
The Ever-Increasing Public Debt: A Comparative Study among 20 Selected Countries

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Mirosław Bojańczyk¹

Abstract:

Purpose: This article analyses public debt in selected countries from 1990 to 2023, focusing on the public debt to GDP.

Design/Methodology/Approach: The research employs an analytical approach predicated on macroeconomic data from 1990 to 2023. To ascertain trends and outcomes, public debt in selected countries and its relation to GDP were thoroughly examined.

Findings: The findings indicate a significant rise in the public debt, primarily due to increased budgetary expenditures. This situation led excessive growth of the debt of many countries and the increase in the costs of financing it. This causes huge threats for these countries.

Practical Implications: The study's findings can provide policymakers with crucial information regarding the fiscal reforms and adjustments necessary to preserve financial equilibrium and increase dependence on public debt as a way to finance budget deficits.

Originality/Value: The article contributes to the understanding of fiscal policy adjustments in response to a sharp increase in public debt in relation to GDP, emphasizing the importance of pursuing a more restrictive fiscal policy.

Keywords: Public financial sector, fiscal discipline, public deficit and debt, GDP growth.

JEL codes: E44, F34, F62, G01, G15, H60.

Paper Type: Research article.

¹Dr hab., Akademia Finansów i Biznesu Vistula, Warsaw, Poland
ORCID: 0000-0003-2985-6921, e-mail: m.bojanczyk@vistula.edu.pl;

1. Introduction

For hundreds of years, governments have issued debt to finance their expenditure as a substitute for raising taxes, especially during challenging times.

The last 30 years have been a period of significant increase in the debt of various entities. The rapid indebtedness of states, enterprises, and households, has mainly been a consequence of the rapid development of financial markets in the 1990s, which, among others, increased both capital supply, and its availability. At the same time, there was a decrease in the cost of capital.

This led various entities into the trap of easy funding. This, in turn, must have led to the economic crisis of 2008, but even after the crisis was over, little changed in this matter. Populism, used by many politicians, has become an additional factor, significantly increasing the risk of excessive debt (Bojańczyk, 2022).

Global debt has reached an all-time high of \$184 trillion in nominal terms, the equivalent of 225 percent of GDP in 2017. On average, the world's debt now exceeds \$86,000 in per capita terms, which is more than 2½ times the average income per-capita. The most indebted economies in the world are also the richer ones. The private sector's debt has tripled since 1950 (Mbaye, Moreno Badia, 2019).

Table 1. The 20 countries with the highest public debt in 2022 in relation to the GDP (in %)

1	Lebanon	283,20
2	Japan	260,08
3	Sudan	186,25
4	Greece	178,11
5	Singapore	167,50
6	Venezuela	159,47
7	Italy	144,41
8	Lao P.D.R.	128,51
9	Bhutan	127,33
10	Cabo Verde	127,25
11	Barbados	122,51
12	United States	121,31
13	Suriname	120,08
14	Bahrain	117,58
15	Sri Lanka	115,54
16	Maldives	114,37
17	Portugal	113,94
18	France	111,80
19	Spain	111,60
20	Canada	107,38

Source: <https://www.statista.com/statistics/268177/countries-with-the-highest-public-debt/October-2024>.

The development of the capital market led to increased indebtedness of many countries and companies, as easier issuance and placement of bonds facilitated the funding of governmental borrowing. Irresponsible government policies and easy financing, especially of social spending, created a huge threat.

There was no problem with placement of new issues of debt instruments on the financial market. And, on the other hand, there was sufficient demand for this debt, as government issued securities were generally considered a safe instrument. In many countries, bonds have become one of the engines of prosperity. At the same time, these bonds determined the cost of capital for companies, often leading to restricted access to resources for companies, that were unable to compete for capital with the states (crowding-out effect).

Living on credit has led to a huge debt. Excessively indebted governments, with no viable debt repayment options. Public debt can be repaid by running a primary surplus, or by promoting economic growth. However, in some circumstances, governments also have an incentive to use inflation to reduce debt.

Such changes will have their impact on the capital market - among others, changed directions of movement of capital, changes in the perception of risk by investors, reduced availability and increased cost of capital for businesses, etc.

“Money and love have a couple of things in common: everyone wants them, but once obtained they seldom cure all the ills we expect them to cure” (William B. Harrison, *Money Financial Institutions and the Economy*, Business Publications Inc. Plano, Texas 1985, p. 3).

The world economy is addicted to much to leverage, and there is no easy way back. Many countries' huge debts will, in the coming years, be a factor significantly increasing instability in the global economy. This is caused, on the one hand, by the sheer scale of the debt, and on the other hand - by the lack of rapid debt-reduction possibilities during long periods of low growth or recession.

Indebted countries will not have funds to continue to intervene during eventual successive waves of crisis (Thalassinos and Stamatopoulos, 2015; Thalassinos *et al.*, 2016, Georgieva, 2020). State intervention can be justified in the case of classical business cycle, i.e., in the situation, when the crisis is followed by a relatively rapid improvement, that makes debt reduction and restoring reserves possible.

Under the present circumstances, further state intervention will translate into a higher cost of debt, and the need to incur additional debt, on top of the already huge current indebtedness. In terms of debt rollover, instability becomes increasingly dangerous, and may be equivalent to running a Ponzi scheme.

Huge debts of many countries are a factor destabilizing the situation of not only the most indebted countries, but also of those who incurred debts to a much lesser extent. An indebted host country is also a big problem for companies, even those unindebted, as their access to capital becomes more difficult, and the cost of its acquisition is growing; moreover, risk levels grow, volatility of exchange rates and prices of securities increases, thus – in turn - increasing instability.

The increase in debt clearly demonstrates that "the world is still in love with debt." Taking into account the global indebtedness of states, enterprises, and households, in relation to GDP, it can be seen that the growing expenses, to a large extent financing consumption, have become the driving force behind the development of the world economy. This excessive consumerism is clearly at odds with sustainable development.

Various studies and models are trying to determine the maximum debt thresholds, beyond which the risk of bankruptcy increases rapidly. Such studies were made by, inter alia, Nobel Prize winners Modigliani and Miller. As the debt increases the risk also increases. The main difficulty comes down to estimating or correlating the rate of debt growth with risk growth. Investors often realize it when it is too late. This risk is fully revealed precisely in times of crisis.

A long period of prosperity sedates vigilance. This was one of the main causative factors of crises in many countries. Despite the many differences in the indebtedness of individual countries, there are some common causes (internal and external) of borrowing by states. The main reason is the lack of a sufficient level of resources to finance development (expansion) or consumption.

The rapidly growing debt of many countries raises the question of whether some countries have not already fallen into the over-indebtedness trap.

Public debt limitations are crucial for maintaining fiscal discipline and ensuring that debt levels remain sustainable. Awareness of the risks associated with this has led to various institutions trying to introduce debt limits:

- The International Monetary Fund (IMF) has a specific policy on public debt limits for countries with IMF-supported programs. This policy aims to address debt vulnerabilities by using quantitative conditionality, such as debt targets, to complement fiscal measures (IMF Debt Public Policy);
- In the United States, the federal debt limit (or debt ceiling) is a cap set by Congress on the amount of debt the federal government can incur. This limit is periodically raised to allow the government to meet its financial obligations (Rouse, Tedeschi, Gimbel, and Bradley, 2021).

- In Poland according to In Poland's constitution a public debt limit is 60% of GDP. This means that the consolidated gross debt of the country should not exceed this percentage. The budget deficit, which represents new annual debt, may not exceed 3% of GDP (worlddata.info).

2. Literature Review

The subject of public debt appears constantly in discussions between economists and politicians. In almost every developed economy, governments are seeking to rein in budget deficits that have ballooned in recent years, and those that have met with success must decide whether to apply budget surpluses to the reduction of the public debt.

There is still no clear consensus among politicians or economists on fundamental questions of public finance. Supporters of large scale government spending and the need for deficit spending in certain situations point to their substantial economic benefits.

Their opponents warn of the danger to the economy that can arise as a result of such policies. When discussing the issue of public debt, it is necessary to mention several basic theories. The most important ones include:

- **Classical Theory** related to scientific work of economists like David Ricardo. He suggested that public debt can be beneficial if it finances productive investments that lead to economic growth. However, excessive debt can lead to higher taxes and reduced private investment (Churchman, 2001, p. 21-47);
- **Keynesian Theory** related to scientific work of John Maynard Keynes. He argued that public debt can be used as a tool for economic stabilization. During economic downturns, government borrowing and spending can boost demand and help pull an economy out of recession (Aspromourgos, 2018);
- **Monetary Theory** was developed by Milton Friedman. Monetarism emphasizes the importance of controlling the money supply to manage inflation and stabilize the economy. Monetarists believe that variations in the money supply have major influences on national output in the short run and the price level in the long run. According to this theory countries with their own currency can borrow indefinitely, as they can always print more money to pay off debt. However, this can lead to inflation if not managed properly (Krugman, 2019).

Views regarding the public debt have been changing according to the changes in general economic thinking about state intervention. The issue of public debt is such an important one that it is hardly surprising that so many well-known economists

have commented on it. Among them were: David Hume, Adam Smith, D. Ricardo, Malthus, J.S. Mill, J.B. Say, A.P. Lerner, A.G. Hart and many others.

Mercantilists favoured public debt as they had great faith in the role of state in economic activities. Smith and Ricardo were against increasing the public debt. In their view, borrowing can be spent irresponsibly because of being an easy income. They claimed that it could cause deterioration in the functioning of economic life.

In this context, the classics have advocated that capital is wasted, and the debt burden is transferred to the next generations due to the inefficiency of public expenditures (Tsoulfidis, 2007).

James Buchanan, a Nobel Prize-winning economist known for his work on public choice theory said that *“The public debt is a burden on the back of our children and grandchildren...All debt is evil; public debt absolutely evil* (Bowen, Davis, and Kopf, 1960).

David Hume opposed public debt and said that, *“nations once they began to borrow, would be unable to resist, until they reached the point of bankruptcy.”* They allowed for the possibility of increasing the public debt in some case such as large infrastructure investment but emphasized that it should be limited and not be kept on.

The problems of public debt began to be looked at differently during the World War I (1914–1918) and the Great Depression (1930s). J.M. Keynes had proposed public borrowing as a war financing to England and argued that it would be useful.

The economic anomaly created by the Great Depression of the 1930s gave way to the development of the new theory of public debt.

Regardless of the above-mentioned theories and views of famous economists, it should be stated that the world has become very accustomed to living on credit in recent years. Budget deficits and growing public debt have become widely accepted. Discussions mainly concern the pace of its growth and the maximum level of debt.

The size of public debt is often related to the rate of GDP growth. This was written about by, among others, Wagner, who suggested that nothing bad happens when public debt grows at the same rate as GDP (Oxfordreference).

On the other hand Sustainability Theory focuses on the ability of a government to maintain its debt levels without causing economic instability. It involves analyzing factors like the debt-to- GDP ratio, interest rates, and economic growth rates (Eichengreen and Panizza, 2024).

3. Methods and Materials

3.1 Methods

Research was conducted in 2024. This research employs an analytical approach predicated on macroeconomic data from 1990 to 2023. The analysis focuses on public debt and GDP growth and the implications of rapid increase in debt on the overall economic stability of many countries.

Numerous sources, such as national financial reports, European Central Bank publications, and international economic databases, were employed to accumulate data. Trends in public debt and their GDP growth, public debt were analysed using several statistical tools, including:

1. Descriptive statistics: Summarized and described the main features of the data, such as mean, median, standard deviation, and percentage changes which contributed to recognizing the central tendencies and dispersion in economic indicators like GDP growth and public debt levels;
2. Time series analysis: Examined the patterns and trends that developed over the specified period. This analysis entailed the collection of data points at regular intervals to identify trends, cyclical patterns, and seasonal effects in economic variables, including annual GDP and public debt growth;
3. Regression analysis: Explored the relationships between different economic variables (e.g., regression models were used to analyse the relationship between the growth rate of public debt and GDP and the verification of Wagner's law, which contributed to the quantification of the strength and nature of these connections;
4. Comparative analysis: Compared USA and EU economic indicators which provided a contextual understanding of fiscal performance relative to its peers and helped to identify areas of strength and weakness;
5. Historical trend analysis: Identified long-term movements in key economic indicators by plotting historical data to visualize trends;
6. Structural break analysis: Detected points in time where significant changes in the economic indicators occurred, often due to policy shifts or external shocks. This helped in understanding the impact of major events like the COVID-19 pandemic on fiscal variables.

The analysis of research results, including the calculation of the average and median number of activities in individual categories, allows for obtaining a more complete

picture of the structure. Used in the analysis a correlation coefficient reflects how similar the measurements of two or more variables are across a dataset.

The formula used to get the linear correlation coefficient of the data is:

$$R = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$$

It's a number between -1 and 1 that tells you the strength and direction of a relationship between variables.

This ratio can achieve results in the range of:

Correlation coefficient value	Correlation type	Meaning
1	Perfect positive correlation	When one variable changes, the other variables change in the same direction.
0	Zero correlation	There is no relationship between the variables.
-1	Perfect negative correlation	When one variable changes, the other variables change in the opposite direction.

This analysis allows for more accurate comparisons with other data sets and monitoring changes.

3.2 Research Results

When discussing public debt, it is worth taking a closer look at the USA. This richest country in terms of GDP is often a model for other countries in the world to follow. The US national debt from 1990 to 2023 increased from US\$ 3.233 billion to US\$ 33.167 billion, i.e.. more than tenfold. This is very dangerous because of the role of the US in the global economy and because other countries often justify their growing public debt by what is happening in the US (Figure 1).

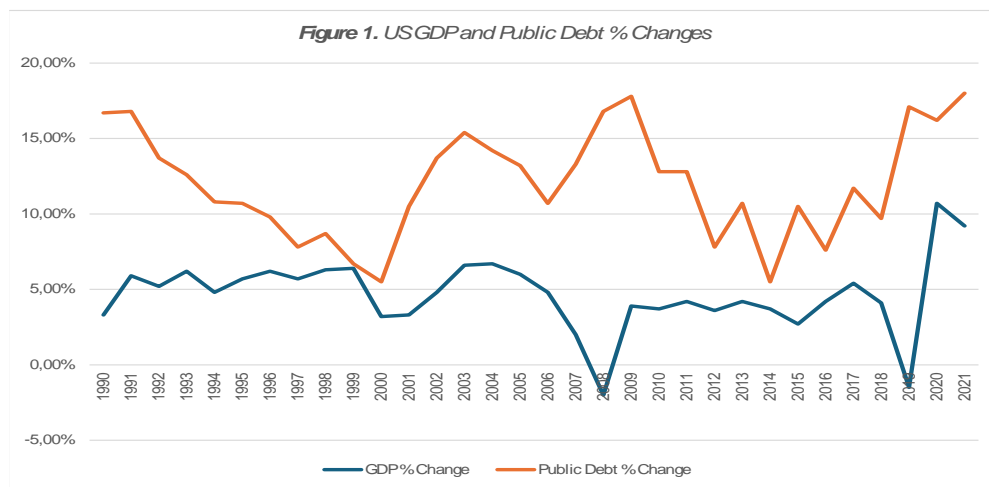
In order to examine the correlation between public debt and GDP, it is worth calculating the linear correlation which is used for measurement of dependence between two random variables (Table 2).

Table 2. Linear correlation coefficient

Correlation coefficient for years 1990-2022	0,967
Correlation coefficient for years 1990-2000	0,94
Correlation coefficient for years 2001-2010	0,883
Correlation coefficient for years 2011-2022	0,971

Source: Own calculations based on data from previous tables.

Figure 1. US GDP and Public Debt % Changes



Source: <https://www.macrotrends.net/countries/USA/united-states/gdp-gross-domestic-product>
access: 23.11.2023

Source: <https://macrotrends.net/countries/USA>

The correlation coefficient for the entire analyzed period is 0.967. This is a very high level of this coefficient, proving a high positive correlation between GDP and public debt in the USA. It should be noted, however, that in the two years analysed the decline in GDP was accompanied by a significant increase in public debt. The change in public debt to GDP ratio in selected European countries is presented below (Figure 2).

In almost all of the cases analyzed here (Table 3), there was a significant increase in the share of public debt in GDP in the period 1995-2021. There was a decline in Belgium, but the country had a significantly higher debt-to-GDP ratio than other countries in the first year of analysis. Public debt has been steadily increasing in the Eurozone and OECD countries. Among developed countries, it has been growing fastest in the US and Japan (Figure 2).

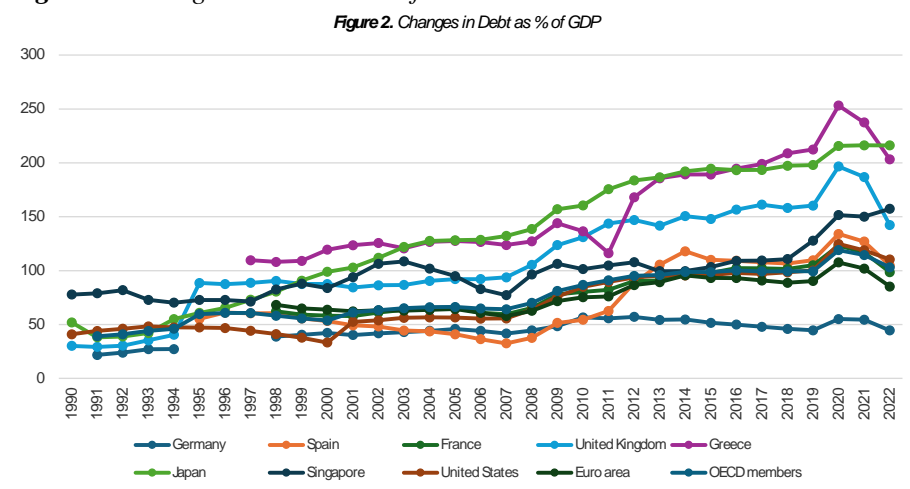
Table 3. Government Debt in the EU: debt as a percentage of GDP for select countries (%GDP)

	Greece	Italy	Portugal	Spain	France	Belgium
1995	99	119,40	62,20	61,50	56,10	131,30
1996	101,30	119,10	63,30	65,40	60	129
1997	99,50	116,80	58,70	64,20	61,40	124,30
1998	97,40	114,10	55,60	62,30	61,30	119,20
1999	98,90	113,30	55,40	60,80	60,50	115,40
2000	104,90	109	54,20	57,80	58,90	109,60
2001	107,10	108,90	57,40	54	58,30	108,20
2002	104,90	106,40	60	51,20	60,30	105,40

2003	101,50	105,50	63,90	47,70	64,40	101,70
2004	102,90	105,10	67,10	45,40	65,90	97,20
2005	107,40	106,60	72,20	42,40	67,40	95,10
2006	103,60	106,70	73,70	39,10	64,60	91,50
2007	103,10	103,90	72,70	35,80	64,50	87,30
2008	109,40	106,20	75,60	39,70	68,80	93,20
2009	126,70	116,60	87,80	53,30	83	100,20
2010	147,50	119,20	100,20	60,50	85,30	100,30
2011	175,20	119,70	114,40	69,90	87,80	103,50
2012	162	126,50	129	90	90,60	104,80
2013	178,20	132,50	131,40	100,50	93,40	105,50
2014	180,30	135,40	132,90	105,10	94,90	107
2015	176,70	135,30	131,20	103,30	95,60	105,20
2016	180,50	134,80	131,50	102,70	98	105
2017	179,50	134,20	126,10	101,80	98,10	102
2018	186,40	134,40	121,50	100,40	97,80	99,90
2019	180,60	134,10	116,60	98,20	97,40	97,60
2020	206,30	154,90	134,90	120,40	115	112
2021	194,50	150,30	125,50	118,30	112,80	109,20

Source: <https://www.statista.com/statistics/1378661/government-debt-eu-gdp-ratio-select-countries/>

Figure 2. Changes in Debt as % of GDP



Source: <https://databank.worldbank.org/reports.aspx?source=2&country=ARE>

Source: <https://databank.org/>

In 2022-2023, many countries saw an improvement in this ratio. This is a consequence of a sharp increase in inflation, which caused rapid growth in nominal GDP. In the same years, the amount of debt did not increase as much, but the cost of servicing public debt rose sharply.

The U.S. government's interest payments on the national debt have reached \$843 billion in the first eleven months of the fiscal year 2024, up from \$630 billion in FY 2023. The Congressional Budget Office (CBO) projects that interest costs will total \$12.9 trillion over the next decade, rising from \$892 billion this year to \$1.7 trillion in 2034 (How Much Interest Do We Pay on the National Debt?).

There is a significant increase in public debt in the European Union and the Eurozone countries as a whole (Table 4). There was not a single year in which this debt did not increase.

Table 4. General government gross debt - annual data

TIME	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
European Union-million Euro	9 710 986	10 024 591	10 273 713	10 428 524	10 582 224	10 715 772	10 813 068	10 909 041	12 127 760	12 799 268	13 282 868	13 862 584
% change		3,23%	2,49%	1,51%	1,47%	1,26%	0,91%	0,89%	11,17%	5,54%	3,78%	4,36%
Euro area-million Euro	9 011 351	9 307 425	9 545 998	9 678 683	9 824 256	9 936 911	10 039 390	10 134 158	11 195 998	11 821 032	12 268 150	12 732 445
% change		3,29%	2,56%	1,39%	1,50%	1,15%	1,03%	0,94%	10,48%	5,58%	3,78%	3,78%

Source: <https://own calculations based on: ec.europa.eu/eurostat/databrowser/view/teina225/default/table?lang=en>

However, GDP did not increase every year (Table 5).

Table 5. Gross domestic product (GDP) at market prices - annual data

European Union-million Euro	11 456 411	11 584 097	11 854 804	12 293 866	12 625 797	13 155 480	13 611 548	14 101 082	13 549 214	14 750 356	16 067 935	17 100 167
% change		1,11%	2,34%	3,70%	2,70%	4,20%	3,47%	3,60%	-3,91%	8,87%	8,93%	6,42%
Euro area-million Euro	9 943 236	10 048 707	10 288 312	10 650 011	10 942 181	11 357 041	11 732 531	12 123 019	11 591 742	12 577 476	13 652 192	14 499 937
% change		1,06%	2,38%	3,52%	2,74%	3,79%	3,31%	3,33%	-4,38%	8,50%	8,54%	6,21%

Source: <https://own calculations based on: ec.europa.eu/eurostat/databrowser/view/teina225/default/table?lang=en>

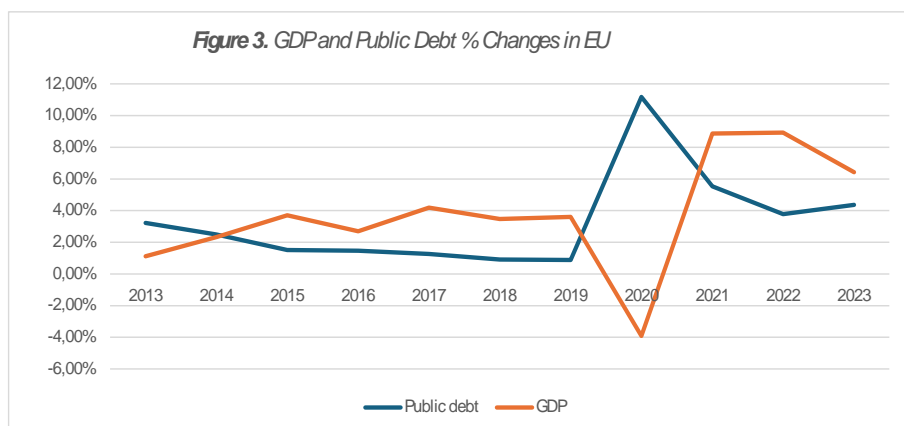
As in the case of the USA, the decline in GDP in the EU was accompanied by a significant increase in public debt (Figures 1 and 3). This is very dangerous in the event of a prolonged economic downturn.

In the period under review, public debt in the entire EU grew slower than GDP (Table 6). This was mainly due to the years 2021-2022 in which inflation increased. However, eliminating the years 2021-2023, the situation changes significantly, public debt is growing faster than GDP (Table 7).

Table 6. Public debt and DGP% changes in EU

Time	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Public debt	3,23%	2,49%	1,51%	1,47%	1,26%	0,91%	0,89%	11,17%	5,54%	3,78%	4,36%
GDP	1,11%	2,34%	3,70%	2,70%	4,20%	3,47%	3,60%	-3,91%	8,87%	8,93%	6,42%

Source: <https://own calculations based on: ec.europa.eu/eurostat/databrowser/view/teina225/default/table?lang=en>

Figure 3. GDP and Public Debt % Changes in EU

Source: <https://own-calculations-based-on-ec-europa-eu-eurostat-databrowser/view/teina225/default/table?lang=en>

Table 7. GDP and Public debt Changes	2012-2023		2012-2020	
	Nominal Change	% Change	Nominal Change	% Change
European Union - 27 countries (from 2020)				
Debt change in 2012-2023	4 151 597,90	43%	2 416 773,60	25%
GDP change in 2012-2023	5 643 755,60	49%	1 694 410,00	15%
Euro area – 20 countries (from 2023)				
Debt change in 2012-2023	3 721 093,80	41%	2 184 646,70	24%
GDP change in 2012-2023	4 556 701,10	46%	1 648 506,30	17%

Source: Own calculations based on data from previous tables

The linear correlation coefficient of public debt and GDP for European Union countries is presented below.

Table 8. Linear correlation between public debt and GDP	2012-2023	2012-2020
European Union - 27 countries (from 2020)	0,9460	0,7028
Euro area – 20 countries (from 2023)	0,9412	0,6875

Source: Own calculations based on data from previous tables

In the years 2012-2023 the correlation coefficient was quite high here, although slightly lower than in the US. However, excluding the years 2021-2023 the correlation is much lower here. Given these results, it is difficult to believe that countries are following Wagner's rule.

4. Conclusions

In the process of globalization, the mobility of capital has increased. This facilitated the financing of various entities, while at the same time leading to the emergence of

many threats. The relatively easy financing of budget deficits has led to a huge increase in public debt in many countries.

The rate of growth of public debt often exceeds the rate of growth of GDP. This causes an increase in the costs of servicing this debt and the need to allocate an increasing share of budget revenues to servicing the public debt. This is very dangerous in conditions of high inflation, when the cost of capital increases rapidly.

High inflation, causing an increase in the cost of servicing debt, creates significant threats, but we should also remember its other side. The analysis carried out showed that the increase in inflation is accompanied by a decrease in the ratio of public debt to GDP in many countries. However, this should not lead to disregarding the growing public debt.

The threats associated with excessive public debt are best seen during periods of falling GDP. Based on the conducted research, it can be seen that the fall in GDP is accompanied by a rapid increase in public debt. If the decline in GDP continues over a longer period of time, it could lead to disaster.

When discussing public debt, it should be emphasized that the way in which the funds obtained are spent (productive and unproductive debt) is very important in assessing its effects.

If the debts are used in construction, such as railways, power stations, and irrigation projects, which contribute to the productive capacity of the economy, they provide a constant flow of income to the state.

The state generally pays the interest and principal debt amount from these projects' revenues. If the debts are used for social spending, which do not contribute to the productive capacity of economy, these debts are a burden on the society. In such a situation the state generally pays the interest and principal debt amount from taxes or getting more and more into debt.

5. Limitations

The study's reliance on macroeconomic data which do not always accurately describe the situation in individual countries and may consequently influence the assessments formulated here.

Further research should include, among others, the structure of budget expenditures, especially those financed by public debt.

Another important area of further analysis should be the analysis of a possible increase in the costs of financing public debt as a consequence of excessive indebtedness and the risks associated with it.

6. Conflict of Interest

The author declares that he has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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