MONETARY AND ECONOMIC RESEARCH CENTER

9th ANNUAL CONFERENCE

INFLATION 2022 - CIRCUMSTANCES, CHALLENGES, IMPACT

SELECTED PAPERS

Sofia, Bulgaria

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MONETARY RESEARCH CENTER

The ninth annual scientific conference of the Monetary and Economic Research Center (MRC) was held from the 18th to the 20th of September 2023 at the University of National and World Economy (UNWE) in Sofia, Bulgaria. The MRC Conference aims to bring together the international academic community, enable interactive discussions and other forms of interpersonal exchange of experience, and support the power of scientific research.

The Selected papers from the Conference are financed through university project *НИД НФ-16/2023* at the University of National and World Economy and through the financial support of The Bulgarian National Science Fund by project *№ КП-06-МНФ/11* from 23.05.2023. The Bulgarian National Science Fund is not responsible for the content of the papers, presented at the conference, nor for the content of the adverts and other material.

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The main accent on the 9th Annual Conference was the inflation in 2022 and its circumstances, challenges and impact. More than 70 researchers, professionals, experts, and students from 12 countries took part.

The present book consists of selected papers in English language.

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FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH IN CEE COUNTRIES

Gergana Mihaylova-Borisova, University of National and World Economy[1]

Abstract: *Given the important financial sector's role in economies, the study examines whether there is a relationship between the GDP growth and financial development of CEE countries. For this purpose, first the causality is tested by means of Granger-causality test and then an attempt is made to assess the influence of one variable on the other. The GDP growth and financial development's relationship is examined for the ten countries in CEE, with the period covered being 2010-2022. It is expected that financial development has a great importance for the improved growth in the studied countries. Data on loans, deposits in the banking system, and market capitalization as a share of GDP are used. The results confirmed that financial sector contributes positively to the realization of higher and stable GDP growth in CEE countries.*

Keywords: *financial development, CEE countries, economic growth*
JEL: *G10, G21, C50*

1. Introduction

The financial sector plays a leading role in an economy because of its active participation in the redistribution of spare resources in the economy. In most countries, the banks play the leading role in financial intermediation and the transfer of free financial resources from savers to investors, especially in Central and Eastern European (CEE) countries where the non-banking sector is not as well developed as the banking sector.

In most CEE countries, financial intermediation by banks as a share of assets in GDP does not exceed 100%, apart from the banking sector in the Czech Republic and Hungary. Capital markets in CEE countries are quite underdeveloped, having a market capitalisation of no more than 30% of GDP, except for the Czech Republic and Poland.

Given the significant role of the financial sector in the economies, this study aims to examine the link between economic growth in CEE countries and their financial development. The choice of these countries is conditioned by the fact that they are less developed than the old EU member states. Some of them are already members of the euro area but have incomes below the EU average, such as Estonia and Lithuania. Others have not yet adopted the euro and are lagging further behind the incomes of the old EU member states such as Bulgaria and Romania.

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However, in all these countries reforms need to be undertaken to bring about faster convergence towards the core EU countries.

The study tests the link between GDP growth and financial development by first examining the causality i.e. whether financial sector contributes to economic growth or conversely economic growth contributes to faster financial sector development. Some studies in the economics literature prove the bilateral relationship between these variables (Adusei, 2013; Yildirim et al., 2013).

For the purpose of this study, the data published by the European Central Bank (ECB) on the balance sheets of credit institutions are used, and for the market capitalization of these countries, the data published in the CEIC database with the stock markets of individual countries as the primary source are used. The study period is 2010 to 2022, the latest available annual data.

The study is structured in four parts. The introduction presents the relevance of the study and the aim. The second part provides literature brief overview. The third part presents the methodology, data and results of the dependencies assessed. In the last part, the main conclusions of the study and future research related to the topic are drawn.

2. Review of the literature

In reviewing the literature on the relationship of economic growth to financial development, the following grouping can be made:

- Studies that support the thesis that financial development contributes to economic growth (Levine, Zervos, 1998; Khan, Senhadji, 2000; Paudel, Acharya, 2019);

- Studies that support the thesis that economic growth contributes to financial development (Ndlovu, 2013; Zang, Kim, 2007);

- Studies that argue that there is a bidirectional link between these two variables (Adusei, 2013; Yildirim et al., 2013).

These results between financial performance and GDP growth depend on the choice of countries (individual country or group of countries) and the choice of variables characterizing the sophistication of the financial system.

The greatest variety is found in the choice of variables. The majority of studies apply indicators that cover the banking sector performance, which is justified by the greater development of this segment in financial sector‘s structure. Among the indicators used are monetary aggregates (King, Levine, 1993; Lynch, 1996), claims on the non-financial sector or loans to the private sector provided by banks (Mihaylova-Borisova, 2023; King, Levine, 1993; Khan, Senhadji, 2000; Cojocaru, Hoffman, Miller, 2011; Guru, Yadov, 2019), bank deposits (Puatwoe, Piabuo, 2017), banking sector efficiency (Mihaylova-Borisova, 2014). Others focus on indicators

characterizing the capital market and more specifically market capitalization as a % of GDP (Neimke, 2003; Khan, Senhadji, 2000).

Among the studies that deal with assessing the relation between GDP and financial development for the CEE countries, several can be mentioned.

Cojocaru, Falaris, Hoffman, and Miller (2015) examine the role of financial sector for the CEE countries' economic growth and the former Soviet Republics for the period 1990-2008.

Zahariev (2018) proves the existence of a positive relationship between a country's GDP dynamics and financial system indicators such as the banking system's assets.

Lupu (2019) examines the impact of financial performance on GDP growth of two countries, Bulgaria and Romania, over the period 1993 to 2019. It proves the existence of such a relationship consistently for the whole period.

The importance of financial sector for GDP growth in the eight Central and Eastern European countries is studied by Dudian, Popa (2013). The authors use indicators for the banking systems of the countries, covering the period 1996 to 2011. Based on the estimated equations, they reach several conclusions, highlighting that the presence of banking crises in most of these countries leads to an impact on the estimated relationships between the dependent and independent variables. They confirmed that the rate of change of domestic credit had positive influence on economic growth, while domestic credit is negatively related to growth. They also confirm the negative relationship between interest rate spread and non-performing loans with economic growth for the countries under study.

A dynamic panel model to examine the relationship between financial development and economic growth is applied by Caporale et al. (2014). The authors divide the ten new member states into more homogeneous groups by examining the period 1994-2007. The result of the study is that the financial market has a limited impact on economic growth due to high levels of non-performing loans and the manifestation of crises in some of the countries studied. It is shown that the capital market development of the five CEE countries - Slovakia, Slovenia, Poland, the Czech Republic and Hungary - is positively related to their economic growth.

Mihaylova-Boriosva (2023) examines the link between GDP growth and bank intermediation by including the credit to private sector as a share of GDP for CEE countries. The positive relationship between economic growth and bank credit is demonstrated in the study.

3. Data, methodology and results

3.1.Data used and tested hypothesis.

Before proceeding to the estimation of the specific equation, the data used are presented. The variables applied to characterize financial development by the banking sector and the capital

market are shown in Table 1, namely credit extended to the private sector and market capitalization of the stock markets of the CEE countries. The study covers the ten CEE countries Bulgaria, Romania, Czech Republic, Slovakia, Hungary, Poland, Slovenia, Estonia, Lithuania and Latvia.

Table 1. Lisy of variables

	Definition	Sources of data
GDP_GR	GDP growth rate, %	World Bank Database
CPI	Inflation, measured by CPI index, %	World Bank Database
CREDITS	Credits, provided by banks	European central bank
DEPOSITS	Deposits, attracted by banks	European central bank
MCAP	Market capitalization, % of GDP	CEIC

Source: Own presentation

Descriptive statistics of the variables are given in Table 2.

Table 2. Descriptive statistics

	GDP_GR	CPI	CREDITS	DEPOSITS	MCAP
Total					
Average	2.7	3.03	78247	76822	27.85
Minimum	-5.5	-1.54	14364	8792	1.56
Maximum	8.21	19.71	339010	413039	393.04
Median	2.95	2.34	39702	43924	14.15
Standard Deviation	2.77	3.99	83951	86098	58.54
Bulgaria					
Average	2.14	2.8	37951	38823	16.99
Minimum	-3.96	-1.42	30995	24232	9.58
Maximum	7.63	15.33	55156	61912	24.34
Median	2.68	2.44	34293	36207	15.33
Standard Deviation	2.69	4.12	7700	11349	5.74
Czech Republic					
Average	1.96	3	166245	156597	132.39
Minimum	-5.5	0.31	104630	118612	21.77
Maximum	5.39	15.1	245926	236959	393.04
Median	2.46	2.15	148573	135685	27.93
Standard Deviation	2.82	3.81	56194	38070	146.91

Estonia					
Average	3.22	3.61	21671	15748	10.51
Minimum	-1.29	-0.49	14364	8792	7.44
Maximum	8.01	19.4	32277	26085	16.49
Median	3.16	2.97	20817	14622	10.01
Standard Deviation	2.69	5.12	6163	5878	2.20
Hungary					
Average	2.72	3.68	75915	80340	16.70
Minimum	-4.54	-0.23	62313	56702	11.30
Maximum	7.2	14.61	105335	123641	20.91
Median	3.71	3.33	72252	74541	16.46
Standard Deviation	3.08	3.8	13457	23422	2.93
Lithuania					
Average	3.38	3.39	24982	21797	8.87
Minimum	-0.02	-0.88	18347	12379	5.30
Maximum	6.04	19.71	39123	40226	15.05
Median	3.55	2.33	21087	19159	8.95
Standard Deviation	1.74	5.16	7402	9316	2.24
Latvia					
Average	2.23	2.73	17764	12856	3.54
Minimum	-4.46	-1.08	15355	8818	1.56
Maximum	7.04	17.31	20540	19568	5.21
Median	2.57	2.26	17402	12547	3.64
Standard Deviation	2.86	4.67	1312	3333	1.12
Poland					
Average	3.6	2.99	284371	287346	53.19
Minimum	-2.02	-0.87	217025	190174	36.32
Maximum	6.85	14.43	339010	413039	73.68
Median	4.38	2.23	275128	270013	51.06
Standard Deviation	2.38	3.88	44216	74791	10.99
Romania					
Average	2.92	3.8	69240	69875	17.44
Minimum	-3.9	-1.54	61182	46388	12.05
Maximum	8.2	13.8	96520	113095	21.19
Median	3.85	3.83	65311	64291	19.29
Standard Deviation	3.56	3.81	10100	22130	2.91

Slovenia					
Average	2.21	1.78	30737	30671	14.61
Minimum	-4.32	-0.53	24595	26353	12.26
Maximum	8.21	8.83	37814	39955	19.33
Median	2.77	1.74	30701	28998	14.19
Standard Deviation	3.41	2.33	5017	4606	2.17
Slovakia					
Average	2.6	2.56	53596	54163	4.27
Minimum	-3.34	-0.52	34333	39466	1.86
Maximum	6.72	12.77	88186	77099	5.43
Median	2.67	1.94	49920	51033	4.77
Standard Deviation	2.46	3.39	17636	13039	1.33

Source: Own presentation

Three hypotheses will be tested in relation to the study of the link between GDP and financial development in the countries covered:

Hypothesis 1: Financial development of CEE countries contributes to economic growth. Such a relationship has been estimated in the studies of a number of authors (Levine, Zervos, 1998; Khan, Senhadji, 2000; Paudel, Acharya, 2019).

Hypothesis 2: Economic growth is positively affected by the credit provided to the private sector by the banking system. When credit provided increases, economic growth is also stimulated by more accurately transferring spare resources to productive investment and avoiding information asymmetry through the intermediation of banks.

Hypothesis 3: The market capitalization of stock markets in CEE countries also matters for economic development in terms of increasing the real growth of the economy as it grows, again through investment.

Before assessing the corresponding relationship between the dependent and independent variables, it is necessary to test their stationarity. For this purpose, the statistical software Eviews.10 and the corresponding stationarity tests are used. The results are shown in next three tables.

Table 3. Results of stationarity tests at the levels of the variables

Test		**GDP_GR**	**CREDITS**	**DEPOSITS**	**MCAP**	**CPI**
		Null: Unit root				
Levin, Lin, and Chu t	*Statistic*	-5.285	3.832	8.094	0.454	1.578

	Probability	0.000	1.000	1.000	0.675	0.943
		Null: Unit root				
ADF-Fisher chi-squaretest	*Statistic*	50.033	11.073	0.789	18.779	4.938
	Probability	0.000	0.944	1.000	0.536	1.000
PP-Fisher chi-square test	*Statistic*	123.700	9.293	0.055	54.680	3.413
	Probability	0.000	0.979	1.000	0.000	1.000

Source: E-views, author's presentation

Table 4. Results of stationarity tests for the first difference of variables

Test		**CREDITS**	**DEPOSITS**	**MCAP**	**CPI**
		Null: Unit root process			
Levin, Lin, and Chu t	*Statistic*	1.341	-0.343	-1.119	-2.616
	Probability	0.910	0.366	0.132	0.004
		Null:Unit root process			
ADF-Fisher chi-square test	*Statistic*	16.950	21.080	41.716	22.454
	Probability	0.656	0.393	0.003	0.316
PP-Fisher chi-square test	*Statistic*	47.680	26.492	130.156	17.190
	Probability	0.001	0.150	0.000	0.641

Source: E-views, author's presentation

Table 5: Stationarity test results for the second difference of variables

Test		**CREDITS**	**DEPOSITS**	**MCAP**	**CPI**
		Null: Unit root (assumes common unit root process)			
Levin, Lin, and Chu t	*Statistic*	-3.104	-9.761	-4.839	-3.477
	Probability	0.001	0.000	0.000	0.000
		Null: Unit root (assumes individual unit root process)			
ADF-Fisher chi-square test	*Statistic*	52.192	95.451	65.141	27.566
	Probability	0.000	0.000	0.000	0.120
PP-Fisher chi-square test	*Statistic*	136.901	117.437	181.495	44.772
	Probability	0.000	0.000	0.000	0.001

Source: E-views, author's presentation

On analysing the obtained results, it can be concluded that the GDP growth (GDP_GR) is stationary at the level of the variable i.e. it is integrated by I (0) and the variables CREDITS, DEPOSITS, MCAP and CPI are stationary at their second difference i.e. they are integrated by second order I (2).

3.2. Results

Before estimating the equation for the variables under study, it is necessary to test causality i.e. to test the first hypothesis. Granger causality test is used for this purpose.

Using the test to determine the causality between credit (CREDITS) and GDP growth (GDP_GR), it is found that the null hypothesis *CREDITS does not Granger Cause GDP_GR* is rejected with a probability of 0.028 and is below the critical value of 5%, while the hypothesis *GDP_GR does not Granger Cause CREDITS* cannot be rejected with a probability of 0.3866>0.05. Thus, it is proved that credits for determinants of economic development of CEE countries like the studies of Levine, Zervos, 1998; Khan, Senhadji, 2000; Paudel, Acharya, 2019.

Using the test to determine the causal link between market capitalization (MCAP) and GDP growth (GDP_GR), it is found that the null hypothesis *MCAP does not Granger Cause GDP_GR* is rejected with probability 0.0256 and is below the critical value of 5%, while the hypothesis *GDP_GR does not Granger Cause MCAP* cannot be rejected with probability 0.569>0.05. Thus, it is proved that market capitalization is important for the economic development of CEE countries.

Therefore, the following equation will be estimated:

$$GDP_{GR} = f(CREDITS, DEPOSITS, MCAP, CPI) \qquad (1)$$

where:

GDP_GR - real GDP growth, annual percentage change.

CREDITS - credit extended by banks to the private sector, expressed in millions of euros for all CEE countries. Credits are expected to have a positive impact on economic growth due to the fact that economic agents will increase demand for goods and services with greater borrowing of financial resources, which will increase output and hence the GDP growth rate.

MCAP - market capitalisation expressed as a share of GDP. It can be expected that an increase in the market capitalisation of a stock exchange will have a positive impact on economic activity because an increase in market capitalization is evidence of more active demand for financial instruments, which raises their prices. Economic agents, through the intermediation of the

capital market, will access more financial resources to invest in new projects. The increase in investment will also contribute to an increase in output and economic growth.

CPI - inflation measured by the harmonised index of consumer prices in percentages. Inflation is expected to be positively associated with GDP growth due to the fact that stable and predictable inflation contributes to higher GDP growth (Fisher, 1993; Iqbal, Nawaz, 2009). For example, Fisher (1993) proves that at low levels of inflation, positive GDP growth is observed, but when inflation increases, the relationship changes from positive to negative. Similarly, Iqbal, Nawaz (2009) prove for Pakistan that the link between inflation and GDP growth turns from positive to negative above 6% inflation. Inflation is included in the second difference estimating equation due to the fact that at second difference the series is stationary. This is the reason for not including inflation with non-linear form (Table 3, 4 and 5).

The inflation rate for the period 2010-2022 averages around 3% for the CEE countries, which is within the understanding of price stability, although in the last year of the study, 2022, there is a more significant increase in inflation due to the continued expansionary policies of central banks, limited energy commodities, rising prices (Borisov, 2022, p.8), the war between Ukraine and Russia.

DEPOSITS - deposits in the banking system, expressed in millions of euros for all CEE countries.

A balanced panel model is estimated for ten CEE countries. Cross-section fixed effects are included. The results of the estimated equation are presented in Table 6.

Table 6: Results of the estimated regression equation

	Model
Constant	5.0202***
	(8.3277)
D(D(CREDITS))	0.285345***
	(3.5258)
D(D(DEPOSITS))	-0.000226***
	(-3.626892)
D(D(MCAP(-1)))	0.008277**
	(1.993236)
D(D(CPI(-2)))	0.258475**
	(2.511652)
GDP_GR(-1)	-0.343001***
	(-3.42903)
GDP_GR(-3)	-0.250648*
	(-1.773001)

R-squared	0.456408
Adjusted R-squared	0.346221
Prob(F-statistic)	0.000019
Durbin-Watson stat	2.349869
Cross-sections included	10
Total panel (balanced) observations	90
Sample adjusted period	/2010-2022/

* Significant at the 10 percent level

** Significant at the 5 percent level

*** Significant at the 1 percent level

Source: E-views, own calculations

All coefficients on the independent variables are statistically significant, (at the 1% level) except for market capitalization, which shows significance at the 5% level, and economic growth with lag 3, which is significant at the 10% level. The estimated regression results prove that there is a positive link between credit and GDP growth and between market capitalization and GDP growth as expected. Market capitalization is included with lag 1 in the estimated equation, which is explained by the fact that it takes time to transfer the impact of financing investment with financial resources from capital markets on economic developed. More significant is the impact of credit on GDP growth, as the coefficient is several times higher in front of this variable compared to the coefficient in front of market capitalization, 0.29 versus 0.01, respectively.

The dependent variable with lags 1 and 3 is also included, which is explained by the presence of a certain cyclicality in the economy. Inflation has the expected positive sign due to the low level of inflation during the covered period of study, which is consistent with previous studies.

4. Conclusion

The study examines whether there is a relationship between GDP growth and financial intermediation in CEE countries by first testing causality. For this purpose, a balanced panel model was used for the ten CEE countries - Bulgaria, Romania, Czech Republic, Slovakia, Hungary, Poland, Slovenia, Estonia, Lithuania and Latvia.

The hypothesis of the existence of a link from financial intermediation to GDP growth is tested. Two variables are used to characterise financial performance to capture financial intermediation

through banks and intermediation through the capital market, namely bank credit and market capitalisation.

The results of the study show that there is a positive relation between GDP growth and financial intermediation, and it is unidirectional for the study period 2010-2022: from financially developed country to economic growth. This indicates that countries' policies should focus on the continued improvement of financial systems development for the purpose of achieving higher and sustainable levels of GDP growth.

Given the importance of the financial sector for economic development, it is envisaged to conduct a study on the banking efficiency of CEE countries in the future and to link efficiency to economic development. In addition, it would also be of interest to extend the scope of countries to the European Union level because all CEE countries are also members of the European Union.

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THE EUROPEAN CENTRAL BANK AT 25: EFFECTIVENESS OF THE MONETARY POLICY

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Abstract: *25th anniversary of the European Central Bank is the occasion for an assessment of its monetary policy. Maintaining the price stability is the main objective according to the ECB statute. However, changes in economic conditions led to unconventional measures and additional objectives like financial stability.*

A set of indicators is used in order to assess the efficiency of the monetary policy medium-term inflation rate, deviation between the actual and the targeted interest rate on the interbank market and the output gap. Data shows that close to 50% of the time ECB failed to meet its inflation target.

Key words: *European Central Bank, monetary policy, inflation*

JEL: *E3, E4, E5*

1. Introduction

1 June 2023 marks the 25th anniversary of the European Central Bank. The main objective of this institution is to maintain price stability, and in this respect, it is the successor of the German central bank, the Deutsche Bundesbank. Formally speaking, the ECB should be the most independent central bank in the world, which in turn would contribute to the fulfilment of its objective.

Since its inception, the ECB has evolved and begun to perform tasks not originally envisaged. It is currently involved in maintaining financial stability, micro- and macro-prudential supervision, and it is also a decision-making partner of the European Commission. Some of these additional tasks have been regulated by legislative changes, while others are presumably covered by the Treaty on European Union and the Statute of the Bank.

The independence of the central bank is a very important condition for its effectiveness. Cukierman et. al. (1992) provides four measures of central bank independence and explores their relationship with inflation. The study also reveals the difference between developed and emerging markets regarding the relationship between independence and inflation. Alesina et. al. (1993) explores the relationship between central bank independence and the dynamics of key macroeconomic variables such as real interest rates, growth and unemployment. The main conclusion is that central bank independence increases price stability but cannot influence indicators related to the real economy. Fuhrer D. C. (1997) seeks empirical evidence to support the thesis that an effective central bank should be independent of political influence and should make the necessary efforts to target inflation directly. Klomp, J. and De Haan, J. (2010) examines the relationship between central bank independence and inflation in over 100 countries and finds that only a small number of countries show a statistically significant relationship.

Wellink N. (2023) points out that some of the necessary conditions for a smoothly functioning monetary union are not present in the euro area. The article examines the formulation of the price stability objective, the use of unconventional monetary policy instruments, monetary transmission problems, and the financial stability framework.

The literature review points to the idea that the central bank should be independent, have a clear mandate and effectively implement its monetary policy instruments.

This study focuses on monetary policy and more specifically on the effectiveness of monetary policy, which is defined as the extent to which the stated objective of price stability is being met. During the period under review, there have been several major changes, especially in the instruments used in the conduct of monetary policy (so-called unconventional policy).

Depending on the fulfilment/non-fulfilment of the price stability target, several periods can be distinguished: from the establishment of the ECB until March 2002; April 2002 to September 2009 - the longest period of non-achievement of the inflation target; October 2009 to July 2012 - the financial crisis and the response to it; August 2012 to March 2014 - again non-achievement of the inflation target; April 2014 to April 2022 - the period of "missing" inflation and the COVID-19 crisis; and May 2022 to the present - high inflation.

The second part of this paper examines the objective of monetary policy to achieve and maintain price stability. The evolution of the way this objective is formulated is examined and explained.

The third part defines and explains in detail the indicators for assessing the effectiveness of monetary policy. Three main indicators are proposed: the dynamics of the inflation target itself, the deviation between the interest rate target and market interest rates, and the deviation from the euro area potential GDP (output gap). The lack of a specific definition of what is meant by inflation in the medium term makes it difficult to assess the achievement of the target. This challenge can be overcome by taking average annual inflation over a three-year period, which is consistent with the classical notion of medium-term.

The second indicator takes as target the interest rate on the main refinancing operations (MRO). ECB monetary policy will return to its classical basics when this interest rate starts to play its primary role. This means that the deposit and lending facility rates will also return to their classical meaning and role.

The output gap is an important indicator that suggests how monetary policy relates to the phases of the business cycle and whether it is pro-cyclical in certain periods.

The fourth part of the paper concludes and reflects on periods of higher and lower than target inflation and their implications for economic growth.

2. The goal of the monetary policy

The Treaty on the Functioning of the European Union (TFEU) and the Statute of the European Central Bank (ECB) set out the Bank's main task - to maintain price stability. However, price stability itself is not explicitly defined. In fact, therefore, the Governing Council of the ECB adopted its own definition in October 1998. According to this definition, price stability is an increase in the Harmonised Index of Consumer Prices on an annual basis for the euro area below 2% over the medium term. The medium-term period is considered to be between 1 and 3 years. Thus, the GC quite deliberately does not set a specific inflation target in the range between 0% and 2%.

The ECB's official target refers to the rate measured according to the overall harmonised index of consumer prices, but in addition it also uses the so-called core inflation, which is the exclusion from the index of food and energy prices, which are assumed to be more sensitive to temporary factors. Thus, both indicators (headline and core inflation) are used simultaneously by the ECB in its monetary policy decisions.

The first review of monetary policy strategy was conducted in 2002. In 2003, there is a formal publication, namely Issing et al. (2003). The Governing Council reaffirmed the chosen definition with the specification that, if the target is met, the inflation rate will be close to but below 2% in the medium term. This means in effect that the inflation target is considered to be met when the rate is between 0% and 2%, i.e. the presence of deflation in the medium term is thus interpreted as non-fulfilment.

In 2019, the ECB's Governing Council is undertaking a change to the definition of price stability. A symmetric target of around 2% was adopted. This means that the 2% upper bound is effectively removed and inflation can fluctuate on either side of 2%. The 2% inflation target in the medium term has not been changed, but the rate is now allowed to diverge and exceed this value in the short term. The ECB's commitment to price stability is thus weakened.

The formal confirmation of this change occurs in 2021 with the revision of the monetary policy strategy. The new approach is an insufficiently specified symmetric target around 2%. The impact of this change can be observed in the Bank's final period of operation from May 2022 onwards. The acceleration in inflation is also due to the increased appetite for going beyond the 2% limit.

The ECB's Governing Council sets the inflation target to be 2% and, moreover, upward or downward deviations are equally undesirable. However, changing the target does not make it any clearer, nor does it lead to increased credibility. Thus, it does not determine in what cases action would be taken in the event of deviations from the target. Such temporary deviations are possible, but if they have occurred in past periods this does not necessarily mean that corrective action should be taken. Monetary policy is forward-looking.

The understanding in society of a target defined in this way is that it would allow for longer periods of looser monetary policy, especially during an economic recovery. Thus, in the ensuing episode, when inflation started to rise in the second half of 2021 and then reached record high annualised rates in 2022, the comment from the ECB was that it would be gradually

lowered to its medium-term target. However, this episode has given additional arguments to the proponents of the idea of raising the numerical value.

3. Indicators for assessing the effectiveness of monetary policy

The first indicator that could be used to assess the monetary policy of central banks under an inflation targeting regime is the inflation rate observed. According to the ECB Governing Council decision, inflation should be close to 2% (and above 0%) in the medium term. This means that in fact the inflation target should be achieved in a sustainable manner over time and short-term deviations do not define a failure with respect to the set target. Of course, such short-term deviations should not be ignored; they should serve as a signal that action should probably be taken to steer the inflation trajectory in the desired direction.

In order to be consistent with the target defined in this way, I use the annual average inflation rate over a 3-year period. According to conventional understanding, the chosen period is adequate for the set target. Moreover, failure to meet the inflation target for an indicator defined in this way implies that the deviation is persistent and corrective action by the ESB is necessary.

This gives 283 observations until July 2023. Several periods can be distinguished according to the fulfilment of the inflation criterion (between 0% and 2% according to the defined medium-term measure). The first of these is from the establishment of the ECB until March 2001, when the criterion is met. During this period, however, the dot-com (.com) bubble burst, necessitating the ECB to adopt an accommodative policy.

As a result, inflation started to accelerate and this led to the next period, from April 2002 to October 2009, which lasted 90 months and then the ECB did not meet the inflation target. During this period, the maximum inflation rate according to the selected indicator reached 2.56%, i.e. the deviation was not that large. However, the length of the period is perplexing because of the lack of a more timely response from the ECB.

This period was characterised by the first and second waves of enlargement of the European Union (in 2004 and 2007 respectively). It has been combined with the maintenance of low monetary policy base rates, which also means negative short-term interest rates in the euro area. The monetary expansion of this period also served as an instrument to support the newly acceded EU members through short-term and direct investment flows. The most advanced economies among them managed to meet the nominal convergence criteria relatively quickly and to join the monetary union as well.

The tightening of monetary policy after the prolonged expansion, together with the development of the financial crisis in the United States, contributed to the development of a recession in the euro area. The fall in economic activity means a decline in employment, a contraction in credit and in the balance sheets of the banking system and of non-financial corporations.

The following period, which lasted until July 2012, served to recover the economies from the economic crisis and was characterised by the fulfilment of the inflation target. The ECB undertook a further aggressive cut in key interest rates. However, the financial turmoil has led to a change in investors' perceptions of the default risk of individual euro area countries. While

spreads tightened strongly before the crisis, during and after the crisis quality preferences and risk aversion led to strong demand for German government securities at the expense of mostly Greek, Portuguese, Spanish, Italian and Irish ones. As a result, risk premia for the latter have risen sharply and this has contributed to the development of the euro area debt crisis.

In the 20-month period from August 2012 to March 2014, the ECB again failed to meet the medium-term inflation criterion. This time, the maximum inflation rate according to the selected indicator reached 2.34%, i.e. the deviation was relatively small.

The euro area economies then slowed down. The economic stagnation also affected the price level, which changed slowly. During this period, the interest rate on the ECB's main operations was gradually lowered to 0% and that on the deposit facility even became negative, which represented a precedent in the history of finance. In this way, euro area credit institutions effectively paid interest to the ECB on their excess reserves held with it. Despite this and asset purchases, inflation remained low.

In 2020, the COVID-19 crisis and the measures to prevent its spread involving the closure of economies and the suspension of some activities lead to a short-term severe shock that caused a serious downturn in economies around the world, including in the euro area. Previous attempts to tighten monetary policy got suspended. Massive fiscal and monetary stimulus was launched.

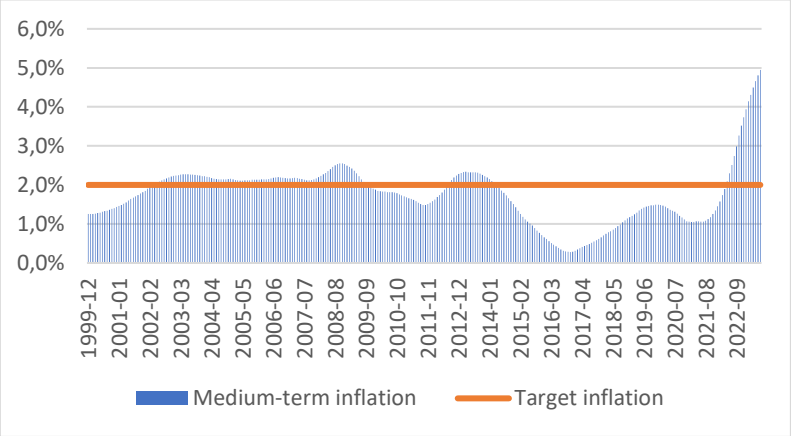
Together with the disruption of supply chains for some commodities (supply shock) and a massive demand stimulus in the recovery process, this led to a rapid acceleration in the inflation rate starting in early 2021. The process received a further boost from the outbreak of war in Ukraine and the decision of EU countries to end their dependence on energy resources and other raw materials from Russia.

However, the next period, according to my proposed inflation criterion, began in May 2022 and continues at present. This period is characterised by a failure to meet the inflation target and the presence of a serious deviation from it, with the indicator reaching a maximum value of 4.95%. The ECB's response is overdue. The arguments of the members of the Governing Council are that the deviations are temporary, the factors causing inflation are one-off effects that will subside over time and this will lead to a calming of inflation.

However, these arguments proved inadequate to the reality. The ECB is started to raise its key interest rates, but nevertheless maintained the policy of quantitative easing for a period of time, thus continuing to maintain a high level of liquidity in the euro area. This, of course, did not help to slow inflation.

After all, from the ECB's establishment until July 2023, the total number of months in which the ECB did not meet its medium-term inflation target was 124. This means that in 43.8% of the entire period the inflation target was not met, and the ECB only fulfilled its mandate in 56.2% of the period.

Figure 1: Medium-term and Target Inflation Rate



Source: The European Central Bank and author's calculations based on EUROSTAT data.

The second assessment indicator is the deviation between the target interest rate and the market interest rate. The importance of this indicator is determined by its use as a key instrument in the inflation targeting regime. The idea is that the value of the interest rate on the main operations should be as close as possible to the overnight rate on unsecured deposits in the interbank market. If the ECB manages the interest rate target and liquidity in the interbank market effectively, the achievement of the inflation target should consequently follow.

Two periods could be distinguished according to the degree of deviation of the target rate from the market rate in the interbank market. The first covered the period from the creation of the ECB until January 2009. Then, the difference between the main operations rate and the interbank market rate ranged from -31 bp to 19 bp, with an average deviation over the period of -5 bp. That is to say, during this period the ECB used the interest rate as its main monetary policy tool.

However, the outbreak of the global financial crisis and the accompanying economic recession changed the situation. The ECB started to use unconventional monetary policy measures through (massive) asset purchases. The idea of short-term interest rate management is to influence economic activity through the yield curve. When short-term interest rates rise, they are to be followed by longer-term interest rates, slowing domestic demand and the rate of inflation.

Under unconventional policy, the ECB is directly involved in other markets - it can trade longer-term government but also corporate bonds, thus directly influencing liquidity and interest rates in these markets. However, this distorted the long-term bond markets because it produced different interest rates than would have been the case without central bank intervention. Thus, the ECB's main tool is gradually shifting from short-term interest rates in the interbank market to asset purchase programmes, and the size of the balance sheet of the European System of Central Banks has become the measure of these operations.

However, the change in the tool affected the observed indicator. The difference between the target value and the market value increased. During the period from February 2009 to July

2023, the maximum difference between the two rates reached 101 bps, while the average was 44 bps. The second period therefore differed significantly from the first.

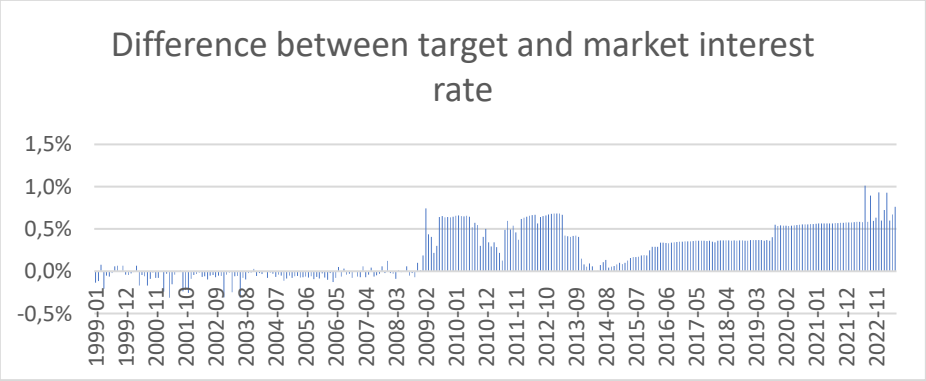
In fact, in the second period, the interbank market rate was closer to that of the deposit facility offered by the ECB to credit institutions, coupled with a prolonged period of negative values for this indicator. In November 2013, as a result of the resolution of the euro area debt crisis, the interest rate differential between the main operations rate and the interbank market rate narrowed.

In October 2014, however, a historic event in finance took place: as a result of ECB policy, the euro area interbank market rate turned negative for the first time in history. In March 2016, the ECB reintroduced a zero interest rate on the deposit facility amid prospects of the euro area stabilising and achieving higher economic activity. The next important date was 1 October 2019, when the Euro Short Term Rate was introduced, replacing the previously existing EONIA.

In July 2022, the main operations rate was raised to 0.5%, marking the start of this cycle. From September 2022, the interbank offered rate was already positive.

In fact, the change in the main instrument used and the introduction of unconventional monetary policy were the main factors behind the deviation between the target and market interest rates. However, as I also pointed out above, this also contributed significantly to the acceleration in the inflation rate from the beginning of 2021.

Figure 2: Deviation between Target and Actual Interest Rate in the Interbank Market

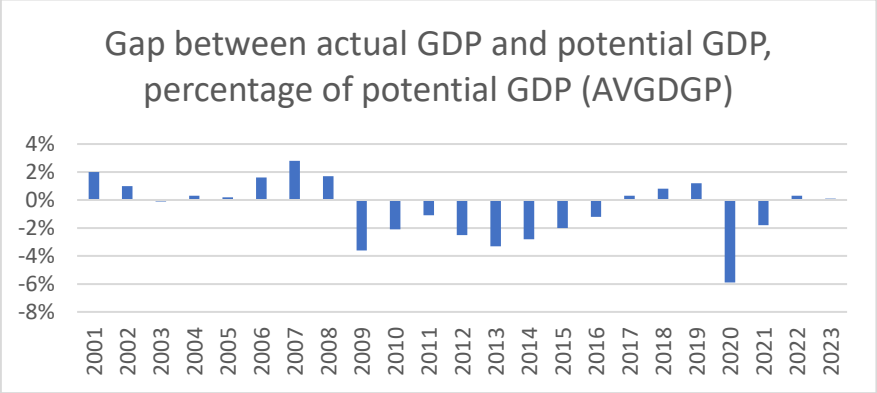


Source: The European Central Bank and author's calculations.

The third indicator is the deviation from the potential GDP of the euro area (output gap). Annual data for this indicator are available from the European Commission's AMECO database. They show that before the dotcom (.com) bubble burst, the euro area economy was above its potential, a situation that has since been corrected, with EU enlargement having an impact, as some capital flowed into these economies, which also generated additional demand for euro area output.

A highly expansionary monetary policy then led to an overshooting of potential in the period 2006-2008. This was a period of high but unsustainable growth in the euro area and the rest of the EU, which was interrupted when the global financial crisis erupted.

Figure 3: Output Gap in the euro area



Source: European Commission's database AMECO.

From 2009 to 2016 was the most prolonged period when the euro area economy was below its potential. This was driven first by the recession that accompanied the Global Financial Crisis and then by the Eurozone Debt Crisis, which permanently depressed economic growth in the region.

The ECB responded to these events by undertaking active asset purchases. The first sharp increase in its assets took place in September 2008, when, on a monthly basis, the assets of the Eurosystem increased by 35% or EUR 512 billion. Thus, at the end of 2008, they reached EUR 2 trillion for the first time. The programme for asset purchases, the Securities Markets Programme, was launched in May 2010.

Asset purchases continued and in March 2012 the Eurosystem's balance sheet total reached EUR 3 trillion. In September 2012, Outright Monetary Transactions (OMTs) were launched and in principle these two programmes should be neutral in terms of money supply. The resolution of the debt crisis and the stabilisation of the euro area economy contributed to a contraction of the ESCB's balance sheet in 2013-2014.

In June 2014, the programme of Targeted Long-Term Refinancing Operations was launched with a maturity of 3 years. However, asset purchases were then resumed and in April 2016 the Eurosystem's balance sheet reached EUR 3 trillion again. Then, in less than a year (until March 2017), the assets reached EUR 4 trillion, which means that their year-on-year growth exceeded 33%.

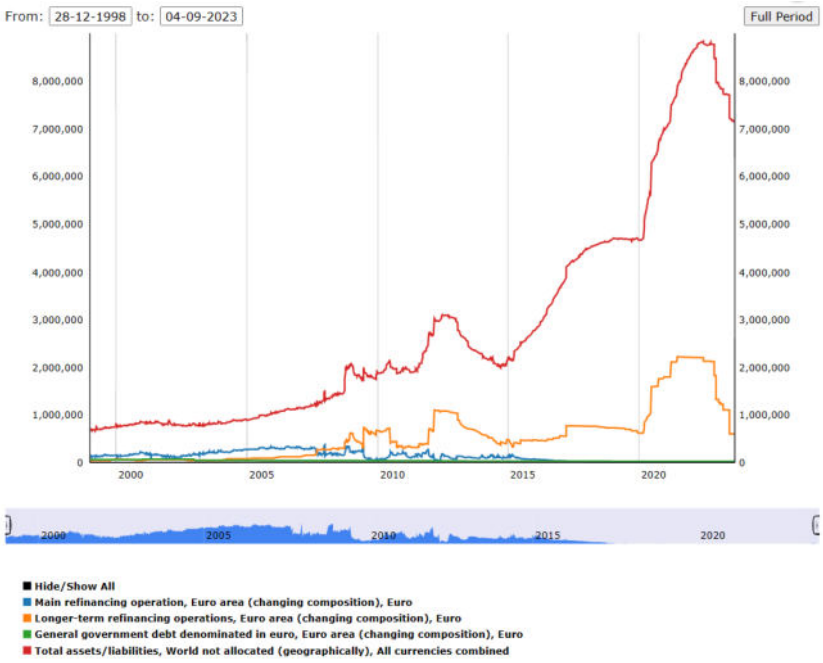
From the beginning of 2019 until March 2020, the Eurosystem's balance sheet figure remained relatively constant at around EUR 4.7 trillion. In March 2020, however, the COVID-19 crisis erupted, triggering a swift reaction. The Pandemic Emergence Purchase Programme (PEPP) was launched and by the end of the month the Eurosystem's assets had already reached EUR 5 trillion. The explicit objective of the programme was to prevent deflation.

Active asset purchases have begun, with €600 billion in asset purchases over a one-week period reaching €6 trillion at the end of June 2020. The rate of purchases remained high until the end of the year and in December the balance sheet figure was already EUR 7 trillion, i.e. in one year assets had increased by 48.7% or EUR 2.3 trillion. The record high value of the ESCB's

balance sheet was reached in June 2022 at EUR 8,836 billion. In fact, net asset purchases have only been discontinued in June, even though year-on-year inflation in the euro area has since exceeded 8%. Nevertheless, the programme was launched in July in order to keep the euro area Transmission Protection Instrument (TPI) operational. As a justification for the ECB's delayed reaction, one can point to the fact that, according to the June 2022 medium-term inflation gauge, inflation exceeded 2% for only the second consecutive month, but against the pertinent background of a sustained upward trend.

Indeed, the COVID-19 crisis caused a sharp change in the deviation of current from potential output, with the euro area economy suddenly ending up well below its potential due to simultaneous demand and supply shocks. The active asset purchases commented above, together with the fiscal stimulus, contributed to the relatively rapid recovery in demand. However, the shock to global trade, together with the outbreak of war in Ukraine and the EU countries' reaction to it, contributed to catching up with the slippage already in 2022.

Figure 4: Assets of the Eurosystem



Source: The European Central Bank

4. Conclusion

In the aftermath of the Global Financial Crisis and the Debt Crisis, the euro area has experienced a prolonged period of low inflation and a divergence of the economy from its potential. This has caused lasting fears among European policymakers of a repeat of the Japanese economic scenario - prolonged deflation and low economic growth. This appeared to be a major motivation for monetary policy decisions in the euro area.

In fact, year-on-year inflation data have indicated that there have been only four episodes of deflation in the ECB's lifetime, two of which were directly related to sharp declines in economic activity - the Global Financial Crisis and the COVID-19 crisis. In both cases the deflation lasted for 5 consecutive months. In the other two episodes, between December 2014 and March 2015 and then February-May 2016, they did not last long enough to contribute to price declines according to the measure of medium-term inflation that I constructed. So, in fact the deflation fears were not justified, and at the same time the problem of slower economic growth could not be solved by means of monetary policy. This once again proves that the ECB's mandate is about price stability but not about employment or growth.

However, the bottom line is that for prolonged periods of time, the inflation rate has exceeded the inflation target set by the ECB's own Governing Council. This implies that the effectiveness of its core task could be improved. The alternative option is to recognise the existence of other objectives that are, in certain circumstances, seen as more crucial to fulfil than price stability. However, this would not be conducive to enhancing the credibility of the Bank.

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FINANCIAL CONDITION OF BULGARIAN ENTERPRISES IN THE CONTEXT OF INFLATION

Yanko Hristozov[1]

***Abstract**: The topic of poly-crises and the inflation caused by them has been particularly relevant recently. High price levels have led to a number of problems for businesses The purpose of the study is to track the financial condition of Bulgarian enterprises in the context of inflation in the years of poly-crisis. The research focuses on the years 2019 to the beginning 2022. Inflation levels in Bulgaria for the period will be tracked and basic financial indicators of Bulgarian non-financial enterprises from the three largest sectors - trade, manufacturing and energy - will be analysed. The idea is to track the impact of inflation on the financial performance of non-financial corporations from the three biggest Bulgarian economic sectors.*

***Keywords**: financial statement, financial Bulgarian non-financial corporations, inflation,*
***JEL**: D0, E3*

Introduction

Financial and economic crises are one of the most frequently discussed topics, giving scientists the opportunity for numerous studies on the topic. Despite the serious experience of the Great Depression, the 2008 crisis, the COVID-19 crisis and the crisis caused by the war in Ukraine, it seems that we scientists, politicians and businesspeople are still surprised and often unprepared and fail to we foresee the deterioration of the economic indicators in our countries or the financial indicators of the enterprises we manage. This was the case with the COVID-19 crisis and the crisis caused by the war in Ukraine, for the reason that no one had forecast the two events that gave rise to the crises.

Perhaps now it will happen again with the war between Israel and Hamas. The discussion in this report is related to the question, that such unpredictable phenomena often shatter many economic and financial theories, laws and trends. Therefore, it is necessary to change and update our thinking on a number of topics. What is interesting about these crises is that they have led to different problems for businesses. The closest and most interesting crises for researchers are those caused by the war in Ukraine and the pandemic. Unfortunately, there is not yet enough data to draw clear and definitive conclusions about what impact they have had on businesses.

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My personal observations as a researcher and a person running a business are that the pandemic crisis has disrupted supply chains and had a negative effect on the finances of enterprises, due to lack of goods and raw materials, due to difficult logistics and transportation. At the beginning, this crisis led to a significant drop in fuel and energy prices, to a drop in real estate prices. But this was only observed in the first few months, while still no one knew what was going on. In the months that followed, many businesses suffered severely due to the newly created and unforeseen situation.

We observed a number of corporate bankruptcies. At the same time, those who managed to regroup, rethink their business and strategy, adapt to the new environment, managed to profit from this crisis. After all, in a financial and economic crisis, some businesses gain a lot because of the atypical situation, others lose a lot. Of great importance is not only management, but also the sector, the branch, the state, etc.

V. Yotsov, G. Minasyan et al. (2022) highlight several important moments for economies and business and among them are the tightening of monetary policies, unfavorable financial conditions and phenomena, including high inflation, the sharp deterioration of international political relations, environmental problems , increasing the risk of social unrest and protests. Evil Zlatkov (2022) makes an interesting attempt to answer the question, is it possible, by combining several cyclical theories, to obtain clear information about the financial performance of the company and its possible development in the constantly changing macroeconomic environment? This is another approach to analyzing the impact of crises on corporate finances.

The main purpose of this report is to track inflation levels in Bulgaria for the period 2019-2022. At the same time, the main financial indicators of the enterprises from three large and key sectors for the Bulgarian economy - trade, processing industry and energy - should be measured. To trace whether there is any relationship between inflation and these key indicators for enterprises. The study suffers from a lack of data. For inflation, these are available to date, but data are missing from the annual financial statements for 2022. The latest data available is for 2021, so this research should be developed soon when the data is available.

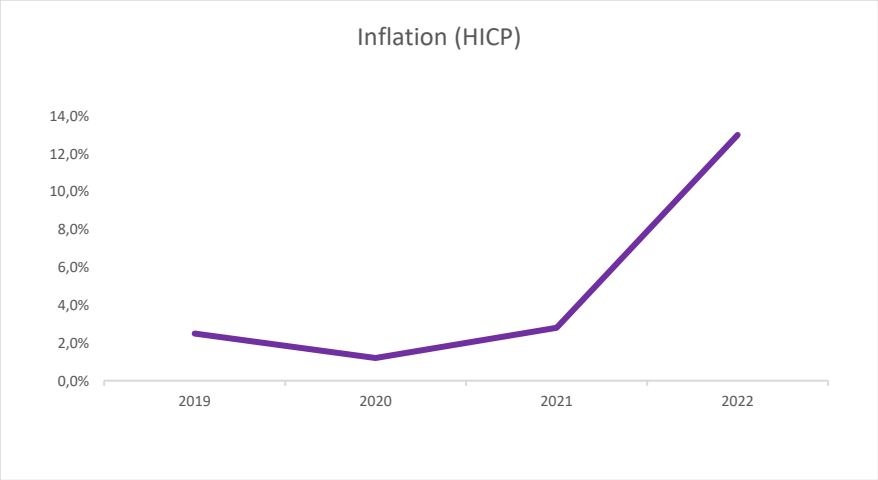
1. Inflation

Inflation is one of the main indicators in the economy and has a significant impact on business development and the finances of enterprises. The last three years, which have passed under the threat of the Covid-19 pandemic, the measures of governments around the world to contain it, the war in Ukraine in 2022 and the deepening economic crisis with rising inflation rates, have significantly influenced the behavior of consumers and traders of small (Dimitrova, V., 2022).

If they want to prevent negative events, enterprises must monitor and analyze global trends in their industry, changes in the prices of raw materials used for their business, changes in world stock market indices, labor market data and other key factors that affect cost of goods. For this reason, the report will look at inflation levels for the period 2019-2022. For a moment we thought that maybe the peak had passed, but with the recent events of October 2023 (Israel-Hamas) no accurate predictions can be made .

In 2022, inflation reached levels not seen in decades. The long and comfortable period of ultra-low inflation and low interest rates ended abruptly after the onset of COVID-19. As a result of the high rates, central banks around the world moved to raise interest rates sharply to cool demand and tame inflation. The effect is yet to be felt. Inflation rates (HICP) are presented in the following figure. As can be seen from 2019 to 2021 the levels are low and almost unchanged, in the range of 1.2 to 2.8. But in 2022 there is a significant increase to 13%. The situation was similar throughout Europe and Bulgaria is not a precedent.

Fig. 1. Inflation (HIPC), annual data, average index and rate of change



Source: Eurostat, own illustration

These low inflation rates were quite favorable for business. They allowed credit to increase excessively, and every pundit knew that excessive credit would increase the money supply, with the result that inflation would inevitably increase. Perhaps no one predicted the high levels of the end of 2022 and the beginning of 2023, but we witnessed an increase in the required minimum reserves for the first time since 2008 from 10 to 12%, yes to this instrument of monetary policy in Bulgaria rarely resorted to. This was done in order to limit high inflation. As a result of crediting, economic growth was also achieved. Business development was upward. This can be traced below in the analysis of the financial indicators of the enterprises. Due to the limited volume of the research, the author focuses on the three largest (as a total amount of assets) economic sectors

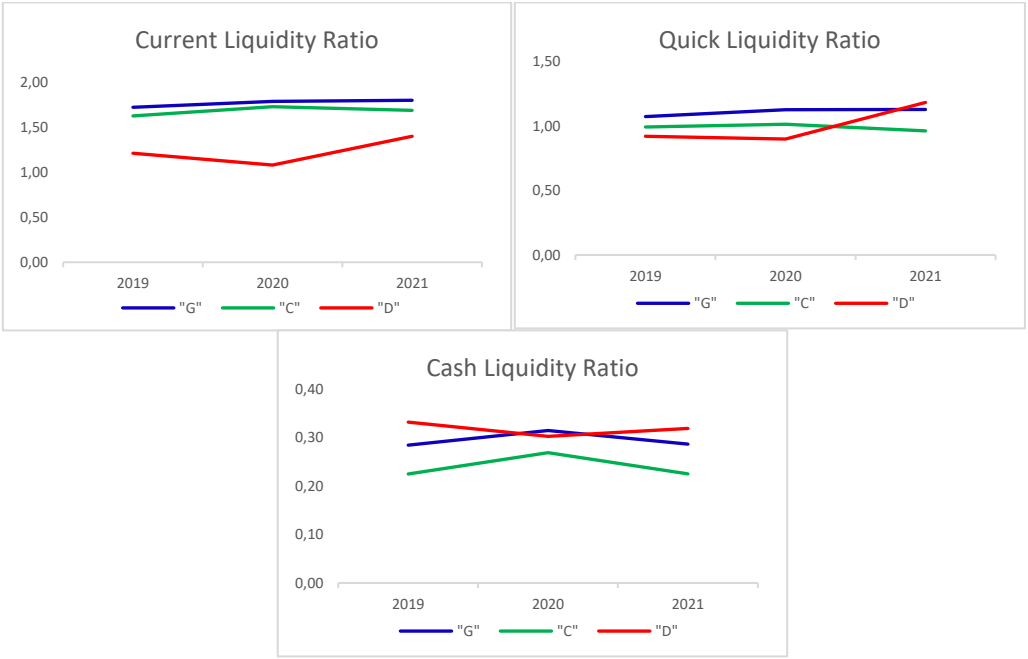
according to the NSI classifier. These are sector G. Trade; repair of cars and motorcycles, C. Manufacturing, D. Production and distribution of electric and thermal energy and gaseous fuels.

Financial statements are essential to track the facts of the economic reality and to take adequate actions to overcome the adverse consequences and overcome the potential risks in the conditions of extraordinary events such as the COVID-19 pandemic (Savova, K., 2022). For this reason, the following points will track the levels of key financial ratios.

2. Corporate Liquidity

Liquidity is an indicator that enterprises analyze and do not underestimate, because it shows their current ability to pay their debts, it is often perceived as a measure of the risk that these debts will not be covered on time. Liquidity has many manifestations and can be measured in different ways. In this report, the typical and most common indicators for its measurement are applied - the coefficients, which are ratios between different balance indicators. The three indicators differ in that each subsequent one represents a stricter test of the companies' solvency. In the following figures, the results of the enterprises can be traced. The primary data used in the figures is provided for the report from the National Statistics Institute of Bulgaria and the calculations and illustrations are from the author.

Fig. 2. Corporate Liquidity Ratios



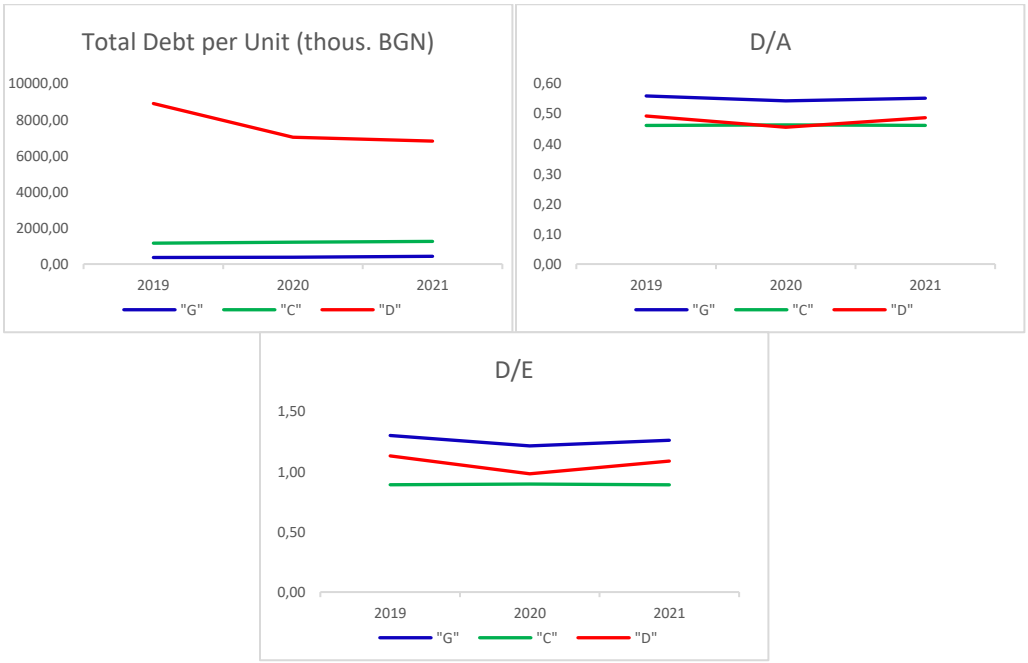
Source: NSI, own calculations

Current liquidity for all three sectors is above 1, indicating that, in general, businesses manage to pay off their short-term liabilities at the expense of their current assets. The levels are highest in sector G. (1.72 to 1.79) and lowest in sector D (1.08-1.4), and in sector C (1.62 - 1.72). A significant change for the studied period is observed only in sector D, where the difference is 32 percentage points. There are no significant changes in the remaining two sectors. In terms of quick and cash liquidity, again the most significant differences are observed in sector D. These significant differences are due to the change in the amount of short-term assets between 2019, when they are BGN 7.95 billion, and 2021, when they are BGN 13.08 billion. The number of enterprises in the sector increased by about 260, perhaps a part of this high difference can be sought in this, but it should be noted that short-term liabilities do not increase as intensively as current assets. Interestingly, the quick liquidity for all three sectors is close to 1. That is, the sectors have serious buffers against the risk of insolvency. Cash liquidity for all three sectors is within the limits that manage to cover between 22 and 33% of short-term liabilities due to cash in hand and on accounts. There are no risk phenomena or particular changes in liquidity indicators. It will be of interest to follow what happens to corporate indebtedness in these sectors.

3. Corporate Debt

The following figure presents two key debt ratios and one absolute value measure.

Fig. 3. Corporate Debt



Source: NSI, own calculations

On fig. 3, it is observed that the total debt on the basis of one enterprise from the sector remains unchanged for sector G (about 360 thousand BGN) and C (about 1200 thousand BGN). Indebtedness according to this indicator for these two sectors is low, while for sector D it is high (about 7-9000 thousand BGN), but a significant decline has been observed in the last year. This indicator is determined by dividing the total debt for enterprises in the sector by the total number of enterprises for the respective years.

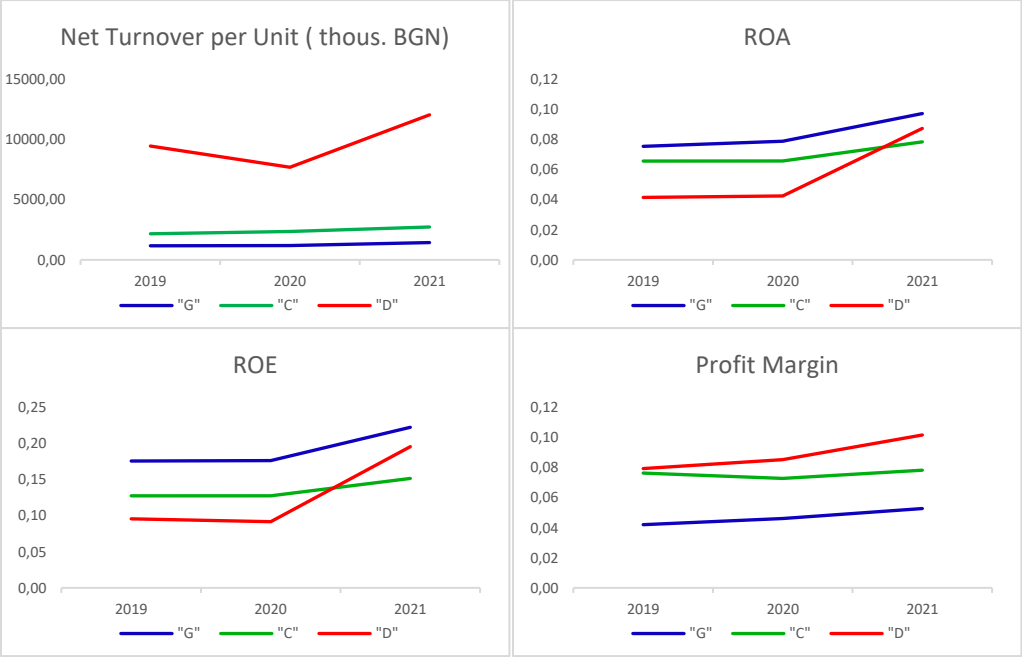
The debt on the accounting balance sheet of the enterprise represents certain financial obligations that it has assumed in order to develop its main activity. The D/A ratio shows how much of the company's assets are financed with debt in one form or another. This leverage ratio shows how a company has grown and acquired its assets over time. The coefficient values for all three sectors are around 0.5 and no significant changes are observed.

The D/SC ratio helps the company's management and its creditors to assess the risk of the company's financial structure. The coefficient helps in making financial decisions and can consider possible risks in the repayment of obligations. The debt-to-equity ratio reveals the company's share of debt as a percentage of its total market value (Hristozov, 2020). In this case, the coefficient D/SK has the lowest values in sector "C" and is below unity, but the levels are around 0.9. This shows that the sector is financed nearly 90% with borrowed capital and only 10% with own capital. The situation in other sectors is more worrying. For them, the ratio D/SC is close to and above 1, which shows that sectors G and D are mainly financed with borrowed capital. However, the data does not give rise to problems in the sectors, because if an analysis is made years back, the values are much higher.

4. Corporate Profitability

The following figure shows the levels of some of the key profitability indicators in the enterprise.

Fig. 3. Corporate Debt



Source: NSI, own calculations

Net turnover on an enterprise basis differs for the three sectors. It is lowest in the Trade sector, slightly higher in Manufacturing and highest in Energy, where a decline is observed in 2020, but a significant increase in net turnover in 2021. In the three ratios, the numerator is the net profit of the enterprises from the sectors.

ROA shows the ability of the company to generate income based on the use of assets, i.e. the rate of return on assets as a whole. Corporate management, analysts, and investors use ROA to determine how efficiently a company is using its assets to generate profit. A higher ROA means that a company is more efficient and productive in managing its balance sheet to generate profits, while a lower ROA indicates that there is room for improvement. All three sectors saw an increase in this indicator. It is most significant in sector D. In the last year, the indicator for all three sectors is the highest, around 0.8-0.1, with sector D ahead of sector C.

ROE is one of the most important and key financial indicators in an enterprise. It is perhaps the most comprehensive indicator of a company's performance. It is often said to be a measure of the efficiency with which the manager manages the company's equity because it shows the extent to

which the owners (shareholders) achieve the minimum required rate of return on the capital invested by them. Interestingly, despite having the highest turnover, sector D shows a low return on equity in the first two years. In 2021, the sector ranks second. The values are highest in the Trade sector, close to 20%.

The Profit Margin coefficient shows the share of net profit in net sales revenue, or in other words, how much profit the company makes per BGN 1 of net sales revenue. This indicator gives information about the profit margin. Sector D had the highest values, although this was not the case for the other two ratios. The lowest margins are observed in sector G. In all three sectors, the net profit based on net revenues is below 10%. No significant changes were observed in this indicator during the studied period.

5. Conclusion

The topic of inflation and the performance of enterprises from the non-financial sector is particularly relevant and interesting in years of instability, pandemics and wars. It would be interesting to track what impact inflation has on key business metrics. It is also important if NSI provides data on inflation by economic sector, because in this case the general inflation for the country is included. In the current report, it was shown that the inflation levels reached high values only in 2022, this phenomenon is also observed in 2023. Unfortunately, the latest NSI data from the annual financial reports of enterprises is until the beginning of 2022.

That is, for the period 2019-2021, due to the low levels of inflation, there are no significant changes in the financial indicators of the three largest sectors of the Bulgarian economy. The author looks forward to the release of the new NSI data for 2022, which will happen in February 2024, to track the impact of the poly-crises on corporate finances. High inflation in 2023 is expected to have a negative effect on financial enterprises, but my prediction is that there will be a lag and this effect will show itself over time, perhaps as late as 2024. In the future, I plan to produce an analysis where to look for the dependencies between inflation and the financial indicators of enterprises.

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CASHLESS PAYMENTS IN BULGARIA - DEVELOPMENT, REGULATION AND INTEGRATION INTO THE EURO AREA

Petar Chobanov, UNWE[1]

***Abstract**: The main objective of this study is to present an analysis of selected indicators of cashless payments in Bulgaria. The main activities in the process of integration to the euro area as well as changes in regulations at the EU level are examined. The main thesis is that non-cash payments are continuously increasing, both in number and in total value, due to technological changes, the development of EU regulations, as well as the integration of the Bulgarian payment infrastructure to that of the euro area. The number of credit cards as well as POS terminals has increased significantly. The number of credit transfers and card payments increased several times, with positive dynamics also characterising payments initiated via the Internet through both instruments. Similarly, the total value of payments is also developing and the trend is expected to continue in the future.*

***Keywords**: (payment systems, central banks, technological change)*
***JEL**: E42, E58, O33 (according to https://www.aeaweb.org/econlit/jelCodes.php)*

1. Introduction

Cashless payments and technological change can reduce transaction costs and increase efficiency in the economy. Other things being equal, these factors lead to lower inflation in the long run. This study focuses on cashless payments in Bulgaria. It examines some key payment indicators and their dynamics for the period 2014-2022, as well as payment policy decisions and actions. The main source of information is BNB statistics on cashless payments. The study is entirely empirical, and includes policy and regulatory development issues.

The main hypothesis is that non-cash payments are continuously increasing, both in number and in total value, due to technological changes, the development of EU regulations, as well as the integration of the Bulgarian payment infrastructure with that of the euro area .

The study is structured in several main parts - introduction, research on payments, analysis of key payment indicators, actions taken by the BNB to integrate the payment infrastructure with that in the euro area, brief overview of pending changes in regulations, conclusion.

2. Studies on the development of payments

A number of studies can be pointed to that examine the development and impact of cashless payments. The impact of cashless payments on economic growth is discussed in (Tee and Ong, 2016, pp.1-9). The authors present the effects of the introduction of cashless payments in 5 EU

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countries between 2000 and 2012. Their conclusion is that in the short run the introduction of one type of cashless payment affects another type of cashless payment. The impact of payments on economic growth can be observed in the long run, i.e. the effects of the introduction of such payments are not immediately reflected.

The relationship between payments and economic growth over the period 2005-2018 is also explored in (Grzelczak and Pastusiak, 2020, pp. 33-46). Countries are divided into two main groups (CEE and Western Europe) and some differences between the groups are pointed out. The role and influence of e-money instruments is growing in Western European countries. The positive relationship between cashless payments and real GDP per capita is stronger in Western European countries.

The impact of the COVID-19 pandemic on the choice between cash and cashless payments is studied in (Kotkowski and Polasik, 2021, pp. 1-9). The authors carried out a survey of 5000 individuals from 22 EU countries. It shows a clear distinction in payment habits, which deepened during the pandemic. Consumers with preferences for cashless payments exacerbated them further due to the pandemic. Consumers who mainly pay in cash tend to do so despite the pandemic. This may also be due to financial inclusion issues. Country-specific factors play a significant role in increasing the likelihood of more cashless payments as a result of the pandemic.

An attempt to identify the impact of cashless payments on inflation in Indonesia is made in (Titalessy, 2020, pp. 524-532). The author examined the impact of different types of non-cash payments, and found no impact on inflation for debit and credit card transactions. E-money instruments play a statistically significant role in reducing inflation.

3. Key indicators for the development of cashless payments

The analysis of payments uses key payment indicators published by the BNB.

Table 1 shows the dynamics of the number of cards and terminals for the period 2014-2022.

Table 1. Number of cards and terminals

	2014	2015	2016	2017	2018	2019	2020	2021	2022
Debit cards (thousands)	6 286	6 206	6 280	6 390	6 189	6 218	6 257	6 384	6 491
Credit cards (thousands)	938	944	1 216	1 148	1 240	1 244	1 175	1 304	1 327
ATM	5 615	5 616	5 751	5 731	5 604	5 614	5 400	5 250	4 977
POS	75 623	81 513	86 663	91 518	95 408	101 738	102 988	111 346	124 082

Source. BNB

The number of debit cards remains relatively constant, only 3.3% higher in 2022 than in 2014. The COVID-19 pandemic is not impacting this indicator. It is to some extent related to the availability of payments, as cash is often withdrawn from debit cards. The number of debit cards is lower in the period to 2015-2020 than in 2014, but has recovered in the last two years.

The number of credit cards that are more linked to cashless payments increased significantly over the period, with a 41.5% increase in 2022 compared to 2014. This is a clear indicator of increasing cashless payments. During the 2020 pandemic, there is a decrease in the number of credit cards from the previous year, which may be related to difficulties in reissuing and obtaining them.

There is a clear downward trend in ATM terminals, with 11.4% fewer terminals in 2022 than in 2014. In addition to the direct link to cash withdrawals, processes of optimisation of their number by financial institutions, including due to processes of consolidation in this sector, may also have an impact. In 2020, the number of ATMs is declining, but no direct link can be made to the pandemic.

An indicator of the growing role of cashless payments is the number of POS, which increased by 64% between 2014 and 2022. The highest growth is seen in the years after the pandemic 2020, which is also related to the accelerated adoption of technology during this period.

Table 2. Number of credit transfers (million)

	2014	2015	2016	2017	2018	2019	2020	2021	2022
Credit transfers (ordered)	192.5	219.7	243.2	254.9	295.6	258.0	288.1	332.3	370.0
Transfers in Bulgaria	191.1	218.1	240.7	253.0	293.5	255.6	285.5	327.7	365.3
Transfers to other countries	1.4	1.6	2.6	1.9	2.1	2.4	2.6	4.6	4.7
Initiated on paper	99.6	107.8	113.2	112.6	203.9	162.6	181.1	207.2	228.8
Initiated electronically	92.9	111.9	130.1	142.3	91.8	95.4	107	125.1	141.2

Source. BNB

The number of credit transfers (Table 2) almost doubled during the period under review, indicating the increasing role of this type of payment. Due to their lower initial value, the increase in remittances to other countries is the highest - almost 3.4 times. Paper-initiated transfers grew at a faster rate than electronically initiated transferss, which even declined in 2018. This is an indicator of the slower take-up of fully electronic services, which have nevertheless seen a steady increase over the last three years. After 2019, the indicators are steadily increasing.

Table 3. Total value of credit transfers (billion BGN)

	2014	2015	2016	2017	2018	2019	2020	2021	2022
Credit transfers (ordered)	650.9	740.9	800.3	731.9	783.5	789.8	745.8	900.7	1126.7
Transfers in Bulgaria	572.3	639.3	697.0	633.6	689.3	700.7	648.4	769.1	944.6
Transfers to other countries	78.7	101.6	103.2	98.3	94.2	89.1	97.4	131.6	182.1
Initiated on paper	275.0	256.1	246.0	257.5	304.7	333.1	272.7	304.2	340.4
Initiated electronically	375.9	484.8	554.2	474.4	478.7	456.6	473.1	596.5	786.3
GDP	84.1	89.6	95.3	102.7	109.9	120.3	120.5	139.0	167.8

Source. BNB

The total value of credit transfers increased by 73.1% over the period, with the main increase occurring in the last two years, during which it outpaced both nominal GDP growth and average annual inflation as measured by the HICP. For the entire period, GDP grew by 99.4%, credit

transfers by 73.1%, and electronically initiated transfers increased by 109.2%, outpacing the previous two indicators.

Table 4. Average value per transfer (BGN)

	2014	2015	2016	2017	2018	2019	2020	2021	2022
Credit transfers (ordered)	3381	3372	3291	2871	2651	3061	2589	2711	3045
Transfers in Bulgaria	2995	2931	2896	2504	2349	2741	2271	2347	2586
Transfers to other countries	56214	63500	39692	51737	44857	37125	37462	28609	38745
Initiated on paper	2761	2376	2173	2287	1494	2049	1506	1468	1488
Initiated electronically	4046	4332	4260	3334	5215	4786	4421	4768	5569

Source: BNB, own calculations

For most of the indicators presented in Table 4, there is a decrease in the average value per transfer, due to the larger increase in the number of transfers. A lower average value implies a higher degree of user involvement in this type of transaction. Only electronically initiated transfers showed an increase in average value of 37.6% over the period under review.

Table 5: Number of card payments (million)

	2014	2015	2016	2017	2018	2019	2020	2021	2022
Payments with cards issued by local companies	65.2	79.6	93.7	129.7	160.9	195.8	213.6	284.4	375.5
Card payments in Bulgaria	51.9	62.6	72.2	101.0	123.1	149.9	169.4	229.1	301.6
Card payments in other countries	13.3	17.1	21.5	28.7	37.8	45.8	44.2	55.3	73.9
Via a physical POS terminal device	51.6	64.5	77.2	108.0	133.4	165.7	182.8	236.7	305.9
Initiated remotely (via internet)	13.7	15.2	16.5	21.8	27.5	30.1	30.8	47.7	69.6

Source. BNB

The number of card payments issued by local payment service companies increased nearly 6-fold between 2014 and 2022 for almost all indicators considered. Only payments initiated via the internet increased slightly less, by a factor of 5.1, which is also very high. This development clearly shows the strongly increased role of cashless payments. Comparing the data in Tables 2 and 5, we can note that the number of card payments outpaces the number of credit transfers in 2022.

Table 6: Total value of card payments (billion BGN)

	2014	2015	2016	2017	2018	2019	2020	2021	2022
Payments with cards issued by local companies	4.5	5.5	6.2	8.3	10.2	11.9	12.6	17.8	24.9
Card payments in Bulgaria	3.1	3.7	4.1	5.6	6.7	8.0	9.0	12.7	17.5
Card payments in other countries	1.4	1.8	2.2	2.8	3.4	4.0	3.5	5.1	7.4
Via a physical POS terminal device	3.5	4.4	4.9	6.6	7.8	9.3	9.9	13.7	18.7
Initiated remotely (via internet)	1.0	1.1	1.3	1.8	2.4	2.6	2.7	4.1	6.2

Source. BNB

The total value of card payments increased more than 5 times during the period under review, with the largest increase in internet payments - 6.2 times. The years with the highest annual

growth rates are 2021 and 2022, during which it reaches between 35% and 52% for different indicators. The development of technology, cost optimisation and increasing supply of this type of payment services imply high growth rates in the coming years as well. We expect this trend to continue, both in the number of payments and their total value.

Table 7: Average card payment value (BGN)

	2014	2015	2016	2017	2018	2019	2020	2021	2022
Payments with cards issued by local companies	69.0	69.1	66.2	64.0	63.4	60.8	59.0	62.6	66.3
Card payments in Bulgaria	59.7	59.1	56.8	55.4	54.4	53.4	53.1	55.4	58.0
Card payments in other countries	105.3	105.3	102.3	97.6	89.9	87.3	79.2	92.2	100.1
Via a physical POS terminal device	67.8	68.2	63.5	61.1	58.5	56.1	54.2	57.9	61.1
Initiated remotely (via internet)	73.0	72.4	78.8	82.6	87.3	86.4	87.7	86.0	89.1

Source: BNB, own calculations

The average value per card payment decreased over the period under review for almost all indicators, with the exception of internet payments, which increased by 22%. Year-on-year decreases in these indicators are typical for the period 2016-2020, while increases are observed in 2021 and 2022.

4. Key activities in the process of integration into the euro area

In 2022 and 2023, a number of activities are being carried out to upgrade and develop the payment and settlement systems in Bulgaria.

First, the migration to the Eurosystem's new consolidated TARGET services platform took place in March 2023, marking the completion of a major project to consolidate the pre-existing TARGET2 payment system and TARGET2-Securities settlement platform. The TARGET platform is a fundamental financial market infrastructure of the euro area and provides access to several services simultaneously. The first is the real-time euro cash settlement service. The second service is the settlement of securities in euro through TARGET2-Securities (T2S), which offers pan-European settlement, both cash and securities, with money at a central bank. The third TARGET service is TIPS, which provides access to instant payments in euro.

Second, the Depository for Government Securities at the BNB and the Central Depository AD join the securities settlement platform TARGET2-Securities. On 11 September 2023, they migrate to T2S together with three other depositories from other European countries. Currently, depositories from 23 European countries use T2S, and participation in the platform already contributes to better accessibility of Bulgarian securities for European Union investors.

Third, the migration of budget payments to Single Euro Payments Area (SEPA) standards is finalised in early October 2023. This project is essential to prepare for the introduction of the euro in the country. The main objective is to implement SEPA standards with regard to the execution and processing of budget payments in BGN in the country, which will ultimately lead to an overall streamlining and acceleration of the budget banking process.

Fourth, the necessary actions are being taken to ensure full reachability for the execution of customer SEPA credit transfers in euro in the Single Euro Payments Area. In this way, more than 4 800 payment service providers in all SEPA countries will be reachable for the execution of credit transfers in euro. This will be achieved by implementing a pre-paid model with continuous settlement, which will also reduce the time to execute credit transfers in euro.

Fifthly, the project for the connection of the BISERA7-EUR payment system operated by BORICA AD to the Eurosystem's TIPS service for settlement of instant transfers in euro is also being developed, which will provide an opportunity for banks in the country to offer instant transfers in euro. The TIPS accession project can be seen as an upgrade of the euro-denominated instant payments. In addition, this project will ensure infrastructural readiness in the context of the expected changes to SEPA Regulation 260/2012, according to which payment service providers that execute customer credit transfers in euro will also be obliged to execute instant credit transfers in euro.

5. Developments in payments regulation.

Payment services have also developed rapidly in recent years due to the introduction of innovation and new technologies. This also requires corresponding changes in regulations at EU level, which are discussed in this part of the presentation.

In June 2023, new European payments legislation is proposed - a new PSD3 (Payment Services Directive 3) and PSR (Payment Services Regulation). The PSD3 proposal is largely based on the relevant texts of the current Second Payment Services Directive (PSD2) and the Electronic Money Directive (EMD) in terms of licensing and supervision requirements. PSD3 will thus build on and refine the provisions regarding the licensing and supervision of payment institutions. An important aspect of the PSD3 proposal is also the envisaged amendment of the Settlement Finality Directive (SFD) to give non-bank payment service providers direct access to all payment systems in the EU.

The PSR proposal regulates fundamental rights and obligations in the provision of payment services in the EU, including rules for the execution of payment transactions, liability for unauthorised or inaccurately executed payment transactions, open banking, transparency requirements and security requirements for payment transactions. Some key changes proposed by the PSR are the introduction of a dedicated interface for accessing payment accounts through open banking, as well as the possibility for users to manage their permissions to access their financial data through a so-called dashboard. There is also an obligation for payment service providers to carry out an additional matching check between the beneficiary of a credit transfer and the account number specified by the originator, which will further enhance the security of digital payments.

The PSD2 is a complex piece of European legislation which is based on the principle of "maximum harmonisation". In this context, the revision of this Directive has led to proposals to separate aspects into different legal acts in order to further develop and refine them. Among

the proposals for further regulations, the proposal for a Regulation on the Financial Data Access framework (FIDA) stands out. FIDA aims to build on the existing open banking framework, underlining the maturing of the financial services market in Europe. This complementary legislation will affect the effective management of data across the financial system by integrating information on all financial products so that it can be used by third parties to facilitate consumers and optimally meet their needs.

Currently, the licensing of payment institutions and electronic money companies, as well as the registration of account information service providers, are regulated by the Payment Services and Payment Systems Act (PSPSA) and related regulations. Following the successful finalisation of the new European legal framework - PSD3, PSR and FIDA, for which the BNB is actively partnering with the ECB and the EC on the practicalities of implementation, we can expect relevant changes to the PSDPA and the sub-regulations to refine the regulations and provide a better rules-based environment.

6. Conclusion

The indicators examined in the study demonstrate the clear trend towards an increase in cashless payments, which is expected to continue in the coming years due to our integration into the single payment area of the euro area and the development of technology. A number of projects to renew, develop and integrate payment and settlement systems are therefore also contributing. Changes in regulations are also aimed at ensuring more efficient and safer cashless payments.

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ANALYSIS OF THE INFLATION PROCESSES WITHIN THE EUROPEAN DRUG MARKET

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***Abstract**: In this research, we focus on the influence of prices, signified through inflationary processes, and their impact on the price levels of drugs. For this purpose, the situations within the European wholesale and retail drug market is studied, data related to the changes in the price levels of drugs is analyzed in a dynamic order, within the selected period 2011-2021, in order to highlight the trends of growth. The change in the purity/potency of drugs and the dependence of price levels on it is also studied. For this purpose, the price indexes of drugs are adjusted with the price/potency indexes. It was found that in general the price indices decreased, the purity/potency indices increased and accordingly the price index adjusted with purity/potency index decreased to a greater extent than the price indices.*

***Keywords**: Drug prices, Drug enforcement, Illegal drugs, Black market, Inflation,*

***JEL**:E31, E26, E20, E29, E39, D40*

Introduction

Background

Currently the problem with producing, supplying, retailing and using illicit drugs in Europe and within the European Union in particular presents a serious challenge for European administrations and the society. (Europol, European Union serious and organised crime threat, 2021) Significant segments of scientific research are concentrated on the problems connected with law enforcement, social or medical aspects related to drugs. However, there is also an economic side of the issue. The illegal drug market, of course, has its specifics, but producers and suppliers within it have, first of all, economical motivation. Because of its high profitability, drug-related activities are core businesses for organized crime groups in Europe. (Europol, Shadow money – the international networks of illicit finance,, 2021)

Motivation

The research of the inflation within the European drug market might give a different perspective, enabling a deeper understanding of economic processes within it. In turn, this understanding can help both drug enforcement, the tracking of illegal cash flows and other

activities related to the fight against crime, as well as clarifying the processes in the real economy and its interrelationships with illegal markets as well.

Most of the empirical studies of drug markets focus chiefly on the structure of these markets and the relationships among their participants, as well as on the number and types of drugs used and their market share (Boivin, 2014), (Thompson, A., Jeffords, C.,, 2019), etc. Some studies focus on the harms of drug use and the social cost (Hofmarcher, T., Leppänen, A., Månsdotter, A., Strandberg, J., Håkansson, A.,, 2024), (Casal, B., Iglesias, E., Rivera, B., Currais, L., Costa Storti, C.,, 2023). The main aim of the current study is the analysis of the inflation processes in the European drug market. Thus, this research is focused on the relationships between the current situation on the drug market for several of the most popular drugs, the respective quality and purity of these drugs, and the price index for each type of drug.

Methodology

In order to accomplish the study, there are used methods, such as the comparative trend analysis for drug price/quality and price adjusted index for the selected period of 2011-2021. Also used is a time dynamic linear analysis with detailed figures.

1. European drug market situation

1.1 Cannabis - the market situation.

According to the EMCDDA, 29.3% (or about 84 million people) of the EU population aged 15-64 have used cannabis, with 7.9% (about 22.6 million people) having used or using it in the last year. (European Monitoring Centre for Drugs and Drug Addiction, European Drug Report 2023: Trends and Developments, 2023) According to the same data, 1.3% of adults (15-64 years) or 3.7 million people use cannabis daily or almost daily (more than 20 days a month).

The price of cannabis (herbal) on the European retail market ranges from €6 to €25 per gram, with interquartile range (IQR) between €8 and €12 per gram. The content of the main psychoactive substance tetrahydrocannabinol (THC) varies from 2 to 14 per cent, with an IQR 7%-13 %. On the wholesale market, cannabis (herbal) is sold at prices ranging from 1796 €/kg to 5652 €/kg, with an IQR 2214-4926 €/kg.

According to the cannabis market data in the EMCDDA's European Drug Report 2023 the price of cannabis (resin) on the EU retail market ranges from 4 to 30 €/gram, the IQR is in range 6-10 €/gram. On the wholesale market, cannabis (resin) is traded at prices ranging from €1,950/kg to €5,010/kg, with IQR €3107-€3,970/kg.

The content of the main psychoactive substance tetrahydrocannabinol (THC) on the retail market varies between 2 and 32 percent; the interquartile range is between 12% and 29 %. (European Monitoring Centre for Drugs and Drug Addiction, Statistical Bulletin 2023, 2023)

1.2 Cocaine market situation

According to EMCDDA summary data, 5.4% of the EU adult population (15-64 years), or about 15.5 million people, have used cocaine, with 1.3%, or 3.7 million people, having used it in the last year. (Europol E. M., (2022))

On the retail market, the price of cocaine ranges from 22 to 98 €/g., with an IQR 56-90 €/g. On the wholesale market, cocaine is sold at prices ranging from €28,875/kg to €38,545/kg, with an IQR €33091-€3,737/kg.

The purity of cocaine in the retail market fluctuates between minimum and maximum values, 48% and 85% respectively. The interquartile range is 56%-85%.

1.3 Synthetic stimulants

Synthetic central nervous system stimulants available on the drug market in Europe include amphetamine, methamphetamine and, more recently, synthetic cathinones. Amphetamine use is the most common within the European market. 3,6% of adults (15-64 years), or about 10.3 million people used amphetamines lifetime and 0,7% or 2 million people having used or using in the last year. (European Monitoring Centre for Drugs and Drug Addiction, European Drug Report 2023: Trends and Developments, 2023)
On the EU retail market, the price of amphetamine ranges from 7 to 59 €/g., the IQR is from 9 to 19 €/g. On the wholesale market, the amphetamines are available at prices ranging from 1313 €/kg to 11540 €/kg and IQR is between 2290 and 4371 €/kg.

The purity of amphetamines on the European retail market ranges between minimum and maximum values, 9% and 69% respectively and IQR 21%-35%.

On the retail market price of methamphetamine is between 25 €/g and 100 €/g, IQR 36-83 €/g and purity 27%-100% with an IQR70%-91% (European Monitoring Centre for Drugs and Drug Addiction, Statistical Bulletin 2023, 2023)

1.4 3 4-methylenedioxy-n-methamphetamine (MDMA)

On the European retail market, the sell price of MDMA tablets ranges from 4 to 19 €/tablet, and IQR 7-10 €/tablet.

Accordingly, sales per gram range from 14 to 65 €/g powder, IQR of the price is 18-40 €/g powder. On the wholesale market, the supply of MDMA tablets ranges in price from 750 to 8352 €/1000 tablets, with an IQR 1763-5055 €/1000 tablets.

The purity of MDMA in the EU retail market ranges from 42 to 100 percent, with IQR from 69 to 85 percent. MDMA content variate between 38-190 mg/tablet, IQR is 161-173 mg/tablet. (European Monitoring Centre for Drugs and Drug Addiction, Statistical Bulletin 2023, 2023)

1.5 Heroin and other opioids

The EU retail heroin market is characterized by minimum and maximum price levels ranging from 19 to 93 €/g. respectively IQR is 24-45 €/g.

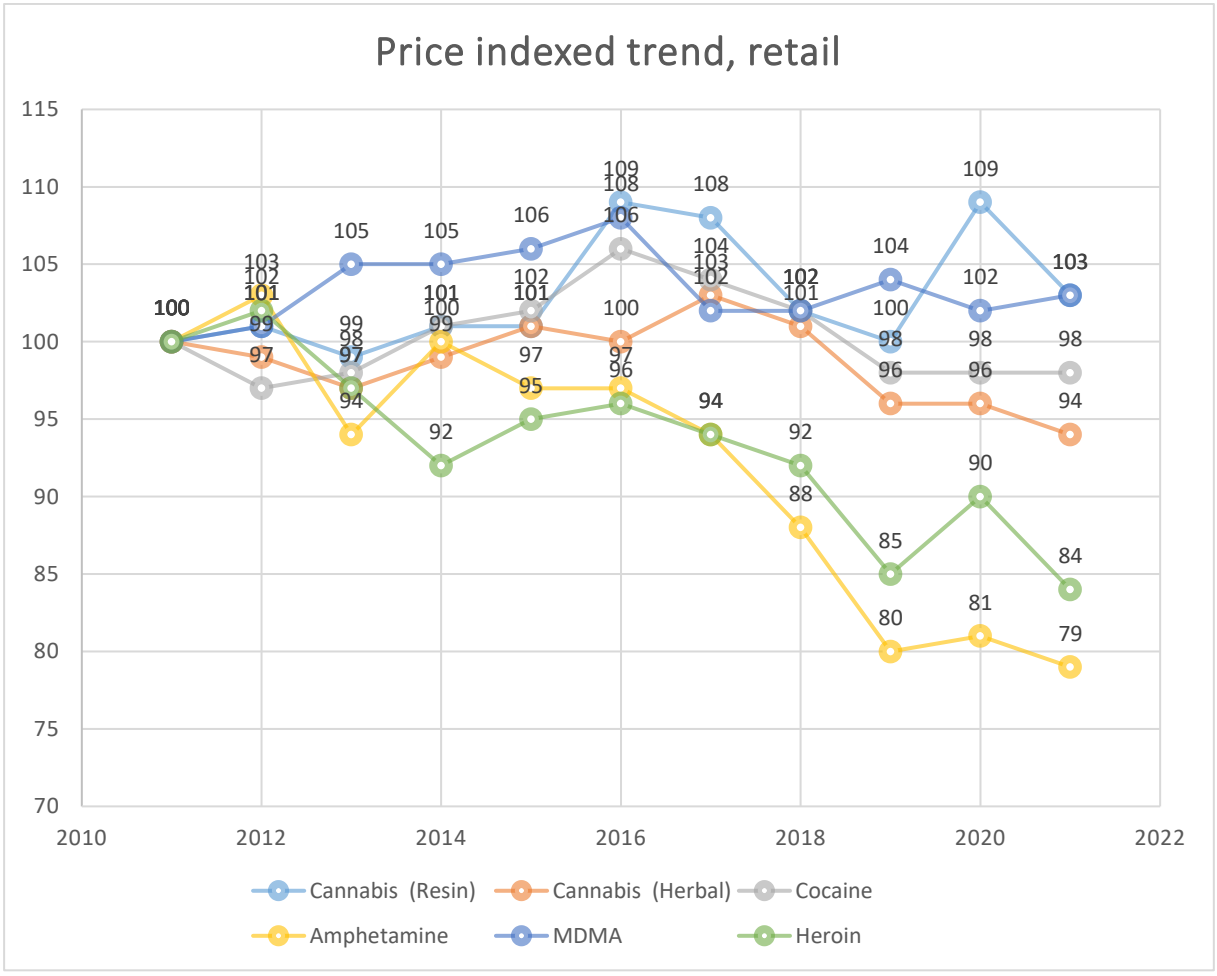
Wholesale prices are at their minimum level of 20162 €/kg and at their maximum level of 31180 €/kg respectively.

Heroin purity ranges from 13 to 47 percent at its lowest and highest points. IQR of the purity is between 16 and 24 percent. (European Monitoring Centre for Drugs and Drug Addiction, Statistical Bulletin 2023, 2023)

2. Analysis of inflationary processes in the European drug market

Considering that the data for the prices and price levels within the drug market is not complete and come from different sources, with different levels of authenticity, it is hard to compile or to find trustworthy statistics concerning the inflation rate within this market. (Caulkins, 2007) The most reliable is the data from the drug reports of EMCDDA (Werb D, Kerr T, Nosyk B, et al, 2013; 3)

Figure 1. Price indexed trend, retail



Source: (European Monitoring Centre for Drugs and Drug Addiction, Statistical Bulletin 2023, 2023)

Table 1. Price indexed trend, retail

Year	Cannabis		Cocaine	Amphetamine	MDMA	Heroin
	(Resin)	(Herbal)				
2011	100	100	100	100	100	100
2012	101	99	97	103	101	102
2013	99	97	98	94	105	97
2014	101	99	101	100	105	92
2015	101	101	102	97	106	95
2016	109	100	106	97	108	96
2017	108	103	104	94	102	94
2018	102	101	102	88	102	92
2019	100	96	98	80	104	85
2020	109	96	98	81	102	90
2021	103	94	98	79	103	84

Source: Monitoring Drugs and Addiction, Bulletin (European Centre for Drug Statistical 2023, 2023)

2.1 Inflation within the cannabis market

For the period of 2011-2021 with a base of 2011 = 100, the prices of cannabis (herbal) values show a slight deflationary process for the period 2012-2013 and 2018-2021, while in the interval 2015-2017 the increase in values is insignificant between 1 and 3 percentage points. The inflation rate for the whole period is (-6%) and due to the negative impact of the prevailing index levels below 100, we can determine that deflation is occurring.

During the period 2011-2021[1], the price indices for cannabis (resin) fluctuate from 100 to 103 percent. The highest levels are in 2016 and 2020 with values of 109 per cent, while in 2013 there is a drop to 99 per cent.

2.2. Cocaine market inflation

In the observed period of 2011-2021[2] with a base of 2011 = 100, we see the following tendencies for the cocaine: in 2012 and 2013, we have a decline in price levels of 97 and 98% respectively. In the interval 2014-2018, there is an inflationary process with the highest value of the price index being 106% in 2016 and in the interval 2019-2021 we find a sustained level of decline of 98%. The rate of inflation during the period is (-2%) which indicates a deflationary process.

[1] For the basic 2011 year the price of cannabis (herbal) ranges from 5-24 €/g, with an IQR of 8-12 €/g. For the same year the price of cannabis (resin) ranges from 3-18 €/g, with an IRQ of 7-13 €/g.
[2] For the basic 2011 year the price of cocaine ranges from 50-98 €/g, with an IQR of 56-77 €/g.

2.3. Synthetic stimulants

The dynamics of price indices of synthetic stimulants (amphetamine) shows a stable deflationary process.[3] There is an increase compared to the previous period only in 2012 - 103%, maintaining the level of decrease in 2015 and 2016 at 97%, followed by a continuous decrease in price levels to 79% in 2021. The rate of inflation is (-21%).

2.4. MDMA

During the same observed period listed above, we can observe fluctuations in amphetamine price index values, but with a persistent trend towards an inflationary process. [4]We have the highest value in 2016 at 108% and the lowest in 2012 at 101%, as well as two holding levels in the 2013-2014 and 2017-2018 intervals. The inflation rate is a positive number – (3%).

2.5. Heroin and other opioids

The trend in changes in heroin price levels has varied with values below 100% since 2012, with the highest being 97% in 2013, and the lowest being 84% in 2021. This shows a deflationary trend. The rate of inflation over the observed period is (-16%).[5]

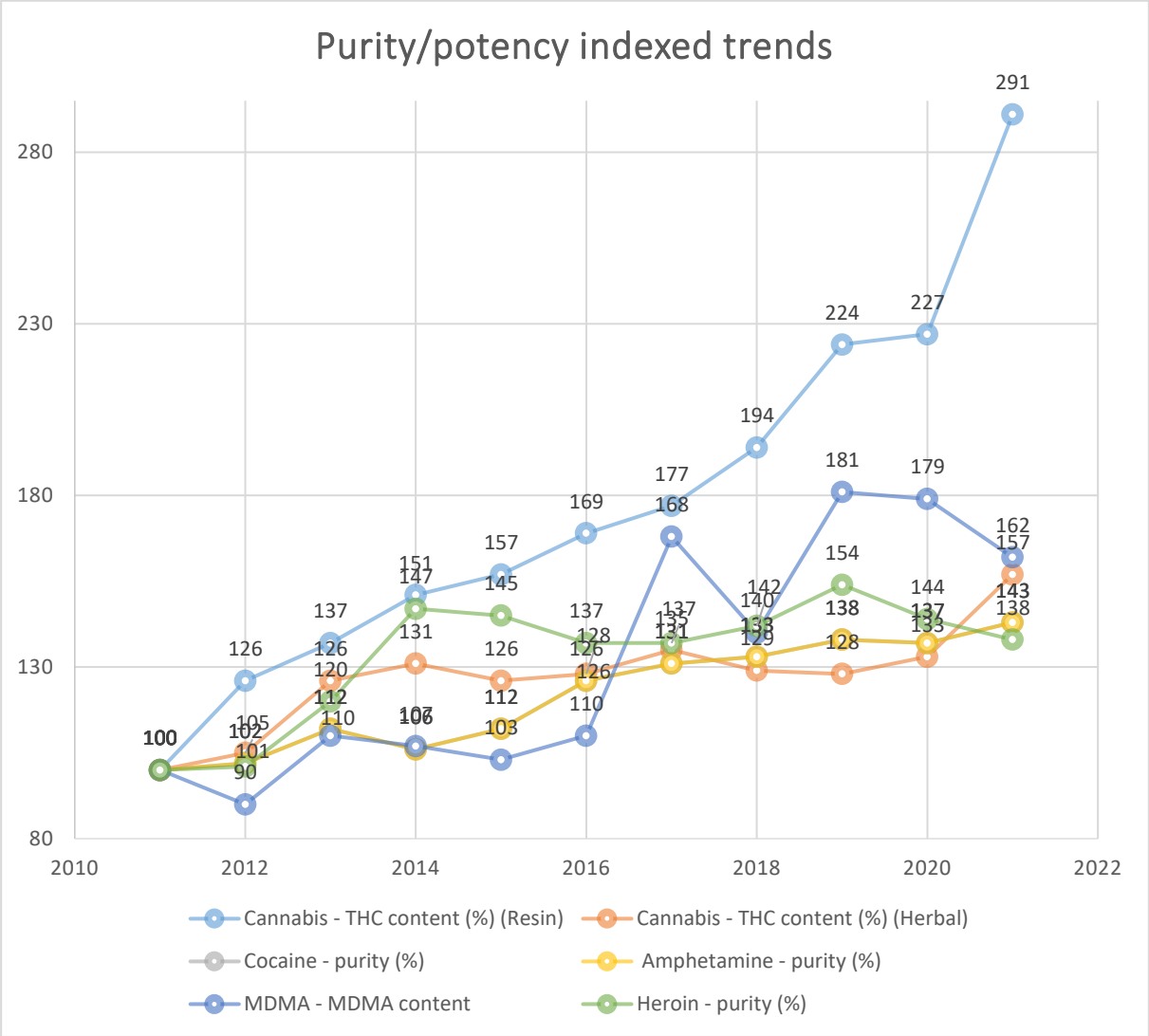
[3] For the basic 2011 year the price of amphetamine ranges from 8-28 €/g, with an IQR of 9-21 €/g. For the same year the price of methamphetamine ranges from 8-79 €/g, with an IQR of 16-70 €/g.

[4] For the basic 2011 year the price of MDMA ranges from 4-17 €/tablet, with an IQR of 5-9 €/g (European Monitoring Centre for Drugs and Drug Addiction, European Drug Report 2013: Trends and developments, 2013)

[5] For the basic 2011 year the price of heroin ranges from 24-143 €/g, with an IQR of 30-57 €/g. (European Monitoring Centre for Drugs and Drug Addiction, European Drug Report 2013: Trends and developments, 2013)

3. Analysis of purity/potency of drugs within the European market

Figure 2. Purity/potency indexed trends



Source: (European Monitoring Centre for Drugs and Drug Addiction, Statistical Bulletin 2023, 2023)

Table 2. Purity/potency indexed trends

Year	Cannabis - THC content (%)		Cocaine - purity (%)	Amphetamine - purity (%)	MDMA - MDMA content	Heroin - purity (%)
	(Resin)	(Herbal)				
2011	100	100	100	100	100	100
2012	126	105	102	102	90	101
2013	137	126	112	112	110	120
2014	151	131	106	106	107	147

2015	157	126	112	112	103	145
2016	169	128	126	126	110	137
2017	177	135	131	131	168	137
2018	194	129	133	133	140	142
2019	224	128	138	138	181	154
2020	227	133	137	137	179	144
2021	291	157	143	143	162	138

Source: (European Monitoring Centre for Drugs and Drug Addiction, Statistical Bulletin 2023, 2023)

3.1. Cannabis

The potency of cannabis (resin or herbal) depends on the content of tetrahydrocannabinol (THC). For cannabis (resin or herbal), there is a pronounced upward trend in potency over the 2011-2021 study period,[6] with index values increasing for each subsequent year and peaking in 2021 at 291% for resin and 157% for herbal, respectively. The deviations from the base year are drastic for resin, 191 percentage points, and less so for herbal, 57 percentage points.

3.2. Cocaine

For the period 2011-2021[7] the indexed trend of the purity of cocaine within European retail market points out that the purity stays relatively stable with index values between 97 in 2012, up to 106 in 2016, and once again, a drop down to 98 in 2019. The data also shows a hold of this rate until 2021.

3.3. Synthetic stimulants

Here the criterion with stimulants is once again the purity. The dynamics of purity indices similarly have increasing values, except for 2012, but with fluctuations in the change of the indices in the dynamic order of years. The data from this trend shows the highest value in 2018 reaching 146% and the deviation showing a result of 41% percentage points.[8]

3.4. MDMA

[6] For the basic 2011 year the potency (content) of THC in cannabis (herbal) ranges from 1-16 %, with an IQR of 5-10 %. For the same year the potency (content) of THC in cannabis (resin) ranges from 4-16 %, with an IQR of 5-11 %. (European Monitoring Centre for Drugs and Drug Addiction, European Drug Report 2013: Trends and developments, 2013)

[7] For the basic 2011 year the purity of cocaine ranges from 22-61 %, with an IQR of 29-48 %. (European Monitoring Centre for Drugs and Drug Addiction, European Drug Report 2013: Trends and developments, 2013)

[8] For the basic 2011 year the purity of amphetamine ranges from 5-30 %, with an IQR of 10-22 %. For the same year the purity of methamphetamine ranges from 16-82 %, with an IQR of 27-64 %. (European Monitoring Centre for Drugs and Drug Addiction, European Drug Report 2013: Trends and developments, 2013)

The efficiency of the drug depends on the average 3,4-Methylenedioxymethamphetamine (MDMA) content in the tablets and the purity of the powder. Compared to the base (2011), [9] the index in 2012 fell down to 90%, after which the increasing values compared to the base in 2011 fluctuated over the years, peaking in 2019 at 181%. The deviation accounted for showed to be 62% percentage points.

3.5. Heroin and other opioids

The main criterion of the impact force of heroin is its purity. The general direction is increasing compared to the base year (2011). The highest value is reported in 2019 - 154%. The deviation is 38 percentage points.

The overall level of inflation is calculated using the average sum of the changes in the inflation levels for these six different drugs with the most common drug types for the period between 2011-2021, and then dividing the result by the number of these types of drugs – 6.[10]

[3% + (-6%) + (-2%) + (-21%) + 3%) + (-16%)] : 6 = (- 39%) : 6 = (- 6,5%)

4. Price index adjusted with Purity/Potency index

When reviewing the price-indexed trend, the data shows that it is not sufficient enough to fully reveal the real inflationary process because, apart from the lower price level at the end of the observed period compared to the beginning for four of the six drugs, an increase in "quality" was observed for all drugs. In these circumstances, there occurs a situation in which a drug with a higher potency or purity can be bought on the market at the same price or at a price lower than the previous one. Accordingly, at the same price level and from the same dose, the obtained narcotic effect is stronger. Due to this reason, when considering prices indexed trends and purity/potency indexed trends, it is necessary to make a correction of the price indices, which reflects the dependence between the price indices and the purity/potency indices. This will give a more realistic and comprehensive picture of the situation within the European drug market. Thus, for the aforementioned reasons described above, a compiled price index adjusted with purity/potency index (PiAPi) for all drugs considered up to now was produced.

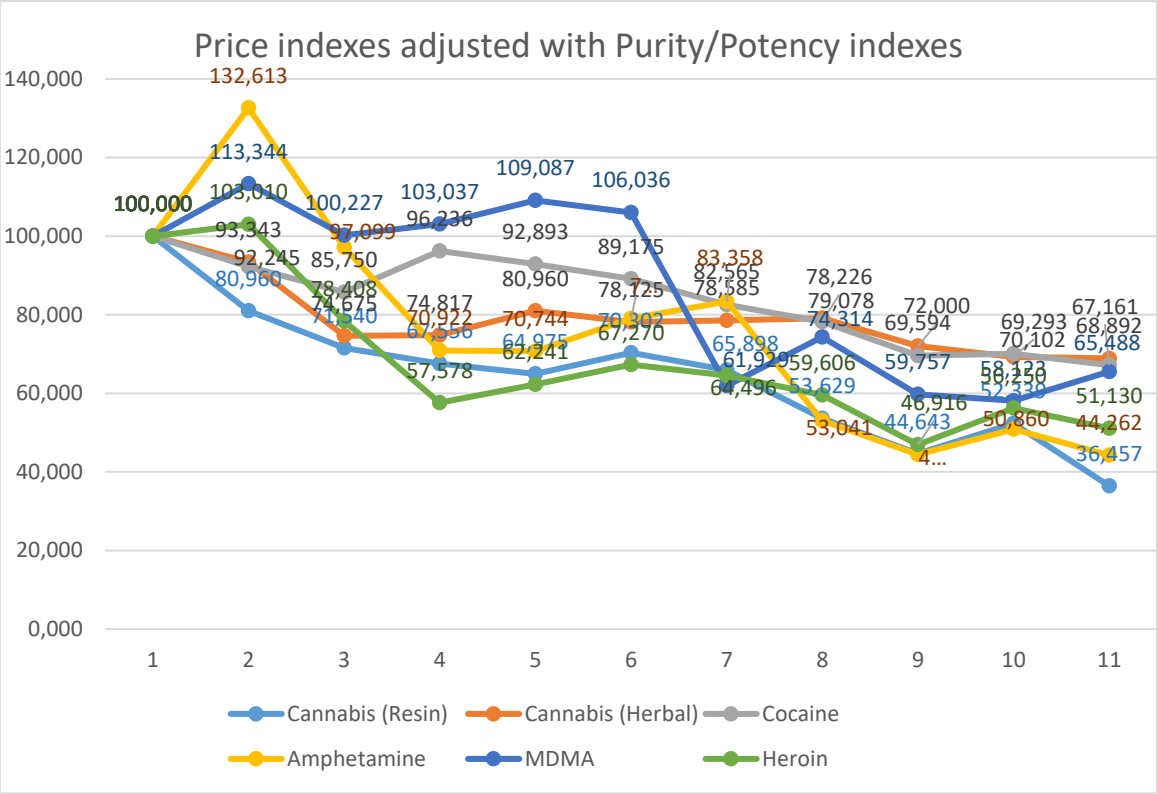
As a result, we adjusted the price indexes with the influence of purity/potency indexes. For this purpose, we calculated a coefficient as a ratio of the price index, adjusted with purity/potency index for each type of drug separately. Furthermore, the corresponding price indices of the

[9] *For the basic 2011 year the content in [mg/tablet] of MDMA ranges from 43-113, with an IQR of 64-90.* (European Monitoring Centre for Drugs and Drug Addiction, European Drug Report 2013: Trends and developments, 2013)

[10] The method for calculating of the inflation basket in this case is not applicable.

specific drug were multiplied with the obtained value for the entire period. We analyzed the result of the adjusted price indices.

Figure 3. Price indexes adjusted with Purity/Potency indexes



Source: (European Monitoring Centre for Drugs and Drug Addiction, Statistical Bulletin 2023, 2023)

Table 3. Price indexes adjusted with Purity/Potency indexes

Year	Cannabis (Resin)		Cannabis (Herbal)		Cocaine		Amphetamine		MDMA		Heroin	
	PiAPi	Coefficient Pi/Pi	PiAPi	Coefficient Pi/Pi	PiAPi	Coefficient Pi/Pi	PiAPi	Coefficient Pi/Pi	PiAPi	Coefficient Pi/Pi	PiAPi	Coefficient Pi/Pi
2011	100,000	1,0000	100,000	1,000	100,000	1,000	100,000	1,000	100,000	1,000	100,000	1,000
2012	80,960	0,8016	93,343	0,943	92,245	0,951	132,613	1,288	113,344	1,122	103,010	1,010
2013	71,540	0,7226	74,675	0,770	85,750	0,875	97,099	1,033	100,227	0,955	78,408	0,808
2014	67,556	0,6689	74,817	0,756	96,236	0,953	70,922	0,709	103,037	0,981	57,578	0,626
2015	64,975	0,6433	80,960	0,802	92,893	0,911	70,744	0,729	109,087	1,029	62,241	0,655
2016	70,302	0,6450	78,125	0,781	89,175	0,841	79,067	0,815	106,036	0,982	67,270	0,701
2017	65,898	0,6102	78,585	0,763	82,565	0,794	83,358	0,887	61,929	0,607	64,496	0,686
2018	53,629	0,5258	79,078	0,783	78,226	0,767	53,041	0,603	74,314	0,729	59,606	0,648
2019	44,643	0,4464	72,000	0,750	69,594	0,710	44,444	0,556	59,757	0,575	46,916	0,552
2020	52,339	0,4802	69,293	0,722	70,102	0,715	50,860	0,628	58,123	0,570	56,250	0,625
2021	36,457	0,3540	68,892	0,662	67,161	0,685	44,262	0,560	65,488	0,636	51,130	0,609

Source: (European Monitoring Centre for Drugs and Drug Addiction, Statistical Bulletin 2023, 2023)

As we can see in Figure 3, all the curves of Price indexes adjusted with Purity/Potency indexes are going down, i.e. PiAPi is decreasing. In addition, it is noticeable that the decrease in PiAPi for all drugs is greater than the decrease in price indices, including those for drugs with an overt deflationary tendency. This means that the Purity-adjusted price (PAP) for the considered

period has decreased significantly more for all considered drugs compared to the retail market price.

5. Results

As it can be seen from the market data, the most common drug in terms of the number of people using it is cannabis and the most expensive is cocaine. As shown, according to the analyzed data for the change in the price levels of separate drugs for the selected period, it can be concluded that with MDMA and cannabis (resin) we can see mainly an inflationary process, i.e. price indices increased compared to the base, while for the rest of the drugs, regardless of the fluctuations, the levels are mainly decreasing with the largest decrease in heroin and synthetic stimulants. This has an impact on the emerging trend to show more of a deflationary process.

The average level of inflation of the drugs included in the scope of the study for the period 2011-2021 is (- 6.5%), which indicates a permanent deflationary process under the influence of obvious deflations in 4 out of 6 types of drugs - cannabis (herbal), cocaine, synthetic stimulants and heroin.

According to the criterion Purity/Potency, we can find a clear upward trend for the entire study period for all drugs, with the greatest increase in potency (THC content) for cannabis (resin). For the period 2011-2021, its THC content has increased almost 3 times. For other drugs, over the ten-year period, the increase is from 138% for heroin to 162% for MDMA.

For the period 2010-2011, PiAPi decreased for all drugs. With the lowest value at the end of the period is cannabis (resin) – 36.46, which is logical considering the significant increase in potency (291%) and the insignificant increase in price (103%) of this drug. The smallest downgrade is the downgrade of PiAPi for the cannabis (herbal) - 68.9%.

As can be seen from the information above, PAP in 2021 are significantly lower than PAP in 2011. Because the dependence between PAP and drug harm, incl. deaths, is inverse, i.e. as PAP decreases, harms and deaths increase, (Hughes, C; S, Hulme; Ritter, A, 2020) the downgrading of PiAPi is highly likely to affect the increase in drug harm. Generally, within the European drug market, we have a tendency to decrease or approximately maintain the level of prices and increase "quality", i.e. purity/potency.

Conclusion

Generally, within the European drug market, we have a tendency to decrease or approximately maintain the level of prices and increase "quality", i.e. purity/potency. Due to the specifics of this market and the fact that the increased "quality" of the offered product actually means an

increase of the harm during its usage, the mentioned trend is negative. (T.M, Brunt; M, van Laar; R.J.M, Niesink; W, van den Brink, 2010)

The observed deflation processes, especially taking into account the Price index adjusted with the Purity/Potency index, create prerequisites for increasing the drug availability on the European market. (D.A, Bright; A, Ritter, 2010) The increased availability itself, in turn, may lead to increased competition in supply, which may further drive down prices and increase the purity/potency of the drugs within the market.

Furthermore, we cannot separate the inflation from other processes within the market, so there remain many issues to be deeply researched. Some of the issues pertain to issues such as its relation and impact on the supply and demand, the limits within which it can move relatively independently of inflation in the real economy, its dependence of law enforcement, etc.

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“NUDGE” IN BEHAVIORAL ECONOMICS– A POSSIBLE RESPONSE TO THE CHALLENGES OF HIGH INFLATION FOR 'BETTER' ECONOMIC DECISIONS OF THE INDIVIDUALS

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***Abstract**: The behavioral economics upgrades the psychological characteristics of the economic agent, homo economicus, when analyzing an individual's decisions, emphasizing their biases. The nudge approach developed by Richard Thaler is a good tool for improving economic decisions made by the individual. The nudging policies, with their flexibility to different conditions, low financial burden, and low instrumental complexity, are widely applicable. The current high levels of inflation amplify the potential for nudges to improve the quality of people's economic decisions. This paper focuses on the possibilities of behavioral economics in the inequalities and promoting savings behavior provoked by current reality using smart disclosure and choice drivers, pre-commitment with setting consumption limits, and promoting the setting of aims.*

***Keywords**: nudge, behavioral economics, Richard Thaler, inflation*

***JEL**: D91, E71, G41*

1. Introduction

High inflation levels have a negative impact on individual economies as well as companies and individuals. The paper aims to show the potential for improving the quality of people's economic decisions through the so-called *nudges* – the popular tool of behavioral economics. The paper includes the following sections: next section analyzes the concept of *homo economicus (HE)* in economic theory to arrive at the main changed characteristics of the economic individual in behavioral economics. Furthermore it has been explored the decision-making process and psychological factors in behavioral economics and nudge technique in part three. The fourth section is devoted to the nudge approach and specific problems and the tools of their solution by behavioral economics. Lastly, the paper leads to its conclusions of the research.

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2. Homo economicus before behavioral economics

The place of the concept of *homo economicus* is central to traditional economic models. These studies begin with certain traits of behavior and contain the main postulates of economists about human psychology.

Just as *zoon politicon* (homo politicus) is considered a symbol of man in Aristotle's description of a social figure of his time, so *homo economicus* represents the view of man of the thinkers who introduced him from their time. Roots of the term *economic man* could be found in John Kells Ingram's *The History of Political Economy, 1888*. Criticizing J. S. Mill's definition of political economy, he states that it is committed not with real, but with imaginary people – 'economic people' conceived simply as 'animals that make money' (Persky, 1995). That understanding of economic man serving to define political economy by Mill and his followers, gives direction in the comprehend of the usefulness of J. Bentham. On its basis, the basic concepts of supply and demand, market and pricing are developed by the neoclassical school, where the nested characteristics of the concept of *an economic person are clarified*.

Neoclassical development clearly imposes the concept of *HE* in science as a representative image of the individual in economic research. It can be said to idealize classical traits and, with the trend of "pure economics", somewhat applies the idea of "clean" analysis to the consideration of the individual as well. Moral with psychological premises and analyses are set aside for a clearer distinction and imposition of mathematical understanding. The mechanics of utility and *self-interest* also require more specific characteristics.

With the development of science, from marginalism to rational expectations and game theory, the framework of rationality clearly becomes a set. This leads an individual to act all the time with ideal rationality and a clearly set preferences, pursuing maximum benefit, perfectly informed, completely selfish, with unlimited cognitive capacity. That description clearly outlines the unnatural, far-fetched, exaggerated features of the concept. The transformation of *homo economicus* from the initial meaning of the term goes through adaptation to the new reality, which allows new knowledge of man to be embedded in the concept in order to achieve a complete and real concept.

The critique of that “full” rationality starts with the institutionalism of Veblen and continues with Wesley Mitchell. However, finds its clarification from Herbert Simon. Another feature, related to rationality imposed on *homo economicus* concerns its computational abilities – the reason why people in economic analysis are called "calculators" by Veblen (1993). Simon takes the first step in better studying the economic agent as the author of the concept of bounded rationality. At its core is the thesis that even if it is willing to maximize, due to limited cognitive capacity, time and information, an economic agent makes a series of "simplifications" in order to arrive at "satisfactory" solutions (Simon, 1955). Even if humans intend to be so, they are incapable of being rational. Bounded rationality is consistent with our knowledge of the actual behavior of human choice. Furthermore, the decision maker must seek alternatives, at the same time has extremely incomplete and inaccurate knowledge of the consequences of actions and is

able to select actions that are expected to be satisfactory. Simon uses the term *satisficing* as a mixture of *satisfy* and *suffice*. This decision strategy involves searching among available alternatives up to an acceptability threshold, i.e. a decision strategy involving searching among the available alternatives up to an acceptability threshold.

The indisputable bridge between these theories and behavioral economic theory are the ideas of institutionalism and, to an even greater extent, Simon's concept of bounded rationality. His great step is also the basis for a change of *HE* in behavioral economic theory. The new view was adopted and further developed by O. Williamson and E. Ostrom, as well as evolutionary economists. Herbert Simon's work provides a basis for the development of both neoinstitutionalism and the overall idea of Behavioral Economics (BE) at a later stage, though he does not belong to the school. Based on his approach, the most important foundational findings for duality of thinking process and the heuristics and bias approach are built. The theory gaps, that have not been addressed to date were found. In general, the "choice architecture" and Richard Thaler's best-known methods and models, such as *nudges* and *mental accounting*, are built on the basis of Simon's "bounded rationality."

3. Decision making and psychological factors according to behavioral economics

Daniel Kahneman and Amos Tversky developed Simon's principles further in the study of the decision-making process. They examined the human mind and also established the two systems of thought in the decision-making process, editing and evaluation phases. Furthermore, they identified the influence of feelings and judgments differing in risk assessment, profit, and loss assessment. The most important conclusion of the research on cognitive relationships of individuals is that the rational agent has "a single cognitive system that has the logical ability of a flawless System 2 and the low computing costs of System 1" (Kahneman, 2003). Theories in behavioral economics on the basis of the rational model add hypotheses about cognitive limitations to register specific anomalies.

Understanding and developing the heuristics and bias approach plays an important role in behavioral economics. Primarily, the behavior economists use the mistakes in people's thinking. The automatic side of thought uses heuristics that are capable of leading to systemic errors. The first statement part of the heuristics and bias approach points out that people use shortcuts, simplifications, and problem reorganization to facilitate the decision-making process in uncertain situations, rather than logic and probability calculations.

Kahneman and Tversky initially pointed out the three main systematic heuristics: *anchoring and adjustment, availability and representativeness*.

- ***anchoring and adjustment:*** Heuristics, in which people evaluate numerical results based on an easily accessible value – the "anchor" and adjusting to it to arrive at a sufficiently plausible answer. The fit is strongly influenced by the initial anchor.

- ***representativeness****:* It represents the short scoring path for uncertain events based on similarity to a prototype.

- ***availability****:* ease of recall; it is a process of evaluating frequency through "the ease with which instances or occurrences can be brought to mind" (Tversky, Kahneman, 1974).

The Prospect Theory (PT) is the third most important point of building the foundations of BE. It is also a framework for heuristics and is the alternative descriptive theory to the theory of expected utility. In summary, the contributions of PT are the indication of a reference point as a basis for comparison, *status quo* or goal, through it a subjective point is determined. Thus, the judgments about gains and losses are separated. The pain of losing outweighs the joy of winning. People use heuristics to manage complex decisions related to estimating probabilities and predicting values. Probabilities are assessed subjectively through heuristics, which implies the possibility of errors. One of the most important conclusions of Prospect Theory is that the choice of individuals is influenced by the way choices are formulated. The choice is influenced by the situation, the wording, the settings, often by the understanding of gain or loss. Therefore, the choice can be formulated by highlighting the positive or negative side. People do not make the same choice by obtaining the same result, which are evaluated differently when the indication of the loss or profit in the formulation is different.

In general, the heuristics and bias approach and PT itself has become the technique by which behavioral economists developed their ideas of finding distinguishable traits from the Standard Model individuals and finding ways of applying to economics. Based on PT and dual-thinking, systematic constraints on individual decision-making are recognized and applied. In this sense, humans are *predictably irrational* (Ariely, 2012). The irrationality of individuals is repeatedly identical in kind.

4. The "nudge" technique of behavioral economics

At the heart of the construction of behavioral economics is the idea of a changed economic agent with its applied characteristics. Richard Thaler himself sees as the main reason for the insufficient predictive power of economic models this very idealized and irrelevant understanding of the economic agent. He pleaded to include real people with their actual traits in order to build an objective view of the world. The aim is to achieve the enrichment of economic research with the concept of *homo sapiens* for a more accurate view of the real world. Behavioral economics adds experimentally proven human traits beyond those of *economically sophisticated people* and bases its analyses on people's real responses and reactions. Moreover, behavioral economics believes that economics does not break away from its predecessors. However, it returns to its basics (Thaler, 2015).

R. Thaler's theories describe the true behavior of individuals. His most important conclusion from consumer choice theory research is that the orthodox economic model of consumer behavior is a model of "robot-like experts" (Thaler, 1980). Whereas real consumers follow reasonable practical rules in decision-making process, which leads to deviations from this expert model. Such deviations are the endowment effect and sunk cost fallacy.

The development of ideas related to the theory of consumer choice led to the construction of the concept of the so-called *mental accounting*. Thaler presents a new model of consumer behavior "a hybrid of cognitive psychology and microeconomics" (Thaler, 1985). Mental accounting in general describes the way resources and consumption are labeled and how they are grouped as regular income versus unexpected profits, consumption of basic necessities versus hedonistic consumption. Furthermore, this results how the revenues are directed among the accounts, with the decisions as to not spend savings on vacations. For instance, bracketing the choice has further impacts. For a too much narrow choice, bracketing leads investor to desire a quick compensation for previous losses without waiting the shares to become more profitable. Thaler's subsequent concepts are on the importance of self-control problems, social impacts, the role of hedonistic adaptation, and overreaction and the role of fairness.

The findings of behavioral economics make it possible to understand people's wrong decisions. The idea of applications is that people would change decisions if they had complete information, unlimited cognitive abilities, and no problem with self-control. Violations of rationality imply helping people when there is the slightest chance that they will not make the right choice. At the same time, it is important, considering all the effects in human behavior, to find a way to preserve the freedom of choice of the individual. The way of giving information must also be designed; the information is not effective, if the way of thinking and its impact are not respected. Informing itself, without considering psychological factors, can give rise to fear and other emotions with consequences for the behavior of the individual. The content of this process of supporting an individual's decisions is generally called *nudge*. In general, the main features of the approach are lack of coercion, delicacy in application, low cost and focus on aspects that would be neglected by the *homo economicus*.

Choice architecture is the technology of nudge application to record the impact of small changes in context so that the design correctly responds to the stimulus-response relationship; the stimulus signal is consistent with the desired action. It requires the application of design questions that economists do not pay attention to, because they proceed from the premise that human behavior is behavior of HE with a flawless response system. In reality, we're dealing with *homo sapiens*, which have "system crashes," so objects and environments must be designed for humans.

The nudge embodies the architecture of choice to the greatest extent, as it relates to every aspect of the construction of choice. The choice architects are the people responsible for the organization of the context of decision-making. Analogous to architecture, design decisions are applied to the decision-making process.

The basic principles of the choice architecture are to provide for a default option, to comply with making mistakes, to provide feedback and a warning signal. In addition, it strives for people to improve their skills to build the right map between preferences, choices, and welfare. Nudges are based on the *heuristics and bias approach*. In some cases, heuristics themselves can serve as nudges, while other nudges target heuristics and biases.

The main and initial ways of nudging are giving a default option, using formulation and social influences. BE holds particularly much for the influence of the default option, which is mainly used because of the tendency to inert behavior and the use of the automatic system of thinking. Going beyond the *default option* generates an expense for the individual. Therefore, people are prone to inertia, and inertia is also an indicator of limited rationality.

Framing is used as a nudge through *formulation*, the choice depends in part on the way the problems and situation are presented. In haste, the formulation has a strong influence on the decision because the verification of a formulation requires effort and time.

On one hand, *social influences* are significant due to people learning from each other, whereas on the other hand, the misconceptions spread in this way. The effects generated indicate the significant influence of other people's opinions on individual decisions. In addition, the influence of society is considered inevitable since it acts on an instinctive level.

4.1. Nudges to promote savings behavior

This type of nudge aims to encourage, facilitate, and assist savings behavior in the individual. The main problems with it are the effects of *loss aversion* and "*myopia*" due to hyperbolic discounting.

The principle *of loss aversion* states that people are more sensible about the losses than the gains. The effects of it are adherence to the *status quo* - against the desire to avoid the new in order not to lead to the abandonment of the old; the endowment effect - emotional attachment, which causes people to evaluate a possessed object often more than its real value; sunk cost effect - indicating the continuation of an undertaking after it has already been invested in it and others.

Hyperbolic discounting indicating the decreasing rate of discounting individuals and giving greater relative weight to consumption in the earlier period is the one creating "myopia" so that for the distant future people will make plans when it approaches their decisions will be shortsighted and inconsistent with previous plans. Hyperbolic discount functions induce dynamically inconsistent preferences, suggesting a motive for users to limit their own future choices (Laibson, 1997). These two behavioral problems lead to an individual's reluctance to make an initial larger investment that bears an opportunity for future saving.

What are the tools *for achieving the purposes?* Smart disclosure of information and engines of choice; categorization and anchoring of savings accounts; introduction of a liquid savings account for emergency financial cases with automatic replenishment; introduction of simplifying strategies for consumers, "smart" programs with default options, use of mental accounting to promote savings.

Smart information disclosure and drivers of choice facilitate account management with warnings, and reminders to avoid penalty charges. Improving financial services with credit card information or limiting accounts, as well as applications that guide savings habits are also to among the tools to help savings. In general, this approach introduces the so-called *nudge*

banking by giving warnings and facilitating the tracking of information about banking services. To promote savings, anchoring and categorizing them plays a role.

Automatic setting of values is a method of controlling inert behavior. Still, on the planning and executing side of individuals, the preliminary commitment to setting consumption limits can have a strong impact. About encouraging household savings, advance payment of a certain value for utility bills with the possibility of tracking consumption can also be applied.

Nudges also include simplifying credit options to avoid taking advantage of individuals' confusion or unawareness. They include giving an overview simplified information to the individual and distinguishing interest, and fees in order to simplify the calculation. Similarly, credit cards include giving an annual report and facilitating comparison with other offers. Card limits play a significant role in anchoring, i.e. they can also encourage spending. Separate fees, deadlines, penalties, currency exchange make calculations complicated for individuals. Implementation of an automatic option for direct payment from the account is also helpful.

Similar to the program *Save More Tomorrow,* auto-subscription options are included with savings plans. In addition, by including channel factors, accession can be facilitated, and behavioral barriers removed, and it can also be recognized that indicating a higher threshold through a higher round number encourages savings.

To increase savings, a liquid savings account for emergency financial cases can also be applied - the so-called *sidecar* account. It allows automatically to distribute the funds for a pension and a liquid account.

4.2. Nudges against inequality

The goals for this nudge are creating a social stability, social behavior and improving the social acceptability of policies and changing mental models and attitudes towards inequality. In this group of nudges, the following behavioral problems arise: the effects of mental accounting, inherited thought patterns generated by institutions of inequality and social norms.

In mental accounting, choice *bracketing* has an impact, too narrow grouping leads to a desire to compensate for previous losses as quickly as possible. Also, the anchor placed may give rise to a tendency to overestimate the probability of positive and underestimate the probability of negative events, the effect of opportunity by giving greater weight to small probabilities, confirmation bias with an interpretation of the information in a way that confirms prior beliefs.

According to the environment, informal institutions and social norms are built, so that both the norms built by oneself, and the social norms already built by society have an impact on decision-making.

The tools to achieve the goals are: the use of simplifying strategies and framing, setting of aims with pre-commitment, improvement of assistance for financial capacity, use of social roles and comparisons, cultural context, increasing interconnections between groups, default options.

In this respect, behavioral economics tools emphasize simplifying procedures for access to services, forms for financial assistance programs, and personal development. Also, assistance is done according to the mental bandwidth. Reducing short-sightedness and improving the financial decisions related to low program enrollment or wrong investment strategies minimizing the consequences of loss aversion can be achieved by providing a framework in which the visibility of long-term benefits is increased**.** A pre-commitment plan with following a promise in a certain direction can be used. Ex-ante goal setting impacts long-term aims when obstacles or temptations occur.

The importance of social influences is also used to change already established society norms. Regarding problems requiring change at the social level such as corruption, the propensity of people to care about their social role can be used. For the change of already established norms and thought models, the influence of mental models in information processing and cultural context must be considered. The norm of justice in society also has an impact.

For the social acceptability of policies and creating public engagement to accelerate their implementation, social influences and increasing interconnections between different social groups are also used, nudge policies play a significant role in building social stability. People behave as expected and reminder has an impact, as people find it difficult to assess their capabilities and easily enter into stereotypes by gender, race, ethnicity, and social groups. In this respect, mentoring or using a peer effect with the indication of a role model plays a positive role.

5. Conclusion

Behavioral economics revolutionized the theory and brought economics back to its roots. As critics of behavioral economics point out, and behavioral economists confirm, their ideas are not original, but refreshed insights from the depths of theory, even before the modern development of psychology. The ideas are embedded in the depth of Adam Smith's *The Theory of Moral Sentiments*, which points to the "impartial spectator" as a corrector of our own behavior, the tendency of people to suffer more from loss than to rejoice at improving their situation, and a better understanding of Jeremy Bentham, who seeks the benefit in happiness but also in the prevention of pain. In this regard, the development of behavioral economics with the inclusion of psychology in economic analysis corresponds to the hope of Alfred Marshall regarding the development of economics in the direction of the study of human nature and its central location, even of Vilfredo Pareto, that in the future it will be possible to derive the laws of social science from psychology.

The practical application of behavioral economics highlights the nudge approach. It shows how heuristics and biases can be used to improve people's decisions, the influence they are subjected to, the feelings that obscure thought, the speed that causes a move away from reporting statistics, unclear preferences, and how not to harm themselves and others as much as possible. The way is in the form of lack of coercion and considering neglected points of mainstream

economics: setting solved tasks to individuals, translating into language that they understand, directing through formulation, and using the social essence of people in their interest.

Behavioral economics develops in unison with new trends, topicality is evidenced by the practical tools of nudge. The main stimulus for the popularity gained lies in the wide scope of the nudge policies. Placing in the center the true human traits with the intuitive impact and adaptability to the environment, focusing on the dynamics and complexity of modern daily routine and considering the reflection of technological development gives the necessary flexibility of implementing behavioral economics for instruments to change according to different circumstances and problems. The application possibilities indicate the effectiveness and wide applicability of nudge. The nudging policies proposed for the particular topics show the possibility of modification according to different circumstances and actuality.

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INFLATION OR DEFLATION? CHINESE ECONOMY IN 2023

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Abstract: *In March 2023, data released by China's National Bureau of Statistics showed that the growth rate of CPI narrowed and the decline rate of PPI widened from the previous. The downturn in price data triggered market discussions about economic "deflation". After a retrospective study of Chinese economy since 1980, we do not think that the downturn in price data is the start of economic "deflation", but rather the early stages of recovery after the end of the three-year epidemic.*

Keywords: *Chinese Economy, Inflation, Deflation, Monetary Policy*
JEL: *E31, E32, E58*

1. Introduction

In March 2023, data released by China's National Bureau of Statistics (NBS) showed that CPI rose 0.7% year-on-year (y/y), the rate of increase narrowed by 0.3 percentage points (pp) from the previous month, lower than the previous value of 1.0%; and PPI fell 2.5% y/y, the rate of decline widened by 1.1 pp from the previous month, lower than the previous value of -1.4%. On a longer-term basis, the year-on-year PPI growth rate has been negative for six consecutive months, and the year-on-year CPI growth rate fell below 1% for the first time in a year. The downturn in price data triggered market discussions about economic "deflation".

Yi Gang (2000) defines deflation as that the money supply continues to decline, price level continues to fall, and a recession occurs at the same time. This definition has become the mainstream judgment of deflation in Chinese economics. From the history of development since the reform and opening up, China has met two rounds of deflation or "deflation-like": the first is the end of the last century and the beginning of this century (1997-2002), during which the CPI and PPI negative growth months accumulated 39 months and 51 months respectively, with the lowest values of -2.2% and -5.7% in several, and China went out of deflation through the reform of state-owned enterprises (SOE), the banking reforms, the issuance of long-term treasury bonds to invest in infrastructure, and the accession to the WTO, etc.; the second is 2012-2016, during which the PPI for 54 consecutive months of negative, the lowest value of -5.9%, but the CPI is still positive, China was out of PPI deflation through the supply-side reform.

The downturn in price data this time, we prefer to regard it as the early stages of recovery after the end of the three-year epidemic, rather than the start of economic "deflation". In fact, from the financial data released by the People's Bank of China (PBoC) at the time, credit expansion in March exceeded expectations, and price level is not down across the board. The economic forward-looking data point to economic recovery in the first quarter, which is clearly not in line with the definition of deflation. However, during the three-year epidemic, China led the world in economic growth, including through leveraging by government departments, while at the same time some new risks emerged: recession in the balance sheets of the household sector,

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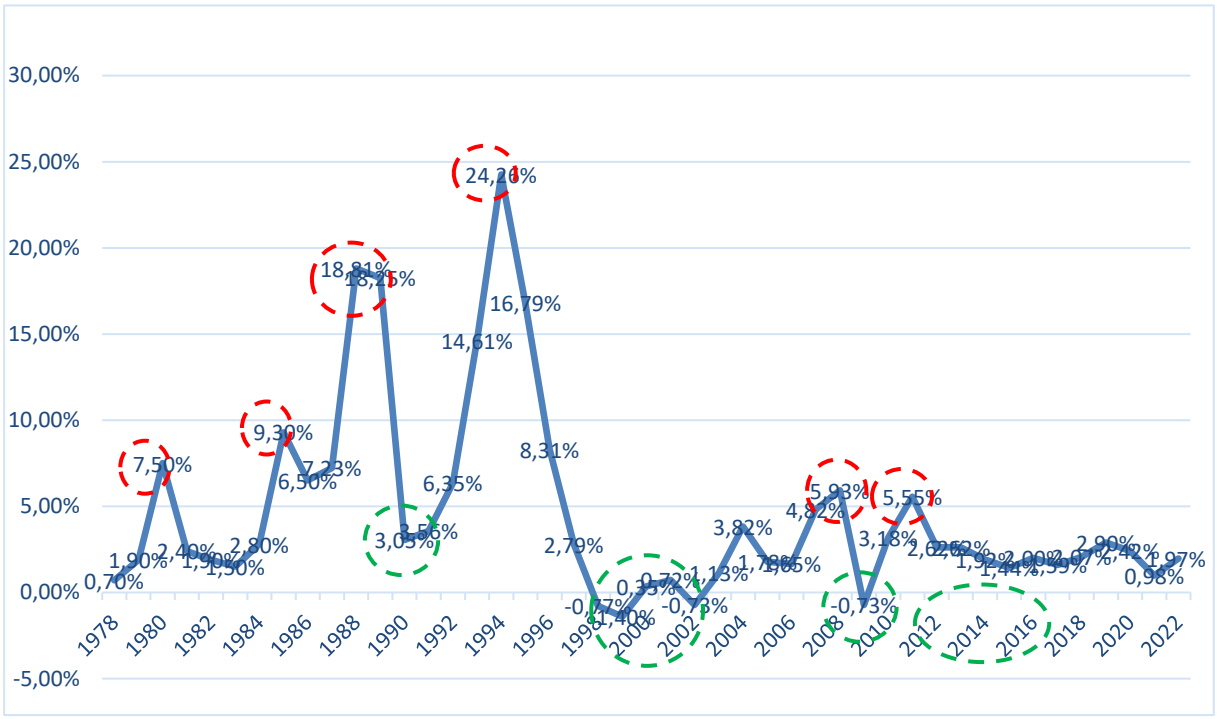
overstretched on the financial capacity of local governments, pressure build-up on debt refunding, and instable on the recovery of real estate market. These issues have become the challenges for China's economy in 2023 after the epidemic.

2. Chinese Economy: From Inflation to Deflation

The fluctuation of prices is a normal phenomenon of the economic functioning. Since the advent of credit money, the risk of inflation has always existed. Inflation was the biggest issue facing the Chinese authorities in the 1980s and 1990s, as China's transition from a planned economy to a market economy required simultaneous price reforms.

Figure 1: Chinese CPI since 1978



Source: National Bureau of Statistics.

At that time, China experienced three relatively serious inflation episodes, which occurred in 1980, 1988 and 1994 respectively. The inflation in 1994 was the most serious, with the CPI rising by as much as 24.1% that year. Zhu Rongji, then Vice Premier of the State Council, was once the governor of the PBoC, and it was only through controlling currency issuance, raising interest rates, and tightly controlling credit that prices were levelled off. It was also in this round of regulation, the concept of M2 began to be included in the official statistics, becoming the most important indicator of monetary control.

After a series of regulations, China's price level began to fall, and CPI fell to 8.3% in 1996. Since the broke out of Asian financial crisis in 1997, the external demand suffered a huge impact, and the price level fell further where CPI was only 0.8% in that year. From a monthly perspective, the PPI turned negative for the first time in June 1997, while the CPI turned eventually negative in February 1998.

This was the first negative price growth after the reform and opening up, and the economic situation was exceptionally bizarre. Liu He (Liu & Yang, 1999) reflected in an article that

initially the central government did not realize that the Asian financial crisis had such a serious impact on the economy: in early 1998 the State Council issued a new industrial policy whereby all products and technologies that conformed to the industry-oriented catalogue were eligible for tariff reductions and exemptions on imports. At this time, the central government was still encouraging imports and was not worried about exports. Under normal circumstances, this would stimulate the enthusiasm of local government to brief projects in ministries. But unexpectedly, "ten days later, basically no one came to the State Planning Commission to brief projects, or to say, the policy judgment and the market's feeling are not the same. The feeling of the market is the economic downturn, but the policy designers feel that the economy is still showing high growth momentum." Two years later, Liu He (2001) wrote that the "Ninth Five-Year Plan" (i.e., 1996-2000), which focused on managing inflation, turned to curbing deflation in the implementation process. For the cause of deflation, Liu He believes that there are two, one is the unsmooth of aggregate demand expansion channel, "the central bank (PBoC) increased the currency, the liquidity does not flow out, not to the canal"; another is the general expansion of manufacturing industry since the 80s, resulting in a large amount of overcapacity.

Around the time of the double negative growth of CPI and PPI, the China Center for Economic Research at Peking University had conducted an in-depth study on deflation. Yi Gang led the macro group to publish a monograph on deflation around 1998. It is because of the professional research on related macro issues triggered the attention of the decision-making authorities, Yi Gang was also transferred to the PBoC Monetary Policy Committee as deputy general-secretary, and then served as director of the Monetary Policy Division, assistant governor, deputy governor, etc., and in March 2018 succeeded Zhou Xiaochuan as governor of the PBoC.

"By the end of June this year, China's total retail price index has been negative for 21 consecutive months, the consumer price index has been negative for six consecutive months, and it is an indisputable fact that deflationary pressure is increasing", Yi Gang (1999) wrote. He also analyzed that the beginning of deflation is usually during a boom period, and in China's case, there was first the high-launch of the economy in 1992, which resulted in an unprecedented investment boom and huge inflationary pressures. Then came the opening of governance and consolidation, with China introducing laws and regulations such as the People's Bank Law, the Commercial Bank Law, and lending rules. Under the constraints of bank lending rules, due to the high indebtedness of SOEs increasingly difficult to operate, banks began to tighten lending. At the same time, repeated investment in the early stages led to excess product supply capacity, which in turn led to a decline in the general price level and profits of SOEs, making it more difficult to operate, "So an endogenous, self-reinforcing trend formed".

As both CPI and PPI continued to grow negatively, there was not much controversy about deflation in the academics at the time, but a huge divergence in policy responses. Some suggestions were made that the central bank should issue money in an unconventional way, such as allowing the central bank to overdraft to the treasury and exempting corporate debt in various ways. Yi Gang (Macroeconomic Group, 2000) wrote at the time saying that it was right for the central bank to increase the money supply moderately, but that issuing money alone would not lead to a rapid recovery in prices. He further analyzed that, in a regulated market economy, as long as the central bank injects capital to the over-indebted enterprises of economy to prevent the spread of the debt crisis, the economy can continue to run. But this is not the case in China. Yi pointed out clearly that the long-term inefficiency of SOEs is the root cause of deflation, and that China's problem is not mainly in the adjustment of macro policy, but in the

micro-mechanisms of the economy, so it is necessary to speed up the reform of micro-mechanisms and improve the economic performance of SOEs.

In retrospect, China then carried out drastic reforms of SOEs, making most of them turn losses into profits. At the same time, the curtain of reform of state-owned banks was opened, and the central government issued 270 billion yuan of special treasury bonds to inject capital into the four major banks, set up the four major AMCs to take over the non-performing asset of the four major banks, and improved the efficiency of monetary transmission. On macro policy, monetary policy took a loose stance, many times to reduce interest rates. In contrast, fiscal policy was more effective. In late 1998, the central government decided to issue an additional 100 billion yuan of treasury bonds, mainly for infrastructure construction. Since then, the long-term construction bonds issued in 1999-2004 for the implementation of active fiscal policy have totaled nearly one trillion dollars.

The Government Work Report (State Council, 1999) also made a special case statement: under normal circumstances, the expansion of fiscal deficits for construction will inevitably lead to inflation. However, under the current specific conditions, the possibility of such a danger is not high. Bank savings deposits are now relatively large, and some of the savings will be converted into investment in infrastructure through fiscal bonds, which will not lead to excessive currency issuance; there is an abundant supply of major agricultural products, industrial consumer goods and means of production, and prices are relatively stable. The data showed that the PPI began to turn positive in January 2000, while the CPI gradually recovered from the growth rate of about -2% in 1999, and in February 2000 was reported at 0.7%. At the National People's Congress held the following month, then-Premier Zhu Rongji made a report on government's work, stating, "after several years of practice and exploration, we have accumulated both rich experience in managing inflation and initial experience in curbing deflationary trends."

It is worth noting that the word used at the official level for this round of falling prices is not deflation, but deflationary trend. Yi Gang (2002) explained that although prices were falling at the time, the average growth rate of the money supply was around 15%, and the GDP growth rate was 7-8%, so it could not be said that China was experiencing deflation in the typical sense, but could be described as "deflationary pressure" or "deflationary trend". Lu Feng (2004), a professor at the National Development Research Institute of Peking University, believes that China out of this round of deflation depends on deep-seated reforms, such as the strategic restructuring of the state-owned economy, the government's streamlining, the decision to open up to the WTO, supplemented by increasing infrastructure investment in active fiscal policy, focusing on strengthening the effectiveness of the financial market reform of the State-owned Banks, superimposed on the catching up with the global Golden decade of "low inflation, high growth" .

3. Coping with PPI Structural Deflation

The deflation at the end of the last century and the beginning of this century was not only a matter of policy itself, but even of the forecasts of economic growth. At the end of 1998, Liu He (Liu, 1998; Liu, Yi, and Song, 1999) was the first to speak at an academic symposium on the sustainability of China's economic growth, organized by the Institute of National Economy in Beijing and the Management World magazine: since 1998, China has been experiencing a period of deflation. With the emergence of deflation in China, many scholars have put forward a pessimistic view that the 20-year-long high-speed growth phase has come to an end, and that China will enter a period of structural adjustment with a low rate of growth, and it is unlikely

to "break through the physical limit of 20 years of high-speed growth". However, Liu He insisted that in the next 10 years, China's three basic trends - urbanization (major adjustment of urban-rural structure), marketization (major adjustment of ownership structure), and internationalization (major adjustment of international labor division in accordance with comparative advantage principle) - would create the physical space, the power mechanism, and the operational practices for high-speed growth.

Yi Gang (Yi, 1998; Liu, Yi, and Song, 1999) went on to argue that there are still five major spaces for China's sustainable economic growth: spaces for urban-rural structural transformation, for ownership structural adjustment, for industrial structural adjustment, for regional structural transformation, and for small and medium-sized enterprise (SME) development. He also pointed out that macro-regulation is to make policy adjustments under given institutional and structural conditions to iron out economic fluctuations and solve short-term problems. However, in the medium and long term, it is necessary to adjust the economic structure through deepening reforms in order to guarantee the efficient and sustainable growth.

Along with the launch of a new boom cycle in China after its accession to the WTO, China's economy grew at an average annual rate of 10.6% during the 10-year period 2001-2010, which is still 0.2 pp higher than the previous 10-year period. During this period, China's economy showed the asymmetric characteristics of going hot easily and going cold hardly, and inflation was the main macroeconomic risk.

However, since 2012, the PPI has shown a deflationary trend. It has shown negative growth since March 2012, and the decline rate has been expanding. It fell 5.9% y/y in August 2015 and remained at that level for five consecutive months, culminating in 54 consecutive months of negative PPI in this round. The market debate on deflation has resurfaced. The side that deflation is coming chose PPI and GDP deflator, which have been negative for a long time, as arguments; the side against deflation pointed out that PPI is related to commodity prices, exchange rate changes and other factors, which are highly volatile, and the negative growth of PPI is not unusual, and CPI is still positive for the same period. The official level this time did not even mention the deflationary trend, the government work report (State Council, 2015), defined as "a continuous decline of industrial product prices", then-Premier Li Keqiang denied deflation in the press conference in March due to CPI positive growth. For this round of PPI structural deflation, academics analyze the declines both in external demand and in international commodity prices, but also the lack of domestic demand and serious overcapacity factors, the latter to some extent reflects the "sequelae " after the previous "four trillion" stimulus.

Authoritative sources (Gong, et al., 2016a) said in January 2016 in an interview with the People's Daily that a considerable amount of China's production capacity was formed in the golden period of world economic growth oriented to external demand as well as the stage of high-speed domestic growth; in response to the impact of the international financial crisis, some production capacity and expansion; in the context of the slowdown in the growth of the international market, it is difficult to solve the problem of overcapacity by relying solely on stimulating domestic demand. "This is equivalent to preparing gourmet for two tables, but came guests only for one, make them never to eat over." Authoritative sources (Gong, et al., 2016b) have summarized the problems, including the decline in industrial prices, as "four declines and one rise" (a decline in economic growth, a decline in industrial prices, a decline in the profitability of real enterprises, a decline in the growth of fiscal revenues, and a rise in the probability of economic risks), and believed that the reasons for these problems are not mainly

cyclical but structural. "Traditional Keynesian prescriptions have limitations, and the fundamental solution lies in structural reform."

This is actually an authoritative source for the supply-side structural reform to explain the doubts. The central economic work conference held at the end of 2015 proposed that in the coming period, we should expand moderately the aggregate demand, at the same time, focus on strengthening the supply-side structural reform, mainly to grasp the five major tasks of de-overcapacity, de-over-inventories, deleverage, lowering costs, and replenishing short boards. While the market is highly concerned about how to coordinate the aggregate demand policy with the supply-side structural reform.

Yi Gang, then deputy governor of the PBoC, analyzed in February 2016 at the annual meeting of the Economists 50 Forum: internationally, many countries' structural reforms have produced a contractionary effect, resulting in further tightening of demand, and some have fallen into deflation. Therefore, we have to manage well aggregate demand along with structural reforms, but aggregate demand management is a complementary policy, in a supporting position. Yi (2016) believes that in the process of supply-side structural reform, fiscal policy is the "main battlefield" of demand management, because fiscal policy is naturally structural policy. For monetary policy, he said to moderate support, but not excessive. "Monetary policy should still be prudent, and excessive easing should be avoided, because excessive easing of monetary policy may generate asset price bubbles and RMB depreciation pressure."

With the advancement of supply-side structural reform, the structural imbalance between macroeconomic supply and demand has been corrected, and the deflationary trend of PPI has been curbed. The PPI showed a rapid rebound in 2016, and ended the consecutive negative growth in September 2016, recovering from -5.9% at the lowest point of 2015 to 5.5% in December 2016.

4. Deflation Risk Renewed Controversy

While the PPI remained negative, the CPI remained stable, fluctuating around 2% in the second decade of this century. Overseas developed countries have entered a low inflation or even deflationary environment, which is most notable in Japan, where the Japanese economy had its ups and downs in the 1980s, triggering deflation and recession after the bubble burst and plunging into a deflationary spiral, which was dubbed as the "Lost 30 Years". In order to boost inflation, the central banks of developed economies have adopted unconventional monetary policies such as zero or even negative interest rates and QE (quantitative easing), and increased their efforts during the 2020 response to the epidemic, which ultimately led to the return of high inflation in 2022. As a comparison, China's CPI rises only 2% in 2022.

In the context of overseas high inflation, since last year China shown the achievements of monetary policy regulation, that is, China has maintained price stability due to the well-done macro-regulation, even in 2020, the most serious situation pf the epidemic impact, did not increase the deficit on a large scale, and did not over-issue of money to engage in a "flooding irrigation". "In recent years, the global economy has faced more unanticipated shocks, and there is a greater uncertainty for the economic environment and policy effects. Our country has been the implementation of prudent monetary policy, where the monetary policy adjustments appropriate to the 'prudent intuition' closer," Yi Gang (2023) said in April 2023 in annual conference of the Chinese Society of Finance and Banking. The background is that, in response to the impact of the epidemic, in March 2020, the Federal Reserve cut interest rates twice by a

total of 150 basis points, into the "zero interest rate" ranks. At the same time, the central banks of developed economies restarted or increased QE, injecting huge amounts of liquidity into the market. For example, the Fed's balance sheet expansion of 3.2 trillion U.S. dollars in 2020, more than the 2008-2013 expansion scale after the financial crisis.

Monetary policy regulation in Western countries is more mature, and in the early years is also the learning object of China's central bank. In the context of overseas flooding irrigation, China how to do? Yi Gang gave the answer is "prudent intuition". He explained that this "intuition", from the historical point of view, can be our experience value; from the timeline, can be the average of different cycles in the past; from the international perspective, can be the average value among regions. These empirical values and averages have good reference value, which can tell us what will happen after the cycle and make our policies forward-looking.

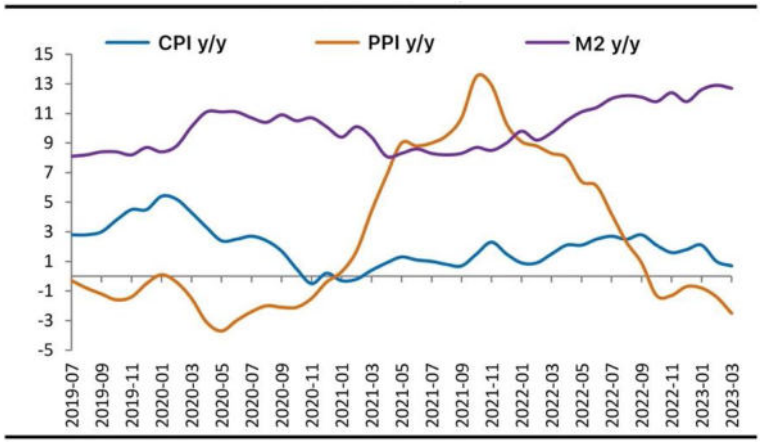
In retrospect, PBoC also launched several initiatives to deal with the epidemic shock, but with considerable restraint. In terms of price-based tools, PBoC has cut the reverse repo rate and MLF rate in 2020, but only by 30BP; in terms of quantitative tools, PBoC has released liquidity through multiple reductions in reserve ratio and open market operations. From the balance sheet point of view, China has had only a small expansion.

Yi also summarized the "monetary policy methodology in Chinese-style " in this speech, that the central bank's goal is simple and clear, i.e., currency stability. He further clarified the relationship between the other objectives of monetary policy and currency stability: achieving currency stability and financial stability helps promote full employment and economic growth. Yi further pinpointed the specific objectives of "currency stability" as well, namely, price stability and basic exchange rate stability.

After the CPI growth of 2% in 2022, China's monthly CPI y/y growth rate has been lower month by month (m/m) so far this year, falling from 2.1% in January to 0.7% in March, while the PPI has been negative for six consecutive months at -2.5%. In the background of the continuous price downturn, the voice of early warning of deflation has risen again. Liu Yuhui (2023) reminded that deflation has begun, the economy has fallen into the recession quadrant, and the prominent contradiction we are facing is the recession of the balance sheet. However, many economists believe that China's economy is not in deflation. "The reason for the current fall in price increases is that demand recovery is progressing slower than supply. In the future, on the basis of sustained macroeconomic policies and demand recovery, the price level is expected to get out of the current relatively low state. One should not simply conclude that we will form a deflationary trend." Liu Yuanchun (2023a) said in an exclusive interview with reporters.

Recently, the NBS and the PBoC have also publicly stated that there is no deflation in the current Chinese economy, and there will be no deflation in the next stage. Their judgment of denying deflation is consistent with the "two declines and one accompanying" criteria put forward by Yi Gang many years ago, that is, the current CPI is rising moderately, M2 maintains rapid growth, and the GDP grew by 4.5% in the first quarter, so there is no deflation. Zou Lan (2023), director of the Monetary Policy Division, also said that the second half of the price increase may gradually return to the average level of previous years, the annual CPI was "U" type trend. In the medium and long term, China's economy is basically balanced between aggregate supply and demand, monetary conditions are reasonable and moderate, the households are expected to be stable, there is no basis for long-term deflation or inflation.

Figure 2: Chinese CPI, PPI & M2



Source: Wind.

In fact, the focus of the debate is obviously not the price change itself, but the policy orientation implied behind it. Liu Yuhui (2023) suggests that because the households' balance sheets are in recession and local governments are facing credit and liquidity collapses, but the balance sheets of the central government and PBoC are still healthy, they should be bold enough to try out some new fiscal and monetary policies, such as fiscal and monetary mergers. This points to measures such as monetarization of fiscal deficit. Currently, the official does not consider deflation, and does not even mention deflationary trends or deflationary pressures, so the super-conventional macro policies in high probability will not be introduced. As for unconventional monetary policies such as fiscal deficit monetization, Yi Gang has always expressed opposition.

Yi Gang (2019) pointed out that ultra-loose monetary policies such as QE may exacerbate wealth divergence, solidify structural distortions, and make the process of crisis adjustment longer. And zero- and negative-interest-rate policies will narrow spreads, squeeze the banking system, and weaken the incentive for banks to supply money. For the monetization of the fiscal deficit, Yi Gang bluntly said that if the government is allowed to directly overdraft the central bank, relying on issuing money to meet the demand for fiscal expenditure, it will eventually trigger hyperinflation, government finance unsustainability, and generate debt crisis. Therefore, to prevent the monetization of fiscal deficits, a "firewall" should be built up between the two "money bags" of government finance and the central bank.

Although the current deflation is still controversial, there is little dispute regarding issues behind prices-weakening, such as the sluggish consumption, high local debt and others. Liu Yuanchun (2023b) said, a loose tone has been formed on monetary policy, and the support to investment and consumption is still relatively full, we cannot and do not have to rely excessively on continued loose monetary policy. Fiscal policy should be adjusted from the rhythm and mechanism, such as increasing support for low-incomes, or implementing some consumer policies in a moderately forward manner.

5. Evidence from Economic Data

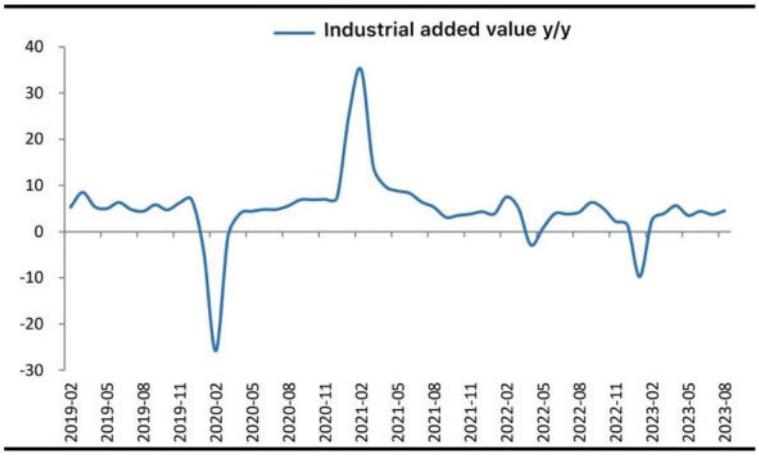
Chinese economy is expected to bottom out due to recently reduction on interest rate and reserve ratio of monetary policy, relaxing regulation of real estate, and enlivening of capital markets, etc., where the recovery needs to be further bolstered by continuous policy. A second round of policy supports in future could be look forward to.

The economic data released for August 2023 shows the first signs of improvement: there are different degrees of recovery on industrial production, investment, consumption, aggregate financing to real economy, prices, PMI, etc., while some cumbrances linger on real estate sales and exports. Some observations could be concluded with the released data:

Industrial production picks up, service sector continues to recover

In August, the value-added of industry above designated size increased by 4.5% y/y, rebounded by 0.8 pp compared with July; it increased by 0.5% m/m, higher than the seasonal. The service sector production index rebounded, up 6.8% y/y in August, an increase of 1.1 pp from July.

Figure 3: Industrial production

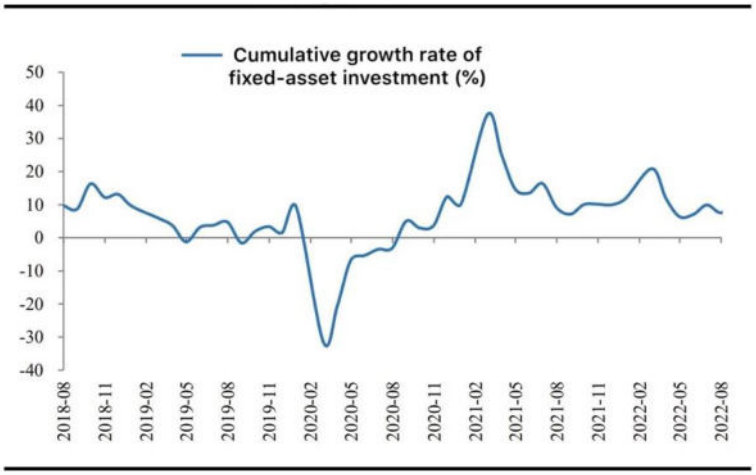


Source: Wind.

Fixed-asset investment rebounded from a low level, and high-tech investment grew faster

In August, fixed-asset investment (excluding farm households) increased by 1.8% y/y, up 0.6 pp compared with July; the cumulative y/y growth of fixed-asset investment (excluding farm households) from January to August was 3.2%, down 0.2 pp compared with that of January-July. And the SOEs are still the main support for fixed -asset investment. High-tech manufacturing industry growth is still faster than the fixed-asset investment as a whole.

Figure 4: Fixed-asset investment

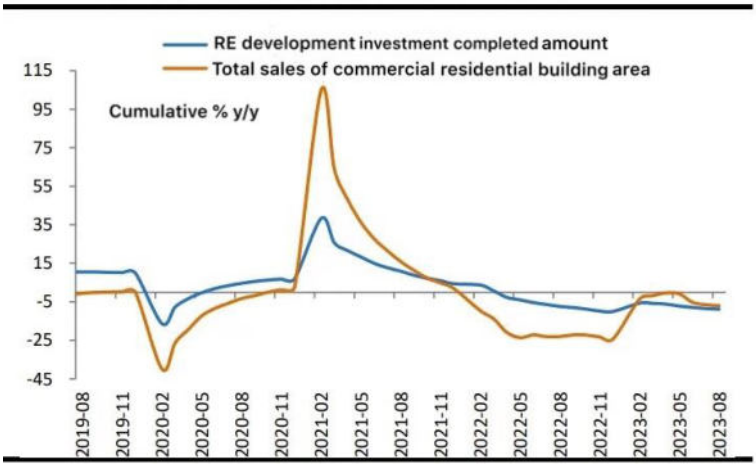


Source: Wind.

Sharp negative growth in real estate sales and investment

The sales and funds-in-place of real estate enterprises remained severe. The commercial residential sales in area and in amount were -24.0% and -23.7% y/y, respectively, widening by 0.1 and narrowing by 0.3 pp compared from July. The rate of decline in the growth of funds-in-place for real estate enterprises further widened. Real estate investment in August was -19.1% y/y, a decline of 1.3 pp from July; the cumulative investment in January-August was -8.8% y/y.

Figure 5: Real estate investment and sales



Source: Wind.

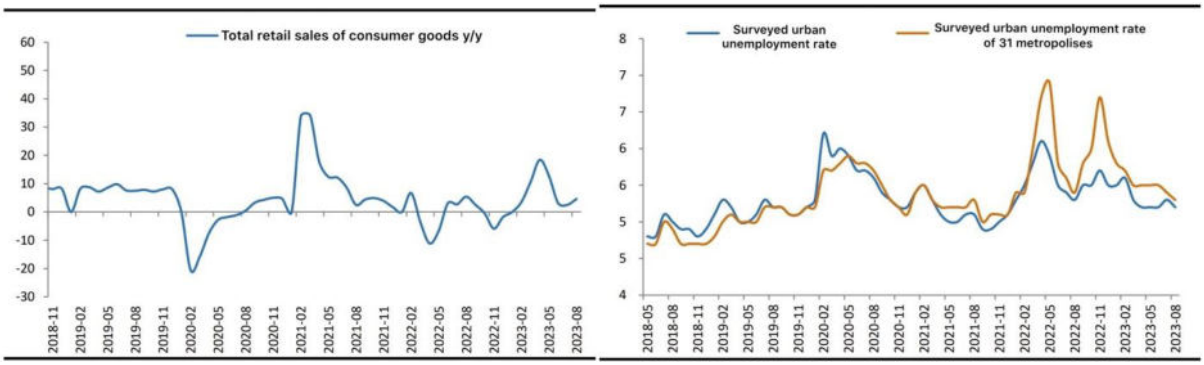
Broad infrastructure investment rebounds, manufacturing investment picks up

Infrastructure investment rose 6.2% y/y in August, up 1.0 pp from July. Excluding water, electricity and gas, it rose 3.9% y/y, down 0.6 pp from July; The cumulative of infrastructure construction investment (excluding water, electricity and gas) from January to August has a 6.4% y/y growth. Manufacturing investment in August has a m/m growth of 7.1%, up 2.8 pp from July; from January to August cumulative growth was 5.9% y/y.

Weak Consumption Recovery

Total retail sales of consumer goods in August rose 4.6% y/y which is up 2.1 pp from the previous, and has a 0.3% m/m growth. Among them, retail sales of services in the first eight months rose 19.4% y/y, down 0.9 pp from the previous; food and beverage revenues rose 12.4% y/y, down 3.4 pp than previous; and retail sales of goods rose 3.7% y/y, up 2.7 pp from July.

Figure 6: Total retail sales and unemployment rate



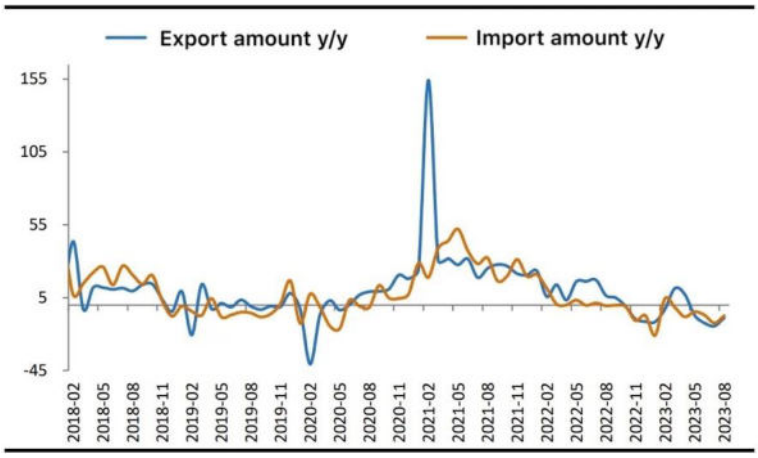
Source: Wind.

Consumption is a function of employment and income. A decline is reported on the surveyed urban unemployment rate; households' short-term loans increased but their willingness to save remained strong. The unemployment rate and the same indicator for 31 metropolises in August were 5.2% and 5.3%, respectively, both down 0.1 pp from the previous. Households' short-term loans increased by 232 billion yuan, and a growth of 39.8-billion-yuan y/y, while households' deposits increased by 787.7 billion yuan, a historically high level for the previous same periods.

Negative export growth, weak external demand

The growth rate of exports in August was -8.8% y/y where the rate of decline narrowed 5.7 pp compared with July, and its 1.1% m/m growth rate was better than seasonal; excluding the base effect, the two-year average of exports growth rate was -1.4%, and these is a 1.5 pp decline compared with the previous month. The decline of many types commodity export narrowed; exclusively, automobile export has a bright performance. Exports to major trading countries improved, where the decline in exports to the United States narrowed sharply; and exports to Russia maintained positive growth. The decline of imports narrowed. In August it was -7.3% y/y, compared with July's decline narrowed by 4.9 pp.

Figure 7: Export & Import

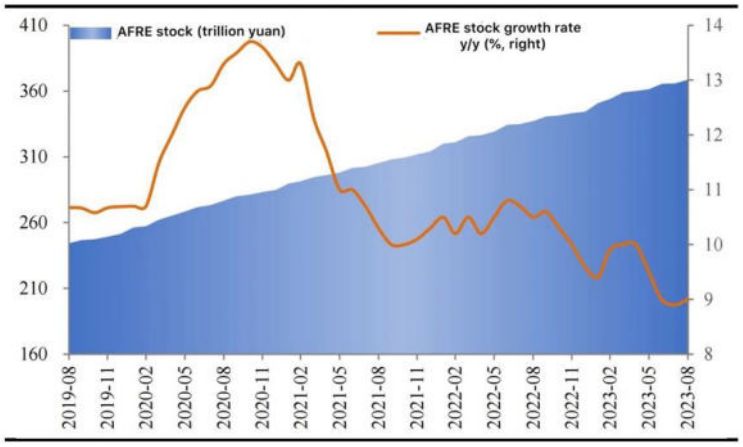


Source: Wind.

Aggregate financing to real economy rebound

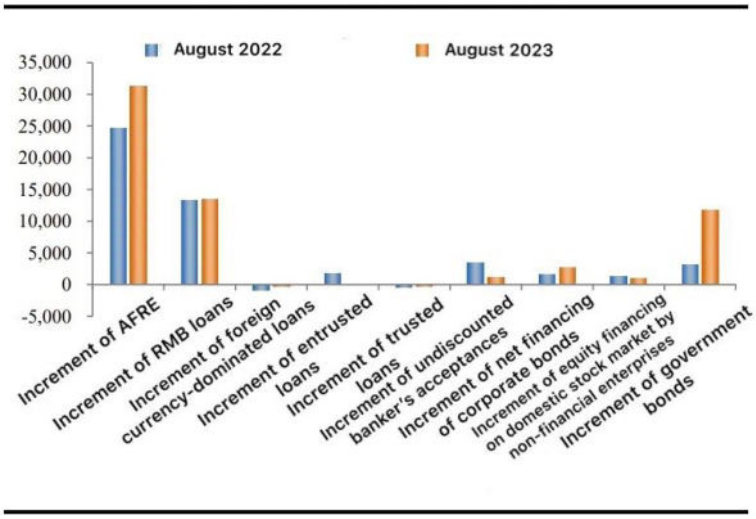
The stock of aggregate financing to real economy (AFRE) in August amounted to 368.61 trillion yuan, up 9% y/y, 0.1 pp higher than July. The increment of AFRE increased by 631.6-billion-yuan y/y. At the structural level, it was mainly supported by government debt and corporate debt. The y/y growth rate of M2 and M1 were 10.6% and 2.2%, respectively, compared with July fell both 0.1 pp; and their scissors difference with previous month was flat.

Figure 8: Aggregate financing to real economy



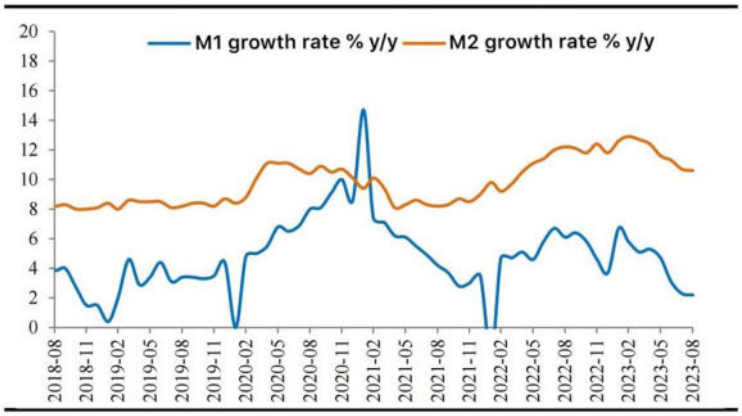
Source: Wind.

Figure 9: Credit structure



Source: Wind.

Figure 10: M1 & M2

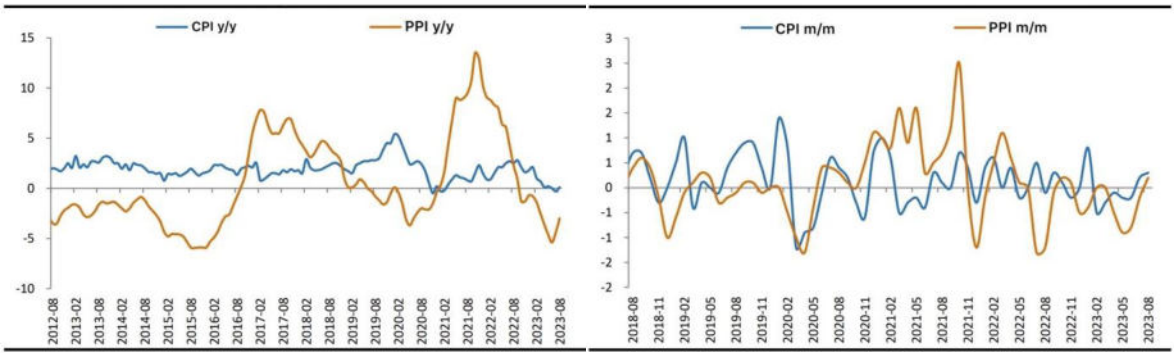


Source: Wind.

Prices rebound from low levels

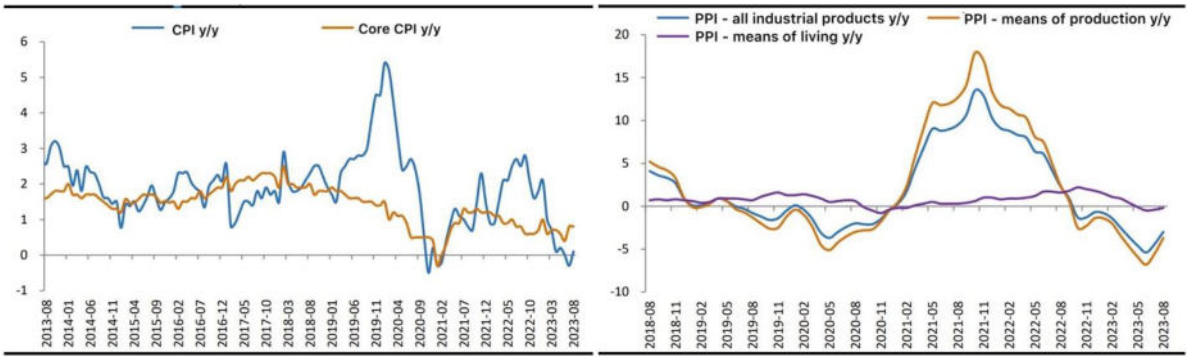
CPI in August turned up to 0.1% y/y from -0.3%; it rose 0.3% m/m, up 0.1 pp from July. Core CPI rose 0.8% y/y, same as previous; and was unchanged month-on-month, down 0.5 pp from July.

Figure 11: CPI & PPI year-on-year and month-on-month



Source: Wind.

Figure 12: Core CPI year-on-year & PPI with segments



Source: Wind.

PPI in August rose from -0.2% to 0.2% m/m, up 0.4 pp from the previous month; PPI declined by 3.0% y/y, narrowing the decline by 1.4 pp from July. Means of production and of living improved in August, their prices increased by 0.3% and 0.1%, respectively, and there was a change of 0.7 and -0.2 pp compared with July, affecting the PPI rose by about 0.21 and 0.02 pp.

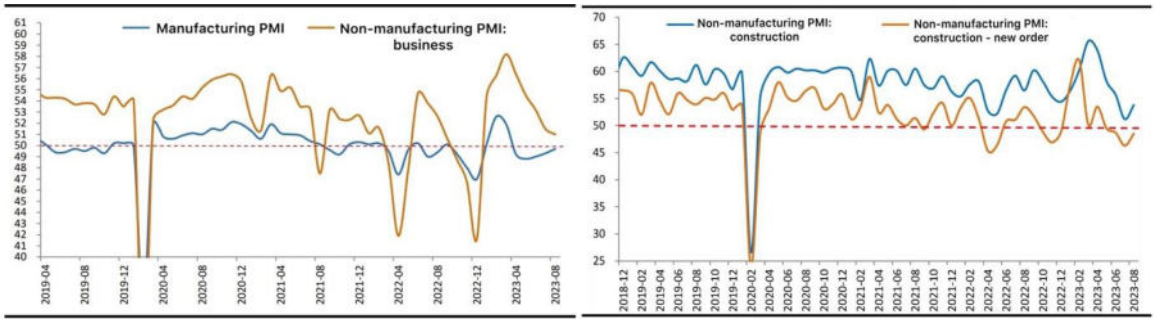
PMI improved, but still below the threshold of prosperity

Manufacturing PMI in August was 49.7%, up 0.4 pp from July, the contraction slowed down, and still below the threshold of prosperity. The production index and new-orders index were 51.9% and 50.2%, up 1.7 and 0.7 pp from July. Export and on-hand orders continue to contract. The impact of decline in demand of Europe and the United States is persistent. The purchase and the factory price indexes of major raw materials were 56.5% and 52.0% respectively, up 4.1 and 3.4 pp from July. The PMI of large, medium and small enterprises were 50.8%, 49.6% and 47.7% respectively, up 0.5, 0.6 and 0.3 pp from the previous. The insufficient of demand and the instability of small & medium-sized enterprises' recovery show the necessity of policy support.

Construction rebounded, and the service sector remained high boom. The business activity index for the construction and the service sector were 53.8% and 50.5% respectively. There is

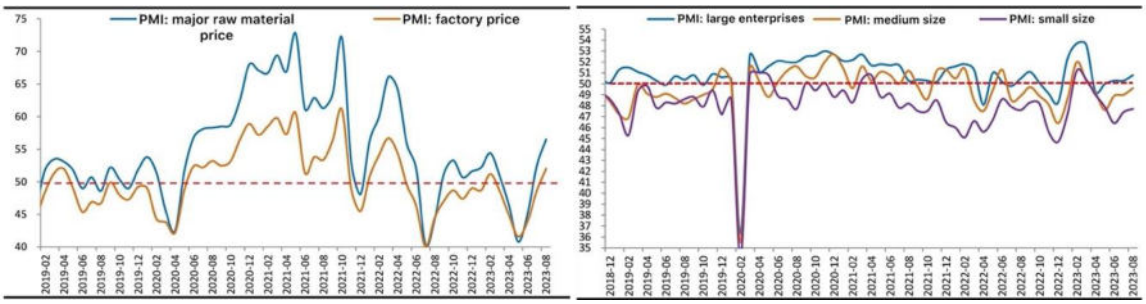
a 2.6 pp growth than July for the former, and a 1.0 pp contraction than July for the latter; after the retaliatory rebound in service consumption subsided, it is still needed to rely on the recovery of households'' employment and income.

Figure 13: PMI in manufacturing, business and construction



Source: Wind.

Figure 14: PMI with price indexes and sizes of enterprises



Source: Wind.

6. Conclusion

In fact, from the financial data released by the PBoC in March, credit expanded more than expected, and prices did not decline across the board. Economic forward-looking data pointed to economic recovery in the first quarter as we pre-judged, which obviously did not meet the definition of deflation. And from the new released data in August, although the recovery is not comprehensive, the main industries, sector, and domains take a turn for the better. The performance of indicators above confirms the statements and the judgement.

Moreover, series of targeted economic policy are being launched or have just been applied in August and September, further policy effects wait to be observed, same to the implementing policies. Chinese economy has struggled ahead after self-adjustment and governmental intervention in the first eight months. There are more and more positive factors in the operations, and it returns progressively back to the steady trends. However, the new emerged risks as we mentioned at the beginning, show the structural problem and make challenges for the future.

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CHALLENGES AND PERSPECTIVES TO THE BRICS IN REFORMING THE INTERNATIONAL MONETARY AND FINANCIAL SYSTEM

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***Abstract**: This paper aims to discuss major challenges and opportunities to the BRICS countries in their attempts to reforming the international monetary and financial system. It analyzes the ongoing processes and trends in the global economy as well as the potential of the emerging economies acting as a political and trading bloc to establish a multipolar monetary system. The author argues that the transition from a unipolar to a multipolar monetary system has already started. Nevertheless, it is difficult to predict how long it will take to transform the existing international monetary and financial system. BRICS countries face big challenges and issues on their path to reform the international monetary and financial system. At the same time the economic power and potential of the bloc are perceived as important advantages which create opportunities to achieve its goals.*

***Keywords:** international monetary system, global economy, BRICS, dollar, international currency, yuan, trading bloc, international financial organizations*

JEL: F30, F52, F55,

Introduction

The international monetary and financial system has been undergoing significant changes and transformation due to the deepening and accelerating processes of fragmentation and disintegration of the global economy since the outbreak of the global financial crisis in 2008. The division of the world into rival blocs has become a distinctive feature of the global political and economic order particularly since the beginning of the Covid-19 pandemic[2]. The war in Ukraine has further exacerbated this trend.

A leading role in the ongoing transformation in the global economy as well in the international monetary system has been played by the emerging economies and particularly by the BRICS.

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[2] See Aiyar, S. et al. (2023)

BRICS is a grouping of Brazil, Russia, India, China, and South Africa. Since 2009, they have become a geopolitical bloc as their governments meet annually at formal summits and they coordinate multilateral policies. They represent over 42% of the global population, 30% of the world's territory, 23% of GDP and 18% of the global trade. BRICS cooperation takes place under three pillars - political and security, economic and financial as well as cultural cooperation. It aims to promote peace and to establish a more representative, fairer international order, a reinvigorated and reformed multilateral system as well as to achieve sustainable development and inclusive growth. Six new countries will become full members the BRICS from 1st January 2024. In August 2023, it was announced that Argentina[3], Egypt, Ethiopia, Iran, Saudi Arabia and the United Arab Emirates had been invited to join the bloc[4].

This paper aims to discuss major challenges and opportunities to the BRICS countries in their attempts to reforming the international monetary and financial system. It analyzes the ongoing processes and trends in the global economy as well as the potential of the emerging economies acting as a political and trading bloc to establish a multipolar monetary system. The author argues that the transition from a unipolar to a multipolar monetary system has already started. Nevertheless, it is difficult to predict how long it will take to transform the existing international monetary and financial system. BRICS countries face big challenges and issues on their path to reform the international monetary and financial system. At the same time the economic power and potential of the bloc are perceived as important advantages which create opportunities to achieve its goals.

The first part briefly presents the history as well as the economic development of the BRICS. The second part focuses on the BRICS' institutions (New Development Bank, Contingent Reserve Arrangement) and their role to expand the bloc's economies and to become an alternative to the Western bloc and institutions (International Monetary Fund and World Bank). Moreover, it discusses the main initiatives and actions of the BRICS to de-dollarize the global economy. It

[3] In December 2023 the new President Javier Milei announced that the decision to join the bloc had been revised and he withdrew the country from the planned entry into BRICS.
[4] See XV BRICS Summit Johannesburg II Declaration BRICS and Africa: Partnership for Mutually Accelerated Growth, Sustainable Development and Inclusive Multilateralism, South Africa, 23 August 2023

also discusses the major challenges and perspectives to reform the existing international monetary and financial system.

1. Theoretical and analytical framework

In a narrower sense, the international monetary system is the complex of international rules and understandings which have evolved in an effort to ensure, by international agreement, a fair and efficient method of conducting international transactions. In its widest sense, the international monetary system includes the broad network of banking and commercial practices through which day-to-day international transactions are undertaken. The pricing of international shipments, the extension of credit, and the settlement of accounts take place in terms of many currencies (IMF, 1965)[5]. The primary goals of the international monetary system is to provide means of payment acceptable to economic actors of different nationalities as well as sufficient liquidity and to correct global imbalances.

In Cohen's monetary pyramid, international currencies are at the top of the pyramid (called *top currencies*). These are currencies that serve most of or all cross-border purposes and whose popularity is universal. As table 1 shows, they are used at two levels in the international monetary system - private and official (public) performing the three main functions of money - a medium of exchange, a medium of account and a store of value[6]. The use of a currency in international trade is explained by the dominant currency paradigm. According to it, the stability of trade stems from the fact that import and export prices are set in a common currency due to the low sensitivity of these prices to exchange rate changes and volatility. The dominant currency paradigm has three key characteristics: pricing in the dominant currency, price complementarity, and imported inputs used in production. However, it makes international trade highly dependent on fluctuations in exchange rates, respectively on the appreciation and depreciation of the dominant currency. Thus, the appreciation of the dollar against other currencies results in a trade decrease between countries in the rest of the world, without affecting US trade[7] .

[5] International Monetary Fund Annual Report 1965, https://www.elibrary.imf.org/display/book/9781616351779/Ch02.xml
[6] See Cohen (2015)
[7] See Gopinath, Boz, Casas, Díez, Gourinchas, Plagborg-Møller (2020)

At the public level, international money plays the roles of a currency anchor, an intervention currency used by the central banks to intervene in the foreign exchange market, as well as a reserve currency in which they hold their foreign exchange reserves. These functions reflect the so-called "exorbitant privilege" that the dollar has enjoyed since the end of the WWII in the framework of the Bretton Woods currency system (1944-1973)[8] and up to now. In brief, the exorbitant privilege enables the US to run up huge current account deficits without substantially worsening its international investment position. In good economic times, capital transfers come to the US, and during crises, wealth flows from the US to the rest of the world, i.e. the US provides insurance to other countries (the so-called exclusive duty)[9] .

Table 1 Roles of international currencies

Functions of money	Public sector	Private sector
Unit of measurement	Currency anchor/fixed exchange rates	Invoicing of trade/pricing of financial assets
Means of exchange	Foreign exchange market interventions/lender of last resort	Cross-border payments for commercial and financial transactions
Store of value	International reserves	Dominance of financial assets/cash

Source: Cohen, 2015

In the paper dollarization of the international monetary system is perceived as the process by which the dollar dominates the international monetary system and fulfills all the functions of the international currencies, being a hegemonic currency. Conversely, the de-dollarization of the global economy entails a reduction in the share and the role of the dollar in the international trade and finance as well as a decrease in the countries' dependence on the US currency. Recently, many countries have announced and pursued de-dollarization to reduce risk exposure to the US dollar and US sanctions. De-dollarization implies a diversification from the dollar and it is seen as a means to help countries to achieve greater geoeconomic and geopolitical autonomy and /or to increase their global influence. In this regard, it is noteworthy to explore the pathways to de-

[8] The dominant role of the dollar in the international monetary system was established after the WWII. The Bretton Woods agreements (1944) aimed to create a new international monetary system in order to solve the problems of the interwar period: protectionism, devaluations, unstable exchange rates and crisis. The adoption of a gold-dollar standard based on the convertibility of the dollar into gold at a ratio of $35 to one ounce of gold under capital controls and fixed but adjustable exchange rates provided the opportunity for countries to maintain currency stability, independence of monetary authorities and to achieve full employment. Moreover, the IMF was established at the centre of the political structure of the post-war monetary system to provide liquidity to its member states to deal with temporary current account problems and stabilise their national currencies.

[9] See Gourinchas, Rey, Govillot (2017)

dollarization and in a broader terms to reforming the international monetary and financial system by the BRICS coalition.

In a recent study Zoe Liu, Papa (2022) applied "Pathways to De-dollarization" framework to explore the BRICS' de-dollarization activities. The research found that the BRICS members have demonstrated an unambiguous consensus and a strong commitment to promoting the use of local currencies in international settlements and building a nondollar alternative global financial infrastructure. The BRICS have implemented both "go-it- alone" and "reform-the-status-quo" strategies to de-dollarize their economies. The first one, "go-it-alone" de-dollarization strategy refers to actions to establish and govern new nondollar-based institutions and market mechanisms. The establishment of the BRICS financial infrastructure through the New Development Bank and Contingent Reserve Arrangement enables the coalition members to diversify currency risks and maintain open access to the global financial system when facing US sanctions and to create an alternative or parallel system which is independent of the US dollar and of the leading Western powers. In contrast, "reform-the-status-quo" initiatives refer to the coalitional efforts to renegotiate the rules of the existing system and to diversify the representation of their currencies and economies in the system.

This paper outlines and discusses the major challenges and opportunities to the BRICS to de-dollarize and reform the existing global monetary and financial system on the basis of the institutional perspectives and market activities that the BRICS coalition have developed and implemented since the bloc's emergence in 2009.

2. Brief overview of the BRICS history and economic development

At the height of the global financial crisis in 2009, Brazil, Russia, India and China held their first annual meeting in Ekaterininburg, where they came up with common priorities for the further development of the global financial system, international trade, sustainable development, etc. Reforming international financial institutions has been central to the final declaration, which stated:

> "We are committed to advance the reform of international financial institutions, so as to reflect changes in the global economy. The emerging and developing economies must have

greater voice and representation in international financial institutions, whose heads and executives should be appointed through an open, transparent, and merit-based selection process. We also believe that there is a strong need for a stable, predictable and more diversified international monetary system" (Joint Statement of the BRIC Countries' Leaders, 16 June 2009, Yekaterinburg).

In 2010, South Africa became the fifth member of BRICS. The crises and the war in Ukraine have caused deep geopolitical changes which have led many developing countries to request BRICS's accession in order to join the efforts to reform global politics and economics. In this regard, the first major expansion of the bloc will take place in 2024. Six new countries will become full members the BRICS from 1st January 2024: Argentina, Egypt, Ethiopia, Iran, Saudi Arabia and the United Arab Emirates.

The BRICS countries discuss and coordinate multilateral policies in the fields of economy, trade, finance, peace and security, culture, human rights, development, etc. At the annual summit in August 2023, they pledged not only to reform the Bretton Woods institutions and to have a greater role and leadership in them for emerging and developing economies, but also to promote the use of local currencies in international and inter bloc trade[10]. This decision represents an important step not only to reduce dependence on the dollar, but also to create a common currency in the bloc in the long run, an idea already launched by Russia and Brazil. Although the creation of a common currency seems a hardly achievable goal due to the great heterogeneity and political and economic differences and interests of the member states, the coalition has a huge economic potential, which, combined with political will and agreement between them, can turn them into a leading center of world politics and economics. The BRICS have become the rising power de-dollarization coalition

The data in Table 1 shows that the BRICS member states, together with the newly acceding countries, not only have huge territories, but also have 46% of the world's population. The BRICS countries' share in the global GDP for 2023 is expected to reach 29.3% (Table 2). The leading economic power is China, which forms 18.4% of world GDP, followed by India with 3.6% and Russia and

[10] See XV BRICS Summit Johannesburg II Declaration BRICS and Africa: Partnership for Mutually Accelerated Growth, Sustainable Development and Inclusive Multilateralism, South Africa, 23 August 2023

Brazil with 2% each. China is far ahead of the other countries in the bloc, which inevitably turns it into the main rival of the USA in the global economy.

Table 2 Territory and population of BRICS Countries, 2023

Country	Area of territory (1 000 sq. km)	Population	Share of global population (%)
Brazil	8 510	216,422,446	2.7
Russia	17 125	144,444,359	1.8
India	3 287	1,428,627,663	17.8
China	9 600	1,425,671,352	17.7
South Africa	1 221	60,414,495	0.8
Saudi Arabia	2 149 690	36,947,025	0.5%
Iran	1 648 195	89,172,767	1.1%
Ethiopia	1 104 300	126,527,060	1.6%
Egypt	1 001 450	112,716,598	1.4%
Argentina	2 780 400	45,773,884	0.6%
UAE	83 600	9,516,871	0.1%
Total		**3.7 billion**	**46.0%**

Source: The world fact book https://www.cia.gov/the-world-factbook/countries/united-arab-emirates/, Joint Statistical Publication BRICS 2023

Table 3 BRICS countries GDP, share of global GDP, GDP per capita

Country	GDP (USD billions) 2023	Share of global GDP (%) 2023	GDP per capita (current prices/US$) 2022
Brazil	2,081	2.0%	8 938
Russia	2,063	2.0%	15 504
India	3,737	3.6%	2 451
China	19,374	18.4%	12 741
South Africa	399	0.4%	4 635
Saudi Arabia	1,062	1.0%	44 300
Iran	368	0.4%	15 000
Ethiopia	156	0.1%	2 300
Egypt	387	0.4%	11 600
Argentina	641	0.6%	21 500
UAE	499	0.5%	69 700
Total	**30,767**	**29.3%**	

Source: IMF projections for 2023, https://www.visualcapitalist.com/visualizing-the-brics-expansion-in-4-charts/ , Joint Statistical Publication BRICS 2023, Data for new BRICS members is for 2021, The world fact book https://www.cia.gov/the-world-factbook/countries/argentina/#economy

China is the largest exporter in the world, with its share representing 14.4% of global exports. According to the data of the World Trade Organization, with the expansion of BRICS, the share of all the BRICS countries in global exports will increase to 25.1%. The new member states, the United Arab Emirates and Saudi Arabia, will have the greatest contribution to increasing the share of total exports, while Ethiopia will make the smallest contribution.

Table 4 Total amount of exports and share of global exports of BRICS countries, 2022

Country	Exports (USD billions)	Share of global (%)
Brazil	334	1.3
Russia	532	2.1
India	453	1.8
China	3,594	14.4
South Africa	123	0.5
Saudi Arabia	410	1.6
Iran	73	0.3
Ethiopia	3.9	0.02
Egypt	49	0.2
Argentina	88	0.4
UAE	599	2.4
Total	**6,259**	**25.1**

Source: World Trade Organization 2022, https://www.visualcapitalist.com/visualizing-the-brics-expansion-in-4-charts/

It is noteworthy that the BRICS countries possess vast reserves of natural resources and are major producers and exporters of basic commodities and minerals, in the world. Table 3 shows that they produce over 43% of the world's oil, with Saudi Arabia and Russia as the leading producers, securing respectively 12.9% and 11.9% of global oil production in 2022. Iran has been the fifth largest producer of crude oil in OPEC, as well as the third largest producer of natural gas in the world in recent years. Thus the BRICS countries can exercise strong political and economic influence on global processes and trends.

Table 5 BRICS countries oil production, 2022

Country	Thousand barrels per day	Share of global (%)
Brazil	3,107	3.3
Russia	11,202	11.9
India	737	0.8
China	4,111	4.4
South Africa	0	0
Saudi Arabia	12,136	12.9
Iran	3,822	0
Ethiopia	0	4.1
Egypt	613	0.7
Argentina	706	0.8
UAE	4,020	4.3
Total	**40,454**	**43.1%**

Source: Energy Institute Statistical Review of World Energy 2022, https://www.visualcapitalist.com/visualizing-the-brics-expansion-in-4-charts/

The green, energy and digital transition and, accordingly, the sustainable development of economies are strongly dependent on the availability and supply of a number of minerals and raw materials in the world. The BRICS countries possess the largest reserves of critical

minerals, on whose extraction and supply depend not only the EU countries, but also the rest of the world. According to the report of the International Energy Agency (2023) China has extracted 70% of the global graphite and rare earths and 15% of the global lithium. China is also the world's leading producer of copper, as well as nickel, cobalt, lithium and other rare minerals. Furthermore, China has processed 45% of the global copper, 20% of global nickel, 67-69% of global cobalt, 70% of global lithium, 100% of global graphite as well as 90% of global rare earths (neodyminium, praseodymium, dysprosium and terbium). The geographical distribution of planned refining projects for key minerals, during the period 2023-2030, reveals the following: China and Argentina dominate the market for lithium as China has 49% and Argentina has 16% of the global lithium, China prevails also in refined cobalt (36% of the global volume) and Brazil plays an important role in refined nickel (3% of the global production).

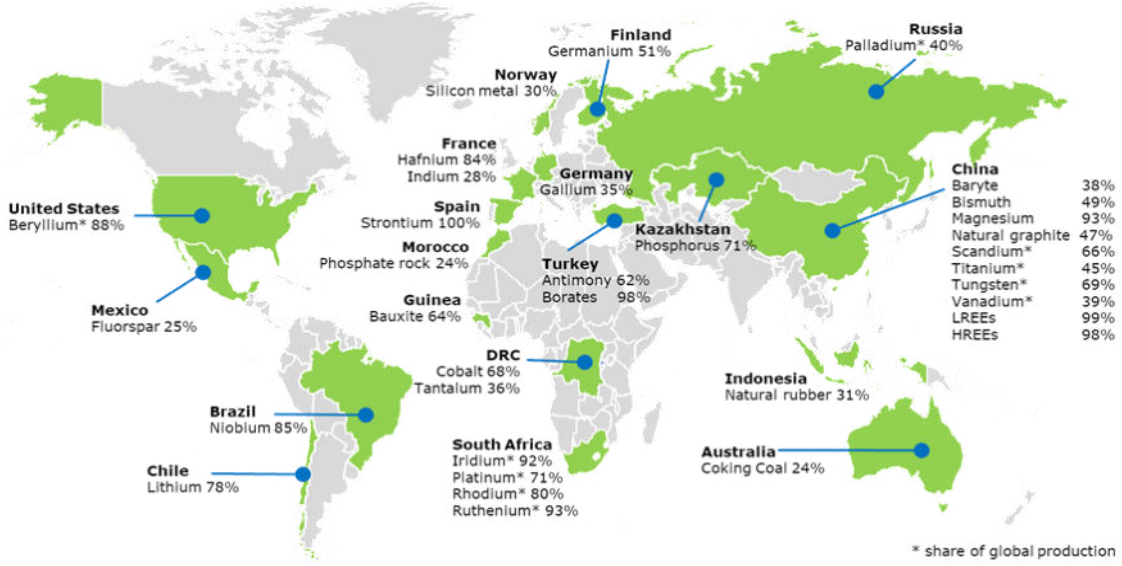
Russia had the world's largest proved natural gas reserves at 1.32 quadrillion cubic feet, accounting for nearly 20% of the global total in 2020. It owned also the second largest gold reserves at 6,800 tons, or more than 12% of global total in 2021. Furthermore, it was the world's third-largest crude oil producer at 12% of global supply in 2020 and oil reserves were the world's sixth largest at an estimated 107.8 billion barrels. (BP, 2022)

The EU countries do not have key raw materials and this makes them extremely dependent on imports from other countries in the world. Raw materials and minerals of critical importance to the EU economies are provided by countries outside the Union. They are mainly used for the production of electric vehicles, in industry, communications, space, defense, etc. The European Union is highly dependent on critical raw materials supplied primarily by: China provides 100% of the EU's supply of heavy rare earth elements, South Africa provides 71% of the EU's needs for platinum, Russia for palladium, Brazil for niobium[11]. In this regard, the fulfillment of the EU's strategic goals and interests inevitably requires close relations and partnership with the BRICS countries. The political opposition, the imposition of sanctions, the protectionist and

[11] https://www.consilium.europa.eu/en/infographics/critical-raw-materials/
Out of the 34 critical raw materials identified, a specific strategic raw materials (SRMs*) list (17 strategic raw materials proposed by the Council) has been created for the materials expected to grow exponentially in terms of supply, which have complex production requirements and thus face a higher risk of supply issues. Among them: lithium, manganese, natural graphite, cobalt, nickel, copper, etc.

discriminatory measures against BRICS countries could hinder the European industry and sustainable development.

Figure 1. Biggest supplier countries of critical raw materials to the EU



Source: European Commission, 2020

Last but not least, the reserves of key natural resources such as water, timber, etc., which the BRICS countries possess, are also of crucial importance for the world economies. For example, China has the world's greatest hydropower potential. Brazil has huge reserves of gold, iron, oil, uranium as well as timber. Furthermore, it has enormous installed capacity of hydroelectric power production.

The competition and struggle for natural resources between developed and developing countries worldwide has increasingly intensified in recent years, especially in the context of the negative consequences and effects of the pandemic, the energy crisis, inflation, wars. From this point of view, the relations between the BRICS and other countries have become a key factor for the development of world politics, global trade and finance.

3. De-dollarization of the global economy by the BRICS

3.1 BRICS financial institutions as an alternative to the US led global financial institutions

The BRICS countries have launched several initiatives aimed at the de-dollarization and reforming of the global financial system since 2009 and especially since the beginning of the war in Ukraine in 2022 amid the imposition of sanctions, the energy and commodity crisis and the peak in global inflation. The BRICS bloc has established the New Development Bank to de-dollarize development finance. The New Development Bank (NDB) was established in 2014 to mobilize resources for infrastructure and sustainable development projects in emerging and developing economies. Bangladesh, the United Arab Emirates and Egypt have become also members of the NDB.

The NDB has an initial authorized capital of USD 100 billion, which is divided into 1 million shares with a par value of USD 100,000 each. The voting power of a member is equal to the proportion of its subscribed shares in the capital stock of the Bank. The Bank's subscribed capital is USD 50 billion, of which USD 10 billion is deposited by the five founding countries. The shareholding structure allows the founding members to have equal voting power while none of them holds veto power over any matter. However, its funding capacity has so far been limited compared to the International Bank for Reconstruction and Development (IBRD), which is the largest development bank in the world.

Table 6 Shareholding structure of the New Development Bank

Country	Number of shares subscribed	Shareholding (% of total)	Subscribed capital (amount billion USD)	Exercisable votes
Brazil	100,000	18.98	10,000	100,000
Russia	100,000	18.98	10,000	100,000
India	100,000	18.98	10,000	100,000
China	100,000	18.98	10,000	100,000
South Africa	100,000	18.98	10,000	100,000
Bangladesh	9,420	1,79	0,942	9,420
UAE	9,420	1,79	0,556	9,420
Egypt	11,960	1,79	1,196	11,960
Unallocated shares	473,060	-	47,306	473,060
Total	1,000,000	100.000	100.000	1,000,000

Source: New Development Bank

In May 2023, the New Development Bank held its annual meeting in Shanghai, during which its President Dilma Rousseff has affirmed that the bank's major goal is the de-dollarization of the global economy. Its short-term purpose is to offer 30% of NDB loans in local currencies by 2026. By diversifying its use of currencies, the NDB not only seeks to weaken the bloc's

dependence on the dollar, but also aims to helping developing countries avoid painful exchange rate fluctuations and financial risks.

On May 18, 2022, the NDB priced a 3-year CNY 7 billion Bond in the China Interbank Bond Market. The transaction is the largest ever Panda Bond issue by a Multilateral Development Bank (MDB). It has a cumulative total of RMB 30 billion bonds issued under its RMB bond programmes in the China Interbank Bond Market, which makes the Bank the largest and the most prodigious MDB issuer in China[12]. Furthermore, on August 15, 2023, the NDB issued 1.5 billion ZAR bonds in the South African bond market to be used to fund infrastructure and sustainable development projects in South Africa. The NDB's strategy is to increase its presence in the local capital markets of its member countries, to fund its robust portfolio of local currency loans[13].

The BRICS countries established also the Contingent Reserve Arrangement (CRA) in 2015 to provide support to developing and emerging countries through liquidity and precautionary instruments in response to current or future short-term balance of payments pressures. The BRICS members are allowed to borrow from the CRA's collective pool of US 100 billion of reserves through swaps using their national currencies. At the same time, the CRA is dependent on the IMF. The individual commitments of each country is as follows: China – USD 41 billion; Brazil – USD 18 billion; Russia – USD 18 billion; India – USD 18 billion; South Africa – USD 5 billion. Nevertheless, for the time being, CRA is unable to replace the IMF, as only 30% of CRA funds are available to be used by the BRICS members on demand, while access to the remaining 70% requires agreements with the IMF. According the Treaty for the establishment of CRA the parties shall be able to access resources subject to maximum access limits equal to a multiple of each Party's individual commitment set forth as follows: China has a multiplier of 0.5; Brazil, India and Russia have a multiplier of 1 and South Africa has a multiplier of 2[14]. The establishment of the NDB and the CRA has been part of the go-it-alone strategy of the BRICS coalition to create alternative institutions to the Bretton woods ones and to challenge the US

[12] https://www.ndb.int/news/new-development-bank-issues-cny-7-billion-bond-in-china-interbank-bond-market/
[13] https://www.ndb.int/news/ndb-issues-zar-1-5-billion-bond/
[14] Treaty for the Establishment of a BRICS Contingent Reserve Arrangement, adopted in Fortaleza, July 15

global leadership. Meanwhile, it is evident that the emerging financial infrastructure of the bloc doesn't have the capacity to fully break from the existing US dollar-based international monetary system. Moreover, some of the BRICS countries like India have closer relations with the US as well as some, like South Africa and Brazil have been more integrated into the dollar system.

3.2 Major initiatives of the BRICS towards a multipolar international monetary system

Apart from the establishment of the NDB and CRA, the BRICS countries have launched other de-dollarization initiatives related to the development of the following: an alternative payment system to SWIFT, a common payment system, to the increase of intra BRICS trade using local currencies, and to the creation of a common currency. The overall goal is to build a non-dollar international monetary and financial system which better serves their interests and priorities. The BRICS explore the possibility of a common payment network and the plan will be officially discussed in Russia at the next annual meeting of the bloc in 2024. The aim is to foster trade in local currencies as opposed to the U.S. dollar and to avoid the use of SWIFT in international banking transactions. The common payment framework is planned to be integrated with a BRICS digital currency to de-dollarize the global finance. Moreover, the central banks of the BRICS countries are in a process of developing their digital money which is considered as a strong push towards de-dollarization.

Individual member states have already taken actions to increase their influence and role in global finance. China has launched the yuan oil futures contract, a new financial instrument to de-dollarize the global oil trade. Both China and Russia have developed their own cross-border messaging systems. Since 2014, Russia has been developing its own payment system. Since 2015 China has established a new payment system for clearing payments in yuan. The final, long-term goal is to create a common currency to rival the dollar.

So far, Russia and Brazil have been among the key proponents for a common currency, an idea which has also been recently advocated by the NDB. This raises the question of what this common money could be – whether it will be based on national money and thus be fiat money, like the dollar and euro, or whether it will be a resource-based and backed money, i.e. the

monetary emission will be tied to the availability of reserves of certain natural resources and commodities.

It is noteworthy the recent intensification of intra BRICS trade settled in national currencies. In 2023 Brazil and China signed an agreement to trade in their national currencies. China has been Brazil's biggest trading partner for fourteen consecutive years. According to data from the China General Administration of Customs, in 2022, bilateral trade between China and Brazil recorded an annual increase of 8.1%. Brazil is also one of the few countries in the world that has a trade surplus with China – RMB 316.6 billion in 2022. China imports Brazilian agricultural products, such as meat, fruits, grains, and honey.

The trade partnership between Russia and China has also developed since 2022 and especially after they agreed to settle trade deals in yuans. Since the beginning of the war in Ukraine, bilateral trade in yuan rose from 4% to 23%. Data shows that about ¾ of bilateral trade has been already conducted in rubles and yuans. The trade volume between Russia and China in the first six months of 2023 has grown by 20% compared to the same period last year. Russia is China's main source of coal, crude oil, and gas imports. Other major part of the exports have been agricultural products. Exports from Russia to China increased by 84% in the first five months of 2023. In the first quarter of 2023, Russia became China's seventh largest trade partner.

In April 2023, Russian officials claimed that more than 70% of settlements in trade between the two countries were already made in national currencies. In June 2023 it was reported that the share of the renminbi in the Forex turnover on the Moscow Exchange increased to 39.8% and had overtaken trading in the US Dollar.

In 2022 the trade between India and China reached an all-time high of US 135.98 billion. China exported mainly computers, smart phones, and semiconductors, while India exported iron ore, refined petroleum, and raw aluminum.

South Africa is China's largest trading partner in Africa, with bilateral trade of US 56.74 billion in 2022. The main products that China exports to South Africa are broadcasting equipment,

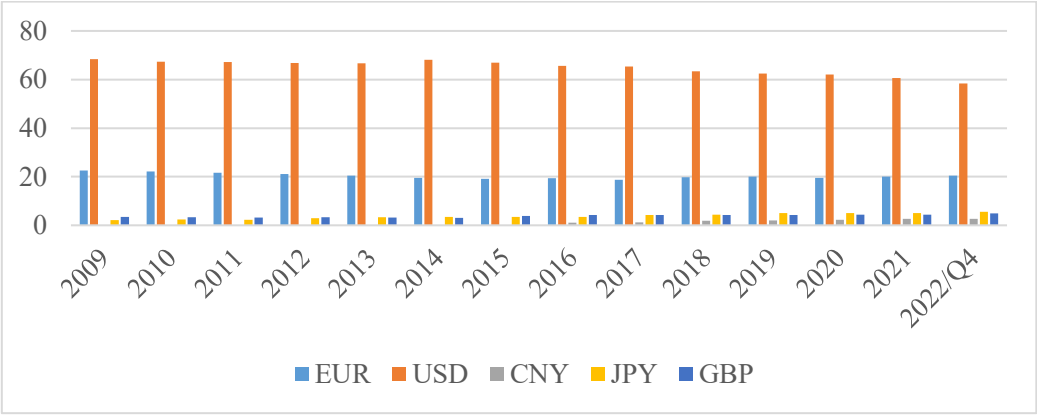
computers, and coated flat-rolled iron. The main products that South Africa exports to China are gold, diamonds, and iron ore[15].

In 2022 Saudi Arabia have announced that it will sell oil in currencies other than the dollar. It started trading oil with China in yuan.

Now, however, let's take a look at the role of the Chinese currency in the global financial system and its potential to displace the dollar in global trade and finance. The dollar continues to be the world's leading reserve currency, far ahead of the euro and other currencies. The chart below presents the share of international currencies in the global official foreign exchange reserves revealing downward trends in the share of both the euro and the dollar. During the period 2009 - 2022, the euro's share declined from 22.6% to 20.5%. The share of the dollar decreased more substantially from 68.4% to 58.4% in the fourth quarter of 2022. The dollar registered the sharpest decline of 2% in 2022, from 60.2% to 58.4%, respectively. Unlike the dollar and the euro the shares of the Japanese yen as well as the British pound increased. It is noteworthy that the Chinese yuan more than doubled its share from 1.1% in 2016 to 2.7% in the fourth quarter of 2022. [16] However, IMF data from early 2022 shows that its share has not increased significantly[17].

[15] https://www.silkroadbriefing.com/news/2023/08/21/intra-brics-trade-and-analysis-2023/
[16] The Chinese yuan has been part in the IMF's basket of reserve currencies since 2016.
[17] The data on official foreign exchange reserves include 149 respondents from IMF member countries, non-IMF countries and other holders of foreign exchange reserves, i.e. they do not cover all countries in the world and therefore the share of the renminbi in global official reserves could be considered as higher taking into account recent trends and decisions of many countries to trade in yuan.

Chart 1 Currency shares in foreign exchange reserves (at constant exchange rates)



Source: IMF (COFER), ECB

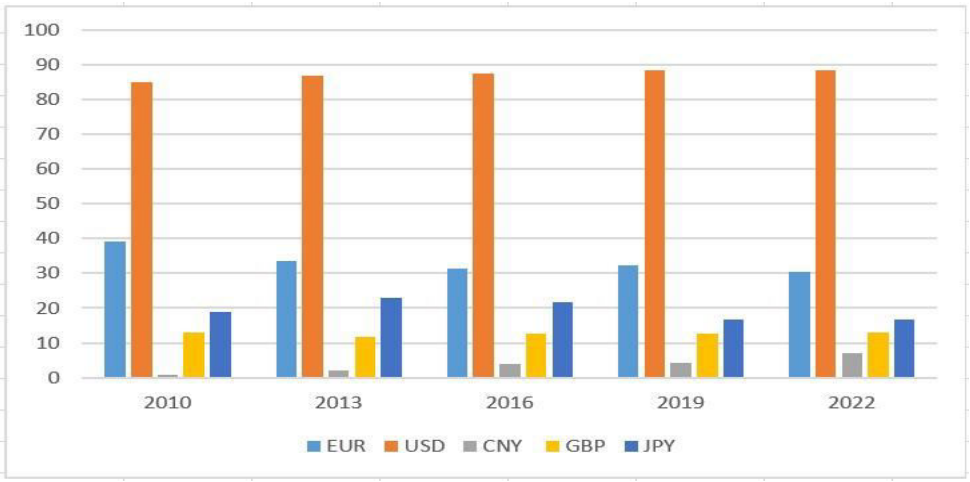
It is interesting to study to what extent sanctions have affected the dollar's role in the global foreign reserves. According to Arslanalp et al. (2022), there is no evidence of an effect of financial sanctions on the currency structure of the reserve portfolios of 80 central banks. Another study argues that the diversification of central banks' foreign exchange reserves has already started as central banks have been buying more gold or hold non-traditional reserve currencies[18]. The central banks have made the biggest gold purchases in 2022. Since the beginning of the 21st century, Russia, China and Turkey have become the biggest gold holders among the emerging market economies as well as among the biggest in the world.

The dollar and the euro remain the most actively traded currencies on the foreign exchange market. During 2010 - 2022, the dollar's share of turnover in the foreign exchange market rose from 84.9% to 88.5%, while the euro's share declined from 39.1% to 30.5%. Undoubtedly, the financial and debt crisis of 2008 and the less developed financial market in the EU compared to that of the US have negatively impacted the international role of the euro. At the same time, the share of the Chinese yuan increased most substantially from just 0.9% in 2010 to 7% in 2022. The yuan has become the fifth most traded currency in the world. The European Central Bank (ECB) data shows that in the last quarter of 2022, the euro accounted for 38% of all

[18] Arslanalp et al. (2023) analyze the impact of past financial sanctions on the share of offshore gold reserves of 180 countries. They argue that there has been a statistically significant effect of sanctions in the recent years on the share of gold reserves in the world. At the same time the quantitative effect is small - a country subject to multilateral sanctions increases its gold reserves by about 4 percentage points. In the third quarter of 2022, central banks around the world increased their gold reserves by a record $20 billion gold in the last 55 years (World Gold Council (2022). See also Arslanalp, Eichengreen, Simpson-Bell (2023)

international currency payments measured at constant exchange rates, while the dollar fell by 6 percentage points, although it was used in almost 90% of the settlements.

Chart 2 FOREX turnover by currency

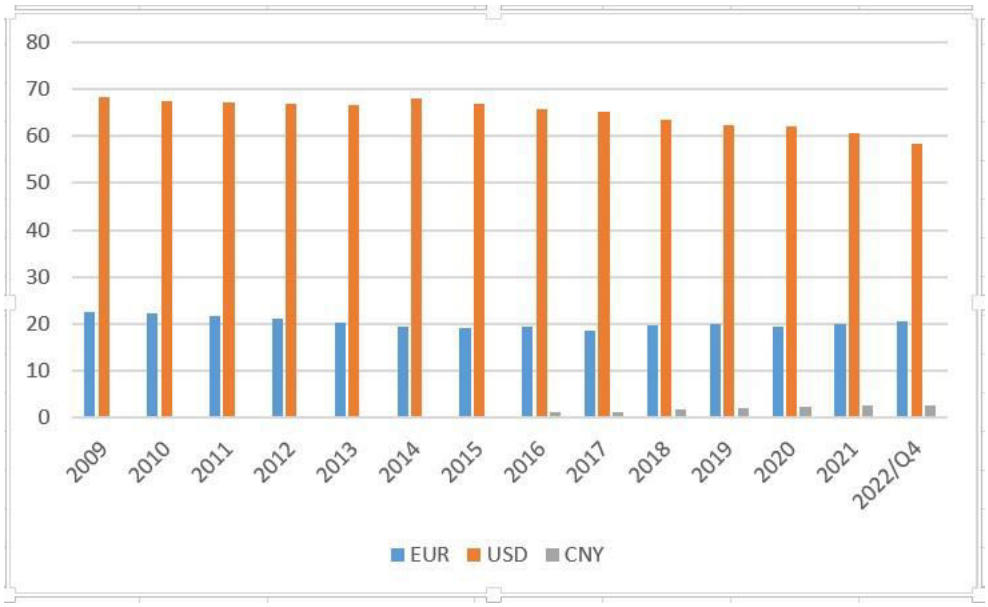


Source: BIS[19]

During the period 2009 - 2022, the share of the euro on international debt markets declined from 37.2% to 32.2% while the dollar's share increased from 40.2% to 52.6%. The yuan's share is still insignificant, representing only 0.7% in 2022. In 2022, the euro's share of foreign currency-denominated bond issuance fell to 25%. The dollar's fell more noticeably, by 36% year-on-year, reducing its share of international bond issuance by 5%. Despite these developments, the US dollar continues to be the leading currency for international bond issuance denominated in foreign currencies accounting for more than 57% of the total bond issuance. At the same time, the share of other currencies has increased to around 17%. The most important changes have been recorded in emerging economies, where issuance of US dollar-denominated bonds declined by 55%. Among the main reasons were rising interest rates and higher financing costs in advanced economies, coupled with increased volatility in bond markets.

Chart 3 Outstanding international debt securities by currency (broad measure, at constant exchange rates, end of period)

[19] The statistical data concerns the FX turnover part of the 2022 Triennial Survey that took place in April and involved central banks and other authorities in 52 jurisdictions.



Source: BIS and ECB

The dollar and the euro also dominate the international deposit markets. The share of outstanding international deposits denominated in euros continued to rise in 2022, reaching almost 18%. Despite a slight decline in 2022, the share of international deposits denominated in US dollars remains close to pre-pandemic levels, representing 52% of total international deposits. Furthermore, in 2022, 50% of the international trade was invoiced in dollars. The euro was mostly used outside the euro area - around 60% in exports of goods and services and over 50% in imports of services and goods (ECB, 2023).

Despite the yuan's still small share in international trade, international reserves, international assets and liabilities as well as China's weak financial integration in the international system, there are regional differences in the use of the yuan, driven by other countries' geographical, political and trade ties with China. International renminbi assets and liabilities account for about 4% of global assets and liabilities, compared with the country's 13% share of global trade. Policy measures implemented by the People's Bank of China related to the establishment of bilateral swap lines and offshore clearing banks have played an important role in the internationalization of the yuan since 2008 (Perez-Saiz, Zhang, 2023).

China has agreed swap lines first with neighboring Asian countries, later on with Canada, ECB, UK, etc. In 2022, there were a total of 38 bilateral swap lines for a total of 4 trillion renminbi. In 2003, China set up the first offshore clearing bank with Hong Kong. In 2020 there were 27

offshore clearing banks in 25 economies. It also created its own cross-border payments infrastructure (CIPS). China is expected to play a greater role in the global financial system even without full financial liberalization, using trade pricing and payments, swap lines, and offshore renminbi markets (CEPR, 2022). This looks increasingly likely amid IMF forecasts that China will be the biggest contributor to global growth over the next five years. Its share in global gross domestic product growth is expected to reach 22.6% of global growth by 2028. Bilateral trade between China and countries subject to US sanctions - Iran, Russia, as well as with Mongolia, Laos, Chile, Turkey and Argentina has been already conducted in Chinese yuan. Argentina signed a currency swap agreement with China worth 130 billion yuan, or USD 19 billion. In July 2023. Argentina, made its first ever payment on its loan to the IMF in yuan worth USD 2.7 billion[20].

The development of alternative institutions and markets is a long-term project and requires significant economic and financial resources as well as political consensus and strategies to overcome dollar hegemony. Meanwhile, the BRICS countries follow "reform-the-status quo" strategies to increase access to the existing trading and financial system by using their local currencies.

Conclusion

This paper reveals that the BRICS countries have enormous human and economic potential and resources that can be mobilized to enhance their political and economic role in the global economy and politics and to strongly influence their transformation and future development. The bloc implements two major strategies to reform the international monetary system. The first one, refers to creation of the New Development Bank and the CRAs regarded as alternatives to the World Bank and the IMF. Their efforts to trade in national currencies have been considered as an important step towards reducing the US dollar dependence. Furthermore, they envisage the creation of a common currency in a long term, an idea which is in a preliminary phase of discussion among the coalition's members. The second strategy includes

[20] Since 2020, the peso has lost about 80% of its value to the dollar. Due to the decline in dollar reserves, it has allowed commercial banks to open accounts and deposits in yuan.

their struggle to reform of the IMF and the other leading international institutions, taking into account the weight, role and interests of developing countries. Both pathways to de-dollarize the international economy and finance seek to make them autonomous from the US dollar, to mitigate the risks it carries, both in cases of sanctions and exchange rate volatilities.

Nevertheless, the de-dollarization process faces several constraints such as: lack of a common strategy, significant demographic, economic and political disparities as well as power asymmetries between BRICS members taking into account the accession of six new countries from 1st January 2024, countries' limited capacity to develop and finance their own market infrastructure and instruments, etc. As stated above, the BRICS financial institutions still have a limited capacity to funding development projects as well as to provide loans in national currencies. Last, but not least, geopolitical dynamics and countries' bilateral relations with the US may hinder the anti-dollar coalition. Lon term results depend on the BRICS ability to achieve political consensus on major issues, to elaborate a common strategy to enhancing and improving global governance and to develop a real partnership for multilateralism.

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IMPACT OF AFTER COVID INFLATION ON INVESTOR PROTECTION

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Abstract: *The after COVID inflation that started in the late 2021 seriously affected all EU economies. This paper aims at investigating how inflation impact the value of client assets invested on the capital market. It also concerns the issues of investor protection of such assets. Inflationary periods are stressful for the whole economy and especially for consumers. The longer inflation lasts the more significant impact it may have on investor behavior. In this paper it is argued that on a short term basis inflation could not be compensated at stock market prices but on a long term the capital market stock market returns overwhelms inflation. Investor protection regards the financial safety net which includes deposit guarantee and investor compensation schemes, which provide protection to investors at European level. Investor compensation schemes have not increased the level of protection for decades which due to the higher inflation rate causes a decreasing real protection. Deposit guarantee schemes on the contrary have imposed very high limit of protection in 2009 and 2010 which is 5 times higher than the minimum required limit on the EU level.*

Keywords: *capital market, inflation, return, investor protection.*
JEL codes: *G01, E66, E43, E63.*

Introduction – Review of inflation and stock market

Inflation always triggers the discussion on the type of investment that can protect savings against it. Weather deposit, property or investment on financial markets – investors look for an appropriate decision when choosing how to save the value of their earnings. In almost a decade of negative or zero interest rates deposits were rather a non option but however in most of that time inflation was also very low, which finally kept deposits with banks. Since the end of 2021 on the other hand and the rise of inflation investors became more inpatient.

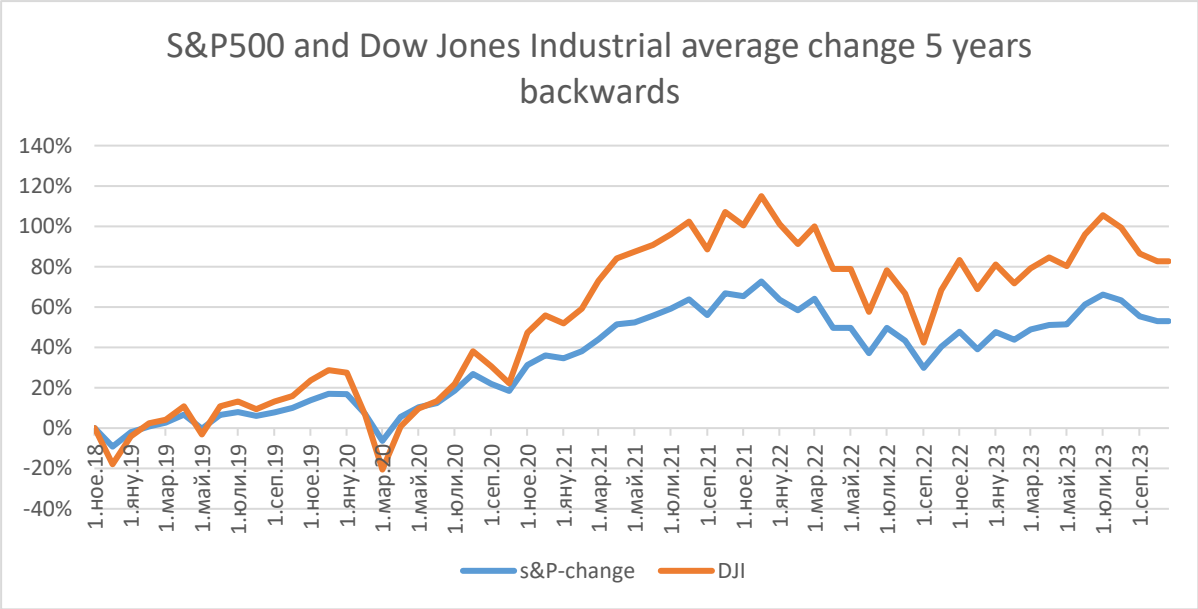
While it is easy to observe the impact of inflation on goods and services it is not the same direct connection with the inflation impact on investment instruments like stocks. Capital

market does not sell goods and services and therefor prices are not so directly affected by inflation measured by the CPI.

Revenda and Arltova (2022) show that there is strong impact of inflation on both the stock index and gold where the market price of gold was partly influenced by the development of market stock prices.

Lets overview the main indexes of stock markets at the next figure - information about the changes of S&P500 and DJI indexes is shown for a 5 years time frame period.

Fig. 1



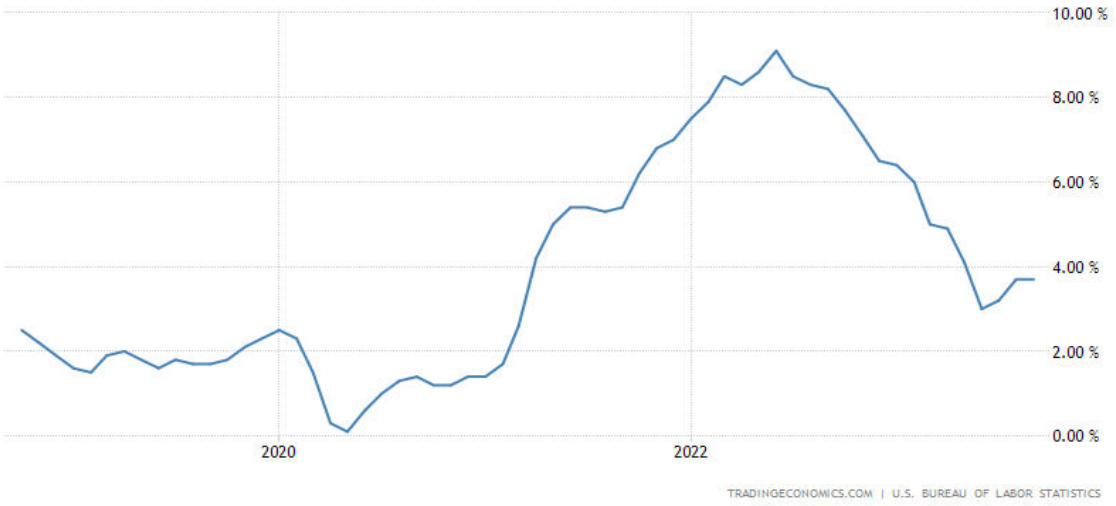
Source: *yahoo finance.*

The S&P500 index shows increase over the years by 35-65%, while DJI shows higher increase, while the curves tend to move together. At the end of the period tDJI is more than 80% higher while S&P is approx. 48% higher.

In the same time inflation for USA for a 5 years time frame is 16,7% (cumulatively).

Fig. 2

United States Inflation Rate



In contrast, inflation (HIPC) in Euro area for the same period tend to be higher– where the cumulative value is approx. 23%.

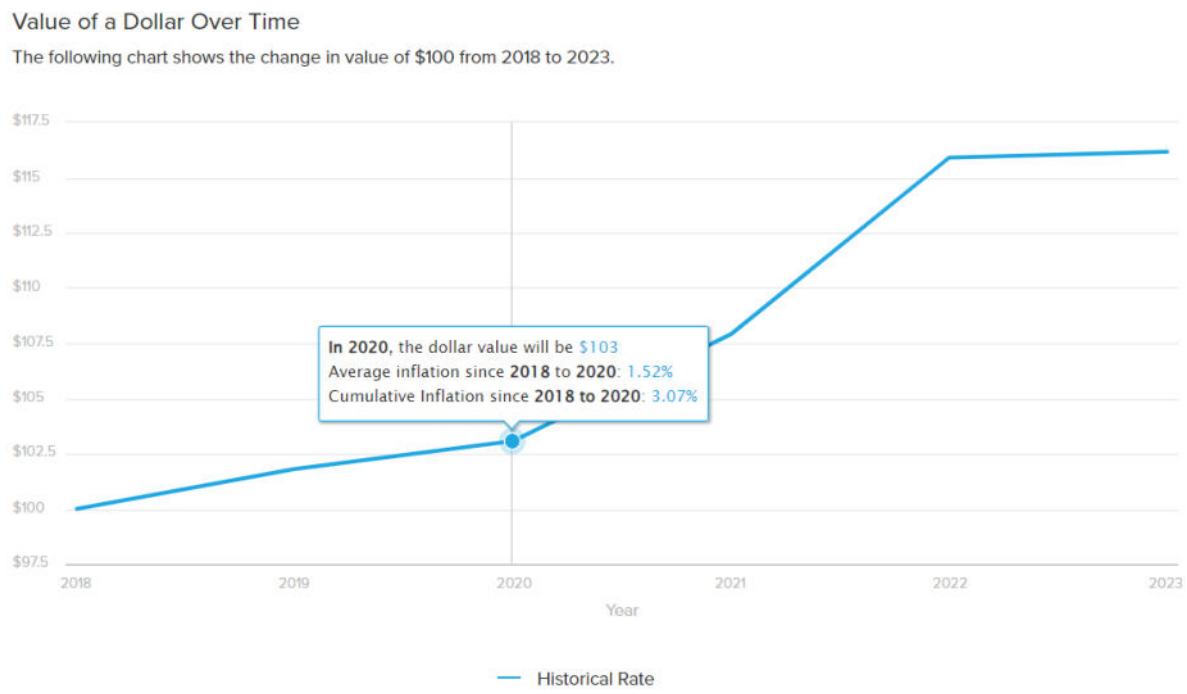
Fig. 3

EU inflation for a 5 years time frame

Source: *ECB statistics.*

Fig. 4

Cumulative inflation in USA



Source: *https://smartasset.com/investing/inflation-calculator*

At first sight it is clear that the cumulative inflation is far lower than the increase of capital market price indexes. In long term the return on the capital market is much higher than the cumulative inflation, still in some periods, for a short-term, when there is a boost of inflation the stock market prices might need some time to react and therefor could score lower short term return. Capital market is attractive for short term investors looking to scalp the market and win from higher volatility but also there are long term investors who keep their investments even during hard inflationary times.

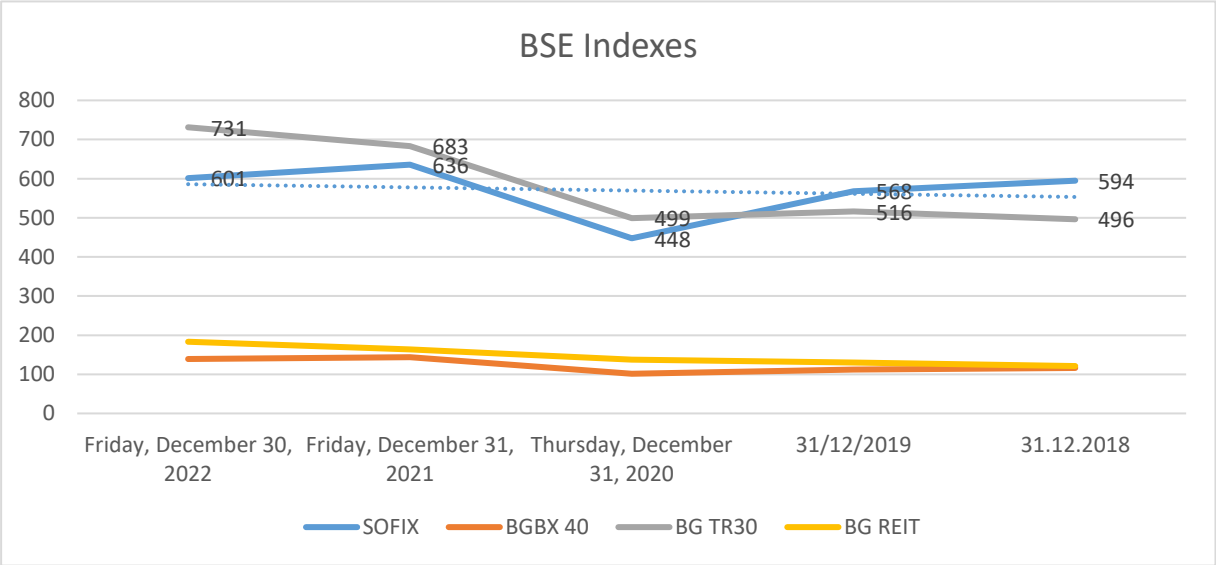
There could be some reasons for investors to withdraw from the market in a high inflation times. First of all, one reason is a necessity for liquidity which may forse investors sell their assets. Second, it could be interest of a higher return opportunities, still it is important to observe if such opportunities truly exist. The third option is the fear of lost of value of savings, as in times of high inflation companies become more vulnerable and riskier, some business might get hurt and thus investors may look for different investment opportunities.

Capital market assets

Not only return on the capital market is important, but also the amount invested. As of the end of 2022 the investors client assets kept and managed by Bulgarian investment companies is approx. 25 bill. euro, scoring increase of 3.5 bill. euro compared to 2021. End of 2021 was negative in this perspective as the client assets decreased by 4 bill. euro in comparison to 2020 and 2019 (ICF, 2021,p.14) , (ICF,2020, p. 15).In comparison, in 2018 that value was 21 bill. euro. In a time of inflation there was a decrease of client assets value, but the recovery was rather quick. This decrease could be either due to a clash of prices or to a withdraw of investors.

In the same time Bulgarian stock exchange indexes show that there is an increase in 2022 compared to 2018 (Fig. 5).

Fig. 5



Source: *Bulgarian Stock Exchange*

Key problem in 2022 is the increase of not only inflation but also major interest rates. The European central bank started tightening its monetary policy by raising the main interest rates in the second half of 2022 which continued in 2023 too. Those measures aim at getting inflation under control, which on the other hand will be at the price of slowing down economy growth. The energy crises could also challenge the sustainable goals of the European program.

The fact that the amount of clients assets on capital market and capital market indexes increase over the time shows that rather investors tend to trust and look for investment opportunities on the capital market, being not afraid of inflation. Another way saying, inflation is compensated by capital market performance.

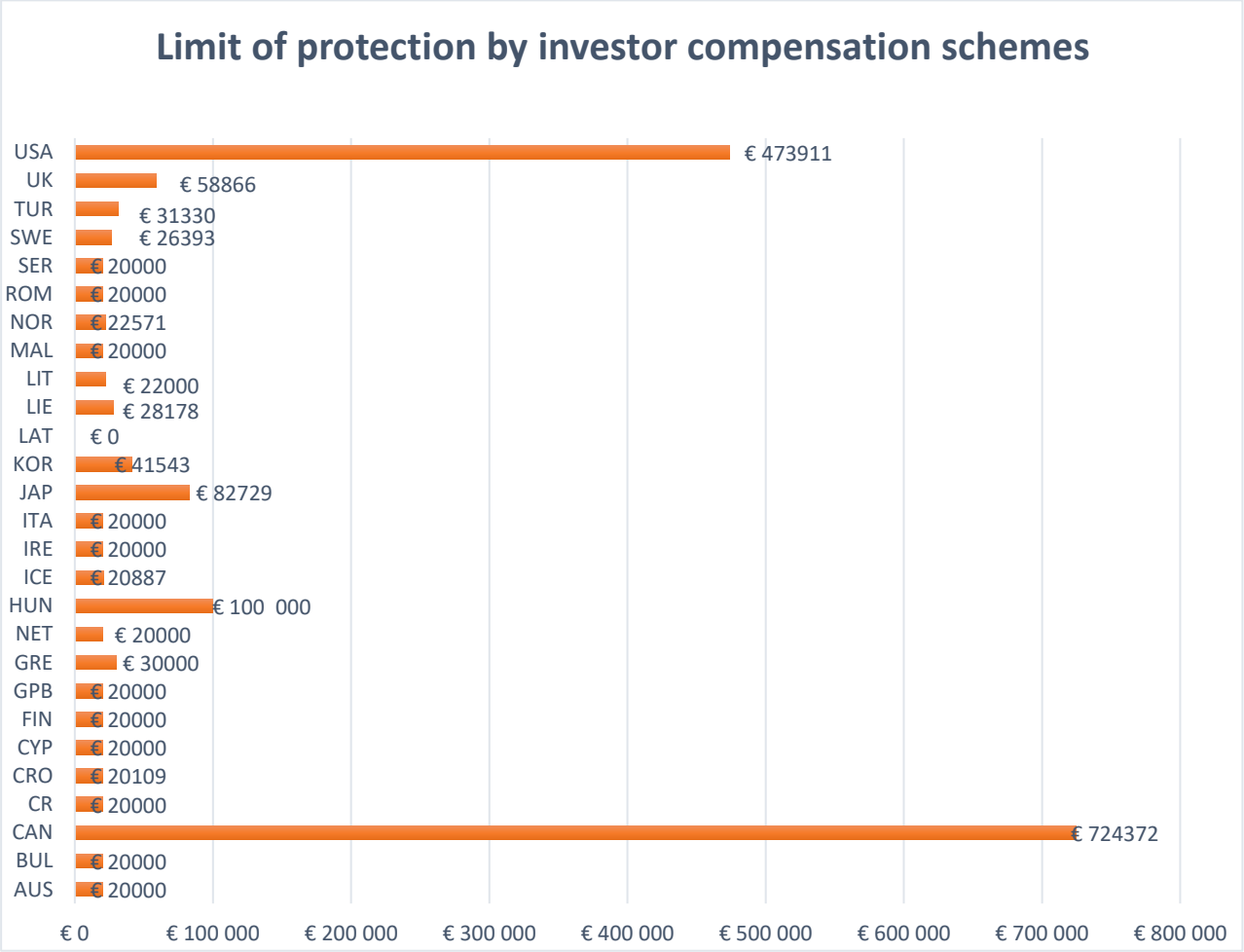
What is happening with investor protection on the other hand. Definition of investor protection could include different perspectives of understandings. All legal financial framework aims to build markets where investors feel confident and protected from losses which are not connected with their investments, which means that are not part of market risk. How actually inflation impacts this protection? Among all types of protection a direct connection can be found with the protection of deposit guarantee schemes and investor compensation schemes. The last two type of institutions aims to prevent a certain amount of investors funds, to be compensated in a case the broker (bank, investment firm etc.) is not able to return it. That certain amount is called protection or compensation limit.

In Europe the deposit insurance protection limit since 2010 has been increased to 100 000 euro according to par. (21) and art. 6 p.1 of the Directive 2014/49/EU for deposit insurance schemes. Prior to 2010, there was a requirement for at least 20 000 euro protection limit, which was in place for the majority of European countries.

Hence, in terms of investor compensation schemes, which protect investors in financial instruments, the minimum limit of protection set by the EU Directive is still 20 000 euro which is provided by the majority of EU schemes.

On the next figure the compensation limit around the world is given. The importance here is that the limits in the EU countries have almost not changed for the last 25 years, with small exclusion.

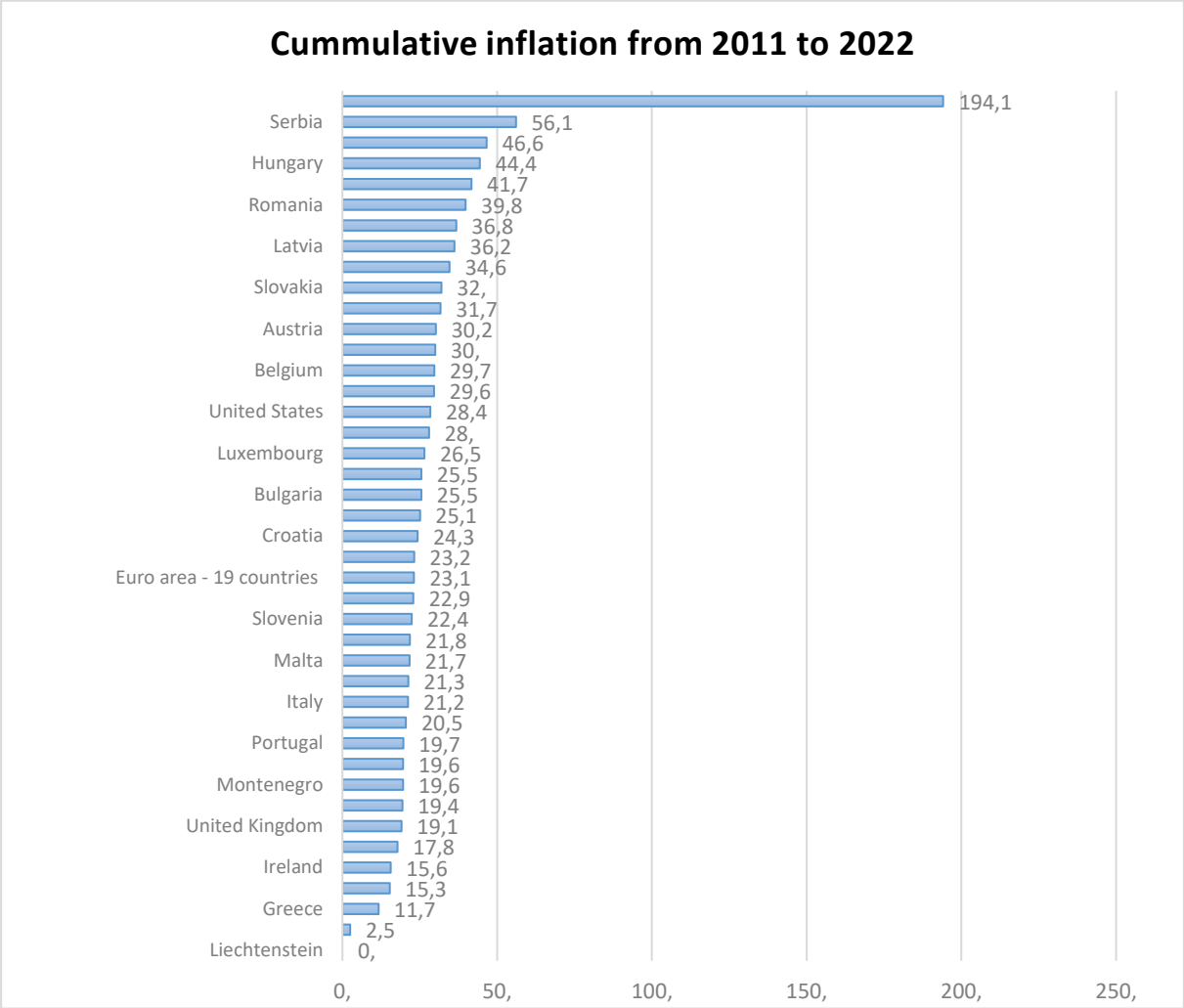
Fig. 6



Half of the schemes have a protection limit of EUR 20 000 or just over this amount, the reason for this has been the Directive which regulates the establishment and operation of these institutions, where a minimum level of protection of EUR 20 000 is set. This is considered to be an appropriate level in 1997 when the Directive was approved. In Bulgaria, for example, over 95% of investors in financial instruments are fully protected up to this level, and this is the situation in most European countries. On the other hand, this minimum level has not been changed since the Directive was introduced in 1997 (now 20 years). Here we come to one of the controversial points and questions about whether the level should be raised and to what amount would be appropriate. The cumulative inflation in Bulgaria for the period 1999-2023 is 189%, according the statistics of the NSI.

However, if we observe inflation in Europe for the period 2011-2022 on Fig. 6, it varies between 11 and 56%.

Fig. 7



If the accumulated inflation for the period 1997-2022 is considered the level should be increased at least by 30-40% or reach approx. 30 000 euro.

The other issue is whether the level should be brought in line with that for deposit protection, which could be challenged as being too high and undermining the financial sustainability of the schemes. On the other hand some countries show interest of equaling the levels of protection for deposits and financial instrument in order to give equal protection for investors. The European countries which provide higher limit are Hungary, Spain, France, Greece, Lithuania, Sweden and Turkey.

In the US, the protection limit is USD 500,000 with an additional USD 250,000 cash limit, indexed to inflation, subject to discussion every 5 years. The limit in England is £50,000, which is significantly higher than the Directive. However, the English scheme has vast experience in paying compensation and regularly changes the limit if there are prerequisites to do so. Also, the English capital market is significantly more developed than other European markets, which also argues for the higher protection. Although Latvia is indicated in the figure with a zero limit, it provides compensation for 90% of the value of irrecoverable or lost financial instruments or damages arising from non-performed investment services , but not more than the equivalent of EUR 20 000. The highest protection is provided by the Canadian scheme - EUR 724 thousand.

Conclusion

This paper aimed at overlooking the inflation and capital market assets and their protection provided by investor compensation schemes. The analysis showed that cumulative inflation is less than the increase of the capital market prices which confirms the statement that in a long turn investments on capital market outline inflation. On the one hand there is significant inflation, but on the other there is a significant rise of client's assets prices. Those are two effects that makes it necessary the limit of compensation to be risen, as the real protection of investors in financial instruments is going down in terms of rising inflation. This events also may make one investors to shift its assets to another provider offering higher return. The after crisis regulation was aimed at rising investors protections in all kind of legal requirements and administrative measures, but the real money protection was forgotten to be adapted at a reasonable level along the time.

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TRADE CREDIT AND BANK CREDIT IN CONDITIONS OF INFLATION: EVIDENCES FOR PUBLICLY TRADED NON-FINANCIAL ENTERPRISES IN BULGARIA

Galya Taseva[1]

***Abstract**: The purpose of the article is to examine the relationship between financing with trade credit and bank credit in the conditions of inflation in Bulgaria. The analysis in the article is based on data for 43 non-financial publicly traded enterprises in Bulgaria for the period 2018 - 2022. The results of the study show that with the sharp acceleration of inflation in Bulgaria in 2022, increase sharp also the ratio Trade credit / Total liabilities to banks and non-bank financial institutions. The research show that trade credit and bank credit are complementary sources of financing for publicly traded enterprises in Bulgaria in the period 2018 - 2021. With the acceleration of inflation in 2022, which is accompanied by a serious increase in the interest costs of companies, the nature of the relationship between trade credit and bank credit is changing. For 2021 and 2022, a statistically significant positive correlation is established between the ratio Interest expenses / Total liabilities to banks and other financial institutions and the ratio Trade credit / Credit from banks and non-bank financial institutions. As inflation accelerates, firms are looking to raise more interest-free financing from their suppliers to ease the burden of rising interest costs on bank loans.*

***Keywords**: trade credit, bank credit, supplier financing*
***JEL**: G30; G32; G39, G20*

1. Introduction

Inflation is a major macroeconomic factor of the business environment and is in the focus of attention of central banks around the world. The trade credit by the supplier companies has a non-monetary nature. But numerous theoretical and empirical studies reveal the role of trade credit for the transmission of monetary policy. There are many studies according to which, in conditions of monetary policy tightening, trade credit could play the role of a substitute for bank lending. But also a number of publications present evidence that credit from suppliers and credit from banks can be complementary sources of financing. The analysis in the article is based on data for non-financial publicly traded enterprises in Bulgaria. The purpose of the article is to examine the relationship between financing with trade credit and bank credit in the conditions of inflation in Bulgaria.

2. Theoretical overview

Existing research on the relationship between trade credit and bank credit shows mixed results (Afrifa, Tingbani, Alshehabi, Halabi, 2023). Trade credit is a substitute for bank credit when

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an increase in the use of trade credit results in a decrease in bank credit financing. When an increase in the use of trade credit leads to an increase in the use of bank credit it indicates the presence of a complementary effect (Engemann et al., 2014; Lin & Chou, 2015 - cited in Afrifa, Tingbani, Alshehabi, Halabi, 2023, p. 748). Trade credit and bank credit are complementary when the demand for external financing is inelastic, i.e. when the firm's access to external financing is limited. But if the demand for external finance is elastic and firms can use one source of finance instead of another, trade credit and bank credit are substitutes (Myers and Majluf, 1984 - cited in Afrifa, Tingbani, Alshehabi, Halabi, 2023, p. 748).

Firms can use trade credit as a substitute for bank credit (Nielsen, 1999, Petersen and Rajan, 1997). This is particularly relevant in conditions of restrictive monetary policy. Based on data on small firms, which are more likely than large firms to have difficulty accessing finance, Nielsen (1999) finds an increase in the value of trade credit used in cases of bank contraction. Sahin (2019) found evidence supporting the hypothesis of substitution of bank credit with trade credit among SMEs in Turkey for the period 2008–2016. However, no such effect was observed for the large firms studied. Sahin (2019) notes that bank loans and trade loans have a dominant share in the financial structure of firms in Turkey.

Petersen and Rajan (1997) conclude that firms have advantages over banks in assessing the creditworthiness of their customers because of the informal information they receive in their commercial relationships. Given that both supplier firms and local cooperative banks rely on informal information in their lending decisions, it follows that trade credit and bank credit may be substitutable sources of financing (Filomeni, Modina, and Tabacco, 2023).

As a source of financing, trade credit is important in the transmission of monetary policy to business, as well as for the financial health of firms (Fitzpatrick and Lien, 2013). Trade credit can serve as an alternative to credit from banks and mitigate the adverse effects for companies when interest rates increase and bank credits become more expensive or access to bank credit is reduced. Where trade credit terms do not include a discount on the price of the goods for early payment, supplier financing is considered interest-free. Trade credit gives companies the opportunity to secure interest-free credit, with which they can replace bank credit to a certain extent, when it becomes more expensive as a result of an increase in interest rates.

Typically, the cost of trade credit has not correlated with changes in interest rates (Fitzpatrick and Lien, 2013, p. 41). The implicit price of the trade credit is determined by the terms of the credit sale transaction, by whether a discount is provided for early payment. Under two-part contract terms, where a discount for early payment is provided, trade credit may be more expensive than bank credit because of costs associated with the possibility of late payment, greater risk of non-payment, and higher costs of acquisition of funds (Cunat, 2003). Petersen and Rajan (1997) find a negative relationship between the strength of firm-bank relationships and firms' demand for trade credit. Trade credit is mostly relied on by companies whose access to bank financing is difficult, as long-term credit from suppliers is more expensive. Nielsen (1999) also shows that in countries where firms have good relations with banks, the use of trade credit is lower.

Fitzpatrick and Lien (2013) examine the micro-level relationship between trade credit and bank credit using data on non-public firms in Australia. Fitzpatrick and Lien (2013) do their research on whether the two types of credit are substitutes under the assumption that bank credit affects trade credit, but the use of trade credit does not affect the use of bank credit. The results of

Fitzpatrick and Lien's (2013) study show that there is partial substitution between trade credit and bank credit for Australian non-listed firms.

Tabash, Farooq, Hamouri, Kumar, and Al-Faryan (2023) examine the impact of government governance on trade credit using data on Pakistani non-financial firms from 2010 to 2019. At high interest rates, external financing becomes expensive for firms, so they reduce their borrowing or abandon debt financing altogether. At high interest rates, corporations are looking for alternative sources of financing such as trade credit. In their study, Tabash, Farooq, Hamouri, Kumar and Al-Faryan (2023) found a positive relationship between the real interest rate and trade receivables and payables. The reason is that the increase in the cost of bank loans stimulates companies to seek more financing from suppliers. The rate of inflation is also a factor in making financing decisions for companies. Rising inflation makes financing from financial institutions expensive and unattractive for firms (Tabash, Farooq, Hamouri, Kumar, & Al-Faryan, 2023). The interest rate on loans from financial institutions is formed based on the rate of inflation, since financial institutions take into account the rate of return adjusted for inflation. This suggests a positive relationship between the inflation rate and trade credit. However, Tabash, Farooq, Hamouri, Kumar and Al-Faryan (2023, p. 13) find a negative relationship of inflation with trade receivables and payables. The explanation, according to them, is that high inflation increases uncertainty and restricts the commercial activity of enterprises. High inflation and high price volatility discourage supplier firms from selling on credit. High inflation also reduces the purchasing power of buyer firms and further shrinks the volume of sales and trade receivables (Musarat et al., 2020 - cited in Tabash, Farooq, Hamouri, Kumar and Al-Faryan, 2023).

Srivastava and Gopalakrishnan (2021) examine the effect of the crisis caused by the Covid-19 pandemic on the trade credit channel and conclude that trade credit depends on product market conditions and is not always a substitute for bank lending. Trade credit replaces bank credit only under favorable product market conditions. The pandemic had a strong negative impact on economic conditions (Miteva, 2022). The crisis that was triggered by the Covid-19 pandemic has specific characteristics, such as the disruption of supply chains, which led to an increase in demand and prices for a number of goods whose supply turned out to be insufficient (Nenkov and Hristozov, 2023, p. 137).

A number of authors prove that there can be a complementarity effect between supplier financing and bank credit (Ng, Smith and Smith, 1999; Demirguc-Kunt and Maksimovic, 2001; Cole, 2010; Daripa and Nilsen, 2005; Antov and Atanasova, 2007). Whether trade credit and bank credit will be substitutes or complementary sources of financing depends on certain conditions, such as the wealth of the borrower (Burkart and Ellingsen, 2004). The difference in the term of trade credit, which is usually short-term, and bank credit, which can be of a longer term, is also a reason for their simultaneous use (Cole, 2010). Even in the presence of a substitution effect, it does not exclude the possibility of complementarity, especially for certain groups of firms such as younger and smaller firms (Gama, Mateus and Teixeira, 2008).

Afrifa, Tingbani, Alshehabi, Halabi (2023, p. 748) examine the relationship between trade credit and short-term bank credit in UK public and private firms using a sample of 254,352 firm-year observations for the period 2008–2021. They find that trade credit is a substitute for bank credit for publicly traded firms that have easy access to cheap external financing, but the two types of credit are complementary sources of funds for non-publicly traded firms that have limited access to alternative sources of funding. Also, the results obtained by Afrifa, Tingbani,

Alshehabi, Halabi (2023) show that publicly traded firms adjust faster to their optimal levels of trade and bank credit.

Afrifa, Tingbani, Alshehabi, Halabi (2023) make an additional analysis of the influence of certain factors such as financial constraints and the size of firms on the nature of the relationship between trade credit and bank credit. Examining the impact of financial constraints, they find that trade credit serves as a complementary source of financing for both public and non-public firms that experience more financial constraints. Regarding the influence of firm size, their research results show that both public and non-public small and medium-sized enterprises use trade credit and bank credit as complementary sources of financing.

Trade credit facilitates the attraction of bank lending due to the signaling effect of trade credit (Alphonse, Ducret and Severin, 2003; Biais and Gollier, 1997; Antov and Atanasova, 2007). The ability of firms to attract credit from their suppliers is indicative of a low probability of becoming unable to pay their debts to creditors. In addition, extending trade credit to customers is a positive signal to banks, which increases supplier firms' access to finance (Biais and Gollier, 1997).

Afrifa, Tingbani, Alshehabi, Halabi (2023, p. 763) find that non-public firms and firms that are financially constrained use trade credit not only to signal their creditworthiness to banks but also to supplier firms. Firms that are more financially constrained use credit from their suppliers to signal their creditworthiness to banks or use their access to bank credit to signal their creditworthiness to their suppliers.

3. Empirical study

The study of the dependence between trade credit and bank credit in the conditions of inflation is based on data from the financial statements of 43 enterprises listed on the Bulgarian Stock Exchange for the period of 2018. - 2022. The research methods used are horizontal and vertical financial analysis, descriptive statistics, Pearson correlation, analysis of variance with Kruskal-Wallis test. Nonparametric analysis of variance with Kruskal-Wallis test was used because it is appropriate when the conditions for applying parametric analysis of variance are not met, as in the case. In order to be able to apply a parametric analysis of variance with an F-test, the following restrictive conditions must be met: independent random samples; normal distribution of the outcome variable in each subset; equality of variances for the outcome variable in the subsets (Boshnakov, 2009, p. 81).

In 2022, a sharp jump in inflation is observed in Bulgaria. Table 1 presents the average annual inflation in Bulgaria during the period 2018-2022 according to data from the National Statistical Institute.

Table 1. Average annual inflation in Bulgaria during the period 2018 – 2022.

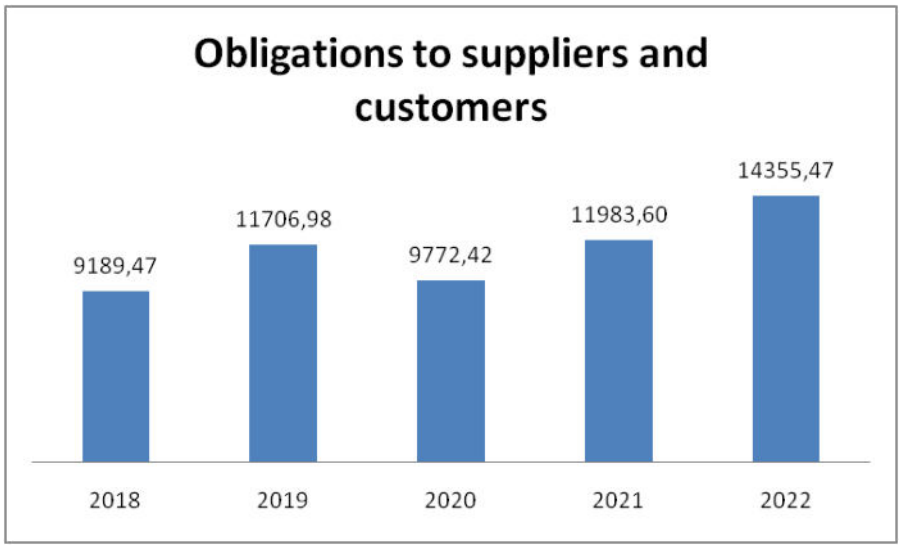
	2018	2019	2020	2021	2022
Total CPI (%)	2.8	3.1	1.7	3.3	15.3

Source: National Statistical Institute

The following figure shows the dynamics of payables to suppliers and customers in the period 2018 - 2022. The graph shows that there was a serious drop in payables to suppliers and customers in the first year of the Covid-19 pandemic in Bulgaria, which mainly is due to a decrease in economic activity as a result of the strict measures to limit the spread of the virus.

In 2021, with the recovery of economic activity, the value of payables to suppliers and customers increased, even surpassing the level of 2019. This increase continues in 2022.

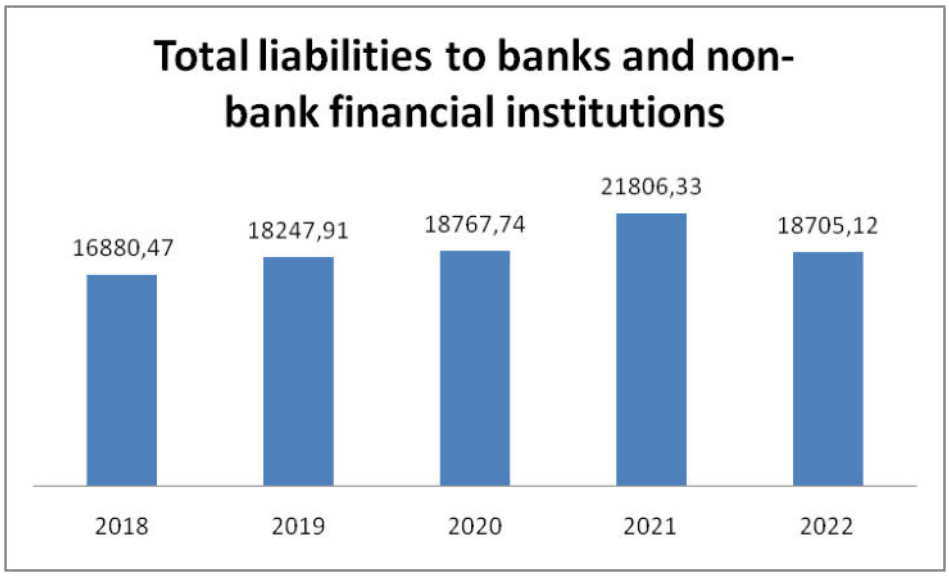
Figure 1. Arithmetic mean of payables to suppliers and customers



Source: Author's calculations

The following figure shows the dynamics over time of the amount of loans drawn from banks and non-bank financial institutions. From 2018 to 2021, an increase in liabilities to banks and non-bank financial institutions is observed. The highest value of this indicator is in 2021. In 2022, a serious decrease in credit by banks and non-bank financial institutions was registered.

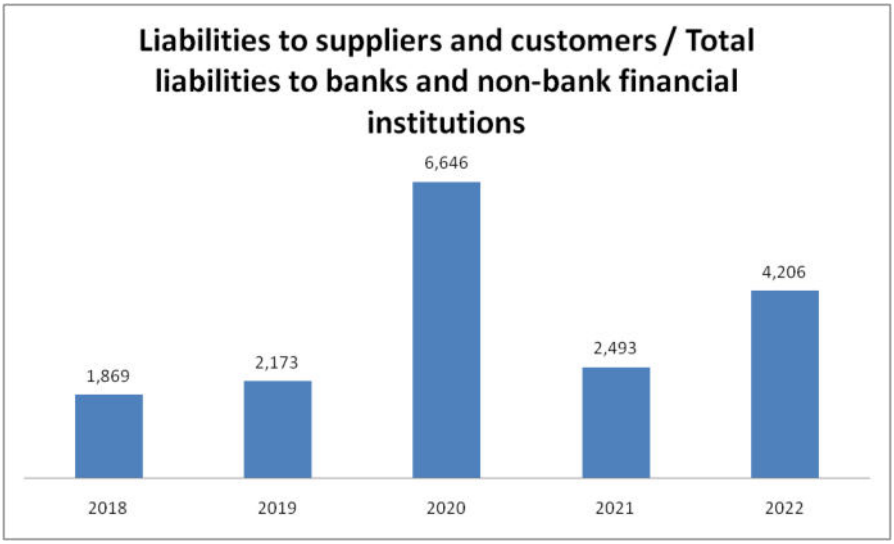
Figure 2. Arithmetic mean of liabilities to banks and non-bank financial institutions



Source: Author's calculations

During the analyzed period 2018 - 2022, a significant dynamic of the ratio of Liabilities to suppliers and customers / Credits from banks and non-bank financial institutions is established. There is a sharp increase in the first year of the pandemic, followed by a significant decrease in 2021. Again, a very sharp increase is seen in 2022.

Figure 3. Arithmetic mean of the ratio Liabilities to suppliers and customers / Liabilities to banks and non-bank financial institutions



Source: Author's calculations

The Pearson correlation coefficient study shows a positive statistically significant relationship between trade credit and institutional credit in 2018, 2020 and 2021 at the 0.05 significance level, and at the 0.1 significance level in 2019 as well. This gives reason to assume that trade credit and lending from banks and non-bank financial institutions are complementary sources of financing for publicly traded enterprises in Bulgaria in the period 2018 - 2021. In 2022, in the conditions of high inflation, is absent such statistically significant dependence.

Table 2. Correlation dependence between liabilities to suppliers and customers and the total liabilities to banks and non-bank financial institutions

	Sig.	Pearson correlation
2022	0,210	0,195
2021	0,003	0,436
2020	0,001	0,471
2019	0,064	0,285
2018	0,007	0,408

Source: Author's calculations

Analogous results are also obtained when investigating the existence of a statistically significant relationship between trade credit and short-term lending by banks and other financial institutions.

Table 3. Correlation dependence between payables to suppliers and customers and short-term liabilities to banks and non-bank financial institutions

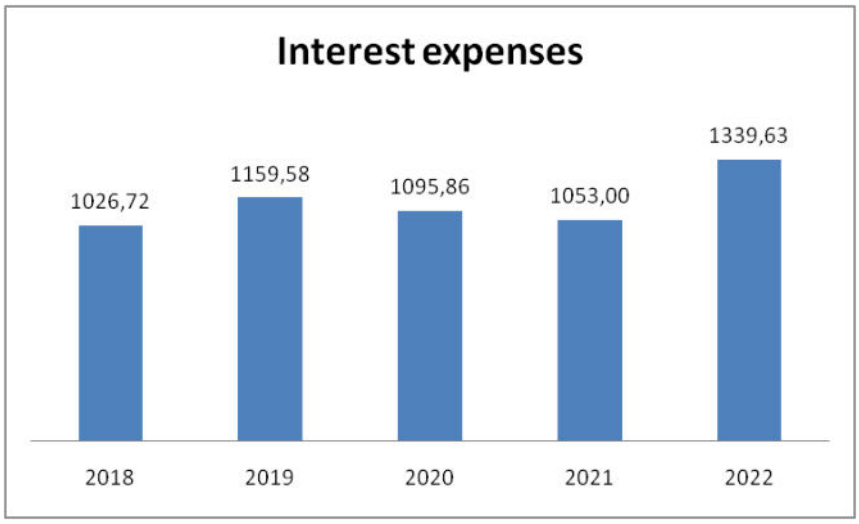
	Sig.	Pearson correlation
2022	0,105	0,251
2021	0,001	0,494
2020	0,001	0,503
2019	0,079	0,271
2018	0,009	0,393

Source: Author's calculations

It is widely accepted in the literature that one of the factors that influence the relationship between liabilities to suppliers and customers and liabilities to banks and other financial institutions is the level of interest rates and interest costs that firms bear. They are directly

related to the rate of inflation. In 2022, a serious increase in the interest costs of the surveyed companies was established. The dynamics of interest expenses of the surveyed companies in the period 2018-2022 is shown in the following figure.

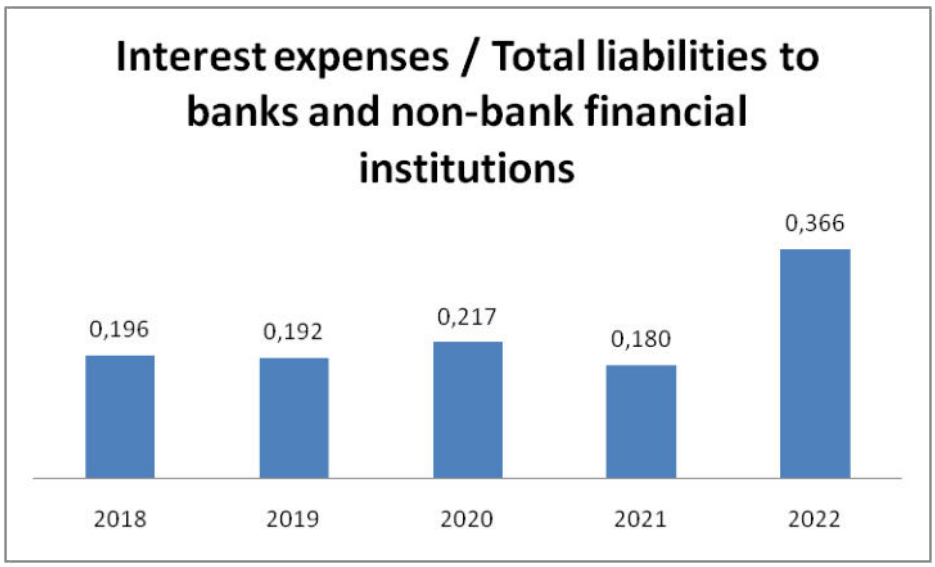
Figure 4. Arithmetic mean of interest expenses



Source: Author's calculations

The very strong increase in the ratio Interest expenses / Total liabilities to banks and non-bank financial institutions in 2022 is evidence of the increasing burden that firms bear in servicing their interest debt.

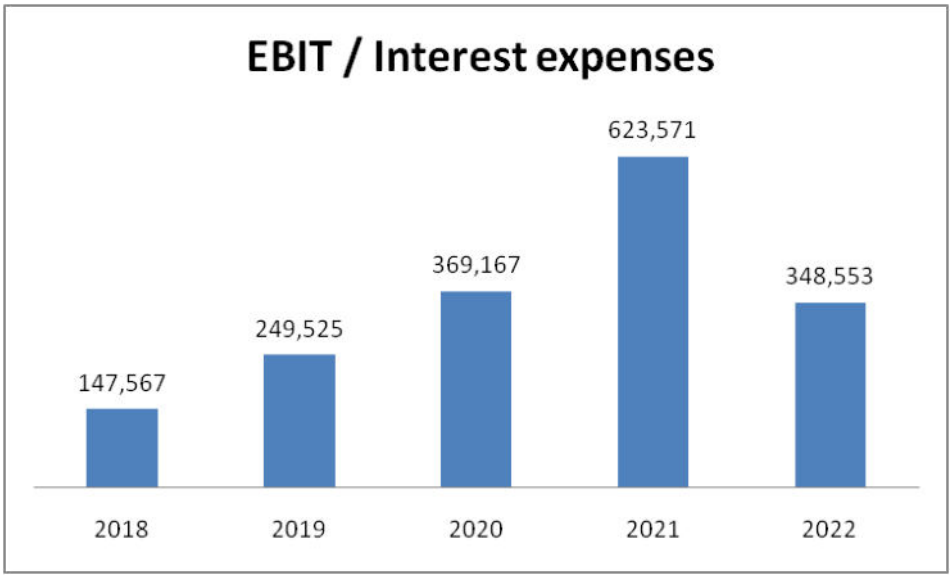
Figure 5. Arithmetic mean of the ratio Interest expenses /Total liabilities to banks and non-bank financial institutions



Source: Author's calculations

The interest coverage ratio is also indicative of the burden of enterprises in servicing obligations to banks and non-bank financial institutions. This ratio increases continuously from 2018 to 2021, when it reaches its peak. In 2022, the interest coverage ratio drops very sharply, which is an indicator of a serious increase in the risk of companies.

Figure 6. Arithmetic mean of the interest coverage ratio



Source: Author's calculations

From the data in table 4, it can be seen that from 2021, with the acceleration of inflation in Bulgaria and the strengthening of inflationary expectations of economic agents, a positive statistically significant relationship appears between the interest burden on servicing bank loans and loans from non-bank financial institutions and the ratio of trade credit, which is largely interest-free to institutional lending. Firms that begin to experience higher interest costs on loans from banks and other financial institutions in 2021 and 2022 have a higher ratio of trade credit to institutional credit.

Table 4. Correlation between the ratio Interest expenses / Total liabilities to banks and non-bank financial institutions and the ratio Liabilities to suppliers and customers / Total liabilities to banks and non-bank financial institutions

	Sig.	Pearson correlation
2022	0,004	0,520
2021	0,005	0,509
2020	0,851	0,037
2019	0,120	0,313
2018	0,696	0,079

Source: Author's calculations

The results of the non-parametric analysis of variance with the Kruskal Wallis test, which are presented in the following table, are in accordance with the above correlation dependences.

Table 5. Results of a study with non-parametric analysis of variance for the presence of a statistically significant difference in the value of the ratio Interest expenses / Total liabilities to banks and other financial institutions for companies net trade credit creditors and net trade credit debtors

	Sig.
2022	0,030
2021	0,030

Source: Author's calculations

In 2022 and 2021, a statistically significant difference is established between the value of the ratio Interest expenses / Total liabilities to banks and other financial institutions for companies net trade credit creditors and net trade credit debtors. The analysis of mean ranks shows that

firms experiencing a higher interest burden on bank loans and loans from non-bank financial institutions tend to reduce their interest costs by trying to attract more interest-free financing from their suppliers and become net trade credit debtors.

4. Conclusion

The results of the research show that with the sharp acceleration of inflation in Bulgaria in 2022, a sharp increase in the ratio of trade credit to credit from banks and non-bank financial institutions is also observed. Trade credit is a flexible source of financing for businesses through which businesses adapt to adverse economic events, such as supply and demand shocks such as those caused by the Covid-19 pandemic, the inflation and related changes in interest rates. The obtained results give reason to assume that trade credit and bank credit are complementary sources of financing for publicly traded enterprises in Bulgaria in the period 2018 - 2021. With the acceleration of inflation in 2022, which is accompanied by a serious increase of interest costs of companies, the nature of the relationship between trade credit and bank credit is changing. In 2022, trade credit and bank credit are no longer complementary sources of funding. For 2021 and 2022, a statistically significant positive correlation is established between the ratio Interest expenses / Total liabilities to banks and other financial institutions and the ratio Trade credit / Credit from banks and non-bank financial institutions. As inflation accelerates, firms are looking to raise more interest-free financing from their suppliers to ease the burden of rising interest costs on bank loans.

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INFLATION AND DEFINED CONTRIBUTION PENSION SCHEMES IN CENTRAL AND EASTERN EUROPEAN (CEE) COUNTRIES

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Abstract: *Pension systems in most of the CEE countries were significantly reformed at the beginning of 21st century. The introduction of fully funded components in addition to the traditional pay-as-you-go ones marked the beginning of a completely new age in the development of the pension systems in the region. The basic goal of the current paper is to research the investment performance of the defined contribution pension schemes in several CEE countries – Estonia, Slovakia, Romania and Bulgaria. The thesis defended throughout the article is that conservative types of investment portfolios for long term investors such as pension funds are not appropriate especially under scenario of significant inflation rate. The results of the research show that those countries where pension fund managers were allowed to structure portfolios with different risk profile have much higher chance to protect the savings of insured individuals in real terms in prolong period.*

Key words: *pension funds, CEE countries, investment results, inflation, risks*

JEL: *G11, G12, G22, G23*

Introduction

Following the recommendations of the World Bank (1994) a number of countries in CEE region reformed their pension systems by introducing second (mandatory) and third (voluntary) pillars in their pension insurance based on a fully funded principle. The main goal of the policymakers was to supplement the traditional pay-as-you-go pillars and in this way to support pension systems' sustainability and adequacy in the long term. The basic reasons behind the reforms were related to the ongoing unfavorable processes of population aging and deteriorating demographic structures in all of the countries in the region. Under certain normal assumptions it was expected that pay-as-you-go structures were going to put serious pressure on public finances in the long term and the predominant model of state financing would not be sustainable in the next couple of decades. Plenty of research in this field also suggested that fully funded pension schemes can effectively support pay-as-you-go insurance. For example, Davis (1995) shows that fully funded pension schemes could have certain advantages to the pay-as-you go ones mostly concerning the improved incentives to insure on "real" incomes, better expected return and raised saving rates that could mitigate the expected deficits in the

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pay-as-you-go pillars. Gochev and Manov (2003) are on a position that pension insurance based on a fully funded principle can have positive effects on the incentives of the insured individuals to contribute on their real wages especially in countries with significant "grey" sector in the economy which was a common feature of the CEE countries in the years after the collapse of the communist regimes. Bielawska (2015) and Pandurska (2018) demonstrate also that reforms made in the pension systems are trying to raise the sustainability of pension insurance in those countries in the long term. The ongoing processes of population aging were additionally fostered by significant emigration rates in CEE countries during the 1990's and early 2000's. Kirov (2010) and Daneva (2016) point out that private pension schemes can have positive effects on labor markets but also on capital markets in the region since pension funds are among the most important institutional investors in the World. So, there was a common notion during the 1990's that pension funds could have a positive influence not only on pension insurance itself but also on public finances, capital markets and the economy as a whole. On the other hand some authors such as Orszag and Stiglitz (1999) and Casey (2013) stress on some of the risks regarding pension reforms and the need of right regulation in order to avoid future problems. Antolin (2008) points out that population aging could have unfavorable consequences not only on pay-as-you-go pension systems but also on fully funded ones by affecting adversely financial markets and the realized yield.

The following table shows the countries that introduced fully funded mandatory pillar into their pension systems in the late 1990's and early 2000's.

Table 1. Pension reforms in CEE countries

N:	Country	Year of reform
1	Hungary	1998
2	Poland	1999
3	Latvia	2001
4	Bulgaria	2002
5	Estonia	2002
6	Croatia	2002
7	Lithuania	2004
8	Slovakia	2005
9	Romania	2008

All countries introduced models based on defined contributions thus transferring the investment risk towards the insured individuals. This type of pension schemes was much more popular in Latin America than in Western Europe at the time of reforms. However, in the following years defined contribution pension plans significantly increased in number in the Western part of the continent as well. The basic reason behind the observed trend was related to the difficulties in covering the deficits formed in the defined benefit pension schemes in many of the countries that applied such models. The decade after 2008 was a period of extremely low and even negative interest rates – quite unfavorable trend for all long-term savers whose accumulations

were not able to increase substantially during these years. At the same time the average life expectancy gradually grew and made almost impossible the financing of the deficits appeared within the defined benefit schemes. As a result, defined contribution pension models started to rise in popularity although the risks to which are exposed insured individuals are many both during the accumulation phase and the pay-out stage. According to Blake (2006) some of the important risks during the accumulation period are: interest rate risk, asset price risk, currency risk etc. During the distribution phase Blake (2006) and Rocha and Vittas (2010) pay attention on the following risks: interest rate risk, longevity risk, liquidity risk, bequest risk. James and Vittas (1999) also point out some of the risks concerning annuities markets and their right regulation for the success of any future pension reform. However, there is one specific risk that significantly affects the accrued resources into one's individual account in both periods – the inflation risk. It is well known that inflation rate erodes the real value of savings and it is quite important for long term investors such as pension funds to preserve purchasing power of accumulated resources towards the date of retirement. The current paper investigates to what extent pension funds in CEE countries were able to manage this risk for the period between 2013 and 2023 (10-year period). More specifically the pension funds situated in four different countries were analyzed: Bulgaria, Slovakia, Estonia and Romania. Two of the countries were able to introduce multifund system (Slovakia and Estonia) and the other two missed that opportunity. This means that insured individuals in Bulgaria and Romania do not have the option to choose the risk profile of their asset portfolio. For the purposes of the analysis the yield realized by some of the major pension funds situated in the above mentioned countries is estimated and presented. The assessment of the investment performance is based on the value change in one pension unit for the investigated period. The time weighted approach is considered as more appropriate since it correctly evaluates the managers' contribution in portfolio management. The money weighted methods (such as IRR, MIRR, etc.) in estimating the investment performance are not applicable in this case because they require specific knowledge concerning the exact arrangement and scale of the incoming cash flows. The realized yield is then compared to the inflation rate. The last is estimated by considering the change of the official consumer price indexes in each of the countries and then Fisher's equation is applied. The results undoubtedly show that for the researched period the performance of the most aggressive portfolios is the most impressive and the yield achieved by these portfolios is the only one that exceeds the inflation rate for the same period. The methods used throughout the paper are: descriptive analysis (concerning the normative rules about the investment regulations in the researched countries), data analysis regarding the performance results of the pension funds, some deductive and inductive approaches are also applied in presenting the ideas for future development of the second pilar pension funds in CEE countries. The first part of the research describes some of the specifics of the second pillar pension funds in each of the researched countries, the second part shows the investment performance of the funds for the last 10 year period. The paper concludes with some recommendations for future reforms concerning mostly the Bulgarian practice.

1. The pension reforms in Central and Eastern European (CEE) countries - specifics and implications

1.1 Bulgaria

Bulgarian pension system was reformed in the late 1990's with the introduction of second pillar mandatory pension funds. Two types of funds were introduced – universal pension funds and professional pension funds (Social insurance code 1999). Each of them followed the model proposed by the World Bank incorporating defined contribution pension schemes. The universal pension funds started their business effectively in 2002. According to the adopted legislation all individuals born after 31.12.1959 were obliged to choose and to contribute into a pension fund from the second pillar of the pension system. The initial contribution was fixed at 2% but few years later it reached 5% level. Part of it is due by the employer (2.8%) and the rest is paid by the employee (2.2%). The professional pension funds started in 2000. All insured individuals who work in hazardous environment (the so called I and II labor category, which include professions such as miners, metallurgists, public transport drivers, etc.) must contribute into a professional pension fund of their own choice. The professional pension funds were destined to pay pension benefits for early retirement, which means that individuals who work in those specific conditions have right to get retired a few years earlier than those who work in normal environments. The insurance contributions for the professional pension funds are paid only by the employer. Their amount is 12% for the professions that fall under I labor category and 7% for the ones which are under the II labor category. Professional pension funds were thought to pay pension benefits only for pre-defined period of time. The universal pension funds are considered as life-time payers since the insured individuals are expected to receive supplementary pension benefit in addition to the one received by the first pillar of the pension system. Bulgarian pension funds are allowed to manage only one portfolio of assets. The multifund system has been discussed for many years but currently it has not been introduced in practice (Daneva, 2018 and Milev, 2019). Pension companies are trying to find the right balance between the interests of those individuals whose retirement is close and those who have just started their first job. The result is a balanced portfolio of assets where government securities are the dominant asset class. The insured individuals both in universal and professional pension funds have an option to transfer their resources into the first pillar of the system and to receive pension benefit only from the state. Under this scenario they must pay the pension contribution in full amount towards the state pension system. In this way the state is trying to take care of those insured individuals who were not able to accumulate enough resources to fund a pension benefit. If insured individuals choose to pay pension contributions only towards the first pillar of the system, they receive state pension benefit in full amount. If they pay pension contributions toward the first and the second pillar of the system, they receive two types of pension benefits but the one received from the first pillar is in reduced amount.

1.2 Estonia

Estonian pension system was reformed in 2002. It was transformed into a three pillar structure with first pillar based on a pay-as-you-go principle and second and third pillar established on a fully funded principle. The approach applied in Estonia suggests obligatory participation into the second pillar only for those individuals who were born after 1 January 1983 and voluntary for all other age cohorts[2]. The contribution paid into the second pillar is 6% as the employer pays 4% and the employee 2%. It is interesting to note that Estonia is the only country in the CEE region where contribution paid by the employee comes as an additional contribution and not just redirected one from the first pillar of the system. Still from the very beginning of the reform, pension insurance companies in Estonia were allowed to establish portfolios with different risk profile. The legislation makes the construction of conservative type of asset portfolio as compulsory but at the same time gives the option for structuring balanced and aggressive portfolios as well. The basic difference among the portfolio types comes from the investments in variable income instruments. Initially, investment regulations were quite severe. Conservative funds were not allowed to invest in variable income instruments at all. Balanced or medium-risk funds were given the option to invest up to 25% of their assets in equities and aggressive or high-risk funds used to invest up to 50% in shares. So, in the very initial stage of the reform 15 different second pillar funds were established – 6 conservative, 3 balanced and 6 aggressive. The investment limits were gradually relaxed during the years and currently conservative pension portfolios may contain up to 10% of their assets in variable income instruments, balanced ones – up to 50% and the aggressive portfolios can be structured with a 100% investment in shares and similar instruments. In 2021 another reform was introduced trying to make second pillar insurance more flexible. Insured individuals were granted the option of the so called "pension investment account". The basic purpose of the account is to allow Estonians to save for their future pension benefit but at the same time to personally determine the way the accumulated resources are invested. At the same time insured individuals were given the option to withdraw their resources from the second pillar and even to stop contributing into the pension fund. By default, all young individuals who enter the labor market should join the second pillar funds but they could rethink and stop contributing at a certain stage of their professional career. The new pension legislation in the country allows insured individuals to decide what exactly to do with the accumulated resources at the date of retirement. Undoubtfully, the new laws bring more freedom to the insured individuals but at the same time they raise the responsibility of the Estonians as well.

1.3 Slovakia

The pension system in Slovakia was reformed in 2005. Following the model proposed by the World Bank, Slovakian government introduced second and third pillars that function on fully funded principle. Initially, the second pillar is mandatory for those individuals born after 1983 and voluntary for all individuals who were in the social security before 2005. The

[2] Leppic, L. and Vork, A (2006), Pension Reforms in the Baltic States

contribution rate was fixed at 9% which makes Slovakian contribution rate for the second pillar pension funds the highest one among the countries in CEE region. The multifund system was introduced in the very beginning as pension companies were allowed to structure three different portfolio of assets: conservative, balanced and aggressive. In 2012 a forth, different type of asset portfolio was established – index fund, which is supposed to be managed passively. Also, since 2012 pension companies have been obliged to structure and offer the insured individuals conservative and aggressive pension funds but also, have been allowed to structure as many funds as they wish. After the financial crisis of 2008 some important changes were made to the system concerning the fully funded components. First, the contribution rate was reduced to 4% in 2012[3] and second, the new insured individuals were allowed to opt out of the second pillar of the system. In this way pension insurance in the second pillar became voluntary. The contribution rate started to increase by 0.25% per year from 1st of January 2017 and it is expected to reach 6% in 2024. The mandatory insurance into the second pillar was renewed in 2022 when some other important changes were made in the pension legislation. First, persons under 40 years of age who have started to work for the first time, mandatory join the second pillar funds with the option to leave the system within two years from the entry. Second, individuals who start working for the first time, by default, begin to pay their contributions into the index fund and not to the conservative one which was the default option until now. In addition, individuals under the age of 54 automatically are moved into the index fund from the conservative one. At the age of 54 they are gradually transferred into the lower risk portfolios. The basic reason is that conservative funds were not able to achieve satisfactory return for the insured individuals in the last decade. Investments in variable income instruments are expected to be more profitable for individuals with long investment horizon which is in line with the financial theory. Thus, after many reforms during the last two decades, the Slovakian pension system continues to rely on mixed pension insurance that combines pay-as-you-go and fully funded principle. The government is trying to ensure that the system is enough flexible to respond to the interests of the different groups of working individuals.

1.4 Romania

Romanian pension system was reformed in 2008. Similar to the other countries in CEE region, it was transformed from purely pay-as-you-go system into a three-pillar structure with second mandatory and third voluntary pillars that embrace fully funded principle. At the start of the reform the second pillar is compulsory only for individuals under 35 years and voluntary for those between 35 and 45 years. The contribution is 2% of the insurable income and it was carved out from the contribution due for the first pillar of the system. Then, it was raised to 6%. The operated schemes are defined contribution and pension insurance companies are allowed to structure just one portfolio of assets, so there is no multifund system and in this sense the system is similar to the one in Bulgaria.

[3] OECD (2021), Pensions at a Glance – Slovak Republic

The pension reforms in the CEE region have been quite dynamic in the last 20 years. Most of the countries followed the model proposed by the World Bank and transformed their pension systems into a multi-column model that combines pay-as-you-go and fully funded principles. However, the reforms undertaken were not straightforward. After the initial years of strong support towards the fully funded components, after 2008 many of the countries accomplished changes that expressed indecisiveness towards further development of pension insurance based on a capital accumulation. The strong inflation of 2022 put another issue of whether pension funds will succeed in supporting the pay-as-you-go structures in the long term. The researched pension systems in the current paper could be divided into two groups – Estonia and Slovakia from one hand and Bulgaria and Romania from the other. The first two countries were more active in the reforms made over the years and were able to change pension legislation significantly during the last decade. They were able to introduce multifund system in pension insurance thus giving an important option for the insured individuals to choose the risk profile of their investment portfolio. The second group of countries (Bulgaria and Romania) were more conservative in adopting further changes after the initial reforms. They stick to the model assumed in the 2000's and didn't assume any significant transformation in the next years. The only exceptions concern the frozen contribution rate which was not raised in accordance with the initial plan and the possibility of the insured individuals to opt out of the second pillar (which concerns only Bulgarian pension system). In the following part of the paper, it is investigated which group of countries was able to protect the interests of the insured individuals to a greater extent. The research concerns the yield realized by the different pension funds and its comparison with the inflation rate for the last 10 years. The results could be used for some further reforms in the field of pension insurance.

2. Investment performance of the second pillar pension funds in Estonia, Slovakia, Romania and Bulgaria and the impact of the inflation rate

The realized yield by pension funds that operate defined contribution pension schemes directly affects the amount of the pension benefit received by the insured individuals. From this point of view, future retirees bear significant investment risk. It deserves mentioning that for those insured individuals that contribute into defined benefit pension plans, the situation is different since the investment risk there is born by the company-sponsor of the scheme, which in most of the cases is the employer of the insured individuals. The second pillar pension funds in Bulgaria, Estonia, Slovakia and Romania are structured in a similar way when it comes to their investment activity. The only significant difference is the availability of multifund system in Estonia and Slovakia. In theory, it is expected that individuals with a long investment horizon could benefit from portfolio of assets in which variable income instruments have predominant share. On the other side, those individuals whose retirement is coming close could take advantage of a portfolio of assets in which fixed income instruments dominate. So, the difference between the current age of an insured individual and the date of retirement is of particular significance when it comes to a proper investment of defined contribution pension

schemes. It is interesting to investigate the behavior of the different portfolios in different time frames. The last ten-year period between 2013 and 2023 is very intriguing because it embraces years of extremely low interest rates and then a period of high inflation. How were pension funds in CEE countries able to manage this situation from an investment point of view is very important both for the insured individuals and for the policymakers who have the responsibility for all of the pillars of the pension system.

The investment performance of the pension funds in the above mentioned countries was examined by taking into account the realized yield by three of the funds that operate at the Estonian market, three of the funds that function on the Slovakian pension system and all of the funds that exist on the Romanian and Bulgarian market. The Estonian market is represented by the following funds: Luminor, SEB and LHV. Swedbank pension funds are excluded because they constantly change the risk profile of the managed portfolios following the change of the age of the insured individuals. In this way the investment performance cannot be attributed to a portfolio structure with a certain risk level, which makes them unsuitable for the aims of the current research. The other pension company excluded from the research is Tulleva which have not operated for the whole investigated period. The Slovakian market is represented by NN, Allianz and VUB since these are funds that have been in operation for the whole researched period. Romanian pension funds are six and these are funds that have existed for the whole period between 2013 and 2023 and Bulgarian pension funds are nine. It is also important to note that each of the Estonian pension funds is represented by three separate portfolios with different risk profile – conservative, balanced and aggressive and Slovakian pension companies are represented by four different portfolios – conservative, balanced, aggressive and one that follows market index. Each of the Romanian and Bulgarian pension companies operate one portfolio of assets.

Table 1. Realized yield by Estonian pension funds for the period 06.2013 – 06.2023[4].

Pension fund[5]	Portfolio risk profile	Annual yield for the period 06.2013 – 06.2023	Annual inflation rate for the period 06.2013 – 06.2023	Real annual yield for the period 06.2013 – 06.2023
SEB	Conservative	-0.46%	4.20%	-4.48%
	Balanced	1.07%		-3.00%
	Aggressive	5.17%		0.93%
Luminor	Conservative	0.17%		-3.87%
	Balanced	1.41%		-2.68%
	Aggressive	5.46%		1.21%
LHV	Conservative	0.82%		-3.24%
	Balanced	2.85%		-1.29%
	Aggressive	4.53%		0.31%

Source: https://www.pensionikeskus.ee/en; own calculations

[4] The estimated real yield is achieved by Fisher formula (1 + nominal yield)/(1+ inflation rate) -1

[5] The investment performance of the following Estonian pension funds is shown:
conservative portfolio types – SEB Conservative pension fund; Luminor C pension fund; Pension fund LHV XS;
balanced portfolio types – SEB Optimal pension fund; Luminor B pension fund; Pension fund LHV M;
aggressive portfolio types – SEB Energetic pension fund; Luminor A plus pension fund; Pension fund LHV XL

For the last decade Estonian second pillar pension funds have had similar performance in terms of realized yield. The results confirm the expectations that aggressive portfolios can achieve the highest rate of return in the long term. For the observed period the funds that invest the highest proportion of their assets in variable income instruments are not only leaders in terms of yield, but they are the only ones that were able to fully compensate insured individuals for the lost purchasing power of money. The positive real rate of return is a proof that long term investors should not stick to instruments whose yield is secure and not volatile in short term, because the inflation rate could easily exceed the achieved nominal yield and make insured individuals losers in prolong period of time.

Table 2. Realized yield by Slovakian pension funds for the period 06.2013 – 06.2023.

Pension fund[6]	Portfolio risk profile	Annual yield for the period 06.2013 – 06.2023	Annual inflation rate for the period 06.2013 – 06.2023	Real annual yield for the period 06.2013 – 06.2023
Allianz	Conservative	0.30%	3.30%	-2.91%
	Aggressive	7.77%		4.32%
NN	Conservative	0.14%		-3.07%
	Balanced	2.96%		-0.33%
	Aggressive	4.55%		1.21%
	Index	9.06%		5.58%
VUB	Conservative	0.72%		-2.50%
	Balanced	3.67%		0.35%
	Aggressive	5.74%		2.36%
	Index	9.70%		6.20%

Source: https://nbs.sk/en/; own calculations

The investment performance of Slovakian pension funds is another confirmation in favour of variable income portfolios. Conservative portfolios in which dominant share takes fixed income instruments were not able to realize positive real yield for each of the funds investigated. Balanced portfolios reported real return at around zero and only the last two portfolio types – the aggressive ones and those which follow a certain market index achieved a positive real rate of return for the last ten years. It deserves to be noted that yield realized by indexed portfolios far exceeds the one announced by aggressive portfolios. For the observed period passive management techniques demonstrated superiority over active management. The last reforms made in the Slovakian pension system envisage those insured who enter the labour market for the first time to start to contribute into index portfolios by default. Another positive

[6] The investment performance of the following pension funds is shown:
conservative portfolio types – GARANT Allianz - Slovenská d.s.s., a.s.; Solid –NN a.s.; KLASIK - VÚB Generali a.s.;
balanced portfolio types – Harmonia –NN a.s.; SMART - VÚB Generali a.s.;
aggressive portfolio types – Progres Allianz - Slovenská d.s.s., a.s.; Dynamika –NN a.s.; Profit - VÚB Generali a.s.;
index portfolio types – Index Global –NN a.s.; INDEX - VÚB Generali a.s.;

feature of passive management is its low costs, which additionally contribute to the amount accumulated into one's individual account.

Table 3. Realized yield by Romania pension funds for the period 06.2013 – 06.2023.

Pension Fund	Annual yield for the period 06.2013 – 06.2023	Annual inflation rate for the period 06.2013 – 06.2023	Real annual yield for the period 06.2013 – 06.2023
ARIPI	5.83%	3.92%	1.84%
AZT VIITORUL TAU	4.89%		0.94%
BCR	5.73%		1.74%
BRD	5.45%		1.47%
METROPOLITAN LIFE	5.89%		1.89%
NN	5.68%		1.69%
VITAL	5.94%		1.95%

Source: https://asfromania.ro/en/; own calculations

Romanian pension funds are allowed to manage only one portfolio of assets. Towards the end of the observed period the structured portfolios contain mostly government securities (at around 60%) and corporate equities (at around 20%). The yield estimated as a change in one pension unit is positive and exceeds the inflation rate for the whole period. To a certain extent this is a surprising result, bearing in mind the proportion of government bonds in the managed portfolios and the significant drop in the market evaluation of all government securities for the last year. However, Romanian pension funds were able to compensate the negative performance in 2022 with the yield realized previous years and, in this way, to preserve the value of savings even in real terms. It deserves noting that in some cases long term investors can use discounted cash flow method if bonds are held until maturity. In this way they can present a more just picture of their assets. However, if pension funds need to liquidate part of their holdings in bonds by selling them at a market price, they surely mislead the public by using discounted cash flows as an evaluation technique.

Table 4. Realized yield by Bulgarian pension funds for the period 06.2013 – 06.2023.

Universal Pension Fund	Annual yield for the period 06.2013 – 06.2023	Annual inflation rate for the period 06.2013 – 06.2023	Real annual yield for the period 06.2013 – 06.2023
Doverie	1.78%	2.67%	-0.86%
Saglasie	2.94%		0.26%
DSK Rodina	1.98%		-0.67%
Allianz-Bulgaria	1.87%		-0.78%
OBB	1.96%		-0.69%
CCB Sila	3.30%		0.61%
Budeshte	1.43%		-1.21%
Toplina	2.04%		-0.61%
POI	1.99%		-0.66%

Source: www.fsc.bg; own calculations

Bulgarian pension funds achieved real rate of return at around zero for the period between 06.2013 – 06.2023. Two of the funds (Saglasie and CCB Sila) realized a positive yield (a little higher than 0) and the other seven funds – negative one (between 0 and -1% annually). The multifund system is not introduced in Bulgarian practice and second pillar pension funds are allowed to structure and manage only one portfolio of assets. The managed portfolios can be classified as balanced since they contain at around 50% government securities but also a significant share of corporate bonds and equities. The basic reason for the negative real yield is the loss realized by all of the funds in 2022. The unfavorable results in the last year are due to the significant drop in the market prices of all government securities held in the pension funds. The assumed approach of marked to market evaluation resulted in current devaluation of these securities. However, universal pension funds in Bulgaria are not forced to sell their holdings in government bonds and the reported losses currently are only in accounting terms due to the assumed methods of evaluation. That's why it is expected the negative results to be compensated relatively easily in the next few years.

The investment performance of the pension funds in all researched countries demonstrates once again the significance of inflation risk for fully funded pension schemes. These types of schemes were introduced in most of the CEE countries two decades ago and they have always been seen as a supportive mechanism for the traditional pay-as-you-go pillars. The negative trends of population aging and the expected strong pressure on public finances in the near future continue to justify their presence in the pension practice. However, accumulating resources in the long term faces the severe risk of continuous loss of purchasing power of the accrued funds. The extremely loose monetary policy stance followed by the major central banks in the last decade seriously threatens the sustainability of the capital pension schemes. One of the basic aims of pension funds is to achieve yield that exceeds inflation rate in the long term. The combination of extremely low interest rates (typical for the last decade) and inflation rate considerably higher than the one targeted by the central banks (seen in 2022) is devastating for the incentives of the insured individuals to support the existence of second pillar pension funds. The investment results of the pension funds in Estonia, Slovakia, Romania and Bulgaria confirm the unreliability of investments in government bonds for securing adequate pension benefit in more distant future. Pension funds around the World are recognized mostly as conservative investors and government securities have always been a significant part of their managed portfolios. However, the last decade undoubtedly shows that investments in low volatile instruments in the short term almost surely lose the battle with inflation in the long term. Those countries that were able to establish flexible investment rules (Estonia and Slovakia) protected more efficiently the resources of future retirees. By investing in corporate equities and bonds (aggressive or index portfolios in Estonia and Slovakia), pension funds were able to achieve real positive yield. Those countries that stick to the rule: one portfolio of assets for all insured individuals have been in a far worse position for the last ten years. However, investment in equities brings significant risk in terms of price volatility and insured individuals need to have knowledge and be prepared about it (Pandurska, 2020). Assuming the probability of short-term

losses they could raise the chance of protecting the purchasing power of their accumulated funds in the long term. Bulgarian and Romanian pension funds currently lack the opportunity to structure and manage portfolios with different risk profile and this could be detrimental for the savings of the insured individuals in more distant future. The introduction of multifund system could have positive effects especially for those individuals who enter the labor market now. For the people whose investment horizon is short, investments in low volatile instruments should be a prerogative. The stability of the investment must be guaranteed as much as possible during the years just before retirement. In this case, the possibility of structuring portfolio of assets whose duration is short could allow pension managers to better protect the interests of the insured individuals and to avoid the grim scenario of 2022, when the abruptly changed monetary policy of the central banks destroyed significant part of the value of the possessed long term government bonds. The last decade brought another proof that one portfolio of assets cannot suit adequately the interests of the different groups of insured individuals. Investments in the long and in the short term need different tools and policymakers must find the right balance between them. The wish to further develop a fully funded system and its use as a supportive element of the pay-as-you-go pension systems needs an effective change in investment rules that allows insured individuals to benefit efficiently from their savings regardless of the years left until retirement.

Conclusion

The last decade was quite turbulent for the development of the second pillar pension funds in CEE countries. The extremely low interest rates for almost all of the period put a significant strain on pension managers in their efforts to find suitable investment instruments for the managed portfolios. Traditional instruments like government bonds and bank deposits brought almost no yield. Corporate shares and more risky bonds were an alternative but the existed investment regulations limited the possibility to effectively restructure the asset portfolios. 2022 was the year of the change of the monetary policy followed by the major central banks. The rising inflation rate needed a fast response, and the monetary authorities started a process of interest rate increases. The widely adopted approach of evaluation of government securities - marked to market, resulted in a significant drop of the possessed securities and reported losses for the pension funds. At the same time the observed high inflation rate contributed additionally to the poor results for that year. The basic lessons of the last decade for the pension fund industry are: 1. flexibility in investments is of utmost priority; 2. government bonds are not secure instrument even in short term if the adopted approach of their evaluation is marked to market; 3. pension funds with long duration of their liabilities and no pressure of selling fixed income securities must use alternative approach of evaluation.

All these implications from the last decade are important signs that must be considered from the policymakers in their efforts to build strong and robust second pillar into the pension systems.

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COOPERATIVE BANKS, WHAT ECOLOGICAL LEGITIMACY ?

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Abstract: *Since the adoption of the Paris Agreement in 2015, European banks have invested 1.331 billion US $ in fossil fuels (Banking on Climate Chaos, 2023). The level of profit serves as a key incentive for banks to continue their involvement with fossil fuels. However, some banks have stopped these practices and committed to no longer supporting the expansion of this sector. This article aims to explore the role of banks, particularly cooperative banks, in combating climate change. Our objective is to examine to what extent cooperative banks are better positioned to tackle the challenges posed by climate change. The legitimacy of these banks is demonstrated through their capacity to adapt in a constantly evolving environment, and their foundational characteristics actively contribute to climate action.*

Keywords: *financial institutions, cooperative banks, climate change, environmental change, institutionalism.*
JEL: *E14, F65, G20, L20, M14*

1. Climate risks

This article aims to assess the legitimacy of cooperative banks in addressing climate change. It seems to us that these types of institutions are better positioned to lead the transition phase. In this section, we will analyze the risks resulting from climate change along with the challenges associated with implementing measures to combat it. Second, we will examine the adaptability of cooperative banks during a transition phase, applying DiMaggio and Powell's theory of institutional isomorphism in the context of globalization.

1.1. New challenges for banks

Currently, we are in a climate emergency: the planet continues to warm at an alarming rate, with no signs of slowing down according to environmental experts. European observatory Copernicus has reported that summer 2023 was the hottest one ever measured, with an average temperature of 16,77°C. For the past 30 years, temperature has been constantly rising and it's expected to increase by 0.05°C more compared to the previous year, reaching 1.2°C. The latest IPCC report also predicts a possible exceedance of the temperature limit set by the Paris

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Agreement (2015) of 1.5°C by 2050 if greenhouse gas (GHG) emissions continue to increase at the current rate (IPCC, 2022).

At the end of the 19th century, the industrial revolution, urbanization, and economic growth led to a significant accumulation of greenhouse gases (GHG) in the atmosphere, causing unprecedented climate change (Boissinot et al, 2016). Since then, human activities such as fossil fuel extraction, industrial production, intensive agriculture, transportation, and other sectors have been responsible for a 67% increase in the concentration of GHG emissions from fossil sources (Crippa & al, 2022).

Faced with this worrying situation, it is essential to reverse the upward trend in GHG emissions in order to limit the consequences. The main solution lies in a phased transition, progressively reducing and ultimately discontinuing our reliance on fossil fuels (United Nations). According to the Banking on Climate Chaos report, financing fossil fuels reached 673 billion US dollars in 2022, which is the lowest since 2016 with a decrease of about 16% compared to the previous year. Among the world's 60 largest banks, 16 European banks are included in the report. They provided approximately 11% of total fossil fuel financing, or 73 billion US dollars for the same year. Five cooperative banks (Crédit Agricole, BPCE/Natixis, Rabobank, DZ bank, and Crédit Mutuel) recorded 18 billion US $, or less than 3% of total financing in 2022. We can note a decrease of 17% in cooperative bank financing compared to 1% for European action banks. In addition, interruptions in financing for the expansion of oil, gas, and coal companies have been observed at Crédit Mutuel since 2016, as well as at DZ Bank and Rabobank since 2018.

Based on these arguments, we can see that the majority of banks that are committed to a real trajectory in the fight against climate change belong to the cooperative model. In this regard, the cooperative characteristics could be responsible for this difference in behavior towards the fight against climate change, as it depends on many other factors such as each bank's internal policies, their commitment to sustainable development, etc.

The evolution of cooperative banks has revealed an adaptive potential within their structure, practices, and activities during the period of globalization in the 1980s. The analysis of the restructuring of cooperative banks during that time shows a capacity for institutional adaptation and flexibility within a changing environment. Furthermore, the cooperative founding principles and values correspond to the characteristics of climate transition and the fight against climate change. In the following section, we will explain the climate risks and emphasize the importance of integrating them into the bank's activities.

1.2. Climate risks

Fighting climate change is a major concern for all organizations because it affects their physical structures, activities, and long-term profitability (Scialom, 2022). Various scientific reports have demonstrated and highlighted the potential damages of climate events on food security, biodiversity, the economy, and the environment worldwide (IPCC, 2021 and 2022; WWF, 2021). For the banking sector, taking action on climate risks could prevent serious consequences for the stability of the financial system (Carney, 2015). Therefore, it is essential

to be aware of potential threats at all levels and to implement necessary precautionary measures to address them. In this section, we will explore the risks arising from climate change and those that banks may incur due to their commitment to fighting climate change and transitioning to more sustainable practices.

To avoid destabilizing the system, banks are required to manage a new risk typology: climate risks (Carney, 2015; NGFS, 2019). Climate risks are divided into three categories: physical risk, transition risk, and liability risk. Physical risk (PR) results, on the one hand, directly from the material destruction caused by climate change which generates short to medium-term extreme weather events such as deadly heatwaves, floods, wildfires and storms, including hurricanes, cyclones, and typhoons as well as extreme precipitation. The latter are becoming more frequent and intense and can have alarming consequences for populations and ecosystems (BCBS, 2021; TCFD, 2022). On the other hand, PR derives from chronic evolution of the climate. It is a slow and progressive climate mutation phenomenon that leads to rising sea levels, increasing average temperatures, ocean acidification, water and heat stress, resource scarcity, loss of biodiversity, and increasing pollution (BCE, 2020). According to the WMO, Europe is particularly affected by these phenomena, which are progressing more rapidly than in the rest of the world (United Nations, 2022). They could cost up to 10% of the EU's annual GDP by 2100, or around 1800 billion euros per year (BCE, 2021). In fact, over the last decade, 12 billion euros have been spent each year in the European economy due to extreme climate damage (BCE, 2021).

The more severe these climate phenomena are, the more financial institutions will be exposed to significant financial losses and a decrease in their profitability. Although the real estate sector is particularly affected, the direct and indirect exposure of credit institutions to extreme climate events and their interconnectivity with other sectors increase their sensitivity to the effects of PR (BCBS, 2021). The financial consequences of PR may include destruction of physical capital, disruption of production and supply, performance of results, and adaptation costs. These risks are mentioned by several sources (Carney, 2015), (TCFD, 2017), (BCBS, 2021), and (BCE, 2020).

According to a 2021 study by the ECB, around 30% of payment defaults on bank loans to businesses in the eurozone will be caused by at least one physical risk (BCE, 2021). Risks include, in particular, floods, heat and water stress, as well as forest fires. The risks of economic damage related to floods vary according to the probability and intensity of the danger. Banks located in Greece, Spain, and Portugal are particularly affected by multiple risks, such as water stress, forest fires, and heat stress. Although the IPCC's climate scenarios predict relative savings for France, the pilot stress test conducted by French supervisors and the ECB highlight significant vulnerabilities associated with the physical risks of climate change. French banks are moderately exposed to climate risks. The first stress test has revealed optimistic conclusions regarding banks' exposure to physical risk by 2050, despite the alarming consequences of climate change (Clerc, L et al, 2021). However, future bank exposures depend on imminent actions to reduce emissions and the degree of adaptation to climate change.

Furthermore, the transition to a low-carbon economy can eliminate some physical risks, but it can also generate, increase, or reduce others, such as transition risk. The latter is influenced by the adoption of low-carbon processes, such as regulatory and technological developments, changes in social norms, individual preferences, and stakeholders (BCE, 2020). These adjustments can lead to transition risks that refer to financial losses when they are not sufficiently anticipated (I4CE, 2019; Bolton et al, 2020; Couppey, 2021). Reducing banks' involvement in fossil fuels results in a loss of value of reserves called "stranded assets" (Bolton et al, 2020). Fossil-type assets are at risk of becoming incompatible with a low-carbon economy, and they may not be replaced by renewable alternatives in time. This incompatibility could lead to a depreciation of value, which unbalances the balance sheets of banks that hold them and exposes them to larger financial losses. Subsequently, these losses could affect the entire financial system (Couppey, 2021).

Finally, the last type of climate risk is reputational or liability risk. It can arise when institutions do not take into account or respond adequately to the consequences of climate change. This risk is directly or indirectly related to physical and transition risks (BCE, 2020) and can expose companies to legal disputes as mentioned in the Final Prudential Guide CPG 229 of 2021. Institutions may be associated with polluting industries, which can lead to damage to their reputation and liability with the public, counterparties, and/or investors.

In conclusion, banks are at the heart of the economy and play a crucial role in financing institutions, society, and in the fight against climate change. Awareness of climate risks and efforts to combat environmental change will have a positive impact by limiting the consequences and slowing them down. The following section focuses on how these risks intersect with the financial and banking sector in particular.

1.3. Climate Risk Mitigation and Resilience Strategies

The banking sector is a crucial element of the economy and is an integral part of a complex and interconnected financial system. Any destabilization within an entity of the system can have far-reaching repercussions, potentially leading to a systemic crisis. As a result, banks must take measures to manage these risks, identify and anticipate them, protect the physical structure and profitability, and enhance the institution's resilience to climate shocks. In this section, we will analyze the measures taken by banks to mitigate climate risks.

Climate concerns can impact the financial system due to its systemic nature (Harrington et al., 2021). This is why Mark Carney, former governor of the Bank of England, emphasized in his speech in 2015 the importance of taking action against this change to prevent financial instability and potential losses in the banking sector. Subsequently, during the COP21 in Paris, the redirection of financial flows towards responsible investments was established in its agreement (article 2.1.c). Other organizations have also recognized the necessity for the banking sector to play a role in combating climate change, which largely depends on their

financing (Plihon, 2020; Oxfam, 2020; Lazaric, 2022). Indeed, they significantly influence the economy through various capital allocation channels and their volume. Depending on the function banks choose to allocate their capital, this can have a positive or negative impact on both the economy and the environment. It is worth noting that the total financing of French banks (deposits, loans granted, and bonds issued) was more than 2.5 times the GDP of the nation in 2021, demonstrating their key role in the climate transition (Oxfam, 2020). Given their role as engines in the financial and economic sector, banks must incorporate these risks into their risk management to avoid systemic consequences (Bolton et al., 2020). They are transmitted to the financial system through macro and microeconomic channels, which respond by transferring these effects to businesses, households, and governments, as illustrated in Figure 1 (Bolton et al., 2020).

As climate change can have various second-order and contagion effects, leading to risks for the entire economic system, these effects can weaken existing risks and create new ones, which can then spread to other sectors and potentially lead to a systemic crisis. This is justified by the recent Covid-19 health crisis. It wasn't just a medical issue, but also a correlation with the degradation of biodiversity due to climate change (Grandcolas, 2020). The consequences didn't stop with the Covid period. The Weather, Climate, and Catastrophe Insight report published in 2023 revealed that global economic losses caused by natural disasters amounted to 313 billion US $ in 2022 (Dauvergne, 2023). However, any deterioration of our ecosystem is likely to harm economic resilience.

Therefore, banks must incorporate climate risks into their existing traditional risk categories, in line with their risk appetite, while considering banking products and services and loan portfolios. This allows for the identification, measurement, monitoring, and management of indicators. Taking credit risk as an example, it increases when borrowers are unable to repay their debts due to a reduction in their repayment capacity (income effect) or if banks cannot fully recover the value of a loan in a case of wealth effect due to climate risk factors. As for market risk, the value of financial assets may be reduced due to climate risk that is not factored into prices, leading to significant and sudden price adjustments. This risk can also alter correlations between assets or liquidity markets, thereby undermining risk management assumptions. Additionally, stable sources of funding may decrease as market conditions can change based on liquidity levels. Finally, in terms of operational risk, banks may face an increased risk of legal and regulatory compliance associated with their investments and activities, while reputation risk may increase depending on market developments or consumer sentiments.

To illustrate the actions taken to combat climate change, many banks have committed to various initiatives or working groups dedicated to reducing and achieving greenhouse gas (GHG) neutrality within their internal policies (such as the Net-Zero Banking Alliance, the Task Force on Climate-Related Financial Disclosures, Principles for Responsible Banking, etc.). However, these commitments, as stated in their annual reports, are at odds with the overall trend of

increased real financing for fossil fuel companies between 2016 and 2022. What will ultimately make a difference in the long-term climate fight are the imminent exclusion policies that only a few banks have implemented.

Unlike Crédit Mutuel, which has been following a policy of divestment from fossil fuels for several years, in 2020, it announced its decision to cease all financing related to the expansion of the fossil fuel sector by 2030, which represents a major advancement in the fight against climate change (Banking on Climate Chaos, 2023). The French institution is also taking responsibility for reducing environmental impact and encouraging the entire banking industry to reduce its footprint. These initiatives contribute to the reduction of carbon emissions and the promotion of long-term energy transition.

In conclusion, managing climate risks is essential for banks to preserve their stability and the resilience of the financial system. In the next section, we will analyze the ability of cooperative banks to adapt in a changing environment according to the theory of institutional isomorphism.

2. Institutionalism and cooperative banks

In an ever-evolving economic and social context, the adaptability of financial institutions is crucial for their survival. Institutional theory helps explain how institutions are capable of adapting to transitional phases or drastic changes. Currently, the cooperative banking sector holds a significant position in the European economy. It consists of approximately 2,700 cooperative banks, with 89 million members and 227 million customers (EACB). In France, the three major cooperative banking groups (Crédit Agricole, BPCE, and Crédit Mutuel) make substantial contributions to the national economy, accounting for over 60% of retail banking activity (credit and savings). In Germany, this sector represents over 20% of the same activity, while in the rest of Europe, the percentage varies between 10% and 4% (EACB,2022). Given the prominent role these banks play in the economy, it is essential to analyze the reasons for their adaptations to the restructuring of the 1980s.

2.1. Institutional isomorphism

In the 1980s, cooperative banks were facing external pressures due to economic and legal restructuring. The transformation experienced by these banks at that time were predominantly shaped by formal and mimetic pressures. Consequently, the theory of institutional isomorphism emerges as a pertinent framework for explaining the dynamics of change and adaptation within cooperative banks. This theory explores deeply into the underlying motivations behind the adoption of specific practices within these institutions. In the following, we will examine DiMaggio and Powell's (1983) work on institutional isomorphism to understand "why" and "how" cooperative banks adjusted to the challenging restructuring circumstances of the 1980s.

Before analyzing isomorphism, it is interesting to understand the concept of change, as it is essential for the survival of the institution (Hamilton, 1919). Indeed, the economy is in perpetual transition towards something else, that is, continuous change (Schumpeter, 1939; Chabaud et al., 2005). According to Veblen (1901), this instability is linked to the changing conditions imposed by society and life (patterns of thought, historical circumstances, technological innovations). This means that there are two choices for the institution when its external environment undergoes a mutation: change or extinction. If it decides to continue in its organizational field, it must adapt to the new contexts. Thus, adaptation is a process constrained by environmental forces (Hannan and Freeman, 1977; Salancik and Pfeffer, 1978). What are these forces of change, and how do they impact the institution?

The concept of isomorphism is defined by a process of homogenization or resemblance of one institution to another dominant one (DiMaggio and Powell, 1983). The authors have emphasized the importance of this concept because during a phase of innovation, new reforms, and other changes, the diversity among economic actors in the same organizational field tends to gradually converge. New requirements all exert pressure by a dominant institution or organizational field on another, seeking legitimacy. This was highlighted by Hamilton (1932), DiMaggio and Powell (1983), in addition to the pursuit of power and sustainability. However, the primary goal of transformation is organizational optimality, not economic. To survive, institutions "*do not necessarily adopt practices most appropriate to current economic requirements, but those that appear more socially accepted*" (Huault, I. 2009). Indeed, the institutions to which changes apply either adopt them to enhance their competitive positions or to escape threats affecting their well-being (Chabaud et al., 2005). In any case, the mutation is the institution's response to changes of the external environment (Veblen, 1901; Hayek, 1967b; Longuet, 2004).

There are three types of institutional isomorphism: coercive, normative, and mimetic. Coercive isomorphism results from formal and informal pressures, as well as cultural expectations within a society. The application of new laws and regulations can stimulate institutional change. Furthermore, all dominant institutional structures reflect patterns of behavior that can be adopted. It is through this informal channel that legitimacy is often gained (DiMaggio and Powell, 1983). As a result, the more institutions are organized in alignment with the larger or dominant institution, the less they will be constrained by structural techniques.

Normative isomorphism is characterized by a strong emphasis on professionalization, where the profession itself establishes and defines various aspects of its functioning, including working conditions, methodologies, and socialization processes like dress code, language, and staff attitude. This phenomenon serves to confer legitimacy upon the institutional framework. Consequently, employees tend to react in a remarkably uniform manner, driven by their training

to address issues, adhering to standardized policies, procedures, and benchmarks, while also adopting a consistent decision-making approach. In situations where there is non-compliance with these established decisions and standards, decision-makers within the profession may imply a withdrawal of the involved partners.

Mimetic isomorphism occurs when an institution adopts familiar solutions, but not its own, due to uncertainty. In some cases, institutions fail to find innovative or clear solutions to imminent problems, or do not quickly hold new technological innovations. They tend to draw inspiration from dominant institutions in the same field that they perceive as more legitimate or effective. Existing solutions are generally viable, less costly, enhance legitimacy, and generate better competitive efficiency. The more similar institutions become, the more rules become self-legitimized and take the place of technical and economic constraints.

These various forms of institutional isomorphism pressure (coercive, normative, and mimetic) can appear separately or simultaneously to lead to a similarity among institutions within the same organizational field. The terms "similarities," "homogenization," and "resemblance" suggest that the institutions being examined are adapting to the evolving dynamics of their environment. The more closely they align with these changes, the more effectively these changes can take root and produce meaningful results. In the following section, we will examine how cooperative banks are adapting to the challenges of globalization and restructuring while considering the application of isomorphic forms.

2.2. Institutional isomorphism of cooperative banks

During the 1980s, we witnessed the development of markets, the deregulation of economies, the technological and information revolution, as well as the explosion of financial engineering that contributed to globalization (Bancel and Mériaux, 2015; Plihon, 2016). At the same time, the banking sector has gone through multiple changes. Cooperative banks were not spared or distinguished by this restructuring since it affected the entire banking sector with a focus on economies of scale (Richez-Battesti and Hector, 2012). However, they were subject to these structural changes due to increased competition and the dominance of the capitalist model in the market. In this part, we will analyze the events of this period (1980) of economic evolution and link them to the responses of cooperative banks from the perspective of institutional isomorphism.

Initially, the theory of isomorphism is embodied at the coercive (formal) level. Indeed, this period of restructuring is characterized by waves of deregulation, liberalization, and privatization. This allowed for a definitive reorganization of the banking and financial system. The process extends to despecialization and disintermediation, as well as reduced reliance on

state (Richez-Battesti and Hector, 2012). The principle of universal banking is now established. For example, in France, the Debré-Haberer decrees of 1967, coupled with the Banking Law of 1984, supplemented by the one of 1996, eliminated all divisions between activities and by placing all banks under the same set of laws. The German Banking Control Act adopted in 1934 placed the banking system under the same regulatory framework. Thus, cooperative banks became universal banks, both by law and in practice. Also in Italy, laws of 1993 have brought transformations in the cooperative banking sector. Consequently, it becomes evident that regulatory pressure was the first stimulus for change and adaptation of cooperative banks. In response, these institutions had no choice but to adapt to preserve their positions in the market, as the regulations did not take into account their cooperative nature.

Furthermore, regulatory transformation has driven significant financial innovations and banking product developments at the expense of their original activities (Ouyahia and Roux, 2017). Competition among banks has intensified as a result. Thus, in addition to the reconstitution of activity and external growth operations (mergers, acquisitions, absorptions, etc.), concentration, profit maximization, and achieving a critical size have also become priorities. This transformation has been pervasive, encompassing all banks, including cooperative ones, which have adapted to the evolving competitive landscape, as well as the increasing of resources, capital, and clientele. Notably, French cooperative banks have significantly expanded their reach through acquisitions of both private and public banks leveraging their substantial reserves (capital accumulation). The first acquisition occurred in 1998 with the union of Crédit Mutuel and CIC, and the most prominent one was the merger of Crédit Lyonnais and Crédit Agricole in 2003. The latest acquisition occurred in 2009 between Banque Populaire and Caisse d'Epargne. Presently, these banks operate with both cooperative and capitalist principles, transcending geographical boundaries and diversifying their range of services (Bülbül, Schmidt, & Schüwer, 2013). In Italy, cooperative banks similarly expanded their activities and structures without geographical or operational constraints, echoing their French counterparts by pursuing mergers and acquisitions. German cooperative banks, however, have displayed a more conservative approach compared to their Italian and French counterparts, despite facing legal pressures to engage in competition. These banks remain inclusive, serving a diverse clientele, including non-members, and offering a wide variety of services. While they underwent a merger in 1972, they predominantly operate at local and regional levels, maintaining their legal independence.

However, other cooperative banks responded to the challenges of universality in the banking system and competition by abandoning their model in countries such as Serbia, and Italy (Banche Popolari). Indeed, those that couldn't adapt (Serbia and Italy) saw their model fade away and transform into shareholder banks or become nationalized (Daskalov and Mishkova, 2014). Meanwhile, others, like in Bulgaria, practically disappeared (one institution left) due to the unfavorable legal environment that subjected them to the same regulations as their capitalist counterparts (Chroneos Krasavac, Petkovic, 2015).

Let's take a closer look at the cooperative banks that successfully adapted to the new constraints. Through the process of imitation, they found a solution within the capitalist banking model. This is the result of mimetic isomorphism. They adopted ways of acting, practices, management tools, and strategies from conventional banks within their structure (Ouyahia and Roux, 2017). Especially in terms of their introduction within their group, these became joint-stock companies, which in some cases are also publicly traded. This granted them relative legitimacy and organizational efficiency (DiMaggio and Powell, 1983).

A note is important to add here, in this article we will steer clear of delving into the structural and organizational transformation that transpired within cooperative banks post-homogenization. Our intention is not to analyze the aftermath but rather to explore the behavior of cooperative banks in different contexts, discerning their adaptability in the face of change, regardless of any potential outcomes. This issue has subsequently posed challenges, particularly in France, where it resulted in a decline in cooperative values and a surge in capitalistic tendencies. What matters is our evaluation of their capacity to evolve because, without change, our discussion would lack relevance. However, what is significant is their resilience in an ever-changing environment and their capacity to adjust to it. Our goal is to establish the legitimacy of their current situation by obtaining evidence from a prior context, all within a similarly dynamic environment.

Such a shift among cooperative banks, within a context of evolution, can be seen as an isomorphic transformation, as noted by Spear (2011). The adaptability of cooperative banks in a dynamic environment is evident through their strong cohesion. Therefore, taking into account the effects of institutional homogenization constraints, whether they are coercive in a formal (regulatory), or mimetic manner through the dominant form of institutions, will then enable us to explain the potential trajectory of cooperative banks in the battle for climate transition.

2.3. Cooperative bank's advantages

The issue of climate change is becoming increasingly important and requires immediate actions. The foundational characteristics of cooperative banks seem to provide the necessary resources and tools to chart a genuine path for environnemental transition and combat climate change. Therefore, in this section we will explore "why" and "how" cooperative banks can be more effective in promoting environmental sustainability than private shareholder banks.

In the previous section, we demonstrated how cooperative banks responded to pressures by adapting to change through the isomorphic effect, as remarked also by Spear (2011). This adaptability has been a key factor in their success, as North (1994) notes that *"Successful political/economic systems have evolved flexible institutional structures that can survive the shocks and changes that are a part of successful evolution"*(p. 367). In this context, the inherent

flexibility of cooperative banks has positioned them as generally responsive to external constraints. In today's challenges, this adaptability equips them with an advantage when it comes to addressing coercive pressure within the context of climate change.

Although cooperative banks and shareholder banks have not fully embraced climate transition, due to the gradual nature of the mutation process, cooperative banks have been more actively moving in that direction. Initially, it is evident that there is a strong commitment to completely stop funding the expansion of new fossil fuel projects. As indicated in the Banking on Climate Chaos report, institutions like Crédit Mutuel, DZ Bank, and Rabobank have demonstrated their intent to gradually disengage from the environmentally detrimental sector. Furthermore, these banks have been reducing their financial support to fossil fuel companies by over 49 % between 2016-2022. This flexibility and adaptation present in these institutions shows the difference with the attitude of shareholder banks. Even though shareholder banks are committed to informal pressures like the Paris Agreement (2015), the Net Zero Banking Alliance (NZBA) and with the United Nations' strategies (SDGs) and integrating ESG issues, they're still investing in fossil fuels and the expansion of new projects. In 2021, there was a significant drop (65%) in these types of investments made by European shareholder banks, which was followed by a recovery in 2022. It's important to note that this decline and subsequent recovery is attributed to various factors: the pandemic, the war in Ukraine, the inflation, and not a change in bank policy (Banking on Climate Chaos, 2023). Furthermore, the European Union's legislation that only focuses on enhancing transparency within institutions, integrating climate risks into their operations, and conducting stress tests to assess banks' capacity to manage these risks may not be adequate for fostering strategies that align with the transition. In such cases, banks are more inclined to publish reports rather than taking substantial actions. The underlying issue here is that banks require transition plans to effectively integrate climate actions into their activities. Although the legal framework does not offer full support for the transition, cooperative banks have shown a remarkable commitment to aligning with it.

In the term of informal pressures, constraints are less legally binding because they are not mandatory such as principles of responsible banking (UNEP FI), the Net-Zero Banking Alliance (NZBA), Paris Agreement 2015, etc. These non-exhaustive recommendations provide guidance to banks to integrate climate issues into their activities and decision-making. They aim to encourage a transition to a sustainable economy and manage climate-related risks. Although banks are not legally required to follow the recommendations of informal pressures, unlike formal ones, they may be motivated to do so for various reasons. Banks can improve their reputation and brand image among customers, investors, and the general public, who are increasingly sensitive to environmental issues. The presence of banking institutions that implement actions in line with the transition trajectory and climate problems may stimulate (in an average-long term) mimicry by other banks in this direction.

At the same time, there are NGOs such as BankTrack, Greenpeace, Reclaim Finance, etc. They are involved in raising awareness, research, mobilization, and monitoring of banks' climate practices. In this category, pressure arises when banks undertake contradictory actions or fail

to take necessary measures to achieve set objectives. The BNP Paribas case is an example since three NGOs have opened the first trial of a financial climate chaos under the duty of vigilance law (2017) (Le Monde, 2023).

There is another factor for change related to cooperative banks at the internal level: cooperative character. The cooperative founding values and principles are consistent with the criteria of climate transition: financing temporality tends towards the medium to long term, participation and collaboration in local development, and collective interest. These cooperative tools will facilitate the implementation of the fight against climate change.

It is now urgent to take short-term action against climate change to achieve the desired ultimate outcome of medium-to-long-term carbon neutrality (Labussière and Nadai, 2020) in the future. The actions that banks must take to fight climate change include mobilizing capital immediately for less carbon-intensive long-term projects, undertaking actions to reduce their GHG footprint, and gradually disengaging from financing polluting channels (Boissinot et al., 2016; Labussière and Nadaï, 2020). In this regard, cooperative banks hold a coherence advantage of temporality within their business model and with the criteria of transition. They give priority to financing useful projects in conjunction with the demand of members and their local community, thus prioritizing the general interest over the individual interest of conventional banks. Since they are not exclusively seeking short-term returns but also social utility (Caire et al., 2013; Ouyahia and Roux, 2017), these purposes lead them to commit to sustainability, which perfectly corresponds to the notion of climate transition. The latter refers to the change from the current economic model, dependent on fossil fuels, to an economy functioning with renewable energy (United Nations). However, our total independence from fossil fuels will not be achievable suddenly but through a long-term progressive process. Therefore, the absence of profit maximization constraint allows cooperative banks to engage in medium-to-long-term investments. In addition, capital accumulated from non-distributed dividends leads to concentration of productive capital which can allow local and regional institutions to invest in projects aligned with the transition goals.

The fact that cooperative banks should be more virtuous depends on internal and external factors. The latter are established based on the potential of this type of institution to adapt to legal, institutional, or cultural changes. The pressure exerted by formal and informal changes results in an aligned application within cooperative banks. For example, in 2023, Crédit Mutuel is supporting local farmers by financing renewable energy equipment projects. It also offers impact loans at discounted rates and advantageous financing solutions for these projects, thanks to the support of the European Investment Bank (EIB).

The legitimacy of cooperative banks in addressing climate change lies in their institutional adaptability, flexibility, and foundational principles. The benefits of such institutions pave the way for climate transition engagement. Immediate actions are necessary to change investment channels and disengage from polluting activities.

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THE ROLE OF FOREIGN DIRECT INVESTMENT IN ACCELERATING BULGARIA'S ECONOMIC DEVELOPMENT

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Abstract: *One of the biggest challenges in developing countries is the shortage of accumulated capital, which must provide the necessary investment for economic growth. Developing countries are increasingly implementing policies targeting FDI to improve their international competitiveness and secure capital for economic development.*

Key words: *economy,financial markets, crisis, prosperity and digitalization.*

JEL Classification System: G 00 General

Introduction

FDI allows long-term control of production, distribution and other business activities by companies that have a subsidiary in the country in which they have invested. These investments are brought in by multinational enterprises through inflow of capital, technology, managerial knowledge, etc., which reflects on the economic growth of the countries. In the process of economic development of countries FDI increase the possibility of economic growth, improve the balance of payments, increase exports, by improving manufacturing activities and by introducing a new knowledge environment, creating more skilled labor and increases the employment rate. However, to contribute to economic growth, FDI needs to satisfy some economic or social criteria. Apart from education, level of technology use, trade and investment policies, FDI has an impact on inward investment, and it is necessary to induce a "compounding" effect through which multiple economic growth can be achieved. In the case of insufficient capital accumulation, FDI can increase productive capacity and employment. In addition, FDI increases the level of technology use and can introduce advanced technologies that will further improve the country's international competitiveness, leading to a reduction in imports and an increase in exports of manufactured goods. To attract FDI, a country must

demonstrate economic stability and favourable business conditions. At the same time, another source of economic growth for inward investment. In general, FDI and inward investment complement each other. When FDI is directed to sectors with a high concentration of domestic investment, domestic investors are forced to increase their capital reserves in order not to be disadvantaged by greater competition in the sector, resulting in an overall increase in capital. On the other hand, if FDI is directed to sectors with lower concentration of domestic investment, domestic investors will be favourably affected by the competition that will be created in these sectors. Due to insufficient capital accumulation in a country, FDI increases productive capacity and employment opportunities. Moreover, with the introduction of high technology, FDI is gradually developing all sectors, improving manufacturing industries and reducing the country's dependence on imports. FDI is likely to increase domestic investment, mainly due to demand for materials and raw materials from domestic suppliers, which has a favourable impact on domestic investment. Despite the positive effects of FDI on inward investment listed above, negative ones can also be observed through the "crowding-out" effect mentioned above.

The crowding-out effect occurs when FDI negatively affects the growth and knowledge accumulation of domestic companies or causes a reduction in skilled labour and capital in industries. The positive effects of FDI on inward investment are not always guaranteed. Sometimes total investment (FDI and domestic investment) increases, yet FDI can adversely affect economic growth. In the domestic economy, sectors with export potential are open to competition and domestic investors may be potential competitors but may not yet have the capacity to compete with large multinationals. FDI severely restricts inward investment and activity for small and medium enterprises with high production factors. It is also important that multinationals only have the resources to employ skilled labour, so FDI may have a negative impact on domestic investment. Foreign direct investment has proven to be an important source of capital needed for economic development in both developed and emerging economies. As part of global integration, developing and emerging economies are increasingly relying on FDI capital, especially those that accept encourage any presence of foreign investment. The main reasons for encouraging FDI are due to the lack of capital in most countries to create jobs, increase productivity and achieve economic growth. Numerous studies have shown that FDI is an engine for enhancing economic growth, but the scale of the said relationship is highly variable and depends on the economic policies undertaken by countries, including with regard

to attracting FDI. FDI can have an adverse impact in terms of limited development of domestic firms, hence the impact on economic growth can be negative due to capital returning to developed countries. Importantly, FDI can have a long-term positive impact on economic development but a negative impact in the short term. In addition, a country's economic growth is influenced by a number of other macroeconomic factors such as money supply, quality of labour force, inflation rate, level of use of technological innovations, etc. A reduction in FDI could lead to a significant reduction in domestic innovation, resulting in a reduction in economic growth.

Impact of foreign direct investment on host economies

Due to these positive effects, many governments, especially those of developed countries, are beginning to focus their policies on promoting FDI, due to the fact that it can lead to the development of the national economy, with a particular impact on the activities of small and medium-sized enterprises, allowing them to be competitive and actively participate in international markets. At the same time, the impact of FDI on national economies is also the subject of opinions on the entry of foreign conglomerates, which can acquire monopoly power over small, and not very developed economies, and restrict the activities of enterprises, thereby damaging the local economy and preventing the effective operation of competition to develop markets. On the other hand, the possibility of exchanging capital between countries can bring a number of benefits, both for the host country and for the country from which the investment originates. FDI affects not only the receiving country but also the sending country. In terms of the host country, the impact is expressed in terms of a reduction in employment of the population, a reduction in tax revenues, a deterioration in the competitiveness of local production and a restructuring of the overall economy of the country. The direct effects of FDI have been studied by many authors. Suchacek et al. investigate the significant impact of transnational companies on employment, technological level, value chains, competition and overall increase in economic growth. Other authors have argued that FDI is a factor in lowering production costs and opening up the economy to international markets, as well as reducing the informal economy and corruption levels.

FDI "with increasing globalization, is a key driver of global economic growth and development, and governments view attracting it as a top priority and a measure of success". Together with imported capital, FDI has a positive impact on the provision of managerial and technological knowledge in the countries it targets. The positive and negative effects of FDI show that investors are guided in their decision to invest solely by their corporate interests, which may not, however, coincide with those of the host countries. The direct effects of foreign investment are initially manifested by the inward investment in the form of capital, and subsequently through the activities of the targeted enterprise in the form of management and marketing practices, knowledge transfer on the use of new technologies, entrepreneurial skills, etc. Evaluating the direct effects of foreign investment is usually done by analyzing employment levels, tax increases, hiring of new technology, use of materials and resources from local producers, etc., and the prevailing view is that the increase in the above direct effects of FDI is a prerequisite for increasing the economic development of the country. FDI also contributes to increased domestic investment and capital flows from investment allow for "diversification of risk, knowledge transfer, with lower volatility of capital flows contributing more to economic development". Multinational corporations bring new capital into the economy and thus contribute directly by increasing the inputs into the production function of firms partly or wholly owned by foreign shareholders. FDI also leads to increased productivity of domestic firms by providing managerial expertise and knowledge on the use of new technologies, which reflects on increased economic growth of countries. The direct effects of foreign direct investment have an impact both at the national level (macro level) and at the firm level (micro level). At the national level, the effects are manifested in terms of:

- the science and technology base;
- the environment;
- the level of taxes and charges;
- the country's balance of payments;
- national revenue;
- competition in the national market.

At the firm level, the effects are characterised in terms of:

- Technological parameters - through technology transfer and the creation and implementation of innovations in the technologies used;

- personnel - depending on the form and size of the investment, the impact can be on the wage rates of the staff (most foreign companies offer higher wages than domestic ones), the creation of new jobs, and on the qualification and motivation of the staff, due to the fact that transnational corporations offer multiple training options for their workers;

- technology transfer - importing new technologies and providing knowledge on how to use them, as well as bringing improvements to the technologies used in the country;

- local sourcing - in cases where the local economy does not offer the necessary products and raw materials for production or they are not at the required international companies can import them from other countries;

FDI generates many direct effects in the host countries in terms of job creation, increased wages in certain sectors, increased tax revenues for the government budget, technology transfer, management expertise, etc. The direct effects of FDI are also expected to bring indirect incentives, mainly related to productivity gains and job creation, which in turn should lead to economic welfare and prosperity. Governments of FDI host countries often use investment incentives as a tool targeting foreign investors to compensate for disadvantages such as the existence of a high employment cost burden and/or insufficient labour productivity in the host country. At the same time, governments that are successful in attracting FDI should provide, in addition to various forms of investment incentives, a stable policy environment with predictable and credible public institutions that allow foreign investors to reap country-specific benefits. Therefore, investment incentives can only be considered effective where the business environment in the host country is considered satisfactory for foreign investors. Most developing and transition countries lack the necessary national savings to support their

economic development, so governments use foreign resources to cover deficits. FDI is the major among foreign resources having a positive effect on a country's economic variables such as national income, balance of payments, inflation, productivity and poverty levels. An indirect effect of FDI is to reduce unemployment. In economies with higher unemployment rates national production lags behind due to the inability of efficient use of available resources including human capital. At the same time, unemployment is a risk factor for poverty among the population. In open economies, the solution to the unemployment problem can be implemented through FDI, due to the fact that FDI creates employment opportunities for the population. FDI has both positive and negative impacts on the quantity, quality and location of employment.

The positive direct effect on employment is due to the creation of new jobs by FDI, while the positive indirect effect is due to the creation of jobs in certain regions, which allows for a reduction in regional disparities within the country. The indirect positive effect on employment also influences the migration of the population to large cities. On the other hand, FDI through acquisitions can lead to rationalisation and job losses (negative direct effect) and import dependency or displacement of existing firms (negative indirect effect). FDI also reflects on an increase in the wages on offer, which puts local firms in an inability to compete in wages and attract labour (negative indirect effect). In terms of employment location, FDI creates new jobs in regions with high unemployment (positive direct effect) and encourages migration of supplier firms to other regions, which also creates new jobs (positive indirect effect). However, FDI can also be directed to economically developed regions, leading to population migration and worsening regional imbalances (negative direct effect). In order for the indirect effects of FDI to manifest, various factors are required, which can be classified into three main categories - common factors, domestic economy factors and foreign investor factors. The common factors for the manifestation of indirect effects of FDI occur when the interests of the domestic economy and the investor are the same. Factors related to the local economy are based on the opportunities for investors to acquire different knowledge, including those related to the use of new technologies, managerial experience, know-how, etc. The factors related to the foreign investor are based on his willingness to develop the local economy through FDI. FDI has an indirect impact on labour productivity due to the acceleration of "technology transfer, managerial and organisational knowledge and experience. FDI from highly industrialised

countries can have a positive impact on economy-wide efficiency as a result of increased competition and diffusion of innovation - technological and organisational".

In each economy, FDI is directed to different sectors, which affects its sectoral distribution and gives rise to inequality in labour income. Investors are interested in economically developed cities where much of the production capacity they need is concentrated and the skilled personnel they need are available. The potential benefits to countries from foreign capital in terms of technology transfer, productivity gains and job creation are concentrated mainly in economically developed centres and to a very small extent in less developed areas. The lack of balance of FDI across the country is a prerequisite for differences in employment and income generation of the population in different regions, which leads to widening regional disparities. When entering a foreign market, investors are forced to compete with local firms to recruit skilled workers, which is a prerequisite for increasing the wages offered by transnational corporations.

Conclusion

The impact of FDI on economic development is a consequence of the absorptive capacity of the country in absorbing skills from foreign capital inflows and the impact of these skills on increasing the competitiveness of domestic firms and the use of technology. Although the benefits of FDI are real, they do not accrue automatically. The magnitude of the benefits of FDI is determined by the enabling investment environment created by the host country. Factors that prevent the full benefits of FDI from manifesting in some developing countries are related to the educational attainment of the population, health status, technology development and use by firms, insufficient openness to trade, weak competition and inadequate regulatory frameworks. Conversely, the level of technological, educational and infrastructural advances in developing countries allows for more efficient use of the benefits of FDI. At the same time, despite the real benefits of FDI, there are a number of drawbacks affecting the economies of the countries receiving the investment. Threats from FDI to the host economy arise from the possibility of balance of payments deterioration due to limited profits remaining in the country (although often offset by FDI inflows), potentially damaging environmental impacts, social disruption

due to increased commercialisation in less developed countries, and reaching unfair competition in some markets. In our country, the most intensive increase in the inflow of foreign investment was observed in the period 2000-2007, when the growth of the national economy was also observed, which favoured investment activity. In the period after 2007, there has been an increase in foreign direct investment in our country, with the greatest interest in the real estate sector. The second sector in which foreign investors are interested is manufacturing, despite a period of decline from 2000 to 2009. Investment in the sector is mainly concentrated in the production of food products, beverages, textiles, clothing, footwear, metals and metal products, rubber products and other intangible mineral raw materials. The dynamics of FDI flows follow an uneven geographical distribution, with the largest investments in the non-financial sector in the capital city, resulting in an uneven distribution of its effects across the country. Over the last ten years, foreign investment has been the mainstay of economic growth in the less developed economic regions of the country. Almost half of foreign investment is concentrated in Sofia, with investment mainly in the services sector and a significantly smaller share in the manufacturing sector. Investor interest is mainly focused on outsourcing services, trade and information and communication technology.

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THE EUROZONE VS. THE OPTIMAL CURRENCY AREA THEORY - SURVEY OF THEIR THEORETICAL FRAMEWORKS AND POLITICAL BACKGROUNDS

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***Abstract**: The paper surveys the development of the Optimal Currency Area theory and the Economic and Monetary Union. After a close examination of how Robert Mundell arrived at the former theoretical framework and its further elaboration by several economists, the paper draws the attempts at European economic and monetary unification. Based on the report* One Market, One Money *(1990), the author concludes that the economists of the European Commission did not follow the OCA theory, but used several contemporary monetary and macroeconomic findings to construct the theoretical framework behind the EMU.*

Keywords: Optimal Currency Area theory, Economic and Monetary Union

JEL: E42; E62; N01; N14

1. Introduction

The present report will address the issue of whether the Optimal Currency Area (hereafter OCA) theory is used in the construction of the Eurozone.[*] Hence, we shall deal with the question of whether their theoretical frameworks overlap and if they match at some points whether it was due to a purposeful copying and borrowing, or whether these matches are of accidental provenance. Finally, we will touch upon the issue of the economic theory behind the European Economic Communities (hereafter EEC) and the Economic and Monetary Union (hereafter EMU).

2. Notes on methodology

In the paper, several research methods will be employed. We shall examine the historical background of the OCA theory as well as the theoretical discourse that precipitated its emergence. Next, we will explore the political circumstances and considerations over the twentieth century that led to the emergence of the EMU in 1999. Then, we will investigate the

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report *One Market, One Money* and will relate its conclusions to the OCA theory. Finally, we will present the theoretical advancements of the OCA theory in response to the theoretical discussions among economists, which in turn were following the political processes and decisions in the second half of the twentieth century.

3. Development of the Optimal Currency Area theory.

The OCA theory which caused in-depth discussions among the economists between the 1970s and the 2020s was formulated by Robert Mundell in his seminal study published in 1961. Mundell aimed to assess the arguments of Tibor Scitovsky and George Meade on whether the established EEC would be a successful or unsuccessful economic experiment. In Scitovsky's view expressed already in 1956, a planned common currency would allow greater capital mobility, but more efforts should be placed to legally ease labour mobility within the geographic borders of the EEC. (Scitovsky, 1956, p. 71-91; Scitovsky, 1957, p. 18-44) In Meade's opinion, the post-WWII economic background does not facilitate the emergence of a common currency due to the lack of labour mobility. Hence, a system of flexible exchange rates would be much more appropriate to achieve an equilibrium in the balances of payments and internal economic stability. (Meade, 1957, p. 379-396)

Mundell decided to join this theoretical discussion and examine the economic background behind the optimal currency areas by comparing the economies of the USA and Canada. The future European EMU was foreseen to mirror them. In Mundell's view, optimal currency areas are geographically defined and encompass various states with a shared currency. The first theoretical construct of Mundell was about the OCA with stationary expectations. He defined three terms for its optimal functioning: labour mobility, capital mobility, and flexibility of prices and wages within it. (Mundell, 1961, p. 657-665) Towards the end of the 1960s, Mundell examined the positive aspects of the EEC and single community currency in a lecture given in New York in 1969. (Mundell, 1969) In his third piece of research, he extended the theoretical framework by assessing the terms of optimality in a currency area with international risk sharing. Mundell concluded that the wider zones would better absorb asymmetric shocks than individual countries since they share a common currency. (Mundell, 1973, p. 114-132)

For the present report, I would like to pay attention to Robert McKinnon and Peter Kenen. The former analysed the optimal currency areas in 1963 and proposed the areas' degree of openness and the economy's size are of importance as OCA criteria. He also pointed out that not only the geographic mobility of factors of production is crucial for the OCA functioning but also the industry-wise mobility of these factors. McKinnon argued that if exchange rate changes are used to offset the effects of domestic demand shocks on the current account, price instability is bound to increase in line with the degree of openness (or the share of tradable goods in production) under a floating rates regime. (McKinnon, 1963, p. 717-725) Peter Kenen offered in 1969, one further term an OCA should fulfil. In his opinion, the OCA needs a system for risk sharing and risk transmission such as a shared fiscal mechanism that would redistribute the fiscal transfers across those member-states of the OCA with stationary expectations that are

affected by the deterioration of the terms identified by Mundell in 1961. (Kenen, 1969, p. 41-60) Kenen is important as an economist since he helped the European Commission in writing the report *One Market, One Money* in 1990, which was an evaluation of the potential benefits and costs of forming the EMU. The assessment report was a result of the Delors plan.

Many economists have added other terms of optimality such as flexibility of prices and wages, factors of production mobility, financial market integration, shared degree of openness of participating countries, production and consumption diversification, similar inflation rates, fiscal integration, political integration, and business cycles synchronization of composing states. Mongelli and Simeonov have described these upgrades of the OCA theoretical framework in detail. (Mongelli, 2008, p. 2-3; Симеонов, 2018, p. 116-147).

4. Emergence of the European Economic and Monetary Union

In 1929, Gustav Stresemann proposed the establishment of a European currency that would bring together the winners and losers of WWI as well as a plenitude of new states that emerged after the disintegration of the German, Astro-Hungarian, Ottoman, and Russian Empires. (James, 2012, p. 33) Given the Great Depression and the issues of the gold standard, this idea was left for better times by the League of Nations.

The next proposal for a single European currency was offered by Marius Holtrop, Governor of the De Nederlandsche Bank (1946-1967) in 1957, but the governors of the National Bank of Belgium, Bank of France, and Deutsche Bundesbank insisted that the EEC was not ready for this form of monetary integration. (James, 2012, p. 44) This proposal is contemporary to T. Scitovsky and G. Meade deliberations on the necessary terms for the viability of such a union.

In 1969, the European Commission offered to the member-states of the EEC to create among themselves a monetary union for *greater co-ordination of economic policies and monetary cooperation*. (Commission memorandum, 1969) This report most likely prompted the studies of Mundell and Kenen dated that year. The proposal was followed by the decision of the Heads of State at their meeting in Hague in 1969 to draft a plan in stages to establish it by the 1970s.

The groups of experts headed by Pierre Werner, Prime Minister and Financial Minister of Luxembourg, assessed all ideas and proposals put forward until 1970. In October 1970, the group offered the first tangible plan to lay down the foundations of the European EMU in three stages until 1978. The first stage aimed at the coordination of economic and monetary policies between the member–states, as well as a reduction of their currencies' fluctuations. Following the abolishment of the Bretton Woods system in August 1971, ten industrial countries, namely Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Sweden, the United Kingdom, and the United States reached the Smithsonian Agreement in December 1971, which set bands of ±2.25% of their exchange rate fluctuations against the US dollar. Apart from Luxembourg, all European Economic Community member-states took part in this agreement. Since the imperfection of the established system, the EEC member states and three other

European states reached the Basel Agreement in 1972, which established a system known in Economic history as *A snake in the tunnel* that limited bilaterally the exchange rate margins to 1.125% so that the maximum change of any two currency towards each other would be 2.25%. (Eichengreen, 2019, p. 146–149)

The oil shocks in the 1970s put the European economic and monetary unification project stemming from the Werner Report to a halt. The project was restarted in 1988 when the twelve governors of member-state central banks chaired by the President of the European Commission, Jacques Delors, formed the Committee for the Study of EMU. It aimed at proposing a new timetable and subsequent stages of economic and monetary integration. A year later, Delors submitted a report and outlined the three stages of the establishment of the organisational infrastructure. During each of them, new institutions and organisations were created starting with the European System of Central Banks, continuing with the European Monetary Institute, and ending with the European Central Bank. Stage one (1 July 1990 – 31 December 1993) included the abolishment of exchange rates and capital controls and liberalisation of capital movements within the EEC. The Treaty of Maastricht in 1992 put the establishment of the EMU as a formal aim and introduced several economic criteria for swift convergence of the European economies such as inflation rates, interest rates, and exchange rate stability.

Stage two was marked by the establishment of the European Monetary Institute in the beginning, i.e. 1994, and ended with its transformation into the European Central Bank. To strengthen the convergence criteria, the European Council adopted the Stability and Growth Pact to align the fiscal policies of its member-states in 1997. Next was the calculation of the exchange rate between the euro and the national currencies of eleven countries that covered convergence criteria codified in the earlier strategic documents. Stage three started in January 1999. It is an ongoing process of inclusion of other European Union states into the EMU.

5. *One Market, One Money*'s critical notes on the OCA theory

A follow-up of the Delors report was a report entitled *One Market, One Money* prepared by the European Commission's General Directorates for economic and financial affairs, national economies, and economic evaluation of Community policies. It included their assessment of the benefits and negatives of the European monetary integration. The European Commission specialists received support from a plenitude of external experts working within the national central banks and at the International Monetary Fund. The authors consulted also a plethora of leading economists working in academia who contributed to the report such as Michel Aglietta, Richard Baldwin, Peter Bofinger, Anton Brender, Ralph Bryant, Jean-Michel Charpin, Alex Cukierman, Andrew Hughes-Hallet, Peter Kenen, Willem Molle, Manfred Neumann, Richard Portes, Andre Sapir, Niels Thygesen, Frederik van der Ploeg, Paul Van Rompuy and Charles Wyplosz.

The report made many observations regarding the OCA theory such as that no applicable theory for assessing the costs and benefits of the EMU exists. Despite its promising perspectives, the OCA theory offers a too narrow and anachronistic framework of analysis. The developments in micro- and macroeconomics in the 1970s and the 1980s have not led to a unified theory of monetary unions. Yet, the authors identify the building blocks for a comprehensive analysis of the EMU.

The report expects four major sets of permanent effects from the EMU: on the one hand, the microeconomic efficiency gains from the removal of exchange rate uncertainty and transaction costs would lead to a permanent increase in output; on the other hand, macroeconomic stability effects from the elimination of intra-Community exchange rates and the policy discipline in the monetary and fiscal fields would impact on the variability of output, prices, and other macroeconomic variables. In third place, the regional equity effects would arise from the EMU's distribution of costs and benefits among its member-states and their regions. Lastly, some external effects would come to light due to the wider international role of the European currency unit accompanied by tighter international policy coordination and likely changes in the international monetary regime. In addition to these, two important macroeconomic effects are expected in the transition to the EMU. Firstly, the lack of a unified theory and the diversity of effects involved imply that an attempt to make an overall quantitative assessment of the EMU would be meaningless. Secondly, in comparison to alternative benchmark exchange rate regimes, i.e. financial market autarky and free float exchange rate, the EMU is expected to yield significant benefits. Assessing the risks of instability in Stage I such as the monetary system reverting to some mix of capital controls or reintroduction of the crawling peg as in the early European monetary system, the report asserts that the net benefit of the EMU would only be greater. (One Market, One Money, 1990, p. 31)

Further on, the authors expand their comments on the OCA by pointing out that it is a theory that presumed an interchange between, on the one hand, the EMU benefits arising from monetary integration and, on the other hand, the costs incurred when the exchange rate is lost as an adjustment instrument. They also point out that an actual and complete outline of these costs and benefits is not present in the OCA theory, since some of the benefits are assumed without any further investigation, while others are missing. Furthermore, the report insists that the theoretical framework of the cost analysis is fractional and old-fashioned. The economic theory has evolved substantially with many significant theoretical novelties since the early 1960s, but a revision of the OCA theory has not been performed. Therefore, the report concludes that the analysis of the EMU does not need to be limited to the rather narrow approach of the OCA theory.

The more detailed critical notes on the OCA theory are provided in box 2.3 which encapsulates the main points, as follows: Firstly, Mundell simply assumed the microeconomic benefits of a monetary union without further research being conducted. Secondly, while labour mobility was lower in the EEC than in the USA between the 1950s and the 1980s, physical and

financial capital mobility intensified in this period. Hence, Ingram's argument is still valid that international financial integration is of utmost importance as an alternative adjustment channel for cross-country financing. (Ingram, 1959, 619-632; Ingram, 1973, 1-33) Thirdly, while Mundell's theoretical framework is based on the rigidity of prices and wages, and indeed they possess a feature of stickiness, markets do adjust which is missing in his theoretical construct. Next, inefficiencies are inherent in the flexible exchange rates because of the instability of exchange markets and the non-cooperative or suboptimal policies of individual countries. In fifth place, the OCA theory ignores the issues of policy credibility which are of material significance as emphasised in the macroeconomic theory developed in the 1970s and 1980s. Finally, the OCA theory regards the whole geographic area as a small country in a global world but omits the external effects of monetary integration. (One Market, One Money, 1990, p. 46)

The report reiterates McKinnon's argument that exchange rate changes offset the outcomes of domestic demand shocks on the current account. Price instability tends to increase with the degree of openness in a floating rates regime. Hence, this is why a number of countries with small economies introduced peg and crawling peg systems in the 1970s and 1980s. The Report also reiterates Krugman's argument built upon this observation that the costs of monetary union decrease while benefits increase with the intensity of trade within the geographic area. (Krugman, 1990) Next, it also repeats the main findings of Kenen that depending on the degree of product diversification one may argue that countries characterized by a low degree of diversification should retain exchange rate flexibility to offset product-specific shocks. However, those countries with a higher degree of product diversification, by averaging product-specific shocks, could compensate for low labour mobility. The report insists that in practice EEC countries typically had highly diversified industrial structures in the 1980s.

The report concludes that the OCA theory offers useful points to be critically assessed but it cannot be considered a complete theoretical framework to assess the costs and benefits of the EMU. When the authors of the report applied a number of statistical models borrowed from the International Monetary Fund, they found out that the empirical applications of the OCA theory are scarce and inconclusive. They admitted also that there is no ready-to-use theory for assessing the pros and cons of the EMU since the recent developments in the 1970s and 1980s in micro- and macroeconomics have not led to unified all-applicable theory. These theoretical advancements allow however to distinguish the above-mentioned four major categories of enduring positive effects of such unification. First, they are macroeconomic efficiency gains from the abolishment of exchange rates among the participating states and these will lead to a permanent increase in the output. Secondly, the removal of exchange rates within union member-states will result in macroeconomic stability effects since they have to be balanced by monetary and fiscal policy discipline. These will clearly impact the output, prices and other macroeconomic variables. Next, such a union will have regional equity effects since the costs and benefits of the EMU will be re-distributed among its member-states. Finally, the EMU will have an external effect that will result in a wider international role of its currency in commerce and as a reserve currency.

6. Conclusions

So, we may agree with the analysis presented in the report *One Market, One Money* that the OCA theory is not applicable to the Eurozone since it has a number of flaws and shortcomings. The report also makes it clear that there is no comprehensive theory behind the EMU. The common features between the EEC and the OCA theory are the mobility of various forms of capital and labour, but they were already well articulated in the Schuman Declaration in 1950. The single currency was viewed as a vehicle towards a more complete economic integration.

Table 1. Timetable of European economic and monetary unification political process and the theoretical advancements of the OCA theory

Years	Political process	Theoretical discussion in the economy	OCA theory advancements
1951-1957 1957	From the Treaty of Rome to the Treaty of Paris Marius Holtrop, European Forum Alpbach	Scitovsky, T. (1957) "The Theory of the Balance of Payments and the Problem of a Common European Currency", Meade, J. (1957) "The Balance of Payments Problems of a European Free-Trade Area",	Mundell, R. (1961) "A Theory of Optimum Currency Areas". McKinnon R. (1963) "Optimum Currency Areas".
1969-1974	Werner Report	Mundell, R. (1969) "A Plan for a European Currency". Kenen, P. (1969) "The Theory of Optimum Currency Areas: An Eclectic View". Grubel H. (1970) "The Theory of Optimum Currency Areas". Fleming J. (1971) "On Exchange Rate Unification".	Mundell, R. (1973) "Uncommon Arguments for Common Currencies".
1989-1992	Delors Commission – Treaty of Maastricht	Eichengreen, B. (1990) "One Money for Europe? Lessons of the U.S. Currency Union". Krugman, P. (1990). "Increasing returns and economic geography".	European economy (1990) "One market, one money. An evaluation of the potential benefits and costs of forming an economic and monetary union".

I would like to point out that each time the policy-makers began discussing European Economic and Monetary Unification a number of scholars presented their expert opinions. Thus, Treaty of Rome established the EEC (1957) in a continuation of the Treaty of Paris (1951). It is this process that has inspired the Scitovsky-Meade discussion which in turn provoked Mundell's OCA theory. During the preparation and shortly after the Werner Report (1969-1974) – one finds that many economists such as Mundell, McKinnon, Kenen and others explored the OCA theory as a useful tool for the European Economic and Monetary Integration. When the third attempt at monetary unification was initiated with the Delors Commission, the arguments of Barry Eichengreen (1990) who insisted that EEC is not an OCA when compared with the USA were refuted by the authors of the *One Market, One Money* report who argued

that that the OCA theory is irrelevant to the European EMU and did not engage with Eichengreen's arguments in detail.

Finally, the critical notes of the authors of *One Market, One Money* report serve a lesson as it is indeed an irony of life that Robert Mundell was awarded the Nobel Prize for Economics in 1999 for the OCA Theory rather than for the Mundell-Fleming Model of a small open economy and the Mundell-Tobin effect outlining that the nominal interest rates would rise less than the rate of inflation, despite their extensive outlines in macroeconomic lecture courses.

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DIGITAL ECONOMY AND FINANCIAL RISK MANAGEMENT

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Abstract:

The purpose of this paper is to analyse and systematize the key challenges to understand the role of digital economy and the relationship with financial risk management. The author put forward the provision on the valuation and measurement of financial risk in contexts of digital economy in Bulgaria. The paper mainly aims to examine the influence of digital finance on enterprise financial risk and its mechanism. The results of the study are presented in Figure 2. Moreover, it attempts to analyze whether digital finance corrects the distortion of traditional financial elements and whether it can effectively improve enterprise financial risk and further verify the inclusion and transmission mechanism of digital finance.

Key words: *digital economy, challenges, risk management, innovation, digitalization*

JEL: G2, G32, O16, O32

1. Introduction

"Sustainable finance refers to the process of incorporating environmental, social and governance (ESG) considerations into investment decisions in the financial sector, leading to more long-term investment in economic activities and sustainable development projects," the European Commission states on its dedicated page dedicated to sustainable finance. The concept of sustainable finance represents measures and proposals to attract the financial sector to the green transformation: how to prioritize capital to investments for the development of a new type, a green economy, as well as for the greening of the traditional economy, including industrial production and the energy sector.

In the investment world, sustainability is generally represented by the environmental, social and governance pillars (ESG) (UN Global Compact, 2004). Despite the two terms being used interchangeably, sustainability is rather focused on the impact humanity has on the planet and society while ESG frames the notion in terms of material risks posed by the environmental and social factors to businesses. In the management domain, the discussion is concentrated around the topics of corporate sustainability performance (CSP) and the triple bottom line theory (Popescu, 2021). Impact measurement in the context of sustainable investing can be defined as “the process of measuring and monitoring the amount of change created by an organization’s or an investor’s activities” (OECD, 2020). Existing measurement and reporting tools do not reflect in totality the

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direct contribution of financial investments to sustainability goals. A recent working paper from the OECD suggests four categories for impact measurement in sustainable investment at large: "(1) principles and guidance, (2) frameworks and methodologies, (3) standards, certifications and ratings and (4) metrics and indicators" (OECD, 2020).

The concept of "digital economy", associated with information and network technologies development (Negroponte, 1995). Digital economy is a kind of activity in which the key production factors are the data presented in digital form, as well as the provision of information and communication services. Digital economy as an economic category is associated with the beginning of the process of all-over informatization of the second generation. Information and network technologies themselves served as the basis for the emerging VI technological mode. In fact all sectors of economy and society in terms of digital economy have undergone fundamental changes (Vovchenko et al. 2017). New tools are necessary to implement a model of digital economy. Such tools, for example, can be modern sensors having characteristics of energy efficiency, accuracy, as well as rather small sizes and low manufacturing cost. Digital economy contributes to effective business modernization, but at the same time it has negative effects associated with personnel reductions as a result of general business processes automation.

In the industrial economy the innovation managers appeared only in high-tech companies; and in digital economy the specialists having such competencies appeared in large state-owned companies, commercial banks, construction corporations. In digital economy the innovation can be divided into several types: innovation in processes, innovation in services, innovation in products and strategic innovation. The blockchain technology use based on the contracts' information transparency provides the financial and technology companies with competitive power, as well as reduces the costs of economic agents' contracting, allows managing the companies' operational risks and controlling costs on the network and financial transactions.

Digitalization affects the company's financial risk management in different ways. On the one hand, innovative digital technologies significantly simplify processes, develop tools and methods for detecting and preventing the occurrence of financial risks, but on the other hand, they also provoke the emergence of new risks that are particularly dangerous in the commercial sphere due to possibilities of direct financial losses.

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. Research is based on the review of relevant and available professional and academic literature. The research outlines the trends of (1) Risk management and information technology actually used in risk management; (2) Future perspectives about the use of Big Data; and (3) New risk manager skills.

3. Features of modern global economic

With the rapid development of the digital economy, digital finance, as a financial innovation combining Internet information technology with traditional finance, plays an essential role in the financial risk of microenterprises and macroeconomic operations. Financial and credit and insurance institutions are currently suffering these risks. Introduction of remote banking systems leads to job cuts, federal chains narrowing, offices shutdown, partial dismissal of experienced operational personnel and reduction of offices. The introduction of information and communication technologies of the digital economy changes the commercial banks business processes. For example, banking systems of risk management are developing, tools of borrowers' creditworthiness assessment based on the use of big data are improving, and risk assessment scoring systems are being upgraded in the new format of business processes automation. A comprehensive analysis of the borrowers' economic activity allows predicting possible credit risks and determining more accurately the borrowers' creditworthiness on the basis of information and network tools (Vovchenko et al. 2017).

High differentiation of countries and their macro regions in terms of their technical and technological development level raises rather sharply the issue of the role and place of digitization in the functioning of modern socio economic systems, markets and business entities. "Fashionable" tendencies and trends dictated by digitization start turning digitization into a goal, leading the control loop from the content of the management process to its organizational characteristics. Certainly, the business processes algorithm development and their further digitization contribute to increased productivity; however, digitization itself cannot serve as a source of growth. Undoubted ly, digitization acts as a driver, improves communication efficiency, and can provide efficient use of resources. However, digital technologies introduced into economic circulation should be relevant to the business systems'

goals and objectives. "Digitization for the sake of digitization" creates objective risks of management systems destabilization, which naturally leads to the control loop blurring and reduced potential for sustainable development (Vovchenko et al.2019).

A special feature of the digital economy concept is the use of information and network technologies and innovative methods of e-business in financial sector, government control sector, education system and a number of other spheres. Members of the European Commission rely in their work on the use of South-East Asian countries best practices in the economic system digitalization process development on the basis of the design of information exchange general system on a number of activities with other countries, e.g. Russia, Norway, Switzerland and other countries. In digital economy the tasks of information support for making managerial decisions are aimed at predicting human behavior. The robots-consultants can evaluate informationally all customer's actions and financial operations: savings, loans, early repayment of a mortgage loan, car purchase, securities trading, etc. On the basis of this analysis the robots-consultants can establish connection

between the client's actions and economic situation. Based on the information analysis the computer can predict a model of the client's economic behavior in a particular combination of circumstances.

Data transparency in the digital economy era makes it possible to search for and find reliable information about the probability of risk occurrence and its possible consequences, which affects the efficiency of response and the ability to predict risks. Another advantage of digitalization is a significant reduction in the degree of influence of the human factor on the results of risk analyses. The mathematical and statistical analysis of the possibility of risk occurrence and the extent of caused damage, carried out by robots and artificial intelligence, is carried out using computer technologies that have significantly greater accuracy of the results obtained (Gasparian et al., 2021).

First of all, theoretically speaking, digital finance is a new type of financial innovation which exerts extensive influence on real life and subverts the traditional financial system to some extent. Digital finance uses technologies such as artificial intelligence to establish a data warehouse by improving algorithms and evaluation mechanisms, construct a transparent and information-based credit system, introduce innovative models or tools to enhance the efficiency of capital allocation in the financial sector, and strengthen risk warning and management capabilities. Furthermore, as a key factor affecting the investment and cash flow of enterprises, financing constraint plays an important role in enterprise financial risk. The existing literature holds that financing constraints can reduce enterprise financial risk and digital finance can reduce information asymmetry, thus alleviating financing constraints. Then, financing constraints may be the mechanism of digital finance affecting financial risk (Wang, 2022).

The extended definition of enterprise financial risk is the process in which the probability of enterprise financial distress is constantly expanding. Among them, financial distress is generally depicted as the situation when enterprises are unable to repay their debts. Financial risk derivation mainly comes from the changes of two internal factors, namely, the capital structure and the value creation ability of enterprises. The competitive environment and regulatory environment are external factors of enterprise value creation, naturally constraining or improving the changes in its financial risk. In addition, transaction constraints, information constraints, and political or administrative constraints can also cause enterprise managers to encounter obstacles when implementing their preferred policies (Wang, 2022).

Digitalization of financial activities also contributes to the strengthening of two standard risks for the financial system, namely, liquidity risk and credit risk. Liquidity risk is associated with the evolution of enterprises engaged in high-frequency trading. Credit risk may be associated with the development of crowdfunding. The main problem consists in the amount of funds raised in this way. At the moment, these are small financial flows, but in the future, the volumes may grow due to the popularization of crowdfunding platforms. Regulatory agencies will have to ensure that the development of these financing channels does not pose a threat to financial stability, as well as to

the legal security of individual investors. For example, future risks may lie in the lack of guarantees of the security and sustainability of crowdfunding platforms through which financial payments are transferred. Consequently, platforms will be required to provide Internet users with all the information necessary to evaluate investments (Gasparian et al., 2021).

Big Data already existed at the end of the 1990s and has spread enormously in the 21st century, becoming, in the current context, a key element for modern business. Companies all over the world are exploring these large volumes of highly detailed data to discover previously unknown information that is useful in improving the decision-making process (Hasnat, 2018 and Dicuonzo et al., 2019). In 2015, the United Nations Department of Economic and Social Affairs classified Big Data into three categories according to the different sources from which it derives: Data from social networks, including information from social media, messages and research conducted on the internet; data from traditional systems of business, such as that generated by commercial trade transactions, e-commerce, credit cards and medical records; and data from the so-called Internet of Things (IoT), referring to machine-generated data, such as that concerning weather and pollution, data from GPS satellites and data from computer-based registers. Many researchers note that technologies relating to Big Data are applicable in many areas of the banking sector, including retail (bank collections, credit cards, private banking), commercial (credit risk analysis, customer and sales management, middle market loans), capital markets (negotiation and sales, structured finance) and asset management (wealth management, management of capital investments, global asset reporting, analysis of investment deposits) (Dicuonzo et al., 2019).

Digital technologies, tools, and new methods of data analysis are gradually being implemented into all types of economic relations. The ambiguity of the digitalization process lies in the fact that, along with the convenience and benefits, it brings new risks to the business that entails the possibility of adverse consequences for the company which may lose its income or assets. It is impossible to completely avoid the risks that appear in the course of the digitalization of the economy since digitization penetrates more actively and fully into various spheres of life of society and business over time. Innovations in the field of technology have a great impact on the development trends of the financial system. In recent years, the largest percentage of global innovation has been associated in one way or another with the development of digital technologies. An increase in new applications being developed from year to year simplifies the possibility of making contactless, instant, mobile payments, investment consulting, data management and information storage, asset management, and informing various participants in financial and economic relations about the status of their assets (Gasparian, 2021).

The recent financial crisis and the continual modifications made to the regulatory framework have led to the diffusion of new models of risk management in the financial sector, especially in light of the move from strategies based on the observation only of losses that have already occurred (incurred loss) to those characterised by the preventive evaluation of risks with a forward looking approach based on expected losses (IFRS 9 – Financial Instruments).

Thus, the measure of financial risk in this paper is the change of return on assets. Financial risk is treated as a negative change (reduction) of return on assets (in the considered period compared to the previous period). The essence of investment according to the existing approach to financial risk management amid the economic crisis is shown in Table 1.

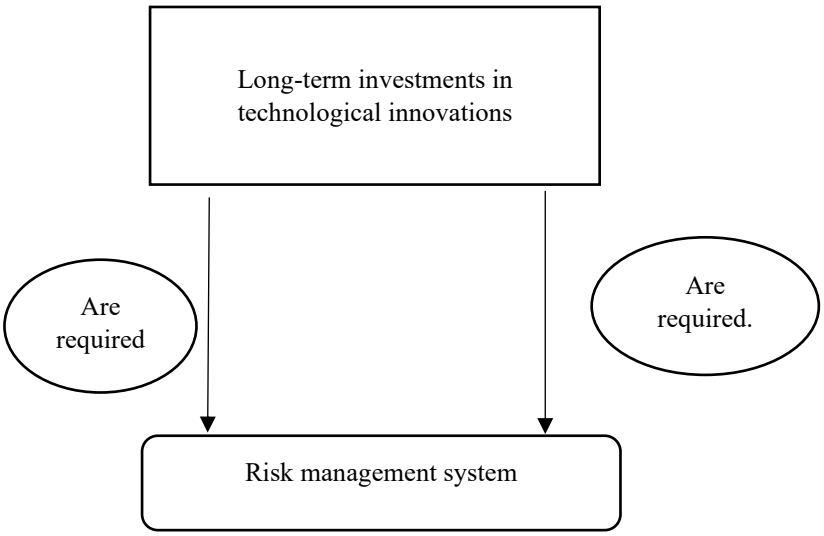
Table 1. Elements of financial risk management

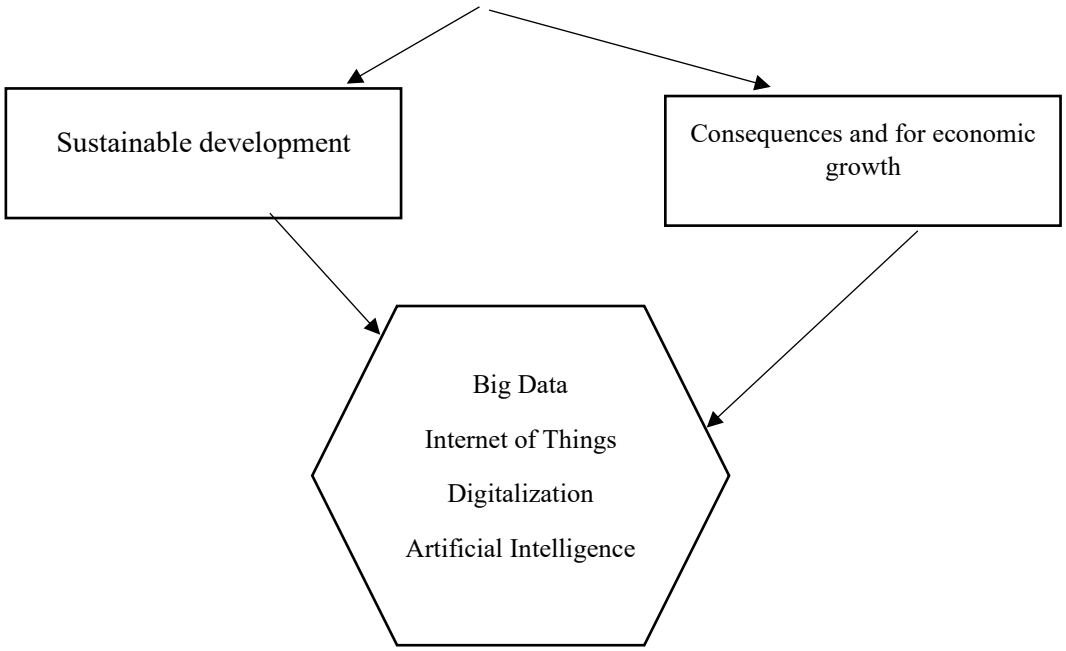
Parameters of investments	Manifestation of the existing approach to financial risk management
Mechanism of investing	venture investing
Object of investing	technological innovations
Type of investments	commercial investments
Period of investing	short-term
The scale of investment projects	small-scale investments
Supported SDGs within the investment projects	SDG 8 (economic growth) SDG 9 (industry, innovations

Source: Prepared by author on the base Yankovskaya et al., 2022

As shown in Table 1, according to the existing approach to financial risk management, the parameters of investments that have to ensure the crisis resolution are preference is given to venture investments in technological innovations since they have the highest potential to increase the rate of economic growth and Investment projects are of a small scale since investors do not possess large financial resources and/or reduce financial risks through the diversification of the investment portfolio. The consequences of investments, according to the existing approach to financial risk management amid an economic crisis and taking into account the theory of investments and the theory of sustainable development, are shown in Figure 1.

Figure 1. Financial Risk Management and sustainable economy in digital era





Source: Author

According to Figure 1, during the new (alternative) approach to financial risk management amid the economic crisis, which is based on corporate social responsibility, long-term, large-scale investments in social and ecological innovations are made, which require positive consequences for sustainable development. One of the most probable scenarios with the new approach is the combination of positive consequences for sustainable development and economic growth, which is a sign of high effectiveness and preference of the proposed new (alternative) approach.

4. Digital economy in Bulgaria– challenges

The most effective ways to reduce risk in the context of instability of the economic and political situation in Bulgaria are the scenarios method and the method of analyzing hierarchies, as well as diversification, i.e. the distribution of risks among several business participants. The existing need to ensure continued growth in the efficiency of companies' performance during the period of active digitalization of financial activities creates the need for timely detection, identification, minimization, and reduction of financial risks to ensure their manageability at all organization's levels. The general public all in all less digital skills than the European average with only 29% having basic skills compared to 56% EU-wide. Quite often, the use of digital services almost always depends on the amount and quality of the digital services which are being offered. On that account, Bulgaria unfortunately has a lot of catching up to do with the European average. Hardly any companies in Bulgaria are using digital services, platforms and channels (Waack, 2022). The main challenges facing the digital economy in Bulgaria and results are presented below.

4.1. Basic characteristics and challenges

The digital transformation has huge potential for economic growth. Bulgaria can build on its strengths in advanced digital technologies and its strong presence in traditional sectors, to take advantage of the opportunities offered by technologies such as 5G networks, Internet of Things, big data, robotics and artificial intelligence, blockchain, 3D printing, and others. This will enable us to take a share of emerging markets for the products and services of the future.

Currently, companies in Bulgaria do not take full advantage of new digital technologies and innovative business models. The state of industry digitalisation varies in different sectors, especially between high-tech and traditional sectors. In order to ensure rapid digitalisation of the economy, every enterprise should be able to implement solutions that support the development, testing and experimentation of new products and services based on digital technologies, including artificial intelligence. Particular attention should be paid on improving the access to advisory services and financing for high-risk innovative start-ups, both in the early stage of their development and in their scalability /growth.

The Bulgarian industry's future is in the digital transformation, which is the essence of the current industrial revolution. The digital technologies enter in an intensive manner in all sectors of the world economy and society, and traditional relationships in the physical world are largely characterized by a digital dimension. The rapid development and innovation in the digital field create economic opportunities for innovation, growth and employment and make people's lives easier.

Industry and its interaction with the services sector occupies a large share and plays an important role in the development of Bulgaria's economy. This synergy should be supported by facilitating investment in new technologies and accepting the changes that have taken place as a result of the increased digitalisation and the transition to a low-carbon and circular economy.

The concept for digital transformation of the Bulgarian industry (Industry 4.0), as well as other documents under development such as the National Strategy for Small and Medium Enterprises (SMEs) in Bulgaria for the period 2021 - 2027, provide goals and measures to support industry and small and medium enterprises for implementation of products, technologies, business models and processes from Industry 4.0.

In the draft National Strategy for Small and Medium Enterprises (SMEs) in Bulgaria for the period 2021 - 2027, one of the 6 priority areas in it is "Digitalisation and skills". The envisaged measures are focused on supporting the digitalisation of enterprises, including onmastering advanced digital technologies and related technologies. SMEs should also be supported to digitize their products and services, to develop new ones, to train the entrepreneurs and employees to develop digital skills. The indirect measures for digitisation of enterprises are the support for builging and development of the environment and infrastructure for SMEs, such as incubators, accelerators, hubs and clusters.

The main directions for reaching the average European level for the penetration of digital technologies in the Bulgarian economy and society, set in the draft Strategy for Digital Transformation of the Economy are[2]:

- ✓ Improving the cooperation between businesses in the field of ICT, industry, science and government, by orienting research to the Industry 4.0 technological trends and fostering opportunities for participation in various international initiatives in the field of digitalisation;
- ✓ Technological renewal of the Bulgarian industry, by establishing models for exchange of experience, good practices and implementation of new business models;
- ✓ Building human, scientific, organizational and institutional capacity for the development of Industry 4.0 in Bulgaria, by increasing the digital skills and adapting the qualification systems to the new technological challenges;
- ✓ Fostering the use of artificial intelligence technologies in the Bulgarian industry (MTC, 2020).

Since 2014, the European Commission has monitored Member States' progress in digital and published annual Digital Economy and Society Index (DESI) reports. Each year, the reports include country profiles, which help Member States identify areas for priority action, and thematic chapters providing a EU-level analysis in the key digital policy areas. The DESI Index ranks Member States according to their level of digitalisation and analyses their relative progress over the last five years, considering their starting point. Bulgaria ranks 26th of the 27 EU Member States in the European Commission Digital Economy and Society Index (DESI) in 2022. Bulgaria's DESI score grew at an annual average of 9% over the past five years. Given the positioning of Bulgaria, this growth rate is not sufficient for the country to catch up with the other EU Member States (EC, 2022). On the business side, the adoption of digital technologies by SMEs remains almost half the EU average. Only 6% of Bulgarian enterprises use big data, 10% cloud and 3% artificial intelligence (AI), as opposed to the EU 2030 targets of 75% for each technology. To support business digitalisation, Bulgaria is making use of European Digital Innovation Hubs. Four European Digital Innovation Hubs proposed by the country received a successful evaluation result and another eight proposals got a Seal of Excellence. The Integration of digital technology in business activities remains a weakness for Bulgaria as it ranks 26th among EU countries. The adoption of cloud services (10%), AI (3%) and big data (6%) by enterprises are all among the lowest in the EU. Only 25% of SMEs have a basic digital intensity. They are lagging behind also in online selling as only 10% of SMEs sell online, around half the EU average.

The challenges, confronting the digital economy in Bulgaria are:

2 This area of impact corresponds to priority 3 "Intelligent Industry" in the National Program "Bulgaria 2030". The actions envisaged will contribute to the implementation of certain aspects of Goal 8 "Stimulating sustainable, inclusive and sustainable economic growth, full and productive employment and decent work for all", as well as Goal 9 " Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation" from the UN Sustainable Development Goals.

- ✓ The development of the digital technologies and their penetration into all spheres of the economic and social life enforces a rethinking of the approach to exploiting their exceptional potential to increase the competitiveness of the Bulgarian economy, increasing demand and supply and efficiency of public services and successfully overcoming the main social challenges in the period up to 2030.
- ✓ The accelerated digital transformation is a prerequisite for the anticipated development of industry production, for economic growth, and increasing incomes.
- ✓ The digital transformation, along with the European Green Deal, is also a key priority at European level.
- ✓ The integration of modern technologies with simple solutions is the ideal combination that will make our country intelligent, competitive and sustainable. The adherence to technological neutrality trough regulatory actions ensures citizens and consumers interests protection Cybersecurity at the design stage.

4.2. Results and discussion

Lackovic et al. (2016) develop a framework in which they suggest the use of Big Data in each of the four key risk management activities (identification, assessment, management and control, and reporting). The framework can be articulated as follows:

1. Risk identification: Identification of new sources for the early identification of risks and in-depth knowledge of customers;
2. Risk assessment: Analysis of underlying information through the calculation of various risk indicators, real-time simulation of risk indicators and predictive analysis for all typologies of risk;
3. Risk management and control: Reputational risk management, operational loss forecasting, compliance management and real-time control of financial risk; and
4. Reporting: Real-time creation of reports, calculation of risk exposure on request, increased transparency and real-time stress tests (Dicuonzo et al., 2019).

The adoption of Big Data in risk management can create an important competitive advantage. However, the management of a highly variable amount of data in real time requires not only new tools and methods, but also the broadening of IT, statistical and mathematical knowledge, mainly oriented to quantitative analysis of data to interpret and transform it into high added-value information. Recent investments in technological infrastructure have modified the activities of the risk managers and the IT staff who deal with the new software and computer systems. This has required the development of new knowledge and skills essential to the conversion of data into a strategic resource.

The risk management function developed, on the basis of the available information, innovative internal predictive models (predictive analytics) of the evolution of the economy, financial stability and the measures that are characteristic of banking and other financial activity, such as default and

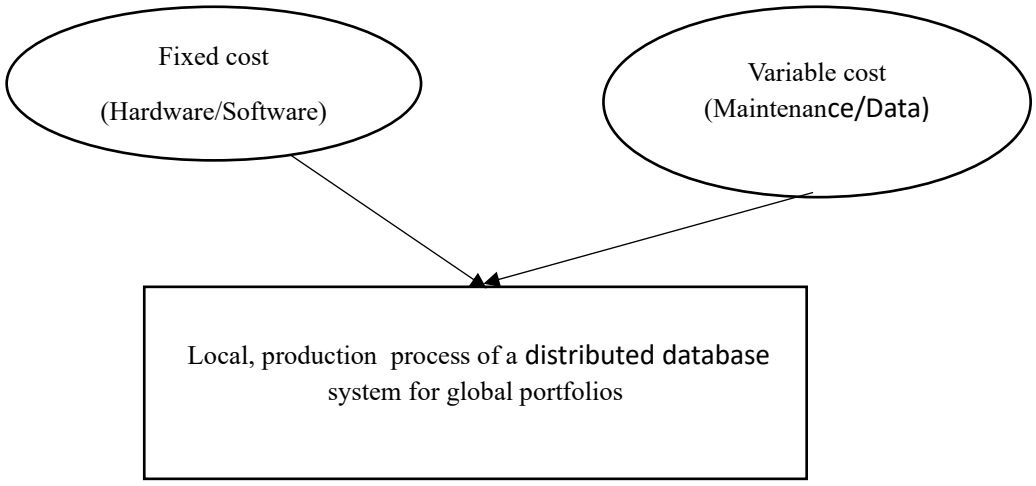
credit. Such estimations are reported in official documents provided to the supervisory authorities with a detailed indication of the calculation methods. The data analysis tools available to the bank support the decision-making process as they can propose operational and strategic solutions (prescriptive analytics). This data management is more developed than was originally intended and it has a very wide range of uses and is the basis of all the typical quantitative analyses: Risk assessment, forecasting analysis, stress tests and testing and development of models of whatever nature and form. The greatest benefits of such sophisticated data architecture are mainly found in credit, operational and financial risk management and in the controls in the Markets in Financial Instruments Directive (MiFID).

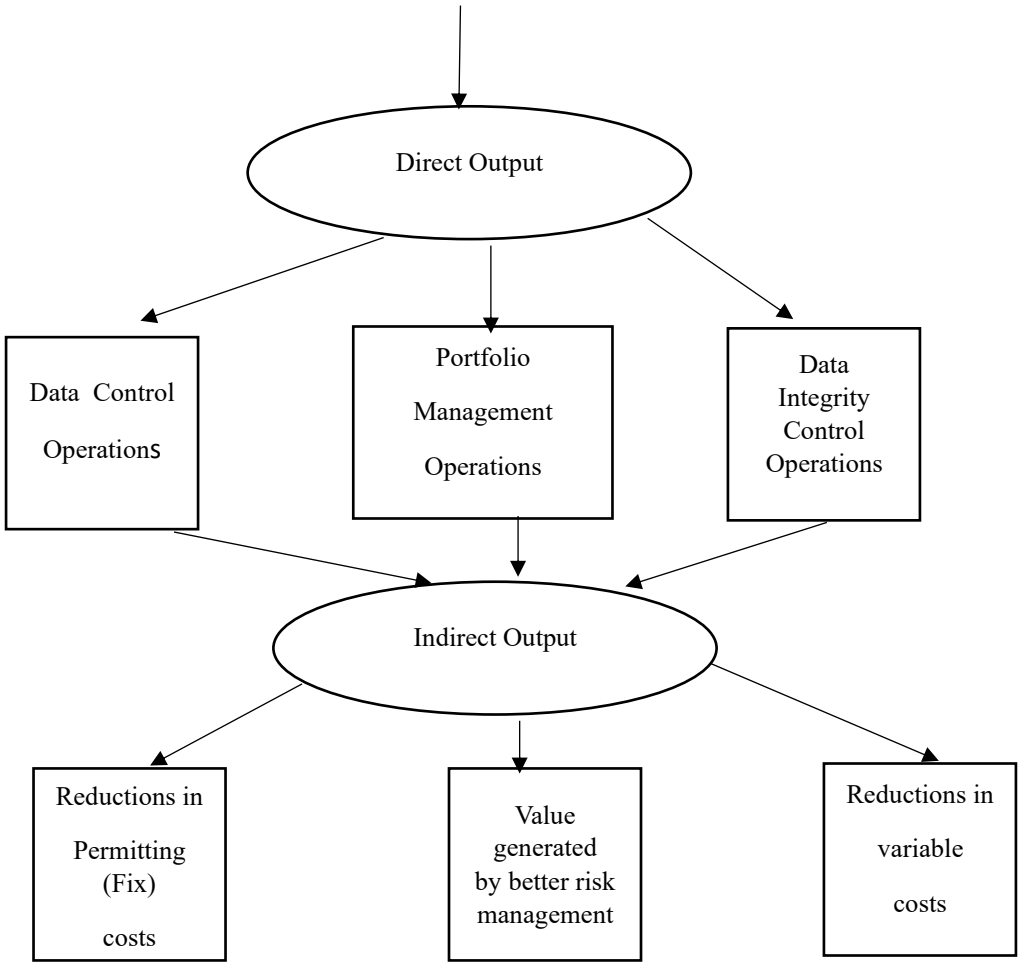
Regarding organisational changes, the adoption of BDA is still at an embryonic stage, even though data management systems with better analytical capabilities—especially predictive and textual analysis—have been introduced. From the case study, it emerged that the adoption of innovative technologies for the acquisition and monetisation of all sources, both internal and external, and the subsequent construction of a shared platform first affected the risk management area, as it is important to capitalise on the information in the formulation of strategies and techniques for the management and coverage of risky events and to exploit possible opportunities.

Figure 2 provides an illustration of a linkage for a distributed object-oriented database system for managing global portfolios. The system has four possible intermediate production processes from which business value can be realized indirectly. These four production processes are: data hiding control operations, data integrity control operations, portfolio management operations, and data mailing operations.

To manage risk, a firm typically has to incur several types of costs, including faed, variable and opportunity costs. Fixed costs include investments in systems. If a new risk management system involves complete replacement of existing hardware, it may not be preferred over one which uses existing equipment, even if the latter system does not provide as good performance.

Figure 2. Algorithm for introducing risk management system.





Source: Author

Variable costs include costs of periodic input data feeds, preventive and break-down maintenance, and of software updates, etc. Variable cost is dependent on the amount of service requested. For example, data feeds may be available in several forms: on-line reports; batch reports; daily reports; and monthly or quarterly reports. The actual cost of the data will usually vary (Bansal et al. 1992).

5. Conclusion

The digital transformation affects all aspects of the economy, society and government. Its success and full opportunities utilization depend on the existence of a comprehensive state approach in the making, implementation and monitoring of the policy in this area. The coordination of efforts between state institutions at all levels of government, as well as the active involvement of all key

stakeholders, including the business community, trade unions, civil society and the technical Internet community, in this process, is crucial. Thus, a conclusion can be made that the ratio of risks and expansion prospects of the digital economy is determined by the level of development of core competencies for the digital economy, which means that the focus is naturally shifted to the centers of competencies and their ability to ensure formation of the desired constructs of the human capital proper ties within research groups.

The sectoral and horizontal policies affected by the digital transformation and the relevant strategic documents concerning their implementation should be linked, updated where necessary and closely coordinated in order to ensure their mutual assistance and maximum synergy. This document offers an effective policy framework for the development of the digital transformation in Bulgaria.

With the rapid development of the digital economy, the changes brought about by digital finance have had a huge impact on the development of traditional finance. The main conclusions are as follows. First, the development of digital finance can significantly reduce enterprise financial risk. Second, digital finance reduces enterprise financial risk by alleviating the financing constraint, which is a crucial mechanism for digital finance to reduce enterprise financial risk. Third, for enterprises with low debt levels and enterprises in the eastern region, digital finance plays a more significant and stronger role in reducing their financial risk.

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GLOBAL SANCFLATION AS A REFLECTION OF THE IMPACT OF SANCTIONS AGAINST RUSSIA TO INFLATION: SOME (IM)POSSIBLE COMPARISONS

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***Abstract**: The paper reflects some thoughts on the nexus between the sanctions against Russia and the global inflation rates since February 2022. The paper sets the following objectives: 1) to bring out and define the term sancflation, and 2) to search for other cases of similar global impact of the sanctions-inflation nexus. The thesis statement is that sanctions on Russia are unique and have global economic effects (including inflation) far greater than anything seen before. The global impact evaluation of Russia's case should prompt a reconsideration of sanctions as a policy instrument.*

***Keywords**: global sancflation, sanctions, inflation, the militarization of finance; global political risk*

***JEL**: F01; F51; F52; F530*

1. Introduction

Inflation is an economic phenomenon that requires political means in order to deal with. It is broadly defined as the tendency for prices to rise. The changes in the inflation rates are one of the first visible (tangible) impacts of any economic disbalances caused by political tension and turmoil, especially by war and sanctions. The surge of global inflation rates in 2022 has a multitude of interconnected factors behind it. The inflation increases coincided with the sustained economic recovery from the COVID-19 pandemic and initially were mainly driven by energy prices, but then quickly became broad-based across consumer goods. Furthermore, the upward shift of energy prices indirectly increases consumer prices via higher input costs for food, non-energy industrial goods, and services. Some observers noted that euro area inflation "started to increase in 2021 well above the inflation target of the ECB and reached unprecedented levels of more than 10% in 2022", and that in 2022, the Russian war against Ukraine "put additional upward pressure on energy prices, in particular on gas and electricity" (Gern, Jannsen, Sonnenberg, 2003:13).

Evidently, the Russia-Ukraine war exacerbated global inflation producing a series of compounding issues/effects such as rising energy and food prices, fiscal instability, consumer

insecurity, etc. The large-scale sanctions on Russia contributed to an additional global inflation rise. Although it's difficult to measure the exact surplus on the headline inflation added by the war sanctions' impact, their triggering effect is obvious.

The current paper takes for granted the sanctions-inflation nexus and uses it as an explanatory tool for the global impact of sanctions imposed on Russia because of its special military operation in Ukraine. Other cases suitable for possible comparisons are reviewed. The sanctions against Russia and their global impact are so unique that it is appropriate to conceptualise this case in terms of sancflation, a term specially designed for the purposes of this paper. In line with this, the paper sets the following **objectives**: 1) to bring out and define the term **sancflation**, and 2) to search for other cases of (at least) similar global impact of the sanctions-inflation nexus.

The main thesis statement is that the unprecedent for their kind and scope sanctions on Russia gave a significant push to the inflation crises of 2021/2022 turning it into a global phenomenon. What is peculiar in this situation is that some countries (the sanctioning ones) are experiencing much worse inflation levels than others. According to the data reported by the IMF, the eurozone, the United Kingdom, and the United States[1] all saw inflation levels surpass eight percent by the spring of 2022 (IFM, 2023b).

The theoretical framework of interpretation combines the following theories and concepts: *(1) quantity theory of inflation*; (2) *nexus sanctions-inflation concept*; and (3) *weaponization of finance concept.*

The quantitative theory of inflation (recently perfected by the University of Chicago economists' group) is chosen, because it highlights the role of the inflation process of the major components (1) the amount of money in circulation, and (2) the psychology (hope) of the public regarding the rise in prices (expectations). The rate of inflation is determined by the increase of the amount of money circulating and by the psychology (expectations) of the public regarding future price increases (Fahlevi, Ernayani, Lestari, Hubur, Wahyudi, 2020). *The sanctions-inflation nexus* has been examined both theoretically and in practice in many cases. For the purposes of the report, we rely on the case of sanctions on Iran (Dasgerdi, Yusof, Shahbaz, 2018; Majidi, Feghe, Zarouni,

[1] By comparison, although inflation in Japan and China is rising, it has clearly not reached the level of other economies. (IMF, 2023b).

2016) where some similarities with the current case of the sanctions on Russia are possible to be found. The attempt to conceptualize the uniqueness of sanctions on Russia and their global impact is backed up by *the concept of weaponization of finance* (Bilotta, 2022; Mulder, 2022a,b).

The theoretical framework constructed in this way establishes only some of the possible perspectives for explaining the phenomenon of sancflation and does not claim to be exhaustive. Each of them (theory or concept) highlights certain aspects of the sancflation phenomenon, and each theory is not a complete /inflation theory/ that covers all important aspects of the price increase process.

The methods applied for developing the research idea are the following: *(1) case study analysis; and (2) comparative analysis of historical analogies. The case study analysis* is considered to be an appropriate method because it facilitates the identification of the specific features of the research subject and underlines its distinctive characteristics. The use of *historical analogies* for *comparative analysis* aims to identify other cases with similar characteristics and distinguish the differences.

2. The global sancflation concept

Technically the term "sancflation" is a result of a purposeful play on words following the logic of formation of the well-established economic theory term "stagflation" and the recently emerged terms of "shrinkflation" and "greedflation"[2], or even "putinflation"[3]. As an idea and concept, the term sancflation is intended to denote a specific kind of global inflation initially induced by Russia's special military operation in Ukraine and additionally triggered by the immediate international sanctions on Russia. Its negative impact is globally manifested and has a more significant effect on the sanctioning countries than on the targeted one. The sancflation consists of, induced by the sanctions on Russia, inflation rates and superimposing them over the headline global inflation (see. fig.1).

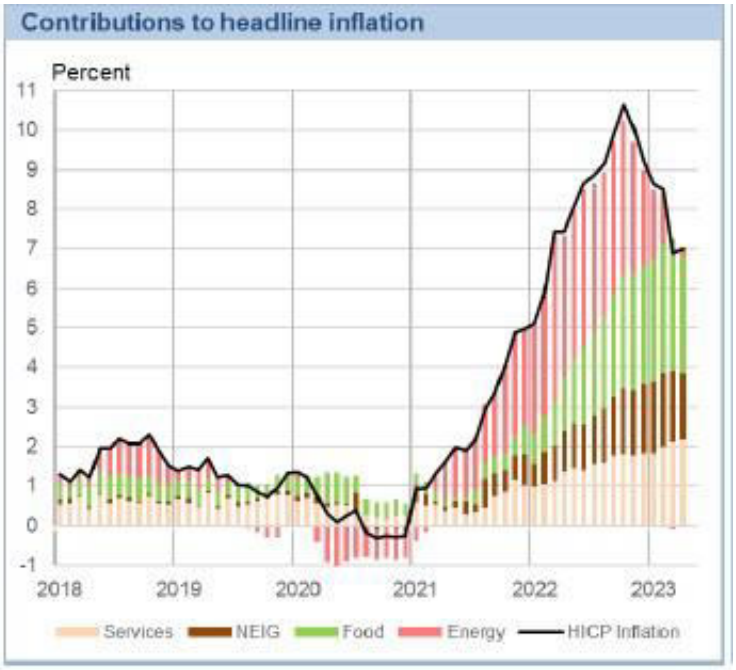
[2] **Shrinkflation** – refers to the reduction in quantity or quality of a product while the price remains the same. **Greedflation** – refers to a price rise introduced by companies to take advantage of inflation and boost their profit margin, even if they do not need to. Production costs have not risen enough for price increases to be justified. Greedflation becomes possible because, in a context of widespread inflation, the prices rise does not usually surprise customers. These concepts have become more prominent during the current period of inflation brought about by the Covid-19 pandemic and, subsequently by the war in Ukraine. See: https://www.reactev.com/blog/what-is-shrinkflation-greedflation

[3] Introduced by Bloomberg https://www.bloomberg.com/news/articles/2023-04-12/blamed-for-putinflation-abroad-russia-is-now-seeing-prices-dive#xj4y7vzkg

The phenomenon of sancflation is unique in scope – as the inflation heightens up across many areas of the globe, "even in regions that have not witnessed high inflation for decades" (IMF, 2023b). There are a multitude of interconnected factors behind it, but for the purposes of the paper, we stress on sanctions as an element of the gradually intensifying process of weaponization of finance.

The global sancflation is at the same time cost-push inflation and demand-pull inflation. Demand-pull inflation is caused by the increase in government spending funding by printing money and/or an increase in foreign demand for export goods, and cost-push inflation is due to rising prices of production facilities imported from abroad and the rising fuel prices. Of course, in practice, both types of inflation are rarely found in their pure form and the inflation that occurs in various countries in the world is a combination of those two types (Fahlevi et all, 2020:2070), but in the case of sancflation, both strengthen one another.

Figure 1: Contribution of sanctions to the headline global inflation



Source: Gern, Jannsen, Sonnenberg, 2003:14

As vis a vis the origin[4]– the sancflation belongs to the "imported" type of inflation – inflation that arises due to a rising process (namely inflation) abroad or in the countries of our trading customers. In summary, the imported inflation works at the same time as cost-push and demand-pull inflation. When the prices of imported goods increase – this (1) directly increases the cost of **living index** because some of the goods included in it come from import and (2) indirectly raises the **price index** through rising production cost (and then, selling prices) using raw materials or machinery that must be imported (cost-push inflation). At the same time increased prices of imported goods (3) indirectly lead to an increase in **domestic prices** because there is a possibility (but this is not the case) that the increase in price of imported goods causes an increase in government spending. trying to offset the increase in import price (demand-pull inflation). Fahlevi argues that "transmission of inflation from abroad into the domestic economy is clearly easier to occur in countries that economies are open, namely the country that the international trade sectors are important (such as Indonesia, Korea, Taiwan, Singapore, Malaysia and so on)". But how far the transmission occurs also depends on government policy taken. With certain monetary and taxation policies, the government can neutralize the inflationary trends that originate from abroad (Fahlevi et all, 2020:2071).

The sancflation can be conceptualized also in the political risk framework. It possesses the main characteristics of that specific kind of risk deriving from the global political environment and affecting not just international business, but the global economy as a whole. After the Covid-19 pandemic, the sancflation is a second phenomenon pushing up global inflation and impacting all countries' economies. Inflation is an economic phenomenon requiring political means to deal with it.

[4] There are three types of classification of inflation based on three types of criteria. The first classification differentiates the inflation according to its "severity": mild (under 10%); moderate (between 10% - 30% a year); severe (between 30% - 100% a year); and hyperinflation (above 100% a year). The second classification is based on the initial cause of inflation: inflation arising from public demand and inflation arising from an increase in production costs. The third classification is based on the origins of inflation – domestic or imported from abroad. See: Fahlevi et all, (2020), p. 2070

3. Some (im)possible comparisons

The uniqueness of the case of the current sanctions against Russia stands out in the search for possible comparisons along the following lines: *(a) the international status (political and economic) of the target country; (b) the scope and stringency of the sanctions; (c) the impact of the sanctions*.

(a) the international status (political and economic) of the target country. For the first time in the 21st century, the international sanctions target such a **large economy**. Russia is the world's 11th largest economy which gives it a structurally significant position due to its role as the prime commodity exporter among emerging markets. Among advanced economies, only the United States, Canada, and Australia have a comparable footprint in global energy, agriculture, and metals markets. Russia is a very **open economy**, with a trade-to-GDP ratio of 46 percent, according to World Bank data. Among the seven largest emerging markets, only Mexico and Turkey had higher shares in 2020 (78 percent and 61 percent) (Mulder, 2020 b:21). The main reason for the economic openness of Russia is the advancing integration, since the end of the Cold War.

Some possible comparisons in terms of the target country's status in the world economy can be found in the late 1930s. The closest of them are Italy in 1935 and Japan in 1939.

Italy 1935. According to Mulder, in the past century, the 1930s is the only decade that offers approximately similar precedents for sanctions against states with a similar weight in the world economy. One of them is Italy. Within six weeks of Benito Mussolini's invasion of Ethiopia in October 1935, the League of Nations crafted a sanctions package against Italy, at that time the world's eighth-largest economy. It was implemented by 52 of the roughly 60 sovereign states in the world at that time[5].

Japan 1939. Japan was the world's seventh-largest economy in the late 1930s and a trading state even more open than Italy, targeted by international sanctions between the summer of 1939 and August 1941. They were imposed by a growing coalition of Western states seeking to restrain the Japanese war of conquest in China. The imposed sanctions gradually diminished the number

[5] For this data, Mulder refers to Bayer (1976).

of available trading partners of Japan at the onset of World War II. The British Empire and its colonies and dominions in Asia and the Pacific (India, Australia, New Zealand, and Canada) restricted their exports to Japan of strategic raw materials and prioritized them for intra-imperial use (Mulder, 2020 b:21).

(***b) scope and stringency of sanctions.*** Another interesting line of possible comparison is the scope of sanctions. In the case of **Italy 1935**, the measures included an arms embargo, a freeze on financial transactions, and export prohibitions on a number of raw materials vital for war production. But the most significant measure was a ban on all imports from Italy. This was possible because the Italian economy's structural current account deficit meant that such a ban hurt Italy more than it did the sanctioning states (Mulder, 2020 b:21).

Sanctions against **Japan 1939** consisted of restrictions on the export of raw materials (especially oil, iron ore, copper, and scrap metal) on the import of which the country was extremely dependent at that time. Even more than the United States – the largest Pacific economy that remained neutral at the launch of World War II. In response to the Japanese conquests in 1940 and 1941, the United States gradually escalated its economic restrictions on Japan. The sanctions' culmination is the imposed full oil embargo, together with the British Empire and The Netherlands and the freeze of yen reserves held in the United States (Miller 2007).

The sanctions against **Russia 2022** are unprecedented in scope and consist of a wide array of legal, commercial, financial and technological restrictions which drastically impeded Russia's access to the world economy. Much more – the sanction against Russia took the shape of a real financial war with the decision by the US and Europe to disconnect select Russian banks from the Society for Worldwide Interbank Financial Telecommunication (SWIFT) and to freeze Russia's foreign reserves. According to Bilotta, this "might have significant, long-term effects on the international monetary system". While transformations in this system have historically been slow to materialise, the range and scope of the recently deployed sanctions will likely catalyse in a global push to diversify from the US dollar-centric global financial system (Bilotta, 2022). Russia is the first G20 country – and formally a G8 country – to be targeted by this financial set of sanctions.

The most dramatic and market-sensitive measure — sanctioning the Russian central bank itself by freezing a large part of Moscow's $643bn of foreign currency reserves is equal to effectively "declaring financial war on Russia". Financial analysts recall that the US has sanctioned central banks before — North Korea, Iran and Venezuela — but they were largely isolated from global commerce. The uniqueness is that the sanctions on Russia's central bank are the first time this weapon has been used against a major economy and the first time as part of a war — especially a conflict involving one of the leading nuclear powers (Pop and Fleming, 2022). Analysts refer to the Official Monetary and Financial Institutions Forum, a central bank research and advisory group, according to which "around two-thirds of Russia's reserves are likely to have been neutralized" (Pop and Fleming, 2022).

As to the stringency of sanctions, we may refer to the case of **Iran, North Korea** and **Venezuela**. Mulder argues that they are "more stringent than those aimed at Russia, but these countries have much less weight in the global economy and international trade" (Mulder, 2020 b:20). For this reason, the nexus sanctions inflation reveals only in the target countries.

(c) the effects of sanctions. In the case of **Italy 1935**, international sanctions succeeded in producing the desired harmful effect on the target country. According to the data presented by Mulder, from October 1935 to June 1936, Italian industrial production fell by 21.2 percent, while in the first five months of sanctions, exports plummeted by 47 percent before stabilizing at roughly two-thirds of their pre-sanctions level (Mulder, 2020 b:21). This sanction had a significant inverse spillover effect on sanctioning countries. The League's ban on imports from Italy drove up international prices for foodstuffs such as meat, fruit, and butter as well as raw materials and manufactures such as wool, textiles, and leather goods. Ristuccia argues that crucially, the sanctions failed to stop the Italian conquest of Ethiopia, in large part because the United States and Germany, the world's largest and third-largest economies, were not League members and did not join the sanctions. As a result, Italy continued to import coal and oil and managed to withstand eight months of serious hardship (Ristuccia, 2000:97).

The sanctions against **Japan 1939** damaged seriously the country's economy. By late 1941, Japan's trade had fallen by 20 to 25 percent in just 18 months (Mulder, 2020 b:21). Faced with a

collapse of its access to key imports, Japan attacked the United States and European colonies in Southeast Asia to secure the raw materials it needed to sustain its war machine. Whereas Italy had borne the brunt of embargoes against its exports, which reduced its ability to earn foreign exchange, Japan was hit more severely by a foreign asset freeze and a ban on its capacity to obtain vital imports from its one remaining large trade partner.

In the 1930s sanctions were deployed in a world of growing autarky, where interdependence between national economies had fallen to its absolutely vital minimum. Thus, the sanctions against Italy and Japan did only moderate damage to an already battered world economy. They failed in their goals - stop the Italian conquest of Ethiopia and the Japanese in Asia, but they threatened the national livelihoods enough to prompt military escalation. Today's world economy is highly interdependent and enjoys substantial gains from this, as trade employs larger workforces and imports can be sourced from manymore places. But at the same time, it's much more vulnerable, for example, inflows of commodities, financial transactions, and technology can be choked by supply chain issues or targeted by sanctions.

The effects of sanctions in the **Russia case 2022** are quite controversial and depend on the measurement's point of view. There is a significant discrepancy between the immediate reason for sanctions implementation and the officially stated intentions. The main reason for the newly and progressively designed wave of sanctions against Russia in 2022 were imposed because of its "special military operation in Ukraine". From this point of view, the sanctions would be considered successful in the case of Russia's withdrawal from Ukraine. However scholars dealing with the political economy of sanctions proved by their profound investigations that "sanctions are usually unsuccessful in ending wars in progress" (Kaempfer and Lowenberg, 2007:871). That is to show that in the case of war in Ukraine, sanctions do not work. As to the officially stated intentions of the sanction's senders (US., EU, Canada and others) "to significantly damage the Russian economy" (Pop and Fleming, 2022), the effect is disputable. What is much more important is the spillover effect of sanction onto the senders. The main manifestation of this backward spillover effect is the global sancflation under question – an increase in the level of headline global inflation with a supplement triggered by the sanctions against Russia.

The sanctions-inflation nexus has been well investigated theoretically and backed up with appropriate empirical data, but in all cases, the sanctions impact has been one-directed to the country of target, or at most regionally deployed. In the case of sancflation, we have one sanctions' target country – Russia, but the negative sanctions' impact is globally deployed. Moreover, in the current case, the inflation rates are higher in sanctioning countries (EU, USA and others) than in the sanctioned one (Russia).

For 2022, the IMF reported the highest annual increase in global inflation since 1996, estimated at 8.75% (IMF, 2023b). After the extremely high global inflation experienced in the 1980s and 1990s, global inflation has been relatively stable since the turn of the millennium, usually hovering between three and five percent per year. The global financial crisis caused the first significant sharp increase in 2008. Even during the Covid-19 pandemic 2020-2021 the global inflation rates is stacked between 3.25 and 4.7 percent in 2021 (IMF, 2023b). It is explained mainly by the impact of supply chain delays on consumer prices. According to IMF observations, "inflation is currently high across many areas of the globe, even in regions that have not witnessed high inflation for several decades" (IMF, 2023a).

Another unique feature of **Russian case 2022** is the way Europe has worked so closely with the US. According to the observers, sanctions planning began in November 2021 when Western intelligence picked up strong evidence that Vladimir Putin's forces were building up along the Ukrainian border. Biden asked Yellen to draw up plans for what measures could be taken to respond to an invasion. From that moment the US began coordinating with the EU, UK and others (Pop and Fleming, 2022).

If we refer to the Cold War period we will find almost 5 decades of history of US unilateral and multilateral sanctions and restrictions on USSR. The most important of them are the Export Control Act of 1949 (concerning the export of strategic materials); and the Battle Act of 1951 (refuse assistance to any nation that did not embargo strategic goods, including oil, to the Soviet Union and nations subject to its influence)[6]; National Security Decision Directive 75 of 1983 (sets the policy of using economic pressure to limit the foreign policy and military options of the

[6] Under pressure from its allies, the United States accepted many exemptions from this act and it was not notably effective

Soviets). The latest stricter regime of sanctions led to considerable conflict with America's allies on the Coordinating Committee for Multilateral Export Controls (COCOM), especially over the export of oil and gas equipment.

Ironically, the most effective use of economic sanctions made by the United States during the Cold War in Europe was against its own allies, Great Britain, France, and Israel, during the Suez Crisis of 1956. When those three powers concerted to invade Egypt in response to Egyptian nationalization of the Suez Canal, President Dwight Eisenhower not only warned them to retreat, but he also began a massive sell-off of British pounds and embargoed U.S. oil shipments to the three nations. For one of the few times in history, sanctions stopped a military invasion in its tracks[7].

4. Concluding remarks

The sanctions imposed on Russia due to its military operation in Ukraine started in 2022, have had an unprecedented impact on global inflation rates. This phenomenon has been conceptualized as **"sancflation"**, a term specially designed for the purposes of this paper. In accordance with the main objective of the paper, a definition of the term "sancflation" has been developed. Comparative historical analogies have been used to search for other cases that reveal the sanction-inflation nexus.

One of the key aspects of the sancflation concept is that the target country (Russia) appears to remain largely unaffected by the sanctions imposed upon it. However, despite the ongoing global inflation crisis, the inflation rate in Russia remained below the 4% target in March 2023, as reported by Bloomberg News in April 2022. This is the lowest level since 2002 and has given Putin a political boost[8].

The uniqueness of the Russian case is predetermined by several major characteristics: the weight of the target country in the world economy; the unprecedented scope of the sanctions and their spillover effect. Expressed in the phenomenon of global sancflation – inflation triggered by

[7] See: https://www.americanforeignrelations.com/E-N/Embargoes-and-Sanctions-Cold-war-sanctions.html
[8] https://www.bloomberg.com/news/articles/2023-04-12/blamed-for-putinflation-abroad-russia-is-now-seeing-prices-dive#xj4y7vzkg

sanctions. This effect becomes possible because of Russia's important role inthe world economy. Globalization in the twenty-first century has increased the economic costs of imposing sanctions on large, highly integrated economies. Mulder argues that economic and technological means have become more effective tools for retaliation than military action (Mulder, 2020 b:23). Overall, the risks and costs of sanctions have changed, but the channels through which they operate, such as higher commodity prices, transaction costs, supply bottlenecks, and trade losses, remain the same. These channels affect people worldwide. And the phenomenon of sancflation demonstrates the significant spillover effects of imposing sanctions on countries in the top tier of the global economy.

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ASYMMETRIC RIVALRIES:
THE CASE OF LEBANON'S FINANCIAL CRISIS

Hachem Hicham, CNAM Liban & LEFMI Amiens[1]

Abstract: *Unlike mainstream explanations, this paper is less concerned with the causes of the financial crisis in Lebanon as much as it raises the problem of adverse relationships between institutions of money creation and destruction. The analysis builds on the theoretical approach of mimetic rivalries and applies tools from graphical models in games theory. It aims to study the sensitivity of solvency constraints to explain asymmetric relationships. The applied case of Lebanon shows two relevant results (1) asymmetric relationships between economic agents and (2) top-down dynamics of money creation and destruction. These findings imply an institutional model of extractive economic policy dominated by strategies of vindication and rivalry.*

Keywords: *Money creation; Parity; Lending capacity; Redistribution; Rivalries*
JEL: *B59; C73; E42; E52; E60*

1. Introduction

The standard literature on the Lebanese monetary crisis explains market dynamics driven by a reversal of capital flows. The discourse on liquidity shortages supposedly justifies banking practices of rationing withdrawals on foreign currency denominated deposits; a situation that led to bank runs, discounts and the suspension of asset convertibility. Analysis of current account dynamics served as a pretext for the Government to declare default on Eurobonds. Beyond the merits of causal and normative studies of the Lebanese monetary crisis, this paper raises the question of ensuing channels of wealth distribution. The problem of this paper is therefore strictly framed to provide an outline for understanding antagonistic relationships that govern institutions of money creation and destruction. The baseline analytic approach aims as such to explain instruments and dynamics that govern such relationships.

The analysis falls within the institutional governance approach of the monetary regime. The theoretical framework is grounded on the theory of "mimetic rivalries" as proposed by Aglietta et Orléan (1982). A simplified top-down standard model – *i.e.* hierarchical system of monetary institutions – is applied to the Lebanese case. The model borrows heavily from the Regulation school and graph theory respectively (Aglietta et al., 2016, p. 90; Kearns et al, 2001). It is however less inclined on institutionalism as it incorporates graph theory analysis in concurrence with the monetary approach to the balance of payments. Specifically, the study aims to provide an interpretation of monetary policy problems ensuing from solvency constraints and antagonistic interests between institutions of money creation – *i.e.* (1) the Treasury for issuing

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sovereign debt; (2) the Central Bank for issuing the monetary base and (3) the banking system issuing credit and broad money.

This paper is organized as follows: the following section presents a bird's eye overview of the literature on the Lebanese currency crisis. It proposes a classification of normative and positive contributions to make the distinction between theoretical and applied work. Section 3 describes the baseline theoretical framework of the regulation school (Aglietta & Orléan, 1982). It depicts the institutional model, the system of ensuing relationships, and the analytical model adapted from graph theory. Section 4 presents the applied case of Lebanon. It describes the data set, conveys results captured by using graph theory, and concludes with a discussion and analysis of the findings which show asymmetric relationships between institutions of money creation. The paper concludes in section 5 by exploring implications on monetary policy, social redistribution, institutional strategies and international relations.

2. A bird's eye view of the literature

To put the problem into perspective it may be useful to give a quick overview of the literature on the Lebanese currency crisis, which may be classified under two methodological perspectives with overlaps in between: (1) normative approaches and (2) positive analyses. The formers mostly advocate a currency board regime and explain the currency crisis by the exposure of the financial sector to sovereign debt. The second group is mostly empirical. The latter studies are grounded, either on data analysis or a historical approach to institutional theory. They mostly explain the crisis by external deficits and debt sustainability.

In essence, normative proposals promote a currency board regime (Hanke, 2020; Böwer, 2021). Within this framework, the empirical analyses of Mansour-Ishrakieh (2022), corroborates that a Lebanese currency board would automatically sterilize risks associated with dollarization. Studies in economic history recommend on the other hand a restructuring of public administrations. Gaspard (2020) appeals to a minarchist governance model centered on the State's sovereignty. On the other end of the spectrum, Dagher (2022) advocates a Weberian model based on the rationalization of the civil service to restore confidence in state institutions. Farah and Maucourant (2022), observe a breakdown of State credibility. They conclude that patronage policies are used as a tool in defense of social classes.

Positive approaches seek to explain the fundamental causes of the Lebanese crisis. The empirical method is dominant. The toolbox is mostly grounded on statistics, econometrics, and data analysis. The findings of Neaime (2004) and Dakhlallah (2020) show the risks associated with the prevalence of expansionary fiscal policies. Dakhlallah (2020) concludes that political authorities have compromised their fiscal solvency by assuming risks of short-term macroeconomic imbalances in order to achieve Budget objectives in the medium and long term. Balance sheet analyses of the Central Bank (Nenovsky and Chobanov, 2020; Bitar, 2021) conclude that seigniorage operations were the cause of the banking crisis. On the topic of these

operations, Nenovsky and Chobanov (2020) caution that discretionary policies of money creation undermine the solvency of the money supply and constitutes the foundations of the parity crisis.

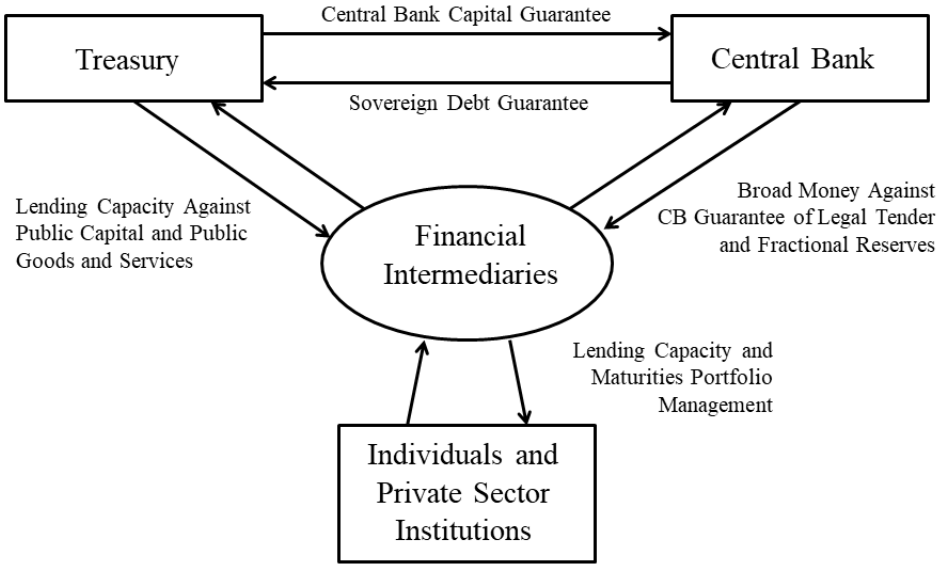
Finally, Salem's (2012) geopolitical analysis warned in 2012 that the Syrian crisis would have spillover effects on the banking sector in Lebanon. This analysis explores the doctrine of monetary sovereignty adopted by the U.S. Treasury. It projects that a potential banking panic would lead to a public debt crisis and an ensuing collapse of economic activity. Such foundational geopolitical events set off a wave of incentives for the reversal of capital flows which were observed soon after at the regional level.

3. Theoretical Framework

To study Institutions of money creation and destruction, the analysis is grounded on the approach of the regulation school (Aglietta & Orléan, 1982). According to this theoretical body of studies, rivalries between agents are mimicked – they are copied, and then mitigated by legitimate institutions that enforce sovereign action and social mediation. The "norm" which revolves around institutions of wealth redistribution, constitutes a body of conventions and regulations governing standards of repayment and enforcing the convertibility of the sovereign currency to liquidate obligations.

Institutions of money creation and redistribution may be represented by the following simplified model (Figure 1) which is adapted in our case to study the hierarchy and regulation order in Lebanon.

Figure 1. Simplified Top-Down Model



Source: (Aglietta et al., 2016, p. 90).

In a state of equilibrium, financial institutions and monetary authorities act as intermediaries to offset deficits and sterilize surpluses that are subject to the solvency constraints of the different agents. This implies that imbalances are compensated by the capacity of the economy to finance deficits, which leads to a problem of social redistribution of wealth and assets, and which in turn are subject to risk aversion constraints.

Grounded on the theoretical framework proposed by Aglietta & Orléan (1982), the model may be represented by the following system of equations:

$$C(G) = f(BD) \quad (1)$$

$$C(M) = f(R + DA) \quad (2)$$

$$C(F) = f(TB + EB + I + L) \quad (3)$$

Where $C(G)$ is the solvency constraint of the Government. It is a function of the sustainability of the budget deficit BD which solvency is largely determined by the service of sovereign debt whether external TB or domestic TB. The solvency constraint of the monetary authorities $C(M)$ is given by currency reserves R and domestic assets DA. The solvency constraint of financial intermediaries $C(F)$ is determined by liquidity L, the sovereign debt portfolio which is a fraction of $(EB + TB)$ and domestic lending I.

To achieve equilibrium, financial institutions and monetary authorities act as intermediaries to offset deficits and sterilize surpluses that are subject to the solvency constraints of the different agents. Given n agents $n = \{G; M; F\}$; this implies that imbalances of agent $C(i)$ are compensated by the aggregate solvency constraint of other agents $C(n - i)$.

$$\sum C(i) = 0 \quad (4)$$

Provided that solvency constraints are price dependent, the budget deficit is financed by creating demand deposits. The "double convention" (*Ibid*, p. 61) verifies the identity between the money supply and assets.

$$M \equiv A \quad (5)$$

Provided that currency reserves are classified under Central Bank assets, the solution of the system is given by the monetary approach to the balance of payments:

$$\Delta Mt = \Delta Rt + \Delta DAt \quad (6)$$

System imbalances imply institutional rivalries that indicate a process of redistribution. A representation of the system may be given in graph game theory (Kearns et al, 2001) by the pair $(G; \mathcal{M})$, where $G(v, \varepsilon, A)$ is a directed weighted graph on n vertices; v is the set of vertices representing each agent $v = \{G; \mathcal{M}; F\}$. A is the set of weights assigned for each directed edge $\varepsilon = \{j, k\}$. Let $i \in \mathbb{N} | \, i = \{1, \dots n\}$; $\mathcal{M}$ is a set of n payoff matrices $\boldsymbol{\mathcal{M}_i}$ called the local game

matrices. Player n is represented by a vertex labeled n in G. The set A is given by the following combinations:

$$A = \{C(G)/C(M), C(G)/C(F), C(M)/C(F), C(M)/C(G), C(F)/C(G), C(F)/C(M)\} \quad (7)$$

The rivalry interpretation (Aglietta & Orléan, 1982) is an optimization problem between liquidity and obligations. Each agent seeks to minimize his payoff function given the strategies of other agents. When the system does not cleared external imbalances accumulate, and the graphical game representation is skewed towards agents with dominant strategies.

4. The case of Lebanon's financial crisis

4.1.Data set

The data set is sampled over a period of four fiscal years, spanning from 2018 to 2021 – *i.e.* a symmetrical distribution around the starting date of the currency peg crisis. This is deliberate by design to avoid normalizing the downturn. The sample size consists of 48 observations across three institutional bodies: the Budget and Debt Service of the Treasury, the Central Bank's balance sheet and the aggregate balance sheet of financial intermediaries. The source of the data set is in the official figures of the Treasury and the Central Bank[2]. The current value of the Treasury and Central Bank's figures, is converted into US dollars at market rates published in newspapers. Deposits in foreign currencies are classified in a distinct category of Broad Money according to the Central Bank's statistics. Bank loans and deposits in foreign currencies are corrected for exchange rate discrimination and discounts on liquidation of bank deposits and other assets according to Central Bank circulars[3].

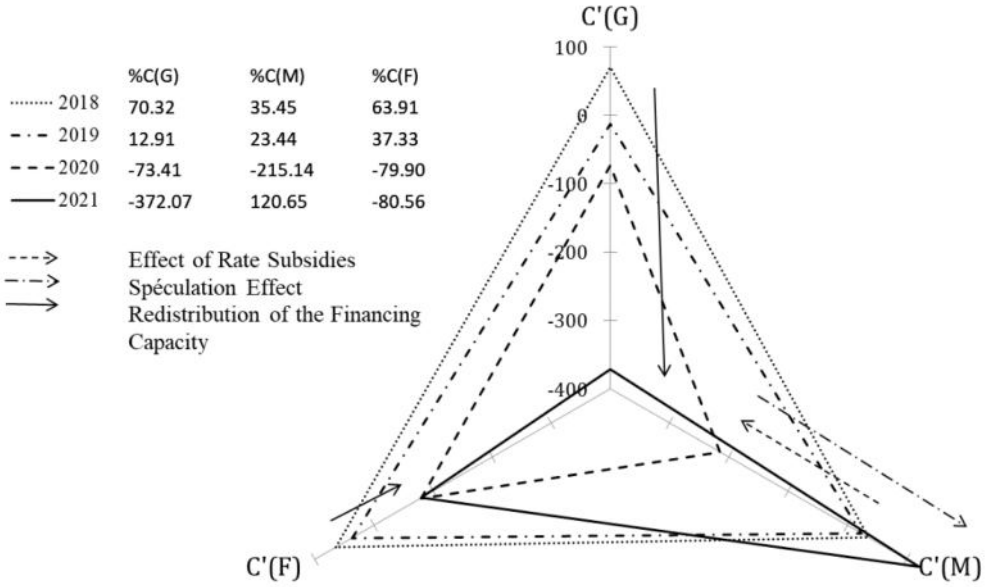
4.2. Results

By applying the model $(G; \mathcal{M})$ to the data set, the results show asymmetric relationships between agents of money creation. Figure 2 shows skewed results with drastically devalued budget deficits at the expense of the financing capacity of the economy and the guarantee of the legal tender.

[2] *cf.* The official figures of the Banque du Liban data for Central Bank and Financial Sector balance sheets: https://bdl.gov.lb/webroot/statistics/ and the Treasury data source: http://www.finance.gov.lb/en-us/Finance/EDS/FP.

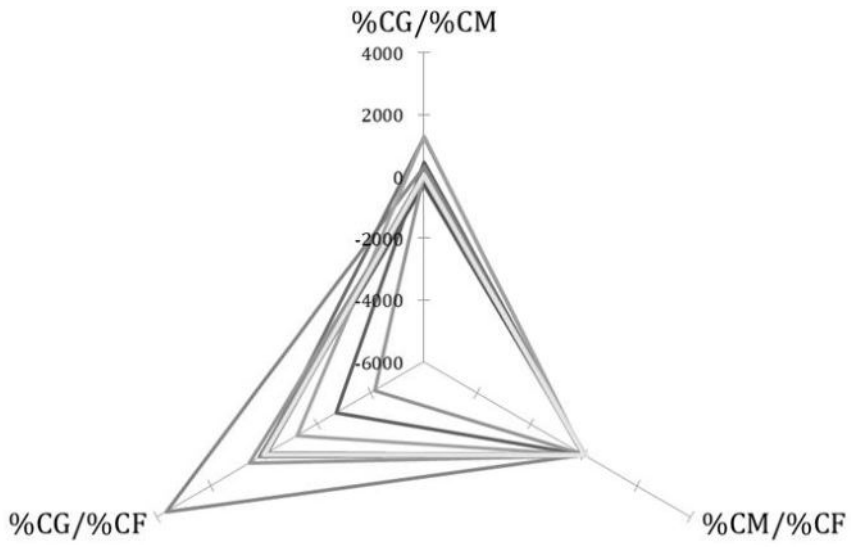
[3] *cf.* https://www.bdl.gov.lb/basiccirculars.php.

Figure 2. Yearly rate of change of solvency constraints



Given the fall of the parity the sensitivity of the fiscal policy substantially overweighs those pertaining to the currency guarantee and to the financing capacity of the financial intermediaries. Figure 3 shows asymmetric sensitivities substantially skewed towards the dominant strategy of the Government. The latter in essence imposes regulations and norms to finance Treasury spending. This strategy comes at the price of draining the financing capacity of the economy. It is enforced either through issuing public debt or by wealth redistribution through an inflationary tax ensuing from exchange rate discrimination.

Figure 3. Model Sensitivity Analysis



These results show a dynamic shift between public deficit, national savings and currency reserves. By the end of 2021, the reversal of the budget deficit in real terms goes from a 70%

increase to a surplus of 372%. As the deficit is financed by savings and seigniorage operations, a greater sensitivity of the Treasury's solvency to the financing capacity of the economy is observed in Figure 3.

4.3. Discussion

The asymmetry of rivalry relationships highlights the polarization of interests based on the redistribution of wealth among the three institutions of money creation. To grasp the extent of this asymmetry, let us consider at first the annual evolution of solvency constraints. Figure 2 shows the Treasury's vested interests in devaluing the parity and discounting securities. This is the natural outcome of the extractive model of State finances, which typically are the largest debtors. After adjusting for price levels and asset discounts, a reversal in the Budget Deficit stands-out by shifting towards a surplus in 2020. By 2021, the surplus increased by 372% in real terms. On the other hand, the financing capacity of the economy is undermined. Starting early in 2020, it went through an 80% decrease. This adds up to a cumulative rate of 96% over two consecutive years. The asymmetry of solvency relationships reveals the dominant strategy of the Treasury. Figure 3 shows that the sensitivity of the public deficit is more than proportional to that of the financing capacity of the economy. This indicates a state of near complete destruction of net national savings that are extracted by the system of hierarchical rivalries.

The relationship between the Central Bank and the Treasury is no less antagonistic. After financing off-budget expenses from discretionary resources at the disposal of the Central Bank, the Government's recovery plan decided to default on Eurobonds and refused to honor its commitments including those due to the Central Bank. The plan (Lebanese Government, 2020) reveals "losses" accumulated by the BDL due to the "restructuring" of public debt. It recommends filling the gap in seigniorage operations by a contribution from bank deposits, thus completely depleting net national savings (Gaspard, 2020). In reality, the Central Bank maintains a guarantee on liquidities for over a 100% of the narrow money supply. This has been the case even after subsidy policies depleted foreign currency reserves – policies that were at the root of hoarding and market shortages. By end 2022, the gold coverage warranted an exchange rate of 3,675 LBP/USD of the monetary base[4]. This amounts to one-tenth of the market exchange rate and one-eighth of the interbank rate. On the other hand the gold coverage warrants a rate of 13,147 L.L./USD to guarantee M4 money supply including M2, deposits in foreign currency M3 and treasury bonds M4 according to BDL classification. The magnitude of the spread with market rates (Hanke, 2002) may be strictly interpreted as a speculative strategy adopted by the monetary authorities.

The Central Bank's speculative policy and the ensuing tightening of liquidity triggered a bank run. Because of the reversal of capital flows, commercial banks failed to bridge the deficit in

[4] *i.e.* currency in circulation plus demand deposits.

their net foreign assets and so were unable to liquidate deposits held by the monetary authorities (Gaspard, 2020). This led to rationing of foreign currency withdrawals and the suspension of the convertibility of deposits in foreign currencies. The weakened confidence signaled creditors to adopt a strategy of defection towards the legal tender. It amplified interests in cashing out on assets, hoarding and the conversion into safer assets. The dollarization dynamics thus reflect the fragility of institutions of money creation (*Ibid*). It triggered a banking panic, and led to the depletion of the financing capacity of the economy.

5. Conclusion

This study builds on the theoretical framework of the regulation school to identify antagonistic rivalries between institutions of money creation and destruction. The model implies the paradigm of the monetary approach to the balance of payments, that if of debt sustainability, bank runs and speculative attack models. The decision-making problem of each agent highlights the role of rivalries and antagonistic relationships in monetary theory. Using the data of the Lebanese case, sensitivity analysis implies social redistribution at the expense of the capacity of the economy to finance productive capital. The model shows asymmetric relationships between institutions of money creation it explains a crowding-out effect which improves substantially the constraint of public finances at the expense of the financing capacity of the economy.

In conclusion, the findings suggest a feedback loop effect that is characteristic of the antagonistic relationships among Lebanese institutions of money creation. On the one hand, mimicked rivalries are channeled through bottom-up dynamics. The vindictive strategy of defaulting on asset convertibility, spreads from the banking sector to the Treasury's policy. On the other hand, the dominant strategy is hierarchical. Faced with the public debt crisis and the monetary crisis, the State's interests imply credit redistribution. Public institutions are thus the primary source of antagonistic relations diffused in a cascade rippling effect. At the core of the diffusion process is the discretionary policy of the Central Bank, which redistributes deficits. The speculative strategy pursued by the Lebanese Central Bank, whether declared conscientious, or else the consequence of administrative dysfunction, negligence, or incompetence, is essentially a devaluation-based redistribution policy that eludes democratic institutional governance. It describes a dynamic of polarization between the issuing institutions, and in essence, represents an extractive model of national savings, that destroys the financing capacity of the economy, which is the case of a "predatory state" (Galbraith, 2008) of national wealth exploitation.

Despite specificities typical of Lebanese institutions, the currency crisis cannot be conceived independently of the global context. Similar trends are observed in almost every emerging economy. Indeed, there is much diversity because of institutional specificities proper to every country. A common thread may be drawn however on the magnitude of public debt in foreign currencies, which has reached an unprecedented level on a global scale. Such is also the case

with the reversal of capital flows. These dynamics are often explained by the Fed's tapering policy. A policy shift, that was identified since 2016 (Aglietta & Coudert, 2014). The liquidation of carry trades and the reversal of capital flows in emerging markets put financial pressures on the service of sovereign debts. The "monetary sovereignty doctrine" on the other hand raises the question of legitimacy in money creation. It bears directly to the relationship between savings and scriptural money creation, which leads to the logic of institutions as both creators and destroyers of money on a global scale.

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ECONOMIC RELATIONSHIPS BETWEEN ATONIAN MONASTERIES AND BYZANTIUM EMPERORS: THE BEGINNING OF MODERN CORPORATE BUSINESS MODELS AND STRATEGIES

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***Abstract**: This article provides an analysis of the connections between monasteries and Byzantium emperors during the existence of the Byzantine Empire. It specifically focuses on how institutions the monasteries on Mount Athos interacted with the imperial authorities. The study investigates the methods through which these relationships were formed and explores their influence on the environment of that era. Also, the article draws an analogy between the business model used by the Athonian monasteries and modern corporations and shows that it has not changed regardless of the different social systems that humanity has passed through in the last thousand years.*

***Keywords**: (Atonian Monasteries, corporate business model, strategies)*

***JEL**: (B52)*

Introduction

The Byzantine Empire, a vast and enduring civilization that spanned over a millennium, witnessed complex and multifaceted economic relationships between monasteries and the imperial authorities. Monasteries, as religious institutions, were not only centers of spiritual devotion but also key players in the empire's economic landscape. The Byzantine Empire's history is marked by the intricate interplay of religious, political, and economic forces, and understanding the business model of monasteries and their relationship with Byzantium emperors is crucial for comprehending this multifaceted era.

The Byzantine Empire was a thriving hub of civilization from the 4th to the 15th centuries. It bridged the gap between the ancient and medieval worlds, inheriting the legacy of the Roman Empire while developing its own distinctive culture and institutions. At the heart of this civilization were the monasteries, which played a pivotal role in shaping not only the spiritual life of the empire but also its economic dynamics.

Monasticism, a religious movement that emphasized asceticism, communal living, and devotion to God, led to the establishment of monasteries across the Byzantine Empire. These monastic communities varied in size and influence, with some monasteries located in remote desert regions and others situated in urban centers. Regardless of their location, monasteries developed unique economic models that enabled them to thrive while simultaneously contributing to the empire's economic stability.

This analysis explores the economic relationships between monasteries and Byzantium emperors during the Byzantine Empire's existence. It delves into the mechanisms by which these relationships were established, the economic activities of monasteries, and their impact on the empire's economic landscape. The study also scrutinizes the legal instruments, such as chrysobulls, that formalized these relationships and examines the delicate balance between the autonomy of monasteries and imperial control.

The economic activities of monasteries were diverse and included agriculture, trade, craftsmanship, and financial operations. These activities not only sustained the monastic way of life but also contributed significantly to the empire's economic prosperity. Furthermore, monasteries, as centers of culture and learning, played a crucial role in preserving and disseminating knowledge.

While monasteries benefited from their economic activities and the privileges granted by emperors through chrysobulls, this relationship was not without tensions. The autonomy of monasteries, including their right to elect leaders and manage their assets, sometimes challenged imperial authority. Therefore, this analysis also examines the complex dynamics between monastic independence and loyalty to the imperial throne.

In essence, the economic relationships between monasteries and Byzantium emperors represent a microcosm of the Byzantine Empire's intricate social, political, and economic structure. By exploring the business model of monasteries and their interactions with secular authorities, we gain insights into the symbiotic relationship that underpinned the empire's enduring legacy.

Establishment of Economic Relations

The economic relationships between monasteries and Byzantium emperors were often formalized through legal documents, such as chrysobulls, which granted the monasteries various privileges, exemptions, and ownership rights. The issuance of these documents symbolized the emperors' recognition of the monastic role in the empire's economic activities. Specific examples, such as:

Chrysobull of Emperor Basil II (976-1025): This chrysobull granted The Great Lavra Monastery various exemptions from taxes and customs duties, as well as the right to elect its own abbot.

Chrysobull of Emperor Nikephoros II Phokas (963-969): This chrysobull confirmed The Great Lavra Monastery's ownership of its estates and granted it various privileges, including exemption from taxation and the right to maintain its own courts.

Chrysobull of Emperor Alexios I Komnenos (1081-1118): This chrysobull confirmed The Great Lavra Monastery's ownership of its estates and granted it various privileges, including exemption from taxes and the right to elect its own abbot.

Chrysobull of Emperor John II Komnenos (1118-1143): This chrysobull confirmed The Great Lavra Monastery's ownership of its estates and granted it various privileges, including exemption from taxes and the right to maintain its own courts.

Chrysobull of Emperor Manuel I Komnenos (1143-1180): This chrysobull confirmed The Great Lavra Monastery's ownership of its estates and granted it various privileges, including exemption from taxes and the right to maintain its own courts.

The Monastery of Vatopedi: This monastery had a chrysobull, issued by Emperor Alexios III Angelos in the 12th century, which confirmed the monastery's ownership of its estates and granted it various privileges and exemptions. The monastery also had a charter, known as the Typikon of Vatopedi, which regulated the internal organization and governance of the monastery.

The Monastery of Iviron: This monastery had a chrysobull, issued by Emperor Manuel I Komnenos in the 12th century, which confirmed the monastery's ownership of its estates and granted it various privileges and exemptions. The monastery also had a charter, known as the Typikon of Iviron, which regulated the internal organization and governance of the monastery.

The Monastery of Hilandar: This monastery had a chrysobull, issued by Emperor Stefan Uroš IV Dušan in the 14th century, which confirmed the monastery's ownership of its estates and granted it various privileges and exemptions. The monastery also had a charter, known as the Typikon of Hilandar, which regulated the internal organization and governance of the monastery.

The Monastery of Dionysiou: This monastery had a chrysobull, issued by Emperor John VI Kantakouzenos in the 14th century, which confirmed the monastery's ownership of its estates and granted it various privileges and exemptions. The monastery also had a charter, known as the Typikon of Dionysiou, which regulated the internal organization and governance of the monastery.

The Chrysobull of Tsar Ivan Asen II was a document issued by the Bulgarian Tsar Ivan Asen II in 1230, which granted the Bulgarian Orthodox Church significant privileges and exemptions, including exemption from taxes and the right to collect tithes from its adherents. The chrysobull also confirmed the ownership of several monasteries and estates that belonged to the Bulgarian Church.

The Chrysobull of Tsar Ivan Asen II is significant because it helped to establish the independence and autonomy of the Bulgarian Church, which had previously been under the control of the Byzantine Empire. The chrysobull also helped to consolidate the power of Tsar Ivan Asen II, who was able to use the support of the Church to strengthen his rule and expand his territory. In addition to its political and religious significance, the Chrysobull of Tsar Ivan Asen II is also an important historical document that provides insight into the political and social conditions of medieval Bulgaria. The chrysobull confirms the existence of several important monasteries, including the Monastery of Rila, which is still one of the most important religious and cultural institutions in Bulgaria today.

Economic Contributions of Monasteries:

Monasteries on Mount Athos, like The Great Lavra, Vatopedi, Zographoy and others, engaged in diverse economic activities, including agriculture, trade, and craft production. They managed large estates that produced essential commodities such as olive oil, wine, and textiles, contributing to the empire's economic prosperity. For example, they comprised a church, residences for the monks and the workers, a kitchen, storehouses, and stables, possibly a tower and other secondary buildings. Often without fortification, they resembled smaller, more basic monasteries. Other metochia were originally independent monasteries that became dependencies of more powerful houses.[1] The monks made efforts to group their properties to form integral estates, which would be managed by the metochion. Most acquisitions documented in the monastic archives concern lands adjacent to or very near existing estates.[2]The monasteries also served as financial institutions, lending money to both the imperial government and private individuals.

They owned vast agricultural estates that produced essential goods such as grains, wine, olive oil, and honey. Monastic workshops produced textiles, icons, manuscripts, and other valuable items that were traded or sold. The sale of these products contributed to their financial stability. Collectively, it was the monasteries that were the largest landlord in this period. The monastery of Lavra, the richest monastery of Mt Athos, is a good example. In 1321, the monastery possessed 185,000 modioi (c.18,500 hectares) of land in the “themes” of Thessaloniki and Strymon and the island of Lemnos. Its annual fiscal revenues, consisting of the dues of the paroikoi and various tax exemptions (which are not real revenues but, rather, savings on expenses), amounted to 4,000 gold coins. Its economic revenues would be in the order of magnitude of 4,300–4,900 gold coins.[3]

[1] *Actes de Lavra, vol. 4, Archives de l’Athos 11, ed. P. Lemerle, A. Guillou, N. Svoronos, and D. Papachryssanthou (Paris, 1982).*
[2] *P. Meyer, Die Haupturkunden für die Geschichte der Athosklöster (Leipzig, 1894), 102–40*
[3] *Laiou, “The Agrarian Economy,” pp. 349–50.*

Monasteries, especially those located in strategic regions like Mount Athos, often benefited from their geographical location, facilitating trade routes and exchanges with neighboring regions. They participated in trading networks that allowed them to acquire necessary resources and expand their influence beyond religious circles. They sought to buy or acquire through donations lands that were contiguous to their existent holdings. The economic benefits are obvious, since transportation costs between various parts of the domain are minimized, and the costs of management are reduced. A prime example of such rationalization of property ownership is the monastery of the Great Lavra, who's arable and vineyards increased considerably between 1300 and 1321, and which sought to acquire continuous parcels of land.18 Similar was the case of the monastery of Iviron, and other monasteries.[4]

Monasteries served as financial institutions, lending money to both individuals and governments. They accumulated wealth through donations, legacies, and income generated from their economic activities. This accumulation allowed them to support various religious, cultural, and charitable endeavors. An Act of 1329 from Chilandar illustrates yet another banking function of the large monastery, as a safe place for the deposit of money. This document describes the sale of property to Chilandar by a certain Theodora for 260 hyperpers, with the proviso, however, that the monks should retain half the sale price in safekeeping until such time as her daughter should marry and receive the money as her dowry.[5] Another case involves the nun, Eulogia, whose family borrowed 50 hyperpers from Chilandar in1325, offering as collateral three houses which Eulogia had inherited fromher father. The contract states that, if the family failed to pay off the mortgage loan within one year, the monastery could purchase the houses outright for an additional payment of 90 hyperpers[6]. When Maria Tzousmene gave a metochionat Hierissos to Zographou, the hegoumenos of Zographou visited her to discuss the terms of her gift.[7]

Some monasteries, particularly those with significant relics or religious significance, attracted pilgrims and visitors. These pilgrims often provided donations and offerings, contributing to the economic well-being of the monastery. The presence of these pilgrims also contributed to the development of local economies around monastic communities.

Examining the evidence from the typika shows the existence of a basic model for the management of the monastery properties. Despite the inconsistency of information, this model appears to have

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[4] *Svoronos, "Le domaine de Lavra," in P. Lemerle, A. Guillou, N. Svoronos and D. Papachryssanthou (eds.), Actes de Lavra, 4 vols. (Paris, Paris, 1970–82), IV, p. 170., Laiou, "The Agrarian Economy," p. 351.*

[5] *L. Petit and B. Korablev, eds, Actes deChilandar, Actes de l'Athos V; VV 19, (1911) suppl. 1 (repr. Amsterdam, 1975) p. 118.*

[6] *L. Petit and B. Korablev, eds, Actes deChilandar, Actes de l'Athos V; VV 19, (1911) suppl. 1 (repr. Amsterdam, 1975) p. 112.*

[7] *W. Regel, E. Kurtz and B. Korablev, Actesde Zographou, Actes de l'Athos IV; VV 13(1907) supp. 1 (repr. Amsterdam, 1969)*

had a very wide application, albeit with individual variations. The typika also shows a close connection between the administration of the lay and imperial estates and that of the monastic estates. The distinction was not always clear, as many monasteries used lay government, a system that appears to have remained in use even into the Ottoman period. However, there is a visible tendency for monasteries to replace lay governors with monks. The latter refers to the refinement and sophistication of management techniques attested in the typika from the eleventh century onwards. The typika gives guidelines more and more often for the managers not only to guarantee but also to increase the income of the properties. The clear division of duties between officials and the strict regulation of management and production registration aimed not only at securing the supplies needed to feed the monks, but also at creating and commercializing a surplus.

Imperial Support

One of the central pillars of the economic relationship between monasteries and Byzantium emperors was the issuance of legal documents known as chrysobulls. These chrysobulls held profound significance as they formalized and solidified the mutually beneficial partnership between monastic institutions and the imperial authorities. This section explores the role of chrysobulls in fostering imperial support for monasteries and the privileges they conferred upon these religious communities.

The monasteries of Mt. Athos accumulated wealth through various means, including donations, requests, purchases, and the absorption of other monasteries. However, the most significant factor contributing to their wealth was their close ties to the aristocracy and, particularly, to the imperial court. This connection is most clearly seen in the case of two well-documented monasteries, Lavra and Iviron. Iviron benefited from its political relationship with Georgia during Basil II's reign. In 979-80, Iviron absorbed the monastery of Kolovos through an imperial decree known as a Chrysobull. Kolovos had previously absorbed other monasteries and had become a substantial landowner, located in the eastern Chalkidiki region. One of its dependent monasteries, Leontia, was situated in Thessalonike. As a result of the Chrysobull, Iviron suddenly became the largest landowner on Mt. Athos, with an estimated landholding of 80,000 modioi, roughly equivalent to 8,000 hectares[8]. The extent to which this land was actively cultivated during this time is not well-documented. Just before 1029, Iviron also acquired a significant property known as Dovrovikeia from the state. The monastery's connection to Constantinople was vital, as demonstrated by the confiscation of five of Iviron's properties following the treason of its abbot, George, in 1029. Some opportunistic landowners took advantage of Iviron's difficulties to seize other monastery estates. While these confiscated properties were eventually restored by Michael IV around 1035, regaining

[8] *J. Lefort, N. Oikonomides and D.Papachryssanthou, eds, Actes d'Iviron,Archives de 1'Athose XIV, XVI (Paris, 1985, 1990)*

usurped lands proved to be a lengthy process. One such property in Ezova was not recovered until 1062. By 1079, a Chrysobull listed twenty-three major properties belonging to Iviron, showcasing the monastery's significant land holdings and its enduring influence in the region.

Lavra, one of the monasteries on Mount Athos, significantly expanded its land holdings by absorbing other monasteries. Much of its property in the western Chalkidiki region was acquired through the monastery of St. Andrew at Peristerai, which had received special fiscal privileges from Constantine VII. In 989, Lavra also took over the monastery of Gomatou, which had suffered during Bulgar raids. One of the reasons Lavra could assimilate other monasteries was its substantial resources, allowing it to restore prosperity to these institutions and bring neglected lands back into cultivation. Imperial support played a pivotal role in this expansion. Both Nikephoros Phokas and John Tzimiskes had granted Lavra "solemnia," which were annual payments from fiscal revenues. In 1057, Michael VI confirmed Lavra's previous grants from emperors, totaling eight pounds and twenty nomismata, and added an additional three pounds.[9]

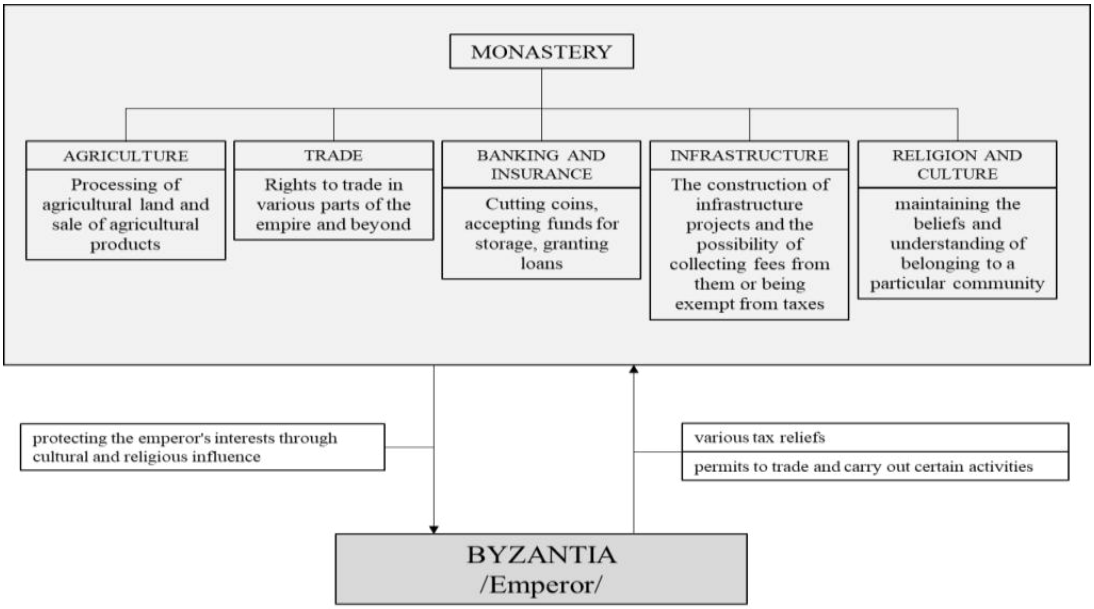
While the Athonite archives do record some land purchases by monasteries, these transactions did not make up most of their land acquisitions. Occasionally, exceptional purchases occurred, such as when the Amalfitan monastery acquired the estate of Platanos in eastern Macedonia for twenty-four pounds in 1081. However, most purchases were smaller in scale and typically took place in areas where the monastery already had property. Donations from influential benefactors were a much more significant source of wealth for the monasteries. In the late eleventh century, for example, Leo Kephalas received four properties through imperial grants, with three of them granted complete fiscal exemptions, meaning he received all the revenues from these estates. When his son transferred most of these properties to Lavra, the monastery also obtained the Chrysobulls that allowed it to claim the same privileges for these properties.

In the context of agricultural improvements during the Byzantine period, there is substantial evidence that landowners, including the monasteries on Mount Athos, invested money in enhancing their properties. While there were no significant technological advancements in Byzantine agriculture, financial resources could still be effectively utilized within the existing technological constraints. A critical factor in these improvements was ensuring a reliable supply of water to the properties. One notable irrigation project was initiated on Mount Athos by a figure named Athanasios. In this endeavor, water was diverted from the higher regions of the mountain to Lavra, where it was used to irrigate gardens and fruit trees. While there may have been some exaggeration in the accounts written by hagiographers, several key elements contributed to the success of this project. Athanasios had established rights to the water, controlled the land through which the water was channeled, and possessed the financial means to carry out the irrigation

[9] *P. Lemerle, N. Svoronos, A. Guillou andD. Papchryssanthou, eds, Actes de Lavra,Archives de l'Athos V, VIII, X, XI (Paris,1970, 1977,1979,1982)*

scheme. Most of the documented agricultural expenditures in the Mount Athos archives were related to vineyards, fruit trees, and gardens. These crops were relatively easy to transport to markets. For instance, Lavra allocated a significant sum of 500 nomismata to the monastery of Bouleuteria, part of which was used to establish new vineyards. When the monastery of Xenophon was being restored by Symeon, new vineyards and gardens were also planted. Records from the Chilandar monastery reveal that in 1193, Sabas purchased unexploited land on Mount Athos for 300 hyperpyra with the intention of cultivating vineyards. This newly acquired land was situated next to a vineyard that Sabas had previously planted, emphasizing the importance of viticulture in the region.[10]

Figure 1. The structure of the Atonian monasteries and their relationship with the Byzantine emperor



Source: author figure.

The Athonites, like the Byzantines, were skilled diplomats. They had anticipated the collapse of the empire and ensured their own survival by making overtures to the Ottomans, both in 1383 before the fall of Thessaloniki and again in 1424 before the fall of Constantinople. By so doing they saved not only their lives but their property, their political autonomy, and their religious freedom. They had to pay tribute; but then they had been taxed by the Byzantines too, and we have seen that their estates were not immune from confiscation by the tottering imperial regime. The

[10] *Noret, Vitae dune, 37,152. For agricultural production during this period see M. Kaplan, Les Hommes et la terre a Byzance du VIe au XIe siecle. Propriete et exploitation due sol (Paris, 1992); Harvey, Economic Expansion, 120-62. For the administration of monastic properties, see M. Kaplan, 'The Evergetis Hypotyposis and the management of monastic estates in the eleventhcentury', in M. Mullett, A. Kirby, eds, The Theotokos Evergetis and Eleventh-Century Monasticism, BBTT 6.1 (Belfast, 1994),103-23.*

very year the city fell to the Ottomans, the Athonites sent a delegation to Sultan Mehmet II, who agreed to protect their rights and safeguard their independence.[11]

Imperial favor was not only crucial for acquiring land but also for safeguarding it from tax collectors and other imperial officials. Influential monasteries enjoyed extensive privileges, although they were not absolute. They generally had to pay the "demosion," the basic land tax, albeit at a more favorable rate than regular taxpayers. Additionally, the state waived various other obligations, as detailed in the Chrysobulls of the eleventh century. These obligations included cash payments, labor services from the paroikoi (dependent villagers), and payments in kind, often intended to support officials while they performed their duties. Irregular demands, such as when high-ranking officials with large retinues were in the region, and the billeting of soldiers presented the most significant challenges for landowners in maintaining their properties.

Conclusion

Chrysobulls played a strategic role in consolidating the relationship between monastic communities and the Byzantine emperors. By issuing these documents, emperors demonstrated their commitment to protecting and supporting the monasteries, which were seen as bastions of religious piety and cultural preservation. In a realm characterized by political intrigues and frequent changes of leadership, the stability of monastic communities was highly valued. Chrysobulls served as a testament to the enduring protection and favor bestowed upon these religious institutions. Imperial support through chrysobulls often engendered loyalty among monastic communities toward the reigning emperor. The monasteries, in turn, prayed for the emperor's well-being and the prosperity of the Byzantine state, contributing to the spiritual and political cohesion of the empire. Beyond the economic and political implications, chrysobulls provided a legal framework that protected the rights and privileges of monastic communities. They became essential tools for navigating the Byzantine legal system and defending their interests. Chrysobulls are invaluable historical records that shed light on the social, political, and economic dynamics of the Byzantine Empire. They offer insights into the cultural and intellectual milieu of the time, as well as the imperial attitudes toward religious institutions.

In conclusion, chrysobulls were not mere bureaucratic decrees; they represented a powerful testament to the intricate relationship between monastic institutions and the Byzantine emperors. Through these documents, emperors formalized their support for monasteries, granting them privileges that were vital for their economic sustenance and autonomy. The chrysobulls stand as

[11] *C. G. Papadopoulos, Les Privileges du patriarcat oecumtnique dans I'empire ottoman (Paris, i924),pp. 27-41.' S. Runciman, The Great Church in Captivity (Cambridge, 1968), p. 182.*

enduring historical artifacts that illuminate the profound influence of religion and economics on the Byzantine Empire's intricate tapestry.

From everything said so far, we can draw the following conclusions:

- The monasteries of Mount Athos acted as modern holding structures trying to control all economic life at the time covering agriculture, banking, trade, coinage, religion, and culture of vast areas of the Byzantine Empire.
- It makes a strong impression that, in practice, mergers and takeovers of monasteries, which are smaller or have fallen into financial difficulties for various reasons, have taken place. In some cases, strategic takeovers have been carried out in order to establish control over strategic resources or routes. Typical behavior of a modern corporation.
- The monasteries also carried out major infrastructure projects on behalf of the emperor. In fact, we are observing typical behavior of a modern international corporation.
- The economic power and political influence of the monasteries was so strong that even the Ottomans did not break the pattern but made it work to their advantage.
- Traces of this type of corporate structure can still be found today in the Administrative Organization of the Athos Monasteries.

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SHOULD STATE-OWNED ENTERPRISES PAY DIVIDENDS?

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Abstract: *The dividend puzzle for private corporations has a long-lasting history. Six theories provide to certain extent explanations of this puzzle. However, the dividend puzzle has not yet been discussed as an economic problem for state-owned enterprises (SOEs). The article addresses this issue.*
All well-known six theoretical concepts of the dividend puzzle are presented and their strengths and weaknesses are analysed. After that, the specific features of SOEs are brought out and the dividend puzzle for them is formulated. After presenting the experience of the dividend policy of SOEs, a confrontation with the theories is made. It is proved that only the theory of dividend payment preference is relevant to SOEs.

Keywords: *Dividend puzzle, state-owned enterprises, dividend policy, Bulgaria*

JEL: *G35 G38 H32 H62*

1. Introduction

The question: Should state-owned enterprises pay dividends? initially was raised by Black (1976). In the beginning of an article entitled *The Dividend Puzzle* he asked two questions: `What should the individual investor do about dividends in his portfolio?` and `Why do investors pay attention to dividends?`. After a short analysis and discussion, Black's answers like this: 'We don't know' and we still don't know what are the economic rationales for dividend payouts (Tanushev, 2016). For that reason, the dividend policy is considered as one of the 'thorniest puzzles' (Allen, Bernardo and Welch, 2000) and an `enigma` (Al-Malkawi, Rafferty and Pillai, 2010). The `dividend controversy` ranks in the ten most important unresolved financial issues (Brealey and Myers, 2002).

The Dividend Puzzle is traditionally discussed for private corporations located in different countries around the world. Very rarely it is analyzed in the context of state-owned enterprises (SOEs). The purpose of this article is to present the results of a study on the relevance of the leading theoretical constructs that explain the dividend puzzle to the experience of SOEs in certain countries and especially in Bulgaria.

The article is conventionally divided into four parts. In the first part, a literature review of the main studies of the dividend puzzle is made and the theories that serve to explain it are presented. The second part is devoted to the peculiarities of dividend policy in SOEs. The third

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part presents the experience of the dividend policy in Bulgarian SOEs. In the last part, the main conclusions of the study are summed up.

2. Literature review

The wide application of SOEs since 1950s is not adequately reflected in research on their governance (Aharoni, 1982). Attempts to delineate the nature of the dividend have been the subject of economic research for more than a century, yet theoretical models have been unable to fully explain it (Wood, 1994). In its origin, the dividend predates the share and, in its evolution, takes different forms:

- Return on Investments. The dividend arose in the 17th century due to the need to attract capital for sea expeditions. Shipowners share the profits from trading with investors depending on the part of their investment for the commercial trips (Leeson, 2009).
- *Liquidation share*. Due to the creation of corporations for a limited time and their subsequent liquidation, the dividend is used as a liquidation share for shareholders. Practices in the Netherlands and the UK begin to limit dividend payouts to net profit and companies are given the opportunity to doing business longer.
- *Monopoly rights*. In the nineteenth century, large-scale railway infrastructure projects began in rapidly industrialising countries and monopoly rights were offered to attract investment. The first cases of unfair practices date from this period - dividends are declared before the calculation of profits and are paid out of accumulated capital or the proceeds of subsequent issues.
- *Response to tax pressure*. In the 1930s, laws were enacted in the United States to tax retained earnings. In response, many corporations increased dividends or introduced special dividends. The modern form of dividend policy emerged.
- *Reduction of information asymmetry*. To solve the principal-agent problem, managers pay high dividends to mitigate the principal's control over them. The dividend begins to perform a signaling function and provide information about the financial condition and future earnings of the company.

The 'dividend puzzle' derived from the Modigliani–Miller theorems of 1959 and 1961 (Modigliani and Miller, 1959; Miller and Modigliani, 1961). An excellent interpretation of their work and formulation of the dividend puzzle is found in La Porta et al. 2000: "...in a frictionless world, when the investment policy of a firm is held constant, its dividend payout policy has no consequences for shareholder wealth. Higher dividend payouts lead to lower retained earnings and capital gains, and vice versa, leaving total wealth of the shareholders unchanged."

However, in a real world, dividends paid by companies are not always proportional to their earnings - some companies pay out high dividends even when their earnings are low, while others pay out low dividends even when their earnings are high (Lintner, 1956). This is seen as

a puzzle because it contradicts the traditional financial theory that companies should pay out dividends in proportion to their profits.

There are several possible explanations for the dividend puzzle, which are known as theories. The most prominent of them is presented in the following part.

Dividend irrelevance theory. At a certain point in economic history, capital markets are seen as perfect, investor behavior as rational, and company information as accessible to all stakeholders. According to the theorem of Fr. Modigliani and M. Miller, the dividend does not affect the value of the shares due to the assumption of a perfect capital market and a tax-free dividend (Miller and Modigliani, 1961). The theorem refers to situations in which the dividend is managed by factors of the internal environment, e.g., managers. In order to increase the market value of the company, profits are not distributed but used for investment purposes. This decision of managers is reflected in the behaviour of investors to hold or sell their shares.

Theory of clientelism. According to this theory, the rational behaviour of market participants influences the dividend decision. The change of ownership of the shares before the date of dividend declaration depends upon the tax characteristics of investors (Elton and Gruber, 1970). Changes in tax laws shape the relationship between dividend policy and investor behaviour depending on the tax liabilities of each investor group (Berk and DeMarzo, 2013). Investors with high tax liabilities may prefer companies to use share buybacks in order to avoid payment of high taxes. Other option is more radical. It refers to avoiding the payment of dividends, which would reduce the cost of capital and in the future would lead to an increase in the share prices of the company.

Agency theory. Agency theory deals with agency problems arise from the conflicts of interest between managers and shareholders because the incentives for managers are likely to differ from those of shareholders. Jensen and Meckling (1976), Easterbrook (1984) and Berezinets, Ilina and Alekseeva (2017) observe that an increase in dividends mitigates agency problems and leads to higher company value because managers have less free cash flows to invest in negative net present value projects. This forces managers to raise funds from the capital markets, which have better means of controlling managerial opportunism.

Dividend payouts can solve the vertical agency problem - between shareholders and managers, but can ignore the horizontal agency conflicts of interest between minority shareholders and controlling shareholders who can exert considerable influence on management's decision making (Shleifer and Vishny, 1997).

Last but not least, the dividend rejects the neoclassical view that managers are a homogeneous group given their opinion on dividend policy (Sarwar et al., 2019). According to this view, the ultimate owner of SOEs, the citizens, assume that an enterprise functions normally if it pays high and permanently-paid dividend (Kowerski, 2015).

Signaling theory. Market imperfections and related information asymmetry can be reduced by paying a dividend. Executive managers payout a dividend to signaling of shareholders, investors, staff and other stakeholders company's financial condition and its future plans

(Bhattacharya, 1979; Miller and Rock, 1995). The fundament of this theory are managers who have complete information about the company, take into account the expectations of shareholders and balance the taxation. In adopting this theory, other profit-sharing options such as share buybacks are eliminated due to lack of information signal.

Life cycle theory. Startups have greater financing needs that require them to reinvest their profits as internal sources of finance are cheaper than external ones. In contrast, companies in a mature stage already have stable earnings and can pay dividends (Grullon et al. 2003; DeAngelo et al. 2006).

This theory is closed to the theory for signal function of dividend, the difference being in providing information about the presence or absence of growth. The maturity effect is to some extent related to the "principal-agent" theory, as the agency problem manifests itself at the maturity stage and it is at this stage that it is recommended to solve the problem through the dividend policy (Kowerski, 2015).

Theory of the dividend payment preference (A bird in the hand is better than two in the bush). This theory follows J. Williams (1938) thought that the value of a share is determined only by the money that it brings. Gordon's (1961, 1962) argues that shareholders prefer a policy of high dividends to their investment in the future development of the company. They wish to receive a dividend today and not take risks to receive a capital gain from future investments. A number of studies demonstrate that this model fails if it is posited in a complete and perfect market with investors who behave according to notions of rational behavior (Miller and Modigliani, 1961; Bhattacharya, 1979). Nonetheless, the original reasoning of Gordon (1961) is still frequently cited.

All theories developed to explain the dividend puzzle refer to practices of private corporations. The dividend puzzle becomes even more complicated if the peculiarities of SOEs are taken into account.

By definition, a state-owned enterprise is created not only to maximize the profits of its shareholders, but also to fulfill social goals related to welfare, incl. reduction of unemployment, national security, provision of social services, development of technical and social infrastructure, uniform development of regions and others (Keremidchiev - Nedelchev 2020). Then why should SOEs pay dividends that are determined by bureaucrats and go to the state budget to finance unclear what programs, instead of remaining in SOEs and serving to support projects related to the social goals they fulfill?

In this way, two effects can be achieved. First, the influence of bureaucrats on the financial decisions of SOEs will be reduced, and secondly, the redistribution that takes place through the state budget, which simultaneously receives dividends and finances SOEs in various forms, will be reduced.

Another feature of SOEs that reflects on solving the dividend puzzle stems from the ownership of real property in SOEs. As a rule, the ultimate owner of state property is the sovereign. If so, then why are the dividends of SOEs not distributed among all citizens. In reality, however,

citizens are mediated and extremely distant owners. They do not make a single important decision about the state enterprise, neither on its establishment, nor on the appointment of directors in it, nor on the distribution of its financial results, nor on its privatization or closure. All these functions have been handed over to government bureaucrats and Parliament. These institutions can, and most often do, have different priorities than the sovereign. Therefore, decisions on SOEs, incl. for the payment of dividends by them are driven by other motivations that arise from pursuing fiscal, political, populist and other objectives. In this case, the solution to the dividend puzzle for SOEs should answer the following questions: why should state enterprises pay dividends, to whom and under what conditions? Obviously, the dividend puzzle in SOEs is very different from that in private enterprises, and its solution derives from clarifying the nature of state ownership.

3. Dividend Policy in State-Owned Enterprises

In order to confront the theory with the practice, in the next two parts, the experience of the dividend policy of different countries is analyzed.

Dividend Policy in SOEs is aimed at achieving one or more of the following objectives:

- Guaranteeing adequate return on capital for the state as owner (Czech Republic and Hungary);
- Encouragement SOEs to follow higher rates of return and to invest in financially viable projects (Lithuania);
- Improving credit ratings and dividend levels that are consistent with private sector practices (Australia);
- Raising competition in the economy, increasing the transparency of liabilities of SOEs and reducing the risk of large-scale SOEs (China);
- Reducing equity and to achieve a higher rate of return on invested capital (Norway and Sweden) (World Bank, 2014).

The government, as the owner, has the ultimate right to impose the rate, terms and other conditions for the payment of dividends by SOEs. It is debatable whether the term `dividend policy` refers to this activity or rather it should be a `payment policy of dividend` (World Bank, 2009).

Under special conditions, such as economic shocks, the state may request an additional dividend. These cases became common after the global financial crisis in 2007-2008 and the turmoil connected to COVID-19. The Irish government imposes special dividends on the Electricity Supply Board and Bord Gáis Energy - both leading energy suppliers, of €585 million and €350 million respectively to implement the state policy for dealing with the effects of the crisis (Palcic and Reeves, 2017). A similar measure was taken by the Bulgarian government in connection with the need for fresh financial resources in the Covid-19 lockdown. It imposed 100 dividend payout rate of SOEs for the financial year 2021 (Table 2).

In most countries, the dividend is paid to the Ministry of Finance, regardless of which ministry acts as principal (Kuijs, Mako and Zhang, 2005). In some cases, special government funds have been set up to accumulate dividends and be used for structural reforms in the economy, to finance government agencies, projects and programmes. For example, in France a part of the dividends by SOEs is paid to a state pension fund, in the Czech Republic – to a special state-owned fund (National Property Fund of the Czech Republic – NPF), and in Austria – to the fund Österreichische Beteiligungs AG.

The privatisation proceeds are similar to dividends, as both revenues are in the portfolio of a competent authority for the budgeting process. Privatized entities pay a `*special dividend*` in the form of the sale proceeds from their assets at the request of the state-principal (World Bank, 2009).

The experiences of different countries are very diverse, but can still be represented by the policies undertaken for large non-financial state-owned enterprises (Palcic and Reeves, 2017). The main sources of information about the dividend payout are published financial statements, which are certified by an external auditor. Dividend policy has three forms of application: general guidelines defining the factors that must be taken into account when setting the dividend level; a specific percentage of net income; level of dividend required to maintain an optimal capital structure (OECD, 2018).

One of the main factor in formulating the dividend policy is the adopted ownership structure. In a decentralized ownership structure, the current needs and imbalances of state budget are partially compensated by dividend payouts. The centralized ownership structure is characterized by a high degree of predictability of financial results and risk mitigation, which makes it easier to implement dividend policy. An additional factor for the dividend policy are social and fiscal goals of SOEs.

The dividend decisions of SOEs differ in who makes the decision for them, what criteria are used to justify them and on what legal basis they are made (Table 1).

Table 1. Dividend decisions of SOEs

Country	Dividend decision is taken by		Criteria for dividend payout			Dividend payout is in accordance with		
	the board	competent authority	Fiscal needs	financial state of SOE	life cycle of SOE	legal act	the statute of SOE	consultations between competent authority and board
Bulgaria		√	√			√		
Canada	√			√				√
Czech Republic		√	√					√
Denmark	√				√			√
Estonia		√		√				√
Finland	√				√			√
Hungary		√	√					√
Ireland		√	√					√
Israel		√	√			√		
Italy		√	√	√				√
Latvia		√	√			√		
Lithuania	√			√			√	
Netherlands	√			√				√
Norway	√				√			√
Poland		√		√		√		
Slovenia		√	√			√		
Sweden	√				√	√		√
Switzerland		√		√		√		
In total	**8**	**11**	**8**	**7**	**4**	**7**	**1**	**11**

Source: adapted from Böwer, U. (2017) and Richmond et al. (2019).

In 11 of the 19 countries whose experience is summarized in Table 1 the dividend decision is taken by a competent authority that acts as the owner of the SOE. Such a practice exists in Czech Republic, Estonia, Hungary, Italy, Lavia, Poland, etc. In other countries such as Canada, Denmark, Finland, Sweden dividend decision is taken by board of SOE (Table 1).

Three criteria are most commonly used when making dividend payout decisions in SOEs:

- Fiscal needs. The state may request the payment of an *ad hoc* dividend for special purposes. This type of dividend policy has a smoothing effect on the state budget and some authors consider it to be the first form of dividend policy for SOEs (Gugler, 2003). The fiscal needs are the main factors for taking dividend decisions, which is common in most countries, e.g., Czech Republic, Hungary, Ireland, Slovenia, France, Germany, New Zealand, South Korea (Böwer, 2017; Richmond et al., 2019; World Bank, 2005).
- Financial state of the SOE. A dividend is paid each year depending on the company's financial state and the achievement of certain financial metrics. This is the case in

Canada, Lithuania, Poland, Switzerland, etc (Böwer, 2017; Richmond et al., 2019; Ter-Minassian, 2017).

- The life cycle of a SOE is a criterion that is taken into account mainly in the Nordic States - Denmark, Finland, Norway and Sweden (Böwer, 2017; Richmond et al., 2019).

In a dominant number of countries - 11 dividend payout is done after consultations between the competent authority and board. In seven countries such as Israel, Poland, Slovenia, etc. dividend payout is defined in a special legal act. Only in Lithuania dividend payout is set in the statute of SOE (Table 1).

4. Dividend Policy in Bulgarian SOES

In Eastern European countries, the role of SOEs is not well understood or consistently reported (International Monetary Fund, 2019). The amount of information generated plays a crucial role in the attitude towards SOEs, and in most cases the data from governments rarely exceed some basic indicators. For these countries, the degree of development of dividend policy in SOEs is considered as benchmark of the level of economic transition to a market economy (World Bank, 2005). These are the reasons to recommend to government of these countries to articulate explicitly the dividend policy of SOEs in order to reduce the undertaking of unjustified risks and avoid macroeconomic imbalances (World Bank, 2014).

In Bulgaria, the state owns or controls 259 enterprises in 2019. Out of them 211 enterprises are with 100% state ownership, and the remaining 48 companies have more than 50% state participation (Keremidchiev and Nedelchev, 2021). Most often the minority owner in them are the municipalities, as is the case with some hospitals and water and sewerage companies.

The legislation considers SOEs as legal entities functioning in the interest of citizens to achieve maximum value for society through the efficient allocation of resources. There are three rationales for the existence of SOEs:

- to eliminate market failures;
- to provide goods or services of strategic importance or those related to national security or development;
- to manage strategic ownership for the state.

The elaboration of dividend policy in Bulgarian SOEs are obligations of the government. The decisions of the Council of Ministers are in line with the preparation of the state budget and aims to provide conditions for the implementation of the revenue part of the state budget. Such an approach to the distribution of profits after the end of the financial year, mainly due to fiscal needs possess problems to the SOE strategic planning (Böwer, 2017). To avoid this problem one can recommend implementation of a structured dividend policy through broad guidelines or pre-defined payout (Böwer et al., 2016). It would enable investment and innovation activities in SOEs.

Traditionally, the Council of Ministers annually adopts three types of decisions related to dividend policy. The first one concerns what share of net profit to be paid as a dividend. At the beginning of the study period in 2016, dividends were defined as 60% of net profit. Thereafter, until 2021, this percentage was 50% with a few exceptions where the take of profits as dividends was 80 or even 100% (Table 2). In 2021, due to the need for fresh financial resources in the aftermath of the COVID-19 crisis, a 100% clawback of SOE profits in the form of dividends has been set, with exceptions made at a lower rate for a few specific enterprises.

Another governmental decision concerns SOEs being excluded from dividend payouts. In 2016, only state-owned hospitals were excluded from paying dividends. In the following year, water and sewerage companies joined this category. These groups of companies along with mental health centres are permanently excluded from paying dividends. The exclusion of these enterprises has a certain impact on the state budget given their profits: BGN 15 million of SOEs in the healthcare sector in 2018 and BGN 9 million for the water supply and sewerage sector in 2018. In some years, individual enterprises most often State Consolidation Company EAD, "National Industrial Zones Company" EAD, "Bulgarian Development" Bank AD are also excluded from paying dividends.

Table 2. Exemption of dividend payouts

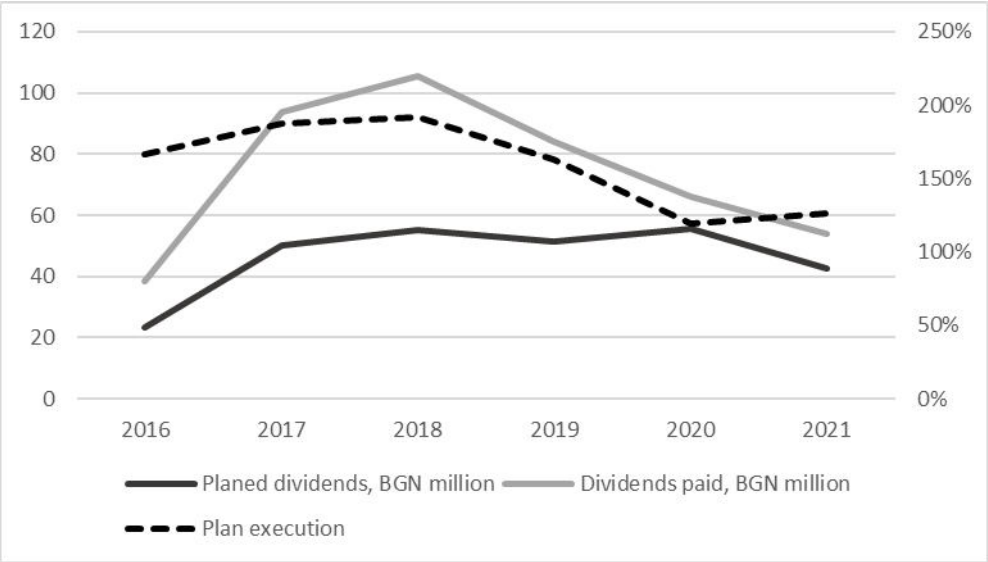
Financial year	Exempted SOEs	Regular dividend rate	Notes
2014	Hospitals	60	
2015	Hospitals and companies in the water supply and sanitation sector	50	
2016	Hospitals and companies in the water supply and sanitation sector	50	
2017	Hospitals and companies in the water supply and sanitation sector	50	
2018	Hospitals and companies in the water supply and sanitation sector and State Consolidation Company EAD	50	Special dividend rate for "Bulgarian Development Bank" AD – 80%
2019	Hospitals and companies in the water supply and sanitation sector, State Consolidation Company EAD, "National Industrial Zones Company" EAD, "Bulgarian Development Bank" AD	50	Special dividend rate for State Enterprise "Air Traffic Control" - 100%
2020	Hospitals and companies in the water supply and sanitation sector, State Consolidation Company EAD, "National Industrial Zones Company" EAD, "Bulgarian Development Bank" AD	50	State Consolidation Company EAD, "National Industrial Zones Company" EAD, with the annulled decision as of August 2021.
2021	Hospitals, mental health centres and companies in the water supply and sanitation sector	100	Special dividend rate for: • 5 SOEs – 50% • "Information Service" AD - 70%

Source: Collected by the author from decisions of the Council of Ministers, 2015-2022.

None of the decisions of the Council of Ministers on the determination of dividends from SOEs present arguments. In the public domain, the explanation is that companies in the water supply

and sanitation sector are exempted from paying dividends due to their obligation to co-finance the implementation of European Cohesion Fund projects in the water sector.

Figure 1. Dividend payouts of SOEs



Note: Planned and paid dividends are in per cent of the central government budget.

Source: Prepared by the author based on data from the state budget execution reports of Ministry of Finance.

The explanation for the exclusion of hospital care facilities is that they are extremely dependent on a limited number of funding sources and taking into account their specificity (Table 2). This rationale is flawed because it is not the number of funding sources that is important, but the volume of that funding. According to the National Statistical Institute (NSI), current expenditure on hospitals from various sources has increased by 93% - from BGN 2.106 million in 2011 to BGN 4.071 million in 2020 (NSI, 2023). With regard to the number of funding sources, after the country's accession to the EU in 2007, hospitals have the opportunity to finance special projects from European structural funds.

Dividends from SOEs are important for the central state budget as their share of non-tax revenues varies between 16 and 52% in 2016-2021. For this period, the absolute amount of dividends paid by SOEs ranges between BGN 39 million in 2020 and BGN 106 million in 2018 (Figure 1).

A specific feature of SOE dividend planning is that they are understated throughout the period. Actual amounts of dividends paid are on average nearly 60% more than planned for the period.

6. Conclusion

The dividend puzzle is an economic concept that reflects problems of private enterprises. This article confronts this concept to theories and practices of SOEs. Five of the six theories analysed are not relevant to the SOE dividend puzzle.

The dividend irrelevance theory is not relevant because the state doesn`t pay taxes over the dividends. Dividends are determined entirely by the principal and behaviour of investors to hold or sell their shares is not taken into account.

The clientelism theoryis not applicable due to the fact that the state is the sole or dominant owner of SOEs and the tax characteristics of investors are not taken into account.

The agency theory is nor relevant as the dividends are determined entirely by the principal and unrestricted financial resources are lacking or very limited.

The signalling theory also does not help solving the dividend puzzle of SOEs as managers do not influence dividend decisions. Signals are received at the principal through the reporting information, controllers, auditors and other control bodies. Dividends are determined entirely by the principal. Unrestricted financial resources are lacking or very limited.

Only the theory of dividend payment preference is relevant and provides a partial explanation of the dividend puzzle in SOEs as dividends are determined mainly for fiscal reasons and financing of SOEs future projects is done mainly in other ways, but not through dividends.

Through the sovereign fund system, it finances the creation of a state-owned enterprise and then decides what portion of the dividend to seize from its profits, regardless of what social goals the enterprise pursues. This puts the fiscal before the social goals of the enterprise. On the other hand, the severe winterization of the residual profit limits the future investments of the enterprise and makes it dependent on new state injections. This is the vicious circle of the dividend puzzle in SOEs that has not yet been solved and deserves to be discussed in future research.

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ROBOTS AS SUBJECTS UNDER BULGARIAN TAX LAW – MISSION IM/POSSIBLE?[1]

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***Abstract**: The aim of the current paper is to examine theoretically the possibility robots to be treated as subjects under Bulgarian tax law. For this purpose, the author will outline the main hypotheses following the tax specifics of the legal personality. Taking into account the relevant provisions of the Bulgarian tax law acts, he will draw conclusion on the future tax treatment of robots.*

***Keywords**: robots, subject of taxation; legal personality; Bulgarian tax law*
***JEL**: K34*

1. Introduction

From something futuristic and revolutionary, robots are becoming an invariable part of our daily lives. There are already cases of a robot assisting in operations, court representation, as well as educational activities.[3] Their variety of functions makes them a valuable helper, but also raises a number of (legal) issues. The lack of detailed legal regulations provides the opportunity for discussions whether it is recommendable for new mandatory measures on this issue or whether we should rather follow the traditional perceptions.

If the idea of significant legal amendments to comply with robotic labor is accepted, the fundamental question is in what direction they should be. Based on the different branches

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[3] See for example https://futurium.ec.europa.eu/en/european-ai-alliance/best-practices/robot-judges-and-ai-systems-chinas-courts-and-public-security-agencies; https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4387301; https://ec.europa.eu/research-and-innovation/en/horizon-magazine/robot-assistants-operating-room-promise-safer-surgery; https://aiforgood.itu.int/the-future-of-educational-robotics-enhancing-education-bridging-the-digital-divide-and-supporting-diverse-learners/

of law and the specifics of international and European law, it is challenging to derive a clear answer.

If it is considered that there should be no amendments, it means that the traditional rules are also applicable to the current trends. However, robotic labor has a number of specificities, and the lack of rules can lead to divergent practice regarding its proper treatment. According to the author, the best option is to find a balance between the two options. The main legal postulates are increasingly difficult to resist the new business models and the types of work. At the same time, a revolutionary change can lead to unwanted negative effects. How this will reflect on the traditional legal institutions cannot be fully determined. Therefore, adherence to the traditional legal postulates, amended accordingly, seems a rational option at this stage.

2. Robots and tax law

From tax law perspective, it is intriguing the robots' impact and more specifically the robotic labor. Robots increasingly seem to be the preferred option for 'employees'. This also reflects the payment of wages, and hence also the liability to pay taxes. Thus, it is advisable to analyze the possibility of introducing special rules governing this matter.

There are already numerous publications on this issue, examining various hypotheses, in the academic literature (Oberson, X., 2019, Taxing Robots, Edward Elgar Publishing; De la Feria, R. and Ruiz, M., 2022 Taxing Robots in Interactive Robotics: Legal, Ethical, Social and Economic Aspects, Springer Nature, Ch 17; Scarcella, L., 2019, Artificial Intelligence and Labor Markets. A Critical Analysis of Solution Models from a Tax Law and Social Security Law Perspective, Rivista italiana di informatica e diritto 1, 1; Chand, V., Kostic, S. and Reis, A., 2020, Taxing Artificial Intelligence and Robots: Critical Assessment of Potential Policy Solutions and Recommendation for Alternative Approaches – Sovereign Measure: Education Taxes/Global Measure: Global Education Tax or Planetary tax, World Tax Journal).

In this regard, different positions are shared. Some propose the introduction of 'robot tax'. Others are of the opinion that the existing rules should be amended, but not revolutionary. Another proposal is that tax reforms are not the right option and different solutions should be found. There is also view that nothing should be amended, given that robots are machines. Last

but not least, the revolutionary idea of robots being subject to taxation and paying taxes, respectively, can also be mentioned.

Although this last hypothesis seems too futuristic and rather impossible, the author believes that it should not be completely ruled out, not least because no one knows to what extent robots will play a key role in the forthcoming decades. Therefore, he will briefly examine whether they can be defined as subjects under Bulgarian tax law, taking into account the current situation and the future trends.

3. Robots as subjects under Bulgarian tax law

3.1. Primary and secondary legal personality

In order to give rise to tax liability, the existence of subject and object of taxation, which are in a certain relationship with each other, are necessary in tax law. That is why, such question is vital and directly affects taxation. If robots do not satisfy the subject criteria, it is impossible for them to have obligations and, respectively, to rely on certain rights. Conversely, if they have legal personality, they should generally file tax returns and pay taxes.

In order to outline certain position, it is necessary to focus on several fundamental points on this matter. First, legal personality should be considered through different perspectives. On the one hand, it is crucial to think about the interaction between tax law and other branches of law. In this regard, there is the so-called primary and secondary legal personality.

Secondary is also known as ‘derivative’. Subjects that exist in other branches of law are also subjects in tax law (for example, in civil law). Hence, there is an identity between them. However, this does not automatically lead to the understanding that subjects in another branches of law should necessarily be subjects in tax as well. The opposite statement is also valid through the prism of primary legal personality.

Based on these arguments, Bulgarian legislation does not contain provisions that define robots as subjects. Therefore, they do not have secondary legal personality under the Bulgarian tax law.

Some may share the opinion that their legal personality should be outlined firstly in civil law so that it can reflect other branches of law. It is therefore irrelevant to examine this question for tax purposes.

On the other hand, there is primary legal personality in tax law as well. It can be defined as 'unique', specific only thereto. In this case, subjects, that do not exist in other branches of law, have legal personality for tax purposes. As such, the unincorporated associations are relevant example. In relation to the requirements of the European legislation, hybrid mismatches can also be mentioned as another hypothesis.[4] Therefore, it is not impossible to add new types of subjects in tax law and sometimes it is even mandatory due to regulations at international and European level.

It can be summarized that primary legal personality in tax law has two dimensions - in relation to international requirements and due to internal needs. Can robots then have such legal personality for tax purposes? According to the author, the answer should be considered in two ways.

First, there are no international requirements to impose such legal measure at this stage. Therefore, taking into account the cross-border norms, it is rather impossible at the moment. Even if this happens, there is again no guarantee to what extent Bulgaria will adopt such position and/or modify it for its own needs.

Second, the answer may also be derived from the specifics of the national legislation. Based on its national sovereignty (with special focus on direct taxes), Bulgaria has the right to introduce new tax rules. The main point here is whether this is appropriate and what would be the arguments of the rule-maker for such measures.

Perhaps, the most anticipated answer here is to provide more revenue for the state. Robotic labor is nothing new and even risks job cuts. This reflects on the wages, their taxation and social security contributions. Thus, fewer taxes in this case would negatively affect the budget.

Although such argument sounds logical, it is again not possible to outline a definitive answer whether this particular measure is the most appropriate. If primary legal personality is

[4] Bulgaria had to transpose Council Directive (EU) 2016/1164 of 12 July 2016 laying down rules against tax avoidance practices that directly affect the functioning of the internal market, where they are outlined.

still recognized as possible, the question regarding its legislative design remains open. In this regard, three main options are possible.

The first is to define robots as e-humans, a subcategory of humans. In this way, they are 'equal' to natural persons. Robots are becoming more and more like us, replacing humans in variety of activities. As already shared, this reflects income taxes and social security contributions. The author considers such approach futuristic and most impractical. At this stage, robots are more associated as 'smart machines', as some kind of technique that facilitates the work. Till now, there is no similar precedent - to define a given category of subjects as a sub/category of human.

The second hypothesis is that they are 'equivalent' to legal persons. Such approach already exists under Bulgarian corporate income taxation and new examples have been noticed over the years.[5] In this case, robots will be similar to the corporations and realize profit. They may be construed as a 'combination of entities' that satisfies the notions of a corporate structure for tax purposes.

However, this approach carries a number of risks. Indeed, Corporate Income Tax Act (CITA) contains several similar hypotheses, but some of them are dictated by the European law. Also, robots are controlled by humans. For example, an unincorporated association consists of human members. Even if robots are perceived to realize profit, it is rather 'absorbed' by the humans who control them. The latter should pay the tax.

The third hypothesis is to introduce an entirely new category of tax entities– 'robots', for which new rules should be outlined. Perhaps, this idea seems fairest at first glance, but also the most difficult to implement. It would give rise to numerous challenges and does not correspond to the postulates of the current legal system.

Regarding the primary and secondary legal personalities, the following aspects can be outlined. Secondary personality cannot exist under tax law, as robots are not recognized as subjects in other legal branches. In regards to the primary personality, there are numerous challenges, such as under which hypothesis the robots can fall into.

3.2. Legal personality under different Bulgarian substantive tax law acts

[5] See for example Art. 2, para 4 of the Corporate Income Tax Act.

Legal personality should also be considered through the prism of the various substantive tax law acts. Based on their specificity, each has different object and subject criteria. For example, Personal Income Tax Act (PITA) examines the taxation of natural persons, while CITA – of legal persons. Pursuant to Value Added Tax Act (VATA), both natural and legal persons can be subjects from VAT perspective, if they perform 'independent economic activity'.

From substantive tax law acts perspective, robots cannot simultaneously meet the subject criterion thereunder. The most difficult for realisation is the hypothesis that they may be subjects under PITA. Pursuant to Art. 3 thereof these are only the natural persons. As evident, PITA follows the secondary legal personality from the civil law. Robots cannot satisfy this criterion and it is impossible to expand it with a new subcategory of 'humans'.

Based on the specifics of CITA, it contains examples of both primary (e.g. unincorporated associations and secondary (e.g. legal persons) legal personality. Following the first, robots can be 'equivalent' to legal persons if they realize profit. The im/possibility of fullfiling the requirements in this substantive tax law act has been already outlined in item 3.1 of this article.

VATA uses the broad term 'person'. At first glance, it does not matter here whether it is natural or legal person or otherwise. Crucial is that it can carry out 'independent economic activity'. In this regard, it should be considered whether robots satisfy this criterion. If the focus is more on the activity and not on the subject, there seems to be such possibility. What matters more is what is meant by 'independent'. If this is identical to 'autonomous', then robots do not satisfy this criterion.

Taking into account the Bulgarian case law on this issue, it is hardly to define robots as subjects. According to Decision No 5030 from 10.04.2013 under adm. c. No 8381/2012, Bulgarian Supreme Administrative Court: 'The provision of Art. 3, para 2 VATA as definitive and contained in the substantive tax law, cannot be interpreted expansively'. Also, 'in the absence of an explicit legal text for determination on the taxable persons..,tax legislation can not be interpreted expansively or applied by analogy' (Decision No 8037 from 16.06.2010 under adm. c. 2016/2010, Bulgarian Supreme Administrative Court). 'Determination of taxable persons cannot be done by interpretation, but only by explicit legal text' (Interpretative Decision No 2/2008 under int. c. No 2/2008, Bulgarian Supreme Administrative Court).

As seen from the Bulgarian substantive tax law acts and case law, robots would hardly satisfy subject criterion. Whether they should be 'equivalent' to the legal persons and fall within the scope of the CITA remains rather impossible at this stage.

3.3. *Active and passive subjects under Bulgarian tax law*

According to the Bulgarian tax law doctrine, subjects may be categorized as active and passive. This is related to the authoritarian method of legal regulation. It is distinguished by 'vertical' relations - of authority and subordination, which is why subjects in tax law are not in equal position (with some exceptions).

In general, passive subjects are those who bear tax liability. They have already been examined in the previous parts of this publication regarding the various substantive tax law acts. Therefore, the author will not focus on this hypothesis again.

Active subjects are the state or the municipal bodies that have authority. They act on behalf of the state/municipality and one of their main functions is to collect the tax revenue from the passive subjects. It is typical for them that they have 'competence'. It has different dimensions.

It can be temporary if it is for a certain period of time. Competence is also territorial, as it extends to certain geographical boundaries. The material includes the range of powers that the authority has. The personal concerns the specific individual who is the active subject in the respective relationship.

Evidently from these dimensions of the competence, robots cannot be active subjects due to their lack of competence. They help the revenue administration with certain tasks. They are rather tools by which the revenue authorities carry out their activities. It is also difficult to imagine robot performing tax audit or tax check autonomously.

3.4. Legal personality under Tax and Social Security Procedure Code

Art. 9 of the Tax and Social Security Procedure Code (TSSPC) outlines the subjects in the tax process. Pursuant to Art. 9, para. 1 of the TSSPC, these are the administrative body, the natural and the legal persons. Therefore, robots cannot fall into any of the listed categories.

Art. 9, para. 2 of the TSSPC also examines the equivalent to legal persons subjects. They are again explicitly delineated. As can be seen from the provision, robots again do not meet the requirements.

However, can Art. 9 of the TSSPC be expanded and include a special text on robots? The author believes that the answer is negative. Main arguments are related to their control from humans. It is impossible for robots to independently submit tax returns, pay taxes, bear administrative criminal liability, be tax audited, have the right to defense, etc.

Conclusion

The purpose of the present paper is to examine the main hypotheses regarding robots as possible subjects under Bulgarian tax law. This aspect is significant for tax law because it reflects the traditional postulates. If the understanding, that they can have legal personality, is adopted, it will lead to complete rethinking of the tax system.

The author is of the opinion that nowadays the answer should be negative. Theoretically, there is no proper argument how robots can be textually placed. There is also no national practice that would allow such possibility. Robots are not recognized as subjects in other branches of law, too. There is no suitable option for them to participate in the tax process with certain rights and obligations. It is also impossible to talk about that they may have competence.

However, the author believes that if now such question seems too revolutionary, then it is not so certain what robot's fate will be in the future. The first robot-citizen - Sophia[6], can be mentioned as an example. Even if it is an exception and seems more like an advertisement, the introduction of such opportunities may lead to a number of legal risks.

In case that robots are defined as subjects in tax law, there are many challenges. For example, should they have equal rights with the already existing tax subjects? If the answer is affirmative, then it would be interesting to see robot prosecuted for tax crimes. If it is negative, can this be defined as discriminatory? Is it possible to create special rights and obligations based on the specifics of robots as mixture of the opposite views?

[6] More about this in https://www.hansonrobotics.com/sophia/

In fact, the biggest question here is whether they should be tax law subjects at all? The author does not support the understanding that this is a suitable measure due to their increasingly widespread use in the work process that reflects income taxes. If this is the main argument, then other mechanisms may be introduced. These could be, for example, a new tax on robots, an increase in the tax burden on robotic activities or even another form of public receivables. However, at this stage, their inclusion as subjects in tax law does not seem to be a rationale option.

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Online resources

https://aiforgood.itu.int/the-future-of-educational-robotics-enhancing-education-bridging-the-digital-divide-and-supporting-diverse-learners/

https://ec.europa.eu/research-and-innovation/en/horizon-magazine/robot-assistants-operating-room-promise-safer-surgery

https://futurium.ec.europa.eu/en/european-ai-alliance/best-practices/robot-judges-and-ai-systems-chinas-courts-and-public-security-agencies

https://www.hansonrobotics.com/sophia/

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4387301

BIG DATA, NEW ADVANCED ANALYSIS TOOLS FOR RESEARCHERS: THE CASE STUDY OF FORECASTED VOLATILITY OF THE USE ESG BONDS

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***Abstract**: The aim of this work is twofold. Firstly, we search to clarify the notion of Big Data (BD) and demonstrate that the taxonomy constitutes one of the fundamental tools to portray the BD characteristics. Secondly, we have shown that the traditional analysis instruments are now relatively obsolete to integrate such outstanding amount of data; consequently, new advanced analysis tools are recommended. Based on a neural network approach, we have found that this methodology improves the forecasting results of high volatility assets compare to a basic GARCH model.*

***Keywords**: Granularity, Big Data, Machine learning, Neuronal Network, ARMA-GARCH process.*
***JEL**: C22; C45; C53; G15.*

1. Introduction

"The world's most valuable resource is no longer oil, but data" (The Economist, 6 May 2017) and the recent years have witnessed an increase in granular data surveys, implying massive database often considered as big data. Granular data are relevant and constitute an important input for a more accurate assessment of economic and financial imbalances and potential risks (Bholat, 2013; Mathur et al., 2023; Mauderer, 2023).

Besides, the advent of Internet has fundamentally revolutionized the IT and communication sectors; access to new technologies has been largely democratized all over the world and amongst all generations; this means that structured and/or unstructured data inflows - emerging from these innovations - are daunting and could be a precious input to increase the economic finance and social knowledge. No domain has been spared, leading to an explosion of the informational volume, to a degree such that the notion of Big Data has appeared everywhere. This buzz term is not new and has been used since around 1990; it was popularized by John R. Mashey (Mohd, 2020), a more or less consensual literature has defined the Big Data, as well. Historically, a sequence of three-time phases (1970-2000; 2000-2010 and 2010-present) provides an interesting frame to understand the evolution of Big Data (BD)[3].

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[3] *For more details, click on the following link: https://www.bigdataframework.org/short-history-of-big-data/*

The wealth of data has affected the usual empirical analysis approach and requires an innovative research area including mathematical and artificial intelligence methodologies (Elgendy and Elragal, 2014; Varian, 2014, Doerr et al. 2021; Araujo et al. 2022).

Within the above-mentioned environment, several issues should be viewed from regulation angles and research scopes: should government deal with the multifaceted challenges including privacy and confidentiality risks and ensuring sufficient and timely cooperation with all actors (national and international) involved in the BD issues? How should the researchers tackle the "Darwinist" obsolescence of the traditional econometric tools? The first set of question is outside of our concerns ergo it is useless to expose it. The last issue is the heart of our problematic. Indeed, given the data size, different econometrics methods have become obsolete to deal with all these information. Moreover, the traditional software is limited to run program with numerous data, this point explains the necessity to converge towards more sophisticated tools. To assess the performance of the tools categories, we make use of two different approaches (neural network and GARCH) to assess the quality of the forecasts of financial assets. We have found that the neural network medialization outperforms the GARCH models.

2. Big Data: Definitions and Tools Frameworks

The need for data is more and more important and thoughts decades, we witness an amazing data development. The data collection acceleration starts with the internet coming and the Covid-19 crisis (OECD Digital Transformation in the Age of COVID-19, 2020)[4]. The goal of this section is to present the evolution of big data.

Since decades, the development of big data (BD) has been impressive and the evolution -that will not stop or curb- has an important impact on the empirical data treatment and the analysis based on statistical tools. To explain with accuracy the consequences of BD on the data production and more specifically its utilization, it is beneficial to understand what we mean by BGD and what was or is the context.

The apparition of the social networks began slowly at the end of 80's the before the World Wide Web advent, the networks were not daily used and the users were limited given the low rate of internet equipment. Since 2002, we observe a substantial increase in the use of social networks (Friendster, LinkedIn, MySpace and Facebook) driven by the IT innovation and its "democratization", at that time, the data concerns were rare. Furthermore, the COVID-19 period and particularly the related measures have pushed people to use in an intensive manner several smart devices, digital platforms and social and/or professional web sites. Hence, nowadays, data protection is at the forefront since it raises fundamental questions linked to the private and confidential data and its growth is amazingly exponential.

[4] *https://www.oecd.org/digital/digital-economy-outlook-covid.pdf*

In parallel, countries have been stricken by several and memorable macroeconomics events that have compelled them to furnish a more accurate picture and understanding of the economic and financial mechanisms, circuits and channels.

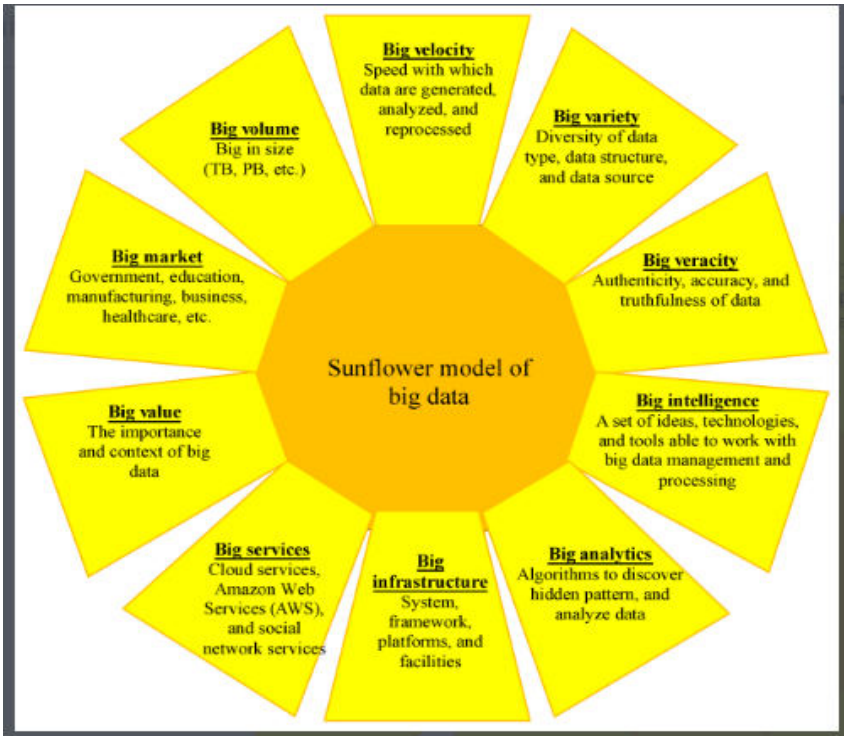
In fact, the last financial crisis was the catalyzer of the ascendant trend; besides, in the recent years, there is an acceleration that are interconnected -directly and indirectly- to the sanitary crisis. Indeed, the acceleration of the development of regulation instrument to ensure the financial stability had required an outstanding amount of information based on financial institutions, household and firm surveys. The target is to assess the financial health of each agent, foresee any imbalances and promote some stabilization policies. During this period, several new and ameliorated actions have emerged. Within a financial scope, central banks have implemented traditional and non-conventional policies to tackle the negative consequences of the financial crisis, which origin was the US subprime mortgage crisis, and prevent any potential systemic risk that is also international given the country's interlinkages. Furthermore, the aftermath of the COVID-19 pandemic has reinforced the idea that the increasing data needs trend is starting and we may assist to a profound transformation of the database treatments. Indeed, some measures such as distant work creating outstanding information flows have boosted the data growth and the statistics analysis. Since decades, the data has become more and more voluminous and granular (Tissot and de Beer, 2020). To capture the nature of the data it may be fruitful to define deeply the notion of Big Data (BD) and particularly describe the close link between granular data and big data.

Given the volume of articles, the notion of big data (BD) has been largely outlined in the engineering literature (Günther et al., 2017). Until today, there is no definitive and consensual framework on the BD concepts and the related notions evolve on a regular basis to propose more adapted layout designs.

Even if there is no certainty on the origin of the word big data (Gandomi and Haider, 2015), it is largely admitted that the term big data is not new. In a 2006 issue of the Harvard Business Review, Tom Davenport noticed that Amazon, Capital One, and the Boston Red Sox use BD statistics methods to dominate in their fields analytics as a competitive differentiator—"businesses were awash in data and data crunchers" (Davenport 2006). In 2010, Hal Varian (Google's chief economist and former Dean of the School of Information Management and Systems at the University of California, Berkeley) studied computer-mediated transactions, through which economic transactions involve computers utilizing sale terminal, a cash register, and more recently electronic commerce. Although the authors do not explicitly use the term "big data," the phenomenon and information they refer to will subsequently fall into the big data debates; nonetheless, given the difficulty to define the Big Data, a pseudo- definition has emerged (IMF, 2021). The first attempt takes into account three criteria named the 3Vs criteria: high-volume, high-velocity, and high-variety. Doug Laney analyst from Gartner came up with the famous three Vs back in 2001; but soon this narrow definition shows some limits therefore an augmented version is designed, the following figure reports the BD related criteria.

The 5Vs approach (data volatility, data variety, data volume, data veracity and data velocity) is not sufficient to characterize the DB notion since several components are absent, however; other works have started to introduce more elements to complete the above-mentioned figure and expose more sophisticated 10 Big picture that seems to be more inclusive now.

Figure 1. Sunflower model to define big data



Source: Rahman and Reza (2022).

At the first glance, it is clear that there are core characteristics (5Vs that remain fundamental) and technical ones, which deal with targeted domains/scopes. Hence, the new representation integrates some specific items oriented towards the economic activities and technology sectors. Indeed, the big market englobes all data related to different markets producing massive information via smart/IT devices or other providers such as business, finance and private and public activities (public expenses and resources, defense, education, sociology, labor etc.). The Big services are designed as platforms that can provide services to millions of users (Google, Amazon, or Facebook networks, mobile services, etc.) and the big infrastructure includes diverse BD treatments environment (machine learning, Apache Hadoop ecosystem, distributed datacenter, etc.). Big intelligence and big analytics are dedicated respectively to concepts tools or metrics related to BD, and to algorithms supposed to manage data and their empirical analysis.

Indubitably, the definition attempt is at the preliminary phase; improvements are continuously available and the rapid emergence of new criteria demonstrate that the BD notion is complex,

evolving, therefore, a unique definition to capture all these characteristics is not relevant and a taxonomy is a very interesting reflection path. The notion of granularity is fundamental and it is quite difficult to exclude granularity from the BD definition. As underlined by Schmarzo, the granularity is one of the pivotal variables of the BD.

Lastly, the development of the volume of BD should accelerate the emergence of an accurate and harmonized legal framework.

According to Statistica website, there is a data explosion projection until 2025 (growth rate from 2010 to 2025, +8 950%), the priority to find reliable definitions and metrics is crucial since they are the cornerstone of any adapted policy foundations. In addition, the granular big data nature is an evolutionary process this means that we need a very flexible framework to delimit in an accurate manner the scope; consequently, the taxonomy seems to be a good alternative, and the continued improvements of the BD definition is a sign of the taxonomy convergence. The sunflower representation is, of course, a relevant starting point for the BD taxonomy but some other variables should be added since they have been omitted. We could cite the energy consumption, BD firms' business plan, the software's classification (free (or not) software such as Python, R), the development of start-ups (or unicorns) specialized in the BD, the legal framework, costs of BD, etc. A meta-analysis could also be an interesting approach to determine the principal determinants of the BD. Furthermore, soon or later harmonization issues should be introduced to permit comparisons between entities and countries. This element is on the way since in the recent years, different European survey are launched to characterize the start-up profile.

The outstanding of amount of information is more and more concerning and most of the traditional empirical tools can barely cope with these information volumes since they are not built for such purposes. Indeed, the size of the variables or observations are limited. Given this limitation, the AI tools should be a natural alternative to tackle the numerous big data obstacles.

The neural network approach seems to be an excellent alternative to complete the traditional tools, however it is still evolving. Diverse research works attempt to demonstrate that the performance of this mathematical tool is relevant for the volatility forecast assessments.

The last decades, the financial fields have largely used mathematical tools to provide information on the high volatility variables. After having overused the famous ARMA-GARCH process, the studies have started to explore the neural network approach to improve the volatility forecasting quality.

3. ARMA_GARCH Model vs Hybrid Neural Network Model

This section is dedicated to present the ARMA-GARCH model and Neural Network (NN) hybrid model results. Based on the most recent literature we run a simple ARMA-GARCH model and NN-ARMA-GARCH models.

Modelling and forecasting stock market volatility have constituted a great concern among researchers and financial market participants since it plays an important role in financing the real economy. Plethoric works have emerged to describe the advantages of using a neural network to improve the forecasting volatility.

From a literature survey[5], several features have emerged. Firstly, there is an abundant and recent literature on the financial methods to measure precisely the size of the volatility. The approach is more and more sophisticated and introduced a significant number of observations. Secondly, from, this very short sample of paper, it is possible to conclude that amongst all the methodologies, the NN approach seems to be the most suitable for high frequency financial variables[6]. Besides, methods and data are plural; therefore, it is quite delicate to compare them. Most of studies have used univariate approaches. Nevertheless, despite the important progress realized in this field, some limits could be cited as the few numbers of observations used with a method mostly dedicated to BG, for instance. There are no relevant studies to analyze the utilization of BD tools on small samples. In the near future, this limitation should be tackled since we stand at the eve of data revolution and not all legal and availability issues are solved.

First, we would like to precise some points on our empirical choices. Regarding the variable, the scope of our works is related to the sustainable activities. Since the Paris Agreement in 2015, the concerns and awareness on the climate change have increased in an exponential manner. In addition, the related risks, such as physical and transition risks as described by the current literature is a threat for the financial stability and could provoke a systemic crisis, which social, financial and economic damages are dramatic. The role of finance is therefore fundamental to tackle the climate change. Given the context, plethoric works have emerged to define and measure the sustainable development (Gueddoudj, 2021). As this notion is complex to assess, the taxonomy approach has been privileged to shed light on the notion of sustainability. Taxonomy is a type of classification of investment in terms of environment, social and governance criteria. Funding of ESG projects is therefore to win the race against the climate change challenge. Amongst all the financial instruments, ESG bonds are highly popular and their increasing evolution is noticeable (Goldman, 2023. Giglio and al. 2023). The area zone is justified by the fact that the US is catching up Europe. Indeed, despite the limited role of the Fed to promote the process of slowing down climatic change, the US sustainable bonds are booming (Poh, 2022). Hence, it may be interesting to provide some forecast on the US ESG bonds thanks to different empirical tools. The US ESG database is based on granular information. Given, the confidentiality status of granular data, we make use of the ESG aggregated variable.

[5] Upon request to authors for the literature survey including 30 articles. All papers which are not cited in the text are provided in the References.

[6] This conclusion should be viewed cautiously since the sample is very low. Only a meta-analysis approach based -on at least 100 supports- could provide results that are more reliable. Indeed, by increasing the sample, the statistics tests powerful is better.

The aim of following paragraphs is the presentation the statistics characteristics of the daily US ESG bonds for a recent period (from 2013 to 2013).

Presentation of the different specifications

ARMA-GARCH(p, q)

We start by exposing the univariate ARMA-GARCH(p, q) (Bollerslev, 1986) that writes the yields r_t process as follows:

$$r_t + \theta_1 r_{t-1} + \cdots + \theta_{t-n} r_{t-n} = \varepsilon_t + \varphi_1 \varepsilon_{t-1} + \cdots + \varphi_{t-n} \varepsilon_{t-n} \quad (1)$$

With $\varepsilon_t \sim N(0, \sigma^2)$ and $\theta + \varphi \neq 0$

The associated conditional variance is:

$$\sigma_t^2 = \omega + \sum_{i=1}^{p} \alpha_i r_{t-i}^2 + \sum_{j=1}^{q} \beta_j \sigma_{t-j}^2 \quad (2)$$

Some traditional assumptions on the returns process are:

$E(r_t) = 0$ and $E(r_t^2) = \frac{\omega}{1-\alpha\beta}$ with $\omega > 0, (\alpha, \beta) \geq 0$ and $\alpha + \beta < 1$ to ensure positive and finite unconditional variance. For the innovations, there are two kinds of hypotheses, the normal or the leptokurtic behaviour of the financial assets returns and the optimisation of the likelihood function to provide estimation of the parameters has different shapes. For the normal and student cases, the expressions are respectively:

$$L = -\sum_{t=1}^{T} \left(\frac{1}{2} \log(\sigma_t^2) + \frac{r^2}{2\sigma_t^2} \right) \quad (3)$$

$$L = -\sum_{t=1}^{T} (log\tau(\frac{\vartheta + 1}{2}) + log\tau(\frac{\vartheta}{2}) + \frac{1}{2}\log(\vartheta - 2) + \frac{1}{2}\sigma_t^2 + (\frac{\vartheta + t}{2})\log(1 + \frac{r_t^2}{(\vartheta - 2)\sigma_t^2})) \quad (4)$$

With τ the Gamma function and ϑ is the degree of liberty greater than 2.

NN-ARMA-GARCH(p, q)

The neural network has started to develop in the financial field because it is flexible and it outperforms some traditional tools applied to non-linearity process, for instance (Zhang, 2001). Indeed, the class of neural network models has taken into account in a simple manner the non-

linearity; however, they are relatively complex and not always easy to interpret (Zhang et al. 2018).

In our case, we make use of a neural network ARMA-GARCH (noted NN-ARMA-GARCH) specification to assess the forecast improvement.

We first start to verify the stationarity hypothesis. Then, some pre-tests validation such as the unit root tests for the stationarity are tested.

Table 2. Unit Root Test for the US ESG Variable

Augmented Dickey Fuller Test	1% level	5% level	10% level	Statistic (p-value)
In Level	-3,431916	-2.862117	-2.567121	-0.971291 (0.7653)
In first differences				-47.30212 (0.0001)

Source: Authors.

According to the unit root test, the daily variable is not stationary; we make use of the yield variable:

$$y_t = \frac{\partial \log (Y_t)}{\partial t}$$

Table 3. Results of Estimations ARMA-GARCH(p, d, q)/NN-ARMA-GARCH(p, d, q) and Performances[7]

Performance tools	RSME	MAE
ARMA(2, 2)-GARCH(1, 1)	0.0036986	0.002574
ARMA(2, 2)-GARCH(1, 1)-NN	0.0012578	0.000586

Source: Authors.

Based Table 3 it is possible to conclude that whatever the performance tools, the hybrid model records the best results in terms of performance since it reduces drastically the error volatility. Moreover, the increase in observations that could be assimilate to big data[8] provides similar results, namely the superiority of the Neural network approach on a traditional model.

4. Conclusion

To resume the key features, the development of the data is at its beginning and it is certain that the qualitative granular data holders will "rule the world". The recent covid-19 crisis has

[7] Notes: After several equation's (EQi i=1, …, n) estimations, we have selected to present the best results estimation. EQ1: All variables are significant at 1%. All post-tests are validated (ARCH-LM test, sign-Biased, residuals Correlogram). The ARMA-GARCH-NN model was trained with the Tensflow. Given the observations numbers, we specify the number of hidden layers and the number of neurons in each layer (4,2).

[8] We simulate an ARMA-GARCH process by using the results obtained from the US database with different samples (until 100 000 observations).

boosted the awareness of the climate change and has contributed to reintroduce explicitly ESG debates. Soon, they have concluded that there is a huge data gap in this field that should be overcome on the very short term. Moreover, the traditional mathematics and econometrics tools seems to be less performant to provide qualitative empirical results. This point is concerning particularly for the prediction's exercises.

We have started with a traditional ARMA-GARCH model, we have conclude that the best specification is a ARMA(2,2)-GARCH(1,1) process. To assess the performance, we have selected different statistics such as RMSE, MAE, MAPE etc. Then, we compare these statistics to other specificities that take into account the NN approaches. In accordance with the financial literature, we have found that the NN models outperform the ARMA-GARCH specifications. Actually, there are some limitations to our models and soon or later, they have to be remedied. The principal drawback is the exclusion of the macro-economic factors such as GDP.

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Appendices

A- Best estimation results (Process AR(2)-MA(2)-GARCH(1,1)

A.1. Post-tests ARCH LM Test

Heteroskedasticity Test: ARCH

F-statistic	1.926378	Prob. F(2,2610)	0.1459
Obs*R-squared	0.103258	Prob. Chi-Square(1)	0.7480

A.2. Engle-Ng Sign Bias Test

Engle-Ng Sign-Bias Test
Null Hypothesis: No leverage effects in standardized residuals

	t-Statistic	Prob.
Sign-Bias	-0.275172	0.7832
Negative-Bias	0.154573	0.8772
Positive-Bias	0.334952	0.7377
Joint-Bias	0.656009	0.8828

DEFINING THE GREEN AGENDA: INTERNATIONAL AND EUROPEAN INSIGHTS INTO GREEN INDUSTRIAL POLICIES

Elena Spasova[1]

Abstract: *This article explores the green political agenda's evolution, particularly its rise as a driving force behind green industrial policies since the 2000s. These policies have become instrumental for governments aiming to bolster their national businesses' competitive edge and international trade roles. The paper is structured in three main sections. The first section traces the evolution of the Green agenda from the 1970s to the present, highlighting its transformation in policy makers' eyes to an economic and strategic tool in the 2000s. It explores how green industrial policies emerged, influencing international trade dynamics and national economic strategies. The second section delves into the specific aims and instruments of these policies over the past decades. The third section provides an examination of green industrial policy measures enacted by the US, the EU, and China in recent years. The conclusion highlights challenges for European decision-makers in crafting effective green industrial measures and suggests areas for future discussion.*

Keywords: *industrial policy, green agenda, subsidies, green industries*
JEL: *O24, O25, O38, Q58*

Introduction

In the context of a weakened global economic governance framework, the historical stability of the European integration project and economic leadership born during the liberal international trade order under GATT and the WTO have shifted. The process of deglobalization is marked by the significant rise of bilateral and regional trade agreements from around 50 in 1990 to about 300 in recent years. The EU, while initially reluctant, has also embraced the trend of bilateral and regional trade agreements. As of 2021, the EU had engaged in around 130 trade agreements. These agreements now govern up to 40%, of the EU's external trade. While globalization has brought economic benefits, recent crises such as the COVID-19 pandemic and geopolitical events like Russia's invasion of Ukraine in 2022 have revealed vulnerabilities in supply chains, energy dependency, and environmental sustainability of international trade. Geopolitical dynamics further induced deglobalization and regionalization patterns in economic governance. Currently, national and international economic policies integrate more and more strategic elements tied to geopolitics and industrial policy. Considering these shifts in international economic order, we focus specifically on the underlying green agenda that marks

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most of the development and sustainability debates in the last couple of decades, incl. those discussing the international trade relations and networks.

The rise of the polemics regarding industrial policy and the revival of idea of state interventionism for economic growth has happened considerably in two main areas: digital and green technologies. In the latest years, the push for stricter rules, more security and less trade openness, has been largely reported in those sectors which realize the so called digital and green industrial revolutions. This report specifically focuses on the green political agenda surrounding green transition that since 2000s became the flagship factor for the development and wide application of green industrial policies by many governments in their attempts to create competitive advantages of national businesses and to increase their odds in international trade and value chains. The definition of green industrial policies that is applied within this report follows Rodrik (2014) where it is defined as all the investments, incentives, regulations, and policy support as forms of active government involvement designed to stimulate and facilitate the development of green technologies and the building of competitive positions for national green industries. Green industrialization is defined as maximisation of the application of clean energy, sustainable resources and green-production technologies. The focus industries are the renewable energy sectors; electric vehicles (EVs) production; hydrogen and energy efficiency technologies.

The paper is structured in three main sections. The first section focuses on the evolution of Green agenda since the 70s and the changes in the way it is perceived by policy makers throughout the 2000s when its economic potential and significance for international strategic leadership are revealed. Within the section the emergence of green industrial policy is studied. It is outlined the impact green agenda and environmental goals have on international trade dynamics and national economic policy modifications. The second section discusses the specific aims of, and the main instruments of green industrial policy applied by governments in the last couple of decades. Their evolution and intensity of application is studied. The third section discusses the actual industrial policy measures introduced by the US, the EU, and China in the last decade. Main similarities and differences in terms of approaches and effects are outlined. The concluding section summarizes the main identified challenges in front of the European decision-makers when designing green industrial measures and structuring policy responses to face and withstand the competitive pressure. Some points for future discussion and study are outlined.

1. The evolution of Green agenda and its implications for international trade and economic growth

The history of climate change issues entering the international political discourse goes back to 1949. Then, the UN Scientific Conference addressed resource conservation and utilization, marking the first UN effort on resource depletion. It focused on managing resources for

economic and social development rather than conservation. Serious attention to environmental issues within major UN organs emerged in 1968. The Economic and Social Council added environmental issues to its agenda, leading to the first UN Conference on the Human Environment in 1972. The First Earth Summit, held in Stockholm in 1972, established principles for human environment preservation and an action plan for international environmental action. The summit mentioned climate change for the first time, urging governments to consider their activities' climatic effects. The conference suggested measures, leading to the formation of the United Nations Environment Programme (UNEP) Governing Council, Vienna Convention for the Protection of the Ozone Layer, and Transboundary Air Pollution Convention.

Over the next two decades, concerns for climate gained international attention, leading to the establishment of the Intergovernmental Panel on Climate Change (IPCC) in 1988. The UN General Assembly identified climate change as urgent, requesting WMO and UNEP to review and recommend response strategies. In 1989 the Montreal Protocol also came into force.

The 1990 World Climate Conference and the Earth Summit in 1992 further emphasized global climate change concerns. The United Nations Framework Convention on Climate Change (UNFCCC) was adopted in 1992 to stabilize greenhouse gases (GHG). The Kyoto Protocol, adopted in 1997, aimed to reduce industrialized countries' emissions. It came into force in 2005 after being negotiated by over 160 nations.

Up to the 90s the state and international efforts on environmental preservation and climate change were dominated by intergovernmental arrangements without clear and definite impact on internal policies and without tangible effect on international cooperation and coordination. Allan, Lewis and Oatley (2021, p. 8) define environmental politics by that time as separated from political economy and a “low-politics” issue – the topic has emerged in the world governance agenda, however, had no effect on global power politics and economic agenda.

For many years, the dominant approach to global environmental policymaking was characterized by what Bernstein (2001) termed the "compromise of liberal environmentalism", emphasizing market-based solutions like pricing pollutants. The Kyoto Protocol exemplified this trend, along with subsequent attempts to establish carbon emission markets at national and regional levels. Concurrently, the political influence of fossil fuels and their subsidies perpetuated state inaction.

The dominant economic mainstream theory did not recognize a possible complementarity between economic growth agenda and environmental protection. They were often perceived as conflicting in political and normative economics. There are plenty of case studies describing the dichotomy between economic growth and green agenda. The 90s focused on market-based policy measures designed to “make” the business comply with the environmental and resource restrictions and to internalize environmental externalities originating from productive activities (the evident example being the carbon emissions market initiatives).

1.1. Economization of the green agenda

The 2000s mark a gradual change in the green paradigm which is well explained by Meckling and Allan (2020) as an outcome of the plurality of economic theories and the increasing significance of Keynesian and Schumpeterian concepts in economic and political discourse, as opposed to the neoclassical dominance in the 80s and the 90s. This influenced global policy discussions, advocating for state intervention to drive innovation, invest in infrastructure, and establish new industries. New conceptual frameworks launched by the United Nations, such as the ”green economy” one, leaned on successful green investment from countries like South Korea and China (in the majority of cases, state-led financial initiatives). This decade marked the emergence of the green growth concepts and the initial design of expected policy reactions.

Despite the initial climate policy shortcomings and inconsiderable successes, the landscape of climate policy underwent substantial changes after 2010. Green industrial policies initiated technological shifts. The decline in solar and wind energy costs between 2010 and 2015 played a significant role, contributing to private sector support and initiatives like Mission Innovation. Announced at the Paris Agreement, Mission Innovation aimed to double clean energy investments and engage the private sector, leveraging recent cost reductions and deployments (Mission Innovation 2015). Schmidt and Sewerin (2017) posit that the Paris Agreement marked a shift from cost-minimization to seizing opportunities, emphasizing the focus on technology over focus on emissions.

1.2. Emergence of green industrial policy

The surge in green industrial policy gained momentum after 2016 due to several cumulative factors. State governance and political agenda saw the rise of populism and more state interventionism, exemplified by the election of President Trump. Protectionist policies and the shaken faith in global liberalized trade and multilateral coordination disrupted the grounds on which international trade and the liberal international order were built in the previous decades. Although international practice did not change significantly, President Trump's critique of free trade opened space for other critiques and for more state creativity when it comes to international trade and national competitiveness.

The decline of free-trade norms and weakening international institutions enabled states to openly promote nationalist economic objectives. This was evident in the pursuit of a European battery industry, framed by the French financial minister as a matter of "sovereignty" (Hall and Milne 2019). Additionally, mounting tensions with China prompted both the US and Europe to use green industrial policy measures in an attempt to reshore value chains and gain more advantageous positions in global rivalry with China.

The sectors which are traditionally identified as “green” – EVs, renewable energy, hydrogen technologies, are now being pointed as strategic ones and their enhancement and subsidization

is described as a matter of national security. In a keynote speech by Christine Lagarde, President of the ECB, at the Peterson Institute for International Economics in 2022, it is stated that shifting value systems and alliances are redoing the global map of economic relations in three ways: from dependence to diversification, from efficiency to security, and from globalization to regionalization. Climate politics evolution is entirely subordinated to these three trends: 1) Diversification of national economies with focus on green technologies, specifically in the energy sector, where the last couple of years clearly demonstrated dependency issue of the developed economies from less reliable from geopolitical point view suppliers; 2) The energy sector, being a major target of green industrial policy, is considered as one of great importance for national security and strategic technologies for greening the energy and transport sector are highlighted as national priority and a matter of "sovereignty"; 3) The geopolitical burden contemporary economic relations have, together with the surge of geo-economic rhetoric, impact the strategic decision-making in the field of climate and green policies (predominantly, industrial ones) to emphasize on regional networks, shorter distribution channels and greater control over and resilience of the supply chains compared to the pre-COVID-19 period.

1.3. Difference between "greening" the industrial policy and "industrializing" the green agenda

The new approach to climate change is putting industrial policy measures at the centre of national response to climate challenges. While in the past environmental policy was considered a sort of an obstacle to development, nowadays the green agenda is at the core of the development and competitiveness strategies. However, environmental policy and industrial policy, despite being intertwined, are not the same thing. They are moved by different motives and, ultimately, different aims.

Environmental and climate policies are originally aimed at addressing sustainability issues and long-term impact of industry and trade on nature and climate. That fundamental definition is opposing the concept of economic progress relying on exploitation of natural resources and driven by higher efficiency and profit. Industrial policy, on the other hand, is generally considered as a toolset of state-driven measures to increase productivity and competitiveness of strategic sectors implemented with the aim to provide economic advantages and benefits in comparison to competitors, specifically, in the international markets. However, the contemporary rhetoric and policy decision-making contributes to their transformation and alignment to each other - environmental policy shifts to green industrial policy as the economic incentives for green technologies take the lead and receive political backup in the face of rising protectionism and the decline of the international liberal order. The geopolitical (and, consecutively, the geo-economic) significance of environment protection and climate policy changes as these measures are being perceived as the rationale for technological restructuring and leadership positions in international markets.

Green industrial policy measures become the one of the pillars of national growth and development strategies. Climate change is being redressed as the next economic challenge pushing the world for a new phase of technological progress. The industries that would contribute to a sustainable attitude to climate change and environment protection become the arena of fierce competition for technological and economic leadership.

The distinctive feature of green industrial policies vis-à-vis other environmental actions is the intent or the goal of the policies rather than the instrument used (Allan, Lewis, Oatley, 2021, p.3-4). Industrial policy measures aim at securing better positions in global production and trade.

However, it has to be clarified how climate politics and its sectoral implications are transformed into efficiency competition. Economic rationale would suggest that the evolvement of the technologies resulted in cost reduction and larger efficiency which made the potential investment more attractive and the political engagement – more socially acceptable. Indeed, one could contend that the swift cost reductions in wind and solar energy from 2010 to 2015 instigated a political transformation. As the costs lowered, states might have become more inclined to undertake climate actions. However, the existing body of research on technological learning and green industrial policy suggests that these cost declines were, in fact, propelled by national and subnational policies (Hayashi et al. 2018; Schmidt and Sewerin 2017).

In essence, state-driven green industrial policies stimulated processes of policy learning and technology cost reductions. These, in turn, heightened the likelihood of further green industrial policies and brought to the forefront the geopolitical implications of transitioning to cleaner energy sources. This interplay between state initiatives (or lack thereof), domestic technological policies, and geopolitical factors is pivotal for understanding the dynamics of green industrial policy. The efforts to establish green industries have elevated the economic and geopolitical significance of environmental concerns. As governments strive to position their industries within global value chains and reshore strategic sectors, the stakes surrounding these efforts have intensified.

1.4. The Green policy: driver for economic growth and for change in international trade

A couple of processes contribute to increasing the economic and geopolitical significance of climate and pollution policies:

1) Due to the geopolitical and economic paradigms shifts, after 2010 climate politics becomes in line with the traditional understanding of industrial policy giving birth to the green industrial policies with the argument that these would contribute to the achievement of certain climate goals. However, the rhetoric shifts from emission reduction to economic efficiency. That marks the evolution of the green agenda from an issue with low (or none) economic complementarity to a focal instance for economic transformation and

restructuring where purposefully designed measures need to be taken to ensure dominant positions in a new international economic order.

2) The realization that green agenda and its aims hide economic potential and opportunities for efficiency and trade leadership is the turning point in the way green agenda is perceived by state and business decision-makers.

3) The economic potential for industrial transformation is revealed due to a couple of converging factors:

   a. Geopolitical: rise of the geopolitical tensions between Asia and Western states which get transferred to the economic arena through trade wars, economic sanctions and protectionist measures; the energy and transport industries being one of the affected ones;

   b. International: weakening of the multilateral system of coordinating international trade and decline of globalization and liberalization at the expense of increased regionalization contributing to more dynamic and unpredictable environment in global trade as it creates a world system of regions competing for technological and economic leadership;

   c. Economic: considerable enhancement of green technologies development and their efficiency which increases their attractiveness. That process does not happen without state intervention. In the 2000s developed countries push for more measures addressing carbon emissions and require businesses and consumers to comply with certain requirements. By that time climate policy is still in the field of non- (or counter-) economic policies where certain economic or market benefits must be proposed for modifying the behaviour of economic agents. After 2010 the state measures are redirected to a more supply-oriented approach where production capacities to be developed and sustained at internationally competitive levels. For instance, in 2005 the EC communications are aimed at boosting the Lisbon Strategy and its guidelines apply to the protection of intellectual property, the improvement in Community Technical Regulations, the strengthening of SMEs in innovation, the development of cross-national co-operation projects and the support of structural adjustments (Jamet, 2006). The green agenda issues are basically covered in the Community Technical Regulations where industrial companies are submitted to a set of technical rules regarding safety, health, and the protection of the environment. In 2019 the European Commission narrative is considerably different putting specific emphasis on the green technologies and industries pointing out six strategic sectors: 1) Connected, clean and autonomous vehicles, 2) Hydrogen technologies and systems, 3) Smart health, 4) Industrial Internet of Things, 5) Low-CO2 emission industry, 6) Cybersecurity. The New Industrial Strategy for Europe in 2020 (EC, 2020) envisions a dual transition – green and digital.

Green transition and agenda are nowadays perceived as an economic and technological matter, where governments design measures to help national businesses take the lead in international markets. That process has clear implications for international trade and order. Four are the main consequences:

1) Green industrial policy has significant influence on global political economy through its role in enhancing technological advancements. Technological changes subsequently impact the costs and comparative advantages associated with different green industry trajectories, thereby reshaping the distribution of international market positions. Consequently, it makes it indispensable for governments to continue devising different combinations of policy approaches to bolster the growth of green sectors.

2) The fact that green technologies predominantly affect the energy sector, which is perceived as strategic and important for national security, further enforces the nationalistic and protectionist rhetoric and action resulting in repositioning in global value chains and pursuit of autonomy and growth in the context of competitive interdependence (Farrell and Newman 2019; Sbragia 2010).

3) Green industrial policy represents a considerable challenge in a globalized context due to the inherent tensions between the political economy of domestic green industries support and the principles of the liberal trade regime. Governments seeking public backing for renewable energy technologies often need to promise job creation and domestic technological advancement. These pledges necessitate direct interventions in international trade flows, potentially conflicting with various provisions of the World Trade Organization (WTO) and domestic trade laws (Allan, Lewis, Oatley 2021). These complexities extend to global supply chains (Helveston and Nahm 2019).

4) Trade negotiations and agreements are subjected to additional environmental requirements and prerequisites. In the recent trade deals of the EU with Japan and South Korea some environment and Paris Agreement obligations were integrated. Environment issues were one of the obstacles in the trade agreement with the US (Bongradt and Torres, 2022, p. 18). The EU-Mercosur agreement faced serious problems as the EU put deforestation of the rainforest under Bolsonaro's rule in Brazil as an irreconcilable issue. Regional trade agreements go beyond conventional trade policy, and they tend to include provisions regarding areas which were in the past considered part of the internal policy competence. While the fragmentation of global value chains made areas such as competition, investment, intellectual property protection, part of the international economic and trade negotiations; the strategic transformation of climate policy as an opportunity for increased competitiveness has made it an important aspect in deep trade agreements that currently dominate international trade and its regionalization.

2. Specific aims and instruments of the green industrial policy

Various tools can be employed to facilitate green economic transformation. These include direct capital subsidies, research and development (R&D) grants, export credit assistance, local content mandates for manufacturing, tariffs, customs duties, and procurement policies. Even

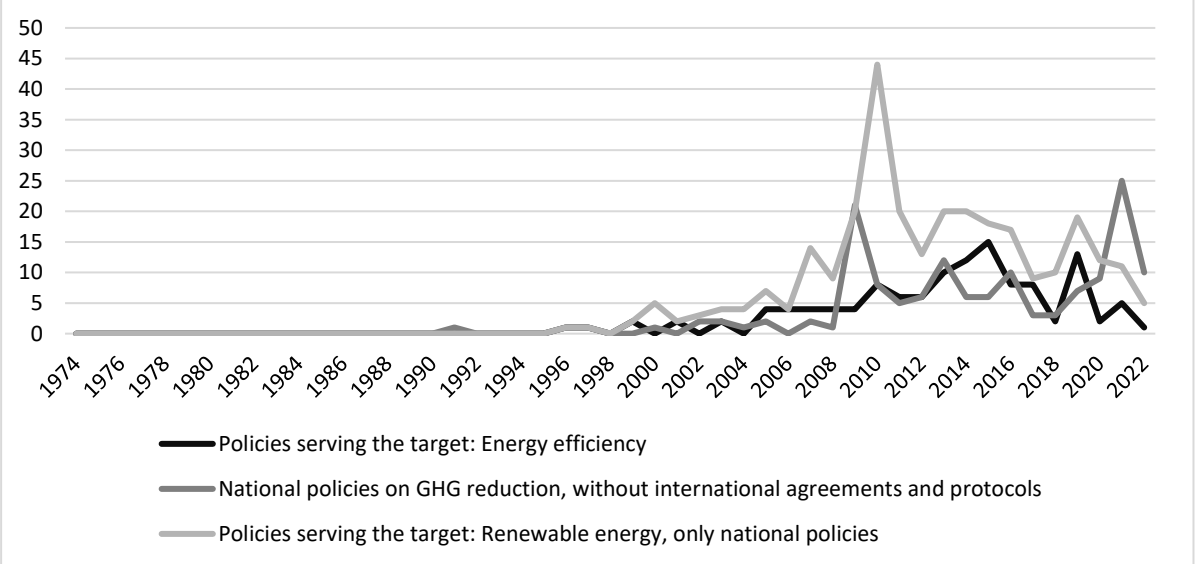
mechanisms like feed-in tariffs or market-based approaches could be seen as forms of industrial policy if they are tailored to specific sectors. Defining strict boundaries for green industrial policy proves challenging due to this variety of measures.

However, certain instruments are more commonly associated with green industrial policy as opposed to broader emissions reduction or pollution control efforts. For instance, grants, subsidies, RD&D support, and local content requirements (LCRs) tend to target particular industries rather than generating widespread environmental effects.

The evolution of the green political agenda described above also suggests change of the focus and scope of the envisioned goals of such policy actions. Figure 1 provides data on the national strategic and policy documents related to climate change. The scope is entirely on national policy tools as our main subject is green industrial policies which by definition are supposed to be targeted at (sub-)national and sectoral level within certain country. We use the Climate Policy Database, maintained by NewClimate Institute. The national strategic and policy documents are divided into three groups based on the targets they aim to address: 1) National policies for energy efficiency; 2) National policies for GHG reduction; 3) National policies for renewable energy. The database provides exhaustive list of the policy documents in 42 countries (EU considered a country) and non-exhaustive list of the strategic documents in other countries.

The figure presents data for the years 1974 – 2022. The starting year is 1974 since climate change and environment protection appear as issues in international political agenda and decision-making in the 70s. It is evident the number of national policy documents focusing on targets related to climate change significantly increases after 2008.

Figure 1. National strategic and policy documents on climate change, distribution based on target.

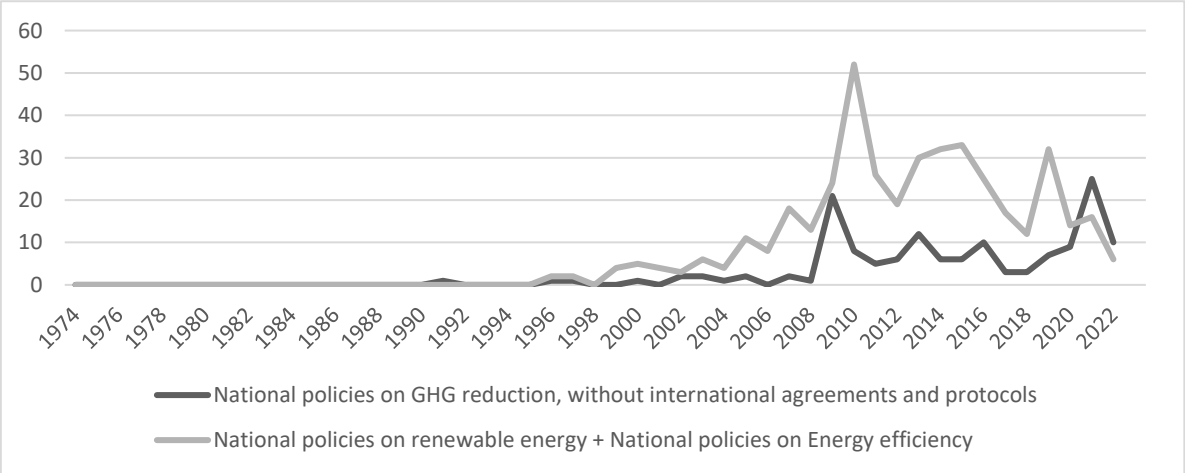


Source: Climate Policy Database, 2023.

The most significant increase is reported for national documents focusing on renewable energy as a target. The conventional target related to climate change in the political discourse – the GHG reduction – also marks certain increase in focus, however, national actions in that field are considerably less compared to the ones which we consider are more directly related to the green industrial policy measures at national level – energy efficiency and renewable energy. Here it must be pointed out that all documents related to national contributions and policies part of international UN commitments are excluded from the selection. This would mean that the Montreal Protocol, the Kyoto protocol and Copenhagen Accord, as well as the Paris agreement ratifications and Nationally Determined Contributions (NDCs) are not accounted in the selection. The reason for that is that those engagements are a result of international commitment and do not fall into the scope of the paper – nationally-designed climate and green policies.

It is noteworthy that two out of the three targets have direct economic significance and impact on output levels and structural advantages of production. Renewable energy as a target of green policies has direct effect on energy markets and production. While energy efficiency is entirely placed in the field of economic reasoning and strategic planning. The target of GHG emissions reduction is the oldest one in terms of climate action and it could be argued that it is the original aim of policies and agreements addressing climate change. However, that target is not economic one. Its achievement is subjected to market-based measures (emissions markets and certificates), however, their nature is related to correction of market operations. This would mean that they are not compliant with the definition of industrial policy. Consequently, the three targets addressing climate change and environment protection could be grouped in the following manner: 1) Non-economic targets achieved through market corrective measures designed to handle economic externalities: the target on GHG reduction; 2) Economic targets achieved through market development measures designed to encourage certain economic activities and sectors: the targets on renewable energy and energy efficiency. Figure 2 is based on this distinction.

Figure 2. National strategic and policy documents on climate change, economic and non-economic targets



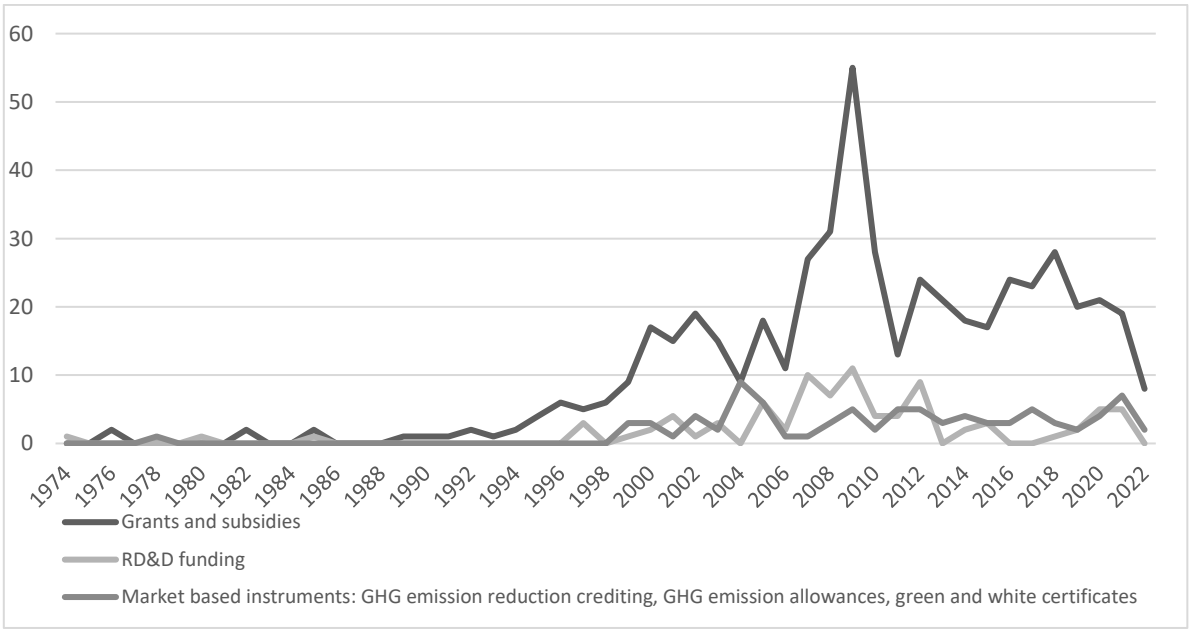
Source: Climate Policy Database, 2023.

After 2000 the economic targets are better presented in national policy and strategic documents which could be considered as a sign that those targets are prioritized compared to the target of GHG emissions reduction. After 2010 the number of documents addressing energy efficiency and renewable energy grows significantly.

These findings are in line with the data on the number of policy measures introduced by governments to address climate change. Allan, Lewis and Oatley (2021, p. 4) find that some state instruments are more likely to be associated with green industrial policy compared to more general attempts to reduce emissions or control pollutants. For example, grants and subsidies; support for research, development, and deployment (RD&D); and LCRs are all more likely to be used to bolster specific targeted industries rather than produce general effects on the environment. The instruments which are consistent with the definition of green industrial policy are generally aimed at energy efficiency and renewable energy, while those aimed at the target of GHG emissions reduction (emissions markets and certificates) do not fall into the category of industrial policy measures as they are not directly bolstering national industries and businesses.

Figure 3 presents the number of instances national governments have applied policy measures addressing climate change and environment protection. The policy instruments are grouped as follows: 1) Grants and subsidies (predominantly addressing energy efficiency and renewable energy): industrial policy instrument; 2) Financial support of RD&D (in energy efficiency and renewable energy): industrial policy instrument; 3) Market-based instruments such as GHG emission reduction crediting, GHG emission allowances, green and white certificates: non-industrial measures.

Figure 3. Policy measures on climate change, number per year

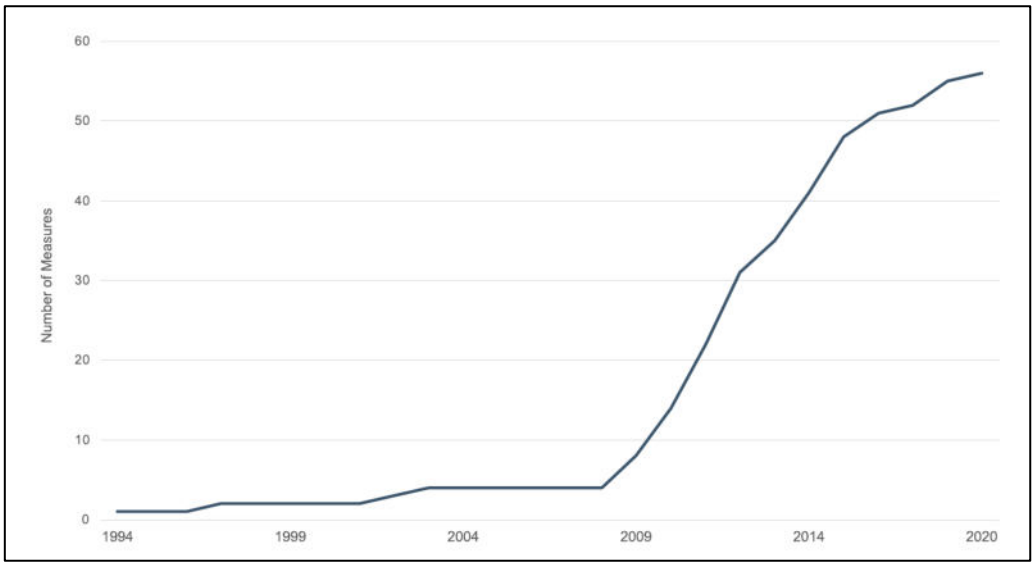


Source: Climate Policy Database, 2023.

Based on the data, it could be easily concluded that the rise of policy documents addressing economic targets goes together with an uptick of industrial policy measures aimed at achieving the targets. One of the most conventional instruments of industrial policy, grants and subsidies, sees the most significant increase.

The Inflation Reduction Act raised considerable backlash with the newly introduced LCRs (see next section). However, the US is not the pioneer in that matter. Introduction of LCRs in renewable energy increases after 2009 (figure 4). A study estimates that the imposition of LCRs results in an annual reduction of global trade amounting to approximately $93 billion (Hufbauer et al. 2013). This finding emphasizes the apprehension surrounding green industrial policy, sparkling fears of reverting trade to a zero-sum world contradicting the foundational principles of the liberal trading system.

Figure 4. Local contents requirements for renewable energy, number of measures



Source: Allan, Lewis, Oatley (2021) referencing Lewis (2021).

It could be concluded that the intensive application of industrial policy measures in clean energy technological development entails the inevitable emergence of winners and losers, carrying significant geopolitical implications. Studies on the possible outcomes of energy transition have predominantly stated that it will create winners and losers (e.g., Vokalchuk et al. (2020), IRENA (2019), Overland (2019)). Green agenda has turned into geopolitical and geo-economic matter where stronger voice and engagement translate into technological dominance and carry substantial economic significance. For instance, China's investments in alternative energies, EVs, and lithium-ion battery technology in the last 15 years have positioned it as a frontrunner to capture the economic benefits associated with them.

Green agenda is a race to the bottom for technological and trade dominance and the decline of global liberal order makes it possible for competing states to use previously unacceptable instruments and policy measures. Next section will present some of the main tools applied by

the key players in global green competition.

3. Green industrial policy measures in the US, the EU, and China

This section will focus on the main policy documents and the green industrial policy instruments introduced by the US, China, and the EU. A comparative analysis will be done between the European measures and the ones introduced by its trade partners and competitors.

3.1. The US green industrial policy

The cornerstone of the American green industrial policy lately is the Inflation Reduction Act (IRA) of August 2022. It was hailed as the most ambitious climate policy plan of the US so far, but also it was called "a new paradigm" (Scheinert, 2023) as it envisions ambitious climate goals, but more importantly, it introduces unprecedented and unexpected interventionalist and protectionist measures for supporting and developing national industries undermining WTO international trade order.

However, the IRA is not the only act addressing climate issues and green industries, nor it is the first one. Climate issues are a top priority for the Biden administration, leading to a multitude of legislative and policy efforts.

The CHIPS and Science Act, established in August 2022, focuses on bolstering American manufacturing, national security, and research and development in crucial fields like nanotechnology, clean energy, quantum computing, and artificial intelligence.

The American government also employed the Defense Production Act (DPA) in June 2022 to accelerate domestic production of clean energy technologies. The Infrastructure Investment and Jobs Act of November 2021 addresses climate change mitigation through repairing and rebuilding roads and bridges, enhancing transportation options, reducing emissions from the transportation sector, upgrading airports and ports for efficiency and emissions reduction, promoting rail transport, establishing a nationwide network of EVs chargers, and improving infrastructure resilience against climate impacts and cyber threats.

Regarding the IRA's state aid elements, tax credits, tax deductions, grants, loans, and loan guarantees are the primary instruments employed. These measures vary in duration, with some expiring by September 2024, such as grants for domestic heat pump production, while others are permanent, like the tax credit for domestic critical minerals manufacturing.

Three sets of measures are included in the IRA: 1) a tax reform; 2) a healthcare reform; 3) energy and climate legislation, envisioning climate-related expenditure of $400 billion over 10 years (Kleimann et al., 2023). There are three types of climate and energy subsidies envisioned: 1) Subsidies for EVs purchases, incl. up to $7500 tax credit; 2) Production and investment

subsidies for clean technologies, incl. batteries and components used in renewable energy production; 3) Subsidies for carbon-neutral electricity (hydrogen and clean fuel).

The IRA is defined as the "*continuation of President Trump's hard-nosed 'America First' approach*" (Scheinert, 2023) due to the introduction of LCRs in the green-tech sectors. EVs buyers could get a tax credit of $3750 for vehicles for which a minimum percentage of critical minerals has been extracted or processed in the US or a country with which the US has a free trade agreement, and an additional $3750 tax credit for vehicles meeting the requirement that a threshold percentage of battery components are manufactured or assembled in North America. Final assembly in North America is also included as a requirement.

Kleimann et al. (2023) make an estimation on the trade distortive effects the IRA measures could bring. Their provisional estimations point to considerable trade-distortive effects in consumer electric car tax credit subsidies ($7.5 billion), clean-tech manufacturing support ($32 billion of the total $37 billion), and the bulk of the clean-fuel and emissions-reduction subsidies ($16 billion). Additionally, the trade-distortive effect of the subsidies for green-energy production and investment might range between 0 and $21.9 billion, depending on the number of producers meeting the criteria.

3.2. The European green industrial policy

Although there isn't a singular EU flagship green subsidy scheme equivalent to the IRA of the US, a variety of initiatives at both EU and national levels utilize subsidies for similar purposes. Here are some key points:

- EVs Subsidies: Many EU member countries provide subsidies to encourage the purchase of EVs. These incentives vary in form and value but collectively amounted to nearly €6 billion in 2022, averaging around €6,000 per vehicle. Unlike the IRA tax credits, these subsidies generally do not discriminate between different vehicle manufacturers.
- Support for Clean-Tech Manufacturing: various instruments to support clean-tech manufacturing, including:
    - Important Projects of Common European Interest (IPCEIs): cross-border project-based EU support for initiatives like battery and hydrogen manufacturing.
    - EU Innovation Fund: Established under the EU emissions trading system (ETS), backs the demonstration and deployment of clean technologies in energy-intensive industries.
    - European Innovation Council's EIC Accelerator for breakthrough technologies.
    - European Investment Bank (EIB) Loans: support for clean technology projects.
    - EU Guarantees under InvestEU: Managed by EIB to encourage sustainable investments.
- Renewable Energy Production Subsidies: Most EU member states subsidize energy

production from renewable sources. In 2020, these subsidies totaled around €80 billion, with Germany leading with €33 billion.

- EU Recovery and Resilience Facility (RRF): a temporary financing tool within NextGenerationEU (NGEU), designed to counter the economic impacts of the COVID-19 crisis with a strong focus on green and digital transitions. It involves grants and loans to support these transitions and includes provisions for climate-related initiatives:
  - The EC is funding up to EUR 250 billion (or 30%) of NextGenerationEU by issuing green bonds. This makes the Commission the largest green bonds issuer in the world.
  - Total amount is capped at EUR 750 billion, but inflation adjusted it would be more than EUR 800 billion. The repayment of the EC borrowing will be spread from 2028 to 2058.
- REPowerEU plan: launched in May 2022 by the EC as a reaction to the war in Ukraine and the overdependence on Russia's energy supplies. Proposes measures to save energy, produce clean energy, and energy diversification.
- Green Deal Industrial Plan: Introduced on February 1, 2023, the Green Deal Industrial Plan is intended to boost Europe's net-zero industry's competitiveness and climate neutrality. It includes a simplified regulatory environment, improved access to finance, skills development, and open trade for resilient supply chains. The plan proposes acts such as the Net-Zero Industry Act and Critical Raw Materials Act, along with reforms to electricity market design. The EC announced it would be proposing a European Sovereignty Fund.
  - It builds predominantly on relaxing State aid rules, thus allowing more national support, including through tax benefits.

Relaxation of state aid rules is generally one of the tools the EC uses to facilitate state support of businesses. However, this is subjected to certain restrictions by the acquis Communautaire. In 2022, the EC introduced specific categories of State aid under The Temporary Crisis Framework, that was created to address various challenges arising from exceptional circumstances (the COVID-19 pandemic). The Temporary Crisis Framework underwent extensions and amendments on October 28, 2022, and eventually evolved into the TCTF on March 9, 2023. Simultaneously, the EC modified the General Block Exemption Regulation (GBER) to facilitate the green and digital transition. This entailed increasing Member States' aid limits in line with inflation and introducing larger State aid allowances in less-developed regions of the EU. The revised GBER will remain in effect until the end of 2026. The TCTF also allows governments to discourage companies from offshoring by granting them authorization to match subsidies offered by other countries, but only for a limited period.

3.3. The China green industrial policy

The Chinese government has recognized the strategic importance of green industries and has

introduced a great variety of policy measures to encourage green production. It employs both market policy tools such as carbon emission trading mechanism and financial instruments including green loans, green bonds, tax and fiscal instruments, and non-market measures such as improving the renewable energy standard system and constructing a legal system conducive to green and low-carbon development (Xu, 2022). The range and variety of national and regional regulatory and strategic actions is rich and multidirectional. However, the scale and scope of the Chinese green industrial policy in the last couple of decades has restructured the global markets for solar and wind energy, driving down costs and pushing out competitors (Hopkins and Li 2016; Lewis 2013).

Some of the main Chinese policies supporting green industries include:

- Feed-in Tariffs and On-Grid Electricity Tariffs: feed-in tariffs for renewable energy sources like wind, solar, and biomass. On-grid electricity tariffs provide financial incentives for connecting renewable energy projects to the power grid.
- Subsidies for Renewable Energy Projects: cover a portion of the installation costs for solar, wind, hydropower, and other renewable energy installations. China's finance ministry has set the 2022 renewable power subsidy at 3.87 billion yuan ($607.26 million).
- Subsidies for EVs and energy-efficient appliances: aim to reduce the purchase cost of EVs and encourage the expansion of charging infrastructure. For example, China unveiled in June 2023 a 520 billion yuan ($72.3 billion) package of tax breaks over four years for EVs and other green cars. At some point purchase subsidies were estimated as probably the most generous ones worldwide (Mock and Yang 2014; Altenburg et al. 2016) combining national support and regional cash subsidies. Additionally, subsidies are tied to local production.
- LCRs and restrictions on foreign manufacturers in the EVs and battery production sectors. A development plan issued in 2010 clearly states that for any joint venture manufacturing key components of EVs – such as batteries, motors and controllers–the Chinese partner must hold at least 51 per cent of the capital.
- Public procurement restrictions on foreign companies in targeted productions.
- R&D Grants: The International Energy Agency (IEA) estimates that overall energy R&D spending by the Chinese government in 2021 was $8.3 billion—26% of world energy R&D spending. The World Intellectual Property Office (WIPO) ranked China third in the number of energy patents in 2019. China intends to increase its R&D expenditure by 7% per year by 2025 which would represent a total expenditure of 490 billion euros in 2025.
- Tax Incentives for Green Technologies: designed for the so called high and new technology enterprises (HNTEs) which must meet certain criteria and to operate in strategic sectors. Environmental Protection Tax is introduced in 2018.
- Green Bonds and Financing Incentives: China’s green finance market has reached $2.3

trillion.

Some of the key policy documents and initiatives that have introduced measures to stimulate green industries in China are the 13th, 14th and 15th Five-Year Plans; the strategic plan Made in China 2025 (published in 2015); "Energy saving and New Energy Vehicles industry development plan 2012–2020"; Guiding Opinions on Promoting Energy Storage Technology and Industry Development (in 2017); Catalogue for Guiding Industry Restructuring (in 2019).

3.4. Comparison of the US, EU and China's green industrial policies

There are several common broad features of the green industrial measures applied. First, the three economies have strategic and regulation documents that set out green technologies as a priority and envision strategic actions to facilitate that transition and to support their businesses and consumers when modifying their behaviour accordingly. In all three cases the major measures follow similar logic and pursue similar market outcomes. They are directed towards change in the demand patterns; change in the supply structure (resulting in greening of national production) and support of technological progress (resulting in change in international positions and mid-term competitiveness).

The three economies introduce and sustain a considerable financial support package for purchases of green vehicles. The subsidies could range from $6000 to around $9000 (in some Chinese regions). Secondly, they all finance and encourage RD&D investments, an indispensable prerequisite for technological leadership. Here, a quantitative comparison might prove difficult as there is a variety funding schemes – some of them are on central level, some of them are regional (or national, in case of the EU); they follow a different structures and time horizons. Thirdly, in each of the three economies there is a certain toolset for supply-side subsidization encouraging clean-tech manufacturing and renewable energy production.

However, although the measures envision the achievement of similar goals, the concrete approaches of intervention diverge considerably, specifically, when it comes to supply measures.

There could be outlined two fundamental differences in the elaboration of green industrial policy measures which originate from the sovereignty identity of the policymakers.

1) ***Level of application.*** The structure of the EU and its acquis Communautaire follow a strict order of distribution of competences at Community and at national level. For example, the subsidies for EV purchases are adopted at national level and follow different national rules and schemes. Incentive programs differ in coverage and intensity which creates disparities and diverging impact. It is a fact that in the US and China there are also regional (or state) measures, however, they are in line with centralized measures and policy agenda.

2) ***Scope and breadth of centralized decision-making.*** The EC has a very limited competence for vertical sectoral measures and no authority over tax policies. Most of the above-

described EU policy measures for state aid exemptions became possible only due to the fact that were elaborated as a response to unprecedented force majeure circumstances (COVID-19 and the war in Ukraine), which marks their temporary character. The EU architecture is built on the principles of market freedom and minimum interventionism mainly through horizontal policies (competition law and common trade regulations). The member states are generally restricted in applying vertical industrial policy measures by the EU treaties; the EC has no authority to adopt and impose centralized measures. American and Chinese national governments have the competence and authority to impose a much more centralized approach in green industrial policy.

These variations in authority and control over decision-making explain the immediate differences in the green industrial policy measures applied by the EU, the US and China:

1) In both, the US and China, there are policy measures following the "Made in America" and "Made in China" imperatives. However, they are no "Made in the EU" measures. That marks more protectionist stance of the US (after IRA) and China. The existence of strong LCRs in the US and China, inconsistent with the WTO rules, illustrates that difference. China has for long time applied different restrictions on foreign investors, especially in sectors of strategic importance, The EU has lately introduced some screening and control mechanisms on FDIs. However, they are still predominantly a subject of national competence (no strong EU common approach) – which makes it possible to circumvent them.

2) More bureaucratical procedures for the EU subsidies; many times, project-based approach, while the US apply a simpler approach using the tax system and planning for tax credits or exemptions. Kleimann et al. (2023) also identify that the IRA measures mostly focus on mass deployment of green technologies, while the EU support finances mostly R&D and innovation efforts.

3) The EU policy measures are debt-financed, while the IRA ones are tax-based. This marks a difference in philosophy of the support (Scheinert, 2023), but also difference in the macroeconomic effects these would have, specifically when it comes to fighting inflation.

4) More measures in the US and China undermining the liberal trade order and WTO rules. The US has introduced subsidies with LCRs, a practice that has not been observed in advanced countries before and could potentially set a precedent for the application of such measures even in other developed countries. This could contribute to more fragmentation and inefficiency in international trade and refusal of more countries to stick to the international trade norms.

5) Political engagement in climate policy and green industrial policy is more vulnerable in the US, compared to the EU and China. Green policies in the US would be probably cut off if a potential Republican President and administration take the rule in the years to come. IRA would probably be modified or cut in size. Although, the EU engagement in green agenda

is more consistent, the temporal nature of the financial support is also an issue. The EU tries to establish permanent funds using temporary source of income (Scheinert, 2023). Once, the force majeure circumstances are gone, there would be no reasons for these policies continuation.

Closing remarks and discussion

The rapid advancement of green technologies is now driving a competitive race between developed and developing countries. This competition is not only about addressing the climate emergency but has transformed into a green industrial revolution. Countries are competing for leadership in green technologies, industries, and supply chains, which will ultimately shape the global economy's future hierarchy over the next couple of decades. This shift is accompanied by a change in perspective. The belief that market-focused approaches alone can drive the necessary transformation in industries to address climate change is fading. As carbon subsidies persist, policymakers are reviving traditional tools of industrial policy, like grants and EVs subsidies, to drive the transition.

The theoretical and data review confirms that the evolution of the green agenda since the 70s till nowadays faces its most considerable development in the 2000s when the political climate agenda transforms into geo-economic narrative and the goals of handling climate change and environment protection enter the economic strategic agenda becoming the key challenges moving technological progress and, consequently, economic growth. There are at least two consequences of that process:

1) Issues such as climate change and environment protection which are generally placed beyond the economic focus area of efficiency and profit-making are given economic significance *for efficiency and profit-making*. Tracking progress on overcoming these global challenges becomes vaguer and predominantly directed towards economic performance, not environmental impact. The analysis of the climate policy targets frequency in political agenda confirms that observation.

2) The *economization* of the topic increases the attention of society and decision-makers and contributes to greater efforts and political and economic involvement, to address these issues. Solving climate and environmental challenges today entails some national economic *benefits.* The approach for achieving them, however, is subordinated to the processes of deglobalization, regionalization and protectionism, giving rise of green industrial policies which further enforce those processes. The rise in the number and size of industrial policy tools such as green energy grants, subsidies and LCRs provides clear evidence for that.

The main findings for the European green industrial policy compared to the US and Chinese ones may be summarized in the following way:

- The EU engagement on green policy, incl. financial, is more consistent over time and more resilient to political changes, specifically when it comes to comparison with the US. However, financing of green initiatives and strategic measures is troublesome in the EU as the currently applied schemes are based on ad-hoc structures and are debt-based.
- The range and scope of the applied measures for supporting green industries is restricted by the institutional architecture of the EU. Most of the funding support is currently described as an action in crisis situations. The path forward for European green industrial policy is not clear.
- The EU green industrial supporting tools are the least protectionist in this selection. So far, the EU still abides to the international trade order when designing its industrial policy. The EU treaties grounded on the principles of free markets also represent a limiting factor. That is not the case with the Chinese and the American policy measures. The retaliatory reaction of the EU might go in two directions: 1) Joining the protectionist race (which might prove to be more harmful than beneficial for the Community (Jansen and Redeker, 2023; Scheinert, 2023; Kleimann et al, 2023)); 2) Remaining loyal to the international rules-based trade order and file complaints. However, either option would not solve the issue with the mid-term prospects for the European green industrial policy.
- One of the main critiques of the European green policy is that the EU managed to create a market, but failed to build an industry (Paris Tech Review, 2012; Altenburg and Assmann, 2017).

The American and Chinese green policy actions have intensified the conflict between Single Market proponents and supporters of a stronger state role in the form of an EU industrial policy. The EU's response will be influenced by its stance on free markets versus interventionist economic approaches (Scheinert, 2023). However, without additional public funds in key green industries, the EU could turn into the loser in that international race and might fail to address the concerns of supplies security which became a major issue as result of geopolitical shifts and rivalries.

4 issues should be further discussed, analysed and solved in the near future:

1) Should the EU economies support financially the European green industries? Here, the predominant opinion is positive, as the economic and geopolitical realities demand a more interventionist approach.
2) Which industries to be supported? A lack of focus in the industrial support measures will reduce their impact. A deep analysis of the realistic international positions and potential of the EU green industry is necessary. Jansen and Redeker (2023) provide some initial conclusions in that regard.
3) Who to support them? Financial support from the national governments will increase the EU divergence and will result in efficiency losses. Centralized EU financing and industrial planning would require change in the institutional setup of the Community.
4) How to support them? Except from the actual industrial policy measures to be applied –

their size, format, time horizon, eligibility; there are certain EU labour market issues that need to be addressed if reshoring of production is envisioned. The issue of supplies of raw materials and components concentrated in China may be addressed by intensification of the trade relations and arrangements with Latin America and other regions.

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MONDAY - SEPTEMBER 18th

08:30 - 09:00	**Registration**	
09:00 – 09:30	**Welcome speeches** *Large Conference Hall*	**Dimitar DIMITROV,** Rector of UNWE, Bulgaria **Nikolay NENOVSKY**, University of Picardie Jules Verne, Bulgarian National Bank **Petar CHOBANOV**, Institute for politics and economics, UNWE, Bulgaria, Bulgarian National Bank **Tatiana HOUBENOVA-DELISIVKOVA,** Chair Union of Economists in Bulgaria, ERI at the Bulgarian Academy of Sciences, Bulgaria **Diyana MITEVA,** MRC, IEP, UNWE, Bulgaria
10:00 – 11:00	**Keynote speech 1** *Large Conference Hall*	**Nikolay NENOVSKY,** University of Picardie Jules Verne, Bulgarian National Bank */Resource based international currency. Perspectives and problems/*
11:00 – 13:00	**Presentation session 1** *Large Conference Hall*	**International economics** **Moderator: Rossitsa TONCHEVA** **Elena SPASOVA,** New Bulgarian University, Bulgaria */Defining the Green Agenda: International and European Insights into Green Industrial Policies/* **Gildas BONDI,** Marien Ngouabi University (Brazzaville, Republic of Congo) - LEFMI (UR 4286) */Security and socio-economic issues as vectors of change in political governance/* **Virginia ZHELYAZKOVA & Sarah GOLDMAN,** VUZF, Bulgaria & Lux-SIR, Luxembourg */Big Data, New Advanced Analysis Tools for Researchers: The Case Study of US ESG Bonds/* **Jeko MILEV**, UNWE, Bulgaria */Inflation and defined contribution pension schemes in Central and Eastern European (CEE) countries/*
13:00 – 14:00	**Lunch**	
14:00 – 17:15	**Presentation session 1** *Large Conference Hall*	**International economics** **Moderator: Rossitsa TONCHEVA** **Petar CHOBANOV**, Director of Institute for politics and economics, UNWE, Bulgaria / CASHLESS PAYMENTS IN BULGARIA – DEVELOPMENT, REGULATION AND EUROZONE INTEGRATION / **Mikhail RAEV** PhD, University of Sofia "St Klement Ohridski", Bulgaria */The Eurozone vs the Optimal Currency Area Theory - survey of their theoretical frameworks and political backgrounds/* **Plamen D. TCHIPEV & Aygun ERTURK-MINCHEVA,** Plovdiv University "Paisii Hilendarski", Bulgaria */In behavioural economics "nudge" – a possible response to the challenges of high inflation for 'better' economic decisions of the individuals/* **Tatiana HOUBENOVA-DELISIVKOVA,** Chair Union of Economists in Bulgaria, ERI at the BAS, Bulgaria */The financial literacy of students in Bulgaria: current problems and challenges/*

		William BURRUS, Master's in finance at the University of Picardie Jules Verne, France /*Gold Jewelry Demand Effects on Gold Price: Evidence from China and India*/ **Violeta TODOROVA** PhD, UNWE, Bulgaria /*The impact of inflation on non-performing and restructured loans: the case of Bulgaria*/
17:15-17:30	**Coffee Break**	
17:30 - 18:30	**Keynote speech 2** *Large Conference Hall*	**Kiril TOCHKOV,** Texas Christian University /*Regional heterogeneity and the provincial Phillips curve in China*/
20:00	**Official Dinner- Restaurant "Pri Orlite"** **https://www.priorlite.com/en/contacts**	
	TUESDAY - SEPTEMBER 19th	
09:00 – 09:45	**Keynote speech 3** *Large Conference Hall*	**Peter BRASS**, Germany /*Model of a neutralised currency and exchange system for central banks*/
09:45 - 10:30	**Keynote speech 4** *Large Conference Hall*	**Jovan ZAFIROSKI**, Ss. Cyril and Methodius University, Skopie, /*CBDCs and the Future of the Banking System*/
10:30 – 10:45	**Coffee Break**	
10:45 – 13:00	**Plenary Session** *Large Conference Hall*	***Oscar Halecki's Idea of Europe*** **Chairperson: Tsvetelina MARINOVA,** New Bulgarian University, Bulgaria **Oskar Halecki's idea of Europe, Antonio MAGLIULO,** University of Florence, Italy **Oscar Halecki's Europe seen from Bulgaria, Nikolay NENOVSKY,** University of Picardie Jules Verne, Amiens **Oscar Halecki's Europe seen from Poland, Artur KOZLOWSKI,** WSB Merito University in Gdańsk **Oscar Halecki's Europe seen from Ukraine, Ksneniia LOPUKH,** Kyiv National Economic University
10:45-13:00	**PHD Session** *Small Conference Hall*	**Moderator: Diyana MITEVA, UNWE** **Alexander GODUMOV** PhD, UNWE, Bulgaria/*The impact of the federal open market committee rate actions during 2022 on the popularity of dividend stocks amongst retail investors*/ **Nona NENOVSKA,** LADYSS, University Paris Cité, France/ *Methodologie pour l'étude de la gouvernance des biens communs complexes: le cas de deux AMP sur la cote de la mer Noire* / **Avi TAHCHIEVA**, Master graduate student, *UNWE,* Bulgaria /*Euro area membership effects on inflation*/

		Mehmed RASIM, PhD, UNWE, Bulgaria */The role of Foreign Direct Investment in Accelerating Bulgaria's Economic Development/*
13:00 – 14:00	**Lunch**	
14:00-15:00	**Keynote speech 5** *Large Conference Hall*	**Gordon KERR,** Cobden Partners, UK */The impact of EU shadow liabilities on member states; inflation and currency effects/*
15:00-18:00 **/16:00-16:15 – break/**	**Presentation session 2&3 Parallel** *Large Conference Hall*	**Moderator: Yanko HRISTOZOV,** UNWE **Dimitar CHOBANOV**, UNWE, Bulgaria */The European Central Bank at 25: Efficiency of the Monetary Policy/* **Hristiyan ATANASOV**, University of Library Studies and Information Technologies, Bulgaria/*On the Founding of State Cooperatives in Agricultural Credit: The "Public Benefit" Funds in the Ottoman Empire/* **Tsvetelina MARINOVA**, New Bulgarian University, Bulgaria */Challenges and perspectives to the BRICS in reforming the international monetary and financial system/* **Radostin VAZOV**, VUZF, Bulgaria */Economic Relationships Between Atonian Monasteries and Byzantium Emperors: The beginning of modern corporate business models and strategies/* **Shouyi ZHANG & Guangxing HE**, LEFMI, University of Picardie Jules Verne & Shanghai Jiaotong University, */Inflation or Deflation? Chinese Economy in 2023/* **Nadya VELINOVA-SOKOLOVA,** University of Sofia "St Klement Ohridski", Bulgaria */Digital economy and financial risk management/*
15:00-17:30 **/16:00-16:15 – break/**	**Presentation session 2&3 Parallel** *Small conference hall*	**Moderator: Diyana MITEVA,** UNWE **Yanko HRISTOZOV**, UNWE, Bulgaria */Financial Condition of Bulgarian Enterprises in the Context of Inflation/* **Diyana MITEVA**, Deputy Director of Institute for politics and economics, MRC, UNWE, Bulgaria */Inflation impact on investor protection/* **Hachem HICHAM**, CNAM Liban & LEFMI Amiens /Lebanon's currency crisis: a case of asymmetric rivalries/ **Galya TASEVA**, UNWE, Bulgaria /*Trade credit and bank credit in conditions of inflation: evidences for publicly traded non-financial enterprises in Bulgaria/* **Kremena YOCHKOLOVSKA,** UNWE, Bulgaria */Social Security in the Context of the Sustainable Development Paradigm/*
WEDNESDAY - SEPTEMBER 20th		
09:00-10:45	**PhD /Student Session** *Large Conference Hall*	**Moderator: Rossitsa TONCHEVA,** UNWE **Valeri MINCHEV** PhD, UNWE, Bulgaria */Analysis of the inflation processes within the European drug market/* **Nikola N. NENOVSKY** Master Student in Econometrics and Statistics, Toulouse School of Economic, France */Are money aggregates good predictors for the Bulgarian inflation rate?/* **Semrah BUJARI** PhD, Ss. Cyril and Methodius University, Skopie */Impact of social media messages on online shopping/* **Maya JANDAH**,PhD student in economics, CRIISEA, University of Picardy Jules Verne, France */Cooperative banks, what ecological legitimacy ?/*

		Tatjana ACKOVSKA PhD, VUZF, Bulgaria /*Trends and opportunities in the construction sector in selected South-Eastern Europe's countries*/
10:45 -11:00	**Coffee Break**	
11:00-13:15	**Plenary session** *Large Conference Hall*	**Moderator: Gergana MIHAYLOVA-BORISOVA**, UNWE **Gergana MIHAYLOVA-BORISOVA**, UNWE, Bulgaria /*Financial development and economic growth in CEE countries*/ **Stoycho DULEVSKI**, UNWE, Bulgaria /*Robots as subjects under bulgarian tax law – mission im/possible?*/ **Elena SIMEONOVA**, UNWE, Bulgaria /*The global sancflation: the limits of (im)possible comparisons*/ **Krasimira DECHEVA**, UNWE, Bulgaria /*The convenience of inflation in the Neoliberal doctrine*/ **Spartak KEREMIDCHIEV**, Economic Research Institute at Bulgarian Academy of Sciences, Bulgaria /*Dividend Puzzle of State-Owned Enterprises*/ **Rositsa NAKOVA**, New Bulgarian University, Bulgaria /*Important information on food labels*/
13:15-14:00	**Lunch**	
14:00-17:00	**Plenary session - Round table** *Large Conference Hall*	**THE FINANCIAL LITERACY OF STUDENTS IN BULGARIA: CURRENT PROBLEMS AND CHALLENGES** **Moderator: Tatiana HOUBENOVA-DELISIVKOVA,** Chair Union of Economists in Bulgaria, ERI at the Bulgarian Academy of Sciences **Participants:** **Kaloyan SIMEONOV, Ministry of Finance** **Elitsa IVANOVA, Ministry of Finance** **Josif JOSIFOV, Bulgarian National Bank** **Anka KOSTOVA, Financial Supervision Commission** **L. KOSTOV, Institute for Social and Trade Union Studies** **Elena STRAVROVA, South-West University Neofit Rilski** **Irina KAZANDJIEVA, UNWE** **Rossitsa TONCHEVA, UNWE*, About the definition of the financial terms /Interpretation of the National Strategy for the Financial Literacy of the Republic of Bulgaria/*** **Representatives of the D. A. Tsenov Academy of Economics** **Representatives of other invited institutions and academic bodies**
17:00-17:30	**Closing remarks**	**Nikolay NENOVSKY, Tatyana HOUBENOVA-DELISIVKOVA, Diyana MITEVA**

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