amounts of government indebtedness vary. But, to our opinion, the important element, which influences the limits of the public debt, which country can service, is the economic situation. Developed countries, which have the stable economic growth, can service the higher amounts of the government debt. Though, historically, countries tend to borrow more in the periods of economic crisis, which leads to increase of government debt.

6.2. An examination of government debt and analysis of debt sustainability indicators in Ukraine

Since the moment of proclaiming the independence of Ukraine in 1991, the management of government debt was made by different methods. The government debt of Ukraine during the period of 1991-2000 was characterized by the higher amount of external borrowings and the increasing of government indebtedness. After the 10 years of independence it was accumulated 14,1 billion USD (10,3 billion USD of external debt and 3,8 billion USD of internal debt).

The main goal of usage the government borrowings was the coverage of budget deficit. Firstly, the document, which regulated the process of government borrowings was issued in 1995 [28]. The history of cooperation with the international financial organizations started in 1994. During the 1990s because of ineffective usage of loans, taken by companies, which were guaranteed by the state, there was observed the increase of guaranteed government debt. According to the data of the Accounting Chamber, as of January 1, 2000, the total amount of overdue dent on guaranteed government obligations amounted to 1,03 billion US dollars. The ineffective policy of the government debt management caused the situation, that the total amount of government indebtedness exceeded the legally allowed level, and the total amount of international reserves was significantly lower than the interest rate payments. This situation caused the necessity of debt restructuring and total change of debt policy. In fact, it was a technical default, which caused a decrease of credit rating. Effective measures of restructuring and debt policy, which became more cautious, influenced the increase of trust to Ukrainian financial market. In 2008 the global financial crisis came, and it caused the decrease of possibilities to borrow. Since 2007 to 2013 the international reserves dropped from 31,5 to 20,4 billion US dollars. In this period government used actively the borrowing from the International Monetary Fund and World Bank. During the year 2008-2013 the total amount of state and guaranteed government debt increased more than 300%- from 17,6 billion US dollars at 31.12.2007 to 73,2 billion US dollars in 2013.

The amount of government debt to GDP also increased during the years 2014-2015 (Figure 6.1.)

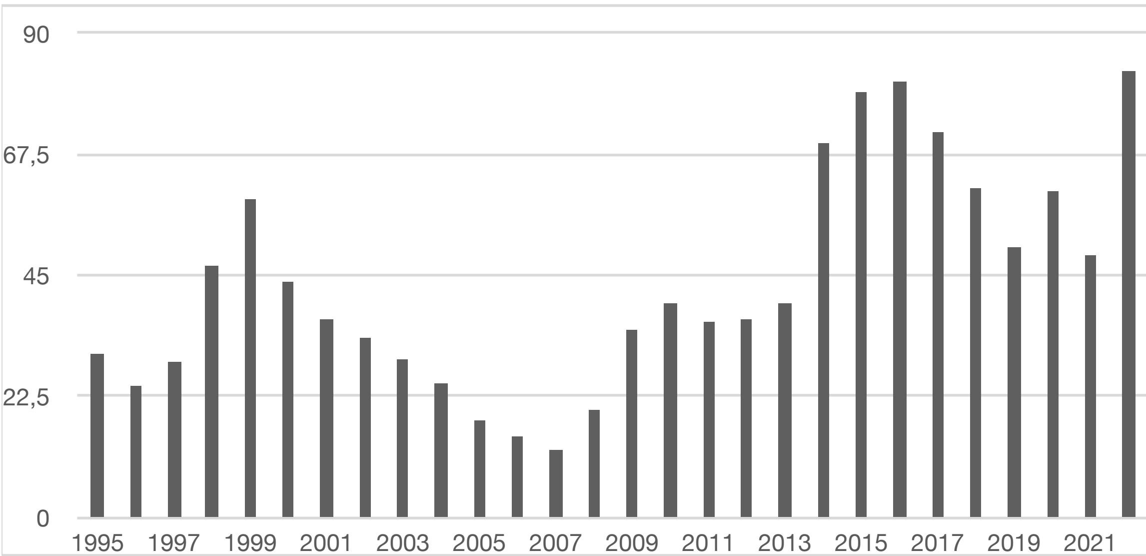

Figure 6.1. Central Government Debt (Percent of GDP), %

Source: developed by authors based on data [29]

The tendency of increase of government indebtedness after the financial crisis was observed in many countries in the world, especially in Greece, Spain, Italy, where the debt burden deepened the consequences of financial crisis.

In Ukraine the borrowing on international markets after the global financial crises causes the government debt spiral, when the new borrowings were used to pay for the previous one. Economic situation after the first invasion of Russia in 2014 was characterized by the increase of government indebtedness, and that also was one of the factors which was influencing the economy negatively. The reasons of the increase of government debt in 2014-2015 were the following:

- political crisis, annexation of Crimea and long-term conflict of the East of country;

- deep economic recession, which was caused by the changes of economic relations and damage of infrastructure and industrial enterprises on the East of the country;
- financing the budget deficit via government borrowings. The increase of government debt was caused by the growth of expenditures on the defense industry and servicing the existing debt;
- the necessity of support of state banks and companies, including “Naftogas Ukraine”;
- devaluation of the national currency.

Important is the fact that the central bank was buying the internal government bonds, what is negative, as far as led to inflational processes. So, in 2017 the total amount of the internal government borrowings in assets of the National Bank of Ukraine was 360,6 billion US dollars [16].

In 2015 it was made a restructuring of the government debt, and further management of government indebtedness was more effective, as a result the government debt to GDP relation decreased. The Russian invasion in 2022 caused a massive increase of government indebtedness to 83,12 % of GDP [30].

Increase of debt in relation to GDP is a negative tendency, as far as it indicates about fast accumulation of unpaid borrowings and inability to cover the growing needs for the debt servicing by the country’s economic development. While the war continues, the rate of increase in the national debt is likely to exceed the pace of economic growth. However, active debt management and the faster restoration of economic activity in areas where it is possible are crucial for a rapid post-war recovery. Past experience has shown that after crisis periods, when the debt burden approaches 100%, with the support of creditors and effective government action, a return to the path of growth is entirely possible.

As of October 31, 2023 the state and state-guaranteed debt of Ukraine amounted to 136,35 billion US dollars. It is worth paying attention, that the external government debt predominated in the structure of government indebtedness – it amounted 68,04% of total sum of government debt [31]. On the Figure 6.2. there is presented internal and external government and state guaranteed debt for the last 5 years (since 31 of December 2018 till 31 of October 2023). It is easy to observe the tendency of increasing the government indebtedness, both internal and external one, after the Russian invasion in 2022.

Important element for the evaluation of the government indebtedness also there is analysis of the currency structure. Since, the substantial portion of the state debt is denominated in foreign currency, it may impact the stability of the national currency and become one of the factors contributing to a currency crisis.

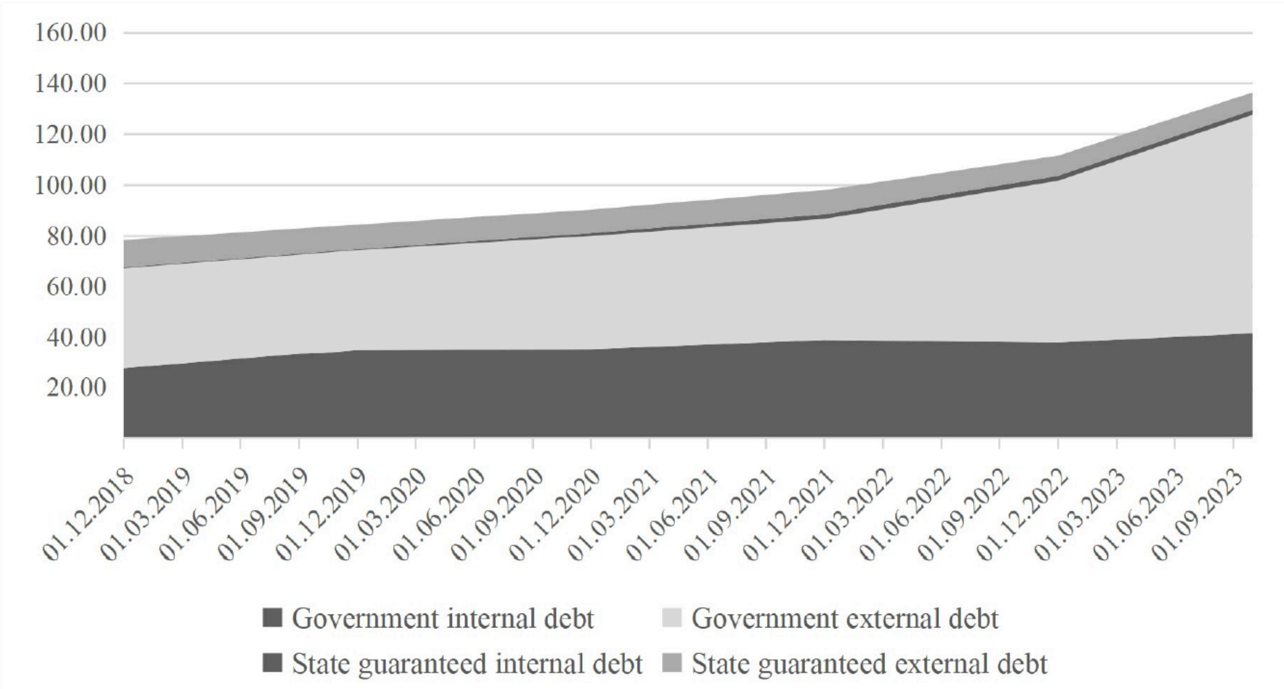

Figure 6.2. Government and state-guaranteed debt, billion US dollars

Source: developed by authors based on data [31, 33]

As shown in Figure 6.3, as of October 31, 2023, the majority of the debt was denominated in euros and US dollars (30.35% and 25.85%, respectively). Borrowings in the national currency accounted for 29.33%, which is less than one-third of all the borrowings.

Solvency of the state on its external borrowings depends on the currency income. Currency inflows to the government sector are recorded on the balance of payments. The positive balance in the Central Bank Sector indicates resources that replenish the Ministry of Finance's foreign exchange account, thereby enabling it to service external debt. In 2022 the currency income to the sector of state government was high. The main positive impact had the inflow from the grants and loans from the international partners, which were used to finance the most important expenditures of the country, including social and humanitarian sector: that is the payment of salaries, social benefits, pensions, and financial aid for internally displaced persons. These inflows were caused by the increased financial needs of the Ukrainian government budget as a result of the war.

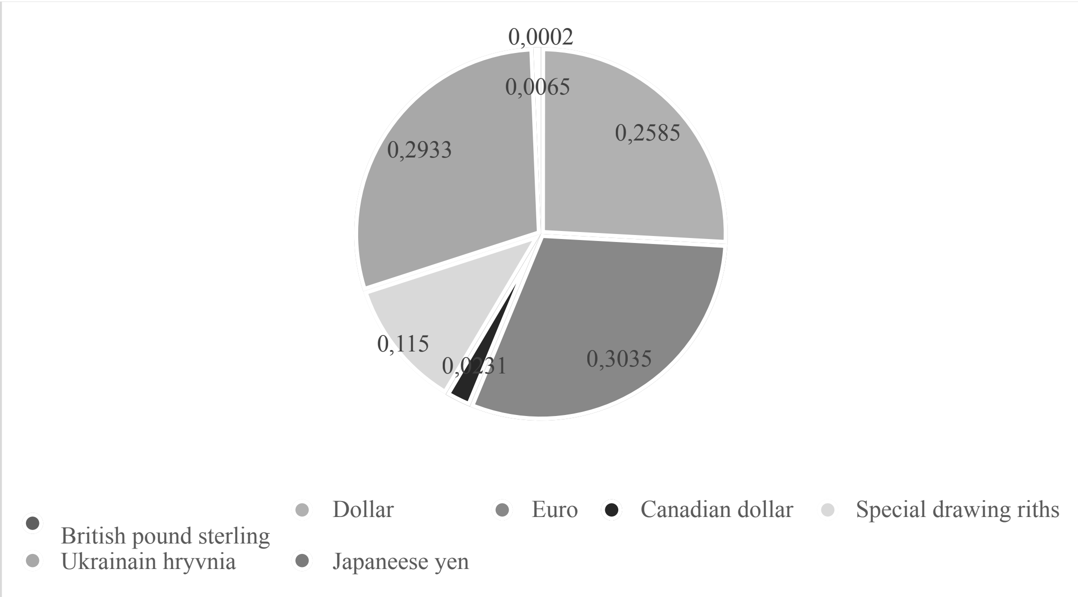

Figure 6.3. Government and state guaranteed debt in the currencies of payment, % (as October, 31, 2023)

Source: developed by authors based on data [31, 34]

Increase of debt burden in 2014-2015 was caused also because of the high depreciation of national currency, so, it is important to pay attention to the relation of the exchange rate of hryvnia to US dollar and the government debt. Relation of this indicators is very high, what is obvious as far as a great part of government debt in Ukraine is accumulated in the foreign currency and of course, its negative tendency.

During 2022 government and state guaranteed debt in the national currency increased rapidly. It was caused also by the devaluation of the national currency. Big part of debt in the foreign currency is dangerous as far as devaluation increases the debt burden. It already has happened in the years 2014-2015. That is why while transfer to the floating exchange rate it is important to replace external debt in foreign currency into the debt in national currency.

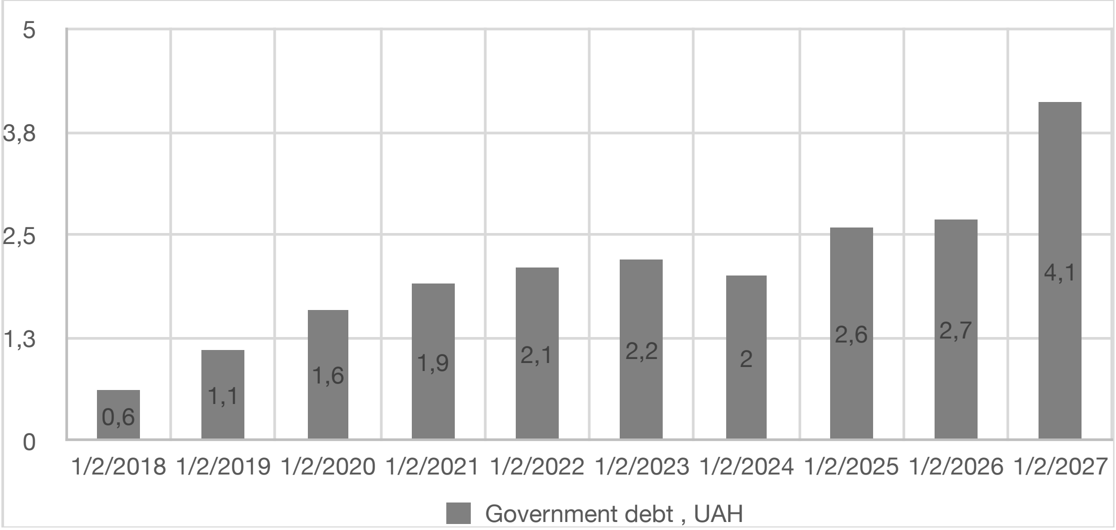

Figure 6.4. Dynamics of the government debt and exchange rate

Source: developed by authors based on data [31, 34]

The main source of the government debt is the budget deficit.

According to the Maastricht Treaty, the acceptable budget deficit level for a country that is a member of the EU is 3% of GDP. A budget deficit exceeding 3% of GDP leads to decline of investment activity and increase of inflation. Article 14 of the Budget Code of Ukraine says that the deficit of the state budget cannot exceed 3% of the projected nominal GDP of Ukraine for the corresponding year. However, for the years 2021, 2022, and 2023 this rule was cancelled.

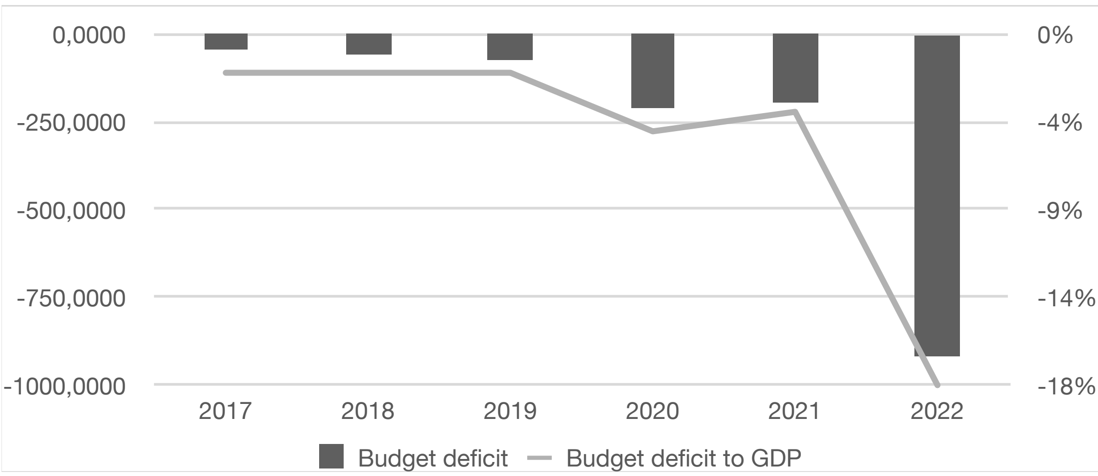

Figure. 6.5. Dynamics of the budget deficit to GDP, billion UAH

Source: developed by authors based on data [32]

The analysis of the state of the budget deficit in Ukraine showed that it exceeded 3% of GDP over the last three years. In 2022, due to a decrease in revenues and an increase in expenditures on defense, the budget deficit increased even further. The Budget Law for 2023 prognosed a further increase in the budget deficit to 20.3% of GDP.

After the active phase of the war ends, there will be a gradual fiscal consolidation. However, during these years, the national debt will continue to increase in absolute terms. Nevertheless, in the case of rapid post-war recovery, the economy's size will grow at rates comparable to the increase in external debts. As a result, the debt as a percentage of GDP may remain at a stable level.

The internal source of the servicing and repayment of the government debt is the budget income, most of their part is formed by the tax revenues. It is worth noting that the tax revenues decreased in 2022 due to the damage of enterprises and loosing a great part of territory after Russian invasion. But it is also important to pay attention that enterprises in Ukraine were relocating and adapting to conditions. It is worth noting that the amount of tax income in 2022 was almost the same as in 2020 (in this year decrease was caused by pandemic).

In recent years, the ratio of tax revenues to GDP, or the tax burden, has decreased. In 2022, due to tax reliefs provided by the government to help businesses to survive during the war, Ukraine's tax burden reached its lowest level in recent years, standing at 18.3%. Expanding the country's own revenue base is crucial to prevent further growth of the national debt. Therefore, one of the requirements of the International Monetary Fund within the framework of the Extended Fund Facility program is to increase tax revenues and cancel similar business reliefs after the active phase of the war.

So, after analyzing the dynamics of the government debt, it can be concluded, that the main factors of the increase of government debt are deficit of budget, depreciation of national currency. In the time of war it is important to concentrate on the development of national enterprises, stimulation the business activity, which can increase the tax income and stimulate economic growth. It is important to attract government debt in the national currency for the minimizing the currency risks. In the current conditions of increasing the debt burden it is crucial to attract grant financing and credits with low rates.

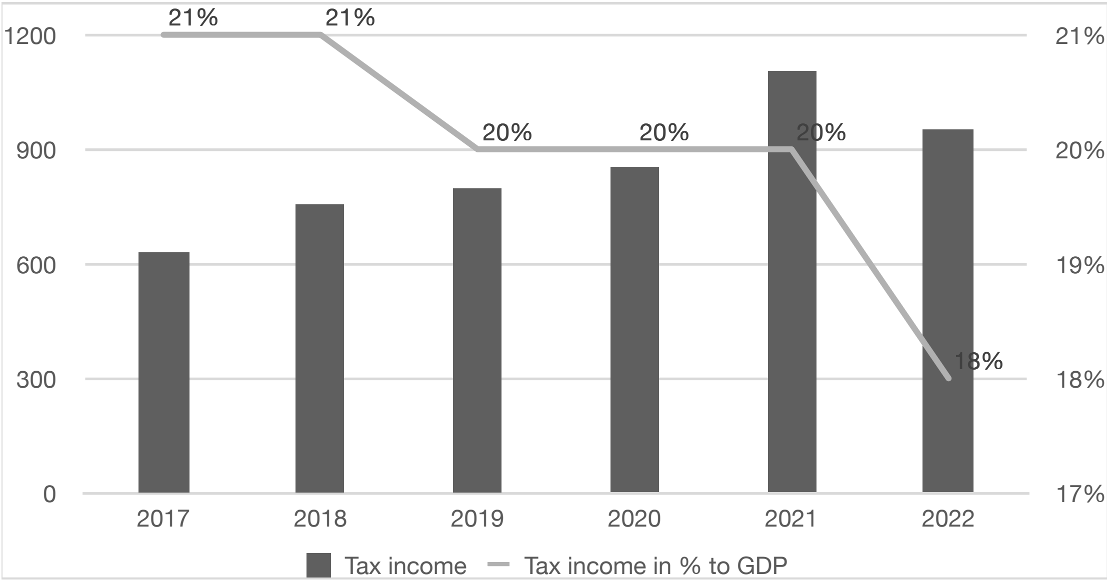

Figure 6.6. Dynamics of the tax income to the budget, billion UAH

Source: developed by authors based on data [32]

Ukraine has a history of cooperation with the International Monetary Fund and the World Bank. Since 1993 it was approved 149 projects of the World Bank in Ukraine. It is worth to pay attention that credits of the World bank are a cheaper instrument, than government bonds and have long period of payment, which allows them to be used more effectively. In economic literature scientists usually criticize the credits of the International Monetary Funds, but the cooperation with the World Bank is considered more positive as far as they are goal -oriented. To our mind they can be rather effective in the period of war and reconstruction, as far as can be used for the rebuild of infrastructure, improvement of state services, development of medicine and education [16]. Since the Russian invasion on February 2022 World Bank approved new 19 projects for Ukraine (Table 6.3).

Table 6.3. Projects approved by the World Bank after the Russian invasion

Project Title	Commitment amount	Status	Approval date
AF2 to Ukraine Emergency COVID-19 Response and Vaccination project	91.39	Active	March 7, 2022
Financing of Recovery from Economic Emergency Ukraine Supplemental Development Policy Loan	489.25	Closed	March 7, 2022
Public Expenditures for Administrative Capacity Endurance (PEACE) in Ukraine	23395.90	Active	June 7, 2022
Additional Financing for PEACE in Ukraine	1300.00	Active	June 26, 2022
Second Additional Financing for Public Expenditures for Administrative Capacity Endurance (PEACE) in Ukraine	4500.00	Active	August 2, 2022
Third Additional Financing for Public Expenditures for Administrative Capacity Endurance (PEACE) in Ukraine	529.90	Active	September 30, 2022
Health Enhancement And Lifesaving (HEAL) Ukraine Project	123.50	Active	December 20, 2022
Fourth Additional Financing for Public Expenditures for Administrative Capacity Endurance (PEACE) in Ukraine	500.00	Active	December 20, 2022
Repairing Essential Logistics Infrastructure & Network Connectivity (RELINC) Project	50.00	Active	February 8, 2023
Ukraine Procurement System Enhancement Project	0.15	Active	February 9, 2023
Restoration Project of Winterization and Energy Resources	200.00	Active	April 11, 2023
Fifth Additional Financing for Public Expenditures for Administrative Capacity Endurance (PEACE) in UKRAINE	500.00	Active	June 16, 2023
Ukraine Relief and Recovery Development Policy Loan	1500.00	Active	June 29, 2023
Additional Financing for the Second Power Transmission Project	39.18	Active	July 27, 2023
Strengthening the Partial Credit Guarantee (PCG) Fund for small farmers in Ukraine (Strengthening the PCGF in Agriculture Project)	0.00	Active	July 28, 2023
Housing Repair for People's Empowerment Project (HOPE)	70.00	Active	August 30, 2023
Ukraine Agriculture Recovery Inclusive Support Emergency (ARISE) Project	550.00	Active	October 30, 2023
Investing in Social Protection for Inclusion, Resilience, and Efficiency (INSPIRE) Project	1200.00	Active	November 30, 2023
Sixth Additional Financing for Public Expenditures for Administrative Capacity Endurance (PEACE) in Ukraine	1346.00	Active	December 14, 2023

Source: developed by authors based on data [33]

For an understanding of the perspectives in the dynamics of the national debt and debt burden, it's important to analyze the cost of government borrowings. As the cost of external debt is presently not determined by the market and interest rates and terms are concessional, forecasting these rates might be done mainly through expert methods. However, it's possible to statistically examine and forecast rates for internal debt. According to data of the Ministry of Finance, during the wartime period, the cost of internal debt increased, unlike external debt. Over 90% of the internal debt consists of government domestic bonds. The rising interest rates pose risks for the government as servicing this debt becomes increasingly challenging. Moreover, it is important to pay attention to the attraction of internal debt in the current conditions.

In 2022 it was observed the negative policy of the National Bank of Ukraine to buy the government domestic bonds. According to the economic theory and previous examples of such policies in different countries, especially in the war period or after it, it can lead to inflation. This instrument is rather negative, but the National Bank of Ukraine used it as a result of high demand of the Government of Ukraine for resources to finance the military and social expenditures of the country.

Government have decided to prevent such monetization in 2023 and the National Bank of Ukraine have not bought government domestic bonds in 2023. Meanwhile, the banking system, a major holder of government domestic bonds, operates in a situation of excess liquidity and thus has the potential to increase purchases of government bonds. State bodies and the central bank are actively working in this direction. Also increased the purchases of government bonds by the citizens.

Over the past 10 years, interest rates in the Ukrainian market have been quite unstable. The central bank rate reached its peak in 2015 when it amounted 30% and remained at this level for about six months. In 2020, due to the pandemic and economic slowdown, the central bank rate was at a low level of 6%. In 2021, as the economy recovered after the pandemic and global energy prices increased, the central bank rate gradually increased to mitigate inflationary pressures. Prior to the full-scale invasion of Russia, it was 10%. During the early stages of the war, it was maintained at this level, but in June 2022, the National Bank sharply raised it to 25%. It was done to stabilize the markets and decease inflation. In 2023, decreasing inflation and an improved economic situation allowed a gradual reduction of central bank rate. By December 2023, it had already decreased to 15%.

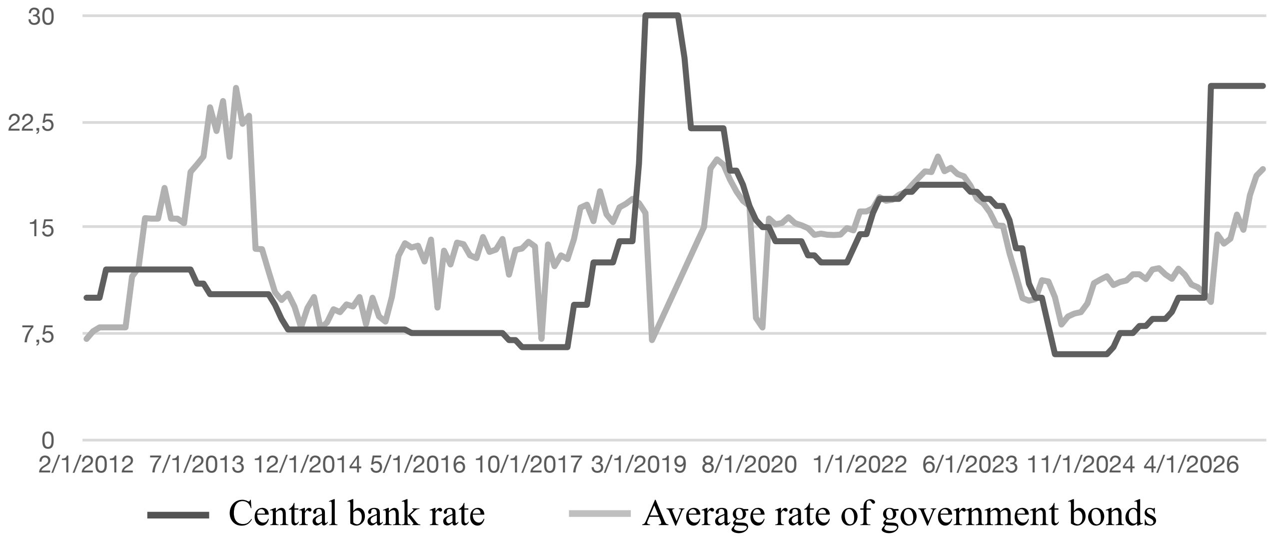

Figure 6.7. Dynamics of the central bank rate and average rate of the government domestic bonds, %

Source: developed by authors based on data [32]

The yield on domestic government bonds has been quite volatile, with the highest growth during the global financial crisis of 2008-2009. Since the introduction of the inflation targeting regime in 2016, there has been a correlation between the central bank rate and the yield of government bonds, and also it was observed smoothing of fluctuations in bond yields. The government bond instrument is one of the components of the transmission mechanism, the development of which is one of the key tasks of monetary policy. Following the increase in the central bank rate to 25% in 2022, there was an observed rise in the rates for government bonds

It is obvious, that high profitability of government bonds increases the demand for them on the market, and commercial banks and citizen were more willingly to but the government domestic bonds. But it is important to mention, that it caused the additional burden for the Ministry of finance, as far as it has to pay more for government obligation in future and that is an additional burden in the war time.

It is important to pay attention to the debt servicing and repayment. As we can see from the Figure 6.8. in 2024 and 2025 will be expected the high peaks of debt repayment and services. Of course, it makes additional burden for the state finances in the conditions of war. It is obvious, that internal government borrowings are often issued lately for the short-term period, as this instrument is more popular on the internal market among the main investors of state bonds- banks and citizens in the conditions of high risks. But, taking into consideration the possible decrease of financing from the international sources in 2024 and further years it is dangerous for the debt stability.

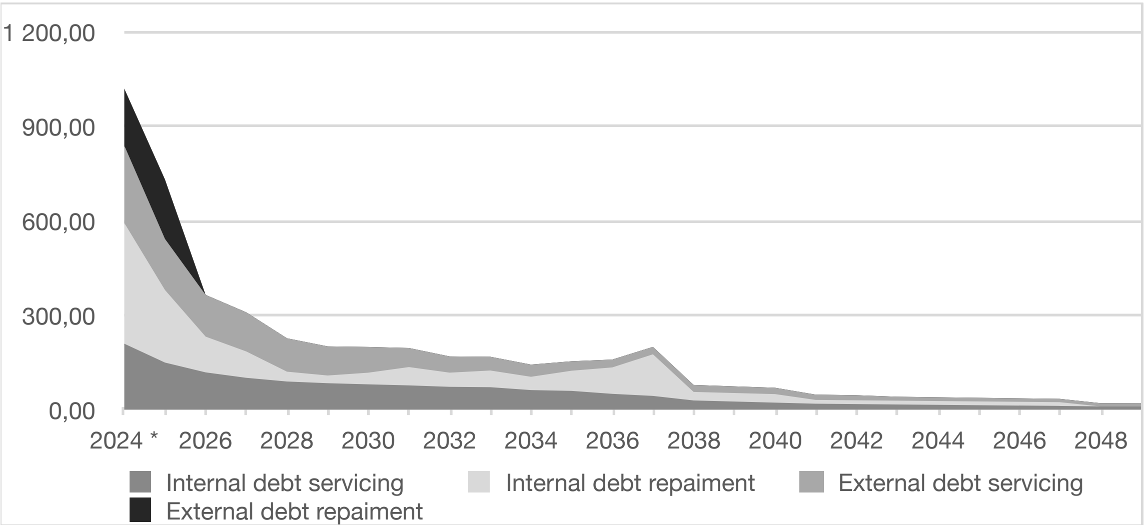

Figure 6.8. Amounts of debt servicing and repayment in the years 2024-2049, billion UAH

Source: developed by authors based on data [34]

There is high dependance on the international help and in the case of its decrease that will cause the huge impact on the economic stability and recovery, on the budget expenditures and possibility to repay debt. It is obvious that it also will highly influence the exchange rate stability, which in the conditions of big part of external government debt in the structure of government indebtedness it is also an additional risk for the debt stability.

Most of the recourses received as international aid is in the form of loans and guarantees (Figure 6.9). It can be observed, that amount of resources is fluctuating. In the conditions, when there is a lack of resources to cover the budget expenditures, the Ministry of Finance tended to borrow more on the internal markets.

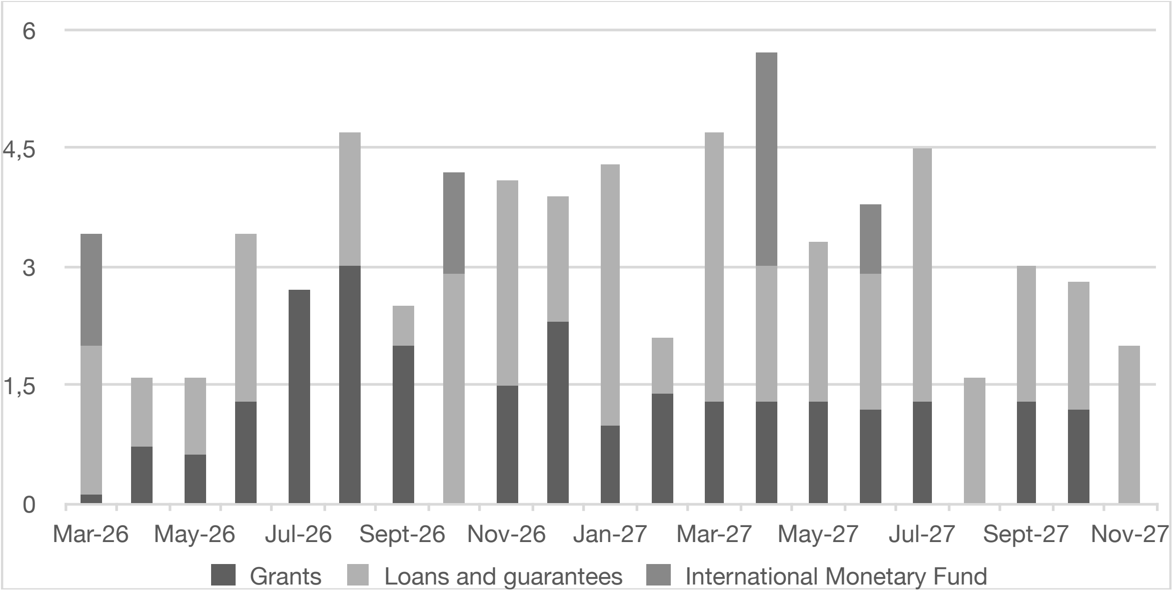

Figure 6.9. International financial help from the beginning of full-scale invasion, billion dollars

Source: developed by authors based on data [35]

This high dependance on the international financing is rather hard for economy. It is obvious, that in conditions of possible decrease of financing it is important to search for own resources and pay more attention to the development of business activity. Raising of taxes, which is one of the options, can be rather hard for business and society and influence negatively the economic activity. Another option of the internal borrowing in the form of state bonds will cause the further increase of the government debt, which again will be the burden for the state budget.

The simplest method of empirically testing of debt sustainability is through econometric tests. Professor of Econometrics at Adnan Menderes University Ismet Gotser in his study, uses a test for stationarity to assess the sustainability of both external debt and the current account balance and budget balance [36, 37].

Another example of applying econometric methods is found in Demir's study, where debt sustainability is also assessed through stationarity. This research aims to analyze the sustainability of external debt in transition economies of Southeast Europe (some of which are developing countries) using a unit root test after wavelet transformation. Therefore, the unit root test was applied to the variable of gross external debt and the ratio of gross external debt to Gross Domestic Product (GDP) of countries to investigate their stationarity. The time period of analysis varies for each country; however, overall, quarterly data from the 2000s until the second quarter of 2020 were used. The data were initially checked for linearity, and for non-linear data, unit root tests WKSS (unit root test by Capetanios, Shin, and Snell after wavelet transformation) and FWKSS (WKSS test with Fourier transformation) were applied.

The author notes that in order to achieve stability in terms of the gross external debt to GDP ratio, countries should aim for growth by directing external debt into investments. Consequently, the denominator of this indicator will increase, leading to stability. In other words, countries should develop a growth-oriented policy. For this purpose, transitioning economies should attract foreign direct investments into their countries. Within the context of a growth-oriented policy, they should undertake structural reforms that facilitate the production of capital-intensive goods based on advanced technologies.

In this section, the stationarity of time series describing the debt burden is tested using an econometric unit root test. Three indicators have been selected for analysis: the ratio of government debt to GDP to analyze the stability of government debt, as well as the ratio of external debt to GDP and the ratio of external debt to exports to analyze the stability of gross external debt. The variables were chosen based on research by other authors as described above. First, let's consider the government debt-to-GDP ratio, which represents the debt burden. The dynamics of the government debt-to-current GDP, meaning the sum of GDP for the last four quarters, are presented in Figure 6.10.

It was conducted a test for the presence of a unit root. The test indicates that a structural break occurred in the fourth quarter of 2022, when the debt burden reached its lowest point in the last decade due to active debt management. After this period, it sharply increased due to a decline in GDP and rapid accumulation of new debts. Additionally, the test results suggest that the time series of the debt burden is non-stationary, indicating that the debt is not stable.

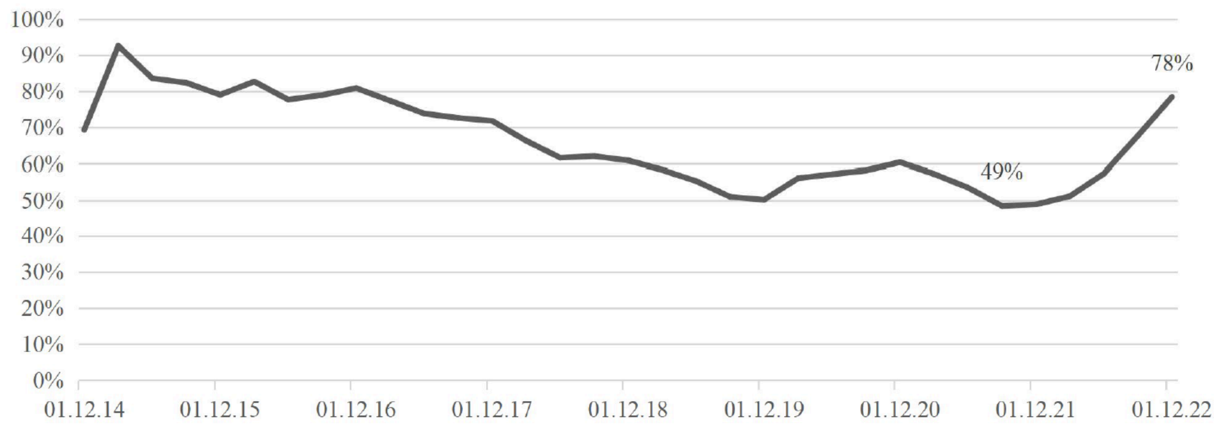

Figure 6.10. Dynamics of relation the government debt to GDP

Source: developed by authors based on data [32]

Thus, using the test for stationarity, it was found that Ukraine's national debt is not stable. It's also essential analyze the stability of external debt since its stability is more vulnerable and poses a greater risk to Ukraine. External debt should also be examined in relation to GDP (Figure 6.11).

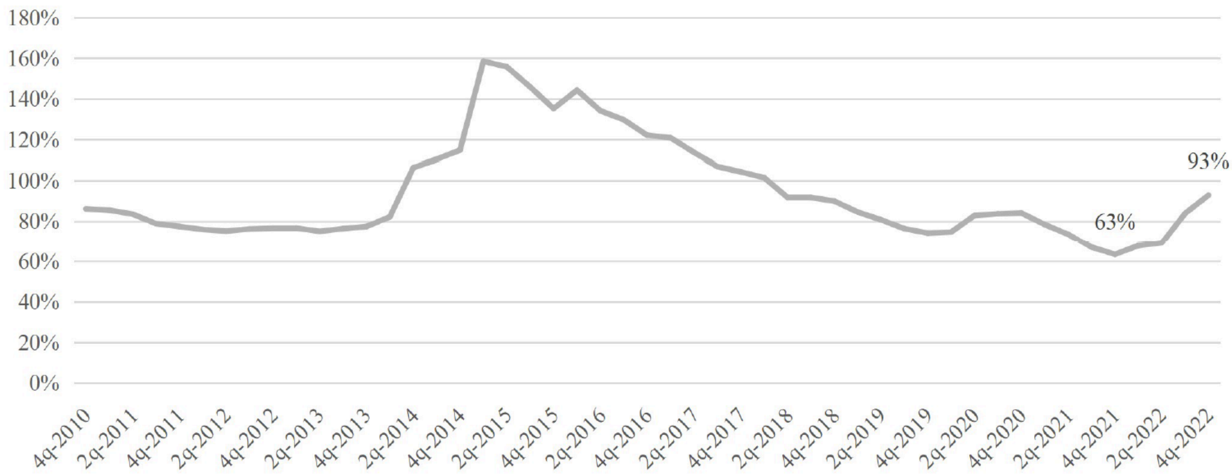

Figure 6.11. Dynamics of relation of external government debt to GDP

Source: developed by authors based on data [32]

Similarly as with the national debt-to-GDP ratio, Ukraine reached a record low level of debt burden at the end of 2021 in the last 10 years. Unfortunately, this trend changed in 2022 due to the war. Just like the time series of external debt in absolute terms, the time series of the ratio of external debt to GDP is non-stationary, indicating that the external debt burden is unstable.

The structural rupture occurred at the beginning of 2014 when the external debt burden began to increase sharply and exceeded a record level by 150%,with the further decrease through debt restructuring and GDP growth. In the context of gross external debt, the debt-to-export ratio can also be considered since export is the primary source of foreign currency inflows into the country.

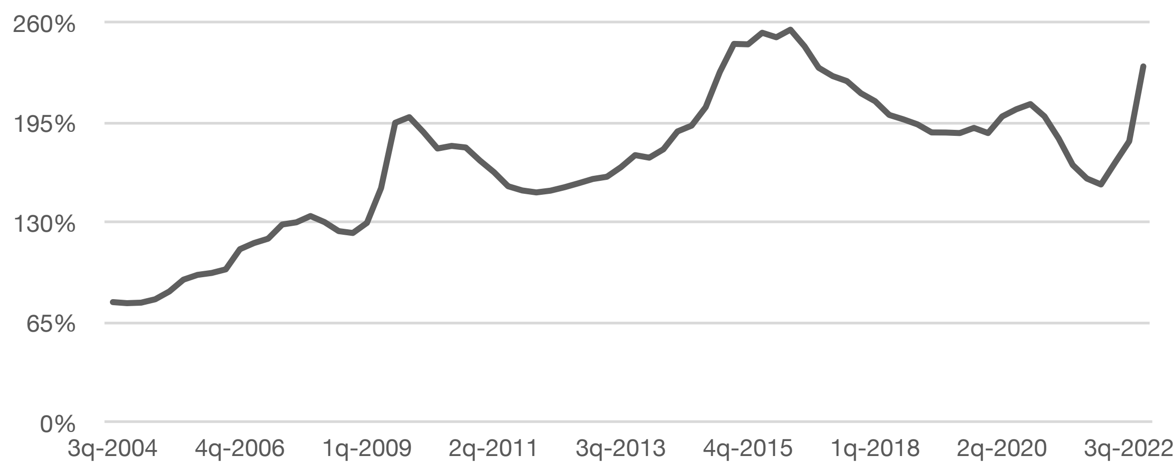

Figure 6.12. Dynamics of relation the external debt to export

Source: developed by authors based on data [32]

Similarly to the debt-to-GDP ratio, the debt-to-export ratio is not stationary, indicating that external debt is not stable based on this indicator as well.

Therefore, as a result of econometric analysis for the presence of a unit root with a structural break, it was found that the government debt is unstable according to all indicators: as a ratio to GDP, as gross external debt which includes both public and private external debt in relation to GDP, and in relation to export. The first year of full-scale war was marked by a significant decline in GDP, export, and active government borrowings to fill the budget, which led to these outcomes.

In March 2023, the IMF approved a new support program for Ukraine through the Extended Fund Facility (EFF) mechanism. This program is medium-term (4 years) and includes providing Ukraine with assistance amounting to $15.6 billion (11.6 billion SDR) and has the aim to maintain economic and financial stability and restore debt sustainability. The final goal is Ukraine's post-war recovery and its accession to the European Union. The approval of the Extended Fund Facility mechanism became a long-awaited step from the Fund because, following two transfers under emergency financing totaling approximately $2.7 billion, it became evident that Ukraine required more stable and predictable assistance. The agreement with IMF became a catalizator of further international support, as far as it signalizes about the reliability of Ukraine as a borrower.

Usually, in the report on financial assistance, an analysis of the recipient country's debt sustainability is provided. Unlike in the previous versions in March and October 2022, the latest debt sustainability analysis clearly indicated the absence of such stability and the necessity for substantial funding to restore it [38].

According to the analysis of IMF from the 31 of March 2023, in the case of absence the active management of government debt, it is un stable as in basis scenario to restructuring and to pessimistic scenario of restructuring. But in order to restore the debt sustainability it has made arrangement about the special financial support, including the debt cancellation. So, both in the basic and pessimistic scenarios the government debt as evaluated as not stable in the perspective.

The previous Debt Sustainability Analysis (DSA), which followed Ukraine's request for program monitoring with the IMF's Executive Board in December 2022, identified that the macroeconomic situation in Ukraine somewhat stabilized in the second half of the year following a significant war shock [39]. The baseline scenario projected stabilization in 2023 as the economy adjusted to war. However, it also predicted that activity would remain subdued against the backdrop of lower harvests, depressed consumer sentiment, and attacks on energy infrastructure.

The December DSA emphasized an extremely high level of uncertainty regarding both the duration of the war and the extent and pace of recovery. It included multiple probable scenarios foreseeing vastly different trajectories for debt and gross financing needs (GFN). Therefore, the December 2022 Debt Sustainability Analysis highlighted that the provided macroeconomic forecasts and assumptions about funding were preliminary. However, they were sufficient to contain further escalation in the trajectory of debt burden.

Taking into consideration the exceptionally high uncertainty regarding Ukraine's macroeconomic prospects, the Debt Sustainability Analysis (DSA) accompanying Ukraine's request for EFF includes two possible medium-term scenarios — baseline and pessimistic, both of which rely on the same results of 2022.

Despite the war continuance influence the economy hardly, activity has somewhat stabilized in the third and fourth quarters, and the estimated economic contraction for the year 2022 standed at 30.3% (previously, the IMF expected a decline of 33%). Inflation remained high in 2022, with the GDP deflator at 28.7% (IMF's forecast was 28.5%). The disbursed and prospective official external financing amounted to a significant $32 billion USD, slightly below expectations by $0.5 billion USD, with over 40% received in the form of grants.

However, considering the extraordinary fiscal pressure because of defense and social needs, the primary deficit amounted 13.4% of GDP, which was an improvement compared to the previous forecast of 17.9%. The total volume of the national debt at the end of 2022 reached 82.1% of GDP. This represents the highest level in Ukrainian history and also among neighbouring countries.

The suspension of servicing Ukraine's external state debt has been implemented since August 2022, following an agreement with official bilateral and private holders of Eurobonds and GDP warrants.

The baseline scenario does not involve an fast reconstruction program similar to the Marshall Plan. Assumptions regarding external financing for 2023 remain largely unchanged, estimated at around $42 billion USD, with defined financial commitments sufficient to meet external financing needs for the year.

The baseline scenario reflects the finishing of the agreed suspension of debt service with bilateral official creditors (with resumption of payments in early 2024) and private bondholders (with resumption of payments in August 2024). In the medium term (2024–2027), further official financing of over $80 billion USD is expected, with annual amounts decreasing gradually over time. Approximately 80% of Ukraine's external financing is expected to come in the form of concessional loans, with the 20% in grants.

In the long term, the baseline scenario predicts relatively smaller official financing flows of $8-9 billion USD per year, including a return to market financing in the long-term forecast (starting from 2029).

Without additional financial support on appropriate terms, including debt restructuring, Ukraine's debt is considered unsustainable under both the baseline and pessimistic scenarios. The baseline Debt Sustainability Analysis (DSA) before restructuring forecasts a debt increases to over 105% of GDP by 2024 due to the projected primary deficit taking into consideration the high defense expenditures. Then, it prognoses a gradual decline to 78% of GDP by 2033 as the country recovers from the war. The medium-term modules of the model indicate high sovereign stress risks, notably an extensive fan chart indicating considerable uncertainty regarding this forecast and GFN stress tests revealing consistently high financing needs, especially in the nearest perspective.

Under the pessimistic DSA, the debt trajectory worsens significantly compared to the baseline, and the vulnerabilities identified through the fan chart and GFN tests deteriorate further.

According to the baseline scenario of the Debt Sustainability Analysis (DSA) published by the IMF in March 2023, the sustainability of debt could be restored in perspective through adequate restructuring and guarantees for highly concessional lending during and after the program. For Ukraine, illustrative modeling suggests that the sustainability of external debt in the medium term can be achieved if average gross financing needs will maintain at around 8-9% of GDP in the post-program period (from 2028 to 2033), and the debt-to-GDP ratio decreases to 60-65% of GDP.

The IMF staff anticipates that this could be achieved under the following conditions: official bilateral creditors agreement to extend the debt service suspension throughout the program period, with an obligation to restructure up to the amounts required in the baseline scenario and final debt restructuring based on updated data when the high uncertainty ends (or approximately when the proposed Fund-supported program ends); commitment from the Ukrainian government to seek comparable agreements with private external commercial creditors; as well as reliable and specific assurances from donors regarding support on adequate financial terms in both the baseline and pessimistic scenarios.

The debt sustainability analysis, conducted together with the approval of the Extended Fund Facility by the IMF, also includes a pessimistic scenario, which is necessary due to the high level of uncertainty. This scenario anticipates a more prolonged and intense conflict compared to the baseline scenario, slowing the return of migrants, and causing further damage to infrastructure. Due to sustained high defense needs, the budget deficit will be higher in 2023–2024 and then gradually improve more progressively. Expectations suggest that imbalances in the currency market will persist longer due to ongoing export constraints, leading to a higher nominal devaluation, although the extent of real depreciation of the national currency will be mitigated by relatively higher inflation.

Further recovery will be slower than in the baseline scenario, considering more significant damage to Ukrainian capital, slower return of migrants, and poorer business indicators, resulting in production levels remaining significantly lower than pre-war levels.

In the pessimistic scenario, the cumulative financing deficit reaches approximately $140 billion, which is roughly $25 billion higher compared to the baseline forecast for the years 2023–2027, which will demand additional measures to ensure debt sustainability. The full additional financing under this adverse scenario is expected to come in the form of highly concessional loans (approaching grant-like conditions). Furthermore, considering the existence of exceptional financing amounting to $7.1 billion per year over a 5-year period post-program completion, this scenario also identifies the need for a combination of additional grants during the program period, financing on highly concessional terms aligned with assurances received, and further debt management to provide its sustainability. This will reduce the overall government debt to approximately 60% of GDP at the end of the 10-year forecast and achieve a manageable level of gross financing needs at 8-9% of GDP annually in the post-program period, thereby contributing to the sustainability of debt on a prospective basis.

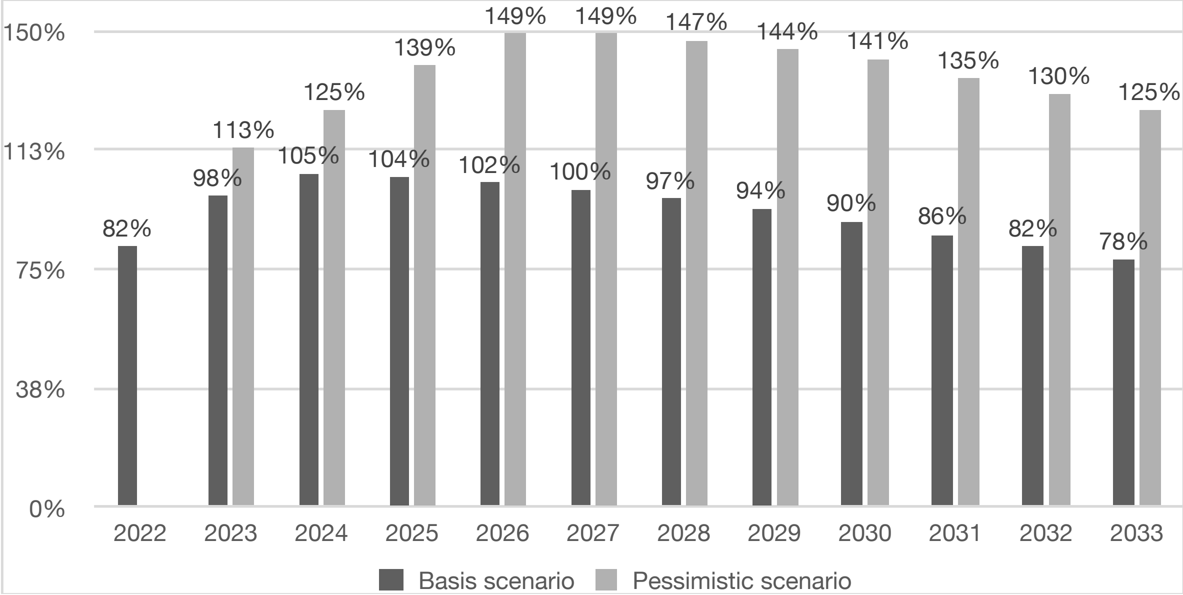

Figure 6.13. Prognosis of the government debt to GDP ratio according to the baseline and pessimistic scenario of the March 2023 Analysis of IMF

Source: developed by authors based on data [38, 39]

Former NBU Governor Kyrylo Shevchenko highlighted that one of the challenges in sustaining the economy amid administrative constraints is the dollarization and withdrawal of savings from the financial system. When inflation rises and rates on government domestic loan bonds (OVDP) are fixed, owners of hryvnia-denominated savings face losses. To avoid these losses, they might seek to withdraw such capital and invest in foreign currency, thereby exacerbating inflationary and devaluation pressures. The solution to this issue primarily involves raising OVDP rates, which, in turn, would lead to an increase in rates on hryvnia deposits. The Ministry of Finance has aligned government bonds with attractive market financial instruments. It can be said that the main adjustment of bond rates has already occurred. Therefore, the internal debt cost in 2023 was set at around 17.5% for short-term securities and approximately 20% for medium-term ones [40].

In general, the economic situation in Ukraine depends heavily on the international financing of the countries and international financial organizations. Mechanism of extended financing is a kind of guarantee to receive the grant and concessive financing. However, as long as the war continues, it is impossible to avoid a primary budget deficit, high inflation, and interest rates. At the same time, Ministry of Finance already has agreements about the debt restructuring. Till the creditors are eager to prolong the payment for loans and debt securities, it will be possible to avoid default. Important element for the current situation in these conditions is also a political stability.

Attracting of the internal debt decreases the risks of insolvency. Nowadays, the inflow of foreign currency into the country is complicated, as key export industries like agriculture and metallurgy are affected by the war. External financing in foreign currency may carry additional liquidity or insolvency risk. Servicing debt in the national currency is easier – default on debt in the national currency is generally considered unlikely because, unlike foreign currency, the national currency can be printed as needed. Of course, considering the independence of the Central Bank, such a scenario is unacceptable both for us and our international partners and National Bank make all the efforts to avoid such a scenario. Though, in 2022 the National Bank of Ukraine was buying the government obligations, which led to the monetization of the budget. In 2023 National Bank avoided usage of this instrument. However, this scenario carries lower risks than declaring default.

In history happened many defaults, and it is obvious, that countries that countries restore access to international markets, but the rates are not favorable. According to investigation of the Bank of England, losses for the countries, which have not made the deals about the restructuring are three time higher, than for those which had the possibility to make such agreements [16]. In case of Ukraine default can influence rather negatively the economic and financial stability of the country. It is important to avoid it and restructure the government indebtedness.

Before war commercial banks were the main creditors on the internal market – their part among the owners of government bonds was the highest. The banking system in Ukraine has operated and continues to operate in conditions of excessive liquidity, though this liquidity is unevenly distributed across the system (with inflows to state bank current accounts due to military payouts, but outflows of client funds from small and medium-sized private banks) [16]. Due to tighter lending conditions and a decline in economic activity, the volume of new loans continues to decrease.

A potential scenario involves a gradual slowdown in banking operations – reducing the growth rates of both liabilities and assets. However, such a scenario would be negative for the economy. An alternative scenario involves replacing credit assets with government securities. The National Bank and the Ministry of Finance are already working on involving commercial banks in the purchase of government bonds, they increased the yield and announced the possibility on forming up to 50% of mandatory reserves in government bonds.

This decision is advantageous for the state as a borrower, banks as investors, the population as agents trying to protect their savings from depreciation (as banks will continue to increase deposit rates to attract more resources for purchasing government bonds at even higher rates), and also for the National Bank, which, in these challenging conditions, is making efforts to achieve its main goal – targeting inflation, and 2023 was rather successful in stabilizing the economic conditions.

The main risk for the sustainability of government debt- continuing war. With every month and year national and foreign resources are becoming exhausted, and budget deficit continues to accumulate together with debt. So, the main task for citizens is to support the army and for the state – to use the attracted resources appropriately.

It is important to analyze the cost of attracting debt and its servicing. These indicators are reflected in yields on bonds. For a country in wartime, it's impossible to attract debt on market terms while maintaining an acceptable credit risk for creditors. However, statistics show an increase in the volume of debt, both domestic and external, with the external debt growing more significantly. It means that Ministry of Finance can attract capital. Of course, the rates have grown since the beginning of war.

Ukraine continues to raise funding for its needs, which have sharply increased during the period of war.

It is important to mention, that the costs of external government borrowings even decreased (Figure 6.14). Taking into consideration the rapid increase of the amount of external government borrowings, such decrease in interest rates proves very favorable conditions of borrowing.

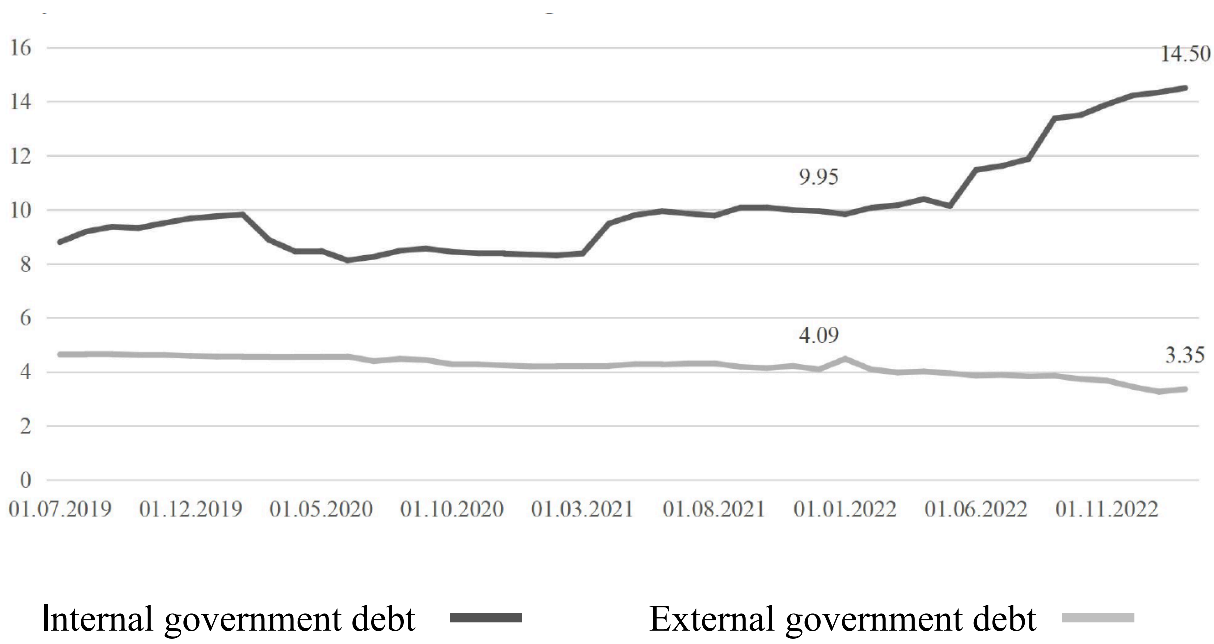

Figure 6.14. Dynamics of average rate on the government debt, %

Source: developed by authors based on data [24, 32]

The cost of domestic government debt has significantly increased during the war, unlike external debt. The internal state debt consists of internal government bonds by 99.9%, and the increase in rates for domestic government bonds has caused such a surge in the internal debt rate. External partners demonstrated a greater willingness to finance the Ukrainian budget almost for free, though it required higher rates to mobilize internal resources. Perhaps if the government had actively promoted government bonds for the public before the full-scale war began, the situation would have been different. In the beginning of war, when feelings of patriotism and the necessity to help the state in its struggle intensified, there was a positive trend in the population's purchase of military government bonds.

Beside the National Bank of Ukraine, which significantly supported the budget in the first year of full-scale war- bought a big part of government internal debt bonds, and committed not to use this instrument in future, major holders of government securities are commercial banks. And because of their activity that the Ministry of Finance was forced to raise rates for new bonds. At the beginning of the war, banks were already in a situation of excess liquidity, and the government needed to attract more financing, while the National Bank aimed to enhance the transmission mechanism's efficiency. Therefore, increasing rates for government bonds was a necessary step to stabilize the situation in the financial market. Overall, the fact that rates increased was considered normal given the high inflation present in 2022. The decrease in the average rate for external debt was the result of effective work by the Ukrainian government and the National Bank, along with support from international partners.

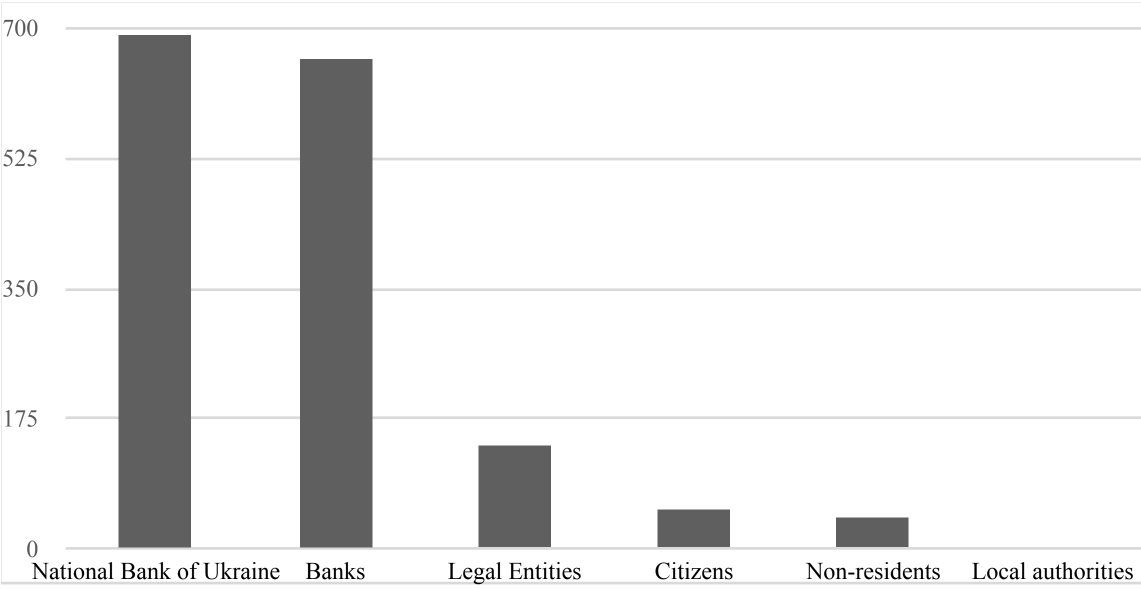

Figure. 6.15. Dynamics of the amount of State internal bonds according to the holder, billion UAH (as on 29.12.2023)

Source: developed by authors based on data [32, 24]

However, it is important to mention that the increase of the government bonds interest rates has a negative effect of the debt sustainability. It increases the amount of servicing payments and becomes an additional burden in the time of war.

It is important to note that information regarding the cost of borrowing is not entirely transparent, especially concerning external borrowings. While the National Bank provides comprehensive information on the rates for government domestic bonds (OVDP) and their yields on the secondary market through daily statistics, data regarding external debt is very limited. In particular, the statistics on the average rate of the debt was taken from the hidden sheets of the monthly information reference on government debt from the Ministry of Finance. These rates are provided for the total volume of external debt without any breakdown by sources. Consequently, there is virtually no ability to calculate the terms of each new loan unless this data has been disclosed through mass media channels.

Such restricted access to the information about the cost of borrowings is explained by the political component of this process. Unlike domestic debt, where bonds serve as the primary instrument—market tools with transparent conditions, external debt consists of loans from international financial organizations (half of the external national debt), funding from foreign governments and foreign commercial banks and only around 30% -external government bonds.

Predictability of debt repayments is a crucial element for debt sustainability. To minimize interest rate risk, it's necessary to attract as much funding as possible at a fixed rate, not the floating one.

According to the Debt Management Program for 2023 [42], it was planned to attract the government borrowings to finance the budget deficit for 58% at a fixed rate and the rest at floating rates. The structure of the overall debt continues to shift towards floating rates.

After the fixed rate the highest one is the credits of IMF. IMF loans are considered concessional, as their interest rates are lower than market rates. Their repayment terms typically do not exceed 5 years. Ukraine has obtained funding from the IMF under various programs: Stand-by Agreements (1995, 2008, 2010, 2014, 2018, 2020), Rapid Financing Instrument (2022), and Extended Fund Facility (1998, 2017-2020, 2023). The IMF rates are not fixed but calculated based on the Special Drawing Rights (SDR) basket, involving a combination of currency values, interest rates on financial instruments for each currency in the basket, the exchange rate of each currency against the SDR, and depend on the type of financing, outstanding amount, and loan repayment terms.

The interest rate on the current program can reach 7.5% given the current level of global interest rates. According to the analytical agency EIU, interest rates in the American market reached their peaks in 2023, and their decrease in future can be expected; however, on average, they will still remain higher than the average value of the last 10 years. The interest rate on the extended financing program is floating and can constantly change. Due to the increase of global interest rates and the expansion of IMF lending, the interest rate applied to the outstanding balance of all IMF loans to Ukraine has increased and currently fluctuates within the range of 6-7%. In 2020, the Ministry of Finance stated that the average interest rate on IMF loans for Ukraine remined around 2.5%.

To conclude, the government debt increased during the war due to the rise in rates of domestic government bonds, yet the average rate on external debt even decreased. Meanwhile, there is an increase in the interest rate risk due to the attraction of financing at floating rates, mainly through the IMF rate. According to analysts' forecasts, global interest rates will reach their peak in 2023-2024, which, given the favorable terms of the loans obtained, will reduce the interest rate risk for Ukraine.

The government debt is considered in the current period as unstable. External government borrowings prevail in the structure of government debt. It exposes the country to the currency risk. Of course, it is positive that interest rates on the external borrowings are rather high and in the period of war they are crucial, but it is important to consider the possibilities of the devaluation of national currency, which highly relates on the international help and war conditions. At the same time, it is worth mentioning that rates for internal government bonds increased with the increase of the central bank rate in June 2022. Of course, that made them more favorable and attractive for national investors- banks and citizens, and helped to stop the process of buying government bonds by the central bank of Ukraine. But it is important to remember, that it makes additional burden for the Ministry of Finance in terms of servicing government debt. In the current conditions, to our mind, it is important to restructure the government debt. In 2022 it was made agreement of postponing the payments regarding the external government bonds. Other agreement, for example, with the government of countries on the borrowed loans are needed. In the current conditions government debt becomes a burden for the economy and the state budget, which already has a big deficit and it is expected in the future as well.

Moratorium of payment the external debt of official creditors, which was assigned in 2022, will continue to 2027. At the same time the government debt of private creditors will expire in August 2024, and International Monetary Fund on its

Consultation and Second Review under Extended Fund Facility Arrangement recommended further restructuring of the external government debt to commercial creditors in first half of 2024 [43].

According to the analysis of the International Monetary Fund, economic indicators in Ukraine have improved and show strength. IMF forecast the economic growth to be 3-4 percent in the year 2024. But, taking into consideration the continuance of war and high risks, IMF recommended to increase the own sources of income and implement the National Revenue Strategy [43].

It is obvious that it should be increased the own sources of financing, taking into consideration the possible decrease of international help. But, as we mentioned earlier, the sharp increase of taxes can have negative impact on business activity and stimulate migration. The changes should be implemented carefully and gradually.

6.3. Modeling the cost of government debt

To build the model, monthly data from January 2016 to March 2023 were used, including the central bank rate, weighted average yield on government bonds, average rates on loans and deposits, as well as the spread between interest rates on hryvnia and foreign currency deposits. As far as the inflation targeting regime was implemented in 2015, the effect of changes in the base rate started influencing other financial market rates through the transmission mechanism from 2016. Before, the rates were relatively weakly correlated. The first step in determining the model's specification involves checking the time series for stationarity. All-time series, except for the new deposit rate, are stationary in the first differences, while the deposit rate is stationary in the second differences.

So, for the analysis of rates on the financial market of Ukraine, particularly the yields on government bonds, a VAR model specification was selected. It is a convenient tool for analyzing multiple variables simultaneously, especially their interactions. As the variables have different orders of integration, using a VECM model would be inappropriate. Through tests to determine the optimal number of lags and to reduce noise in analyzing impulse response functions, it was decided to use