396	0.100	3.961	0.000	0.127	3.731	114
		β	-0.344	0.075	-4.597	0.000			
E	EA	α	0.002	0.009	0.167	0.868	0.067	2.343	95
		β	-0.253	0.075	-3.349	0.001			
	Non-EA	α	0.053	0.015	3.462	0.001	0.148	4.280	114
		β	-0.330	0.067	-4.896	0.000			

[5] Despite their diverse composition, manufacturing industries have been shown to contribute more to GDP growth (through TFP growth) than non-manufacturing industries, as in *Baumol (1967), Jia, et al. (2020)* among others.

[6] Detailed information about GDP levels and industry shares is available at www.ec.europa.eu/eurostat.

F	EA	α	0.516	0.134	3.840	0.000	0.139	4.043	95
		β	-0.329	0.074	-4.455	0.000			
	Non-EA	α	0.206	0.074	2.779	0.006	0.076	2.556	114
		β	-0.219	0.057	-3.851	0.000			
G-I	EA	α	0.700	0.274	2.550	0.013	0.083	2.695	95
		β	-0.139	0.052	-2.678	0.009			
	Non-EA	α	0.860	0.189	4.553	0.000	0.177	5.049	114
		β	-0.424	0.079	-5.389	0.000			
J	EA	α	-0.013	0.031	-0.430	0.668	0.030	1.575	95
		β	-0.117	0.061	-1.913	0.059			
	Non-EA	α	0.080	0.033	2.434	0.017	0.059	2.186	114
		β	-0.143	0.057	-2.495	0.014			
K	EA	α	-0.659	0.129	-5.125	0.000	0.220	6.292	95
		β	-0.524	0.094	-5.579	0.000			
	Non-EA	α	-0.095	0.052	-1.828	0.070	0.199	5.685	114
		β	-0.283	0.051	-5.492	0.000			
L	EA	α	-0.639	0.136	-4.681	0.000	0.209	5.971	95
		β	-0.302	0.060	-5.012	0.000			
	Non-EA	α	-0.828	0.150	-5.512	0.000	0.168	4.807	114
		β	-0.321	0.061	-5.261	0.000			
M-N	EA	α	-0.597	0.158	-3.788	0.000	0.144	4.167	95
		β	-0.211	0.048	-4.392	0.000			
	Non-EA	α	-0.429	0.148	-2.891	0.005	0.093	2.941	114
		β	-0.132	0.038	-3.481	0.001			
O-Q	EA	α	-0.947	0.181	-5.218	0.000	0.183	5.200	95
		β	-0.260	0.052	-4.979	0.000			
	Non-EA	α	-1.152	0.233	-4.953	0.000	0.170	4.867	114
		β	-0.282	0.058	-4.902	0.000			
R-U	EA	α	-0.129	0.049	-2.646	0.010	0.086	2.773	95
		β	-0.166	0.053	-3.140	0.002			
	Non-EA	α	-0.171	0.061	-2.815	0.006	0.059	2.170	114
		β	-0.214	0.065	-3.291	0.001			

Source: Authors' calculations based on Eurostat data.

Overall, despite the slightly faster convergence of the CEE countries that have already joined the eurozone, the non-members are also showing a positive progress towards the single currency area. This observed trend fits within the conclusions regarding long-run economic development that characterise *Fisher's (1939)* three-sector model. In the long run though, the trends outlined above may lead to an unfavourable widening of some existing gaps between the two groups, since non-EA CEE countries are already lagging behind their eurozone neighbours in many respects.

3.2. Convergence of GDP expenditure structure

The obtained results show the presence of beta convergence of the two groups of countries towards the euro area in terms of the relative shares of all four expenditure components of GDP – final consumption, investment, exports and imports (see Table 2). The β coefficient is negative and statistically significant in all panel models. The above demonstrates the existence of a tendency towards increasing similarity in the GDP expenditure structure of the EU Member States from CEE to that of the euro area within the studied time period.

Upon comparison of the empirical estimates for the two distinct groups of countries, it becomes clear that the process of increasing convergence to the euro area is more pronounced for the countries that have already adopted the euro as an official currency, but the differences are not so significant. The above applies to all structural elements of GDP. The most significant difference between the two groups of countries is observed in the coefficients in the final consumption convergence models. The absolute value of the coefficient β in the model for the euro area countries is about 2.5 times higher than that in the model for the non-euro area countries. This indicates that the catching up process in terms of the relative share of final consumption in GDP for the CEE countries that are in the euro area is significantly stronger than that for the countries that are yet to adopt the euro.

The differences between the two groups of countries in investment convergence are significantly weaker than those in final consumption. At the same time, however, these coefficient differences are greater than the corresponding deviations in the other two expenditure elements - exports and imports. It can be concluded that the greatest similarity in the course of convergent processes in terms of the GDP expenditure structure is observed in those components that are directly related to the openness of the economy, namely exports and imports.

Table 2. Estimation results: β-convergence of the components of the GDP expenditure structure

	CEE Countries Group	Variable	Coefficient	Std. Error	t-Statistic	Prob.	Adj. R^2	F-stat.	Obs.
Final Consumption	EA	α	-0.01	0.146	-0.069	0.945	0.216	6.467	100
		β	-0.32	0.058	-5.491	0.000			
	Non-EA	α	0.017	0.151	0.113	0.910	0.032	1.65	120
		β	-0.125	0.041	-3.078	0.003			
Investment	EA	α	0.947	0.397	2.386	0.019	0.099	3.183	100
		β	-0,284	0.072	-3.931	0.000			
	Non-EA	α	0.64	0.207	3.096	0.003	0.116	3.601	120
		β	-0.235	0.053	-4.463	0.000			
Exports	EA	α	4.629	1.071	4.321	0.000	0.134	4.075	100
		β	-0.16	0.042	-3.814	0.000			
	Non-EA	α	1.899	0.504	3.772	0.000	0.062	2.315	120
		β	-0.147	0.042	-3.489	0.001			
Imports	EA	α	8.277	1.724	4.801	0.000	0.181	5.381	100
		β	-0.276	0.059	-4.705	0.000			
	Non-EA	α	4.109	0.916	4.484	0.000	0.112	3.491	120
		β	-0.263	0.059	-4.496	0.000			

Source: Authors' calculations based on Eurostat data.

Certain specificities are also present in the convergence of the individual expenditure components of the GDP structure within the separate panel models. For the countries of Central and Eastern Europe that have adopted the euro, the fastest process of convergence to the euro area is observed in the relative weight of final consumption expenditures in GDP. The opposite is true for the relative share of exports, where the lowest increase in the degree of similarity is

observed. Regarding the relative importance of investments and imports in GDP, it can be noted that the values of the coefficients β are almost identical.

The group of CEE countries that have not yet adopted the euro is characterized by certain peculiarities. The strongest growing structural similarity with the euro area is observed in the relative share of imports in GDP. By analogy with the group of CEE countries that are part of the euro area, and for the group of countries that are not yet in it, close values of the coefficients β are observed in the models related to the convergence of imports and investment. The indicated similarity in the course of convergent processes for these two elements of the GDP expenditure structure can be explained by the existing interdependence of their dynamics over time, which is typical for the CEE countries. It is due to the fact that changes in investment activity are also related to changes in imports, since in these countries fixed assets are mainly of imported origin. These specificities in the dynamics of investments and imports also project their influence on the progress of the structural convergence process. In addition, it can be noted that these features are able to influence the dynamics of GDP both in the short and long run. In the short run, the positive impact of investment growth on GDP is limited by the negative effect associated with the increase in imports, and vice versa – weaker investment activity is accompanied by a decrease in imports, and the resulting effects on GDP are mutually reduced. In the long term, however, the increase of investment is an important factor for economic growth, regardless of the fact that this increase may be primarily determined by the rise of import of capital goods. This is also the reason why the stronger convergence of investments in the CEE countries towards the euro area, which is primarily related to the reduction of their relative share in GDP, projects negative impacts on the possibilities of achieving higher economic growth. These conclusions are also confirmed by other empirical studies that analyze the structural convergence of CEE countries to the euro area (Velichkov, Damyanov, 2021; Raleva, 2021). The indicated stronger structural convergence with the euro area may also have a restraining effect on the intensity of the real convergence process (Velichkov, 2021).

3.3. Convergence of GDP income structure

The empirical results for beta convergence indicate that the β coefficients are negative and statistically significant in all model constructs. Estimates obtained from the econometric modeling relating to compensation of employees, both for the group of CEE countries that are part of the euro area and for those outside of it, cannot be perceived as sufficiently indicative of an increasing structural similarity with the euro area due to problems with the characteristics of the corresponding panel models. This also applies to the model estimating capital income synchronization for the group of countries that are already part of the euro area.

Table 3. Estimation results: β-convergence of the components of the GDP income structure

	CEE Countries Group	Variable	Coefficient	Std. Error	t-Statistic	Prob.	Adj. R^2	F-stat.	Obs.
Gross operating	EA	α	0.415	0.303	1.37	0.174	0.001	1.025	100
		β	-0.139	0.066	-2.093	0.039			

surplus and mixed income	Non-EA	α	1.291	0.350	3.684	0.000	0.106	3.345	120
		β	-0.246	0.06	-4.084	0.000			
Compensation of employees	EA	α	-0.313	0.289	-1.085	0.281	-0.013	0.741	100
		β	-0.118	0.064	-1.848	0.068			
	Non-EA	α	-0.876	0.375	-2.339	0.021	0.038	1.780	120
		β	-0.134	0.052	-2.566	0.012			
Other income components	EA	α	-0.023	0.051	-0.444	0.658	0.198	5.876	100
		β	-0.345	0.068	-5.099	0.000			
	Non-EA	α	0.362	0.106	3.419	0.001	0.074	2.589	120
		β	-0.254	0.065	-3.901	0.000			

Source: Authors' calculations based on Eurostat data.

Regarding the coefficient β in the model referring to the convergence of the relative share of gross operating surplus and mixed income in GDP for the countries that are still outside the euro area, it can be noted that it indicates an increasing similarity with the EU monetary union. A higher share of capital income in GDP compared to the corresponding share for the euro area is typical for this group of countries. In this regard, stronger convergence with the euro area corresponds to a decrease in this share in the CEE countries. However, the decrease in the relative importance of gross operating surplus and mixed income in GDP is also accompanied by certain negative effects. These effects refer to the dampening effect on investment activity. In turn, the limitation of investment projects its negative impact on aggregate economic activity as well. These negative effects are supposed to be more pronounced precisely in the countries where a stronger convergence of the GDP income structure to that of the euro area is observed. The aforementioned acts as one of the reasons for the higher economic growth observed in Romania compared to that in Bulgaria in recent years (Raleva, 2021).

The analyzed dependence between the relative importance of capital income and investment activity is also the basis of the existence of a relationship of convergent processes relating to the GDP income and expenditure structure. This can explain the close estimates obtained for the coefficient β in the model for the assessment of convergence in the relative share of investment, referring to the CEE countries that have not adopted the euro, and the respective coefficient in the model for the convergence of the share of capital income for the same group of countries.

The panel models that estimate the beta convergence of other income components outside of compensation of employees and gross operating surplus and mixed income indicate increasing similarity with the euro area both for the group of CEE countries where the euro is already the official currency and for the group of countries that have not yet adopted the euro. The growing convergence in this particular structural element does not have strong macroeconomic projections, considering that it includes such components that are not related to the actual income from the production factors. At the same time, however, the observed increase in the degree of similarity is indicative of the ongoing process of convergence in the GDP income structure as a whole.

4. Conclusions

The results obtained from the empirical analysis give reason to conclude that there is a process of beta convergence in the GDP structures of the CEE countries towards the euro area. The intensity of this process shows certain specifics both in relation to the countries in and outside the euro area, and in relation to individual structural components. When it comes to the production structure, the CEE countries that are already members of the euro area appear to be converging more strongly towards the single currency area than their non-EA counterparts. This is due mostly to the changes in the industries from the secondary sector, while in Services the two groups show comparable convergence rates overall. There are some indications that EA member countries from the region tend to converge faster than non-members in industries that generate higher value added and which also have smaller shares than the eurozone average. This can be expected to contribute to a better growth outlook for these economies at least in the short to medium run.

For the expenditure components of GDP, a more pronounced increase in the degree of similarity is also observed for the CEE countries that are part of the euro area. For these countries, the strongest catching up process is registered in the relative share of final consumption in GDP. As for the countries that do not yet use the euro as an official currency, the strongest growing structural similarity with the euro area is registered in the relative share of imports in GDP. In addition, for both groups of countries, similarity is observed in the manifestation of convergent processes related to imports and investments, arising from the specifics of the interdependence in their dynamics.

The stronger convergence of the relative weight of investment in GDP for both distinct groups of countries also corresponds to certain negative effects, expressed in a depressing influence on economic growth, which can become a limiting factor for achieving real convergence. The registered convergence of investment is also accompanied by an increase in the similarities of the share of income from capital in GDP. The latter is confirmed by the obtained econometric results for CEE countries outside the euro area. These convergent processes can be perceived as intensifying each other. This is due to the fact that the stronger convergence of the share of gross operating surplus and mixed income to the corresponding share in the euro area is associated with a decrease in this share in the CEE countries, which has a negative effect on investment activity. The limitation of investment activity in CEE countries, on the other hand, is a prerequisite for increasing similarity in the relative weight of investment in GDP in these countries with the corresponding weight in the euro area.

All this is indicative that a clear process of increasing convergence in the GDP structural elements of the CEE countries towards the euro area is being observed. This is an important prerequisite for increasing the level of synchronization of the economic cycle between the countries, which has a significant role for the effective functioning of strong integrated communities. This is essential both for the CEE countries that are already in the euro area, and for the others that are yet to adopt the euro but are in varying degrees of readiness for participation in the common currency area. Increasing homogeneity between countries makes their economies more resilient to external shocks and implies greater effectiveness of supranational policies. At the same time, however, the increasing structural similarity does not

exclude the manifestation of certain negative influences on macroeconomic dynamics, which could reduce the intensity of the real convergence process.

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CHALLENGES OF MANAGEMENT OF GREEN FINANCE AFTER THE PANDEMIC

Nadya Velinova-Sokolova[1]

Abstract: *Transitioning to a sustainable future with inclusive, green economies and resilient ecosystems requires huge investments. The rescue packages imposed by the COVID-19 crisis make the pursuit of global sustainability goals even more dependent on urgent investment decisions to be taken by the public and private sector. In response, this study is an attempt to understand the role of green financing in economic growth after the pandemic. The article also examines the impact of COVID-19 on the financial industry, the participation of green finance in the economic recovery after the pandemic. The author put forward the provision on the existence of causal relationships between the "green" financial and "green" economy and analyzed the challenges of management of green finance in Bulgaria.*

Key words: *Green finance, challenges, management, after COVID – 19, Bulgaria*

JEL: G32, M2, N20, O1

1. Introduction

Coronavirus disease was declared a pandemic in early March 2020 by the World Health Organization, despite the fact the outbreak began in mid-2019 in central China. In just a few months, the pandemic managed to affect the development of the world economy leaving no country aside. First of all, changes in the trends of managing the mechanisms of world economic development are associated with the introduction of strict quarantine measures, which were introduced by the governments of many countries. As a result, many shopping and entertainment centers were closed, all public events were banned and the population operated in conditions of restricted movement both within the country and traveling abroad. As for the economy, almost every industry experienced a reduction in production volumes due to the introduction of limits on the simultaneous stay of workers in one room.

The analysis of publications in journals included in the SCOPUS database (2021) shows that as of 2021, about 132,110 studies on coronavirus have been conducted worldwide. This is one of the most popular topics covered by almost any research on the development of economics, medicine, science, culture and other areas. When it comes to the studies of the impact of coronavirus on various sectors of the economy all around the globe, there are about 6,710 publications in SCOPUS database now (Petrunenko et al., 2021, p. 77).

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The global pandemic will have a long-term effect on human attitudes towards the environment and on the financing of this area. As uncertainties grow about protecting populations from disease and preventing climate change, it is important to build resilience to both COVID-19 and long-term environmental challenges. This can be done by focusing on green finance - increasing its efficiency and strengthening its position in post-pandemic economic recovery. In the last decade, green finance has become not only an important area of countering environmental threats and climate change but also a condition for sustainable development. They represent an attractive foundation for creating resource-efficient, less carbon, less harmful to the environment, more socially oriented, and inclusive communities. In modern conditions, environmental safety is becoming a decisive factor in sustainable development (Klioutchnikov and Kliuchnikov, 2021).

Much of the economic literature on the optimal financial response to climate change has focused on the trade-off between direct costs and the potentially uncertain long-term benefits of investments to reduce carbon emissions. At the same time, the discount rate and its parameters play a central role in this discussion, since even small changes in discount rates can dramatically change the current value of investments in long horizons (Klioutchnikov and Kliuchnikov, 2021). Thus, in the long term, make investments in reducing carbon emissions attractive or not attractive. In this regard, finance was considered from the standpoint of solving two problems: (I) climate change in the right direction, (II) adaptation of the production and household system to climate change. The impact of financial innovation on climate change is being actively studied/Policymakers and academics are just beginning to examine the scope and impact of COVID-19's impact on the financial industry and its involvement in post-pandemic economic recovery. However, the link between climate change and the current pandemic in light of the development of green finance is a new topic.

Promoting responsible or sustainable investments in the aftermath of the pandemic requires a progressive rather than defensive financial system. Key will be to embrace the best examples of responsible behaviour, circularity, and solidarity that emerged during the health crisis. In turn, this demands a profound rethinking of financial instruments, practices, metrics and tools in use prior to the crisis, which were evidently failing in their ability to mobilize sufficient public and private capital to accomplish the sustainability transition and convince stakeholders of progress made (Quatrini, 2021).

With the aim of achieving the Sustainable Development Goals by 2030, policymakers, governments, and researchers are continuously seeking a solution that can provide ecological balance along with economic development. According to the International Finance Corporation, green finance is a financial innovation that will provide economic growth and environmental benefits. Green finance is attracting the attention of many countries (Singh and Mishra, 2022) define green finance as a fiscal model that combines economic development and environmental protection.

2. Methodology

The methodology used is based on general scientific methods of scientific knowledge - analysis, synthesis, induction and deduction, as well as on specific methods, specifically applying the

systematic approach, the historical approach, the method of comparison and the abstract-logical method. The information base of this study is the results of large studies of international professional organizations on development on management of green finance.

3. The global finance economy after pandemic

Along with the study of the dynamics of epidemics, research was conducted on the negative effects of the COVID-19 pandemic on the world economy and possible changes in trends and methods of business management and economic development strategies. Many countries attempt to revise history and trying to build a strategy for the development of the state that will prevent similar catastrophes. An attempt was made to predict the transformation of the world and Europe. In particular, after the end of the pandemic, those sectors of the economy that are based on low-skilled labor and old technologies will be significantly weakened. The pandemic severely affects such sectors of the economy as tourism, logistics and transport, the restaurant and hotel business, the leisure industry and a large number of industrial sectors other than agriculture. However, every challenge and difficulty leads to new opportunities. Thus, as a result of the pandemic, some markets have been allowed to develop. These are the markets for communications, health care, ecological production and construction, ecological energy, the economics of psychological comfort (Petrunenko et al., 2021, p. 77).

As the world enters the third year of the COVID- 19 crisis, economic developments have been both encouraging and troubling, clouded by many risks and considerable uncertainty. The good news is that output in many countries rebounded in 2021 after a sharp decline in 2020. Advanced economies and many middle-income countries have reached substantial vaccination rates. International trade has picked up, and high prices are benefiting many developing countries. Domestic financial crises and foreign debt restructurings have been less frequent than might have been expected in a time of severe global shocks (World Bank, 2022).

After rebounding to an estimated 5.5 percent in 2021, global growth is expected to decelerate markedly to 4.1 percent in 2022, reflecting continued COVID-19 flare-ups, diminished fiscal support, and lingering supply bottlenecks. The near-term outlook for global growth is somewhat weaker, and for global inflation notably higher, than previously envisioned, owing to pandemic resurgence, higher food and energy prices, and more pernicious supply disruptions. Global growth is projected to soften further to 3.2 percent in 2023, as pent-up demand wanes and supportive macroeconomic policies continue to be un-wound. Although output and investment in advanced economies are projected to return to pre-pandemic trends next year, in emerging market and developing economies (EMDEs)— particularly in small states and fragile and conflict -afflicted countries—they will remain markedly below, owing to lower vaccination rates, tighter fiscal and monetary policies, and more persistent scarring from the pandemic (World Bank, 2022).

As some developed economies start recovering, central banks and national governments are weighing the impact and timing of tapering off monetary and fiscal support as a result of concerns over potential inflationary pressures against the prospect of slowing the pace of the recovery. These concerns are compounded by the emergence of new disease variants and

rolling pandemic hotspots that challenge national efforts to contain infections and fully restore economic activities. Major advanced economies, comprising 60% of global economic activity, are projected to operate below their potential output level through at least 2024, which indicates lower national and individual economic welfare relative to pre-pandemic levels. According to the October 2021 World Economic Outlook prepared by the International Monetary Fund (IMF), global economic growth fell to an annualized rate of around -3.2% in 2020, with a recovery of 5.9% projected for 2021 and 4.9% for 2022.The IMF also concluded that advanced economies would face continued economic challenges into 2022 as a result of supply shortages and that prospects for low-income developing economies "had darkened considerably" due to the disparities in access to vaccines and differences in economic policy support (Jackson et al., 2021).

A raging pandemic—unleashed by a highly contagious COVID-19 virus—has triggered unprecedented restrictions not only on the movement of people but also on a range of economic activities, and the declaration of national emergencies in most countries in Europe and North America. Growing demand for urgent healthcare and rising death tolls are straining national healthcare systems. The pandemic is disrupting global supply chains and international trade. Since the COVID-19 threat first emerged, economists have debated whether the shock to the global economy will be _temporary' or _permanent'. In the more optimistic _temporary shock' view, the virus will eventually pass, and economic life can then largely go back to normal. Massive fiscal and monetary expansion programs in Western countries will keep the economy afloat in the interim — with government balance sheets socialising the costs of economic hibernation. Government debt will be much higher in the aftermath. But incredibly low borrowing costs will keep this sustainable. The three important Economic impact of COVID-19 could affect the global economy through:

- ✓ Direct impact on production - Production has already been substantially affected by the shutdown in global areas.
- ✓ Supply chain and market disruption - Many manufacturing firms rely on imported intermediate inputs from China and other countries affected by the disease. Many companies also rely on sales in China to meet financial goals.
- ✓ Financial impact on firms and financial markets. Temporary disruptions of inputs and/or production might stress some firms, particularly those with inadequate liquidity. Traders in financial markets may or may not correctly anticipate or understand which firms might be vulnerable (Mishra, 2020).

The COVID-19 pandemic represents an unprecedented disruption to the global economy and world trade, as production and consumption are scaled back across the globe. Urgent and bold policy measures are needed, not only to contain the pandemic and save lives, but also to protect the most vulnerable in our societies from economic ruin and to sustain economic growth and financial stability. Required key policies are:

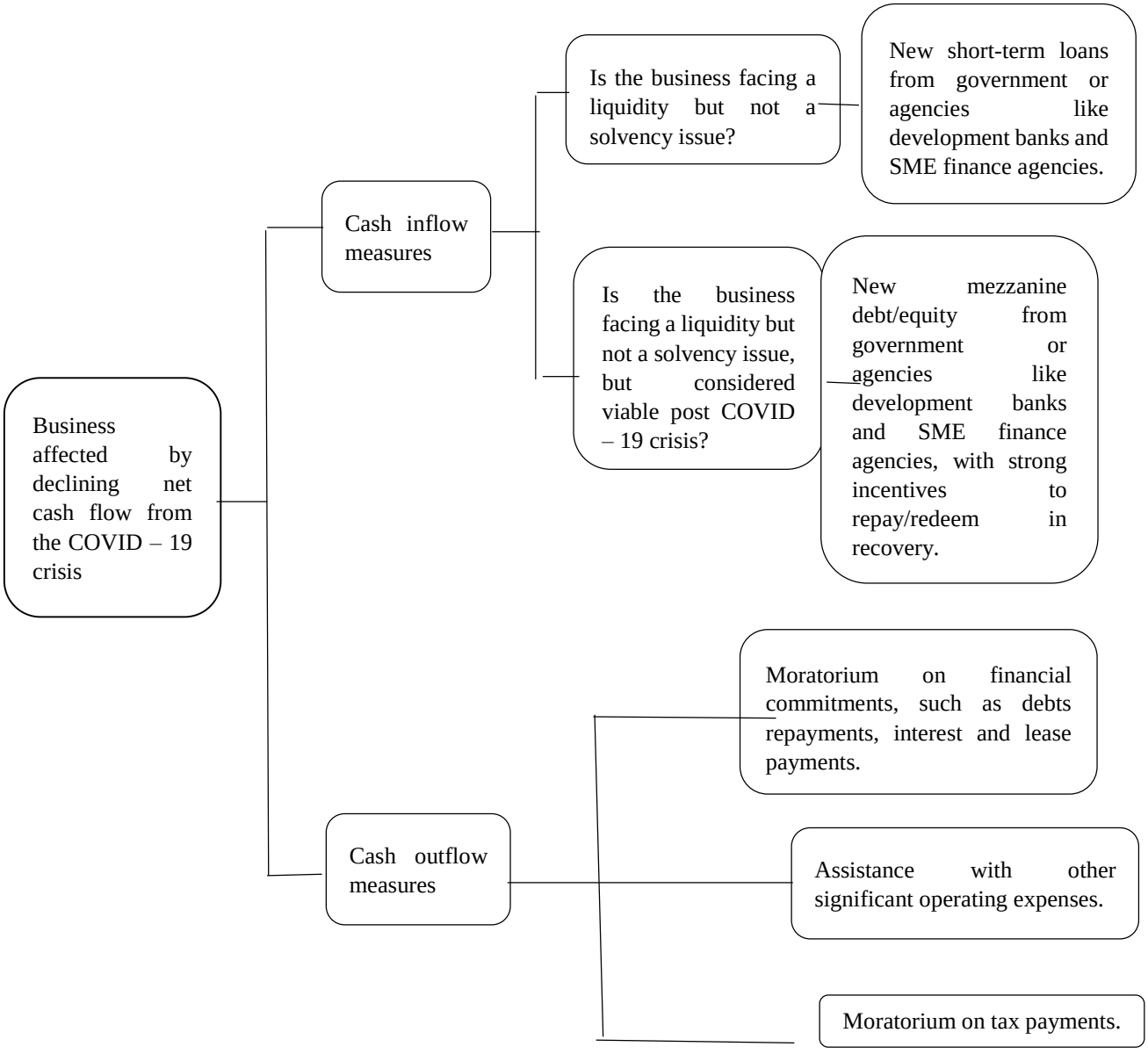
- ✓ Fiscal Issues
- ✓ Macroeconomic and Development Policies
- ✓ Manage Balanced Supply and demand of essential goods and services
- ✓ Supply and demand for foreign currency

- ✓ The role of international organizations
- ✓ Investment Promotion and Facilitation.

The one of the main problems of global finance is related to the management of cash flows after pandemic. Corporate cash flow challenges need tailored global politics (see fig. 1).

Figure 1. Challenges of management of corporate cash flow

Entity	Direction of Flow	Challenges and Responses



Source: *OECD Report, 2020*

At the intersection of the COVID-19 pandemic and the global economy, numerous issues pose challenges to scholars and policy makers. The de-globalization phenomenon coupled with trade slowdown has been an issue even before the pandemic broke out. There are several outstanding issues in international trade such as disruptions of global value chains, the multilateral trading system in crisis and WTO reform, the US-China trade war, and accelerating digital transformation of the world economy (rapid development and growth of digital technology and digital trade) among others. In international macroeconomics and finance, some of the important issues that are interconnected with the current pandemic and need to be addressed include the global financial crisis and its aftermath, crisis management, capital flow management, exchange rates, and financial globalization.

Trade and financial globalization have marched hand-in-hand continuously for several decades before the global financial crisis. However, the de-globalization of international trade was initiated by the global financial crisis, and it continued with a series of events such as Brexit and the US-China trade war that came after the global financial crisis. International trade has fallen sharply under COVID-19, and many people predict that de-globalization of international trade is likely to continue even after COVID-19 ends (Deardorff et al., 2020).

Near-term global growth prospects face major down-side risks, amid a lingering pandemic. With new waves of infections spreading quickly, the human and economic tolls are expected to increase. The key measures are:

- ✓ The world has emerged from the depths of a paralyzing economic crisis, but recovery remains fragile amid the lingering pandemic, persistent labour market challenges, ongoing supply-chain disruptions and rising inflation.
- ✓ The pandemic has threatened hard-won achievements towards the 2030 Agenda for Sustainable Development, significantly undermining progress on global poverty reduction.
- ✓ Governments around the world are facing difficult policy choices, which require better targeted and coordinated monetary, fiscal and labour market policies.

4. Green finance and global finance economy

The transition to a green economy is necessary. First of all, for the world to avoid catastrophic climate change. The International Energy Agency (IEA) estimates that additional investment in renewable energy and energy efficiency alone between 2015 and 2040 was the US $ 26 trillion. Overall, reaching the global targets in 2030 may require mobilising green finance of $ 90 trillion. Under the influence of the pandemic, many problems in the economy and finance have worsened significantly. Some of these problems are temporary and will resolve quickly after the end of the pandemic, while others are long-term, but new ones have also

emerged. Big data finance analysts have observed that epidemiological methods of studying disease incidence and prevalence are well-suited for assessing financial risk and for building models that can analyse green inclusions in finance and economics. It turned out that, despite the differences in the subject area, there are general approaches for the analysis and predictive modelling of green finance and mass diseases and anti-epidemiological measures, as well as the risks associated with them. In addition, a significant part of the data used for analysis is common for these purposes. Modern epidemiological models of the spread of infection, as well as the stages of a pandemic and its exit from it, can affect the development of business and the market (its structure and even scale) and, thereby, direct investments in the appropriate direction. Another use of data for green investment decisions will be information on industry rebounds and recovery rates, as the impact of COVID-19 on different industries varies significantly (Klioutchnikov and Kliuchnikov, 2021).

In simple terms, COVID-19 showed all importance of sustainable finance for the health and well-being of people and the planet. Where economic recovery is urgently needed, green finance can be a long-term solution especially in regions like the Middle East, Africa, Asia and Latin America. Strategies to restore green finances should consider raising funds from global investors. The global green bond market is growing rapidly, with investors increasingly focusing on green bonds as a long-term investment strategy. Sustainability will be a driving force in green finance in the coming decades (Streimikiene and Kaftan, 2021). According to a recent World Bank report, sustainable fixed assets will reach $30.7 trillion by 2030. As financial institutions fight climate change on a global scale, they are being tempted to participate (World Bank (1), 2020).

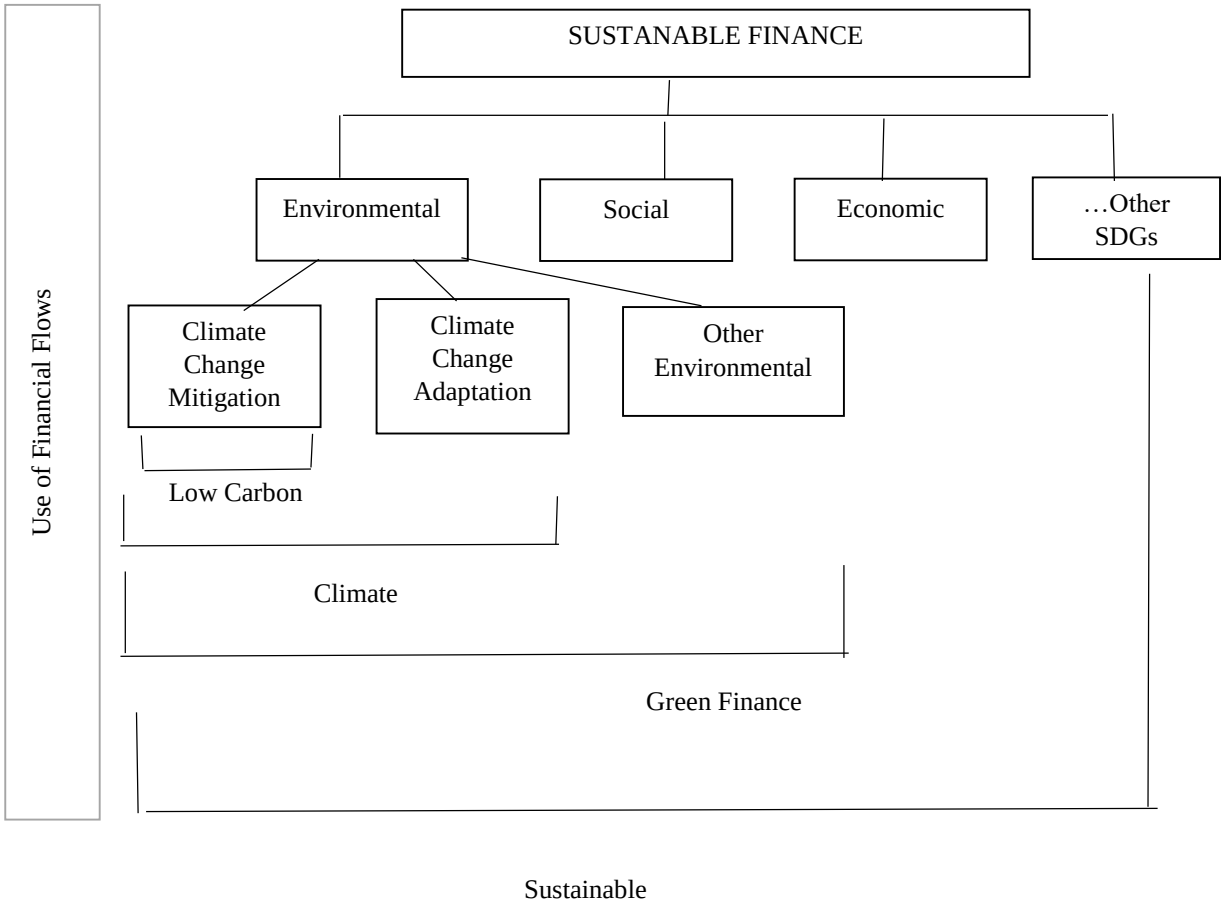
The pandemic primarily affected banks. The sudden decline in interest rates and customer behaviour as a result of market volatility required rapid analysis to support decisions such as revising lending strategies and deposit pricing. The effectiveness of these strategies directly affects the bank's ability to mitigate margin pressure in near-zero conditions. Measurements and instruments in many banks are not dynamic enough to meet adequate information needs. As a result, all the necessary data can be obtained. Buffer levels are eliminated, but not necessarily consistent. It appears that local governments, for example, will issue municipal bonds to finance green solutions at the local level. The following main directions of the impact of climate risks on the financial business can be distinguished: (1) since the risk increases and its probabilistic assessments change, changes are expected in insurance, banking and stocks; (2) linear impacts are replaced by non-linear ones - socio-economic consequences propagate in a predominantly non-linear manner; (3) more and more hazards reach threshold values, beyond which physiological, anthropogenic or ecological systems are affected, then there is a danger for the operation of the entire financial system - the prospect of its failure; (4) temporary impacts, for example, associated with the postponement of the payback periods of investment projects and the increase in temporary asymmetries between expectations and actual restructuring; (5) geographical - climatic impacts can be both local and global in nature on the economy and require appropriate financial decisions; (6) systemic impacts - the direct impact of climate change on agriculture is local in nature, it can have indirect consequences for regions and sectors through

interconnected socio-economic and financial systems; (7) the poorest communities and population groups are generally the most financially vulnerable to climate impacts (Klioutchnikov and Kliuchnikov, 2021).

To catalyse a decisive green transition, targeted government stimulus spending must be backed up by accelerated measures to build markets that can deliver for people and the planet. In the context of the COVID-19 recovery, this means delivering a green agenda that creates green jobs and markets and galvanises progress to ensure we leave no one behind. Central banks and supervisors are already playing a big role in providing emergency support to economies. Many are also acting to take account of climate-related risks and green finance. The mechanisms used by central banks to support stability and stimulate recovery can be calibrated to account for climate and sustainability concerns and objectives. These include aligning of asset purchases and refinancing operations with Paris Agreement goals, adjusting prudential measures to avoid transition risk building up on the balance sheets of financial institutions, and adopting sustainable investment practices for portfolio management (PRI Report, 2020).

Enhancing green and climate finance availability at the regional, national, and local levels will help countries recover more swiftly from the pandemic and grow in a more resilient and sustainable manner. Although green and climate finance is often associated with the financial provisions to support compliance with commitments to the Kyoto Protocol and the Paris Agreement, it is a far broader concept that includes financing sourced and leveraged through international, domestic, public, and private channels and utilizes numerous government and market instruments taddress environmental and climate challenges (United Nations publication, 2021). Green finance is an even broader term which encompasses both climate finance for mitigation and adaptation and finance for a wider range of environmental objectives, including industrial resource efficiency and pollution control, water sanitation, or biodiversity protection. Together, green and climate finance combine a wide range of instruments, mechanisms and policies that fund and support projects that deliver environmental benefits and promote a low carbon economy (see Fig. 2).

Figure 2 – Use of Financial Flows



Source: *United Nations publication, 2021*

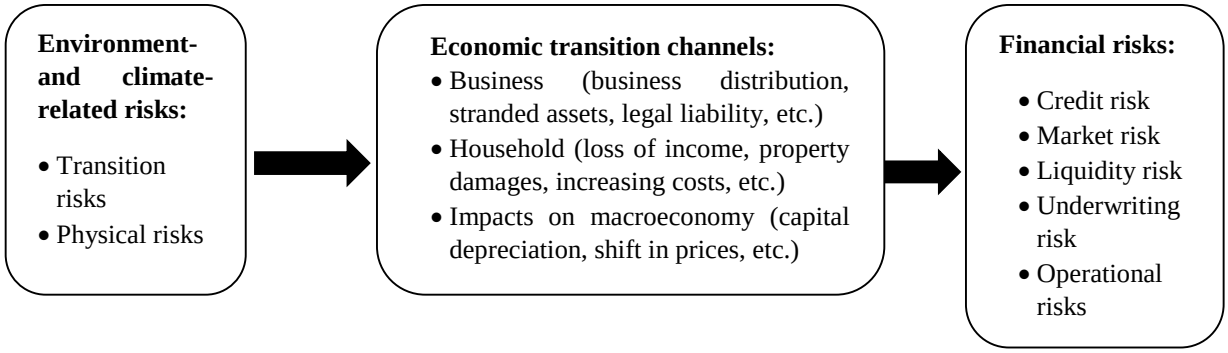
The OECD estimates that €6.35 trillion a year will be required globally to meet Paris Agreement goals by 2030, while the European Commission estimates that in the climate and energy areas alone an additional annual investment of €240 billion is needed to meet the EU's climate and energy targets by 20301. The financial system can contribute to addressing these needs through climate finance, green finance and sustainable finance. Climate finance provides funds for addressing climate change adaptation and mitigation, green finance has a broader scope as it also covers other environmental goals (e.g. biodiversity protection/restoration), while sustainable finance extends its domain to environmental, social and governance factors (ESG). Therefore, green finance should be seen as a subset of sustainable finance; or alternatively sustainable finance can be considered as an evolution of green finance (Spinaci, 2021).

Greening finance and green financing are driving the green transformation of the financial system. Greening finance aims to mainstream climate and environmental factors into the financial system and to improve the identification and management of financial risks related to the climate and the environment. Green financing aims to mobilise private capital flows

in green investments. These drivers are also the backbone of sustainable finance. Moreover, the inclusion of ESG factors in the investment decision-making process allows to consider a broader area of investment and to strengthen financial stability by considering further risks than just the environmental one.

'Greening finance' is short for 'greening the financial system', and corresponds to the diffusion of new tools, procedures and regulations aimed at inducing the financial system to take due account of climate and environmental considerations in financial risk management and, consequently, in investment decision-making. The financial system is increasingly treating climate- and environment-related risks as financial risks, not just as reputational ones. There is more awareness that these risks can become financially material, due to the working of some economic transmission channels (see Fig. 3) (Spinaci, 2021).

Figure 3 – Transmission channels from environmental risks to financial risks



Source: Prepared by author on the base Spinaci, 2021

The financial stability may be undermined by the increasing financial risks linked to climate change and identified three major risks: (1) Physical risks are strictly linked to the physical effects of climate change; (2) Transition risks are linked to the transition to a less polluting, greener economy, which may lead to changes in the value of a wide range of assets; (3) Liability risks are strictly linked to the consequences of the above two risks. Since financial risks have an effect on financial stability, policymakers, financial regulators, and supervisory authorities are working in parallel to promote the integration of climate- and environment-related risks into financial decision-making processes and financial risks management. Market and regulatory trends indicate that there is an increased interest in green and sustainable finance among investors and policymakers. However, despite the rapid uptake of green and sustainable finance on the financial markets and the increased political focus they enjoy, their growth needs to be accelerated in order to achieve the targets indicated by the Paris Agreement and the 2030 UN Agenda for Sustainable Development.

While market-fixing approaches address information barriers for financiers, the market-shaping approach has gradually emerged over the past 30 years to address both demand and supply barriers to climate finance. It aims to tackle several risks that deter entrepreneurs and financiers from exposing their resources:

1. Political and regulatory risks arising from governmental actions, including changes in policies or regulations that adversely impact infrastructure investments;
2. Macroeconomic and business risks arising from the possibility that the industry and/or the economic environment are subject to change; and
3. Technical risks determined by the skills of operators and managers, and related to the features of the project (e.g. its complexity, construction and technology).

A direct consequence of these risks is the limited supply of high-quality, transparent, low-carbon and climate-resilient investment projects despite the unmet demand for new infrastructures (Hourcade et al., 2021).

The financial sector plays a crucial role in the transition to a more sustainable future, but it is not the only sector that plays a role. The influence of financial institutions as financial services providers means not only that they control their own impact on companies, but also that they do more than any other industry to integrate global business and investment. Sustainable finance generally refers to a more proactive approach to investment decisions, which leads to increased long-term investment in renewable energy, energy efficiency and sustainability. More specifically, it can refer to environmental aspects, but also to the environmental and human health effects of financial transactions. The Green Finance strategy aims to establish a common understanding of "greening", clarify the role of finance as a key component of the greening of our economy and establish a common framework for the development of a sustainable financial system. It is also important that the sector can demonstrate its social objectives. More recently, many financial institutions and companies have been more concerned about the need to meet the net emissions target of zero carbon emissions by 2050. This includes internalizing external environmental factors and adapting risk perception to encourage environmentally friendly investments and reduce polluting ones. For example, it is important that we behave responsibly in our decisions on how to reduce energy consumption and restrict business travel. Promoting large-scale, economically viable green finance helps to prioritise green investment over – as usual – business investment that supports unsustainable growth patterns (Streimikiene and Kaftan, 2021).

Central banks and financial supervisors could be a key player in developing climate finance instruments that can help reduce systemic risk and stranded assets. Other arguments in favour of an expanded role for central banks and financial supervisors in climate finance include the need to develop a long-term national strategy. Given that climate change is becoming a major threat to the global economy, central bank supervisors should be asked to analyse its effects and intervene to fulfil their duties as public institutions. If their

responsibilities include restricting certain types of lending, they should limit financial flows to carbon-intensive and polluting borrowers, in order to mitigate credit market failures.

The economic and financial impacts of Covid-19 have exacerbated the four challenges developing countries were already facing to scale up climate action. These countries will need to ensure that climate action and economic recovery are mutually supportive, scale up investment without increasing the debt burden, attract large scale private financial flows in a context of perceived higher investment risk, and secure access to long-term affordable finance at a time of rising capital costs. These challenges can be addressed through four sets of complementary actions.

1. Integrating policies on climate action, sustainable development, and Covid-19 stimulus to minimise incremental investment requirements and optimise development co-benefits.
2. Alleviating the debt burden of developing countries to create fiscal space to finance their green, climate-resilient recovery plans.
3. Leveraging sovereign and multi-country guarantee funds to reduce investment risk and catalyse private finance.
4. Increasing developing countries' access to the green bond market.

The four strategic interventions could enable developing countries to address the additional economic and financial challenges created by the pandemic and realise their climate ambitions. Together, these four interventions – support to integrated and costed climate policy and plans, alleviation of debt burden, leverage of sovereign and multi-country guarantee funds and increased access to the green bond market – would enable developing countries to foster a green, climate-resilient recovery from the Covid-19 crisis (Hourcade et al., 2021). Table 1 shows the main types of instruments.

Table 1. Environmental Policies Instruments

Type of Instruments	**Information and empowerment instruments**	**Control and regulatory instruments**	**Economic and market instruments**	**Institutional instruments**	**Financial instruments**
Market Creation Instruments	Rely on knowledge, communication, and persuasion to influence behaviour and supply skilled labour.	Rely on the establishment of obligations, encouraging or prohibiting or restricting certain types of behaviour.	Financial incentives and disincentives to influence private sector behaviour and investment decision-making.	Create an institutional and organizational environment to facilitate policy and technology development and deployment.	Direct public sector (co) investment to establish a proof of concept or commercial track record of new solutions.
Demand-side instruments	✓ Information disclosure and green taxonomies (climate risks, carbon liabilities, etc.)	✓ Macro-prudential regulations (climate stress tests for banks and insurers, etc.)	✓ Carbon taxes, phase out of fossil fuel subsidies. ✓ Development of new asset classes.	✓ Green finance regulatory networks, asset managers coalition and central bank	

			✓ Fossil fuel divestment by public financial institutions.	coordination mechanisms.	
Supply-side instruments	✓ Investment in education and research ✓ Technical and vocational training and retooling	✓ Streamlining licensing processes	✓ Power purchase agreements ✓ R&D commissioning ✓ Property rights agreements	✓ Dedicated financial institutions (green banks, green guarantee companies, green bond platforms, etc.)	✓ Public sector-led R&D ✓ Project concessional finance (grant and loans) ✓ Incubation grants/venture capital ✓ Guarantees ✓ Equity investment

Source: Prepared by author on the base Hourcade et al., 2021

5. Challenges of management of green finance in Bulgaria

According to the The National Development Programme BULGARIA 2030 (Bulgaria 2030, 2022) the main policy objective by 2030 is to accelerate the economic convergence with the EU standard, through targeted and focused government support for increasing specialisation in products and industries characterized by a high technological and research intensity. The implementation of the strategic goals is envisaged through targeted policies and interventions, grouped into five interconnected and integrated development axes: (1) Innovative and Intelligent Bulgaria; (2) Green and Sustainable Bulgaria; (3) Connected and Integrated Bulgaria; (4) Responsive and Just Bulgaria. The introduction of eco-innovation activities, including new eco-products and technologies, will play an important role in supporting businesses. At the same time, efforts will be made to create new jobs in the green and blue economy. Low resource efficiency will also be addressed through actions to reduce the amount of waste generated in the production process, including in the implementation of projects within the framework of public procurement and concessions.

The developed system of co-ordinates characterizing the current socio-political background suggests that (1) political practices led by the idea of sustainable development are possible to launch at the present, that is, the necessary minimal socio-political stability for such initiatives has been already secured (2) as of 2019 it would even be desirable to have policies organized under this global programmatic concept, (3) Bulgaria's specific context requires that special attention be drawn to a number of issues which, otherwise, might become serious obstacles. There is an imperative necessity of adopting and implementing the sustainable development concept.

The analysis of challenges shows that the most important and manageable in a short term are the following main spheres:

1. Clarifying and popularizing the sustainable development concept and providing political and public support for its implementation
2. Long term oriented strategic planning

3. Promoting and assisting partnership and dialogue
4. Improving the information provision, environment impact assessment and monitoring

The activities in these spheres lead to the common objective to establish systems and procedures to include sustainable development in the decision-making process. The main requirements to the institution are that its staff should be competent on the problems of sustainable development, it should have the necessary political prestige in order to be able to overcome the sector approach and institution interests, to serve as an instrument for promoting the dialogue, partnership, mutual information and interaction between the various agents of sustainable development. The most important functions performed by the institution could be:

- ✓ methodological and information assistance of sustainable development activities, various institutions including popularization of sustainable development concept
- ✓ elaboration of a national strategy for sustainable development
- ✓ coordination of national programs and large investment projects (above certain fixed value) from the point of view of their contribution for sustainable development of the country
- ✓ following the policy and development with regard to implementation of sustainable development concept including monitoring and assessment of accomplishing programs and projects for sustainable development by various organizations and on different levels
- ✓ promoting of dialogue, interaction and partnership including through assisting to establish networks
- ✓ interaction with similar institutions abroad (Marinov, 2020).

One of the most important challenges of green finance in Bulgaria is the intensification and the complicated interweaving of global problems that have interdependent social economic, demographic, natural-resource and ecological characteristics, but they refer mostly to the relations between nature and society. It becomes obvious that we cannot afford to use energy, forest, ground, plant and animal sources, regulate the increase of cities and produce industrial production the way we have done it before. The intensification of the global problems or the efforts to solve any of them would lead to considerable changes in quantitative and qualitative characteristics of the whole complex of planetary, regional or local socio-economic problems of social development. Therefore for their solving are necessary not only the united efforts of all states but also a change in contemporary attitudes and models of behavior of governments, business, groups and individuals combined with development of science and implementation of technology. It is also necessary a common methodological base, which will balance the proprieties in development of contemporary civilization. This necessity causes the appearance of the concept for sustainable development that is transformed into a new paradigm of contemporary social development.

The other challenges for sustainable development after the pandemic in Bulgaria are improved or acknowledged commitments, needs, restrictors, resistance, sources of unsustainability and

the risks related to them. They could be summarized in several groups that show both the type and the source of problems, as well as the degree of their overcoming and the possible influences:

- ✓ imperatives
- ✓ conceptual challenges
- ✓ challenges related to the objective conditions and development of the country
- ✓ instrumental
- ✓ behavior (Marinov, 2020).

The behavior challenges are related to the necessity of change in thinking, attitudes and behavior of individuals, groups and institutions directed to sustainability. Although they are easy to overcome at first sight , due to the wide adoption of sustainable development concept the practice so far shows that it is a sphere where exceptional efforts will be necessary and no fast results are to be expected. The risks related to development green finance are the following:

- ✓ sustainable development is difficult to perceive as a whole concept;
- ✓ sustainable development could be rejected easily as a declarative and abstract one, impossible to be implemented, or at least untimely;
- ✓ sustainable development could be used as a modern word, as a spell or even as a cover for ”unsustainable” actions;
- ✓ it is possible to form policies and undertake concrete activities that do not lead to real sustainable development for a long period of time due to ”distortion” in there is a risk of ”copying” (including the help of experts) of ”successful” projects for sustainable development that are not complied with the concrete conditions (national or local)one direction and violation of the idea for a balance set in the concept.

The strategic priorities for management of green finance in Bulgaria are connect with assistance with infrastructure expansion and upgrades, in close cooperation with the EU and others, including private providers. The other is support sustainable infrastructure development through regional connectivity, green municipal solutions, decarbonisation and resource efficiency. This priority can be achieved through (1) improved connectivity and integration of key transport and energy infrastructure with more private sector participation; (2) improved green infrastructure and access to finance at the local and municipal level; (3) decarbonisation and increased energy and resource efficiency; (4) Strengthened financial sector resilience. Achieving improved green infrastructure will be achieved through the implementation of the following activities:

- ✓ Promote sustainable municipal investments using Green and Smart Cities frameworks to address environmental challenges.
- ✓ Helping public service operators (water, wastewater, solid waste, district heating) to improve their services and comply with EU directives via

technical cooperation and funding, including through managing and co-financing EU structural funds to ensure their effective utilisation.

- ✓ Support urban regeneration plans and brownfield redevelopment (including new industrial development zones).
- ✓ Facilitating financing by local commercial banks to public utility companies by providing risk sharing instruments, such as guarantees.

6. Conclusion

The COVID-19 pandemic has become the biggest problem for financial institutions in nearly a century. As the economic impact spreads, financial institutions face some big priorities that require concrete steps to turn things around now as well as calibrate for the future. Finance is designed to tackle the challenges of economic recovery in ways that help not only reduce risks and vulnerabilities to the economy but also reduce the emissions that cause climate change and increase development uncertainty (Klioutchnikov and Kliuchnikov, 2021).

We must take a careful look at market signals across asset classes, recession and recovery patterns, as well as the history of epidemics and shocks, to glean insights into the path ahead. Urgent and bold policy measures are needed, not only to contain the pandemic and save lives, but also to protect the most vulnerable in our societies from economic ruin and to sustain economic growth and financial stability.

The world financial centres were the most affected by the pandemic, which affects the revaluation of green finance. Thus, green finance in academia and green finance in financial markets are very different concepts. In the financial industry, data deployment and collection is becoming key, and the only thing that matters are whether the financial product that real customers want can be delivered in sufficient green packaging and adequate liquidity.

Banking systems in Europe and the United States must play a role in getting the economy back on track after the pandemic by lending to businesses that have suffered. However, how effective their support for economic recovery will be depends on the resilience and health of the banks. The loss of risk-weighted assets, such as derivative assets, will eat up banks' capital and reduce their liquidity. This vulnerability could have an increasing impact on the supply and financing of the real economy in general. The outcome is likely to increase vulnerability in the non-financial sector, but the necessary government containment measures will lead to a return to a more stable financial system and thus to a stronger economic recovery. Banks were asked to support a government-led programme of providing emergency loans with permanent liquidity through credit facilities (Streimikiene and Kaftanq 2021).

In spite of its negative effects, the COVID-19 crisis is an opportunity for banks in general to make up for the indifference of the past and to prove that they are responding more than ever to the needs of their customers. In a way, COVID-19 crisis is an opportunity for financial intermediaries to change and improve their long-term position. It is time for them to review their strategies and incorporate structural, social and environmental

approaches, and to stand up for the interests of their customers, their employees and their communities.

Further research is needed to mobilise the necessary resources, bridge obvious knowledge gaps and make progress in addressing questions on how to close the green finance gap. Adapting to clean energy sources and reducing overall energy consumption are therefore crucial to mitigating climate change and achieving the goals of the Paris climate agreement.

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THE FOREIGN EXCHANGE POLICY OF CHINA – IS THE COUNTRY A "CURRENCY MANIPULATOR"?

Paskal Zhelev [1]

Abstract: *China's exchange rate policy has been one of the most contentious economic issues in present times. The large open economy with a state-led development model has been often accused of deliberately keeping its currency undervalued, thereby conferring unfair competitive advantages to its exporters, and fuelling global imbalances. The experts' opinions on that however are greatly divided. The paper's main goal is to evaluate whether China has been manipulating the exchange rate of the RMB through its exchange rate policy over the last decade. Based on various indicators, the results show that there is no evidence of China engaging in currency manipulation to the detriment of its trading partners.*

Keywords: *renminbi (RMB), undervalued exchange rate, currency manipulation, foreign exchange reform*

JEL: *F50, F31, F33*

1. Introduction

In 1978 China initiated an economic reform that has gradually started changing its economic system from a centrally planned towards an increasingly market led. In 2001 the country joined the World Trade Organization. The integration into the global economy in combination with the specific characteristics of China's economic model has brought huge benefits to the country. It has managed to substantially expand its contribution in global GDP - from 3.9% in 2001 to 17.4% in 2020, simultaneously surging its share in world merchandise trade by 9.1 p.p. to 13.1%.[2] Since 2009 China is the No 1 exporter of goods in the world, and it has turned to be the largest manufacturing powerhouse surpassing by far the previous leader the USA.

The miraculous economic success of China has had some important side effects for the global economy. Its export-oriented development has been accompanied by persistent current account surpluses and given the size of the Chinese economy they have contributed significantly to the accumulation of global imbalances. A number of prominent scholars attribute these global imbalances as being among the major roots of the Great Recession in 2007-2009 (Obstfeld & Rogoff, 2009).

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[2] Own calculations based on UNCTAD data

In this context, the chronic positive trade balance of China and its increasing international reserves have given rise to concerns over the origin of China's competitiveness in international trade. Running an undervalued exchange rate has been traditionally used by outward-oriented economies to gain a competitive edge on the world market. Western countries, led mostly by the USA, which has experienced a dramatic increase in trade imbalance in the Sino-US trade relations over the last two decades, have largely accused China of using its exchange rate policy to get an unfair advantage in international trade. These accusations have become especially pronounced with the President's Donald Trump election campaign and subsequent coming into office.

On August 5th, 2019, the US government designated China a "currency manipulator" for the first time after 1994 (U.S. Department of Treasury, 2019) amidst already tense US-Chinese relations characterized by a looming trade war. In January next year, prior to signing a "phase one" agreement, aiming at deescalating the trade conflict, the USA has reversed its decision to label China a "currency manipulator" (BBC news, 2020). Nonetheless the issue is not permanently settled. The global COVID-19 pandemic, that started in the beginning of 2020 and has not yet fully abated, could be an important factor resurging currency manipulation around the world (Cagnon and Sarsenbayev, 2021).

Thus, the question whether China's currency (the Renminbi – RMB) is kept undervalued continues to be highly pressing. It has pertinent global political economy implications being tightly related to issue of the compatibility of the Chinese socialist market economy with the liberal world economic order. If China is found to be continuously manipulating its exchange rate in a neo-mercantilist fashion to the detriment of its trading partners, that would represent a major blow to the multilateral trading system and the level-playing field it tries to sustain.

In addition to the high importance, this is one of the most controversial economic issues of our times. Different economic studies have reached non-conclusive and very often opposite conclusions on the matter (Zhang, 2017). This is due not only to the different research approaches used but obviously due to the political charge and bias inherent in the studies. Therefore, an impartial analysis based on objective indicators utilizing up-to-date data is very much needed.

The main objective of the paper is to shed light on the contentious issue whether China manipulates the exchange rate of the RMB through its exchange rate policy in order to confer its exporters a competitive advantage over its competitors.

To that end, the following tasks have been set:

- to provide a definition of a currency manipulator;
- to identify relevant measures of currency manipulation;
- to present the evolution of the Chinese exchange rate policy in the recent years;
- to check whether the RMB is undervalued and if China could be branded as a "currency manipulator".

In methodological terms the paper rests on desk research of papers and official documents and applying commonly used indicators to measure currency undervaluation.

The paper proceeds as follows. First, a short overview of the multilateral and the U.S. national framework addressing the problem of currency manipulation is provided. The relevant criteria for determining currency manipulation are exhibited. Next, the evolution of the Chinese exchange rate policy is presented. Finally, the outcome of the indicators measuring currency manipulation with regard to the RMB exchange rate is discussed.

2. Currency manipulation designation

2.1.Frameworks to confront currency manipulation

After the WWII, committed to avoid the mistakes from the pre-war period when there was an absence of international cooperation, countries created the International Monetary Fund (IMF) to oversee the international monetary relations. Nowadays the IMF has almost a universal membership and it is within its competence to address exchange rate issues. Within the Bretton Woods system, that lasted between 1946-1971, the problem of currency manipulation was well dealt with. The fixed parity exchange rate system precluded countries to amend their currency rates by more than 10% without prior approval from the IMF. Furthermore, just correction of Balance of Payments' fundamental disequilibrium was a legitimate reason to allow countries to propose a change in the par value of their currencies.

The Bretton Woods monetary system collapsed in 1971 after the key founder devalued the exchange rate of its currency twice without turning to the IMF. The new regulations adopted in 1978 through an amendment to the IMF Articles allowed countries to use exchange rate system according to their preferences (fixed or floating/market-based). The Fund still had to approve the exchange system countries adopt but it could no longer influence the relative currency values determination (Sanford, 2011, p.2).

The IMF Articles of Agreement ban currency manipulation to improve trade competitiveness, but the IMF has no capacity to enforce that prohibition. The IMF can provide economic advice and discuss how changes in countries' exchange rates might be in their own interest. It can set a forum, where other countries can try to persuade a country to change its exchange rate procedures. However, ultimately, it is up to the country alone to make the change. (ibid.)

As the IMF cannot force a country to change its exchange rate, while the World Trade Organization (WTO) has the capacity to adjudicate trade disputes but has never dealt with currency manipulation cases via the WTO dispute settlement process, countries like the USA have addressed the problem under domestic trade laws.

Such a legislation was passed back in 1980s. The 1988 Omnibus Foreign Trade and Competitiveness Act requires the Treasury Department to analyse annually the exchange rate policies of foreign countries. The Treasury should evaluate whether they manipulate their currencies against the U.S. dollar for purposes of preventing effective balance of payments adjustments or of gaining unfair competitive advantages. If the analysis shows that such manipulation concerns countries with: "1) material global current account surpluses and 2) significant bilateral trade surpluses with the United States, the Treasury Secretary has to initiate

negotiations with such countries in the IMF or bilaterally to ensure that they regularly adjust the exchange rates between their currencies and the U.S. dollar" (U.S Congress, 1988).

New provisions on currency manipulation were adopted in 2015 in the Trade Facilitation and Trade Enforcement Act. It defined which countries could be considered as currency manipulators and should undergo enhanced analysis of macroeconomic and exchange rate policies. These are major trading partners of the United States that have:

"(I) a significant bilateral trade surplus with the United States;

(II) a material current account surplus; and

(III) engaged in persistent one-sided intervention in the foreign exchange market." (U.S Congress, 2015).

The Act mandates actions to counter currency manipulation. Specifically, Treasury is to engage in enhanced bilateral engagement and, if currency manipulation persists longer than a year, enact a number of remedial actions, such as raising the issue at the IMF and prohibiting procurement contracts with the country in question.

2.2. Indicators for currency manipulation

Based on the mandate given by the Trade Facilitation and Trade Enforcement Act of 2015 and the adopted three criteria for currency manipulation, the U.S. Treasury has used four benchmarks to identify currency manipulators in its latest report. They are summarized in table 1.

Table 1. U.S. Treasury Thresholds for Currency Manipulation Under the 2015 Act

criteria	***benchmark***	***threshold***
Significant Bilateral Trade Surplus with the USA	Goods and Services Surplus with the USA	$15 billion
Material Current Account Surplus	Current Account Balance or Estimated Current Account Gap	3% of GDP (1% of GDP)
Persistent, One-Sided Intervention in FOREX	Net FX Purchases	2% of GDP
	Persistence of Net FX Purchases (months)	8 of 12 months

Source: U.S. Department of The Treasury (2021, p.3).

Countries that meet all the three criteria during a given review period are designated by the Treasury as currency manipulators, while those which meet two of the three criteria are placed on a "monitoring list". Throughout the last years the indicators for identifying currency manipulators have undergone some modifications. Yet, they remain ambiguous and suffer from significant flaws.

A major flaw of Treasury's designation of manipulators is related to the inclusion of the bilateral trade criterion. Bilateral trade imbalances do not capture currency manipulation – they would exist even if every country had balanced trade and there was no currency manipulation. Bilateral trade patterns reflect differences in resource endowments, economic structures, and historical commercial links that are independent of currency policy (Gagnon and Collins, 2019). Furthermore, Treasury's criteria lack any measure of reserve adequacy. In times of crises countries should possess enough reserves to counteract, therefore they should not only be allowed but even motivated to hold foreign exchange reserves. However, if their total stock exceeds certain value, it could signal deliberate state's action.

Cognizant of the above-mentioned caveats, the Peterson Institute for International Economics (PIIE) uses slightly different criteria than the Treasury in its section on currency manipulation. According to the U.S. based think-thank, a country could be labelled as a currency manipulator if in a given calendar year it meets all of the following criteria:

- The current account surplus exceeds 3 percent of GDP;
- Net acquisitions of official foreign-currency assets (net official flows) exceed 2 percent of GDP;
- Foreign exchange reserves and other net official assets exceed three months of imports of goods and services;
- Foreign exchange reserves and other net official assets exceed 100 percent of short-term external debt, public and private;
- Net official flows exceed 65 percent of energy exports minus production cost; and
- The country is classified as a high-income or upper-middle-income country by the World Bank. (Bergsten and Gagnon, 2017)

The PIIE dropped the Treasury's bilateral trade criterion and added indicators on the reserve adequacy of countries and their income status (indeed it doesn't make much sense to accuse a poor developing country of being a currency manipulator). However, the PIIE's criteria are still far from being problematic - they include the current account balance, which tells us whether a country's spending to the rest of the world is higher than the incoming payment. If a country maintains a large surplus, that means that it is saving more than it invests in the home economy, and this does not necessarily stem from currency manipulation.

Alternative way to evaluate whether a country is manipulating its currency is to look directly at its exchange rate misalignment. This approach is based on the PPP hypothesis and the law of one price (LoP), which states that in the absence of trading barriers and transaction costs competition equalizes the prices of similar bundles of tradable goods across economies. If *e* is the nominal exchange rate, P^* the foreign price index and P the domestic price index, then with no misalignment, the same bundle of goods would have the same price across countries denominated in a common currency. Thus, based on the ratio of the price levels of two countries we can derive their equilibrium exchange rate.

In 1986 The Economist magazine has invented the so-called Big Mac Index, demonstrating the concept of purchasing power parity in a cheerful and easy to grasp way. Since then, it has been used as a rule of thumb to determine the over- or under-valuation of international currencies.

Despite its simplicity and usefulness, the Big Mac Index has some significant shortcomings. The Big Mac is a global product, identical across borders, but the LoP assumes that there are no restriction and costs on goods movement, but the hamburger is not really an easily exportable product. Most importantly, the hamburger cost of production does not include just tradable inputs (meat, buns, vegetables, ketchup, etc.) but also labour and other local inputs required for preparing and serving the item. Thus, for countries whose income levels are lower than the benchmark currency country (the USA), the Big Mac estimated exchange rate is smaller than the exchange rate determined in the goods market (Yang, 2014). Recognizing this limitation, The Economist has addressed the criticism stemming from the lower labour costs in poor countries leading to cheaper average burger prices in developing economies than in the developed ones, by releasing a GDP-adjusted version of the Big Mac Index.

Another drawback of the Big Mac Index is its lack of diversity and also treating the equilibrium exchange rate only versus one foreign currency (the US dollar). The index is made up of one item only: the Big Mac, thus it lacks the diversity of other economic metrics such as the Consumer Price Index. It measures misalignment with US prices but does not say anything about the currency relations with the rest trading partners.

To overcome these issues, a widely used indicator for currency under/overvaluation is the real effective exchange rate (REER). According to the IMF (2022) the REER is a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs. An increase in REER implies that exports become more expensive, and imports become cheaper; therefore, an increase indicates an overvalued exchange rate which incurs a loss in trade competitiveness.

3. Evolution of China's exchange rate policy

3.1.Changes in the exchange rate policy of China

Together with an intensification of the overall economic reform, China has initiated a major reform in its foreign exchange regime in 1994, adopting a market-based and managed floating exchange rate system. The country has set a goal for the currency to become convertible for

current account transactions. It has unified its dual-track exchange rate by merging the official exchange rate and the swap rate. The merged rate was set at 8.7 yuan to the dollar at the beginning of 1994, in conformity with the swap rate, a better reflection of supply and demand in the foreign exchange market. In April 1994, China's foreign exchange trading centre, located in Shanghai, started operation and marked the commencement of China's inter-bank foreign exchange market. Starting on December 1, 1996, China adopted currency account convertibility, a significant step toward fulfilling the agreements of the IMF. (Yang, et al., 2007, p. 123)

During the Asian financial crisis China adopted fixed nominal exchange rate vis-à-vis the US dollar. Major currencies from the region depreciated sharply against the U.S. dollar. The RMB was under immense pressure to devalue to maintain price competitiveness in the world market. Yet, the RMB remained unchanged and proved to be a pillar of stability in the international monetary system. (ibid.)

A new exchange rate regime was adopted in July 2005 when the Chinese government announced that it would revalue the RMB by some 2% and shift from its dollar peg system to a managed floating exchange rate regime "based in market supply and demand with reference to a basket of currencies". The basket of currencies consisted of the US dollar, euro, yen, pound, won, Singapore dollar, Malaysian ringgit, ruble, Australian dollar, Thai baht and Canadian dollar, but the weights of the currencies in the basket were not publicized. The new regime has been described as "band (±0.3%), basket, crawl (± 1.5%)". (Kwan, 2005)

Since the announcement of a move away from a fixed exchange rate 2005, China started taking regular steps towards a more flexible currency, though exchange rate stability continued to be a priority. Over time the RMB exchange rate has become more flexible, nevertheless still carefully managed. A flexible exchange rate, determined by the market, is needed to help absorb external shocks and maintain the People's Bank of China's (PBC) ability to use monetary policy to affect domestic economic conditions (Das, 2019). However, China has always preferred to carry out reforms very prudently, in a gradual way that is consistent with its economic aspirations and conditions.

The PBC decided to further increase the flexibility of the RMB-to-USD exchange rate midrate quoting mechanism in August 2015. This way the market determination of RMB exchange rates was amplified, giving market supply and demand an even greater role in exchange rate formation. (IMF, 2022a. p. 3)

Since June 2018 China's de facto exchange rate regime has been classified as other managed arrangement. The de jure exchange rate arrangement is managed floating with a view to keeping the RMB exchange rate stable at an adaptive and equilibrium level based on market supply and

demand with reference to a basket of currencies. The aim is to preserve the stability of the Chinese economy and financial markets. The floating band of the RMB's trading prices is 2 percent against the U.S. dollar in the interbank foreign exchange market: on each business day, the trading prices of the RMB against the U.S. dollar in the market may fluctuate within a band of ±2 percent around the midrate released that day by China's Foreign Exchange Trading System (CFETS). Despite the continued exchange controls to most capital transactions, RMB's use in international transactions has increased over time. Since October 1, 2016, the Chinese currency has been determined to be a freely usable currency and was included in the SDR basket as a fifth currency, along with the U.S. dollar, the euro, Japanese yen, and the British pound. (ibid., p.2-3)

3.2. Is the RMB exchange rate manipulated?

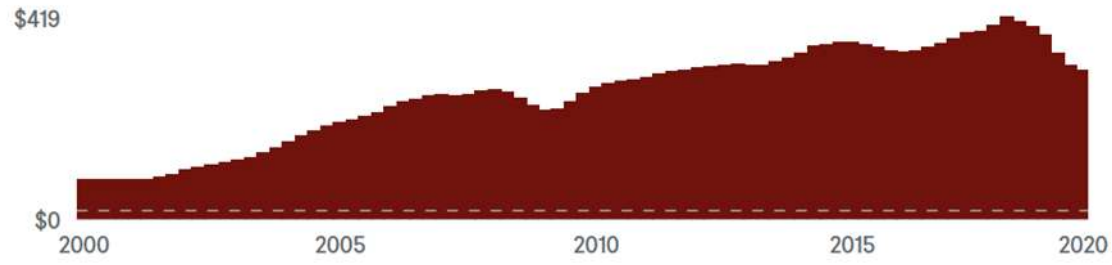
Before looking at the dynamics of the various indicators commonly used to determine if a certain country is a currency manipulator, it is informative to check the opinion of international economic institutions on the matter of the RMB's exchange rate. In the year 2019 when the US Treasury designated China as a currency manipulator, the IMF, through its annual staff report for the Article IV Consultation, disclosed China's external position as well as its REER to be broadly in line with fundamentals. (IMF, 2019) That basically means that the IMF did not validate Treasury's statement.

Now let's have a look at the various indicators and see if we can find evidence of currency manipulation by China in the last decade.

3.2.1. The U.S. Treasury criteria

To check whether China meets the U.S. Treasury criteria for currency manipulation, we are going to make use of an interactive tracker provided by the Council for Foreign Relations (CFR). The tracker is updated quarterly, on a trailing four-quarter basis. It analyses data on the three variables the U.S. Treasury uses to assess countries for manipulation. Indicator values are highlighted in red when they exceed the Treasury threshold, or in brown when the overstep is by more than 100%.

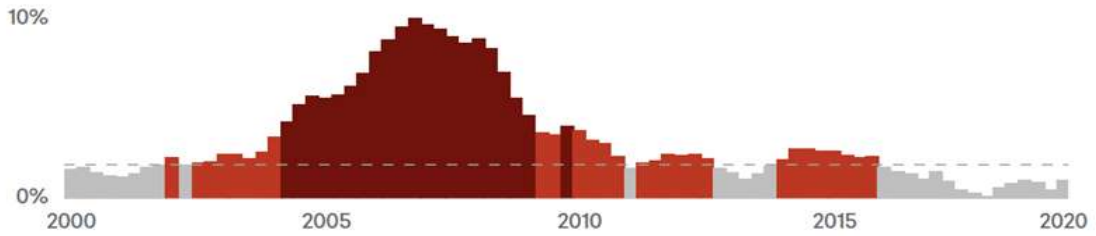
Figure 1. China's bilateral goods trade balance with the USA *(billion USD)*



Source: Council on Foreign Relations (2022).

When looking at the first indicator – bilateral trade merchandise balance – it is obvious that throughout the last two decades the USA is recording almost constantly growing and massive negative trade balance. The value of this indicator exceeds far and away the threshold. However, this is the only one of the three indicators that has been constantly met.

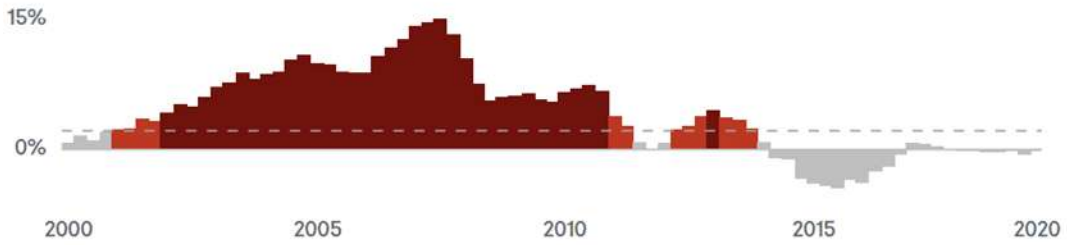
Figure 2. Current account balance of China *(% of GDP)*



Source: Council on Foreign Relations (2022).

When it comes to the second indicator – the current account (CA) balance of China – it has been in a huge excess in the period Q1 2005 – Q4 2009. Afterwards it has gradually declined. The last time it exceeded the threshold was in Q3 2016. Similar is the status of the third indicator – foreign currency intervention. It has greatly exceeded the benchmark between Q4 2002 – Q3 2011. Ever since Q4 2014 the indicator is below the threshold. What is even more, in the Q1 2015 – Q3 2017 period and then after Q3 2018 China has been on net selling dollars. Thus in the last couple of years China has been keeping the RMB from weakening and thereby supporting American rather than Chinese competitiveness.

Figure 3. China's foreign currency intervention *(% of GDP)*



Source: Council on Foreign Relations (2022).

3.2.2. The Big Mac Index

The Big Mac Index (BMI) has been widely used by policy makers and business executives alike in support of their assertion that the RMB is undervalued. Indeed, if one looks at the Raw BMI it is clear that the Chinese currency has been consistently undervalued in the last ten years and this undervaluation is quite significant (over 40% for most of the time). However, the Raw BMI has significant limitations, therefore the Economist magazine has introduced a GDP adjusted

version of it, taking into account the differences in income per capita among the different countries.

Table 2. Raw and GDP-adjusted Big Mac Index for the Chinese RMB

time	local_price *(RMB)*	XR *(per 1 USD)*	dollar_price (USD)	dollar_ppp	under (-)/ over (+) valuation in %	gdp adjusted under/ overvaluation
Jan-22	24.4	6.37	5.8	4.2	-34.0	4.8
Jul-21	22.4	6.5	5.7	4.0	-38.8	-0.1
Jan-21	22.4	6.5	5.7	4.0	-38.9	2.5
Jul-20	21.7	7.0	5.7	3.8	-45.7	-6.5
Jan-20	21.5	6.9	5.7	3.8	-44.9	-8.4
Jul-19	21	6.9	5.7	3.7	-46.9	-11.8
Jan-19	20.9	6.8	5.6	3.7	-45.3	-3.9
Jul-18	20.5	6.6	5.5	3.7	-43.8	-3.6
Jan-18	20.4	6.4	5.3	3.9	-39.9	0.7
Jul-17	19.8	6.8	5.3	3.7	-45.0	-9.6
Jan-17	19.6	6.9	5.1	3.9	-44.1	-6.5
Jul-16	18.6	6.7	5.0	3.7	-44.7	-8.6
Jan-16	17.6	6.6	4.9	3.6	-45.6	-9.2
Jul-15	17	6.2	4.8	3.5	-42.8	-9.3
Jan-15	17.2	6.2	4.8	3.6	-42.2	-5.2
Jul-14	16.9	6.2	4.8	2.7	-43.1	-6.4
Jan-14	16.6	6.1	4.6	2.7	-40.7	1.2
Jul-13	16	6.1	4.6	3.5	-42.8	-6.5
Jan-13	16	6.2	4.4	3.7	-41.1	-4.2
Jul-12	15.7	6.4	4.3	3.6	-43.4	-5.9
Jan-12	15.4	6.3	4.2	3.7	-41.9	-0.4

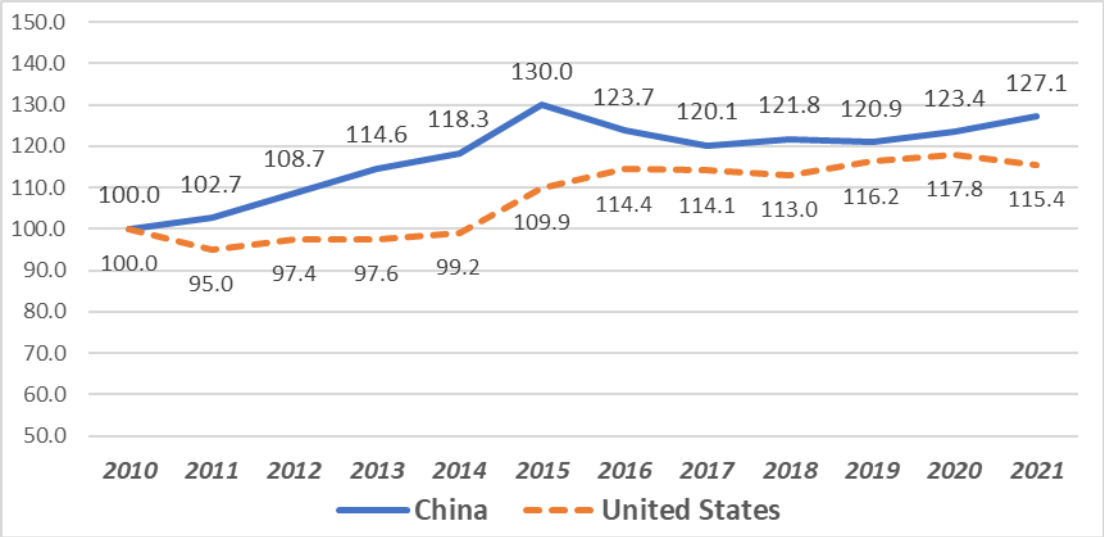
Source: The Economist (2022).

The data in the last column of table 2 shows that when taking into account the much lower GDP per capita in China than in the USA, the undervaluation of the RMB decreases quite substantially. On top of that, in some periods (*Jan 2014*, *Jan 2018*, *Jan 2021*, *Jan 2022*) the nominal exchange rate of the RMB turns out to be overvalued.

3.2.3. The Real Effective Exchange Rate

Data about the real effective exchange rate of the Chinese yuan shows that it has appreciated by 27.1% over the last decade. That is a higher appreciation in comparison with the dollar, meaning that in relative terms China is losing comparative cost advantage in comparison with the USA and cannot be claimed that it manipulates the exchange rate to stimulate its exports in that period.

Figure 4. REER index of China and the USA *(2010-2021, 2010=100)*



Source: IMF (2022b).

4. Conclusion

China has one of the most contested exchange rate regimes in the world. The way China manages its national currency is subject to constant interest and comments from the country's main trading partners, and mainly from the USA. The US president Donald Trump has pledged to designate China a currency manipulator status right after coming into power. He achieved that in 2019 obviously by putting solid political pressure on the U.S. Treasury as at that time China did not meet the necessary three criteria for the designation according to the U.S. regulations. The analysis in the current paper, based on the U.S. criteria, the adjusted Big Mac Index and the Real Effective Exchange Rate indicator, has confirmed that there is no evidence that China has manipulated its currency throughout the last decade. Therefore, labelling it as a currency manipulator is not justified and pursues populist objectives. Yet, the country has a long way of reforms to go to achieve a market-determined exchange rate.

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ORDOLIBERALISM AND LIBERALISM IN THE POST-WAR CZECHOSLOVAKIA (1945–1948)

Tomáš Nikodym[1]
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Abstract

The paper deals with economic thought of almost forgotten Christian conservatives after the World War Two. Despite the all-embracing socialist ideas, these people were proposing non-socialistic post-war order based on private property, free enterprise and competition. Their proposals were in the sharp contrast to the leading idea of "socializing" or "economic" democracy and comprehensive economic planning. Their economic thought had elements of both classical liberalism and ordoliberalism. Despite their relatively good public recognition, political development of post-war Czechoslovakia did not allow them to change public opinion. One way or another, the proper interpretation of their work is still missing in the history of economic thought textbooks so we attempt to provide at least the overview of their ideas and thus also provide the basis for future research agenda.

Keywords: *Ordoliberalism, Liberalism, Czechoslovakia, Christianity,*
JEL: *B29, B31*

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1. Introduction

The environment for economic liberalism was never favorable in Czechoslovakia and the former Czech lands through their entire history. When socialism finally fell in 1989, it was according to some interpretations more a coincidence rather than as a requirement of the liberal economic order.[3] Of course, we can find some liberals from the nineteenth century onwards, but liberalism was never a leading philosophy in Czechoslovakia (see the overview of Czech / Czechoslovak liberalism in Šíma, Nikodym, 2015). The Great Depression and the subsequent World War Two did not help to improve the position of liberalism either, since it was understood to be the cause of all evils (Beneš, 1938, pp. 71, 155; Peroutka, 1947, pp. 117–118). This feeling was even strengthened after World War Two when the post-war order was being considered.

However, there were still some individuals who were intellectually fighting the all-embracing socialism. We have to mention especially Antonín Basch who was a true liberal thinker and saw that the only possible way to post-war recovery led through a free economic system and international cooperation (Nikodym, Nikodym and Brhelová, 2016). While Basch participated at various international meetings dedicated to the post-war order, he practically lost all his influence after the war. Another prominent inter-war liberal, Karel Engliš, also met the same fate. He did not have the strength to form a liberal opposition either. Unfortunately, his speech at Masaryk University in Brno in 1947 warning about the dangers of economic planning came too late. *"Where economic liberalism is knocked down, authoritative planning extends into the political sphere […]. The state which controls the economy wants to control the thoughts of the whole nation to secure its planned economic system"* (Quoted in Vencovský, 1993, p. 125).

When trying to find the opponents to the leading idea of socialism after the World War Two, we would like to turn our attention to the small group related to the Christian People's Party which achieved at least some public recognition. The group itself was rather heterogenous without any deeper connection other that Christianity. The post-war debate resulted in various proposal of the ideal post-war order, but only few members of this group proposed order which can be considered as liberal social order, while others imagined society organized on the caste principle, conservative patriarchy, national-conservative system close to Othmar Spann's ideal, etc. In our paper, we would like focus on thinkers who proposed liberal post-war order, namely Miloslav Skácel and Helena Koželuhová.

Miroslav Skácel was born in 1914 into the family of the lawyer and the president of the Chamber of Advocates. While Miloslav Skácel studied law as well as his father, he was also heavily influenced by his uncle Bernandin Jan Skácel, who was professor of theology and philosophy in the Gymnasium of Dominican Order, and accepted his neo-scholastic philosophical orientation (Nikodym, 2022). In the next sub-chapter, we will show how this philosophical orientation also affected his economic thought.

[3] Michal Pullmann (2002, p. 258) shows how the hegemony of socialism was much stronger than the Czechs are currently willing to admit.

Helena Koželuhová was born in 1907 and she grew up in the intellectually stimulating environment. While her father was politician and publisher of an economic journal, her mother came from cultural-literary environment and she was related to Čapek brothers – famous writers during the interwar period. In 1925, she enrolled to University and studied law under the supervision of František Weyr and Karel Engliš. Engliš was the most prominent economists of that time and he is still considered as the proponent of economic liberalism. (Šíma, Nikodym, 2015, p. 278) His thought definitely influenced Helena Koželuová's economic argumentation since she used mainly practically-oriented arguments to defend her position.

The purpose of this paper is to provide the overview of the ideas of Miloslav Skácel and Helena Koželuhová, who were, in our opinion, amongst the most important proponents of ordoliberal ideas in the post-WWII Czechoslovakia. To our best knowledge, the topic of ordoliberalism is completely missing in the Czechoslovak history of economic thought and this paper should be understood as a first piece which provides the basis for the future research agenda. Despite the fact that ordoliberalism is in Czech economic textbooks related almost exclusively to the Freiburg school (see for example Holman 2005, pp. 342–349), we argue that ordoliberalism does not necessarily have to be connected to any homogeneous school of economic / social thought. It can be, in our opinion, also understood as bundle of specific ideas as presented in this paper, especially economic liberalism (but with the strong emphasis on governmental measures such as designing the legal-economic environment; anti-monopoly policy, etc.), intended creation of the order, the strong democratic state and the necessary commonly shared values in the social sphere – Christian ethics. All three aspects of social life were then interdependent.

While having listed the basis of the ordoliberal social order, these features and their combinations should be understood as the starting point of the study of ordoliberal ideas in Czechoslovak economic thought. Then the study of ordoliberalism should not be limited only to the people who openly admitted influence of ordoliberalism / Freiburg school (for example Skácel), but also to the people whose works shared the above-listed values and principles. This is, in the end, also the approach we use in this paper, especially in Koželuhová's case.

2. Miloslav Skácel's Anti-Capitalism

We are fully aware of the fact that the title of this sub-chapter may seem quite puzzling. In fact, it accurately describes Miloslav Skácel's intellectual position and yet we consider him to be a consistent liberal thinker. In our opinion, Skácel's anti-capitalism was simply a matter of particular understanding of general concepts and theories such as capitalism, socialism and economic democracy. Moreover, while we see the biggest intellectual shift in 1947 when he discovered the work of Wilhelm Röpke, the shift was not as significant as Drápala (2000, pp. 514–515) claims. Let us now analyze Skácel's work.

In his "pre-Röpke" work, Skácel strongly opposed the ideas of liberalism and capitalism in general. There were several reasons for his rejection of liberalism as well as capitalism. Firstly, it involved the destruction of the family. As a conservative Christian, Skácel considered the family to be the most important social unit. In his opinion, it was the family which stood against all forms of oppression, i.e. the family was considered to be the "guardian of liberty". Then, the capitalist system was created and *"the capitalist needs a person to be 'liberated' from the family bonds in order to be able to exploit him easily"* (Skácel, 1946a, p. 17). The disintegration of the family was the main cause of the atomization of society, because an atomized individual is much easier to exploit. *"Of course, the liberal theoreticians do not fight against the family, but the greatest enemy of the family is the factory which tears it to pieces when the man works in the first factory, the woman in the second and the children in the third"* (Ibid., p. 25). Secondly, Skácel claimed that capitalism is in direct contradiction to the institution of private property. In his opinion, private property was one of the oldest institutions which had been generally accepted and its "serious enemies" represented the minority of mankind. These "serious enemies" were then the big capitalists and socialist doctrinaires (Skácel, 1946b, pp. 26–27). Moreover, liberalism was understood to be a threat to democracy, because it meant the negation of all moral values – or rather all values could be "right". It could only lead to the isolation of the individuals and the depletion of the "democratic brotherhood".[4] The logical outcome would be a dictatorship (Skácel, 1946c, p. 8).

While Skácel rejected capitalism as well as liberalism, this does not mean that we can consider him to be a socialist. In his opinion, there was a close relationship between capitalism and socialism. Skácel concluded that socialism was just capitalism with all the evil honed to perfection. *"We do not reproach socialism for wanting to reverse the development started by capitalism, but the fact that socialism wants to accomplish and bring to perfection all that we hate in capitalism"* (Skácel, 1946b, p. 30; see also Skácel, 1946a, p. 26). In other words, he understood socialism to constitute the replacement of the big capitalists with bureaucrats. Ironically, he did not reject the idea of the progressiveness of socialism, but he used it against the socialists. *"Socialism calls itself a progressive movement, but that is the reason why we are against it, because socialist progress leads us inevitably to the totalitarian regime, the police state […]. Socialist progress means, in the end, to be pushed forward by the police"* (Skácel, 1946b, p. 32).

In fact, Skácel's rejection of capitalism and liberalism was merely a matter of different definitions and understandings. We believe that we can show that he can be considered to be a member of the economic opposition thanks to his approach to individualism and collectivism, private ownership of the means of production and economic democracy. Of course, there is also an extremely important relationship with Röpke's ordoliberalism. While Skácel discovered Röpke's work in 1947, we are of that opinion we can even find typically ordoliberal ideas in his earlier work.

[4] Skácel's claim can be compared with the understanding of classical liberals such as Hayek or Mises. Both believed that democracy itself is only a political method with no values and that it was liberalism which could give the "empty-valued" political method content.

When considering the issue of individualism, we have already mentioned Skácel's critique of the "capitalist atomization" of society. However, this did not mean the rejection of individualism. This should be clear from his critique of collectivism. *"The dependency of man on society is the reason why sociologists have lost sight of the individuals who are, in fact, creating society",* Skácel (1946a, p. 5) reasoned. He continued by saying that *"man is for (both socialist and fascist) collectivists only the atom of the nation, species or race."* So, while he accepted the idea of the dependency of the individual on society, this did not lead him to the idea of the superiority of society over the individual. Since the "initial reality" is itself individual, we can only explain the nature and goals of society through individual nature and goals. In effect, the individual, as a rational and free person, could not be used as a means to achieving society's goals. Moreover, Skácel expanded his concept of individuality to include personality which is, in our opinion, a concept which is very close to the ordoliberal understanding of liberty in general. "*Personality adds to individual specific positive transcendence, because there is an individual essence in it which rationally and freely leads the individual to his own actions […]"* (Skácel, 1946b, p. 24). It is often not mentioned, but the ordoliberal concept of *freiheitlich und menschenwürdig* order contained Christian principles as its value basis, which in our opinion lay at the root of the similarities with Skácel's work even before he had discovered ordoliberalism. For example, Walter Eucken considered "freedom and (Christian) morality" to be the basis of order. He was strongly against stereotyping processes, because this could only bring "mental uniformity" and the loss of the soul and personal identity. *"For what is freedom, if man denies his own essence?"*, asked Eucken (2004, p. 250). In addition, similarly to Skácel, he refused classical liberal individualism, because he recognized the importance of the society when forming individual personality (Rieter, Schmolz, 1993). Moreover, Röpke made a direct connection between the "emptiness of the soul" and the support for collectivist totalitarian regimes. *"Communism prospers more on empty souls than on empty stomachs"* (Röpke, 1971, p. 111). And since this understanding of individual liberty and its essence was, in our opinion, the basis for social order, we may conclude that Skácel had had "ordoliberal thought" even before he discovered Röpke and his work.

Despite the fact Skácel turned his attention to ordoliberal works, he did not stop criticizing capitalism and he still understood it as the negation of the institution of private property. *"Socialism is not a cure for capitalism, but its very culmination",* wrote Skácel in his 1947 article (see Drápala, 2000, p. 527). On the other hand, he criticized the socialists as well for their misunderstanding of capitalism. In fact, this merely clarifies his anti-capitalist position and his final explanation of the term. *"[…] we have to realize that the socialist theoreticians have used this term [capitalism] to mark every economic order based on economic freedom, free exchange and competition"*, Skácel stated (Ibid., p. 536). He then continued with a critique of the socialist theorists stating that they *"do not use the term capitalism for any unhealthy monopolism and property hoarding, because they claim that every economic order based on private property leads to monopolistic capitalism […]"* (Ibid., p. 536). Even more important is Skácel's explanation of the free economic system in the monopolistic capitalism which he opposed. *"The truth is that the free economic order characterized by private property, entrepreneurial freedom, free exchange and competition was disfigured by the*

private monopolism which was allowed and supported by government interventions and collectivist interventions" (Ibid., p. 537).[5] To conclude, Skácel only used the term capitalism for what is now called *cronyism*, i.e. a system where big business has strong connections with the government and tries to use its political influence to gain advantages over others.[6] In fact, the problems with Skácel's use of terms do not end with capitalism. Once he had rejected capitalism as a possible post-war order on the aforementioned grounds, he turned his attention towards economic democracy. Unlike the usages for example by Edvard Beneš (1946), Milan Hodža (1942), Štefan Osuský (1925; 1939) or Karel Ladislav Feierabend (1994; 2007) and others, Skácel's understanding was diametrically different.[7]

Economic democracy, according to abovementioned authors, can be explained as the transfer of political means (for example, voting, participating of workers in the company management, etc.) into the economic sphere. Skácel's approach was different. In his opinion, economic democracy was an issue of property ownership and responsibility – the means of production belongs to whoever bears the responsibility (Skácel, 1947, p. 7). In Skácel's economic democracy, the voting principle was a means for consumers, not for producers or workers. If we have private property (since it also means private responsibility) and economic systems where *"the subject of production, its quantity and quality depends on the will of the consumers, then we can talk about economic democracy"* (Ibid., p. 8). On the other hand, socialism was economic dictatorship, because the individual and the individual's choices constituted nothing but a burden for the socialists. Despite the fact that Skácel was against capitalism, we can find fascinating similarities in the work of Ludwig von Mises, who was probably one of the most significant defenders of capitalism in Skácel's time. According to Mises (1981, pp. 399–400; see also Schumpeter, 2008, pp. 242–243, 273), the original purpose of political democracy was to make the will of the people effective in political issues. On the other hand, economic democracy in the socialist understanding could never be a way to effectively implement the will of the people in economic issues. Let us ask the question: under which conditions would the will of the people (consumers) be most effectively expressed in the economy? There is no doubt that it is the capitalist system with its profit motive, which provides the most efficient way of using scarce resources in the manner which consumers want. Briefly summarized, *"the capitalist system of production is an economic democracy in which every penny gives a right to vote"* (Mises, 1944, p. 21).[8] In fact, we may conclude that Skácel's economic democracy and Mises' capitalism are the same concepts since both demanded an unhampered free economic system without political intervention. The difference was in the terms they used to describe it.

[5] He even admitted that the liberal demand for free markets, not socialism, is the true opposition to monopolism. It was probably the ordoliberal influence which led him to use the word liberal / liberalism in a slightly positive way.

[6] Moreover, Skácel understood non-interference as a means to peaceful cooperation between nations. The biggest threat to it and the roots of imperialism lay, in his opinion, in merging political and economic power (Drápala, 2000, p. 531).

[7] We are using these politicians as example since they all were considered as people with different economic-political views. At first, Hodža and Osuský are commonly understood as prominent members of anti-Beneš opposition during the World War Two. Secondly, Feierabend was, according to Beneš, an anticipated leader of post-war right-wing party. Unfortunately, these interpretations make no sense from economic point of view, since all of them accepted socialist definition of "economic democracy".

[8] The same idea was also expressed by Frank Fetter. Fetter argued *that "The market is a democracy where every penny gives a right to vote"* (Quoted in Mises 1981, p. 400).

Of course, Skácel's economic democracy had "purely" ordoliberal features as well. He criticized liberals in the same way as Eucken did. According to Skácel (1947, p. 10), liberalism failed because its proponents thought that the system of economic democracy would be created as a spontaneous order and would then preserve itself. The same applies to Eucken (2004, p. 60) who claimed that in order for it to be a "permanent" order, it had to be created by "human design" and not by spontaneous processes.[9]

Some similarities can even be found when considering the specific functioning of the market system. In Skácel's opinion, capitalism's error lay in its consideration of everything through the eyes of economic and market logic. He was in no doubt that competition was a good thing and the same applied to the division of labor, commercialization, etc. On the other hand, he claimed that *"there must be fields of life which are not directed by the market. It is necessary to have part of the citizenry largely self-sufficient and independent of the market changes, specifically the peasants […]"* (Skácel, 1947, pp. 19–20). The peasant issue was of special importance in the Freiburg school. For example, Eucken's colleague, Constantin von Dietze, emphasized the special relationship between the peasants and the soil and refused the commercialization of the agrarian sector to a greater extent (see Rieter, Schmolz, 1993, p. 107). Eucken (2004, p. 329) was not so strict in his considerations, but he also demanded a market-independent sector. He especially mentioned small, self-sufficient peasant and family farms.

Finally, like Röpke, Skácel was afraid of mass society. *"The biggest danger of socialism lies in the fact that it wants to implement the main modern ill, i.e. enmassment […]"* (Skácel, 1947, p. 30).[10] For Röpke, socialism lacked brakes which could prevent the *enmassment* of society. In effect, society's center of gravity would move from communities and individuals to *"the center of impersonal public administration and the impersonal mass organizations flanking it. This implies growing centralization of decision and responsibility and growing collectivization of the individual's welfare and design for life"* (Röpke, 1971, p. 163).

Let us now summarize Skácel's work. We have endeavored to show that, despite his openly anti-capitalist stance, he supported the free economic system. It was just a matter of different terms. As such, we are of the opinion that he can be considered to be a member of the liberal opposition since he proposed an economic system which was not based on economic planning. Or to put it in a Hayekian way, he proposed an economic system based on individual economic planning. For both Skácel and Hayek, the issue was not "to plan" or "not to plan", but "who plans". *"If we think about a plan, we think about a specific goal – then every economic activity is planned since every individual necessarily has a goal whenever he freely acts"* (Skácel, 1947, p. 36). For Hayek, the issue of "who plans" was part of the debate over the rational economic calculation and in fact one of the most important arguments against socialism. *"This is not a dispute about whether planning is to be done or not. It is a*

[9] On the other hand, Röpke's work contains "spontaneous features". Röpke claimed that competition was not only a means for achieving the economic efficiency, but that it could also play a role when constituting the order. Compare Eucken and Skácel with Röpke (1971, p. 95).

[10] We are using the word "*enmassment*" from the Röpke's book. Skácel himself did not use the term *en masse,* but "herd" which we feel has the same meaning in the way Skácel used it.

dispute as to whether planning is to be done centrally, by one authority for the whole economic system, or is to be divided among many individuals" (Hayek, 1945, pp. 520–521).

3. Helena Koželuhová – An Unsubmissive individualist

While Miloslav Skácel's argumentation was more abstract and theoretical, Helena Koželuhová's approach to liberalism was purely practical. Of course, this does not mean that her resistance to socialism was weaker. Actually, she was expelled from the Christian People's party because of her liberal approach to the social order (Pehr, 2011, p. 447). While Pehr (2011) concluded that the Christian People's Party was the only non-socialist party in post-war Czechoslovakia. In our opinion, he is mistaken and the only "internal" opposition was truly non-socialist (see the comprehensive analysis of the party's position in Nikodym, 2020, pp. 125–128). This should be clear from the party's internal material. In 1946, when she was conclusively expelled from the party, the party's verdict was as follows: *"She has proposed liberal economic theories which are in direct contradiction to the party's program"* (quoted in Drápala, 2000, p. 90).

Milan Drápala called Helena Koželuhová an "unsubmissive individualist", so let us start with her understanding of individualism and collectivism. As in Skácel's case, we can perceive some aspects of ordoliberalism, especially when considering the meaning of the individual. *"The essence and meaning of human life lies in free choice and reasoning. Otherwise there is no reason for human existence, because a human ceases to be a human, i.e. an individually reasoning being, and becomes only a working tool"* (quoted in Drápala, 2000, p. 126).[11] On the other hand, collectivism could not allow a human to be a human. For example, when doctors proved that smoking was bad for our health and doing sports was good, a collectivist state would prescribe adherence to the rules of these experts. She concluded that collectivists do not take the "pros and cons" of human nature into account. Similarly to Hayek, she did not question the good will of the communists, but accused them of ignorance of human nature. While she refused the ideal of collectivism, she did discuss the features of the typical Czech national nature. She claimed that Czechs were bureaucrats without an entrepreneurial spirit.[12] If that was true, then post-war reconstruction would be extremely difficult, because the Czech nation was "full of intelligence", but lacked entrepreneurs. *"We are afraid of the*

[11] Elsewhere, she expressed herself as follows: *"We create an impersonal mankind from the people, then en masse from mankind which in fact has nothing to do with being human – it is only the malleable material which our rulers can use to create the State they imagine."* Even more importantly, it seems to us that she refused the idea of positive freedom. In the same place, she continued: *"These good-natured men would deprive us of the burden of thinking – they would think instead of us. Moreover, they would deprive us of the obligation and the possibility of being a human with reason, emotion and will"* (quoted in Drápala, 2000, p. 147). Moreover, she also criticized the "positive rights" when opposing the new understanding of "people's culture*". "They claim that we have a right to beauty, happiness and education and that everyone should be given that like everything else. Well, that is great and I cannot wait for my portion of happiness"* (Koželuhová, 1945, pp. 53–54). Her claims were similar to the argumentation of Hayek (1976, pp. 25–26) who, in his *Road to Serfdom,* criticized positive freedom as the overthrow of the necessity or even freedom from the "despotism of physical wants".

[12] In fact, there are historical studies confirming Koželuhová's claim (see for example Doležalová, 2006). Moreover, it is well documented that throughout history the Czechs held more bureaucratic positions, while the Germans in the Czech lands were entrepreneurs (Jančík, Kubů, 2011, pp. 31–208; Průcha et al, 2004, pp. 38–56).

responsibility, risk and loss. We lack the pioneers' courage", stated Koželuhová. And more importantly, she continued by saying that *"We do not think that a person who started out with empty hands and built up a factory from a small workshop has in fact done more for the state than an intellectual who has written a mediocre book."* She tried to interpret the reason for this: *"He [the entrepreneur] is the master and this is the root of the resentment"* (quoted in Drápala, 2000, pp. 132–133). The idea that the entrepreneur is the master was expressed, for example, by the prominent journalist Ferdinand Peroutka, an advocate of President Beneš' "socializing democracy". In fact, Peroutka (1947, pp. 25–26) was one of those who were in favor of economic democracy in the socialist sense*: "A human who is already free in politics is not going to be completely at ease until he or she has full civic values and freedoms, including in the workplace […] The idea that one human should serve another has immense power."* Elsewhere, he "replied to the rightwingers" that *"men no longer want to serve one another (i.e. capitalism), mankind now has an unquenchable desire for an increase in the material and moral standards of living and growth into a sovereign"* (Peroutka, 1947, p. 120). Not only was his critique purely collectivist, since only the individual can be sovereign, but the idea that socialism can provide a higher material and moral standard of living is highly questionable. We are especially referring to the economic calculation debate which was of high importance in 1940s. Of course, Koželuhová's reply was based more on empirical observations and Christian thought than on theoretical arguments. She replied to Peroutka by stating that halting service would in fact mean the definitive destruction of morality. *"If the service of one man to another is capitalism and man no longer wants to serve another, this would mean the end of civilization, the end of life in society, the end of progress and the standard of living"* (quoted in Drápala, 2000, p. 139). In her Christian perspective, only a fool or an evil man would refuse to serve another. She continued with the economic approach. Koželuhová rightly realized that an individual is both master and servant in a free economic system. *"The most beautiful motto of our time is: 'our customer – our master"* (Ibid., p. 140). The idea behind that motto is simple - it means that an individual can be a servant in his or her own job, but at the same time can also be a consumer which in fact means that he or she is the master and the entrepreneur is the servant. Of course, she was not the only one to realize that the socialists often only took one side of the mutual relationship into account. As, for example, Bruno Leoni (1972, p. 54) succinctly explained: *"When a grocer or a doctor or a lawyer waits for customers or clients, each of them may feel dependent on the latter for his living. This is quite true. But if no customer or client makes an appearance, it would be an abuse of language to assert that the customers or clients who do not appear constrain the grocer or the doctor or the lawyer to die by starvation."*

What were the implications for her economic system? At first, she refused massive nationalization. Once again, her argumentation was fully empirical. She argued that the industry was oriented towards wartime production and that its nationalization would make the state worse, since it did not have its own money to spend on the transformation of industry. She wondered why the people did not understand the idea that *"we are the state and, if the state squanders money, in effect we have squandered it, because the state can only make payments from our pockets"* (Koželuhová, 1945, p. 48). In effect, she was in favor of private property and free competition, since it had been the reason for the improvement, cheapening

and expansion of production in the past. She especially emphasized the fact that competition served everyone, not only the rich. According to her empirical observations, different kinds of the same goods, for example shoes, appeared in the market with a wide scale of prices, quality and quantity when competition was unhampered. The reason was simple: she repeated the motto, our customer – our master. On the other hand, even if the state tried to take care of its people as parents care for their children, this would involve the negation of free competition by its very nature (Drápala, 2000, pp. 113–114). Moreover, she criticized the socialist politicizing of the economic system which in fact only meant the creation of a system based on nepotism.[13] On the contrary, she demanded a system which would allow social and material progress – free competition and private entrepreneurship. There is no room in this system for nepotism, because the entrepreneur is always under the threat of loss, i.e. the loss of his very own money. Let us quote Koželuhová once more. She concluded the debate thus: *"We are not socialist and we are proud of it. We do not want to support new and powerful Übermenschen who would make slaves of everybody else. We are fighting for free and happy humans and equality of rights"* (quoted in Drápala, 2000, p. 150). In conclusion, we would like to highlight the term "equality of rights". If we consider her use of the term, we are of the opinion that she used it correctly. There were people, such as Hubert Ripka, Beneš's close friend and a minister in exile, for example, who confused the term with a more socialist understanding. Ripka confused "equality of rights" with other forms of equality, for example in the material sense. In fact, equality in a material sense could be in direct contradiction to "equality of rights", because it would mean treating different people differently.[14]

4. Summary

Despite the post-war intellectual atmosphere, which was characterized by all-embracing socialism covered by democratic terms, there were still people who proposed liberal order, both classical and ordoliberal. While classical liberalism was in deep crisis right after the war, we can use German economic miracle as a great example of successful institutional order based on ideas of ordoliberalism. From this point of view, it is quite striking that Czechoslovak ordoliberalism is almost forgotten up to this date. Both Skácel and Koželuhová proposed economic and institutional order which was proved as functional in Western Germany. Skácel even translated few Röpke's books and they were placed into *Universum* publishing house publications plan. Unfortunately, when the communists took power, the publication plan was cancelled.[15]

[13] Peter Boettke has undertaken a brilliant analysis of the nepotism in socialist regimes. Boettke (2001, pp. 140–212) argues that personal relations and corruption are inherent features of the socialist system. The institution of central planning allows rent-seeking in the form of corruption. Despite there being no legal framework, rents are protected and enforced by informal quasi-contracts.

[14] Ripka claimed that the idea of the "equality of rights" is common to both democracy and bolshevism and as such cooperation between democracies and communists was, in his opinion, viable. On the contrary, we are of the opinion, that the "equality of rights" is interpreted differently in democracy and bolshevism. Since the ideal of communism is "forced" equality, it is in contradiction to the "equality of rights" (see Ripka, 1944, p. 18).

[15] On the other hand, Czech translation of Henry Hazlitt's *Economics in one lesson* was still published in 1948 by the Union of the friends of USA.

Skácel's and Koželuhová's ordoliberal thought had its consequences on their lives after the communist *coup d'etat.* To save her life, Koželuhová took the train to the state border few days after the "Victorious February". Unfortunately, she was arrested together with her daughter and transported to the police station. During the night, they asked the police officer to go to the restrooms. They were lucky because they were allowed to do it. They left all their stuff, winter clothes and personal belongings in the police station and disappeared in the dark of the night. After the whole-night walk through the woods, they finally crossed the border and reached Bavaria (Drápala 2000, p. 93). Miloslav Skácel was not so lucky. He did not leave communist Czechoslovakia and he was arrested in 1951. He was accused of counter-state plot. The situation was even worse after the emigration of his son. After his release, Skácel was forced to work as a factory worker, truck driver and finally the stroker in the boiler room. During the Prague Spring of 1968, he was thinking about the return to his original profession – the lawyer, but he did not truly believe that the regime was changing and decided to stay in the boiler room (Ibid., p. 516).

We hope that this short summary will bring more attention to the study of the ordoliberal ideas in the Czechoslovakia. While there was strong emphasis put to the study of the influence of Austrian economic school in the Czechoslovakia / Czech Republic, the influence of ordoliberalism is still underappreciated. This is, of course, quite understandable. Not only that ordoliberalism, respectively Freiburg school, never reached so much attention as aforementioned Austrian school, but they did not also create such a homogeneous school of thought – neither in Germany, nor in Czechoslovakia. However, we proposed to study ordoliberalism as a bundle of specific ideas, not as a homogeneous school. This approach allows us to trace ordoliberal ideas and features even in the works which are, on the first sight, unrelated to ordoliberalism or Freiburg school.

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THE OWNERSHIP IN DIFFERENT SCHOOLS OF ECONOMIC THOUGHT. COMPARISONS AND AN ALTERNATIVE APPROACH

Plamen D Tchipev[1]

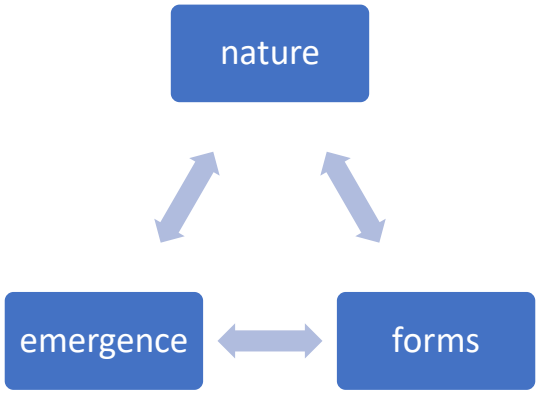
Abstract: *The paper aims to identify several major approaches used by various important schools toward the concept of ownership. And to find how they differ from each other and what benefits (and shortcomings) offer those differences to the analysis of the ownership/property. These comparisons are in order to launch an alternative approach toward the concept. The point is not to "improve" or to criticize, but to attempt to look on the category from an "outside" viewpoint.*

Keywords: *Ownership, Property Rights, Classical Political Economy; Neoclassical Economic Paradigm; Neo-Institutional Economics; General Theory of Systems.*
***JEL**: B11, B12, B13, B14, B25*

1. Preclassical economic views on the property

The focus of the scholars was to answer 3 basic questions – What is the **nature of the ownership**? How has it emerged? And eventually what are the relevant forms it may or must take?

Figure 1. Pilars of the Ownership



Source: Author's own

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Staring from Plato and Aristoteles, it is presupposed a kind of *preceding, born by the nature* (and, to that effect, natural) state of society (and of humanity), which had led to the birth of that property. This natural state is of **divine** origin (albeit to varying degrees to different authors):

- and thus, it is **outside** the will and actions of man,
- which means that it is considered a **given, absolutely**, and
- **the task of knowledge** is to learn well and **to adjust** the society to the divine law.

That state – *unsocial* or *pre-social,* is subject of transition toward an orderly society, i.e., society which has legality and law. Within this society people are equal (Aristotle, Hobbes, Locke), if not completely, then to a great extent. And they are also free. Thus, this equality is an **equality to the goods,** which in that state are nothing more than natural. Henceforth, for the early scholars, the primary state **of ownership is common, non-divided, unindividual, and thus non-private**!

At that point, differences emerge among the authors. For some of them (Plato), this is righteous, consecrated by the gods and it is advisable that ownership in the ideal country remains so.

The opposite group of others (like Aristotle) find the private ownership more attractive. What is important, both sides highlight the advantages and disadvantages of their choice and *do not exclude* the existence of the alternative form. Moreover, they find justification for the alternative forms.

The Enlightenment reproduces the same duality in the opinions. Some of the thinkers (Hobbs) considered impossible, the existence of the private property. But others (Locke) find it adequate to the "socialized" condition of mankind. Locke is the first to deal extensively with the emergence of ownership as a result of a conscious action, a creative act of the reasonable man. This is a huge step recognizing:

- that human activity, (the labour), makes the free, common and natural goods, private ones.
- that property **arises** from the merge of human effort with natural origin.
- This logic indicates that ownership as an economic category objectively emerging in the course of action of the economy.

The fact that ownership evolves only as private launches the liberal tradition in the widest possible sense of this term

1.1.Summarizing the pre-classical views

The important thing with the pre-classical views is that, except for Locke their schemes are institutional – ownership is or it must be as it is because God (or the gods) give it that way. Or, for some authors, because the law (Roman tradition) forms it that way. So, in this sense, these approaches are **legal or normative.** Emphasizing the regulatory nature is aimed to show, that their authors do not associate them with the way economy works; early scholars do not see the ownership neither as a consequence, nor as a reason for its functioning.

And when we speak about its analysis, those authors do not put anything else in it, than the idea that there is better or worse ownership, and accordingly the more or less adequate to society they live in, or to the "ideal" state.

2. Classical Political Economy (CPE) concepts of the Ownership

Perception of ownership of the CPE was inherited from the ideas of the Enlightenment. Adam Smith laid the grounds of the liberal notion for the functioning of market and of labor value theory. That way he reproduces Locke's understanding of a person's natural right over his own labor which leads to the appropriation of property, though, Smith asserts that it happens always in specific social conditions as "[P]roperty and civil government very much depend on one another. The preservation of property and the inequality of possession first formed it, and the state of property must always vary with the form of government (Smith, 1896, p. 16). In his sense, the ownership of the individual always appears as **private** and **exclusive** one, which comprises the main concept for it in the Classicism.

Jean-Baptist Say also remains, grossly, with the early economists' tradition – there is a primitive stage of humanity which is lacking property, but it is wild and undeveloped; he gives examples of savages from New Zealand and America who are forced to feed on worms, caterpillars, any other "creeps" chased by extreme scarcity and poverty. The land there is unappropriated (non-privatized) and no one wants to make investments because of this. For Say, things are clear - progress requires appropriation of the land (which apropos, is in everyone's interest) to overcome poverty and provide abundance. Moreover, in that logic, such "absorption" is probably advisable also for other natural forces, but he points out some difficulties, since they are non-exclusive, in terms of consumption, and "inexhaustible" as availability. Of course, such logic is an excellent contribution to the economic liberalism, and it is no coincidence that Say is his undisputed flag today, especially given his "vision" regarding the privatization of some other "indestructible forces of nature" such as rivers, waters, etc.

Ricardo does not have a specific analysis of the ownership, but he has an extensive treatment of the rent. According to him, *the worse soil* yields more expensive corn than the better one. And the price is set by the former, because the constant demand for labour drives the population growth. Expansion of the population requires cultivation of *poorer and poorer lands.* Paradoxically, here Ricardo accepts **Malthus' point** on the fast-growing population. The result: more labor is needed to produce the same amount of grain as before the poor-land cultivation. This ensures a continuous growth in the grain prices, which in turn provides for a continuous rent growth: "The wheat does not have a high price because the rent is paid, and the rent is paid because the wheat has a high price..." (Ricardo, 1981, 80). Hence, there is no rent when the good-quality land is abundant. Thus, "[R]ent is that portion of the produce of the earth which is paid to the landlord for the use of the original and indestructible powers of the soil" (Ricardo, 1981, p. 74).

That treatment of the rent indicates on his sense of ownership. It occurs naturally in the course of effort to ensure a ***fuller (***and ***better) use of the "productive powers"*** of the soil. This resembles physiocrats' "*produce of nature", o*r Say's *"powers of nature"*, (encompassing those of earth, water, and even of the sun)! But the point is different; Ricardo's "*powers"* increase the quantities of produced goods (e. g. of corn) but never – its value! And, Ricardo goes much further in his analysis of ownership, as an economic category. Showing with numerous examples, that, when unlimited and good-quality land is present, rent will not arise (and hence all the severe consequences of delayed accumulation of capital and poor socio-economic problems of workers), it essentially highlights an entire class – the landlords – not only as parasitizing, but also as holding back the progress of capitalist society in its early industrial era.

The views of J. S. Mill are deeply influenced by the Bentham's principle of "chasing more happiness". They exhibit a strong predisposition towards equality in ownership. The main thing about Mill's understanding of ownership is that it regards existing property as imperfect compared to its general principle: "The laws of ownership have not yet been consistent with the principles on which the justification of private property is based", (Mill, [1848] 1909, p. 208). This is the main reason why he deals with the *soft* principles of distribution, targeting them through the prism of the individual property, as it should be, according to him.

And here they are Mill's "specifics," which seem rather contradictory within the liberal classic line of economics. For him, the ownership (often non-exclusive) must be subject to restriction (when inherited), and even to progressive taxation. His opinion is sharpest for the ownership on land – it is not as "sacred" as other objects of property, and "no one has made it", but is the primary heritage

of all beings. Then: *its appropriation is wrong*, since it gives exclusivity (exclusive rights) to the owners, thus preventing others from acquiring them in the same way. Iinterpreting the ownership on land as *an exclusionary* (exclusive) category adds stroke to the Locke's view. Locke had assumed that, in the free state, anyone could acquire *goods in so* far as she applies labour, provided goods remained enough and of the same quality for others. Thus, Locke did not postulate the original *scarcity* of wealth, including land (at least it did not separate it from the general case), whereas Mill's treatment of property as an exclusive right already means that he *introduces* the principle of scarcity, although still only regarding the land.

One can clearly see the two strands of ownership analysis in CPE - while Mill's direction is closer to the normative treatment that we will later find vividly embodied in the neo-institutional approach, then the analysis that Ricardo makes of ownership, (and especially of one particular form of it), is an economic analysis that postulates it (for the first time in theory) as an economic phenomenon.

2.1. Marxian Political Economy (MPE) point of view.

MPE is usually classified as a radical one, due to his emphasis on the revolutionary change of the society. Nevertheless, his economic findings follow CPE tradition which he led to a logical end assuming that part of the labour is unpaid to the worker, and it is therefore a source of the profit, which is accumulated in capital. Its contributions on the ownership are multidimensional. Marx distinguishes the category of private property from the pre-existing forms of personal dependence (slavery and serfdom). Marx asserts, that capitalist production needs employees to be free and deprived from any productive property in order to sale their *labour power.*

Marx defines for first time the private property, not just as opposing the common possession in the "natural" state of society, but also as a *characteristic* of the *individual*, as a full-fledged subject, who has a control of the objects of his property and enter into relations on an equal basis, with other individuals possessing same characteristics. Which means that, ownership is ***a social relation***, an objective, material, not legal and normative one.

Thus, this is no longer *just a private property*, which, as belonging to its principal, gives him/her an opportunity for an immediate use (or of its fruits), but is also a self-growing and self-sustaining value that expands and multiplies its base. That makes it a ***capitalist*** property, which works in the same legal regime, but with new features and new agents.

And the least, Marxist understanding of private property defines it as developing historically, starting from a very simple common forms in primitive societies (e.g as in Indian community),

passing through slavery, feudalistic and bourgeois societies and ending by its abolition. The main difference here is that MPE explains it as a social rather than a natural process.

2.2.Summarizing the views of classical political economy

CPE concept of the ownership embraces three approaches:

1. The liberal (and major) one:

- Property results from the appropriation of wealth from the nature by individual's own labor in a specific social condition.
- So, it always appears as a private and exclusive one, which is its **main feature** in classicism (Smith)
- Ownership occurs naturally to ensure a better use of the "productive powers" of the earth, (Ricardo's rent theory).

2. The one based on Bentham's principle for "chasing happiness":

- It is predisposed towards **equality** in ownership, so the appropriation of the land is wrong, since it gives exclusive rights to the owners, preventing others from acquiring them in the same way. (J. S. Mill)
- Roughly, Mill introduces the principle of scarcity, though still only in relation to the land.

3. The radical one:

- It understands the property as a historical category, emerging as a communal one, evolving as a private one, then as a **capitalist one** and ending through its abolition, (Marx).
- Private property is not just an opposite to the common possession in the "natural" state of society, but also is a characteristic of the subject, who has a control of the objects of his property and enter into relations, on an equal basis, with other individuals possessing same characteristics.
- It sees it as a **social relation** rather than a natural process; an objective, material, not legal and normative one.

3. The Neoclassical concept

Neoclassicism does not offer any special analysis of ownership. In fact, it is removed from its set of categories. Moreover, Neoclassical paradigm acknowledges absence of the ownership as a desirable rather than a problematic fact.

Deprivation of the analysis of social dimension, however, deprives economic objects also of the institutional one. And the ownership is exactly such a phenomenon – regardless of the opinions of the theoretical schools, the view that it characterizes the economic system qualitatively stands out. Hence, it is important to say that depriving the analysis of an institutional incision impoverishes it and ultimately schemes it, moving it away from reality.

In the few occasions, where ownership is dealt explicitly, the analysis is reduced, pretty much like in the Roman legal tradition, only to the material objects, sending it, this way. back to the pre-classic notions, (see Menger, 1950). The ownership is stated solely as *attached* to the individual, i.e., just as a private one. Menger himself did not use that term, and when he thought of any change in ownership, he linked it to the impossibility of its separation from the socialized economy itself. In principle, this is the general approach to the ownership of the neoclassical school, although it is defended with different harshness. Reducing goes together with a highly declarative manner of the statement - "[T]he Program of Liberalism… should be read as *property*, i.e., *private property… "*, (Mises, 1985).

Neoliberalism seeks to re-establish the principles of freedom of competing economic agents, considering, however, the existence and influence of monopolies. Particularly, this is the neoliberalism of the German "ordo"-school, to point out the views of Walter Eucken. For him, as for the entire neoclassical track, private property is the absolute basis of the competitive markets. Though, this is no longer enough; in the context of a monopolistic structure of the economy, private property has changed its characteristics. Eucken, therefore, considers that conditions must be made to combat cartelization and hindering of free competition. The concept of "social market economy" developed by him and the other scientists of the Freiburg School became the basis of the post-war reconstruction of the German economy. The latter in the German neoliberal school is associated with the widespread distribution of shareholder property and, more precisely, its diffusion through folk shares to create and strengthen the middle class, a "nation of owners".

The neoclassical lack of institutional structure provides us with the opportunity to make a *challenging hypothesis*: Abandoning of the ownership in the explanation of the economy appeared possible because of the introduction of *scarcity;* a category, which economic sense simply means

that goods are not free, not available, and not accessible to anyone who would like to take advantage of them. They are limited, scarce, etc. because they are not free, just as this is postulated in classical economic theory.

4. The ownership in the Neo-Institutional Economics (NIE)

Considering the fact, that the production, in addition to the transformation of materials, is also a transfer of rights, the NIE "complements" the notion of the neoclassical economist with the thesis that agents "maximize their objective functions, subject to the constraints of organizations and institutions", (Eggertsson, 1990, p. xi). That, essentially, constructs the neo-institutional paradigm as an epistemological attempt to revise the neoclassical economics, directed against assumptions and hypotheses of its "protective belt"[2] in several points: to introduce the transaction costs and to account for the incompleteness of information.

Thus, in NIE, institutions and organizations (as long as they are different), come up as additional restrictions in the construction of the optimizing functions of economic agents. And the ***property***, (set as property rights *structures*), is a factor constructing institutions in one way or another. And already, "the idealized structure of property rights (PR) in the neoclassical model is used only as a benchmark for comparison", (Eggertsson, 1990, p. 6, *i.m. P.T.*). That perception, in fact, confines ownership itself simply to an element of the rules and contracts which 'rule exchange'. Summarizing, Eggertsson concludes that the neo-institutional economist is "ultimately interested in the impact of different ownership rights structures on the wealth of nations" (Eggertsson, 1990, p. 12).

Shortly, the existence of transaction costs (TC) makes the assignment/allocation of property rights a primary task, introduces the question of economic organization and makes the political institutional structure, key to understanding economic growth because property rights have different effects on wealth. Thus, *transaction cost* become crucial to the way in which the neo institutional paradigm works.

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[2] Lakatos' understanding for the protective belt of a research program (ad hoc assumptions modified and adapted to explain the counter-examples in the program), (Lakatos, & Musgrave, 1970).

The most important thing for our analysis is the recognition that the neo-institutional economics does not reject, but rather, generalizes, the optimization approach of the neo-classics, adding new factors of optimization, including a varying structure of property rights and transaction costs, such as companies, bureaucracies, legislative communities; exchanges in alternative economic systems etc.

It is therefore concluded that even relatively small changes in the appropriation/allocation of private property rights can significantly affect human *behaviour*.

4.1.Summarizing of the neo-institutional concept

- NIE identified property with the cost of the transaction, thus
- depriving it of its almost divine status, which it had in previous paradigms, and thus
- the NIE opened the way for formalizing g the ownership.
- Clear and significant distinction between the economic and legal aspects (Barzel, 1997). Decomposing ownership into **bunch of rights,** NIE made possible to **arrange** them **institutionally** in various ways, making the institutions matter again.
- Paradoxically, it appeared that the desired favorable outcome on social benefit from this **institutional arrangement** can also be achieved through state intervention.
- Generally, the dismantling of the property rights of individual elements and the broad interpretation of their object leads to a serious **redefinition** of the economic system.
- Regardless, the NIE concept is the most promising concept currently, it does not seem to offer the final picture of the ownership. It contradicts both some theoretical principles and the liberal principles of the positive economists.

5. An Alternative approach to the property through the General Theory of the Systems (GTS):

The inalienability/irrevocability of the property from the economic system, established at virtually every step of the development of economic theory, starting with the ancient deification, leads us to try to address it from the position of the systems' analysis.

According to the GTS each system comprises of *elements* and *relations* between them, (Bertalanffy at al., (1968). They determine each other mutually and each element possesses a systemic attribute, which makes it element of that *particular* system. Dropping of or acquiring a new systemic attribute, excludes a particular element from one system or switches it to another one, so precise definition of the systemic feature is essential for the analysis.

If we now apply this to the economic system, we can easily see that the companies (economic agents) are the system elements, and the market, or the price mechanism (in Coase terms) is the systemic relationship(s) between the elements.

Then we come to the question - what is the systemic attribute of the economic system? And the ownership is the only candidate for this role. Its type determines the nature of the links between the economic agents. Where the economic agents own their products, the relation between them is as of commodity producers, i.e., it is based on the value or price (if one sticks to neoclassical paradigm) of their products. The agents are equal each other.

If one or both agents are deprived of one or all producing factors, they are deprived of the above systemic attribute, though they possess other one – e. g. they are serves. Thus, the relation between them alters, and is no longer an economical one and might be one of power, violence, or personal dependence.

6. Conclusion

The GTS approach enables us to treat property, at a general system level, as a category – inseparable from the economic system, dependent on it, but also having its own development, which in turn predetermines changes in the system to which it belongs.

This concept does not revoke or replace the need to analyze each particular form of ownership in its manifestations and functioning as an objective economic category. It is just a complementary view, an additional aspect that outlines more clearly, the place of ownership and its organic connectivity with the economy system.

The GTS shows best inseparability, irrevocability of the ownership from the economic system, which one may find practically at every step of the development of economic theory, starting from its deification in the antiquity.

Ownership is the systemic attribute that is inherent in all economic agents, predetermines the links between them and thus makes them elements of that *particular* system.

Ownership, as a system quality, develops together with the systems and develops them in accordance to the its own changes.

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FINANCING FROM SUPPLIERS DURING COVID-19 PANDEMIC: EVIDENCE FROM BULGARIAN LISTED FIRMS

Galya Taseva[1]

Abstract: *The article examines which firms rely more heavily on supplier financing and how the crisis caused by the Covid-19 pandemic has affected supplier financing for these firms. The research is based on information about manufacturing companies listed on the stock exchange in Bulgaria for the period 2018 - 2021. The results of the research show that companies that are net debtors on trade credit have worse financial indicators. Accounts payable of companies net debtors to suppliers have shrunk in absolute terms in both years since the start of the pandemic. But for companies that are net debtors on trade credit, the reduction in payables to suppliers is much smaller than the reduction in loans to banks and other financial institutions in the first year of the pandemic. In the first year of the pandemic, when the initial shock to the economy was the strongest, the relative importance of trade credit as a source of financing for firms with poorer financial performance and lower creditworthiness grew.*

Keywords: *trade credit, supplier financing, financial performance, Covid-19, Bulgaria*
JEL:*G30, G32*

1. Introduction

The disruption to supply chains and liquidity problems for companies caused by the coronavirus pandemic have challenged the existence of many businesses. The pandemic caused a macroeconomic shock to the supply of labor and resources for production and hence to the activity of companies around the world. Firms have been forced to change their strategies and policies in response to the changes that have occurred. The impact of the pandemic on the trade credit policies of companies has been extremely significant, as real business activity and hence cash flows for suppliers and buyers along the supply chains have been directly and drastically affected (Luo, 2021). The shock to firms' cash flows caused by the pandemic has focused attention on the ability of companies to pay their suppliers.

The purpose of the article is to examine which firms rely more heavily on supplier financing and how the crisis caused by the Covid-19 virus pandemic has affected supplier financing for these firms. The tasks that are set are:

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- To outline the profile of companies that are net debtors to suppliers, analyzing the main indicators of their financial position and the changes in these indicators in the period before the pandemic and at the beginning of the pandemic;

- To track changes in the levels of firms' trade payables under pandemic conditions to assess the importance of trade credit for net debtor firms.

The main hypotheses are:

H1: The first hypothesis in the research is that companies that are net debtors on trade credit are companies that perform weaker financially.

H2: The second hypothesis to be tested in the study is that the crisis caused by the pandemic led to changes in the levels of trade indebtedness and increased the relative importance of supplier financing for firms with worse creditworthiness in the first year of the pandemic.

The research methods used are: analysis and summary of the literature in the field, analysis of main indicators of the financial condition of companies, comparative analysis, trend analysis, index analysis, structural analysis, statistical analysis.

2. Theoretical overview

Some authors (Khan, 2022) draw a parallel between the crisis of 2008-2009 and the crisis caused by COVID-19. There are similarities such as the burden the two crises created on the global economy due to liquidity shortages, corporate bankruptcies and losses (Khan, 2022, p. 3). But during the crisis caused by the coronavirus pandemic, an aggregate demand and supply shock developed simultaneously for lenders and borrowers (Khan, 2022, pp. 3-4). During the protracted crisis caused by the pandemic, the sales revenue of the companies has been disrupted indefinitely, which is accompanied by the burden of fixed costs, including the fixed costs of servicing the debt and simultaneously reducing the cash holdings of the companies. Against this backdrop, adverse financial conditions make it more difficult for firms to raise urgently needed liquidity due to banks' reluctance to lend to non-creditworthy firms with low asset values (Khan, 2022, p. 4).

The ambiguity about how long the negative effects of the crisis caused by the pandemic will be felt in parallel with the new geopolitical realities further fuel uncertainty and make it difficult for companies to access finance and to recover economies in the region and around the world. After the global economic crisis of 2007-2008, which affected most countries of the Balkan region, a recessionary gap was formed in the majority of Balkan economies, which had been developing for years below their potential (Nenkova, Angelov, 2020).

According to Bureau, Duquerroy, Vinas (2021, p. 1), for the correct assessment of liquidity shortages in crisis conditions, it is extremely important to consider the channel of trade credit. The bulk of short-term financing for non-financial enterprises is provided by suppliers. Trade credit is extremely important for maintaining the liquidity of companies. In 2019, the trade payables of French firms exceeded seven times the amount of short-term bank loans (Bureau, Duquerroy, Vinas (2021, p. 1).

The importance of trade credit is confirmed by numerous studies that show that industries in which the use of trade credit is widespread grow faster and are more resilient to financial crises (Chen, Ghoul, Guedhami, Kwok, & Nash, 2021, p . 2). According to many studies, firms experiencing financial difficulties use more credit from their suppliers (Petersen and Rajan, 1994; Petersen and Rajan, 1995; Petersen and Rajan, 1997; Frank and Maksimovic, 2005; Molina and Preve, 2007; Wilner, 2000).

But there are also studies, such as that of Bureau, Duquerroy, Vinas (2021), according to which the use of trade credit in a certain situation, as observed at the beginning of the pandemic, may pose additional risk to companies. Based on daily data for 175,000 French firms for 2019 and 2020 on the default of payments to suppliers Bureau, Duquerroy, Vinas (2021, p. 1) find that trade credit amplifies the Covid-19 shock in the first months of the pandemic, dramatically increasing the need for short-term liquidity in the most affected downstream sectors. However, they stress that this effect is short-term and pro-cyclical and concentrated on financially constrained firms. The conclusions reached by Bureau, Duquerroy, Vinas (2021) are contrary to the traditional understanding of trade credit as a countercyclical source of financing that serves as a substitute for bank credit when bank lending shrinks (Bureau, Duquerroy, Vinas (2021, p . 2). The results of their research show that companies that are net debtors on trade credit experience severe liquidity problems as a result of the lockdown at the beginning of the pandemic, which significantly increases the risk of non-payment of trade debts. However, this effect is short-term and cyclical in nature, peaking in April and gradually declining and reversing in June 2020. They also find that smaller, riskier, financially distressed, less profitable and generally financially weak firms that are net trade credit debtors are more likely to default on their obligations to suppliers. Another conclusion reached by Bureau, Duquerroy, Vinas (2021, p. 2) is that firms can offset the effect of non-payment of trade credit obligations by hedging liquidity risk. They also found a reduction in default risk when using trade receivables financing, but only for the largest firms (Bureau, Duquerroy, Vinas (2021, p. 2).

Firms' trade credit balance (whether they are net debtors or creditors) depends on the payment terms negotiated in trade transactions and is largely determined by the specifics of the industry and the firms' position in the supply chain. Firms that sell to final customers tend to be net borrowers because final customers pay in cash and payment delays increase upstream (Gonzalez, 2020 - cited in Bureau, Duquerroy, and Vinas (2021, p. 2).

Bureau, Duquerroy, and Vinas (2021) describe the mechanism by which the lockdown at the beginning of the pandemic affected the commercial credit chain. If the level of activity of the firm does not change between two dates, then, other things being equal, its trade lending position remains unchanged, since both trade receivables and trade payables are continuously reproduced. As demand plummets as a result of the lockdown, sales revenue plummets, and accounts payable accrued prior to the demand shock remain past due. Thus, for companies that are net debtors on trade credit, liquidity problems arise, escalating to the impossibility of paying due obligations. Conversely, ceteris paribus, net creditor companies on trade credit experience an increase in liquidity as a result of an excess of cash inflows over cash outflows. The reduced demand for production during the lockdown, in turn, reduces the demand for resources for production, and hence the amount of obligations to suppliers. When economic activity recovers, the increase in sales and, accordingly, cash and trade receivables leads to an increase in liquidity

for the original net debtors and, accordingly, to an increase in cash outflows for net creditors (Bureau, Duquerroy and Vinas (2021, p.3).

Trade credit can serve as a mechanism for companies to adapt to the conditions of the environment in which they operate, but this requires flexibility in the management of trade receivables and payables. According to Zimon and Dankiewicz (2020), maintaining liquidity and generating profit, especially for small firms, requires optimizing trade credit management policies. Zimon and Dankiewicz (2020) investigate trade credit management strategies in Polish group purchasing construction firm organizations during the COVID-19 pandemic. Trade credit occupies a large share in the financing of the construction sector in Poland. Zimon and Dankiewicz (2020) conclude that during the pandemic, the trade credit management strategy changes, moving from a moderately conservative to a highly conservative policy. The changes they found in the Polish construction companies regarding the management of trade obligations are related to the formation of large reserves in purchases.

Luo (2021) examines the extent to which COVID-19 affects corporate trade credit policy in the US. He identifies the US economy as one of the most affected by the pandemic. Luo (2021) finds that COVID-19 significantly accelerated the rate of convergence of US firms to targeted trade credit. The adjustment to the target level of trade credit is faster for companies that are ex-ante exposed to a higher operational risk. The results of Luo's (2021) study are generally consistent with the understanding that changes in firms' trade credit policies correspond to risk aversion in adverse shocks.

According to previous research by Luo (2021), there is an optimal level of trade credit that firms aim for, with the adjustment rate being about 70% of the difference between the actual and target level of trade credit for each year. During the pandemic, the speed of trade credit adjustment increased significantly compared to the pre-pandemic period. Also, the adjustment speed is higher for trade payables compared to trade receivables.

Risk aversion is one of the channels through which pandemic-induced uncertainty affects the adjustment speed of trade credit (Luo, 2021, p. 1). Uncertainty about how long the macroeconomic shocks the pandemic has caused will continue is adding to the uncertainty for businesses. The increase in uncertainty is a consequence of the volatility of cash flows, the increase in financing costs and the risk of non-payment by trading partners. Firms have the ability to increase or decrease the absolute level of trade credit depending on their specific constraints, but large deviations from the optimal level of trade credit expose firms to more risks (Luo, 2021, p. 5).

Adjustment costs are determined both by general economic conditions and specific characteristics of firms (Cook and Tang 2010 and Hackbarth et al. 2006 - cited in Luo, 2021, pp. 1 -2). As uncertainty increases during the pandemic, so does liquidity risk and default risk, which also affects trade credit adjustment costs. As a result of higher operational risk and difficult access to credit, it becomes more expensive for firms to adjust trade credit the greater the deviation of the actual level of trade credit from the optimal level. This means that it is in the interest of firms to adjust trade credit more quickly in order to avoid a significant deviation from its optimal level. If the higher rate of convergence of the actual level of trade credit to its optimal level during the pandemic reflects risk aversion, the adjustment should be faster for

riskier firms (Luo, 2021, p. 2). The results of Luo's (2021) study show that firms with higher operational risk experience a faster adjustment during the crisis.

Luo (2021) also considers that the speed of adjustment depends not only on the willingness of firms, but also on their ability to do so. It is established that companies with higher contractual power can impose more favorable terms on their trade partners and, accordingly, achieve a higher speed of adjustment to the optimal level of trade credit. Firms with more significant market share and correspondingly better contractual positions adjust trade credit faster during the crisis Luo (2021, p. 2).

Khan (2022) finds that constraints in bank lending prior to the spread of the COVID-19 virus exacerbated the effects of the pandemic. Companies that have been subjected to restrictions on access to bank credit are exposed to a greater risk of more serious problems with liquidity and cash flows, and hence bear a greater risk of defaulting on obligations to creditors financial institutions through the economic crisis caused by the pandemic. It also found that firms with limited access to bank credit before the crisis were less likely to draw on bank loans as a primary source of financing to address liquidity and cash flow problems that arose from the pandemic. Khan's (2022) research findings also show that firms with limited access to bank credit before the crisis are more likely to use trade credit, delay payments to suppliers and employees, and rely on government grants for support during the pandemic.

Ferrando and Ganoulis (2020) examine firms' attitudes toward access to finance at the onset of the COVID-19 virus pandemic. They analyze the channels of impact on access to finance. According to the firms they studied, the observed supply and demand shocks would have affected access to finance for many firms even if banks had not changed their lending policies in line with the impact of these shocks on income and balance sheets (equity) of the companies and from here on their creditworthiness. Ferrando and Ganoulis (2020, p. 11) highlight two other channels of influence on firms' access to external financing. One is the deterioration of the economic outlook and the resulting sharp fall in asset prices, and the other, an extremely important transmission mechanism, is related to trade credit. Trade credit can contract rapidly following severe demand and/or supply shocks as a result of firms' reluctance to lend (Deutsche Bundesbank, 2012 - cited in Ferrando and Ganoulis (2020, p. 11)). Ferrando and Ganoulis (2020, p. 11) emphasize that the net effect of the contraction of trade credit on the balance sheet of non-financial enterprises may be limited if trade receivables and payables decrease simultaneously. But the impact of the contraction in trade credit on business activity and creditworthiness could be significant as a result of difficulties arising in supply chains and trade agreements.

Ferrando and Ganoulis (2020, p. 23) concluded that firms in different countries had different expectations about the intensity of the financial impact of the shock caused by the pandemic. They also find that firms with poor credit histories, high debt-to-asset ratios, and that do not use factoring (as a substitute for liquidity management) were more likely to expect a deterioration in their access to external financing. Companies in the service sector also had more negative expectations. Another conclusion reached by Ferrando and Ganoulis (2020, p. 23) is that SMEs are less likely to have expectations of a deterioration in their access to trade credit, which they explain by considering trade credit as a form of of a financial buffer for smaller firms.

Shah, Liu, Shah, and Shah (2022) examine the importance of trade credit for the development of the textile sector in Pakistan and its importance in overcoming the problems of SMEs that have arisen due to the pandemic. Shah, Liu, Shah and Shah (2022) indicated that the pandemic had a direct effect on the financial condition of the small and medium-sized enterprises of the textile sector in Pakistan, which is defined as the backbone of the Pakistani economy. The study by Shah, Liu, Shah, and Shah (2022) is based on survey data of 115 Pakistani firms in the textile sector. According to Shah, Liu, Shah and Shah (2022), trade credit is an ideal solution for SMEs in the context of the crisis caused by the pandemic. They recommend that measures be taken at the government level to facilitate the use of trade credit by firms.

3. Empirical study

The research is based on data for 23 manufacturing companies from various sectors of the economy listed on the Bulgarian Stock Exchange in the period 2018 - 2021. The period considered covers the first two years of the coronavirus pandemic in Bulgaria (2020 and 2021) and the previous two years, which makes it possible to track the changes that occur as a result of the pandemic.

Public enterprises have a wider range of alternative financing options. In countries with well-developed capital markets, bond issues are the main source of attracting credit financing for corporations (Nenkov, Hristozov, 2020). But the stock market in Bulgaria is characterized by low liquidity, high price volatility and insufficient depth (Stefanova, 2019, p. 103). In the Bulgarian economy, bank loans remain the main liability item on the balance sheet of companies. In a crisis situation, disrupting supply chains, collapsing demand and restricting access to bank credit, the importance of companies' ability to attract financing from suppliers is increasing. The ability of enterprises to attract financing from their suppliers depends on many factors. Among them is the financial position of the companies.

The following table presents the average values by year of the researched period of the indicators for the size of the companies and for the net financial result of the entire set of analyzed companies and of the companies that are net debtors on trade credit. As net debtors to trade credit are defined companies where the liabilities to suppliers and customers exceed the receivables from customers and suppliers for the relevant period.

Companies that are net debtors on trade credit are significantly smaller companies in terms of total assets and net sales. In addition, it finds that firms that are net debtors on trade credit achieve on average lower net profits and higher net losses over the entire period 2018-2021.

Table 1. Indicators for the size of the companies and for the net financial result

	2018	2019	2020	2021
For the entire sample of companies				
Total assets	125287,609	135821,522	132475,000	145377,565
Net sales	80699,261	82700,783	78571,087	100972,696
Net profit	4715,435	4747,870	3401,783	3340,478

Net loss	181,000	196,826	788,522	3311,130
For companies that are net debtors				
Total assets	49269,625	86169,100	61195,167	72882,778
Net sales	31458,875	45969,800	27008,833	42179,556
Net profit	803,750	2395,100	1811,500	830,667
Net loss	510,625	408,700	1227,333	6669,222

Source: Author's calculations

Companies that are net debtors on trade credit are significantly smaller companies in terms of total assets and net sales. In addition, it finds that firms that are net debtors on trade credit achieve on average lower net profits and higher net losses over the entire period 2018-2021.

From the analysis of the changes in percentage, which are presented in the following table, it can be seen that in the first year of the pandemic, there was a significantly more serious collapse of the amount of assets and turnover of companies that are net debtors on trade credit, but also relatively faster improvement of these indicators in 2021. For companies that are net debtors to suppliers, the decrease in net profit in 2020 is slightly weaker, but for them the deterioration in this indicator continues in the next year 2021, when an even more significant percentage (54.14%) of a decrease in net profit was found.

A similar change is observed in terms of net loss. For net trade credit debtors, the increase in net loss in the first year of the pandemic was weaker, but the net loss for these firms continued to grow more strongly in the second year of the pandemic.

Table 2. Change in the indicators for the size of the companies and for the financial result in percentage

	2019	2020	2021
For the entire sample of companies			
Total assets	8,41	-2,46	9,74
Net sales	2,48	-4,99	28,51
Net profit	0,69	-28,35	-1,80
Net loss	8,74	300,62	319,92
For companies that are net debtors			
Total assets	74,89	-28,98	19,10
Net sales	46,13	-41,25	56,17
Net profit	197,99	-24,37	-54,14
Net loss	-19,96	200,30	443,39

**Small differences result from rounding*

Source: Author's calculations

The following table presents the indicators of indebtedness, liquidity and risk of bankruptcy of the companies.

Table 3. Indebtedness, liquidity and bankruptcy risk indicators

	2018	2019	2020	2021
For the entire sample of companies				
Total Liabilities / Total Assets	0,396	0,397	0,389	0,437
Long-term Debt / Equity	0,315	0,323	0,387	0,876
Long-term debt / (Long-term debt + Equity)	0,209	0,214	0,228	0,286
Long-term debt / Total Assets	0,149	0,140	0,159	0,199
Current liabilities / Total Assets	0,251	0,258	0,231	0,247
Current Liquidity Ratio	3,836	3,181	3,982	3,078
Interest coverage ratio	247,164	419,352	448,531	621,071
Beaver coefficient	0,417	0,355	0,358	0,294
For companies that are net debtors				
Total Liabilities / Total Assets	0,582	0,597	0,492	0,637
Long-term Debt / Equity	0,723	0,592	0,530	1,991
Long-term debt / (Long-term debt + Equity)	0,359	0,367	0,257	0,501
Long-term debt / Total Assets	0,225	0,233	0,188	0,337
Current liabilities / Total Assets	0,357	0,367	0,304	0,301
Current Liquidity Ratio	1,183	1,621	1,709	1,729
Interest coverage ratio	11,272	8,447	13,788	10,042
Beaver coefficient	0,143	0,143	0,198	0,114

Source: Author's calculations

The following table shows the percentage changes of the above indicators for the financial condition of the companies by years of the researched period.

Table 4. Change in indicators of indebtedness, liquidity and risk of bankruptcy

	2019	2020	2021
For the entire sample of companies			
Total Liabilities / Total Assets	0,35	-2,07	12,39
Long-term Debt / Equity	2,67	19,78	126,40
Long-term debt / (Long-term debt + Equity)	2,30	6,64	25,09
Long-term debt / Total Assets	-5,79	13,63	24,92
Current liabilities / Total Assets	2,88	-10,53	6,62
Current Liquidity Ratio	-17,08	25,19	-22,70
Interest coverage ratio	69,67	6,96	38,47
Beaver coefficient	-14,85	0,83	-17,79
For companies that are net debtors			
Total Liabilities / Total Assets	2,53	-17,51	29,45

Long-term Debt / Equity	-18,08	-10,58	275,83
Long-term debt / (Long-term debt + Equity)	2,34	-29,90	94,65
Long-term debt / Total Assets	3,81	-19,38	79,02
Current liabilities / Total Assets	2,78	-17,17	-1,18
Current Liquidity Ratio	37,00	5,38	1,20
Interest coverage ratio	-25,06	63,23	-27,17
Beaver coefficient	-0,29	38,69	-42,42

**Small differences result from rounding*

Source: Author's calculations

The obtained results show that companies that are net debtors on trade credit are more heavily indebted in all years of the analyzed period according to all calculated indebtedness indicators. High indebtedness gives rise to many direct and indirect negative effects for companies, including loss of suppliers and customers and deterioration of financing conditions from suppliers (Aleksandrova, 2016).

In the first year of the pandemic, there were serious reductions in debt ratios for companies that were net debtors on trade credit. The reason is the extremely sharp fall (40.97%) of long-term liabilities in 2020 compared to pre-crisis 2019 for companies that are net debtors to suppliers. The opposite is observed for the entire set of companies, a 19.13% increase in long-term liabilities was recorded in 2020 compared to 2019. The decrease in current liabilities in 2020 compared to the pre-crisis 2019 is also much greater as a percentage at companies that are net debtors on trade credit (41.09 %) compared to the average reduction for the entire population (17.69 %).

The liquidity of companies that are net debtors is lower in all years of the researched period. It is noteworthy that for the entire set of 23 firms, there is a decrease in current liquidity in the year before the pandemic, then a significant improvement in liquidity in the first year of the pandemic, and again a deterioration in liquidity in the second year of the pandemic. The reason is that for the whole population of 23 companies, the decrease in current liabilities in 2020 compared to the pre-crisis year 2019 is much stronger (17.69%) compared to the decrease in current assets for the same period (5.8%).

The companies that are net debtors also recorded an improvement (an increase of 5.38%) in the current liquidity ratio in the first year of the pandemic. The reason is also that current liabilities decrease more strongly (by 41.09%) compared to the decrease in current assets (by 31.66%). The more significant reduction of current assets and liabilities for companies that are net debtors on trade credits is proof of the stronger negative impact of the crisis on their operational activity. These firms are more vulnerable to the shock caused by the pandemic.

In the second year of the pandemic, a decrease in the current liquidity ratio was observed for all companies as a whole, which is the result of the excess of the increase in current liabilities (by 30.68%) over the increase in current assets (26.71%). For companies that are net debtors in 2021 compared to 2020, the increase in current liabilities (by 17.32%) slightly exceeds the increase in current assets (by 15.31%). This slightly larger increase in current liabilities over current assets in 2021 for companies that are net debtors cannot compensate for the significantly

larger drop in current liabilities from the previous period, resulting in a weak increase (by 1.2%) of the current liquidity ratio.

Table 5. Change in current assets and liabilities of companies

	2019	2020	2021
For the entire sample of companies			
Current assets	7,72	-5,80	26,71
Current liabilities	20,76	-17,69	30,68
	2019	**2020**	**2021**
For companies that are net debtors			
Current assets	222,56	-31,66	15,31
Current liabilities	75,91	-41,09	17,32

Source: Author's calculations

The lower liquidity of companies that are net debtors under trade credit is also evidenced by the repeatedly lower values, in all years of the researched period, of the interest coverage ratio. The reason for the sharp increase in the interest coverage ratio of companies net debtors in the first year of the pandemic is due to the drastic decrease in interest expenses (by 41.94%) compared to pre-crisis 2019. The decrease in interest expenses in 2020 compared to 2019 for the whole group of 23 companies is much lower (13.27%). The decrease in pre-tax profit is at a similar rate for companies net debtors (26.59 %) and for the entire group of companies (28.6 %).

In accordance with the results obtained for the much lower liquidity and higher indebtedness of the companies that are net debtors on trade credit, it is also established that the risk of bankruptcy is much more serious for them. Bankruptcy risk was measured by the Beaver Ratio (1966). With a value of the coefficient greater than or equal to 0.45, it is assumed that the financial condition of the respective enterprise is stable, with a value of 0.15, there is a risk of bankruptcy after five years, and with a value of the coefficient - 0.15, the company is expected to went bankrupt after a year.

The results of the study of the profitability of the assets of the companies show a slightly higher profitability of the entire population of companies compared to the profitability of the assets of the companies net debtors on trade credit during the analyzed period except for 2020. The reason for the increase in the profitability of the companies net debtors in the first year of the pandemic is the sharp fall in their assets, which is much stronger than the average decline in assets for firms in the entire population. The declines in operating profit and net profit for the entire set of companies and for companies that are net debtors on trade credit are relatively comparable in size in the first year of the pandemic.

Return on equity is also slightly higher for the population of all firms analyzed compared to the population of net debtors firms. Again, only 2020 is an exception, and the explanation for this is that for companies that are net debtors on trade credit, the equity decreases significantly (16.2%), and for the totality of all companies studied, it increases by 0.98% . Firms that are net debtors achieve lower asset turnover throughout the analyzed period.

Table 6. Profitability indicators

	2018	2019	2020	2021
For the entire sample of companies				
Net Profit / Total Assets	0,038	0,033	0,030	0,032
Operating profit / Total Assets	0,042	0,037	0,033	0,035
Net Profit / Equity	0,053	0,047	0,049	0,050
Net Sales / Total Assets	0,748	0,697	0,652	0,764
For companies that are net debtors				
Net Profit / Total Assets	0,025	0,028	0,032	0,023
Operating profit / Total Assets	0,028	0,031	0,036	0,026
Net Profit / Equity	0,042	0,045	0,053	0,048
Net Sales / Total Assets	0,686	0,597	0,587	0,689

Source: Author's calculations

The following table shows the changes in profitability indicators.

Table 7. Change in profitability indicators

	2019	2020	2021
For the entire sample of companies			
Net Profit / Total Assets	-10,85	-10,70	6,57
Operating profit / Total Assets	-12,48	-10,63	6,54
Net Profit / Equity	-11,79	4,43	1,95
Net Sales / Total Assets	-6,79	-6,46	17,21
For companies that are net debtors			
Net Profit / Total Assets	11,39	14,84	-28,71
Operating profit / Total Assets	11,36	15,35	-27,83
Net Profit / Equity	6,01	20,05	-9,60
Net Sales / Total Assets	-13,00	-1,63	17,30

**Small differences result from rounding*

Source: Author's calculations

It can be summarized that the first hypothesis is confirmed, that companies that are net debtors on trade credit are companies that perform weaker financially.

The shock created by the pandemic forces companies to look for mechanisms to adapt to the new economic conditions. It can be seen that in the new environment, the relative importance of trade credit as a source of financing for companies that are net debtors to suppliers has increased in the first year of the pandemic.

Table 8. Indicators of the importance of trade credit as a source of financing during the pandemic

	2018	2019	2020	2021
For the entire sample of companies				
Accounts payable	10731,91	14052,70	9984,04	13789,61
Long-term liabilities to banks and other financial institutions	5611,09	6323,74	7621,09	9486,61
Short-term liabilities to banks and other financial institutions	11489,96	12111,91	10819,26	12451,78
Accounts payable / Current assets	0,28	0,23	0,21	0,22
Accounts payable / Current liabilities	0,35	0,36	0,32	0,37
Accounts payable / Total liabilities	0,25	0,25	0,22	0,23
For companies that are net debtors				
Accounts payable	8435,75	21252,50	16739,17	14608,22
Long-term liabilities to banks and other financial institutions	5044,00	9891,70	2218,83	11273,67
Short-term liabilities to banks and other financial institutions	3593,38	2908,20	1013,33	2594,22
Accounts payable / Current assets	0,56	0,38	0,39	0,39
Accounts payable / Current liabilities	0,46	0,44	0,47	0,48
Accounts payable / Total liabilities	0,26	0,28	0,29	0,23

Source: Author's calculations

The following table presents the changes to the above indicators.

Table 9. Changes of indicators of the importance of trade credit as a source of financing during the pandemic

	2019	2020	2021
For the entire sample of companies			
Accounts payable	30,94	-28,95	38,12
Long-term liabilities to banks and other financial institutions	12,70	20,52	24,48
Short-term liabilities to banks and other financial institutions	5,41	-10,67	15,09
Accounts payable / Current assets	-19,67	-7,63	7,31

Accounts payable / Current liabilities	1,35	-9,89	14,64
Accounts payable / Total liabilities	1,22	-13,93	7,35
For companies that are net debtors			
Accounts payable	151,93	-21,24	-12,73
Long-term liabilities to banks and other financial institutions	96,11	-77,57	408,09
Short-term liabilities to banks and other financial institutions	-19,07	-65,16	156,01
Accounts payable / Current assets	-31,82	2,20	0,73
Accounts payable / Current liabilities	-5,87	7,25	2,30
Accounts payable / Total liabilities	6,10	3,67	-20,08

**Small differences result from rounding*

Source: Author's calculations

The data show that for the aggregate of all firms studied, the value of current accounts payable decreases in the first year of the pandemic and then increases again in 2021. While for net debtor firms, the value of accounts payable increases in the pre-pandemic period and decreases during the two years at the beginning of the pandemic. But despite the decrease in trade payables in absolute terms, their importance as a source of financing for net debtor firms increased at the beginning of the crisis. Proof of this is the changes that have occurred in the financing structure of these companies since the beginning of the pandemic. The results obtained confirm the second research hypothesis.

The decrease in the liabilities to suppliers of the firms net debtors on trade credit is much smaller than the decrease in loans to banks and other financial institutions. In the event of an unexpected shock, trade credit turns out to be a more sustainable source of financing for companies with financial problems and low creditworthiness. It should also be borne in mind that the reduction in payables to suppliers is largely the result of the disruption of supply chains and the contraction of demand during the pandemic, not just the unwillingness of supplier firms to sell on credit.

For companies that are net debtors on trade credit, that are in a worse financial position and with lower creditworthiness in 2020, there is a very sharp decrease in both long-term (by 77.57%) and short-term (with 65.16%) loans from banks and other financial institutions. For the entire set of companies for 2020, there was a decrease only in short-term loans from banks (by 10.67%). For the entire population of firms, the ratio of payables to suppliers to current assets for the first year of the pandemic decreased by 7.63%, and for firms net debtors increased by 2.2%.

The importance of trade payables in financing net debtor firms at the start of the pandemic is even more apparent when we compare them to current liabilities. The ratio of short-term payables to suppliers and current liabilities for the entire set of firms decreased in 2020 by 9.89%, while for firms net trade credit debtors increased by 7.25%.

The importance of financing from suppliers in the event of unexpected shocks, such as the outbreak of the pandemic, is also confirmed when relating them to the total liabilities of companies. In 2020, for companies that are net debtors, the ratio of liabilities to suppliers to total liabilities increased by 3.67%, and for the entire set of companies, it decreased by 13.93%. The initial shock at the beginning of the pandemic led to a sharp contraction in access to long-term financing, especially for firms with lower creditworthiness. With the gradual normalization of the situation in the second year of the pandemic, the importance of supplier financing is also adjusted.

4. Conclusion

The results of the research prove that the companies that are net debtors on trade credit are in a worse financial condition and with a lower creditworthiness compared to the entire studied set of companies. They achieve a lower return on assets and equity, and are also more indebted, less liquid, and more likely to default. During the pandemic, they experienced a sharper decline in sales revenue, assets and financial results. Also, due to the lower creditworthiness and higher risk, they experience more serious difficulties in attracting financing from banks and other financial institutions in the first year of the pandemic. The account payables of companies that are net debtors on trade credit have shrunk in absolute value in both years since the start of the pandemic. But the reduction in trade credit payables to companies net debtors is much smaller than the reduction in loans to banks and other financial institutions. In the first year of the pandemic, the relative share of financing from suppliers increased.

The results of the study prove the importance of trade credit as an important source of financing for companies with weaker financial performance. Supplier financing cushioned the severe shock in the first year of the pandemic for firms with weaker financial indicators and lower creditworthiness.

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SOME SPECULATIONS ON MEASURABILITY WITH WERY (WAR ECONOMIC RECOVERY INDEX)

Elena Simeonova[1]

ABSTRACT

The paper proposes and conceptually outlines an author's composite indicator for measuring from political risk perspective the economic recovery after the current Russian-Ukrainian war. The core assumption is that the economic recovery is inevitable according to the general law of systems and the cyclicality. The aim is by combining and amending available measuring tools to propose new derivative which gives a different prospective economic recovery measurement. As a measurement tool, WERI is not yet complete and will be subject to future refinement and development. It should be perceived as a kind of manifestation of the author's passion for measurement and the construction of measuring tools.

Keywords: *war, economic recovery, compose indicators, index, political risk, geopolitical risk, Covid-19*
JEL: *C430, F510, H560, O190, O570*

INTRODUCTION

The world pandemic of Covid-19 and the war in Ukraine are perfect examples of political risk manifestation of "grey swans"[2] that put a new impetus to the measurability strive. Only few soothsayers were able to foresee them, for the others rest the temptation to foresee at least the aftermath of these overlapping crises and eventually to measure somehow their impact.

Long before happening they appeared in many forecasts[3], thus raising the suspicions of a hidden global agenda (conspiracy), or at least for self-fulfilling prophecy. These "black swan" [4] derivatives altered the entire global economic and political order and cleared the way of the "new" one – comprehensive and multidimensional in its implications. Many efforts are put of estimating the impact (economic, social, and political) of Covid-19 pandemic and the Ukrainian war (Ruta,

[1] *Elena Simeonova, PhD, associate professor at the Department of Political Science, UNWE, esimeonova@unwe.bg, ORCID- ID: 0002-4518-5630*
[2] "events that are possible and known, potentially extremely significant but considered not very likely to happen" https://www.investopedia.com/terms/g/grey-swan.asp https://www.investopedia.com/terms/g/grey-swan.asp
[3] Some of the most accurate of them are: George Friedman's "The Next 100 wars" book, issued 2009 for the war in Ukraine, and The Global Risk Report 2006 of the World Economic Forum for the pandemic.
[4] The term was popularized by **Nassim Taleb** (former Wall Street trader, professor in finance, and writer) in his book ***The Black Swan: the importance of highly improbable*****"**, issued 2007, just before the financial crisis that hit the world in 2008. In short, Taleb describes "**black swan"** phenomenon as an event that Is unexpected, unknown and unpredictable. For more details, see: Taleb, N. (2007).

2022). Another direction of research interest is the delineation of the possible economic recovery and it eventual measurement. That is the point in the present paper. The recovery of the world economy is not just a wishful and desired – according to general law of systems it's inevitable, whenever it happens.

Objectives: This paper stets the following objectives: (1) to sketch theoretically an index for capturing and quantifying the degree and the speed of world economic recovery after the Ukrainian war; (2) to draw the attention of professional audience on the measurability issues of economic recovery.

Indexes significance: The indexes are the most common composite indicators. They are useful in identifying trends and drawing attention to particular issues. They can also be helpful in setting policy (or research) priorities and in benchmarking or monitoring performance. They are employed in the social sciences for several reasons: (1) they enable several variables to be represented by a single score that reduces the complexity of the data; (2) provide quantitative measures that are amenable to greater precision and statistical manipulation; (3) increase the reliability of the measurement (Nachmias and Nachmias, 1987:465). Among the limited number of analytical tools for assessing and forecasting the political risk (such as war f.ex.), the composite indicators are the most flexible and sensitive ones. They provide researchers with the opportunity to display on a large scale their imaginations and intentions.

Some stipulations: In order to avoid misunderstanding and any expectations exceeding stated objectives, the following stipulations have to be done: (1) the proposed index – WERY – has to be considered only as an initial research intention, and request for authorship; (2) the paper covers only the conceptual framework development and possible items selection of the index, which delineate only the main pillars of study and which will be a subject to future refinement and complementation.

WAR ECONOMIC RECOVERY INDEX (WERY)

WERY is meant to be a two-dimensional composite indicator expressing: (1) the degree to which the countries in the world, divided in several groups by the level and type of involvement, overcome the Ukrainian war impact and gain economic recovery; (2) the speed of the economic recovery correlated with new political risks impetus. In addition and after further refinements, the index might be set to measure the **"rate of recovery"**, "**speed of recovery"** (how fast the process is going) and **"directions of recovery"** (tracing the path of relocation of resources and investments from failed businesses to new ones). There is a possibility to correlate WERY with another composite indicator I'm working on, and that is the International Political Conformity Index (IPCI).

Grounds of the idea for WERI: I came up with the idea of WERI, re-reading and back-warding the George Friedman's next 100 years forecast were he amazingly predicts or prescripts the Russian-Ukrainian war in 2020 (only 2 years of deviation) and were he states that "wars - or at least those that do not lead to the destruction of the respective country - actually stimulate its economic development" – (Friedman, 2009:15). So my first endeavor was to construct a measurement tool for capturing the specific economic stimulus triggered by the war

(in general not only the current one). But at the second glance this proved to be a hard effort for many reasons, so I gave up and looked away searching for some approximations and I found them in WERY. Another research trigger was the wishful thinking about the faster ending of the war and rapid restoration of the status quo. In other wards – instead of steering at war impact – trying to reconsider the desired economic restoration.

Theoretical framework: WERI lays into the theoretical patterns of *Keynesianism, economy of destruction* and *systems theory.*

Similar measurement tools: The worst thing for an academic researcher when camming up with an inspiring idea, is to find it already done by someone other. Almost it was the case with WERI. An index measuring the economic recovery, but from the Covid-19 pandemic - CERI, is already put to life by Horizon Group[5]. The Covid-19 Economic Recovery Index (CERI) assesses how 122 countries are positioned to weather the economic impact of the pandemic and recover from the crisis. It is the first global assessment of its kind. CERI has three equally weighted and overarching elements: (1|) **health resilience**, (2) absorptive capacity of economy and (3) **economic agility**. These elements are measured through 15 sub-categories that allow users to analyze the performance of each country in detail (see Table 1).

Table 1.CERI composite indicators

COVID Economic Recovery Index		
Health Resilience	Absorptive Capacity of the Economy	Economic Resilience
1. Health system capacity and access 2. Pandemic preparedness 3. COVID health risk factors	1. Industrial strength and diversity 2. Debt levels 3. Labour market performance 4. Reliance on international markets 5. Social resilience 6. Food Security	1. Labour market adaptability 2.Governence & social capital 3. Market size & prosperity 4. Digital economy prevalence 5. Education & skills 6. Financial system resilience

Source: https://www.covidrecoveryindex.org/methodology

Over 100 indicators from renowned sources including the IMF, ILO, WHO, World Bank, and the World Economic Forum were used to compile the index. CERI can be used for identifying countries at risk of a prolonged recession, informs exit and investment strategies, and helps countries takes measures to strengthen resilience to future shocks. It is supplemented by country profiles for each of the 122 economies.

Bulgaria is also in the rank list and performed pretty well with its 55 rank of 122 and a score of 54.50 from maximus 100. The lowest score the country receives for its health resilience. The first in range is Finland with 79.03 points and the last one is Chad with 31.16 points. Romania is on 41st place with 59.19 points and Greece takes 53 ranks with 55.04 points.

Basic assumptions: War in Ukraine (similar to Covid-19 pandemic) has strong destabilizing and destructive impact on world economy and investments. Initial estimates suggest that the war will cost the global economy up to $950 billion in 2022 (Raga and Pettinitti, 2022).

[5] A think-tank the originated from the communities of the World Economic Forum and the United Nations and based in Geneva, Switzerland, see https://www.covidrecoveryindex.org/ceri.

Forecasts on when the war will end differ widely – between several months to several years. Definitely a recovery will occur after the world political negotiation of the new conditions and structure of the new world order.

Economic recovery notion: For the purposes of the WERY, we borrow the definition of "economic recovery" from Investopedia. According to it, economic recovery is the "business cycle stage following a recession that is characterized by a sustained period of improving"[6]. The economic recession can be caused by different factors, including war, revolutions, financial crises, global influences and etc. The recovery period is a **self-healing process** from the damage done, expressed in: **adaptation** and **adjustment** to new conditions, and **reallocation** of resources. This process is usually help by governments and central banks policies. The essence of economic recovery is the process of sorting capital goods into new combinations, under new ownership, at new prices after they have been released from failed businesses or business cutbacks in the recession.

STRUCTURE OF WERI

The main challenge for researchers when constructing a measurement tool is to identify the most appropriate indicators. This always matter of subjective judgement and the possibility of latest improvements is permanently open. As mentioned in the beginning, the current index just roughly outlines its structural content which combines three basic items (see Table 2). The first component is highly developed and put into the practical approbation, the two others are in different stages of the development process.

Table 2 .WERI composite indicators

War (in Ukraine) Economic Recovery Index		
Economic Vulnerability to the Russian-Ukrainian War Index (EVtoRUWI)	International Political Conformity Index	Political Intervention Propensity in the Economy
1. Direct economic exposure to Russia and Ukraine 2. Indirect economic exposure to the global effects of the war	1.Tendency to follow recommendations and instructions issued by global powers and supranational structures 2. Degree of compliance with the imposed sanctions against Russia	1. Level of economic regulations. 2. Size of the state in the economy

Source: the author

Economic Vulnerability to the Russian-Ukrainian War Index (EVtoRUWI). The reason to take in consideration and as a component another composite indicator is the preposition that the economic recovery strongly depends on the rate of the economic vulnerability to the war. The main assumption is that the countries with highest vulnerability rate will recover slowly than that with low vulnerability rate. The EVtoRUWI, developed by Sheryllin Raga and Laetitia Pettinotti, quantifies the economic vulnerabilities of 118 Low and Medium Incomes Countries (L&MICs) to the economic effects of the Russia–Ukraine war through different impact channels. The economic vulnerability to the war at country level is measured as the combination of direct economic exposure to Russia and Ukraine (e.g. through bilateral trade and investment,

[6] https://www.investopedia.com/terms/e/economic-recovery.asp

migrants), and indirect exposure to the global effects of the war (e.g. through levels of commodity imports, trade and investment openness, tourism), minus resilience (e.g. quality of economic governance, capacity for energy transition, food security) to manage the negative impact of shocks that may emerge from the war) (Raga and Pettinotti, 2022).

International Political Conformity Index. A two-fold composite indicator expressing: (1) the degree to which the sovereign countries are incline to follow recommendations and instructions issued by global powers, supranational structures (international organizations and/or alliances), concerning the war; (2) the tendency of duplicating the measures and policies undertaken by other countries toward Russia and Ukraine. In general, **conformity** is "the act of matching attitudes, beliefs, and behaviors to group norms and politics or being like-minded" (Cialdini and Goldstein, 2004:591). The concept of conformity comes explains why people choose to conform to society rather than to pursue personal desires (because it is often easier to follow the path others have made already, rather than creating a new one). The conformity tendency occurs in small group and/or society as a whole and may result from subtle unconscious influences (predisposed state of mind), or direct and overt social pressure (Cialdini and Goldstein, 2004:593). Conformity follows the logic that –"if everyone is doing it, then it must be good and right" (Ashfold and LeCroy, 2010:465). Research in social psychology has focused primarily on two varieties of conformity – ***informational*** and ***normative***. ***Informational conformity***[7] occurs when one turns to the members of one's group to obtain and accept accurate information about reality. A person is most likely to use informational social influence in certain situations: when a situation is ambiguous, people become uncertain about what to do and they are more likely to depend on others for the answer; and during a crisis when immediate action is necessary, in spite of panic. Looking to other people can help ease fears, but unfortunately they are not always right. The more knowledgeable a person is the more valuable they are as a resource. Thus people often turn to experts for help. But once again people must be careful, as experts can make mistakes too. Informational social influence often results in *internalization* or *private acceptance*, where a person genuinely believes that the information is right (Ashfold and LeCroy, 2010). ***Normative conformity*** occurs when one conforms to be liked or accepted by the members of the group. This need of social approval and acceptance is part of our state of humans. In addition to this, we know that when people do not conform with their group and therefore are deviants, they are less liked and even punished by the group. Normative influence usually results in *public compliance*, doing or saying something without believing in it.

Political Intervention Propensity in the Economy. Measures the degree to which the governments tend to interfere the economy. In the field of political psychology, the political propensity refers mainly on the political leaders risk propensity. Researchers tempt to explain the decision of political leaders (mainly of presidents) to intervene interstate conflicts. Some researchers "examine the link between US presidents' risk propensity and the frequency with

[7] In social psychology **conformity** is explained through another related concept – that of **social influence**. It is developed by the Harvard social psychologist **Herbert Kelman**, who is identifying three major types of social influence: (1) **compliance** (when people appear to agree with others but actually keep their dissenting opinions private); (2) **identification** (when people are influenced by someone who is liked and respected, such as a famous celebrity), and (3) **internalization** (when people accept a belief or behavior and agree both publicly and privately). For more details, see: Ashfold and LeCroy (2010).

which they intervene internationally" covering the period 1946–2001 (Keller, Grant, Forter, 2020). Taking grounds for this idea, we propose to estimate the propensity to intervene in economy for political purposes. Some possible sub-categories of this indicator might be the level and scope of economic regulations, and the size of the state in the economy.

CONCLUDING REMARKS

We don't know how long the Russian-Ukrainian war will last, but at least one thing is sure – it will keep provoking research quests in all scientific fields for a long time ahead. Political risk analysts and consultants will continue to adjust their tools for assessment and forecasting in strive to measure the unmeasurable. No matter how rough or precise are the tools, they all are in some extent important. The here proposed index when completed, could provide up-to-date and reliable information to the business, policy makers, civil society organizations, academics, citizens, and others.

There is a lack of consensus among academics and practitioners about the efficiency of composite indicators elaboration and use. The adepts ("aggregators') believe there are two major reasons for combining indicators in some manner to produce a bottom line. They believe that such a summary statistic can indeed capture reality and is meaningful, and that stressing the bottom line is extremely useful in garnering media interest and hence the attention of policy makers and business. The opponents, the so called "non-aggregators", believe one should stop once an appropriate set of indicators has been created and not go the further step of producing a composite index. Their key objection to aggregation is what they see as the arbitrary nature of the weighting process by which the variables are combined (Sharpe, 2004).

Of course we must be aware that composite indicators sometimes can send misleading policy messages if they are poorly constructed or misinterpreted. Their "big picture" results may invite users (especially policy and business decision-makers) to draw simplistic analytical or policy conclusions.

It is hard to imagine that the debate on the use of composite indicators will ever be settled. Official statisticians may tend to resent composite indicators, whereby a lot of work in data collection and editing is "wasted" or "hidden" behind a single number of dubious significance" (Saisana *et al,* 2005:307). On the other hand, the temptation of stakeholders and practitioners to summarize complex and sometime elusive processes *(e.g.* sustainability, single market policy, etc.) into a single figure to benchmark country performance for policy consumption seems likewise irresistible. (Saisana *et al,* 2005:308)

All composite indicators should be seen as a "live" product, which requires successive refinements and supplementations as long as new developments are taking place. An index is a very good instrument for drawing attention to the issue being investigated. Thus for example, the exercise of computing an index of resilience may itself make decision makers and stakeholders more aware of the factors that lead to resilience building. Such an exercise may also generate academic discussion and enhance awareness amongst scholars and practitioners on the issues involved.

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THE IMPACT OF COVID 19 ON ACTIVITIES OF BANKS

Kamelia Assenova[1]

Abstract: *The COVID-19 pandemic is causing unpredictable disruption in the global economy. The pandemic affects every sector of economy. As a result of this virus, the world economy is weakening, and this is also happening in Bulgaria.*

The banking sector is an important component of every economy. The banks have a fundamental role as provider of payment services, liquidity and funding to the business and individuals in the time of COVID-19 crisis.

This paper aims to examine the impact of COVID-19 on bank liabilities and assets during the crisis and their role for the recovery of the economy. During the COVID19 crises the business reduces its deposits, because it does not have enough purchases and receivables. The firms need the usage of lending to cover inequality between in- and outflows, decide their liquidity problems and ensure the working capital for restarting of business. The risk during the COVID-19 crisis rises and the quality of credit portfolio will deteriorate, by increasing non-performing loans.

Keywords: *COVID 19, economic cycle, banks, credit.*

JEL: *G21, E32, E51.*

1. Introduction

The COVID-19 pandemic is causing unpredictable disruption in the global economy. The pandemic affects every sector of the economy.
The main goal of economic policy after the pandemic of COVID-19will aim at the recovery of the economy. The banking sector will play a key role in these activities.

The banks have a fundamental role as provider of payment services, liquidity and funding to businesses and individuals in the time of COVID-19 crisis. On the one hand, during the COVID-19 crisis most of the governments designed schemes for recovery, based on easy access to the credit for businesses and households, guaranteed by the state and low interest. It has made it possible to pass more easily through the crisis. On the other hand, the banking sector will play an important role in the recovery of the economy.

This is true for a small and open economy as the Bulgarian.

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2. Problem Statement

2.1Theoretical approach

The banks play an important role for the majority of businesses in Bulgaria. For this, banks have to dispose of liquidity resources. Mainly they come from deposits and credit lines from other parents 'banks abroad.

Most of these funds go to businesses though credit. The credit transmission channel includes bank's and balance sheet types. The bank credit channel is based on the understanding that banks play a special role in the financial system. The large companies can attract resources by selling commercial papers and other forms of credit thus increasing their debt. Small and medium-sized businesses have limited access to financial markets. They are not able to attract funds from there. The gap between large and small firms becomes larger mainly during a recession. Less access to other forms of credit markets than to banks makes small businesses extremely dependent on the actions of banks.

The balance sheet channel focuses on the potential impact of changes in monetary policy on borrowers' balance sheets and their incomes, including their net wealth, liquid assets and cashflows. The firms often finance investments and current expenses by borrowing, and sometimes by increasing their loans earlier during the economic cycle. The households also reduce their incoming cash flow due to the close-down of essential businesses and unemployment. However, their outgoing cash flow does not fall at the same pace as the in-coming cash flow. The consumers also want to borrow at a time when their income is declining and when credit conditions are poor, which leads to an increase in the volume of credit.

2.2 Literature review – COVID-19 and its impact on the economy

Lots of resources in the literature examine the role of policy initiatives during financial crisis (Claessens et al, 2005; Reinhart &Rogoff, 2009; Taylor & Williams, 2009). Ait-Shalia et al. (2012) examine the effects of policy measures on liquidity risk premia and interbank credit during global financial crises. Asli Demirguc-Kuntet al.(2020) study the market response of banks to policy initiatives and differences between the COVID-19 shock versus the previous events of financial and economic stress. Since the shock is truly exogenous to the financial sector, the irresistible reaction from policy makers has been to decrease regulatory requirements and use capital buffers.

3. Aims of the Research

All countries in the world have taken measures, which, if implemented successfully, are aimed at minimizing losses during the COVID-19 crisis and lead to the recovery of economies afterwards. The impact of COVID-19 on the banking sector depends on:

- deterioration of the financial situation in the firms. It is due to the restrictions on activity, as a result of the dramatic fall in consumption, especially services, and in net exports. At the same time, prices changed on commodity markets, mainly those of raw materials. This led to a decrease of incoming cash flow and a delay of local and foreign payments.

- deterioration of the financial situation for the households. They lost part of their incomes due to unemployment or earned reduced wages. All measures of banks were aimed the reducing the negative impact of COVID-19 on the financial conditions in the short term and at supporting the flow of credit to firms and households.

The recovery of the economy also will require active participation of banks. The firms will need working capital to restart the business. At the same time, business models will change after the pandemic and they will need new investments. The changes in businesses will improve the financial situation of households, too. The instruments used for recovery could be monetary and fiscal. This paper aims to examine the impact of COVID-19 on bank liabilities and assets during the crisis and their role in the recovery of the economy.

4. Research Methods

The achievement of key targets and accomplishment of the main aim of the study are done by systematic theoretical - empirical approach. In particular, this approach is realized as follows:

- Induction and deduction in the research of the facts characterizing bank activities before and during the pandemic of COVID-19;
- Empirical study of the situation in the banking sector before and during the COVID-19crisis;
- Comparative analysis of all main variables before and during the pandemic of COVID-19.

The chosen instruments for achieving the main objectives of the study use extensive statistical data. The data are illustrated by means of graphics and text application.

The conclusions of the research are based on the results of calculation of the main variables before and during the pandemic and on feedback analysis.

5. Findings

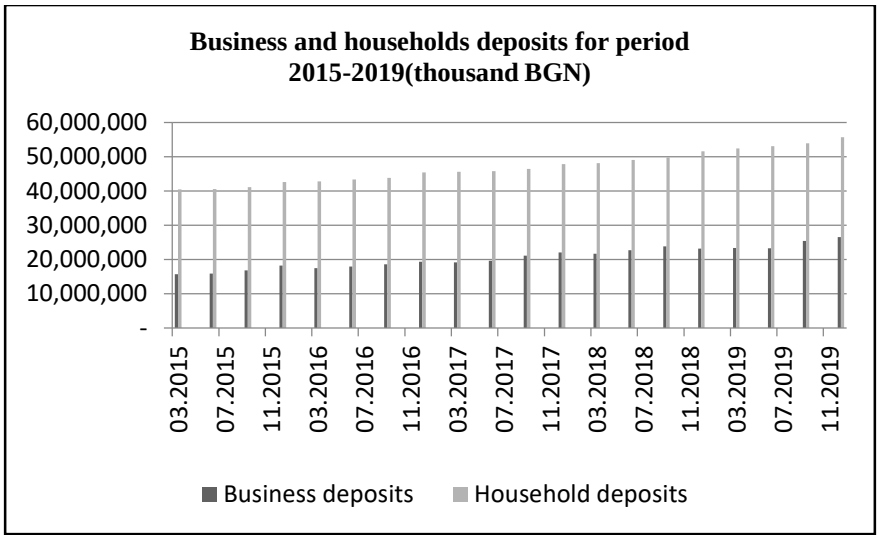
The banks are being called to play an important countercyclical role to support the real sector. These actions also have a series of implications for the future resilience of the banking sector. It requires investigating the situation in the banking sector before and during the COVID-19 pandemic.

5.1 Bank liabilities and assets before the pandemic

The dynamic of deposits for the investigated period depends on the current account balances and term deposits. The corporate deposits during the whole period changed, following positive trend. This is a result of continued and sustainable development of the economy in Bulgaria, and of the economic growth achieved before the crises. But most of the resources attracted by banks come from households. The deposits from individuals increased during the period 2015-2019 by 73%, from businesses – by 59%, and the total increase was by 68%. During the period 2015-2019, it can be noticed that the wealth in the economy increased. According to the theory of demand of assets, it will increase investments in different ways, including deposits. From the bank's point of view, the level of deposits in the banking system ensures sustainable disposable

resources for the active operations. The changes of business and household deposits are following:

Figure 1. Business and households deposits for the period 2015-2019 (thousand BGN)

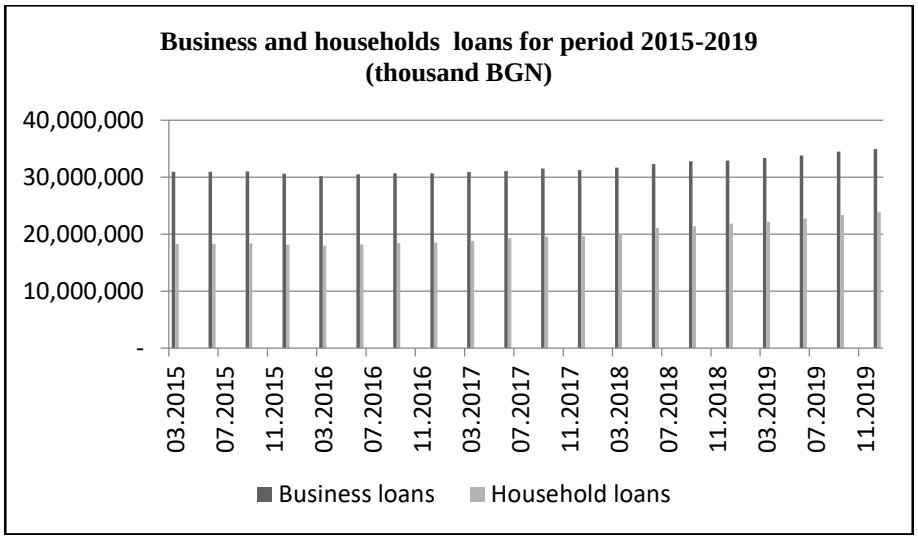


Source: Bulgarian National Bank

Before the health crisis, the overall economic and financial stability in Bulgaria led to a strong increase of lending (Assenova, 2019).

The crisis in the second half of the 1990s led to the suspension of any financial intermediation for some time. The policy followed, aimed at reducing inflation, increasing GDP and rapidly growing incomes and profits, it exacerbated the need for credit, and changed banks 'views on borrowers' requirements. The entry of foreign banks into the market, as well as the strengthening of commercial banks' audit in the sector, led to return the confidence of the public in banks, and hence to an increase in deposits. On the other hand, improved economic conditions predetermined the growth of foreign cash flows, mainly coming from foreign banks in Bulgaria. All factors led to a strong need to find ways to invest the accumulated funds to generate income (Assenova, 2009, 2018). The business loans increased during the investigated period 2015-2019. This is shown below:

Figure 2. Business and households loans for the period 2015-2019 (thousand BGN)



Source: Bulgarian National Bank

5.2 Banks 'liabilities and assets after the pandemic

After the onset of the health crisis in China, before the coronavirus crisis became evident, GDP sharply declined during the first stage of the pandemic (Farboodi, Jarosch, Shimer, 2020; Alfani, G., 2020). It made it difficult for the supply chain to function in other parts of world. As it is known, the world economy depends on China for delivery. As a result, supply in other parts of world declined. In the second stage, after the lockdown in more countries, many sectors of economy were closed and this additionally reduced GDP in those countries. The Bulgarian economy, a small and open economy, is very sensitive to outside conditions. The lockdown in the many countries in the world influenced the Bulgarian net exports, orientated mainly to the countries of the EU. Their GDP declined and it directly reduced the Bulgarian GDP. During the pandemic, investments in Bulgaria collapsed due to expected recession all over the world. The third part of the GDP – consumption – also fell. More consumers were temporarily unemployed or unemployed, and the incomes were reduced due to the uncertain situation. All efforts forced a sharp reduction in consumption. The last part of the GDP – public spending – does not compensate the loss from the other three components of GDP.

The Bulgarian National Bank introduced several measures, including following:

- "temporary moratorium on bank loans repayment, following the EBA Guidelines on legislative and non-legislative moratoria on loan repayments applied in the light of the COVID-19 crisis (EBA/GL/2020/02)
- The state Fund Manager for Financial Instruments in Bulgaria announced a new package of measures to support various business and public groups through financial instruments. The Fund will provide bank guarantees in the amount of BGN 170 million (EUR 87 million), which

should serve to secure a loan portfolio of up to BGN 850 million. Loans under the scheme will have a term of up to 10 years and the possibility of interest-free loans."[2]

The bank activities are developed under these conditions. The changes of deposits during the period of lockdown are insignificant.

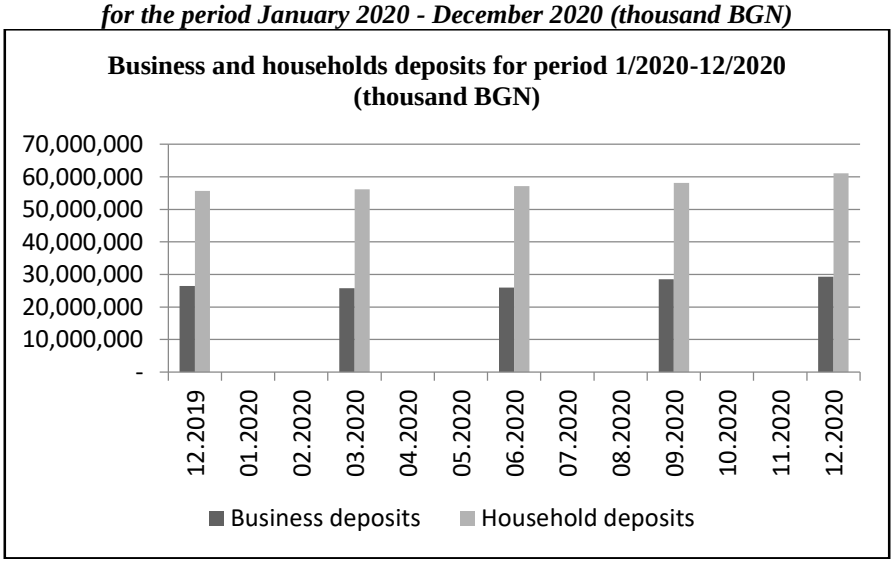
Table 1. Changes of Deposits after pandemic of COVID 19

Period	Δ Business Deposits %	Δ Households Deposits %
12/2019-3/2020	Minus 2.56	0.85
3/2020-6/2020	0.74	1.87
6/2020-9/2020	9.70	1.71
9/2020-12/2020	2.63	4.97

Source: BNB and own calculation

Business deposits decreased only during the first lockdown and after it they recovered to reach the pre-crisis level. Nevertheless, local consumption remained at the same level, and the external market went down, with more sectors continuing the work, excluding services – transport, tourism. Households kept their saving for the prudential motive. During crises, the situation is unpredictable and they keep savings for more bad days ahead. From the bank's point of view, they stayed on a sustainable liability position. Because the Bulgarian National Bank works as per requirements of the Currency Board, it lost some of the monetary instruments as creditor of last resort and open market operations. For these reasons, the Bulgarian government delivered additional liquidity resources though state Bulgarian Bank of Development. This financing for the banking system was enough to ensure the measures taken by the government for supporting businesses and households.

Figure 3. Business and households deposits for the period January 2020 - December 2020 (thousand BGN)



Source: Bulgarian National Bank

[2]European Commission, Directorate General Economic and Financial Affairs(2020). Policy measures taken against the spread and impact of the coronavirus – 17 July 2020.

On the other hand, businesses that have to hire workers, needed to start operating again and to see the demand for their products and services rebound quickly, if indeed they had survived the downturn. The new stimulus package from the Government perhaps catalyses the change of the credit cycle. The companies may redirect payment installments for later periods after lockdown and take new loans to cover differences between in- and out- flows. They could take credit for the recovery the business (Beck, 2020).

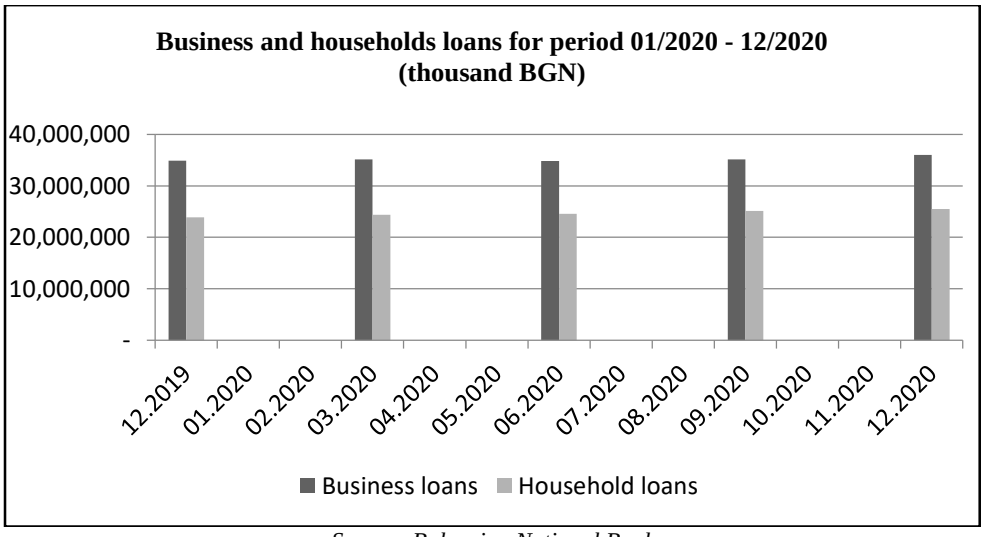
Table 2. Changes in Credit after COVID-19 pandemic

Period	Δ Business Loans %	Δ Households Loans %
12/2019-3/2020	0.74	1.89
3/2020-6/2020	Minus 1.04	0.81
6/2020-9/2020	1.06	2.36
9/2020-12/2020	2.33	1.40

Source: BNB and own calculation

The credit cycle went into a new stage after the lockdown. The answer of businesses after the lockdown took place later, in the second quarter of 2020 and after it the firms recovered through credit. The loans for households remained at similar levels to those before the pandemic.

Figure 4. Business and households loans for the period January 2020 - December 2020(thousand BGN)



Source: Bulgarian National Bank

The credit cycle went into a new stage after the lockdown. During this period, the factors affecting demand were:

- Income fell or remained at the same level;
- Unemployment;
- Companies reduced their investments due to the stage of market;

- Negative trend in Bulgarian net export;
- Financing negative cash flows.

The factors influencing the supply were:

- Reducing part of business deposits by banks during the crisis;
- Increasing risk in the economy;
- Economic activity froze for several months. The return on projects was reduced. Therefore, companies financed their negative cash flows.

The interest rate of bank loans was highly volatile in the beginning of 2020. After the COVID-19 pandemic, the rates decreased sharply.

In the short term, banks saved some cost during the pandemic, such as: lower interest on deposits, lower operation cost, lower HR cost. At the same time, they increased their cost for usage of IT technology.

The banks received lending assistance from the government, including instruments facilitating supply of funds to firms and households due to the loss of revenue or income during the lockdown. The banks improved liabilities though the Bulgarian Bank for Development. Moreover, the government directly financed the working capital of firms, provided direct funding to strategic sectors and ensured state support for interest-free loans. The measures to provide liquidity or financing delivered to businesses and households did not bring the expected results.

Due to the moratorium on repayment and to keep the profit and stock prices at the same level, banks increased the fees and commissions for all services and this had a negative impact on business activities and households' expenses for financial services.

The banks' activity during the pandemic could stimulate changes in their functioning in the long term as following:

- new business models;
- ongoing development of on-line banking;
- expansion of non-cash trade;
- strengthening and further development of remote communication with customers;
- reduction of the number of branches of every bank;
- reduction in the operating cost.

6. Conclusions

The COVID-19pandemic has dramatically affected almost every aspect of the economy. The credit cycle transformed into a stressed one. This paper seeks to analyse the accumulated deposits and access to credit prior to the unexpected global health crisis and its immediate and extended impact, as well as the performance of several key indicators of deposits and credits.

The Bulgarian economy, as a small and open economy, is very sensitive to outside conditions. During the COVID-19 pandemic, the national economy depended on them. They affected all sectors. The new stimulus package of the Government perhaps catalysed the change in the credit conditions. The deposits in banking system did not change sharply during the lockdown. The credit cycle during the pandemic went into new stage, with reduced loans for

businesses for two months in the second quarter of 2020 when the COVID-19 pandemic started. The economic activities slowly recovered and household credits covered the liquidity gap and supported the recovery of the economy.

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THE EFFECTIVENESS OF MONETARY POLICY IN THE CONTEXT OF CENTRAL BANK INDEPENDENCE IN DEVELOPING COUNTRIES

CASE OF MOROCCO

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Abstract: *The objective of independent central banks is to ensure price stability to achieve macroeconomic stability, because controlling inflation depends on the effect of monetary policy on activity. So central banks have two mandates. They act on the interest rate based on the economic situation. To ensure price stability, most developed and developing countries have made their central banks independent and transparent. Independence strengthens the credibility of monetary authorities and makes monetary policy in this context more effective. To verify the effectiveness of monetary policy within the framework of the independence of the central bank, we mobilized a SVAR model for the Moroccan case. The study covers two separate periods on a quarterly basis (1994 to 2005 and 2006 to 2020) to take account of the effective implementation of independence. The results imply an efficient transmission of monetary policy, and we conclude that the framework of independence is a good solution to conduct monetary policy for BAM.*

Key words: *Monetary policy efficiency, central bank independence, central bank transparency, SVAR*

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Introduction

The Moroccan central bank is already more than a century old, but it was declared independent only fifteen years ago, in 2006. This independence was achieved with the advent of the new statutes of Bank Al-Maghrib (BAM) under Law No. 76-03, which defines the fundamental tasks and prerogatives of its governance bodies. Indeed, this reform has just affirmed Morocco's commitments undertaken since the 1990s, in political and economic matters under the aegis of the International Financial Institutions.

From the end of the 1990s, the institutional framework of economic policy sought to establish clear objectives that could be interpreted by public actors. The Moroccan Central Bank "Bank Al-Maghrib" joined this movement and stated an absolute objective which is price stability and thus the fight against inflation. Indeed, the reference framework of the monetary authority is the conclusions of Friedman (1968), who advocates anti-inflationary policies by controlling the money supply under the quantitative theory of money.

The institutionalization of the independence of the monetary authority from the government strengthens both the fight against inflation and its credibility. A guarantee of credibility, independence has as its corollary transparency and accountability, the requirement of communication, transparency of decisions and results. It should be noted that the statutes do not exclude consultation with the political decision-maker to avoid any differences between the two political instruments, monetary policy and fiscal policy.

The action taken by the issuing institution highlights the existence of an inflationary bias. Kydland and Prescott (1977) show that a discretionary policy leads to the problem of temporal inconsistency. Barro and Gordon (1983) applied the conclusions of the two economists on monetary policy by considering it as a repetitive game between the government (Principal) and the economic agents (Agent), and thus the rule against discretion. Discretionary policies that try to surprise economic agents give way to rules policies because of the problem of temporal inconsistency, that is, policies that will not be consistent over time, and therefore the credibility of the monetary authority is called into question. The asset of a central bank is the establishment and maintenance of its credibility.

To overcome the problem of temporal inconsistency, the literature proposes, at least, three solutions. The first was announced by Kydland and Prescott (1977) who favored rule policy over discretionary policy in so far as the central bank cannot deviate from the stated objective. Then, and to establish his reputation, Barro and Gordon (1983) advocated entrusting monetary policy to a conservative banker. Indeed, if economic agents know with certainty the intentions of the monetary authority and the economic model, they will be able to anticipate the future variables, and will not be surprised and will have the time to properly adjust their price. Kydland and Prescott (1977) argued that once expectations are formed based on zero inflation, the government tries to surprise agents by increasing inflation to reduce unemployment. When public decision-makers announce monetary rules, there is a temptation to "cheat" each period to take advantage of inflation shocks. However, this situation threatens the viability of the balance of rules and tends to shift the economy to a lower balance under discretionary power

(Barro & Gordon, 1983). Due to repeated interactions between the decision-maker and private agents, it is possible that reputational forces may support the rule. In other words, the potential loss of reputation - or credibility - motivates the political decision-maker to abide by the rule.

The third solution is to delegate monetary policy to a conservative banker, who is more prone to inflation than the government. The aim is to achieve a balance of non-cooperative play between monetary authority and private agents. In other words, this game is about solving the problem of the central bank's credibility. Consequently, Rogoff (1985) proposed appointing a head of the monetary institution who would be more prone to rising prices than his fellow citizens. The latter's appointment will be preferable to the adoption of a rigid rule policy. While this reduces inflationary bias, it does not minimize social loss because the models incorporate a compromise between inflation prevention and stabilization policy. Walsh (1995a) considers the delegation of monetary policy as a principal agent problem and proposes a central banker's contract to eliminate inflationary bias. Having a contract that imposes a penalty for higher inflation forces the central banker to voluntarily choose shares that eliminate inflationary bias, while preserving discretion.

According to the new statutes of BAM, the ultimate objective of the Moroccan monetary authority is price stability, while the government seeks to achieve other objectives such as full employment and economic growth. The focus is on assessing the effectiveness of the monetary policy implemented by Bank Al-Maghrib in the context of its independence. In other words, within the framework of the monetary policy conducted from 2006 to 2020, the effectiveness of the transmission of monetary policy in terms of price stability and output is examined.

This problematic leads to the following questions:

o Is BAM an independent central bank?

o Is an independent monetary policy more effective?

To assess the effectiveness of monetary policy in Morocco, we will evaluate the transmission channels of monetary policy. The literature proposes a variety of econometric methods. SVAR models and DSGE models are the most used.

In our work, we choose a structural modelling and use a structural VAR approach with six endogenous variables, the industrial production index, the consumer price index, the money supply, the credits to the economy, the real effective exchange rate and the short rate, to analyse the monetary policy. The modelling is done in two periods to capture the effective establishment of BAM's independence. These periods, which are spread out between 1994 and 2005 and from 2006 to 2020, are at quarterly intervals.

The choice of structural VAR modelling has several advantages. Firstly, it is recognized by its simplicity compared to other macro econometric models. Indeed, it involves estimating a low-dimensional system. Moreover, it requires few constraints. Indeed, the resulting simulations are based on a limited number of economic assumptions. Finally, it allows the simulation of structural shocks.

This article is organized in two parts. The first part is devoted to the evaluation of the degree of independence of BAM and the second is an attempt to model the effectiveness of monetary policy in Morocco.

1. Evaluating the degree of independence of BAM

Like all other countries, Morocco has been endowed with an organization whose mission is to conduct monetary policy. It was in 1906, and exactly on 7 April of the same year, that the monetary institution came into being under the name of "the State Bank of Morocco". This international bank of issue was created by the Algeciras Act of 1906 in the context of the imperialist rivalries of our first globalization. The speech made by King Mohammed V on 2 July 1959 marks the creation of a monetary authority: "The sovereignty of any nation is manifested by attributes, notably freedom of action in the conduct of financial and monetary policy and the orientation of its economy in accordance with its interests, and by the possession of a national currency issued by a national bank and not a satellite currency issued by a foreign institute. [...] Our country is thus endowed with a national institution run by nationals". On 30 June 1959, Morocco set up its own central bank called the Bank of Morocco to replace the State Bank of Morocco, and it was not until 1987, 3 March, that Morocco adopted the name "Bank Al-Maghrib". On 17 October 1959, the dirham was instituted as the new monetary unit of Morocco, replacing the Moroccan franc introduced in 1921.

Following the collapse of the international economic system in the 1970s, structural adjustment programs were imposed during the 1980s, forcing all national economies to transform themselves to adjust to the new state of the world economy.

To strengthen financial stability and modernize the banking system to accompany the integration of the Moroccan economy in the international environment, BAM was given a new status which was the subject of law n° 76-03 which came into force on 20 February 2006. Through this new statute, the fundamental missions of BAM have been redefined and expanded.

After giving a brief overview of the creation of BAM, we will assess its degree of independence by referring to the Cukierman, Webb and Neyapti index.

1.1.Legal measure of BAM's independence

The 2006 reform of BAM's statutes gives it more independence in the conduct of monetary policy from a legal perspective. Indeed, referring to BAM's 1993 statutes, CWN constructed their index and found a legal index score of 0.14, while following the 2006 statutes, an index of 0.757 was found, moving away from 0 and towards 1.

There are two problems with indicators based solely on the law. First, the statutes are incomplete in that they cannot explicitly specify the limits of authority between the central bank and the political authorities under all contingencies. These gaps are filled by tradition at best and by power politics at worst. Second, even when the law is very explicit, actual practice may deviate from it. These findings lead us to assess the degree of independence of BAM by reference to the actual conduct of monetary policy.

The assessment of the actual conduct of monetary policy is made using the turnover rate of the central bank governor and the governor's policy vulnerability index.

1.1.Real measure of BAM's independence

1.1.1. Governor's turnover rate

The two measures of the true conduct of the central bank used by Cukierman (1992) are the turnover rate of the governor and his political vulnerability.

For the case of Morocco, BAM's statutes stipulate that the governor of the central bank is appointed for 6 years, so the average turnover rate of the governor is 0.16 (one change per 6 years).

The turnover rate of the Governor of the Central Bank of Morocco is 0.13, i.e., one change every seven and a half years. This suggests that the tenure of the governor of the central bank in his position presents a clear volatility. Indeed, Driss SLAOUI and M'Hamed Zghari did not finish their mandates (they remained in their posts for 4 years and 3 years respectively).

It should be noted that the turnover rate for the last Governor Mr Abdellatif JOUAHRI is not included in the calculations as he is still in his post.

Table 1: Turnover rate of the BAM Governor

Governor	Turnover rate of the BAM Governor	
M.M'hamed Zghari 1959-1964	0,16	
M. Driss SLAOUI 1964-1967	0,25	
M.M'hamed Zghari 1967-1969	0,33	
Son Altesse le prince Moulay Hassan BEN EL MEHDI 1969-1974	0,16	
Son Altesse le prince Moulay Hassan BEN EL MEHDI 1975-1981	0,16	**number of changes / length of period : 6/45= 0,13**
Son Altesse le prince Moulay Hassan BEN EL MEHDI 1982-1984	0,33	
M. Ahmed BENANI 1985-1989	0,2	
M. Mohamed SEQAT 1989-1994	0,16	
M. Mohamed SEQAT 1995-2000	0,16	
M. Mohamed SEQAT 2001-2003	0,33	
M. Abdellatif JOUAHRI 2003 à nos jours	Is still a governor	

Source: Prepared by the author based on data from BAM (2019)

1.1.2. The Governor's political vulnerability

Three cases of political vulnerability of the governor of the central bank of Morocco can be distinguished (Table 8). Indeed, the appointment of Abdellah IBRAHIM on 24 December 1958 was followed by the arrival of M'Hamed Zghari on 1 July 1959 in the post of governor of the central bank. The second case concerns the Prime Minister El Hadj Ahmed BAHNINI who took office on 3 November 1963. A change of governor was made by the appointment of Driss SLAOUI in 1964. The third case was the appointment of M'Hamed Zghari in 1967 following the arrival of Mohamed BENHIMA's government on 6 July 1967. Thus, the political vulnerability ratio takes the value (3/15) =0.2 since there were 15 changes of prime ministers and only 3 changes of central bank governors within a period not exceeding 6 months. Thus, the political vulnerability ratio of the central bank governor does not indicate a persistent sensitivity of the central bank governor to the executive authorities.

The degree of independence of BAM was assessed using three indices proposed by Cukierman, Webb and Neyapti (1992). It was found that, although BAM has recently made price stability its main objective, it is beginning to be more transparent. Indeed, using three indices measuring the degree of independence of the central bank namely, the legal index, the governor's rotation index and the governor's political vulnerability index, it seems that the central bank of Morocco has experienced an improvement in its degree of independence.

2. Application of SVAR modelling on Moroccan monetary policy

2.1. Description of variables and data

This study considers only national factors in the channels of transmission of monetary policy. These factors include the industrial production index (IPI) as a proxy for economic growth, the consumer price index (IPC) as a proxy for inflation, the real exchange rate index (TCR), money supply (MM), credits to the economy (CE) and a monetary policy indicator (the day-to-day weighted average rate). M3 is an intermediate instrument of the central bank, which measures the money supply of the economy. An increase in the M3 reflects a relaxation in monetary policy, which affects the IPC and economic growth, and is chosen instead of the M2.

Table 2: Variables included in the SVAR models

Variables	Code	Period 1	Period 2	Source
Interbank market rate in %	TMP	1994Q1-2005Q4	2006Q1-2020Q1	IFS
Money supply in logarithm	MM	1994Q1-2005Q4	2006Q1-2020Q1	BAM
Industrial production index in logarithm	IPI	1994Q1-2005Q4	2006Q1-2020Q1	IFS+HCP
consumer price index in logarithm	IPC	1994Q1-2005Q4	2006Q1-2020Q1	IFS+HCP
real effective exchange rate in logarithm	TCR	1994Q1-2005Q4	2006Q1-2020Q1	IFS
credits to the economy in logarithm	CE	1994Q1-2005Q4	2006Q1-2020Q1	BAM

2.2.Structure of the SVAR model

To empirically test the effectiveness of the mechanisms of transmission of monetary policy in the Moroccan framework, we use a SVAR model with six endogenous ones such as:

$$A_0 Y_t = \alpha + \sum_{i=1}^{p} A_i Y_{t-i} + \varepsilon_t$$

With $Y_t = (IPI, IPC, MM, CE, TCR, TMP)'$ the dimension 6 vector of endogenous variables. $\varepsilon_t = (\varepsilon^{AS}, \varepsilon^{AD}, \varepsilon^{DM}, \varepsilon^{CE}, \varepsilon^{BP}, \varepsilon^{PM})'$ Represents the vector of uncorrelated innovations and refers to the structural shocks of the model. Canonical innovations refer to shocks or impulses whose propagation results in fluctuations of the studied system.

2.3.Identification of shocks

To identify the different shocks, the methodology of Camarero et al (2002) is followed:

The behavior of the endogenous variables is explained by six structural shocks: the aggregate supply shock (ε^{AS}), the aggregate demand shock (ε^{AD}), The money demand shock (ε^{DM}), the credit shock (ε^{CSP}), the balance of payments shock (ε^{BP}) and the monetary policy shock (ε^{PM}).

Global supply shock: ε^{AS}

Based on De Arcangelis (1997), if full employment output is equal to current output expectations formed in $t-1$, i.e., $IPI = E[IPI_t^s / I_{t-1}]$,, then the output gap can be interpreted as the output innovation e_{IPI} and the following relationship holds:

$$e_{IPI} = \varepsilon_t^{AS}$$

This implies that aggregate supply shocks equal real output innovations and, therefore, are treated as technology shocks.

IS shocks: ε^{AD}

A short-term block recursive structure is assumed in which the non-policy variables (IPI, IPC) do not respond simultaneously to innovations in the policy variables (MM, TCR). This assumption, common in the literature (see Gordon and Leeper, 1994; Shioji, 1997), reflects the fact that non-policy variables respond slowly to changes in policy variables due to the existence of decision lags. Thus, the above relationship for the aggregate demand shock can be rewritten as follows:

$$e_{IPC} + \beta_{21} e_{IPI} = \varepsilon_t^{AD}$$

The money demand shock: ε^{DM}

The reaction function of the central bank where BAM reacts concomitantly to the monetary aggregate and the exchange rate is represented by:

$$\beta_{31} e_{IPI} + \beta_{32} e_{IPC} + \beta_{36} e_{TMP} + e_{MM} = \varepsilon^{DM}$$

The shock of credit to the economy: ε^{CSP}

According to Ehrmann et al (2003), the demand for loans that a bank face is assumed to depend on output, the price level, and the interest rate on loans. The reaction rule for the period from 2006 to the present can be expressed in terms of innovations as follows:

$$\beta_{41}e_{IPI} + \beta_{42}e_{IPC} + \beta_{46}e_{TMP} + e_{CE} = \varepsilon^{CE}$$

The balance of payments shock: $\boldsymbol{\varepsilon^{BP}}$

Since ε^{BP} has been normalized to the exchange rate, it is considered that this shock represents the market's adjustment expectations. It can be concluded that:

$$\beta_{51}e_{IPI} + \beta_{52}e_{IPC} + e_{TCR} + \beta_{56}e_{TMP} = \varepsilon^{BP}$$

The monetary policy shock: $\boldsymbol{\varepsilon^{PM}}$

In Morocco, BAM has designated M3 as the intermediate target, while the short-term interest rate has become the monetary policy instrument. The reaction rule for the period from 2006 to the present can be expressed in terms of innovations to financial variables as follows:

$$\beta_{63}e_{MM} + \beta_{65}e_{TCR} + e_{TMP} = \varepsilon^{PM}$$

Where the structural shock $\boldsymbol{\varepsilon^{PM}}$ has been normalized to short-term interest rates, so that this type of shock is assumed to be captured by innovations in this variable.

The empirical analysis presented in this paper is based on the so-called 'successive relationship'. This involves determining the relationship between variables recursively in blocks (Raghavan and Silvapulle, 2006). Over-identified restrictions are used, which is a common practice.

The residues of the reduced form of equation (1) can be related to the structural residues by the following structure: $A\boldsymbol{e_t} = B\boldsymbol{\varepsilon_t}$

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 \\ a_{21} & 1 & 0 & 0 & 0 & 0 \\ a_{31} & a_{32} & 1 & 0 & 0 & a_{36} \\ a_{41} & a_{42} & 0 & 1 & 0 & a_{46} \\ a_{51} & a_{52} & 0 & 0 & 1 & a_{56} \\ 0 & 0 & a_{63} & 0 & a_{65} & 1 \end{bmatrix} \begin{bmatrix} e_{IPI} \\ e_{IPC} \\ e_{MM} \\ e_{CE} \\ e_{TCR} \\ e_{TMP} \end{bmatrix} = \begin{bmatrix} b_{11} & 0 & 0 & 0 & 0 & 0 \\ 0 & b_{22} & 0 & 0 & 0 & 0 \\ 0 & 0 & b_{33} & 0 & 0 & 0 \\ 0 & 0 & 0 & b_{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & b_{55} & 0 \\ 0 & 0 & 0 & 0 & 0 & b_{66} \end{bmatrix} \begin{bmatrix} \varepsilon^{AS} \\ \varepsilon^{AD} \\ \varepsilon^{DM} \\ \varepsilon^{CE} \\ \varepsilon^{BP} \\ \varepsilon^{PM} \end{bmatrix}$$

2.4.Seasonal adjustment of data

The IPI, IPC, MM, CE and TCR series are seasonally adjusted using the TRAMO/SEATS program.

2.5.Unit root testing

After performing the usual unit root tests (Dickey-Fuller), some variables are stationary in level and others in difference (Table 3). As a result, we opt for the estimation of a SVAR on the variables in level. This approach is widely applied in the literature of SVAR models (Sims, et al., 1990; Cushman and Zha, 1997; Amisano et al., 1997; Ramaswamy and Sloek, 1998; Bernanke and Mihov, 1998; Kim and Roubini, 2000; Elbourne, 2008, Ouchchikh, 2014 for the Moroccan case).

Table 3: Stationarity test of the series

	Series	ADF	PP	Conclusion
Model 1	IPI_1	**S (Cte et T)**	**S (Cte et T)**	**S (Cte et T)**
	IPC_1	**S (Cte et T)**	**S (Cte et T)**	**S (Cte et T)**
	MM_1	**NS (Cte et T)**	**NS (Cte et T)**	**NS (Cte et T)**
	CE_1	**NS (Cte et T)**	**NS (Cte et T)**	**NS (Cte et T)**
	TCR_1	**NS (Cte et T)**	**NS (Cte et T)**	**NS (Cte et T)**
	TMP_1	**S**	**S (Cte)**	**S**
Model 2	IPI_2	**NS (Cte et T)**	**NS (Cte et T)**	**NS (Cte et T)**
	IPC_2	**S (Cte et T)**	**S (Cte et T)**	**S (Cte et T)**
	MM_2	**S (Cte et T)**	**S (Cte et T)**	**S (Cte et T)**
	CE_2	**S (Cte et T)**	**S (Cte et T)**	**S (Cte et T)**
	TCR_2	**NS (Cte et T)**	**NS (Cte et T)**	**NS (Cte et T)**
	TMP_2	**S (Cte et T)**	**S (Cte et T)**	**S (Cte et T)**

2.6.the optimal number of delays

As for the selection of the number of delays, the information criteria (LR, AIC, FPE, SC and HQ) opt for a single delay for both models.

Table 4: Selection of the optimal number of delays

	Delays	LR	FPE	AKAIKE	Schwarz	Hannan-Quinn
Model 1	0	----------	$3.08x10^{-19}$	-25.59636	-25.11932	-25.41766
	1	274.0938*	$1.11x10^{-21}$*	-31.24413*	-29.33599*	-30.52933*
	2	44.31115	$1.47x10^{-21}$	-31.06364	-27.72438	-29.81273
	0	----------	$1.97x10^{-19}$	-26.04544	-25.60748	-25.87608

Model 2	1	516.0081*	$1.26x10^{-23}$*	-35.71524*	-33.96339*	-35.03779*
	2	38.59059	$1.92x10^{-23}$	-35.34739	-32.28164	-34.16184

2.7.The normality test

By conducting the Jarque-Bera normality test, the null hypothesis of normality is not accepted for residual e_4 for model 1 and residuals e_1 and e_4. Nevertheless, despite the departure from the normality assumption, the VAR model continues to provide consistent and unbiased estimators (Gonzalo, 1994; Brooks, 2008).

Table 5: Jarque-Bera normality test

	Residues	e_1	e_2	e_3	e_4	e_5	e_6
Model 1	**JB**	2.823424	0.256857	0.354815	10.22214	1.688460	3.305876
	Prob	0.2437	0.8795	0.8374	0.0060	0.4299	0.1915
Model 2	**JB**	40.54923	3.321669	3.684958	19.73819	1.248538	3.884203
	Prob	0.0000	0.1900	0.1584	0.0001	0.5357	0.1434

2.8.Error autocorrelation

the statistical test LM > 5%, so we reject the hypothesis of autocorrelation of errors for both models.

Table 6: LM test for autocorrelation

	Khi-deux	**Dof**	P-value
Model 1	695.3781	651	0.1110
Model 2	823.9562	735	0.0122

2.9.The SVAR stability test

To test the stability of the model, the inverse of the roots of the characteristic polynomial is used. It is shown that the models are stable (stationary) because all inverses of the roots of the autoregressive characteristic polynomial exhibit moduli less than one. Consequently, the estimated SVAR (1) models are satisfactory representations of the data used.

Table 7: Inverse of the roots of the characteristic polynomial

	Root	Modulus
Model 1	**0.938912**	**0.938912**
	0.913158	**0.913158**
	0.781065	**0.781065**
	0.565231	**0.565231**
	0.422592	**0.422592**
	0.112378	**0.112378**
Model 2	**0.880830**	**0.886133**
	0.096797	**0.886133**
	0.760170	**0.760170**
	0.609849	**0.609849**
	0.495157	**0.499021**
	0.061976	**0.499021**

3. Result and discussion

3.1.Impulse response functions

3.1.1. Interest rate shocks

We begin by analyzing the responses of the main macroeconomic aggregates to an interest rate shock.

The simulations carried out using the SVAR model (Figures 1 and 2) show that monetary policy shocks influence the evolution of the main macroeconomic aggregates.

During the first period, the growth rate registers a decrease following the increase in the interest rate in the medium term (six quarters) and an increase in the long term, which confirms the result found by Boughrara (2009) which stipulates that Morocco's GDP progresses despite the monetary tightening. The analysis conducted during the second period, when BAM becomes independent, shows that the GDP growth rate decreases following an increase in the interest rate in the medium term, to return to equilibrium in the long term, which suggests that a high cost of money negatively impacts the consumption and investment decisions of economic agents and is considered a brake on production. This result is in line with those of Ortiz and Barcelo (2010) and Neamie (2008). Our results confirm the theoretical corpus according to

which economic activity contracts following a restrictive monetary policy shock and therefore the interest rate channel under BAM independence is more effective.

At the same time, the monetary shock generates a fall in the price level in the medium term before stabilizing in the first period. From 2006 onwards, prices depreciate with a significant drop before stabilizing, after three and a half years, at the level reached at the beginning of the reaction. This result is in line with the one found by Neamie (2008) who observed that there is a deceleration of prices following a restrictive monetary policy shock, but contradicts the results found by Ortiz and Barcelo (2010). This finding suggests that BAM controls prices through the interest rate as part of its independence.

In terms of credits to the economy, the restrictive monetary policy shock results in a significant increase from the beginning of the response in the first period. This behavior of credits to the economy is contrary to theoretical expectations, since we expected a contraction in the volume of credit distributed following the rise in interest rates. It should be noted that this result is different from those of Ortiz and Barcelo (2010) who found a contraction of bank credit following the rise in interest rates. In the second period, the shock to credit following a rise in the interest rate results in an increase and then a decrease from the third year, which is stipulated by the theory.

A monetary policy shock through an increase in the interbank market interest rate reduces the volume of the M3 money supply, but over a short period (two quarters), which is different from the result obtained in the BAM independence framework.

Figure 1: Impulse response functions following an interest rate shock (model 1)

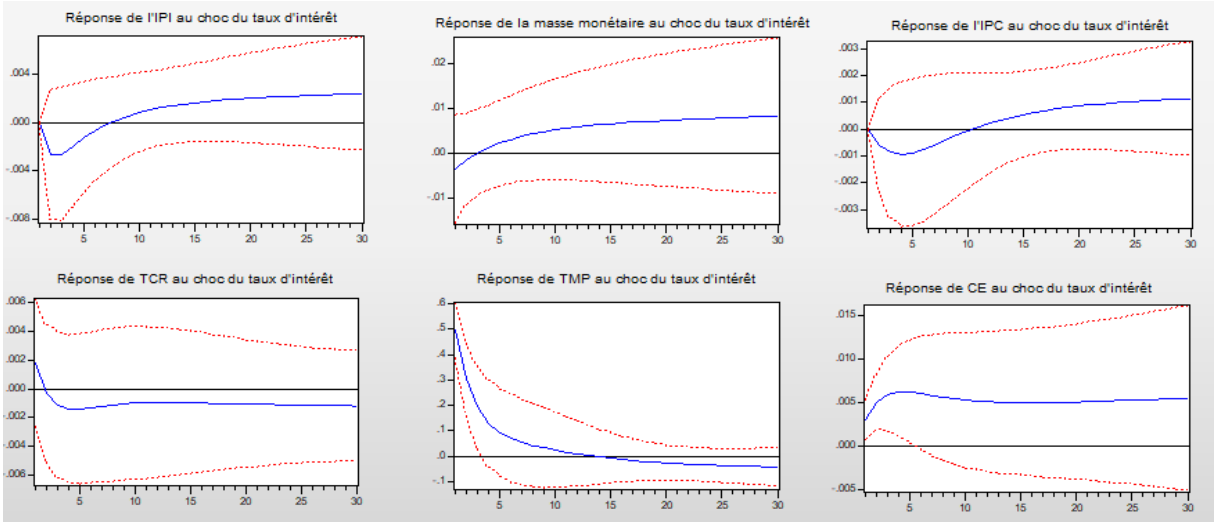
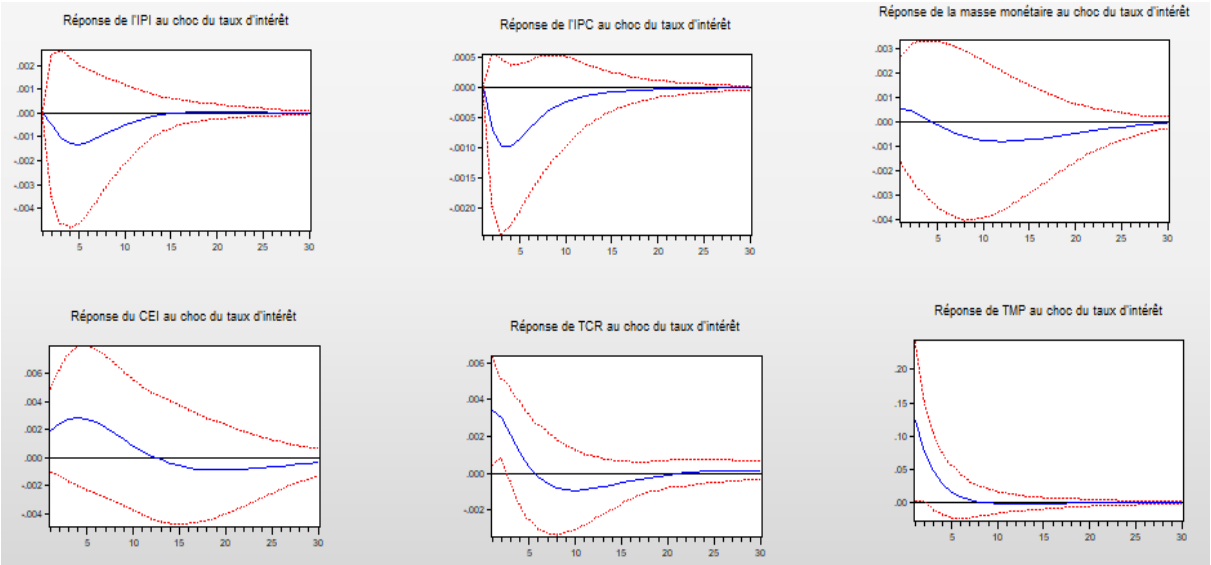


Figure 2: Impulse response functions following an interest rate shock (model 2)



After analyzing the effects of a shock to the interest rate, we focus on analyzing the effects of shocks to other variables in the system on output and prices.

3.1.2. Shock on the demand for money

During the first period, the money supply shock generates a sustained rise in prices (graph). The same is true for the second period. Indeed, the money supply shock gradually fuels the rise in prices until the third quarter and then fades to its equilibrium level. This is fully in line with expectations, especially from the quantitative theory of money which establishes a positive correlation between the money supply and the price level. According to the analysis, BAM controls inflation through the growth of the money supply within its independence.

The analysis of GDP shows that, in the first period, the expansion of M3 supports economic activity (Figure 3). For the second period, a shock to the money supply increases economic activity with a peak in the fourth quarter and then a return to equilibrium is recorded in the twelfth quarter (Figure 4). This result is logical, as the monetary expansion allows for an easing of the financing conditions of the economy.

Figure 3: Impulse response functions following a shock to the MM (Model 1)

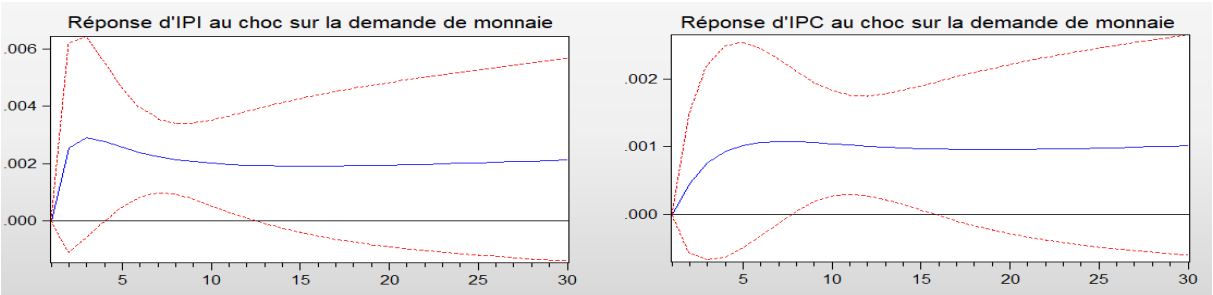
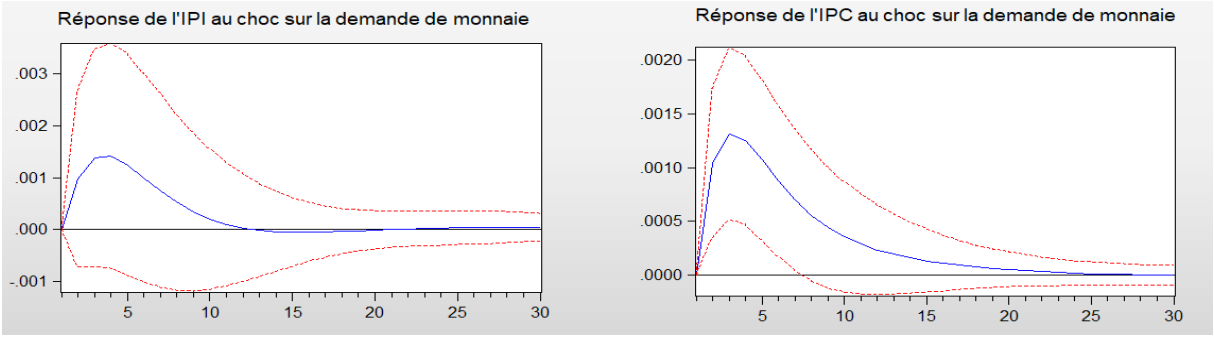


Figure 4: Impulse response functions following a shock to the MM (Model 2)



3.1.3. Credit shock

An increase in credit has a positive impact on output and a negative impact on prices during the first period (Figure 5). In contrast, during the second period, the growth of the industrial production index declines for ten quarters and after an insignificant increase following a shock to bank credit. As for the impact of the credit shock on prices, the reaction of the latter is bearish (Figure 6).

It appears that the credit channel is effective when the central bank is independent. This result may be due firstly to the predominance of indirect intermediation in the Moroccan economy, to the degree of competition.

Figure 5: Impulse response functions following an impact on the CE (model 1)

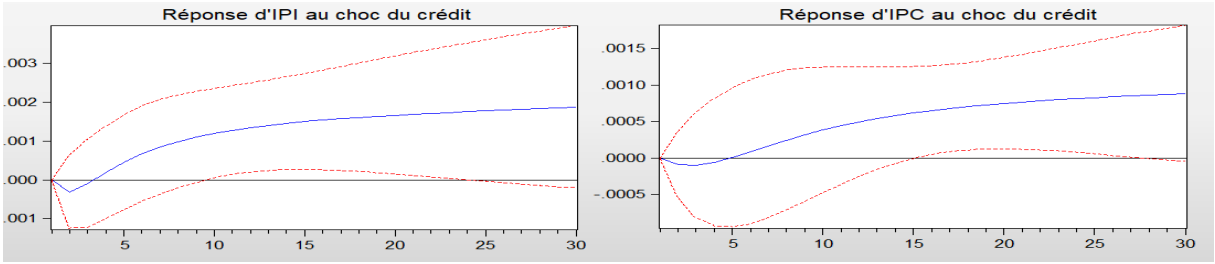
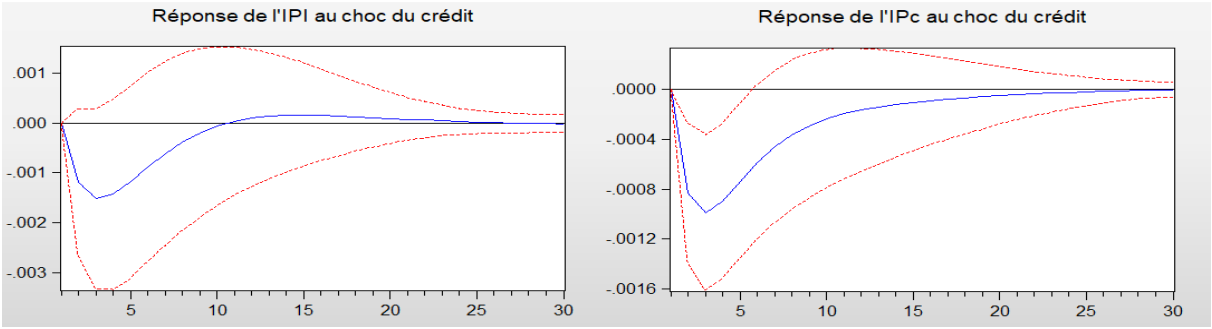


Figure 6: Impulse response functions following an impact on the CE (model 2)



3.1.4. Exchange rate shock

In the first period, the effect of the exchange rate shock on industrial production is positive in the first eight quarters, in contrast to its effect which is negative in the second period, which suggests the inefficiency of the exchange rate channel in the framework of central bank independence. Moreover, the behavior of prices shows a similar response to shocks to industrial production in the first period. In contrast, during the period of BAM independence, prices appear to be under control and thus the effectiveness of the exchange rate channel in achieving price stability (Figures 7 and 8).

This analysis shows that the exchange rate channel is effective in terms of price control and, conversely, ineffective in terms of stimulating industrial production.

Figure 7: Impulse response functions following a shock to the TCR (model 1)

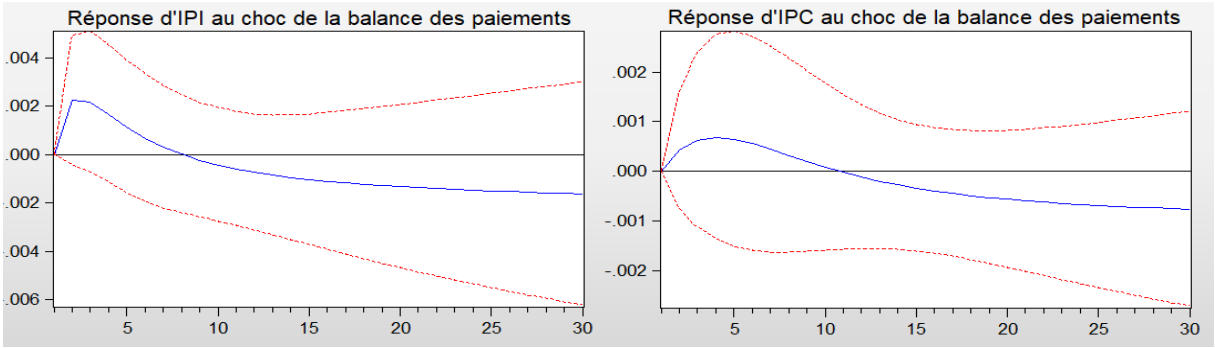
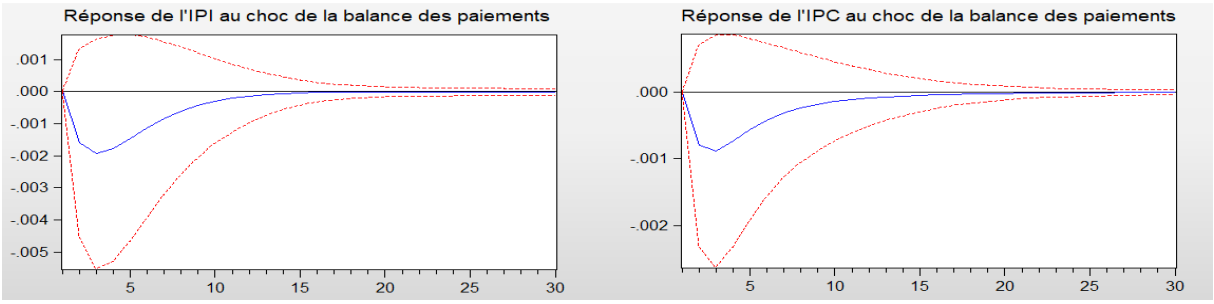


Figure 8: Impulse response functions following a shock to the TCR (model 2)



3.2.Variance decomposition

When the response functions reflect the impact of a shock to one variable on all the variables in the model, the variance decomposition indicates the relative importance of each shock affecting the VAR model in explaining the variance of each variable over a given time horizon. Tables 8 and 9 summaries the results of the variance decomposition of output and prices over a ten-year horizon.

Before BAM's independence, between the first quarter and the fifth year, the supply shock explains a share of the variance of output ranging from 100% to 51.77%. In the second period,

the supply shock explains a share of the variance in industrial output ranging from 100% to 85% (Tables 8 and 9).

The analysis of the variance decomposition of the forecast error of industrial production has shown that variations in production are caused by the interest rate and the money supply rather than by credit and the exchange rate.

According to the result of the table, one cannot put forward the superiority of one channel over the other in the transmission of monetary policy in Morocco.

Table 8: Variance decomposition of output (model 1)

	Décomposition de la variance de l'IPI						
	Horizon	**IPI**	**IPC**	**MM**	**CE**	**TCR**	**TMP**
Mod**el** 1	1	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
	4	79.38671	0.765459	8.469279	0.053149	4.708019	6.617384
	8	71.89893	0.779202	14.98156	0.834933	4.855826	6.649545
	12	65.86033	1.175224	18.45721	2.611742	4.736902	7.158595
	16	58.75005	2.241035	20.18546	4.622545	5.199309	9.001599
	20	51.77518	3.633162	20.95217	6.427663	5.944048	11.26777
	24	45.61384	5.052254	21.24855	7.917319	6.737629	13.43041
	28	40.39939	6.358271	21.33138	9.116877	7.477664	15.31642
	32	36.04286	7.509537	21.32264	10.08292	8.132764	16.90928
	36	32.40170	8.507385	21.27771	10.86838	8.701147	18.24369
	40	29.34065	9.368032	21.22111	11.51502	9.191280	19.36392

Table 9: Variance decomposition of output (model 2)

	Décomposition de la variance de l'IPI						
	Horizon	**IPI**	**IPC**	**MM**	**CE**	**TCR**	**TMP**
Modèle 2	1	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
	4	91.35663	0.789555	1.659391	1.970757	3.222680	1.000990
	8	86.05331	2.095325	2.529126	2.595875	4.265550	2.460817
	12	85.52335	2.344582	2.548260	2.579595	4.318433	2.685779
	16	85.47426	2.364923	2.547519	2.604373	4.318021	2.690900
	20	85.45601	2.365670	2.548155	2.621060	4.317171	2.691938
	24	85.45095	2.365767	2.548376	2.624325	4.317098	2.693481

	28	85.44851	2.365942	2.550145	2.624365	4.317239	2.693798
	32	85.44591	2.366109	2.552195	2.624722	4.317336	2.693730
	36	85.44391	2.366214	2.553493	2.625301	4.317367	2.693712
	40	85.44287	2.366262	2.554046	2.625704	4.317367	2.693752

As for the variance decomposition of the price forecast error, it could be argued that price changes are rather caused by the money supply and secondarily by the interest rate and bank credits (Table 10).

Table 10: Variance decomposition of the IPC (model 2)

	Décomposition de la variance du IPC						
	Horizon	**IPI**	**IPC**	**MM**	**CE**	**TCR**	**TMP**
Mod**el** 2	1	6.291146	93.70885	0.000000	0.000000	0.000000	0.000000
	4	6.194381	65.32707	11.08228	6.257307	4.934641	6.204325
	8	6.141284	56.82723	15.00635	7.827605	5.483103	8.714426
	12	6.306435	55.73126	15.54250	8.039187	5.476534	8.904083
	16	6.325374	55.51482	15.65404	8.110485	5.473702	8.921575
	20	6.326313	55.46064	15.67790	8.136438	5.472282	8.926429
	24	6.326166	55.44772	15.68147	8.144254	5.471668	8.928722
	28	6.326131	55.44536	15.68151	8.145902	5.471489	8.929617
	32	6.326126	55.44507	15.68144	8.146059	5.471462	8.929844
	36	6.326115	55.44497	15.68154	8.146053	5.471463	8.929857
	40	6.326104	55.44487	15.68164	8.146081	5.471465	8.929840

Conclusion

From 2006 onwards, the government introduced important reforms to the legal and institutional framework for monetary policy. These reforms have contributed to the modernization of the economy. To confirm or deny the effectiveness of monetary policy under the independence of the Moroccan monetary authority, we opted for a SVAR modelling on two periods, before and after the independence of BAM, on quarterly data. The first period runs from 1994 to 2005 and the second from 2006 to 2020.

The empirical analysis focuses on the transmission channels of monetary policy. The domestic channels examined in this chapter include Morocco's industrial production index (IPI), the consumer price index (IPC), the money supply measured by M3, the short-term interest rate

(TMP), credits to the economy (CE) and the real effective exchange rate (TCR). Restrictions were imposed on the contemporaneous effects of endogenous variables.

The empirical analysis concluded that in the BAM independence framework:

- The interest rate channel is more effective, economic activity contracts following a restrictive monetary policy shock.

- BAM controls prices through the interest rate and money supply growth since an increase in the interest rate reduces the volume of money supply.

- The credit channel is effective. The credit channel is effective, as there has been an increase in industrial production and a downward reaction of prices following a shock to bank credits.

- The exchange rate channel is effective in controlling prices and ineffective in stimulating industrial production. This result is expected despite the flexibilization of the exchange rate in Morocco.

Annexes:

Construction of the CWN legal index

Caractéristiques	Poids	Score	Poids*score
1- Chief executive officer :	**0,20**		**0,1625**
a- Term of office :	**0,05**		
6 to 8 years		**0,75**	**0,0375**
b- Who appoints the CEO ?	**0,05**		
Legislature ;		**0,50**	**0,025**
c- Dismissal :	**0,05**		
No provision for dismissal ;		**1,00**	**0,05**
d- May the CEO hold other offices in the government ?	**0,05**		
No ;		**1,00**	**0,05**
2- policy formulation :	**0,15**		**0,1**
a- Who formulates monetary policy ?	**0,05**		
Bank alone ;		**1,00**	**0,05**
b- Who has final say in resolution of conflict	**0,05**		
The bank, on issues clearly defined in the law as its objectives ;		**1,00**	**0,05**
c- Role in the government's budgetary process :	**0,05**		
Central bank has no say.		**0,00**	**0,00**
3- Objectives :	**0,15**		**0,15**
- **Price stability is the major or only objective in the charter, and the central bank has the final word in case of conflict with other goverment objectives.**	**0,15**	**1,00**	**0,15**

4- Limitations on nonsecuritized lending to the government :	**0,50**		**0,3445**
a- Limitation on nonsecuritized lending :	**0,15**		
Advances permitted, but with strict limits		**0,67**	**0,1005**
b- Securitized lending :	**0,10**		
Not permitted		**1,00**	**0,10**
c- Terms of lending	**0,10**		
Specified by the bank charter		**0,67**	**0,067**
d- Potential borrowers from the bank	**0,05**		
Public and private sector		**0,00**	**0,00**
e- Limits on central bank lending	**0,025**		
Shares of government revenue		**0,33**	**0,00825**
f- Mturity of loans :	**0,025**		
Within 6 Months		**1,00**	**0,025**
g- Interest rates on loans	**0,025**		
At market rates		**0,75**	**0,01875**
h- Central bank prohibited from buying or selling government securities in the primary market ?	**0,025**		
Yes		**1,00**	**0,025**
			0,757

Political vulnerability of the Governor of BAM

Appointment of Central Bank Governors	Moroccan Prime Ministers
	10 octobre 2013 Abdelilah BENKIRANE 9 novembre 2011 Abdelilah BENKIRANE 19 Septembre 2007 Abbas EL FASSI 7 Novembre 2002 Driss JETTOU
➢ **M'Hamed Zghari (1er juillet 1959 au 20 août 1964)** ➢ **M. Driss SLAOUI (1964-1967)**	8 juin 2004 Driss JETTOU 14 mars 1998
➢ **M'Hamed Zghari (1967)**	Abderrahmane YOUSSOUFI 6 septembre 2000
➢ **Le prince Moulay Hassan Ben El Mehdi (11 février 1969 au 1er novembre 1984)**	Abderrahmane YOUSSOUFI 27 février 1995 Abdellatif FILALI 7 juin 1994
➢ **Ahmed Bennani (1er avril 1985, septembre 1989)**	Abdellatif FILALI 30 septembre 1986 Azzedine LARAKI 11 août 1992
➢ **Mohammed Seqat (septembre 1989 à 2003).**	Mohamed Karim LAMRANI 19 novembre 1983
➢ **Abdellatif JOUAHRI (depuis mars 2003)**	Mohamed Karim LAMRANI 12 avril 1972 Mohamed Karim LAMRANI 6 Aout 1971 Mohamed Karim LAMRANI 5 novembre 1981 Maati BOUABID 27 mars 1979 Maati BOUABID 10 octobre 1977 Ahmed OSMAN 20 November 1972 Ahmed OSMAN 7 October 1969 Ahmed LARAKI **6 Juillet 1967** **Mohamed BENHIMA** **3 November 1963** **El Hadj Ahmed BAHNINI** **24 décembre 1958** **Abdallah IBRAHIM** 12 Mai 1958 El Hadj Ahmed BALAFREJ 28 octobre 1956 M'barek Lahbil EL BEKKAI 7 décembre 1955 M'barek Lahbil EL BEKKAI

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EU GLOBAL LEADERSHIP IN TRUSTWORTHY AI: HIGH RISK APPLICATIONS – IMPLEMENTATION AND GABS

Galia Mancheva, Phd [1]

Abstract: *The paper is devoted to the European Union regulatory framework on Artificial Intelligence related to SME and the EU global position in this aspect. The objective is to follow up the readiness of the EU to have a global leadership in trustworthy AI. The thesis of the study is that the EU is not ready to have a global leadership in trustworthy AI**.** For the purposes of the analysis firstly the position of the EU globally is observed within the global trends in Artificial intelligence. Secondly, content analysis and cross-check of current the EU regulatory framework and legislation is performed in order to investigate the main raised issues and their stage of completion. It was found that the main unsolved and unregulated issues are related to adaptation of current legislation of national AI strategies and new and adapted liability rules to be established. As of the national AI strategies a total of 19 Member States, including Norway have adopted national AI strategies. Some Member States (e.g. Finland, Cyprus and Germany), have already updated and reviewed their initial strategies. Forthcoming national action have to be taken by Austria, Belgium, Croatia, Greece, Ireland, Italy, Romania, and Slovenia. As of the new and adapted liability rules, it is postponed to the end of 2022 the EU to measure adapting the liability framework to the challenges of new technologies, including AI. As per global trends, the inconsistency of the EU members will prolong the process of implementation the legislation and achieving the main EU goal to have a global leadership in trustworthy AI.*

Keyword*: artificial intelligence, European union, regulations, symbolic approach, statistical approach, machine learning*
JEL: C51, C52, C53, C65, C67, L21, L22, L25

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Introduction

Artificial intelligence (AI) as a topic and term has been raised by John McCarthy, an American computer and cognitive scientist in 1956. Since then it has been wildly discussed and transformed. The understanding of AI and its application are changing and have an increasing role on the global economy but also in daily life. Although its application has been applied by a number of countries globally and as it seems it is going to be the next generation competition worldwide, the term still is a mystery for the society. Artificial intelligence brings concerns manly related to the risk and uncertainty it generates.

Within the paper successively are presented the regulatory goals and recommendations, conceptual view of artificial intelligence, and global trends on its application.

Following the trends European Union is proposing a full set of regulations boosting Artificial intelligence application at higher risk level, applying risk based approach and challenging SME sector to target so called "high-risk" applications. End of 2024 is the earliest time the regulation could become applicable to operators. It is expected the standards to be ready and the first conformity assessments may be carried out.

The thesis of the study is that the *EU is not ready to have a global leadership in trustworthy AI*. For this reason the study main objectives are, first, to follow up main trends related to AI globally and the EU place among them. Second, the readiness of the EU regulatory framework and legislation and its application in order to provide EU global leadership in trustworthy AI.

1. Conceptual overview of the AI and trends

1.1. Definitions on AI

For the first time the label "artificial intelligence" is used in 1956 by John McCarthy (a computer scientist). He defines it as "the science and engineering of making intelligent machines"[2] Next popular description on the term is given by Merriam Webster dictionary, namely: "A branch of computer science dealing with the simulation of intelligent behavior in computers, and the capability of a machine to imitate intelligent human behavior"[3]. European parliamentary research service interprets AI as: "Artificial intelligence is a te*rm used to describe machines performing human-like cognitive processes such as learning, understanding, reasoning and interacting"*[4].

The Proposal for a Regulation of the European parliament on artificial intelligence (artificial intelligence act)[5] and amending certain union legislative acts[6], chooses the term to be describe as follows: *"Artificial Intelligence (AI) is a fast evolving family of technologies that can bring*

[2] https://www.sciencedaily.com/terms/artificial_intelligence.htm

[3] https://www.merriam-webster.com/dictionary/artificial%20intelligence

[4]https://publications.jrc.ec.europa.eu/repository/bitstream/JRC118163/jrc118163_ai_watch._defining_artificial_intelligence_1.pdf

[5] European Commission, Proposal for a Regulation of the European parliament and of the Council laying down harmonised rules on artificial intelligence (artificial intelligence act) and amending certain union legislative acts, (data.consilium.europa.eu) brussels, 21.4.2021.

[6] European Commission, Proposal for a Regulation of the European parliament and of the Council laying down harmonised rules on artificial intelligence (artificial intelligence act) and amending certain union legislative acts, brussels, 21.4.2021.

a wide array of economic and societal benefits across the entire spectrum of industries and social activities".[7]

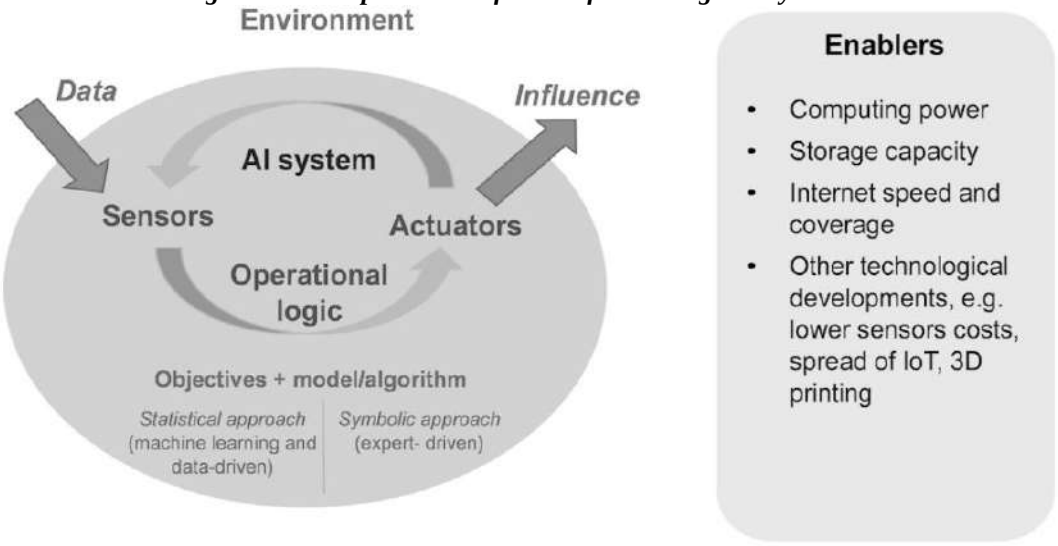
As it seen in brief, the understanding of AI is evolved from *intelligent machines* through *machines performing human-like cognitive processes,* reaching its current interpretation *fast evolving family of technologies.*

1.2. Conceptual view of an AI system

Currently an AI system can be explained by **three main pillars** (see Figure 1):

- First pillar – Data – the stage the date management is performed.
- Second pillar – Environment – the stage the algorithms and the model are developed.

Figure 1: Conceptual view of an Artifical inteligence system



Source: Based on OECD (2019[11]), Artificial Intelligence in Society, OECD Publishing, Paris, https://doi.org/10.1787/eedfee77-en

Within the *Environment stage* two approaches can be used:

- symbolic approach – driven by experts;
- statistical approach – data driven and machine learning approach.

- Third pillar – Influence – the stage the model is applied on the chosen system.

Required enablers are computer power, storage capacity, internet speed and coverage and some other technological development e.g. lower sensors costs[8], 3D printing, ect.

1.3. Global trends on AI application

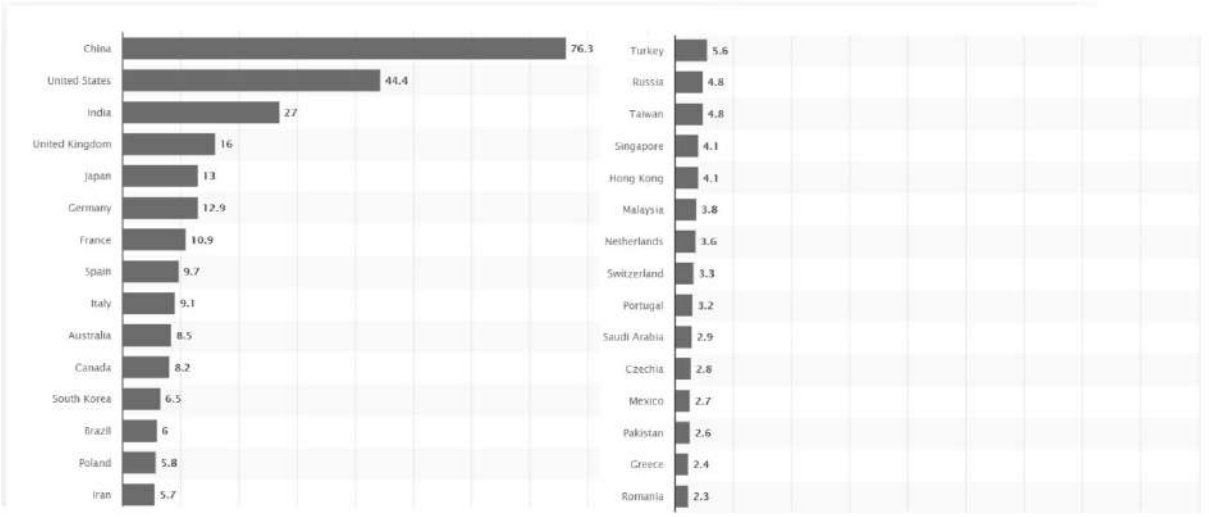
Within the study three main global trends are presented on AI application, representing the most important aspects, namely the AI "frontrunners" trends in publications, businesses performing

[7] European Commission, Proposal for a Regulation of the European parliament and of the Council laying down harmonised rules on artificial intelligence (artificial intelligence act) and amending certain union legislative acts, (data.consilium.europa.eu) brussels, 21.4.2021.

[8] https://www.unapcict.org/sites/default/files/2021-10/135.%20OECD%20-%20The%20Digital%20Transformation%20of%20SMEs.pdf

big data analysis, and artificial intelligence hiring index scores worldwide. These global trends are chosen to provide information and to compare EU globally in AI competition.

Figure 2: Number of AI publication worldwide from 2016 to 2020, by country (in 1,000s)



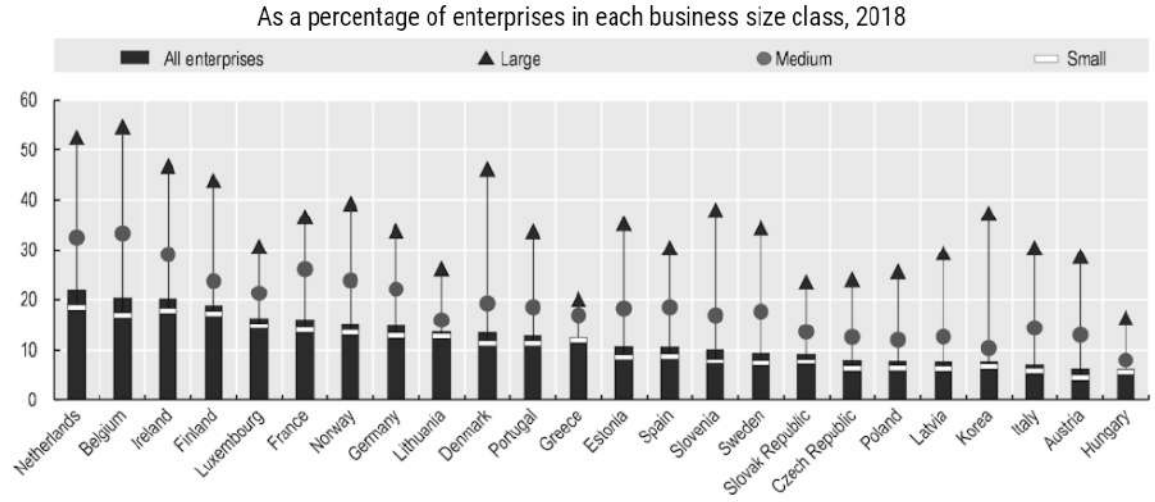
Source: Statista

First trend (see Figure 2) represents the number of AI publications worldwide prom 2016 to 2020, by country in thousand. As it can be seen the main "frontrunner" is China producing 76 300 publications for the observed period. Second approaching country is United States producing almost half of the China publications - 44 4000, follow by India with 27 000 publications. From the EU prospective the main "frontrunner" are Germany, France, Spain and Italy issuing 9 to 10 000 publications for the period. Or it is the EU core which processes publication on AI. Rests of the EU countries are briefly presented on the figure.

The stated trend illustrates the competition the EU is entering by **targeting global leadership in trustworthy AI.** Only the core of the EU have to increase at least 7 time its publications but also the periphery have to do **big effort in terms of investment in all necessary resources like human, capital, information, ect**. to start producing publications close to the "frontrunners".

The second trend (see figure 2) represents the businesses in the EU having performed big data analysis. Big data analyzes are the first pillar of an AI system and its managing is required for AI implementation. As it is seen, business population in most of the countries prove low level of data analytics adoption. Nevertheless countries as Netherlands, Belgium and Ireland have taken the lead. In these countries more than 20% of the companies are executing big data analysis in 2018. A last position in the trend belongs to Italy, Austria and Hungary. They are engaged with 6-7 % only.

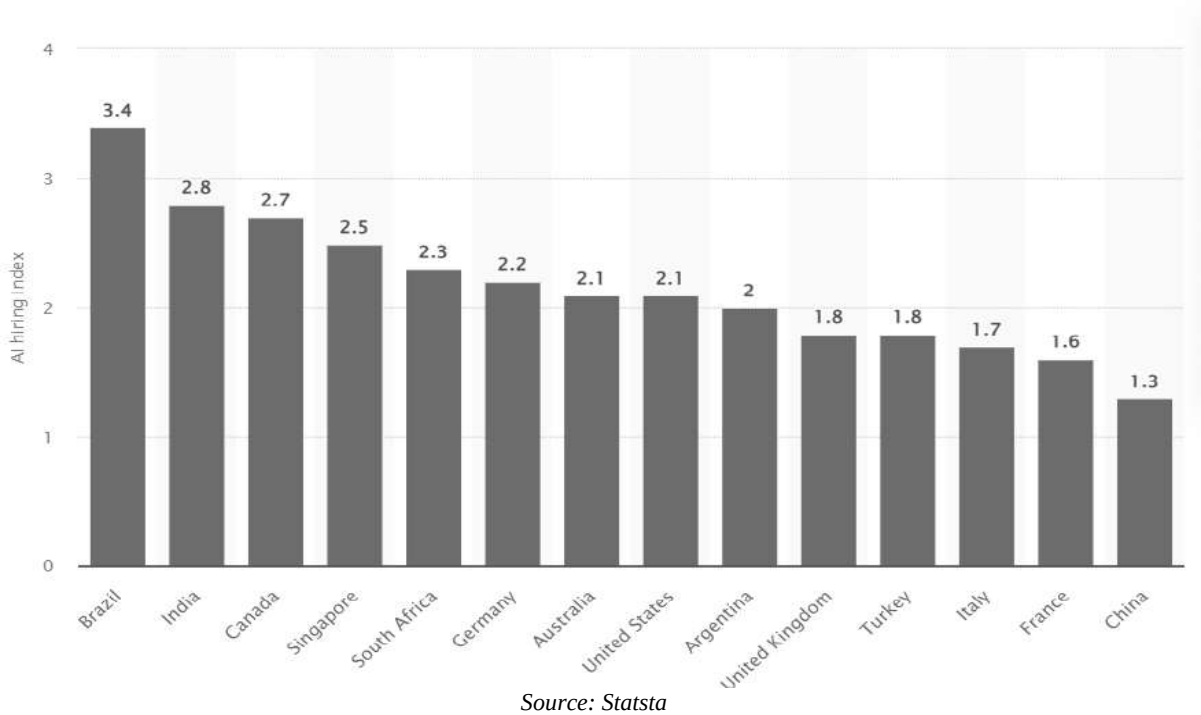
Figure 2. Businesses having performed big data analysis (2018)



Source: OECD (2020[71]), OECD Database on ICT Access and Usage by Businesses, http://stats.oecd.org/Index.aspx?DataSetCode=ICT_BUS (accessed on (www.unapcict.org) 19 September 2020)

The third observed trend is dedicated to the job posting data by country for the period 2013 – 2020.

Figure 3. Artificial intelligence (AI) hiring index[9] scores worldwide from 2016 to 2020, by country



Source: Statsta

[9] The source indicates that the AI hiring index is "calculated as the number of LinkedIn members who include AI skills on their profile or work in AI-related occupations and who added a new employer in the same month their new job began, divided by the total number of LinkedIn members in the country.LinkedIn makes month-to-month comparisons to account for any potential lags in members updating their profiles. The index for a year is the average index over all months within that year."

The hiring index represents Brazil as a "frontrunner" having 3,4 points to the observed period 2013 – 2020 followed by India and Canada. EU presenters for this index are only Italy and France holding last positions on the figure. **The information shows lag of AI skills among EU members and citizens which is mandatory for the goal EU has set: global leadership in trustworthy AI.**

Based on the tends information and the EU place we may conclude the EU briefly presented on the global scene in regard to AI. It is a difficult competition the EU is entering trying to catch up the leader in this industry. The biggest challenge for EU is inconsistency of the EU members.

2. Regulatory framework proposal on artificial intelligence

2.1 Theoretical framework of the EU regulatory proposal on AI and the 2021 Coordination plan

The EU Commission is proposing the first-ever legal framework on AI, which aims at providing AI developers, deployers and users with clear requirements and obligations regarding specific uses of AI. It also seeks to reduce administrative and financial burdens for business, targeting small and medium-sized enterprises (SMEs).

The proposal is part of a wider AI package including the Coordinated Plan on AI reviewed in 2021. AI package tends to have *three main goals*:

- to guarantee the safety and fundamental rights of people and businesses related to AI;
- to strengthen uptake, investment and innovation in AI across the EU;
- **to provide Europe leading role globally in AI[10].**

In order to accelerate opportunities of AI technologies, reviewed 2021 Coordinated Plan puts forward **four key sets of proposals** for the European Union and the Member States[11]:

a) **set conditions for AI development;**
b) **make the EU a high tech place;**
c) **ensure that AI protect human rights and serves them;**
d) **build strong leadership in sectors with high-impact in the society.**

While most AI systems pose limited to no risk and can contribute to solving many societal challenges, certain AI systems create risks. In order to avoid undesirable outcomes the proposed rules target high risk application, set clear requirements for AI systems for high risk applications, and define specific obligations for AI users and providers of high risk applications.

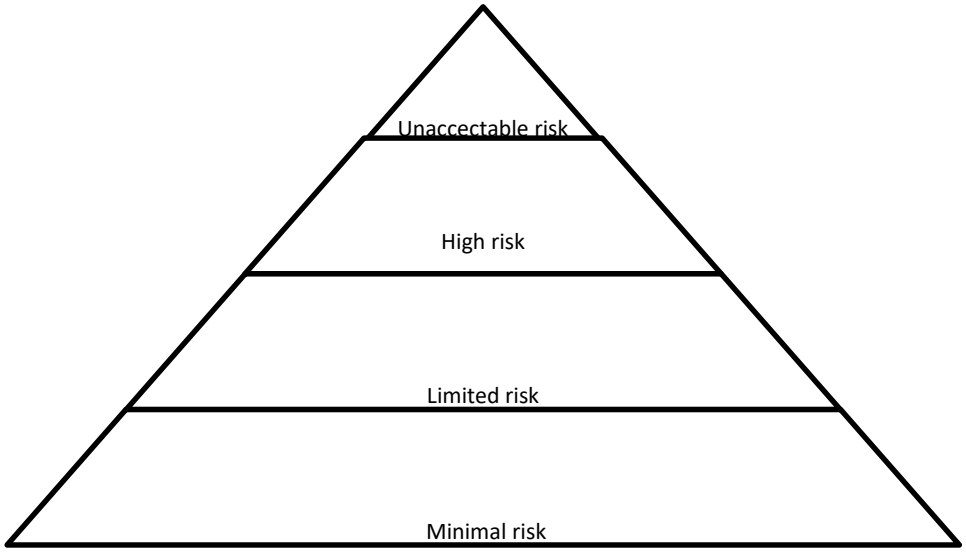
2.2. A risk-based approach

The Regulatory Framework defines 4 levels of risk in AI: (1) unacceptable risk; (2) high risk; (3) limited risk; and (4) minimal or no risk (see Figure 4) but the subject of regulation is only **high risk.** High risk applications are the one expected to boost EU to have **global leadership in trustworthy AI.**

[10] https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai

[11] Cited by European Commission, ANNEXES to the Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions Fostering a European approach to Artificial Intelligence, Brussels, 21.4.2021.

Figure 4. Risk based approach – high risk applications



Sourse: https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai

(1) Unacceptable risk: All AI systems considered a clear threat to the safety, livelihoods and rights of people will be banned.

(2) High-risk: AI systems identified as high-risk include AI technology used in: critical infrastructures, educational or vocational training, safety components of products , employment, workers management and access to self-employment, essential private and public services, law enforcement that may interfere with people's fundamental rights, migration, asylum and border control management, administration of justice and democratic processes.

(3) Limited risk: AI systems with specific transparency obligations: I good example AI systems are chatbots. Users should be aware that they are interacting with a machine so they can take an informed decision to continue or step back.

(4) Minimal risk: The proposal allows the free use of applications such as AI-enabled video games or spam filters. Currently the majority of AI systems used in the EU fall into this category, where they represent minimal or no risk.

Before **high-risk applications** are executed they will be subject to strict obligations, as adequate risk assessment, correct mitigation systems, high quality of the datasets, high level of robustness, ect. [12]

To ensure safety and to protect fundamental rights throughout the whole AI lifecycle the Impact Assessmant document accompanying the Proposal the Regulation on AI sets **five obligatins that provider of high-risk applications** have to ensure (see Figure 5)[13].

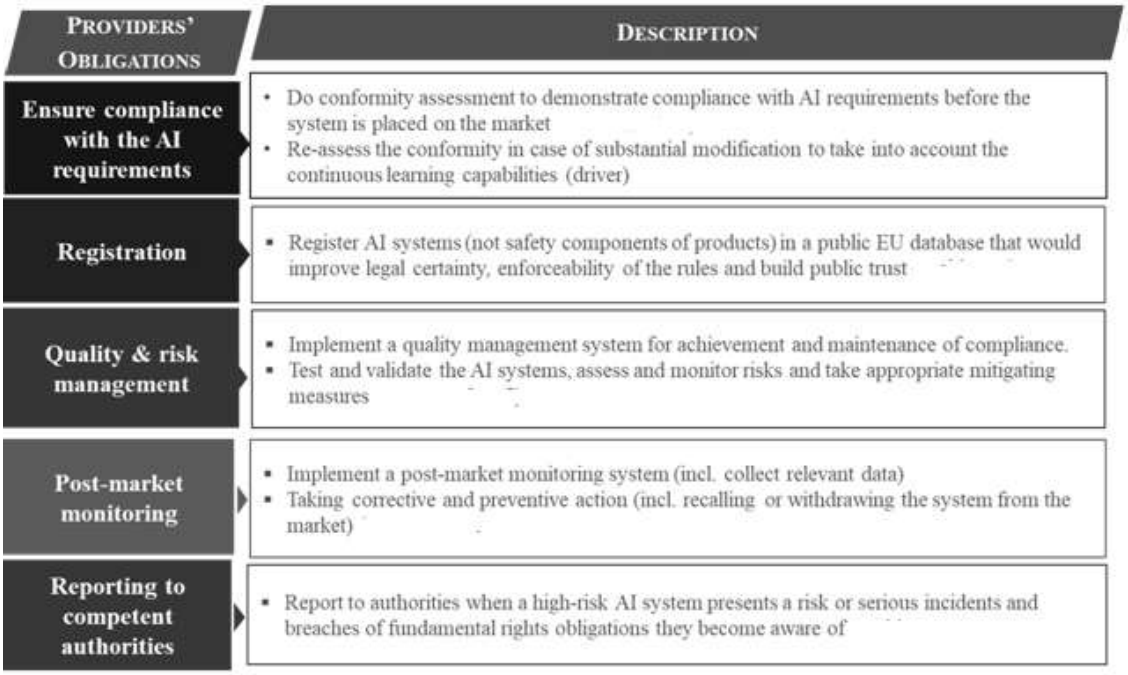
Obligations for providers of high-risk AI systems are stick to:

[12] https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai.

[13] European Commission, Commission Staff Working document, Impact assessment accompaning Regulation of the European parliament and of the Council laying down harmonised rules on artificial intelligence (artificial intelligence act) and amending certain union legislative acts, brussels, 21.4.2021, part ½.

- ensure compliance with the AI requirement;
- registration in a public EU data base;
- quality and risk management;
- post-market monitoring;
- reporting to the competent authorities.

Figure 5. Obligations for providers of high-risk AI systems



Source: European Commission, Commission Staff Working document, Impact assessment accompaning Regulation of the European parliament and of the Council laying down harmonised rules on artificial intelligence (artificial intelligence act) and amending certain union legislative acts, (hal.archives-ouvertes.fr) brussels, 21.4.2021, part ½.

To ensure the minimum degree of algorithmic transparency and accountability a clear requirement for high-risk AI systems need to be set. As far as, it is a common practice for the digital market participants[14]. The fact, gives the author a room to raise the issue with the increasing liberal corporatism as a result of a consequence of the growing monopoly power of interest organizations and increasing economic growth.[15]

[14] European Commission, Proposal for a Regulation of the European parliament and of the Council laying down harmonised rules on artificial intelligence (artificial intelligence act) and amending certain union legislative acts, (data.consilium.europa.eu) brussels, 21.4.2021

[15] Благоева. Б. (2017). Корпоративизъм и корпоративна власт: някои теоретични аспекти. - В: Янков, Г. Интердисциплинарни изследвания. ИК-УНСС, с. 362.

3. Gaps and Forthcoming EU AI initiatives

In order to investigate the main concerns and gaps related to the EU initiative to regulated AI application on SME level, an impact assessment on the first issued draft in 2022 was done – White paper On Artificial Intelligence - A European approach to excellence and trust[16].

Part of the assessment process was discution on the White Paper on Artificial Intelligence ran from 19 February to 14 June 2020. Stakeholders from public and private sector (from governmends to citizeds), representatives from Member States but also from US, the UK, Canada, India, China, Japan, Syria, Brazil and Mexico.

According to the assessment **6 main problems** were pointed out (see Table 1) supplemented by the stakeholders concerns. The raised problems and concerns are related with increased risk and legal uncertainty.

Table 1: Main problems and stakeholder concerns[17]

Main problems	*Stakeholders concerned*
1. Use of AI poses increased risks to safety and security of citizens	**Citizens, consumers and other victims** **Affected businesses**
2. Use of AI poses increased risk of violations of citizens' fundamental rights and Union values	**Citizens, consumers and other victims** **Whole groups of the society,** **Users of AI systems liable for fundamental rights violations**
3. Authorities do not have powers, procedural frameworks and resources to ensure and monitor compliance of AI development and use with applicable rules	**National authorities responsible for compliance with safety and fundamental rights rules**
4. Legal uncertainty and complexity on how existing rules apply to AI systems dissuade businesses from developing and using AI systems	**Businesses and other providers developing AI systems** **Businesses and other users using AI systems**

[16] European Commission, White paper on artificial Intelligence - a European approach to excellence and trust, Brussels, 19.2.2020.

[17] European Commission, Commission Staff Working document, Impact assessment accompaning Regulation of the European parliament and of the Council laying down harmonised rules on artificial intelligence (artificial intelligence act) and amending certain union legislative acts, (eur-lex.europa.eu) brussels, 21.4.2021, part ½.[17]

5. Mistrust in AI would slow down AI development in Europe and reduce the global competitiveness of the EU economy	**Businesses and other users using AI systems** **Citizens using AI systems or being affected by them**
6. Fragmented measures create obstacles for cross-border AI single market and threaten Union's digital sovereignty	**Businesses developing AI, mainly SMEs affected** **Users of AI system, including consumers, businesses and public authorities**

Source: European Commission, Commission Staff Working document, Impact assessment accompaning Regulation of the European parliament and of the Council laying down harmonised rules on artificial intelligence (artificial intelligence act) and amending certain union legislative acts, (eur-lex.europa.eu) brussels, 21.4.2021, part ½.[18]

As a conclusion of the impact assessment **3 main gabs** are observed:

- specific AI legislation is needed;
- the adaptation of current legislation is required;
- clear definition of "high risk" is needed.

The of 'high-risk' concept has take the main focus among the stakeholders. According to the participants of the assessment the definition given in the White paper needs to be inproved but also to be simplified. There are some suggestions for more levels of risk to be implemented[19].

Table 2: Forthcoming EU AI initiatives[20]

AI initiative	Proposal
Horizontal legislation on AI	Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL LAYING DOWN HARMONISED RULES ON ARTIFICIAL INTELLIGENCE (ARTIFICIAL INTELLIGENCE ACT) AND AMENDING CERTAIN UNION LEGISLATIVE ACTS Issued Brussels, 21.4.2021
New and adapted liability rules [21]	Proposal expected at the end of 2022
Sectoral safety legislation revisions	Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

[18] Cited by European Commission, Commission Staff Working document, Impact assessment accompaning Regulation of the European parliament and of the Council laying down harmonised rules on artificial intelligence (artificial intelligence act) and amending certain union legislative acts, (eur-lex.europa.eu) brussels, 21.4.2021, part ½.

[19] European Commission, Commission Staff Working document, Impact assessment accompaning Regulation of the European parliament and of the Council laying down harmonised rules on artificial intelligence (artificial intelligence act) and amending certain union legislative acts, (eur-lex.europa.eu) brussels, 21.4.2021, part ½.19

[20] European Commission, Commission Staff Working document, Impact assessment accompaning Regulation of the European parliament and of the Council laying down harmonised rules on artificial intelligence (artificial intelligence act) and amending certain union legislative acts, brussels, 21.4.2021, part ½.

[21] As indicated in Section 1.3.3., one of the elements under reflection is the possible Revision of the Product Liability Directive. The Product Liability Directive is a technology-neutral directive applicable to all products. If and when reviewed, it would also apply to high-risk AI systems covered under the AI horizontal framework.

	On harmonised rules on fair access to and use of data (Data Act) Brussels, 23.2.2022

Source: European Commission, Commission Staff Working document, Impact assessment accompaning Regulation of the European parliament and of the Council laying down harmonised rules on artificial intelligence (artificial intelligence act) and amending certain union legislative acts, (hal.archives-ouvertes.fr) brussels, 21.4.2021, part ½, including author's data

There are proposed alternative approaches to defining 'high-risk' with more risk levels: some position suggested following a gradual approach with five risk levels.
In order to achieve the main objectives of the framework on AI and to fulfill the gabs, the EU set **three initiatives** related to the framework (see Table 2): (1) horizontal legislation on AI; (2) new and adapted liability rules, and (3) sectoral safety legislation revisions. Each initiative is followed by steps to be achieved.

(1) First initiatives – *Horizontal legislation on AI*, is covered by proposed in 2021 legislative action on a horizontal framework for AI - Proposal for a Regulation of the European parliament and of the Council laying down harmonized rules on artificial intelligence (artificial intelligence act) and amending certain union legislative acts[22], issued Brussels, 21.4.2021.

It covers the main 3 gabs investigated through stakeholders' consultation within the impact assessment. The proposal is focused on issues of safety and fundamental rights specific to AI technologies. The proposal provides a definition of AI, sets mandatory requirements for high-risk AI systems.
From the prospective of national AI strategies implementation there still action to be taken (see Table 3).

Table 3. National AI strategies, EU Member States and Norway (by date of initial adoption)[23]

Country	Status	Date	Country	Status	Date
Austria	In progress		Italy	In progress	
Belgium	In progress		Latvia	Published	Feb 2020
Bulgaria	Published	Dec 2020	Lituania	Published	May 2019
Croatia	In progress		Luxemburg	Published	May 2019
Cyprus	Published	Jan 2020	Malta	Published	Oct 2019
Czechia	Published	May 2019	Netherlands	Published	Oct (publications.jrc.ec.europa.eu) 2020
Denmanrk	Published	May 2020	Norway	Published	Jan 2020
Estonia	Published	Jul 2019	Poland	Published	Dec 2020
Finland	Published	Oct 2017	Portugal	Published	Jan 2019
France	Published	Mar 2018	Romania	In progress	

[22] https://www.mdpi.com/2409-9287/7/1/4/html
[23] European Commission, Commission Staff Working document, Impact assessment accompaning Regulation of the European parliament and of the Council laying down harmonised rules on artificial intelligence (artificial intelligence act) and amending certain union legislative acts, (hal.archives-ouvertes.fr) brussels, 21.4.2021, part ½.

Germay	Published	Nov 2018	Slovakia	Published	Jul 2019
Greece	In progress		Slovenia	In progress	
Hungary	Published	Sept 2020	Spain	Published	Dec 2020
Ireland	In progress		Sweden	Published	May 2018 (publications.jrc.ec.europa.eu)

Source: European Commission, Commission Staff Working document, Impact assessment accompaning Regulation of the European parliament and of the Council laying down harmonised rules on artificial intelligence (artificial intelligence act) and amending certain union legislative acts, (hal.archives-ouvertes.fr) brussels, 21.4.2021, part ½.

As it can be seen some of tme Members have adopted national AI strategies. but other (e.g. Finland, Cyprus and Germany), have updated or reviewed their local strategies.[24] Each member is deciding on their own about the approach to create or update the national AI strategies. Bulgaria, for example, has included measures as part of the digitalisation strategy - 'Digital Transformation of Bulgaria (2020-2030)' approved in July 2020. Belgian national strategy takes into consideration three regional strategies. Forthcoming national actions have to be taken by Austria, Belgium, Croatia, Greece, Ireland, Italy, Romania, and Slovenia.

(2) Second AI initiative – *New and adapted liability rules,* are to be proposed at the end of 2022. They will be related to EU measures adapting the liability framework to the challenges of new technologies, including AI. It is expected to include a revision of the Product Liability Directive, and a legislative proposal with regard to the liability for certain AI systems[25]. It also have to take into account other existing EU legislation, as well as the proposed horizontal framework for AI.

(3) Third AI initiative – *Sectoral safety legislation revisions*, is covered by the Proposal for a Regulation of the European parliament and of the council on harmonized rules on fair access to and use of data (Data Act), issued in Brussels, 23.2.2022. It sets harmonized rules on fair access to and use of data, as far as data is meant to be a core component of the digital economy, and an essential resource to secure the green and digital transitions.

It is important to take into consideration that the appsence of unified local documents will coused inconvenience of the respective reviewing commities. In addition, it will create a prerequisite for deviations from the main course of regulation. But also will raise the discution about political culture in its four categories - psychological, comprehensive, objective, heuristic[26] as well as political values and political interests – material and moral, private and public.[27] The national strategies will outline another interesting topic to be discussed – the topic

[24] European Commission, Commission Staff Working document, Impact assessment accompaning Regulation of the European parliament and of the Council laying down harmonised rules on artificial intelligence (artificial intelligence act) and amending certain union legislative acts, (hal.archives-ouvertes.fr) brussels, 21.4.2021, part ½.
[25] https://www.mdpi.com/2409-9287/7/1/4/html
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[27] Благоева, Б. (2022). Ценности срещу интереси в политиката. ИК – УНСС, с. 165-198.

about ego in politics, namly relations: individual interests vs. common good, and individual – public interest.[28]

The main unsolved and unregulated issues are related to adaptation of current legislation of national AI strategies and new and adapted liability rules to be established. National action have to be taken still by Austria, Belgium, Croatia, Greece, Ireland, Italy, Romania, and Slovenia. As of the new and adapted liability rules, the single initiative not covered yet, it is postponed to the end of 2022 the EU to measure adapting the liability framework to the challenges of new technologies, including AI.

Conclusions

Despite all concerns, uncertainty and lack of knowledge and skills, AI is already part of our lives even without suspecting it. Its application will increase in future, and understanding and accepting it will help to benefit from it. Following the global trends EU is trying to compete in order to have a **global leadership in trustworthy AI.**

Although EU is boosting the AI application to a higher risk aiming at achieving the main goal, a few concerns could be outlined. **First**, targeting and implementation of the high risk applications will be time- and source intensive process which will transform SMEs in EU. **Second**, investments in service, knowhow and training will be the must during the implementation process but it will reduce the number of SMEs on the market giving change to the so called "frontrunners". **Third**, inconsistency of EU member will prolong the implementation process. While the EU core leads the other members in terms of publications, in the use and implementation of big data analysis Benelux is leading.

Taking into consideration these concerns, the thesis, **EU is not ready to have a global leadership in trustworthy AI** is confirmed. Although from regulation prospective and framework EU is managing to follow the timelines. But from implementation prospective considering the inconsistency of all member and the readiness of SME to manage with AI, it will be a time- and source intensive process.

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[28] Благоева, Б. (2020). Политически интереси и политически ценности: методологочески аспекти. В: Интереси, ценности, лигитимност: международни, европейски и национални измерения, УНСС, с. 23-24.

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DETECTION OF FINANCIAL STATEMENTS MANIPULATION USING THE BENEISH M-SCORE: THE CASE OF COMPANIES RECENTLY CHARGED BY SEC.

Desislava Petkova[1]

Abstract:
The Beneish M-score model is a useful tool for identifying the potentially fraudulent behaviour of a company that could lead to misstated financial data. This paper uses the detective model to determine if and when warning signs of manipulation were identifiable before the companies were officially charged with fraud by U.S. SEC. Data used in the analysis are the 10-K reports from the U.S. SEC Edgar database. The study analyses two companies involved in financial scandals in 2021 and shows that the model can be used to catch manipulative actions in advance under the condition that other factors should be considered. To further deepen the analysis of the model's mechanisms, the paper recommends concentrating on fewer fraudulent cases and entering into details for each business.

Keywords: *Earnings manipulation, Beneish M-score model, Financial ratios, Fraudulent reporting*

JEL: *G30, G32*

1. Introduction

One of the central issues of the accounting research is the extent to which companies' managers manipulate the earnings in their favor. (Beneish, 2001). In the last decades, the world economy has seen a lot of fraud cases, financial statement manipulations, and other violations of the corporate ethics. We can mention world-famous fraud scandals like Enron, Xerox, WorldCom, Tyco International, HealthSouth, Freddie Mac, AIG Lehman Brothers, Bernard L. Madoff Investment Securities and others appearing all the time which increases concerns in investors about fraudulent financial reporting.

The purpose of this paper is to examine the ability of the Beneish M-score to reveal the manipulation of the financial statements data of companies who were recently officially charged by SEC. The objective of the elaborated assessment is to observe whether the model based on a few financial ratios is able to indicate and signal possible manipulations of financial data. By analysing the officially reported financial measures, the paper attempts to indicate the companies' fraudulent actions at different points of time, before and after the officially revealed manipulations. The research allows us to observe whether some warning financial distress signs appeared before the manipulations were reported and the companies charged by SEC.

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The first question that this research aims to answer is whether and under what conditions the Beneish M-score successfully reveals manipulation by using data for which fraud is already proven. The second question answered is whether after restatement of fraudulent data and after how many periods Beneish M-score is showing absence of manipulations.

In order to achieve the purpose of this paper, we use the Beneish M-score model with 8 variables for different periods for each of the analysed companies – Kraft Heinz Co. and Pareteum Corporation.

The paper is structured as follows: first we perform a literature review, followed by the methodology of this research and the empirical analysis using the detection model of Beneish. To further deepen and ameliorate the analysis some limitations are examined and recommendations are given. The paper ends with conclusion and references.

2. Literature review

The agency theory provided by Jensen and Meckling in 1976 explains the motivations behind the management of earnings (Jensen & Meckling, 1976). Sometimes in order to achieve higher return on equity the management utilizes the flexibility of the accounting rules or directly violates them. (Curtis & Thalassinos, 2005). In 1999 Messod D. Beneish created the M-score model which represents a quick and easy approach to reveal and measure the probability of earnings manipulation (Salas Najera, 2021). His research is thought-about as one of the fundamental fraud detection models. Beneish's M-Score results showed an accuracy of 76% in identifying manipulators, while only 17.5% of the non-manipulators were incorrectly identified (Beneish, 1999).

In one of his further papers "The Predictable Cost of Earnings Manipulation" in 2007 M.D. Beneish used the M-Score as a stock selection technique for the period from 1993 to 2003. A hedged return of nearly 14% per annum was generated using this strategy (Beneish and Nichols, 2007). Another of his papers named Identifying Overvalued Equity revealed that an overvaluation score (O-Score) can successfully identify companies with abnormal price declines of average 27% by combining proxies for manipulated operating activities, overstated earnings, merger activity and stock issuance (Beneish and Nichols, 2009). M.D. Beneish described the manipulation of earnings as the violation of the Generally Accepted Accounting Principles by the management in order to present better financial performance (Beneish, 1999).

In general, the treatment flexibility in the accounting standards is created to give the accountants the necessary instruments to adapt to the constantly changing circumstances. However, this flexibility in accounting is more often exploited to manipulate financial data for personal economic interest. Arthur Levitt, former Chairman of the U.S. Securities and Exchange Commission outlined the importance of this accounting flexibility in his speech in 1998. Clearly, the accountants need the flexibility to keep up with the innovations in business as it is impossible to predict all new transactions or business structures and include them in the principles (Levitt, 1998).

The earnings manipulation practices should be revealed as otherwise they may lead to rising bad reputation for the whole industry. The frauds in the financial reporting can ruin the image and brand of many companies and even cause business collapse (Mollah and Sakib, 2020)

M.D. Beneish identified the warning signs that indicate the manipulation of earnings and his evidence showed that the probability of fraud rises with the following: growth of sales, drop in gross margins, increase of receivables, decrease of asset quality and increase of accruals (Beneish, 1999).

2.1. Beneish Predictive Financial Ratios

The financial ratios used in the M-score model were five when Professor M.D. Beneish first tested them in 1997 and after the restructuring and enhancement of the model in 1999 their number was increased to a total of eight.

All eight predictive ratios in the model are constructed from the data available in the companies' financial statements and help together to describe the extent to which the accounting financial data might have been altered. The M-score used alone can reveal the financial data manipulation done by any corporation in favour of profit enhancement. Despite the fact that the Beneish M-score resembles in multiple ways the Altman Z-score, it keeps the focus on the prediction and detection of possible manipulation or creative accounting practices, whereas the Z-score's focus is on the bankruptcy prediction (Mahama, 2015).

The eight ratios included in the model capture either financial statement distortions resulting from earnings manipulation - Days Sales in Receivables Index, Asset Quality Index, Depreciation Index and Total Accrual to Total Assets Index, or indicate a predisposition to engage in earnings manipulation - Gross Margin Index, Sales Growth Index, Sales General and Administrative Expenses Index, Leverage Index (Beneish and Nichols, 2007).

Days Sales in Receivables Index (DSRI). This ratio presented in Equation (1) below measures the number of days required between the date of the credit sales and the date when the cash is collected from the customers in the first year when the earnings manipulation is revealed (year t) to the corresponding measure in the previous year t-1. This variable indicates whether receivables and revenues are balanced or not in two consecutive years. According to the model, a large increase in sales may be the result of a change in the credit policy to incite sales but when combined with unusual increases in receivables, it increases the likelihood that the reported earnings and revenue have been overvalued (Beneish, 1999).

$$Days' Sales in Receivables Index\ (DSRI) = \frac{\frac{Accounts\ Receivables, net_t}{Sales_t}}{\frac{Accounts\ Receivables, net_{t-1}}{Sales_{t-1}}} \quad (1)$$

Gross Margin Index (GMI). This ratio in Equation (2) compares the gross profit (sales minus cost of goods sold) to sales revenue in year t-1 and the gross profit to sales revenue in year t. When the result is greater than 1, it means that the gross margins have declined. Consequently, such an evolution has a negative effect on the going concern which may tempt the management to engage in manipulation in order to meet the investor's expectations in terms of investment

return (Spătăcean, 2019). Beneish suggests that increased gross margins may be result of inventories' manipulation and other production costs. The inventor of the M-score also states that either increased or decreased gross margins can boost the risk of manipulation, but in his model he only included a variable reflecting the relation between gross margin changes and inventory changes but it did not enhance this specification (Beneish, 1999).

$$Gross\ Margin\ Index\ (GMI) = \frac{\frac{Sales_t - Cost\ of\ Goods\ Sold\ (COGS)_{t-1}}{Sales_{t-1}}}{\frac{Sales_{t-1} - Cost\ of\ Goods\ Sold\ (COGS)_t}{Sales_t}} \quad (2)$$

Asset Quality Index (AQI). Asset Quality Index in Equation (3) is the ratio of non-current assets other than property, plant and equipment (PPE) divided by total assets of year t versus the previous year (t-1). The index measures for what portion of the total assets the future benefits are not that certain. If Asset Quality Index is greater than 1, it indicates that the company is using cost deferral to show better performance and low cost. Thus, M.D. Beneish expects that an increase in the risk of asset realization indicates an increased inclination to cost capitalization. However, there is a possibility that the increase is partially due to acquisitions which involve goodwill (Beneish, 1999).

$$\text{Asset Quality Index (AQI)} = \frac{\frac{Other\ Long\ Term\ Assets_t}{Total\ Assets_t}}{\frac{Other\ Long\ Term\ Assets_{t-1}}{Total\ Assets_{t-1}}} \quad (3)$$

Sales Growth Index (SGI). This is the ratio of sales in year t compared to sales in year t-1, presented in Equation (4). The increase of this variable does not necessarily imply the existence of a manipulation, but the companies that report significant increases are examined with more caution as the managers are pressed to achieve earnings targets. If companies experience significant stock price drop at the first signs of a slowdown, they may be more motivated to use manipulation and eliminate the impression of growth decelerating, which costs a lot to them (Beneish, 1999).

$$Sales\ Growth\ Index\ (SGI) = \frac{Sales_t}{Sales_{t-1}} \quad (4)$$

Depreciation Index (DEPI). Equation (5) presents the ratio of the rate of depreciation in year t-1 compared to the corresponding rate in year t. The depreciation rate in a given year is equal to the depreciation divided by the sum of depreciation and property, plant and equipment (PPE). A result greater than 1 indicates that the depreciation rate of assets has slowed down which may signal that the reporting entity explores new methods of improving income and financial performance by increasing the estimates of assets' useful lives. To analyse the possibility of companies using lower depreciation rates to manipulate financial results, M.D. Beneish tested the model using the depreciation rate instead of changes in the depreciation rate, which did not lead to enhancement of the model's specification or alterations (Beneish, 1999).

$$\text{Depreciation Index (DEPI)} = \frac{\frac{Depreciation_{t-1}}{(Property, Plant\ \&\ Equipment_{t-1} + Depreciation_{t-1})}}{\frac{Depreciation_{t}}{(Property, Plant\ \&\ Equipment_{t} + Depreciation_{t})}} \quad (5)$$

Sales General and Administrative Expenses Index (SGAI). This index in Equation (6) is calculated as the ratio of sales, general and administrative (SGA) expenses to sales in year t relative to the corresponding ratio in year t-1. An irregular increase of these expenses compared to the change in sales is a warning signal for the future financial perspectives of the reporting entity (Beneish, 1999). This disproportion may also reveal the transfers of resources under the form of external benefits (Spătăcean, 2019).

$$Sales, General\ and\ Administrative\ expenses\ Index\ (SGAI) = \frac{\frac{SGA\ Expenses_t}{Sales_t}}{\frac{SGA\ Expenses_{t-1}}{Sales_{t-1}}} \quad (6)$$

Leverage Index (LVGI). Equation (7) is the ratio of total debt (current liabilities plus total long-term debt) to total assets in year t relative to the corresponding measure in year t-1. A Leverage Index result greater than 1 signals an increase in leverage which is also a negative signal for the firm's ability to continue operations under normal business conditions. M.D. Beneish included this variable to the model with the intention to capture the earnings manipulation incentives driven by the debt covenants (Beneish, 1999).

$$\text{Leverage Index (LVGI)} = \frac{\frac{Current\ Liabilities_t + Total\ Long\ Term\ Debt_t}{Total\ Assets_t}}{\frac{Current\ Liabilities_{t-1} + Total\ Long\ Term\ Debt_{t-1}}{Total\ Assets_{t-1}}} \quad (7)$$

Total Accruals to Total Assets (TATA). The indicator in Equation (8) is calculated as the difference between income from continuing operating and cash flow from operations, divided by total assets. This ratio reveals the extent to which managers manipulate earnings by using discretionary accounting options (Spătăcean, 2019).

An important remark to Equation (8) is that if the company does not specify a net income category for the income from continuing operations or prepare a multistep income statement report, net income can be used instead. Therefore, the total sum of accrual differences is determined as the difference between net profit and cash flows from operating activities - based on the findings of the cash flow statement (Hołda, 2020).

TATA is taken as a proxy for the extent to which cash represents reported earnings and higher positive accruals (less cash) are expected to be associated with a higher probability of earnings manipulation (Beneish, 1999).

$$Total\ Accruals\ to\ Total\ Assets\ (TATA) = \frac{Income\ from\ Continuing\ Operations_t - Cash\ Flow\ from\ Operations_t}{Total\ Assets_t} \quad (8)$$

2.2. Beneish M-score model

All variables in this formula are the indicators described previously and the Beneish M-score model is presented mathematically as follows:

$$M\ score = -4.84 + 0.92 \times \text{DSRI} + 0.528 \times \text{GMI} + 0.404 \times \text{AQI} + 0.892 \times \text{SGI} + 0.115 \times \text{DEPI} - 0.172 \times \text{SGAI} + 4.679 \times \text{TATA} - 0.327 \times \text{LVGI} \quad (9)$$

When the model was first created by M.D. Beneish in 1999 the limit was set at -2.22. This means that when applying the model, a result greater than -2.22 (i.e., less of a negative) is an indication that the financial statements may have been altered with fraudulent intentions (Beneish, 1999). In 2004 the model was tested again by using a sample of 120 "manipulator" companies and 67 366 "non-manipulator" companies for the period from 1986 to 2001 and as a result of the new calculations, the level was moved to –1.99. (Hołda, 2020). Finally, in 2012, M.D. Beneish established the value of -1.78 as the M-score threshold for manipulation of financial statements (Beneish, Lee and Nichols, 2012)

Although, Beneish M-Score method can be used to detect companies with certain probability to commit fraud on their financial statements, not all of the companies which exceed the given threshold, are charged for being manipulators. (Pustylnick, Temchenko and Gubarkov, 2017) Empirically, companies that have higher M-score also have higher tendency to commit fraud. Beneish M-score is a probabilistic model, so that one of the limitations is that the ability to detect fraud is not with 100% accuracy.

3. Methodology

3.1. Approach

In the literature there exist a lot of probabilistic and statistical analyses of the predictive efficiency of Beneish M-Score model with multiple companies. In this research we mainly analyse and comment on two companies which were charged with fraud by SEC in 2021 in order to observe at what point and if the manipulation of financial data was predictable and if after the restatement Beneish M-scores shows that the manipulation was removed.

Selected financial indicators are be taken from the companies' financial statements and used to calculate the eight financial ratios necessary for the M-score model. This action is performed consecutively for each of the analysed periods followed by the calculation of the M-score using the eight-variable version of the formula. These calculations aim to observe how the M-score results change through years and after restatement of financial statements.

3.2. Data and collection method

All the required data is collected from secondary source. The data used for the calculations in this paper is collected from the official 10-K annual reports of the companies from the U.S. SEC database. The analysed period for each company is between five and seven fiscal years, depending on the data availability and the companies' fraud reporting period.

4. Empirical analysis

4.1. Pareteum Corporation

Pareteum is New York-based telecommunications company which is a global provider of Communications Platform-as-a-Service solutions. This includes a platform that connects devices around the world. The company operates in North America, Latin America, Europe, Middle East and Africa, and Asia-Pacific regions (Pareteum.com, 2022)

On September 2nd, 2021 the company was charged by Securities and Exchange Commission with fraud and other violations coming from multiple filings that contained inaccurate financial statements and disclosures (Sec.gov, 2021). SEC's official order states that from January 2018 through June 2019, Pareteum manipulated its revenue. It was overstated by performing revenue recognition based on non-binding purchase orders before the actual shipment of product. In addition, another finding in the order is that once questioned about the large increase in its accounts receivable, Pareteum manipulated the third-party confirmation process and hence provided false information to its auditor (Sec.gov, 2021).

The Pareteum Corporation neither admitted nor denied SEC's findings. The company consented to the SEC order finding that Pareteum violated multiple rules and provisions. As per the order's requirements, Pareteum had to pay a $500,000 penalty. Fortunately, company's cooperation in the process of the investigation and its corrective actions was acknowledged by SEC's order.

On December 14, 2020, Pareteum restated its financial statements for the financial year 2018 and the first half of 2019. Some of the amendments are the reduction of the 2018 revenue from $32.4 million to $20.3 million and the increase of the net loss from $12.9 million to $18.0 million (Sec.gov, 2021).

The analysis of Pareteum Corporation by the M-score method invented by Beneish M.D starts from 2016 before the revealed fraudulent actions. In order to calculate the M-score for 2016, the data used in this research is for the financial years ending on December 31st, 2015 and December 31st, 2016.

Table 1. Selected data from financial statements of Pareteum Corporation

In thousands, USD	**2015**	**2016**	**2017**	**2018**	**2018 (restated)**	**2019**
Sales revenue	31 015	12 856	13 548	32 436	20 258	62 049
COGS	5 926	3 659	3 684	10 330	10 054	47 134
Accounts receivables, net	1 112	615	2 058	15 362	3 338	8 307
Current assets	4 016	3 195	16 696	23 928	11 905	18 662
Property, plant and equipment, net	15 023	8 708	4 713	4 554	5 444	6 262
Depreciation	15 496	14 534	15 756	19 491	22 792	24 205
Total assets	25 392	13 045	25 326	161 041	159 509	54 028
SGA expenses	14 284	13 049	11 672	20 970	20 527	44 928
Net income (loss)	-5 006	-31 445	-12 463	-12 975	-18 024	-226 770
Cash flow from operations	8 980	-3 658	-2 616	-7 662	-7 820	-17 761
Current liabilities	14 822	13 293	7 538	20 006	19 094	49 934
Other long-term assets	6 353	1 142	19 673	132 559	142 160	29 104
Total long-term debt	2 517	9 117	2 367	8 971	8 940	5 656

Source: Pareteum financial statements published on www.sec.gov

In Table 1. I have selected a few financial indicators for the period 2015-2019 which are necessary for the calculation of the financial ratios used in the M-score model. As stated before, the financial statements for 2018 were restated in 2020, so M-score is calculated twice for 2018 – once by using the initially published data and once by using the restated data. This approach allows us to observe if before the restatement M-score model catches the fraud and if after the restatement the indicators for manipulations disappear due to the corrections.

Table 2. Computation of derived variables for Pareteum

Derived variables		2016	2017	2018	2018 (restated)	2019
DSRI	Days Sales in Receivables Index	1.334	3.175	3.118	1.085	0.812
GMI	Gross Margin Index	1.131	0.983	1.251	1.445	2.095
AQI	Asset Quality Index	0.350	8.873	5.322	5.762	0.604
SGI	Sales Growth Index	0.415	1.054	2.394	1.495	3.063
DEPI	Depreciation index	0.812	0.812	0.950	0.954	1.016
SGAI	SGA Expenses Index	2.204	0.849	0.750	1.176	0.715
TATA	Total Accruals to Total Assets	-2.130	-0.389	-0.033	-0.064	-3.869
LVGI	Leverage Index	2.516	0.228	0.460	0.449	5.854

Source: Author's calculations

In Table 2. are shown all the derived variables results for Pareteum Corporation. At first glance, we note that the Days Sales in Receivables Index increased drastically in 2017 and 2018 reaching values above 3 but was significantly reduced to 1.085 in the 2018 restatement. According to the model a result above 1.465 is an alarming sign for possible accelerated revenue recognition to inflate profits, which later turns out to be the case as per SEC's report. The Gross Margin Index result in 2018 before restatement also exceeds the threshold of 1.193 which means that the gross margin is deteriorating, and management may be more prone to use manipulation. However, as the Gross Margin Index keeps growing even after restatement, I suppose that it might be due to company's worsening performance.

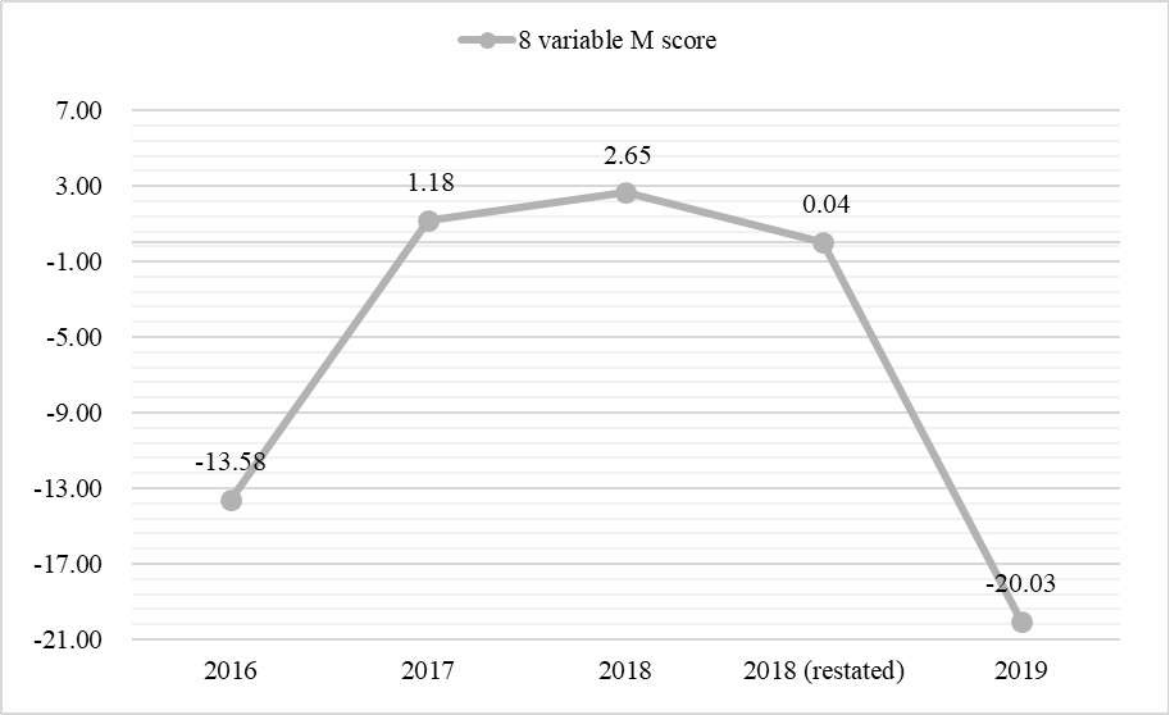
A significant fluctuation is observed in the Asset Quality Index as it reaches values above 8 in 2017. These results are far above the manipulator benchmark of 1.254 and suggest the existence of tendencies toward capitalizing and deferring costs instead of expensing them. The index drops to "non-manipulator" values below 1.039 in 2019 when fraudulent practices were probably ceased. The Sales Growth Index results also adhere to Beneish's model specifications as we observe manipulation results of 2.394 in 2018 when manipulations were proven. Here a value greater that 1.607 is considered as possible earnings alternation. The restated value of 1.495 complies with Beneish's assumptions. In 2019 the SGI even surpasses the result from 2018, reaching 3.063 but we cannot affirm with certainty that new manipulations exist, although the company may be regarded with more caution.

On the other hand, the Depreciation Index results remain quite stable during the examined period, slightly increasing in 2019 which may suggest that Pareteum Corporation slowed its rate of depreciation. With regard to the SGA Expenses Index, Pareteum Corporation does not seem to use creative accounting practices to distort financial results as the index values do not fall below -1 which is considered as the benchmark. Similarly, TATA Index does not exceed 0.031 meaning that most probably the accruals were not involved in manipulation. During the examined year of manipulation – 2018, Pareteum Corporation does not show a Leverage Index

result above the benchmark of 1 which means that no signs of manipulation are present here. The Leverage Index was quite high in 2016 and more than doubled in 2019 which means that predictive ratios cannot be used straightforward and additional specifics of the companies need to be analysed.

In Figure 1 below are shown the M-score results per year calculated via the model's formula with eight variables.

Figure 1. Pareteum Corporation M score



Source: Author's calculations

From the results above we observe a defined curve of the M-score values through the years. Back in 2016, the M-score was way below the threshold for manipulation (even if we consider the original one of -2.22 from 1999), indicating no presence of manipulation. However, in 2017 and 2018 there is a significant increase and M-score reaches record values of 2.65. We observe that this event occurs exactly around the period when manipulation was suspected by SEC. Afterwards, the restatement of financial data for 2018 decreases the M-score result to 0.04, approaching the manipulation "safe zone" below -1.78. Consequently, in 2019, the year following the restatement, a very sharp drop of the M-score can be observed due to the aforementioned ameliorations in few of the manipulation indicators.

4.2. Kraft Heinz Co.

Kraft Heinz Co. is one of the largest multinational food and beverage companies in the world which was formed by the merger of Kraft Foods and Heinz in 2015. The company is co-headquartered in Chicago and Pittsburgh (Kraftheinzcompany.com, 2022).

In September 2021 Kraft Heinz Co. was officially charged by Securities and Exchange Commission with engaging in a long-running expense management scheme (Sec.gov, 2021). According to SEC's analysis, Kraft Heinz Co. performed different accounting misconducts like the recognition of unearned supplier discounts, maintenance of false and misleading contracts with suppliers for the period starting from the last quarter of 2015 to the end of 2018. These actions incorrectly reduced the company's cost of goods sold and led to unreal "cost savings". All these accounting inaccuracies resulted in inflated adjusted EBITDA reported by Kraft Heinz Co. which is a key performance indicator for investors. Consequently, as investors heavily rely on the fact that public companies by definition should be accurate in their public statements, companies misleading them will be held accountable by SEC (Sec.gov, 2021). Kraft's former Chief Operating Officer Eduardo Pelleissone and its former Chief Procurement Officer Klaus Hofmann were also charged by SEC for their participation in the scheme including actions like approving improper contracts, ignoring the warning signs, pressuring the procurement division to hit unrealistic savings targets and approving the company's financial statements (Cnbc.com, 2022). As per the order's requirements, Kraft Heinz Co. had to pay a penalty of $62 million.

After the investigation of SEC began in June 2019, Kraft Heinz Co. restated its audited consolidated financial statements at December 30, 2017 and for the years ended December 30, 2017 and December 31, 2016. The restatement resulted in correcting a total of $208 million in improperly recognized cost savings arising out of nearly 300 transactions. (Sec.gov, 2021).

Kraft Heinz Co. did not post the restated Consolidated Balance Sheets as of December 31, 2016, only as of December 30, 2017, therefore it was not possible to calculate the M-score for both the restated years – 2016 and 2017.

In Table 3 below are shown selected values from Kraft Heinz financial statements.

Table 3. Selected data from financial statements of Kraft Heinz Co. 2015-2018

In thousands, USD	**2015**	**2016**	**2016 (restated)**	**2017**	**2017 (restated)**	**2018**
Sales revenues	18 338	26 487	26 300	26 232	26 076	26 268
COGS	12 577	16 901	17 154	16 529	17 043	17 347
Accounts receivables, net	1 454	898	N/A	1 812	1 812	2 281
Current assets	9 780	8 753	N/A	7 266	7 201	9 075
Property, plant and equipment, net	6 524	6 688	N/A	7 120	7 061	7 078
Depreciation	906	1 830	N/A	2 094	2 089	2 584
Total assets	122 973	120 480	N/A	120 232	120 092	103 461
SGA expenses	3 122	3 444	3 545	2 930	2 976	19 141
Net income (loss)	647	3 642	3 606	10 990	10 932	-10 254
Cash flow from operations	2 467	5 238	2 648	527	501	2 574
Current liabilities	6 932	9 501	N/A	10 132	10 154	7 503
Other long-term assets	106 669	105 039	N/A	105 846	105 830	87 308
Total long-term debt	49 805	53 405	N/A	43 853	43 862	44 180

Source: Kraft Heinz Co. financial statements published on www.sec.gov

As I mentioned above, Kraft Heinz Co. did not post the complete restated financial data for 2016, so the approach I adopted regarding this company is the following: M-score is calculated for 2016, 2017 using the initially reported data. Afterwards, the M-score is again calculated for 2017 but this time using the restated data for 2017 and the original one for 2016. The idea is to

observe at least how the M-score will change when only one year's restated data is available. For 2018 the M-score is also calculated twice – once by using the original data for both 2017 and 2018 and again by using the restated financial statements as of December 30, 2017.

Table 4 shows the predictive ratios results calculated using the financial statements data in Table 3.

Table 4. Computation of derived variables for Kraft Heinz Co. 2016-2018

Derived variables		2016	2017	2017 (restated)	2018	2018 (restated)
DSRI	Days Sales in Receivables Index	0.428	2.037	2.050	1.257	1.250
GMI	Gross Margin Index	0.868	0.978	1.045	1.089	1.020
AQI	Asset Quality Index	1.005	1.010	1.011	0.959	0.958
SGI	Sales Growth Index	1.444	0.990	0.984	1.001	1.007
DEPI	Depreciation index	0.568	0.945	0.941	0.850	0.854
SGAI	SGA Expenses Index	0.764	0.859	0.878	6.524	6.385
TATA	Total Accruals to Total Assets	-0.013	0.087	0.087	-0.124	-0.124
LVGI	Leverage Index	1.132	0.860	0.861	1.113	1.111

Source: Author's calculations

The Days Sales in Receivables Index results in 2017 show one of the manipulation techniques as the value of 2.037 is above the threshold of 1.465. Then in 2018 the index returns to normal levels below the benchmark of 1.465 and suggests that manipulative actions are no longer present. However most of the other ratios including Gross Margin Index, Asset Quality Index, Sales Growth Index, Depreciation Index and SGA Expenses Index, if analysed separately, do not enter the "manipulators" zone beyond the thresholds for each predictive ratio as defined in the model. According to the M-score model Total Accruals to Total Assets Index should not exceed 0.031, otherwise some warning signs for accrual engagement in creative accounting are present. From Table 4 we see that TATA result of 0.087 for 2017 surpassed the threshold, meaning that manipulation indications exist.

Table 5. M score of Kraft Heinz Co. 2016-2018

	2016	2017	2017 (restated)	2018	2018 (restated)
8 variable M score	-2.79	-1.07	-1.03	-3.80	-3.81

Source: Author's calculations

The calculations in Table 5 revealed that even after the restatement of the financial data for 2017, the M-score for 2017(restated) (1.03) remains in the manipulator zone above the threshold of -1.78. This is due to the fact that the calculation of the eight predictive ratios was done based on the original fraudulent data for 2016. Afterwards, we observe that the use of the initial fraudulent data for 2017 as t-1 and the use of the restated data for 2017 as t-1 does not change the M-score result for 2018 (the value is still - 3.8). It remains in the "non-manipulator" zone since the financial statements data as of December 31, 2018 was not manipulated as per SEC's report. Generally, we observe that the model's principles work if the necessary data is available.

For the purpose of this research, I have decided to calculate M-score for the consecutive 3 years (2019-2022) after the "fraudulent" years 2016 and 2017 in order to observe if the M-score model produces consistent results. No fraudulent actions are yet officially discovered by

regulators for the period from 2019 to 2021, therefore by definition the M-score model should not show manipulation signs. In Table 6 is presented the selected data from Kraft Heinz Co. financial statements.

Table 6. Selected data from financial statements of Kraft Heinz Co. 2018-2022

In thousands, USD	**2018**	**2019**	**2020**	**2021**
Sales revenues	26 268	24 977	26 185	26 042
COGS	17 347	16 830	17 008	17 360
Accounts receivables, net	2 281	2 146	2 063	1 957
Current assets	9 075	8 097	10 822	8 994
Property, plant and equipment, net	7 078	7 055	6 876	6 806
Depreciation	2 584	3 187	3 563	3 868
Total assets	103 461	101 450	99 830	93 394
SGA expenses	19 141	5 077	7 049	5 222
Net income (loss)	-10 254	1 933	361	1 024
Cash flow from operations	2 574	3 552	4 929	5 364
Current liabilities	7 503	7 875	8 061	9 064
Other long-term assets	87 308	86 298	82 132	77 594
Total long-term debt	44 180	41 826	41 526	34 878

Source: Kraft Heinz Co. financial statements published on www.sec.gov

Table 7 includes the calculated predictive ratios for 2019, 2020 and 2021.

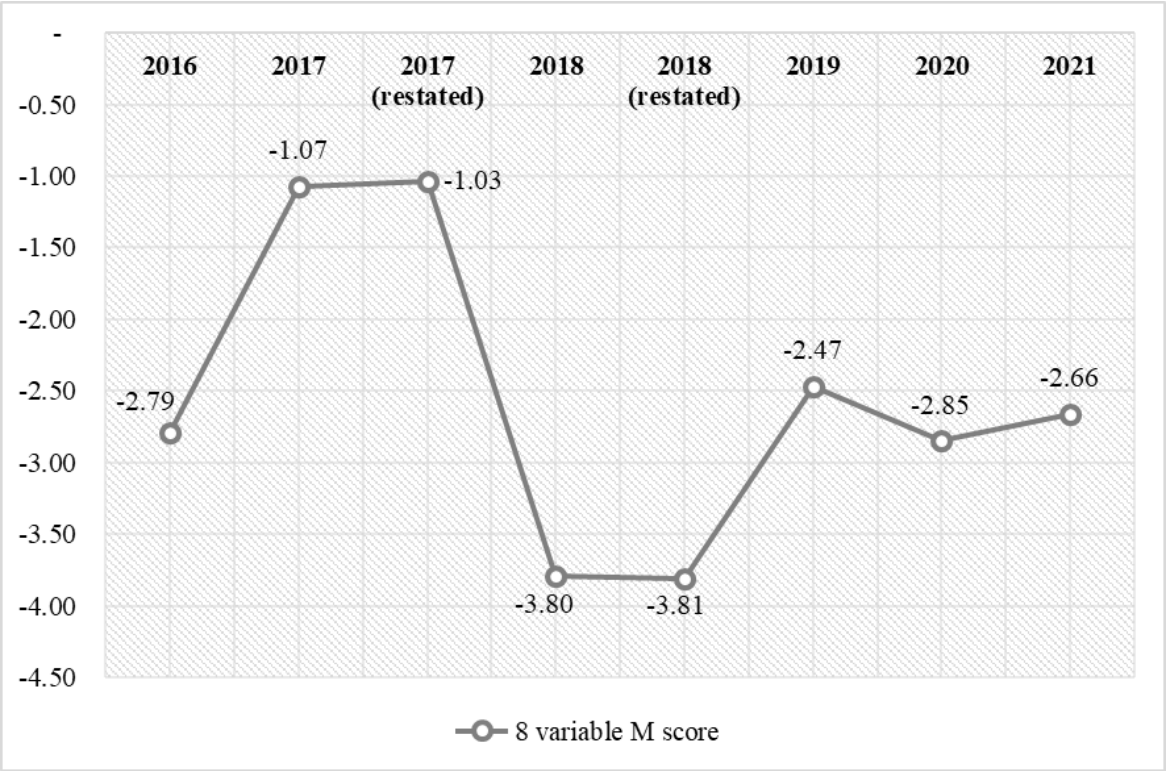
Table 7. Computation of derived variables for Kraft Heinz Co.

Derived variables		**2019**	**2020**	**2021**
DSRI	Days Sales in Receivables Index	0.989	0.917	0.954
GMI	Gross Margin Index	1.041	0.931	1.051
AQI	Asset Quality Index	1.008	0.967	1.010
SGI	Sales Growth Index	0.951	1.048	0.995
DEPI	Depreciation index	0.859	0.912	0.942
SGAI	SGA Expenses Index	0.279	1.324	0.745
TATA	Total Accruals to Total Assets	-0.016	-0.046	-0.046
LVGI	Leverage Index	0.981	1.014	0.947

Source: Author's calculations

Figure 2 reveals the M-score fluctuations for the period 2016-2021. The results confirm that the financial statements data for the period 2019-2021 was most probably not manipulated as the M-score results are below the manipulation threshold of -1.78 varying between -2.47 and -2.85. Even if we consider the first threshold introduced by M.D. Beneish in 1999 -2.22, Kraft Heinz Co. still appears as a "non-manipulator" for this period.

Figure 2. Kraft Heinz Co. M-score



Source: Author's calculations

The analysis of the second company in this paper – Kraft Heinz Co. also shows that the model can be indeed used to catch manipulative actions under the condition that many factors should be considered and model is not just used straightforward.

5. Limitations

First of all, Beneish M-score is a probabilistic model, so that one of the explicit limitations is that the model is not able to detect fraud and earnings manipulations with 100% accuracy. Even though the model helps analysts in detecting the financial frauds in the company, the M-score model only gives the researcher the probability of manipulation. Another limitation is that if the management of the company is quite familiar with the mechanisms and calculation of the Beneish M-score model, then they may manipulate the balance sheet entries, used for the calculation of M-Score.

Another significant limitation of the model is that it is estimated using financial information for publicly traded companies. Therefore, privately-held firms cannot be reliably studied using the M-score model. Moreover, the model was created using sample which involves cases of earnings overstatement rather than understatement and hence, the model cannot be applied to firms that operate in circumstances favorable for earnings decrease (Beneish, 1999). In other words, the model only works when the companies manipulate their statements 'upwards' attempting to create better earnings results. The opposing case can be observed when companies

attempt to limit their tax exposure by manipulating earnings and the approach used in M-Score model will not produce any meaningful signs of earnings manipulation. (Pustylnick, Temchenko and Gubarkov, 2017)

While the model's variables exploit distortions in financial statement data that could result from manipulation, these distortions can have an alternative origin like material acquisition during the period examined, material shift in the firm's value maximizing strategy, or a significant change in the company's economic environment. (Beneish, 1999)

The data availability is also a limitation of this research as not all companies' data is easy-accessible, well structured or consistent. Even if we analyse only public companies as in this paper, data is not always available for each fiscal year or for a prolonged period. Moreover, depending on the standards and the business specifics, companies structure their financial statements in different way and the calculation of uniform indicators for completely different companies can be quite challenging.

6. Recommendations and suggestions

To further expand the analysis a few approaches can be adopted. I would suggest that other companies officially charged with manipulation can be included in the research. Since most of the research papers I have found on this topic focus mainly on testing the capabilities of the M-score model using mathematical and statistical analyses of multiple companies or focusing on notorious cases like Enron scandal, future research might deepen the analysis of the model's mechanisms concentrating on fewer fraudulent cases of companies like Enron and entering into details for each business. The methodology of the research can also be ameliorated by including other theories and models in the analysis. Another recommendation is that the specifics of different industries can be studied in order to refine the ability to reveal manipulations by analysing the key indicators and needs for a business sector.

7. Conclusion

After the performed research, I can conclude that Beneish M-score model definitely outlines some of the most significant manipulation signs and in some cases may indeed assist professionals in the process of revealing fraudulent actions. However, fraud detection remains a difficult task and often requires to think out of box and derive information from various sources. The model has its limitations and cannot be used straightforward as a lot of factors should be taken into account and all included variables need to be carefully analyzed in respect of all companies' specifics and economic environment. The accounting ratios included in the model are fundamental for the analysis and even if these ratios are widely used in financial analysis, they derive from purely accounting data which as history has demonstrated is subject to different interpretations and in some cases even manipulation. In the literature review there were different suggestions and interpretations for some of the metrics used in the model computation which may produce varying results in revealing financial statement manipulations. This research also shows that the computation of metrics which happens year on year, reveals another imperfection of the model when applying it to cases where financial statement

manipulation and then restatement is done over several years. However, the strength of the model arises from the fact that manipulation indicators can be found both in the individual metrics constructing the model and in the collective result.

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CONFERENCE
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20 - 21 SEPTEMBER 2022, SOFIA

	Name	Organization/ University
1	**Mathieu Dunes - key speaker**	University of Picardie Jules Verne (LEFMI), France
2	**Elena Simeonova**	UNWE, Bulgaria
3	**Jeko Milev**	UNWE, Bulgaria
4	**Moustapha Aman**	University of Picardie Jules Verne (LEFMI), France
5	**Nadya Velinova-Sokolova**	Sofia University, Bulgaria
6	**Paskal Zhelev**	UNWE, Bulgaria
7	**Tsvetelina Marinova**	New Bulgarian University, Bulgaria
8	**Galia Mancheva**	MRC, UNWE, Bulgaria
9	**Desislava Petkova**	Sofia University, Bulgaria
10	**Gordon Kerr**	Gobden partners, UK
11	**Nikolay Nenovsky**	University of Picardie Jules Verne (LEFMI), France
12	**Diyana Miteva**	UNWE, Bulgaria
13	**Petar Chobanov**	UNWE, Bulgaria
14	**Plamen D. Tchipev**	Plovdiv University "P. Hilendarski, Bulgaria
15	**Rossitsa Toncheva**	UNWE, Bulgaria
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17	**Presiana Nenkova**	UNWE, Bulgaria
18	**Gergana Mihaylova**	UNWE, Bulgaria
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22	**Spartak Keremidchiev**	BAS, Bulgaria
23	**Marcellin Yovogan**	Sofia University, Bulgaria
24	**Elena Kirilova**	MRC, UNWE, Bulgaria
25	**Kiril Tochkov**	Texas Christian University, USA
26	**Tatiana Houbenova-Delisivkova**	Chair Union of Economists in Bulgaria, ERI at the Bulgarian Academy of Sciences
27	**Nino PAPACHASHVILI**	Institute for Development Studies, Sulkhan-Saba Orbeliani University, Georgia
28	**Tomáš NIKODYM**	Metropolitan University Prague, Czech Republic
29	**Nikolay BOGATZKY**	UNICUSANO University of Rome, Italy
30	**Iskra CHRISTOVA-BALKANSKA**	ERI at Bulgarian academy of sciences
31	**Tadas GUDAITIS**	Vilnius University, Lithuania
32	**Laurent ESTACHY**	KEDGE Business School, France
33	**Antonio MAGLIULO**	University of Florence, Italy
34	**Galia TASEVA,**	UNWE, Bulgaria
35	**Dimitar DAMYANOV**	UNWE, Bulgaria
36	**NIKOLAY VELICHKOV**	UNWE, Bulgaria
37	**Saikak MOULAY-DRISS**	Mohammed V University in Rabat, Morocco

8th ANNUAL MRC CONFERENCE
ECONOMIC CHALLENGES IN THE CONTEXT OF PANDEMIC AND WAR CIRCUMSTANCES
SOFIA, 20-21 SEPTEMBER 2022

TUESDAY - SEPTEMBER 20th	ZOOM Link Hybrid format	
8:30 - 9:00 am	**Registration & time to join the online session**	
09:00 – 9:15 am	**Welcome speeches**	**Nikolay NENOVSKY**, University of Picardie Jules Verne, LEFMI, UNWE, Director MRC **Petar CHOBANOV**, Director of Institute for politics and economics, UNWE, Bulgaria **Tatiana HOUBENOVA-DELISIVKOVA,** Chair Union of Economists in Bulgaria, ERI at the Bulgarian Academy of Sciences **Diyana MITEVA,** Deputy Director of Institute for politics and economics, MRC, UNWE, Bulgaria **Marcellin YOVOGAN, Head of** Department of Finance and Accounting, Sofia University, Bulgaria
09:15 – 10:00 am	**Plenary Session** ***In memoriam of prof. Xavier RICHET***	**Chair: Nikolay NENOVSKY,** University of Picardie Jules Verne, UNWE, Director MRC, Bulgaria **Participants:** **Tatiana HOUBENOVA-DELISIVKOVA,** Chair Union of Economists in Bulgaria, ERI at the Bulgarian Academy of Sciences **Vesselin MINTCHEV,** Member of ERI at the Bulgarian Academy of Sciences **Spartak KEREMIDCHIEV,** Member of ERI at the Bulgarian Academy of Sciences **Tsvetelina MARINOVA,** New Bulgarian University
10:00 - 10:30 am	**Keynote Session1**	**Chair: Nikolay NENOVSKY,** University of Picardie Jules Verne, UNWE, Director MRC, Bulgaria **Mathieu DUNES,** University of Picardie Jules Verne, LEFMI, France */Social media usage: issues and challenges for tomorrow/*
10:30 – 11:00 am	**Coffee Break**	
11:00 – 13:00 pm	**Presentation session 1**	**International economics** **Moderator: Tsvetelina MARINOVA**, New Bulgarian University **Speakers:** **Elena SIMEONOVA,** UNWE, Bulgaria */Some speculations on measurability with WERY (war economic recovery index)/* **Tatiana HOUBENOVA-DELISIVKOVA,** Chair Union of Economists in Bulgaria, ERI at the Bulgarian Academy of Sciences */The anti-corruption fight for the protection of the EU funds: new challenges and risks/* **Nino PAPACHASHVILI, Tamta Mikaberidze, Marine Tavartkiladze,** Institute for Development Studies, Sulkhan-Saba Orbeliani University, Georgia */Georgia's Approximation with the EU: Export Challenges/* -**Online present** **Paskal ZHELEV**, UNWE, Bulgaria */The foreign exchange policy of China – is the country a "currency manipulator"?/* **Plamen CHIPEV,** Plovdiv University**,** ERI at BAS, Bulgaria */The Ownership in Different Schools of Economic Thought. Comparisons and an Alternative Approach/* **Tomáš NIKODYM,** Prague University of Economics and Business, Czech Republic */Ordoliberalism and liberalism in post-war Czechoslovakia (1945–1948)/* - **Online presentation** **Nikolay BOGATZKY,** UNICUSANO University of Rome, Italy */Living standards and Occupational groups of the Bulgarian Urban Population in the middle of the 1920s/*

13:00 – 13:45 pm	**Lunch**	
13:45 – 15:45 pm	**Presentation session 2**	**Banking, crises, currencies** **Moderator: Tatiana HOUBENOVA-DELISIVKOVA**, Chair Union of Economists in Bulgaria, ERI at the Bulgarian Academy of Sciences **Speakers:** **Gordon Kerr**, founder of Cobden Partners, UK /*The evil payment trilogy: push payment fraud; abolition of cash and Deductions from Face Value when payment is made by Cards*/ **Iskra CHRISTOVA-BALKANSKA,** ERI at Bulgarian academy of sciences /*The Bulgarian banking system after the covid 19 pandemic crisis*/ **Kamelia ASSENOVA,** UNWE, Bulgaria /*Is COVID-19 pandemic affect banks activities?*/ **Moustapha AMAN & Nikolay NENOVSKY**, University of Picardie Jules Verne (LEFMI), France /*Monetary Stability and Regional Currency Board: towards a two-tier system to accelerate regional integration in the Horn of Africa. (A Policy Proposal)*/ **Desislava PETKOVA**, Sofia University, Bulgaria /*Detection of financial statements manipulation using the beneish m-score: the case of companies recently charged by sec.*/ **Tsvetelina MARINOVA**, New Bulgarian University /*Monetary policies to Covid-19 in the Balkans: policy reactions and challenges*/
15:45 - 16:00 pm	**Coffee Break**	
16:00 – 16:30 pm	**Keynote Session 2**	**Chair: Nikolay NENOVSKY,** University of Picardie Jules Verne, UNWE, Director MRC, Bulgaria **Kiril TOCHKOV,** Texas Christian University, USA /*Trade Potential and Border Effects between Bulgaria and North Macedonia*/ - **Online presentation**
19:30 pm	**Official Dinner**	
WEDNESDAY - SEPTEMBER 21st		**ZOOM Link Hybrid format**
09:00 – 10:30 am	**Presentation session 1**	**Financial and international economics** **Moderator: Diyana Miteva,** Deputy Director of Institute for politics and economics, MRC, UNWE, Bulgaria **Speakers:** **Tadas GUDAITIS**, Vilnius University, Lithuania /*Assessing funded pensions schemes in Baltic countries from a participant's perspective: benefits or losses?*/- **Online presentation** **Jeko MILEV**, UNWE /*The Distribution Phase and the Short-Term Risks for the Universal Pension Funds in Bulgaria*/ **Laurent ESTACHY**, KEDGE Business School, France /*2022 Inflationary trend: The geostrategic hypotheses in the era of Ukraine's invasion*/ - **Online presentation**

		Vasily TKACHEV, MGIMO University, Russia /*Transition to payments for Russian gas in rubles: one step beyond*/ - **Online presentation**
10:30 – 11:00 am	**Coffee Break**	
11:00 – 11:30 pm	**Keynote Session 1**	**Chair**: **Nikolay NENOVSKY,** University of Picardie Jules Verne, UNWE, Director MRC, Bulgaria **Antonio MAGLIULO**, University of Florence, Italy /*Europe. A Road to Peace and Development*/ - **Online presentation**
11:30-12:30 pm	**Presentation session 2**	**International and Financial Economics** **Moderator: Diyana Miteva,** Deputy Director of Institute for politics and economics, MRC, UNWE, Bulgaria **Speakers:** **Galia TASEVA**, UNWE, Bulgaria /*Financing from suppliers during COVID-19 pandemic: evidence from Bulgarian listed firms*/- **Online presentation** **Galia MANCHEVA**, MRC, UNWE, Bulgaria /*EU global leadership in trustworthy AI: High-risk applications – implementation and gabs*/ **Nadya VELINOVA-SOKOLOVA**, Sofia University, Bulgaria /*Challenges of management of green finance after the pandemic*/
12:00 – 13:00 pm	**Lunch**	
13:00-14:30 pm	**Presentation session 2**	**Monetary and Financial Economics** **Moderator: Tatiana HOUBENOVA-DELISIVKOVA,** Chair Union of Economists in Bulgaria, ERI at the Bulgarian Academy of Sciences **Speakers:** **Gergana MIHAYLOVA**, UNWE, Bulgaria /*Post COVID-19 recovery and new challenges for central and eastern European countries*/ **Dimitar CHOBANOV**, UNWE, Bulgaria /*Bulgaria and the Euro: a year before the target date*/ **Yanko Hristozov**, UNWE, Bulgaria /*What happened to Bulgaria and the Eurozone*/ **Dimitar DAMYANOV & NIKOLAY VELICHKOV**, UNWE, Bulgaria /*Convergence of the GDP structures of CEE countries to the euro area*/ - **Online presentation** **Saikak MOULAY-DRISS**, Mohammed V University in Rabat, Morocco /*The effectiveness of monetary policy in the context of central bank independence in developing countries*/ **- Online presentation** **Diyana Miteva**, Deputy Director of Institute for politics and economics, MRC, UNWE, Bulgaria /*Impact of pandemics- an economic perspective*/
14:30 pm	**Closing remarks**	**Nikolay Nenovsky** **Diyana Miteva**