ANNA MOŹDZIERZ

amozdzie@uek.krakow.pl

Krakow University of Economics. College of Economics and Finance. Institute of Finance
ul. Rakowicka 27, 31-510 Krakow, Poland
ORCID ID: https://orcid.org/0000-0003-1292-0798

RADOSŁAW ŚLUSARCZYK

slusarcr@uek.krakow.pl

Krakow University of Economics. College of Economics and Finance. Institute of Finance
ul. Rakowicka 27, 31-510 Krakow, Poland
ORCID ID: https://orcid.org/0000-0002-4582-8106

Fiscal Consolidation Versus Inflation in Reducing Public Debt in OECD Countries (1985–2023)[1]

Abstract

Theoretical background: The problem of excessive public debt, which arose in the wake of the global financial crisis and intensified as a consequence of the COVID-19 pandemic, is currently one of the most important challenges for fiscal authorities. Theoretical considerations and practical experience indicate that reducing public debt is possible through appropriate actions under fiscal and monetary policies. Fiscal

actions may consist of fiscal consolidation (increased taxation, spending cuts), and monetary actions may relate to inflationary policy.

Purpose of the paper: The aim of this paper is to analyse debt consolidation episodes in OECD countries in 1985–2023 in order to identify which approach – fiscal austerity or inflation – was the key factor in reducing (stabilising) public debt.

Research methods: The empirical analyses in the paper were conducted with the use of the following research methods: chi-square test, Cramer's *V* coefficient and odds ratio. Mosaic plots were used to capture and visualise the relationships between variables. The research used annual data for OECD countries for 1985–2023.

Main findings: The research hypotheses were supported by the research findings: a) in OECD countries, fiscal consolidation is more effective in reducing public debt than inflationary policy. This effect strengthens in the long term, which means that fiscal consolidation results in a lasting debt reduction; b) in the short term, higher inflation leads to a decrease in the public debt-to-GDP ratio. However, this effect is time-limited and does not translate into a permanent debt reduction; c) fiscal consolidation based on austerity policy brings a more lasting effect than reducing public debt through inflation. Countries that pursued austerity policies were more likely to achieve long-term success in reducing debt, which highlights the advantages of this approach over inflationary policies. Sustainable consolidation of public debt is possible thanks to the implementation of responsible fiscal policy (tax and expenditure), and simultaneous support for economic growth (GDP growth). The use of inflation should be seen as a method to reduce the debt-to-GDP ratio under debt pressure, bearing in mind, however, that this reduction will have a short-term effect and carries a significant risk.

Introduction

Since the outbreak of the global financial crisis through the crisis caused by the COVID-19 pandemic, a global debt surge could be observed. The Global Debt Monitor report prepared by the International Monetary Fund (IMF) points out that although the debt-to-GDP ratio in 2023 decreased by about 1 percentage point (p.p.) compared to 2022 (237%), it still exceeds the level observed before the COVID-19 pandemic (IMF, 2024, p. 1). In addition, the reduction in debt levels recorded in 2023 resulted from a sharp drop in private debt, while the value of global public debt rose to USD 98 trillion. This resulted in an increase in the public debt-to-GDP ratio to 94% (2 p.p.), with a simultaneous return to the upward trend. It should be noted that the problem of increasing public debt is not limited to emerging economies, but also concerns developed economies, including the United States. This is best reflected in the words of the Chairman of the US Federal Reserve System, Jeremy Powell, who stated that the US fiscal path is unstable.[2]

This paper analyses OECD countries with an upward trend in both the average public debt-to-GDP ratio and its median from the outbreak of the global financial crisis until 2023. The continuing upward trend in public debt poses significant challenges for fiscal authorities, which must decide on methods of reducing it. The theoretical considerations and practical experience to date allow us to identify various

---

[2] J. Powell's interview for CBS on February 5, 2024.

methods of reducing public debt through appropriate fiscal and monetary measures (Alesina & Perotti, 1997).

The aim of this paper is to analyse episodes of public debt reduction in OECD countries in 1985–2023 in order to identify which approach – fiscal consolidation or inflation (inflationary policy) – was the key factor in reducing (stabilising) public debt.

In order to achieve the research objective, the following hypotheses were put forward:

H1: In OECD countries, fiscal consolidation is more effective in reducing public debt than inflation (inflationary policy).

H2: In the short term, high inflation reduces the public debt-to-GDP ratio.

H3: Fiscal consolidation based on austerity policy has a more lasting effect than a reduction of public debt through inflation.

Literature review

On the basis of the literature on the subject, several macroeconomic factors and fiscal measures that may lead to a public debt reduction can be identified; these are (Callen, 2003; IMF, 2012; Reinhard & Sbrancia, 2011; Yartey & Okwuokei, 2014): accelerated economic growth, fiscal consolidation, low interest rates, changes in the real exchange rate, debt restructuring or default, privatisation. It is no coincidence that the above-mentioned factors are also variables in the equation determining the evolution of the public debt-to-GDP ratio (IMF, 2012, p. 104):

$$b_t = \frac{1+i_t}{(1+\pi_t)(1+g_t)} b_{t-1} + d_t + e_t$$

where: b_t – debt level in period t; π_t – inflation measured by the GDP deflator in period t; i_t – interest paid on debt (constituting the cost of servicing the debt) during period t; g_t – economic growth in period t; d_t – primary deficit to GDP ratio in period t; e_t – a residual that takes into account valuation effects and other accounting adjustments not fully captured by changes in the primary deficit.

The literature on the subject refers to accelerated rate of economic growth as "growing out of debt" (Yartey & Okwuokei, 2014, p. 76). This path out of debt is the one most preferred by decision makers. Economic growth directly translates into a drop in the debt-to-GDP ratio. The positive impact of economic growth on the level of debt is confirmed by the results of research conducted by Yartey and Okwuokei (2014, p. 76). However, the report published by the IMF in 2012 does not clearly confirm the existence of such a relationship in all the cases examined (IMF, 2012). Moreover, taking into account the current macroeconomic conditions in the majority of countries, achieving accelerated economic growth may be extremely difficult. The research findings of de Soyres et al. (2022, p. 2) are worthy of note in this regard. They demonstrated that there may also be an inverse relationship between

economic growth and public debt, i.e. an unexpected increase in public debt has a negative impact on the economic growth. Thus, an unexpected increase in debt related to COVID-19 and geopolitical crises may limit the viability of a growth-based debt reduction process.

Another historically important method of reducing debt is the sale of state assets (privatisation). It should be noted that the first significant wave of privatisation began in the mid-1980s, with the actions of Margaret Thatcher's government (*The Economist*, 2014). This was followed by the sale of state-owned enterprises in Central European countries in the 1990s and mid-2000s. This method of debt reduction, however, has some significant limitations, including economic ones. The sale of state assets in the current geopolitical situation may be impossible or unwarranted due to non-economic reasons, such as security considerations.

As noted by Yartey and Okwuokei (2014, p. 78), historically, debt restructuring or insolvency were often the methods used by governments to solve the debt problem. In the period they analysed (1970–2009), as many as 48% of debt reduction episodes were the result of these methods. The Brady Initiative implemented in the 1990s is a prime example of such approach. Debt restructuring and insolvency should be considered a last resort, as it may entail negative consequences, including long-term ones, such as: loss of reputation, increased debt servicing costs, being cut off from sources of financing and economic crises.

The key method to reduce public debt is fiscal consolidation, leading to high structural surpluses. Fiscal consolidation can be revenue-based (tax increases), expenditure-based (spending cuts) or a combination of both. One should remember that various consolidation measures affect the economy through different channels, influencing economic growth, the amount of disposable income and the balance of payments (Moździerz, 2017). According to the research conducted by Alesina and Ardagna (2013, pp. 1–2), fiscal adjustments focused mainly on the expenditure side may result in greater and longer-lasting effects of reducing public debt in relation to GDP, compared to adjustments based mainly on tax increases. For this reason, authorities considering a fiscal consolidation must take into account its economic and social impact in the short and long term. The success of fiscal consolidation depends not only on the strategy, but also on macroeconomic conditions as well as institutional and political factors. Furthermore, Ziółkowska (2012) emphasized that effective fiscal consolidation should have societal approval. It is also worth noting that some countries have established fiscal rules concerning public expenditure to balance public finances (see Moździerz, 2019).

Finally, a reduction in the real value of debt can be achieved through inflation. Inflation can affect the debt-to-GDP ratio directly or indirectly by influencing key – considering the path of public debt – fiscal variables.[3] A commonly used measure of

---

[3] The analysis ignores the impact that inflation may have on other macroeconomic variables (investment level and economic growth), as this is beyond the scope of this paper.

debt is its ratio to GDP. An increase in the nominal value of GDP leads to a decrease in this ratio. The inflation also affects the debt through the inflation tax. Public revenues increase as a result of the increase in the tax base. The government also benefits from the inflation tax when it issues fixed-rate bonds. If inflation is higher than expected by investors, the rate of return falls. Negative real interest rates may also play a role in reducing public debt. In the context of the impact of low interest rates on the debt, the results of the research by Baldaccio et al. (2012) are worth recalling. They demonstrated that a significant part of the debt reduction episodes that took place in the 1980–2010 period were associated with low interest rates. Looking at the current policy of the world's major central banks, we can see that they have started – after a period of unprecedented tightening of monetary policy – a cycle of interest rate cuts, but these are still relatively high. The interest rate cut cycle may also be postponed due to the risk of tariff wars, which, in turn, could have a negative impact on the future costs of servicing the accumulated public debt. In conclusion, using inflation in the fight against public debt can be an effective, if risky, strategy.

Taking into account the theoretical considerations and the results of empirical research, it can be concluded that the methods of reducing public debt that should be the subject of analyses in further research are primarily: fiscal consolidation and inflationary phenomena.

For the purposes of this research paper, it is crucial to determine how the success of a policy aimed at reducing public debt is defined in the literature. There are significant discrepancies in this regard. Nickel et al. (2010, p. 14) assumed in their research that a success in debt reduction policy is a reduction of the public debt by 10 p.p. over a period of 5 years. In turn, the International Monetary Fund (Callen, 2003) defined three-year periods in which the debt-to-GDP ratio decreased by 18 p.p. Finger and Sadikov (2010) defined successful debt reduction episodes as a decline in the debt-to-GDP ratio by 20 p.p. over a period of at least two years. According to Baldacci et al. (2010), it is crucial to take into account the level of development of a given country when defining success in debt reduction. Thus, in developed countries, the threshold debt-to-GDP ratio is 60%, while in developing countries it is 40%.

Research methods

The relationship between reducing public debt, fiscal consolidation and inflation is the main area of analysis in this paper.

The first stage in the research process was the analysis of the public debt path in the long term (1960–2023) in order to determine the consolidation needs. The next step was to determine the nature of fiscal policy implemented by OECD member states in the period under review, using the typology proposed by Alesina et al. (2015). Taking into account the nature of the fiscal impulse (consolidation or expansion) and

the phase of the business cycle during which particular fiscal policy is implemented, they distinguished four types of fiscal policy. These are:

– countercyclical fiscal consolidation occurring when a negative fiscal impulse (understood as an increase in the cyclically adjusted primary balance compared to the previous year) occurs in the recovery phase (defined as a period in which the output gap is positive);

– procyclical fiscal expansion occurring when a positive fiscal impulse (understood as a decline in the cyclically adjusted primary balance compared to the previous year) occurs in the recovery phase (defined as a period in which the output gap is positive);

– procyclical fiscal consolidation occurring when a negative fiscal impulse (understood as an increase in the cyclically adjusted primary balance compared to the previous year) occurs in a recessionary phase (defined as a period in which the output gap is negative);

– countercyclical fiscal expansion occurring when a positive fiscal impulse (understood as a decline in the cyclically adjusted primary balance compared to the previous year) occurs during a recession (defined as a period in which the output gap is negative).

Next, the relationship between fiscal consolidation and the public debt was identified. Fiscal consolidation episodes were determined on the basis of changes in the cyclically adjusted primary balance. Similarly, the relationship between inflation and public debt was identified. The category used in the research was inflation shock, defined as an increase in the annual inflation rate by at least 1 p.p. year-on-year and a reduction in the public debt-to-gross domestic product (GDP) ratio in the short term, i.e. in a given year.

Empirical analyses of the above-mentioned relationships were conducted with the use of the following statistical methods: chi-square test, Cramer's *V* coefficient and odds ratio. A mosaic plot was used for data visualization. The selection of tools enabled the implementation of the task, which was to identify whether there was a relationship between the variables studied. In other words, the results are to provide information on which factors (fiscal consolidation or inflation) were related to episodes of debt consolidation, i.e. a drop in the debt-to-GDP ratio, and to what extent this relationship was permanent.

The research was conducted for OECD countries, on annual data, for 1985–2023[4] (this time frame was selected due to data availability). The total number of observations was 1,005.

Taking into account the debt dynamics in recent years in OECD countries, the analysis distinguishes between short-term (transitional) and long-term (permanent) episodes of debt reduction. The first group includes episodes that occurred in those years in which the public debt-to-GDP ratio decreased compared to the previous year. The second group included episodes that were characterised by a year-on-year drop
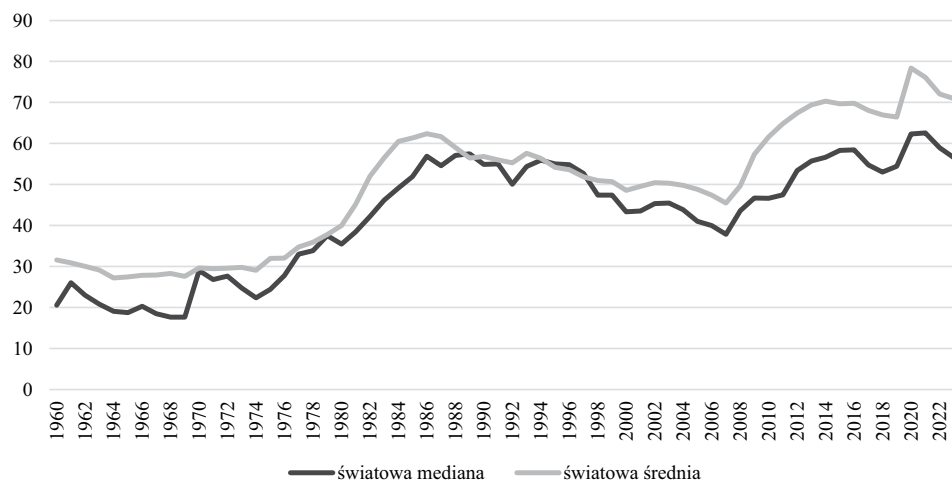
---

[4] For some countries, the time frame of the analysis was shorter.

in the public debt-to-GDP ratio lasting at least three years. This makes it possible to answer the question of how lasting the impact of factors such as fiscal consolidation and inflation on the stability of the public debt path is.

Results

Figure 1 demonstrates data on the dynamics of the public debt-to-GDP ratio in OECD countries from 1960 to 2023. This is a period that goes beyond the time frame adopted for empirical research in the further part of the work. This is an intentional action aimed at determining the long-term trend. The data presented in Figure 1 demonstrate that both the average and the median indicate an upward trend in the debt-to-GDP ratio in OECD countries. It was particularly noticeable since the 1970s and continued until the last years of observations. The turning point was 2008. There was a clear spike in both lines during the global financial crisis, when many OECD countries increased their public debt in order to stabilise their economies and financial markets. Since then, both the average and median continue to rise. Since 2015, we have observed a further increase in the debt-to-GDP ratio, but in 2020–2022 both lines have begun to stabilise. Given the scale of state interventionism in response to the COVID-19 pandemic, which was many times higher than during the global financial crisis, it can be assumed that other factors, such as economic growth and inflation, were responsible for the stabilisation of the public debt-to-GDP ratio.

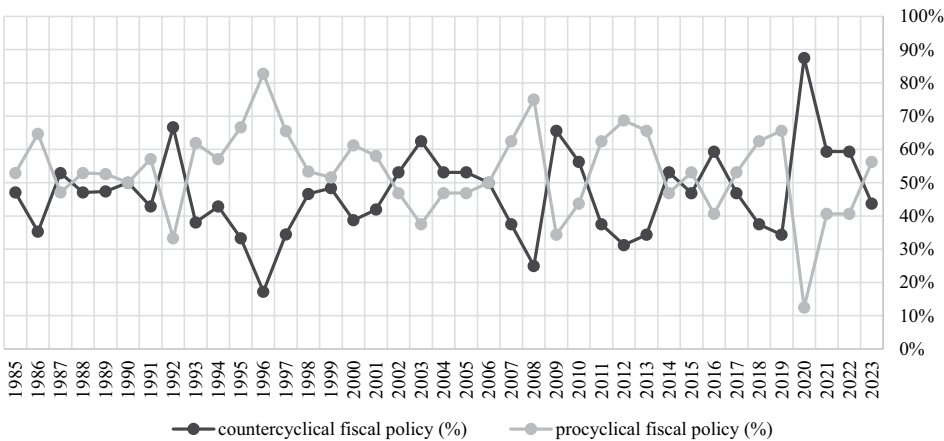**Figure 1.** Public debt in OECD countries 1960–2023 (% of GDP)

Source: own elaboration based on Mbaye et al. (2018).

Although the assessment of the reasons for the increase in debt in recent years is not the subject of this analysis, it is worthy of note that the arguments presented by Barro (1979, p. 940) are valid. According to Barro, the reason behind the rise in public debt is that it can be used as a buffer, the purpose of which is to limit the need for an immediate increase in the tax burden necessary to finance the increase in public spending incurred in connection with the occurrence of phenomena such as wars or natural disasters. Undoubtedly, the way countries have acted in response to the COVID-19 pandemic and the armed conflicts that have taken place in recent years corresponds to this pattern. As already indicated, the increase in debt over the last 20 years is also a consequence of the global financial crisis. Studies on the fiscal consequences of systemic banking crises show that they cause an average increase in the public debt-to-GDP ratio by about 40 percentage points (Baldacci et al., 2009, p. 11). Putting the reasons for the growing debt overhang aside, it should be noted that in the coming years a significant number of countries will be forced to choose a method of reducing it.

Once the needs for public debt consolidation in OECD countries have been analysed, we will move on to identify the fiscal policy stance in the period under review. The typology of fiscal policy is useful in assessing the implementation of one of the basic functions of the state, distinguished by Richard Musgrave, i.e. the stabilisation function (Stiglitz, 2004, pp. 24–25).

Using the classification described in the research methodology section, the evolution of fiscal policy stance towards the business cycle in 1985–2023 in OECD countries was examined and the results are illustrated in Figure 2.
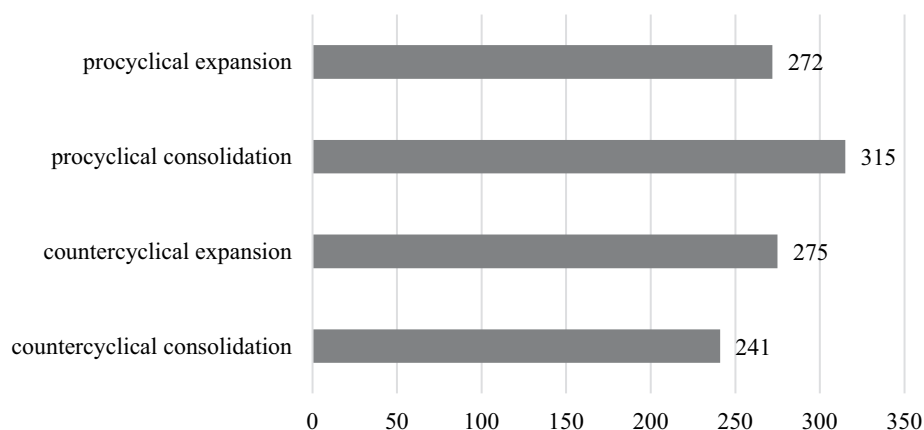
Figure 2. Percentage of countries with procyclical or countercyclical fiscal policy
in OECD countries, 1985–2023

Source: own elaboration based on OECD (2023).

The analysis of the data presented in Figure 2 shows that procyclical policies dominated in OECD countries in the 1980s and 1990s, reaching a peak in 1995. The percentage of countries using countercyclical policies increased in the second half of the 1990s and early 2000s, suggesting that more countries started to use fiscal instruments to stabilise economic fluctuations. During the crisis periods, both in 2008–2010 and 2020–2021 (COVID-19 pandemic), the percentage of countries applying countercyclical fiscal policy increased. After the pandemic, the share of procyclical policies has increased, which may be due to attempts at fiscal consolidation.

Figure 3. Number of observations of a given type of fiscal policy in OECD countries in 1985–2023 (in years; total for all countries)

Source: own elaboration based on OECD (2023).

Figure 3 presents the total number of observations (for all countries) in which individual types of fiscal policy were implemented. It shows that in the period under analysis (1985–2023) the dominant form of policy was procyclical fiscal consolidation. In total, in all OECD countries, it occurred in 315 observations. In turn, the smallest number of observations were made in years in which countercyclical fiscal consolidation occurred – 241 of them in total. Interesting conclusions can be drawn from this large discrepancy. One possible explanation for this distribution is the fact that the government is reluctant to implement public finance reforms during periods of economic recovery, as they are not forced to do so by the deteriorating private sector deficit. A much more persuasive incentive for fiscal reforms is the risk of debt crises during periods of economic slowdown. One should also note that financial authorities in OECD countries were keen to use countercyclical fiscal expansion. This form of fiscal policy was in particular observed during the period of the global financial crisis and the COVID-19 pandemic.

Leaving aside the specific conditions during the global financial crisis and the COVID-19 pandemic, it is worth noting how the emphasis on the above-mentioned types of fiscal policy was distributed over time in the countries studied. It is particularly interesting to compare the nature of fiscal policy before and after the global financial crisis. Table 1 shows the structure of OECD fiscal policies specific to the period of the so-called Great Moderation. It shows that fiscal authorities used mainly procyclical expansion (28% of the studied observations). Moreover, another type of fiscal policy that characterised the Great Moderation period was procyclical consolidation. Table 2 shows that the nature of fiscal policy has changed significantly after the global crisis. The 2010–2019 period was characterised by the predominance of countercyclical consolidation over other types of fiscal policy. It occurred in almost 40% of observations. The results largely illustrate the renaissance of the idea of austerity.

Table 1. Types of fiscal policy in the studied group of countries in the Great Moderation period

	Types of fiscal policy			
	Countercyclical consolidation	Procyclical expansion	Procyclical consolidation	Countercyclical expansion
Number of observations (years)	143	158	146	112
Share (%)	26	28	26	20

Source: own elaboration based on OECD (2023).

Table 2. Types of fiscal policy in the studied group of countries in 2010–2019

	Types of fiscal policy			
	Countercyclical consolidation	Procyclical expansion	Procyclical consolidation	Countercyclical expansion
Number of observations (years)	50	56	124	90
Share (%)	16	17	39	28

Source: own elaboration based on OECD (2023).

The results of the research on the relationship between inflation or fiscal consolidation and public debt will be presented in the further part of the paper.

Consolidation episodes were defined as years in which the cyclically adjusted primary balance improved (binary variable: 1 – *balance improved*; 0 – *no improvement*). The periods in which the debt-to-GDP ratio decreased were classified similarly (binary variable: 1 – *decrease in the ratio*; 0 – *no decrease in the ratio*). In the first stage of the analysis, we verified whether there was a correlation between the changes in the above-mentioned balance and the public debt in the year in which the fiscal impulse occurred. The chi-square test was used to study the relationship.

This test was chosen due to the nature of the data, as well as the cell counts in the contingency table. The test results are presented in Table 3.

The chi-square test result does not allow us to reject the null hypothesis of independence ($p = 0.1888$). This may be due to the negative impact of consolidation on GDP, which is the denominator of the debt ratio.

Since fiscal consolidation may affect public debt with a delay, the next step is to check the relationship in period $t+1$. The chi-square test results indicate that there is a statistically significant relationship between the fiscal impulse in period t and the change in the debt-to-GDP ratio in period $t+1$. The value of the chi-square statistic was 7.34 ($p = 0.0067$). Thus, the null hypothesis of the test, stating the lack of relationship between the analysed variables, was rejected.
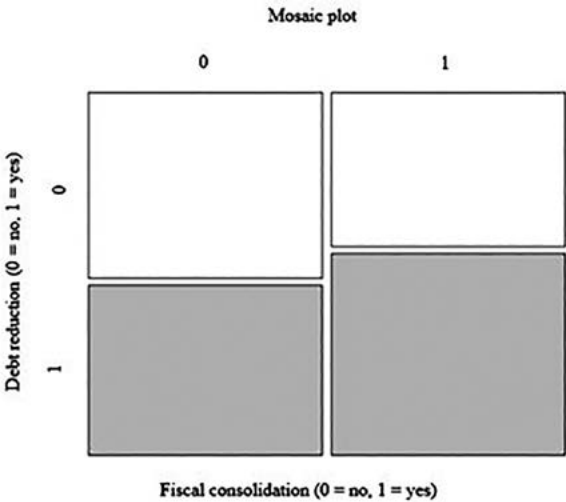
Table 3. Chi-square test results for fiscal impulse and debt reduction (short term)

Value of the chi-square statistic	Number of degrees of freedom	p-value
7.3426	1	0.00637

Source: own elaboration with the use of R. Core Team (2024).

The mosaic plot (Figure 4) illustrates the correlation between the occurrence of the fiscal impulse in year t and the drop in the public debt-to-GDP ratio in year $t+1$. The analysis of the presented areas shows their uneven distribution along the vertical border, which may suggest the existence of a statistically significant relationship between these variables.

Figure 4. Mosaic plot – fiscal consolidation (in period t) and the drop in the debt-to-GDP ratio (in period $t+1$)

Source: own elaboration with the use of R. Core Team (2024).

The nature and strength of the analysed relationship will be assessed with the use of the odds ratio method and Cramér's V coefficient. The odds ratio is 1.43. This means that the probability of a debt drop is 43% higher in the event of fiscal consolidation. The value of Cramér's V coefficient was 0.09 ($p = 0.00637$), which means that this relationship is statistically significant, but weak.
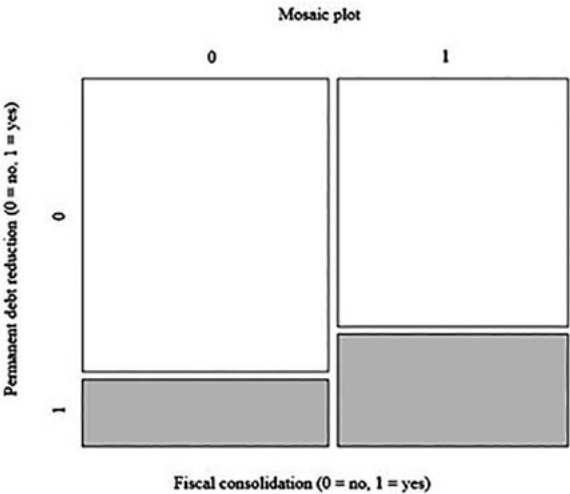
In the next stage of the analysis, we verified the relationship between the fiscal consolidation process and the permanent reduction of the public debt-to-GDP ratio, understood as its systematic (annual) drop in at least three consecutive years after the fiscal shock. Similarly to the previous stage of the study, the fiscal impulse was taken into account with a one-period delay in relation to changes in the public debt. The results of the chi-square test are presented in Table 4. The results of the chi-square test indicate that there is a statistically significant relationship between the analysed variables ($p = 0.0003164$).

Table 4. The chi-square test results for fiscal impulse and debt reduction (long-term)

Value of the chi-square statistic	Number of degrees of freedom	p-value
12.97	1	0.0003164

Source: own elaboration with the use of R. Core Team (2024).

Figure 5. Mosaic plot – fiscal consolidation (in period t) and the drop in the debt-to-GDP ratio (in period $t+1$)

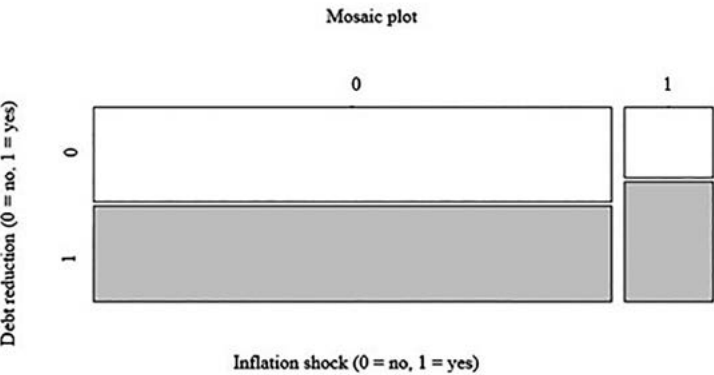Source: own elaboration with the use of (R: Core Team, 2024).

The mosaic plot (Figure 5) illustrates the co-occurrence of fiscal consolidation and long-term episodes of debt reduction. The uneven distribution of areas along the vertical border indicates a possible relationship between the analysed variables. To formally confirm this relationship, the odds ratio and Cramér's *V* coefficient were analysed. The odds ratio was 1.99, which means that the probability of a permanent drop in the public debt-to-GDP ratio for at least three years is almost twice as high in the event of fiscal consolidation. The value of Cramér's *V* coefficient was 0.101, which suggests the existence of a statistically significant but relatively weak relationship between the studied variables.

Although the strength of this relationship remains limited, there is a noticeable upward trend in its intensity in the long term. This suggests that, in the long term, fiscal consolidation may make the debt reduction more permanent.

The next key stage of the analysis carried out in this paper is to look for the relationship between the reduction of public debt and inflation. The research began with an empirical verification of the relationship between the inflation shock and the reduction of the public debt to GDP ratio in the short term, i.e. in a given year. In order to enable a formal assessment of this relationship, both variables were used in binary form: 1 was assigned to cases of an inflation shock or a drop in the public debt, while 0 meant that these phenomena did not occur

The co-occurrence of an inflation shock and a drop in the public debt-to-GDP ratio in a given year is illustrated in Figure 6. As one can see in the figure, the areas are not evenly distributed along the vertical border, which may indicate the existence of a relationship between the analysed variables. This pattern suggests a potential asymmetry in the data distribution.

Figure 6. Mosaic plot – inflation shock and short-term consolidation success
(drop in debt-to-GDP ratio in year *t*)

Source: own elaboration with the use of R. Core Team (2024).

The next step in examining the relationship between the occurrence of an inflation shock and the debt reduction is to use the chi-square test. This test was chosen due to the nature of the data, as well as the cell counts in the contingency table. The null hypothesis of the test assumes no relationship between the analysed variables. The results of the chi-square test are presented in Table 5. The results indicate that the null hypothesis that there is no relationship between the variables should be rejected. There is a statistically significant relationship between the variables. The value of the chi-square statistic suggests that the differences in frequencies are not accidental.

Table 5. Chi-square test results for inflation shock and debt reduction (short term)
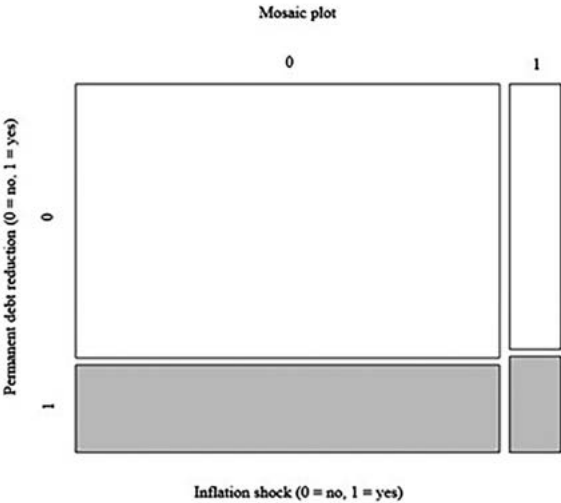
Value of the chi-square statistic	Number of degrees of freedom	p-value
7.4424	1	0.00637

Source: own elaboration with the use of R. Core Team (2024).

The use of the odds ratio and Cramér's V coefficient will allow us to assess the nature and strength of the analysed relationship. The odds ratio is 1.66, which means that the probability of a debt drop is 66% higher in the event of an inflation shock. The value of Cramér's V coefficient was 0.09 ($p = 0.00637$), which indicates a statistically significant but relatively weak relationship between the analysed variables. The next stage of the analysis is to verify the relationship between the inflation shock, understood as an increase in the inflation rate by at least 1 p.p., and a permanent drop in public debt in relation to GDP (an annual drop in debt to GDP in at least 3 years following the occurrence of the shock). In the analysis, both variables were presented in binary form, where 1 means the occurrence of a given phenomenon (inflation shock or a drop in debt), while 0 indicates its absence.

The mosaic plot (Figure 7) illustrates the co-occurrence of an inflation shock and a permanent reduction in the public debt-to-GDP ratio. The lack of clear differences in proportions between categories suggests that there is no significant relationship between the analysed phenomena.

Figure 7. Mosaic plot – inflation shock and lasting consolidation success

Source: own elaboration with the use of R. Core Team (2024).

In order to verify the conclusions resulting from the analysis of the mosaic plot, the chi-square test was performed. The test results are presented in Table 6. According to the obtained results, there is no basis to reject the null hypothesis assuming independence of the analysed variables ($p > 0.05$). A low chi-square statistic value indicates that the observed frequencies in the contingency table are close to the expected values, with no relationship between the variables.

Table 6. Chi-square test results for inflation shock and reduction of public debt (long term)

Value of the chi-square statistic	Number of degrees of freedom	p-value
0.26448	1	0.6071

Source: own elaboration with the use of R. Core Team (2024).

The results of the analysis indicate that the relationship between the increase in inflation (inflation shock) and the reduction of public debt is of a short-term nature. This means that in the short term, inflation may be a factor limiting the pressure resulting from high public debt. However, the results obtained suggest that a sustainable strategy for reducing public debt should not be based on inflationary mechanisms.

Discussion

The literature review and the results of empirical analysis lead to the conclusion that in order to permanently reduce public debt one must implement responsible fiscal policy (tax and expenditure), while supporting economic growth (GDP growth). The use of inflation should be seen as a method to reduce the debt-to-GDP ratio in periods of debt pressure, bearing in mind that this reduction will have a short-term effect and carries a significant risk. These findings are consistent with the adaptive inflation expectations hypothesis, according to which business entities adjust their inflation expectations in response to price shocks. As a result, public debt managers cannot permanently benefit from the effect of reducing the real value of debt resulting from unexpected inflation. The results obtained in the paper are confirmed in the literature on the subject, including, for example, the analysis conducted by Fukunaga et al. (2019, p. 6). Unexpected inflation has also been cited as a contributing factor to lower debt (both public and private) in 2021–2022.

The hypothesis of Reinhart and Sbrancia (2011) is also worth mentioning in this context. These authors link the significant decline in the debt-to-GDP ratio in 1940–1970 with the financial repression taking place at that time and inflation (remaining at an average level for a long period of time). Therefore, it should be recognised that a lasting impact of inflation on debt reduction is possible if appropriate regulations relating to financial markets are present. These regulations – during the period of the Bretton Woods system – included: administrative limits on interest rates (including the American Regulation Q), as well as restrictions on the international flow of capital. Limitations on nominal interest rates enabled reducing debt servicing costs, while negative real interest rates resulted in a reduction in the real value of public debt. Thus, financial repression was a kind of tax imposed on bondholders and savers. It should be noted, however, that since the 1970s – among others, as a consequence of the McKinnon–Shaw hypothesis regarding the negative consequences of financial repression for economic growth – there has been a significant liberalisation of the regulatory framework of financial markets (see Ślusarczyk, 2023). Thus, it is difficult to expect that contemporary decision-makers would be able to implement changes in the regulation of financial markets that would result in conditions corresponding to those of the Bretton Woods system. At the same time, the process of deregulation of financial markets that has been ongoing since the 1970s explains why the impact of inflation on public debt – according to the presented analysis – is not of a permanent nature.

Conclusions

The analyses conducted in this paper confirmed the research hypotheses.

The research results confirm the hypothesis (H1) that in OECD countries fiscal consolidation is more effective in reducing public debt than inflation (inflationary policy). This effect strengthens in the long term, meaning that fiscal consolidation results in a more lasting reduction in debt.

The empirical analysis also confirmed the hypothesis (H2), which assumed that in the short term, high inflation reduces the debt-to-GDP ratio. The results of the chi-square test and the odds ratio confirm that in the short term, an increase in inflation leads to a drop in the public debt-to-GDP ratio. However, this effect is time-limited and does not translate into a permanent reduction in debt.

The research results allow us to conclude that fiscal consolidation based on austerity policy brings a more lasting effect than reducing public debt through inflation. Countries that choose this strategy are more likely to achieve long-term success in debt reduction, which highlights the advantages of this approach over inflationary policy.

References

Alesina, A., & Ardagna, S. (2013). The design of fiscal adjustment. *Tax Policy and the Economy*, *27*(1), 19–68. **https://doi.org/10.1086/671243**

Alesina, A., Barbiero, O., Favero, C., Giavazzi, F., & Paradisi, M. (2015). Austerity in 2009–13. *Economic Policy Journal*, *29*(78). **https://doi.org/10.1111/ecop.12113**

Alesina, A., & Perotti, R. (1997). Fiscal adjustments in OECD countries: Composition and macroeconomic effects. *IMF Staff Papers*, *44*(2). **https://doi.org/10.2307/3867543**

Baldacci, E., Gupta, S., & Mulas-Granados, C. (2009). How effective is fiscal policy response in systemic banking crises? (Working Paper WP/09/160). **https://doi.org/10.5089/9781451873078.001**

Baldacci, E., Gupta, S., & Mulas-Granados, C. (2010). Getting debt under control. *Finance and Development*, *47*(4).

Baldacci, E., Gupta, S., & Mulas-Granados, C. (2012). Reassessing the fiscal mix for successful debt reduction. *Economic Policy*, *27*(71). **https://doi.org/10.1111/j.1468-0327.2012.00295.x**

Barro, R. (1979). On the determination of the public debt. *Journal of Political Economy*, *87*(5). **https://doi.org/10.1086/260807**

Callen, T. (2003). Public debt in emerging markets: Is it too high? *World Economic Outlook.* September, Chapter 3.

De Soyres, C., Kawai, R., & Wang, M. (2022). Public debt and real GDP: Revisiting the impact (IMF Working Paper WP/22/76).

Finger, H., & Sadikov, A. (2010). Lowering public debt. *Finance and Development*, *47*(2).

Fukunaga, I., Komatsuzaki, T., & Matsuoka, H. (2019). *Inflation and public debt reversals in advanced economics* (IMF Working Paper WP/19/297).

International Monetary Fund. (2012). The good, the bad, and the ugly: 100 years of dealing with public debt overhangs. In *World Economic Outlook. Coping with High Debt and Sluggish Growth* (Ch. 3, pp. 101–127). International Monetary Fund.

International Monetary Fund. (2024). *Global debt monitor*. https://www.imf.org/external/datamapper/GDD/2024%20Global%20Debt%20Monitor.pdf

Mbaye, S., Moreno-Badia, M., & Chae, K. (2018). *Global debt database: Methodology and sources* (IMF Working Paper No. 2018/111).

Moździerz, A. (2017). Concepts of fiscal consolidation. In S. Owsiak (Ed.), *Public Finances and the New Economic Governance in the European Union* (pp. 45–63). Wydawnictwo Naukowe PWN.

Moździerz, A. (2019). Wpływ reguły wydatkowej na typ polityki fiskalnej w Polsce. *Annales Universitatis Mariae Curie-Skłodowska, sectio H – Oeconomia*, *53*(4), 115–127. **https://doi.org/10.17951/h.2019.53.4.115-127**

Nickel, C., Rother, P., & Zimmermann, L. (2010). *Major public debt reductions. Lessons from the past, lessons for the future* (Working Paper No. 1241, September).

OECD. (2023). *Economic Outlook*, *114*(2). https://www.oecd.org/en/topics/sub-issues/economic-outlook.html

R: Core Team. (2024). *R: A language and environment for Statistical Computing: Reference index.* R Foundation for Statistical Computing. https://www.R-project.org

Reinhart, C., & Sbrancia, B. (2011). *The liquidation of government debt* (NBER Working Paper No. 16893).

Stiglitz, J.E. (2004). *Ekonomia sektora publicznego*. Wydawnictwo Naukowe PWN.

Ślusarczyk, R. (2023). *Liberalizacja ram regulacyjnych rynków finansowych a wzrost gospodarczy* (PhD dissertation). Uniwersytet Ekonomiczny w Krakowie.

The Economist. (2014, January 11). *Setting out the store*. https://www.economist.com/briefing/2014/01/11/setting-out-the-store

Yartey, C.A., & Okwuokei, J.C. (2014). Global large debt reduction: Lessons for the Caribbean. In C.A. Yartey & T. Turner-Jones (Eds.), *Caribbean Renewal. Tackling Fiscal and Debt Challenges* (pp. 73–101). International Monetary Fund.

Ziółkowska, W. (2012). Kryzys a dług publiczny w Polsce na tle Unii Europejskiej. *Annales Universitatis Mariae Curie-Skłodowska, sectio H – Oeconomia*, *46*(3), 13–20.