

Shvets, Natalia; Rudevskia, Viktoriia

Article

Theoretical foundations and practice of the actions of governments and central banks in the conditions of war : historical excursion and Ukrainian experience

Technology audit and production reserves

Provided in Cooperation with:

ZBW OAS

Reference: Shvets, Natalia/Rudevskia, Viktoriia (2023). Theoretical foundations and practice of the actions of governments and central banks in the conditions of war : historical excursion and Ukrainian experience. In: Technology audit and production reserves 2 (4/70), S. 24 - 31.
<https://journals.uran.ua/tarp/article/download/278349/273714/643357>.
doi:10.15587/2706-5448.2023.278349.

This Version is available at:
<http://hdl.handle.net/11159/631545>

Kontakt/Contact

ZBW – Leibniz-Informationszentrum Wirtschaft/Leibniz Information Centre for Economics
Düsternbrooker Weg 120
24105 Kiel (Germany)
E-Mail: [rights\[at\]zbw.eu](mailto:rights[at]zbw.eu)
<https://www.zbw.eu/>

Standard-Nutzungsbedingungen:

Dieses Dokument darf zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden. Sie dürfen dieses Dokument nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, aufführen, vertreiben oder anderweitig nutzen. Sofern für das Dokument eine Open-Content-Lizenz verwendet wurde, so gelten abweichend von diesen Nutzungsbedingungen die in der Lizenz gewährten Nutzungsrechte. Alle auf diesem Vorblatt angegebenen Informationen einschließlich der Rechteinformationen (z.B. Nennung einer Creative Commons Lizenz) wurden automatisch generiert und müssen durch Nutzer:innen vor einer Nachnutzung sorgfältig überprüft werden. Die Lizenzangaben stammen aus Publikationsmetadaten und können Fehler oder Ungenauigkeiten enthalten.

Terms of use:

This document may be saved and copied for your personal and scholarly purposes. You are not to copy it for public or commercial purposes, to exhibit the document in public, to perform, distribute or otherwise use the document in public. If the document is made available under a Creative Commons Licence you may exercise further usage rights as specified in the licence. All information provided on this publication cover sheet, including copyright details (e.g. indication of a Creative Commons license), was automatically generated and must be carefully reviewed by users prior to reuse. The license information is derived from publication metadata and may contain errors or inaccuracies.



<https://savearchive.zbw.eu/termsfuse>



Natalia Shvets,
Viktoriia Rudevskia

THEORETICAL FOUNDATIONS AND PRACTICE OF THE ACTIONS OF GOVERNMENTS AND CENTRAL BANKS IN THE CONDITIONS OF WAR: HISTORICAL EXCURSION AND UKRAINIAN EXPERIENCE

The object of research is the current global experience of regulating the financial sector and financing the costs of military actions of countries that were at war. This experience is compared in the work with those measures that were used by the government of Ukraine during the russian-Ukrainian war. In the conditions of war, the problem of financing war expenditures and balancing the budget for uninterrupted implementation of social payments is particularly acute. A sharp imbalance of the country's budget in the direction of financing military expenses and a drop in GDP, as a result of military operations on the territory of the country where military aggression is taking place, requires adequate actions of both regulatory and investment nature from the government and regulators. The timeliness and adequacy of such actions is a practical and scientific dilemma, the solution of which lies partly in the world's historical experience. The work proves that the actions of the Ukrainian government and the National Bank of Ukraine during the active phase of military aggression on the part of Russia fully correspond to modern theoretical and methodological achievements in the organization of financing the defense expenditures of belligerent countries. Ukraine is using almost the entire arsenal of possible financing options: reducing non-military spending, increasing government borrowing, and issuing money. The study of the role of expenditures to fill the budget demonstrated the reduction of the role of taxes as a lever for financing the growing expenditures of states on defense. Coordinated actions of the Government of Ukraine and the National Bank of Ukraine prevented a sharp outflow of foreign capital from the country and preserved the purchasing power of the national currency. This is explained by the timely application of historical experience, tools of the classic Lucas-Stokey model with skillful manipulation of government debt rates in order to interest investors in long-term investment in government debt securities, and unprecedented financial assistance from foreign partners.

Keywords: state expenditures, financing of budget expenditures, ensuring the country's defense capability, Ukrainian financing experience.

Received date: 26.02.2023

Accepted date: 03.04.2023

Published date: 30.04.2023

© The Author(s) 2023

This is an open access article

under the Creative Commons CC BY license

How to cite

Shvets, N., Rudevskia, V. (2023). Theoretical foundations and practice of the actions of governments and central banks in the conditions of war: historical excursion and Ukrainian experience. *Technology Audit and Production Reserves*, 2 (4 (70)), 24–31. doi: <https://doi.org/10.15587/2706-5448.2023.278349>

1. Introduction

As the ancient Roman politician Marcus Tullius Cicero (106 BC–43 BC) said: «Money is the nerve of war».

Waging wars and ensuring the defense capability of a belligerent country requires governments to spend enormous amounts of money on military operations. The use of high-tech weapons in modern wars requires large public expenditures, which are usually unplanned (as in the case of Russia's surprise attack on Ukraine on February 24, 2022). This creates large deficits in state budgets due to a sharp increase in defense spending. Being in a state of war requires governments to review traditional policies and methods of financing budget expenditures and redirect funding to more extreme methods and take radical measures to ensure the country's defense capability.

The history of the world includes many wars, after studying the experience of financing in which it is possible to single out the most important positives and gaps of such financing and, comparing with Ukrainian realities, use the experience of solving financial support issues in other warring countries. Military challenges give rise to non-standard decisions and actions of governments and central banks in the field of finance. *The aim of research* is to determine conceptual solutions for effective state intervention in the economic sector during the war. In the current conditions of the active phase of Russia's war against Ukraine, which has already been going on for more than a year, it will help to use the best financing practices in Ukraine to increase the financial potential of government finances in order to ensure Ukraine's victory in this shameless aggression of the neighbor-enemy. Therefore, the relevance of the study is that

it is aimed at analyzing the current actions of governments and other regulators in war conditions and solving the issue of effective state intervention in the economic sector in the Ukrainian context. As well as identifying problems and opportunities for solving them, and developing recommendations for improving the situation in conditions of uncertainty.

2. Materials and Methods

Research methods are: analysis and synthesis of the theoretical base, methods of analysis, generalization, structuring, induction and deduction, systematic approach, graphical and comparative methods. Also, in the process of research and implementation of tasks, general scientific and analytical methods were used.

3. Results and Discussion

Since the beginning of the full-scale war, the government of Ukraine has been spending colossal resources on waging an armed struggle against the aggressor and financing the country's socio-economic needs. From the end of February 2022, the volume of budget expenditures and the budget deficit, as well as the structure of its financing, reflect the increase in the share of the state and its reorientation to the primary financing of military needs. On a theoretical level, conducting an armed struggle against the enemy requires an increase in government spending, which can be financed in the following main ways:

- tax increase;
- reduction of expenditures not related to military purposes;
- borrowing by the government from investors/creditors through obtaining loans or selling them government securities;

- emission of money and the involvement of the central bank in the internal debt operations of the government [1];
- expansion of the tax base;
- reduction of fiscal pressure on business in order to encourage taxpayers to avoid optimization and evasion.

If to take a short tour of the actions of the United States of America during the First and Second World Wars, it is possible to highlight the following most characteristic features:

- negative trends in labor supply, that is, the transformation of civilian workers into military personnel;
- significant government restrictions on internal and international movement of citizens, certain goods (their trade);
- an increase in federal government spending, which was mostly financed by the issuance of debt securities and money issuance;
- support by the US Federal Reserve System (Fed) of federal bond prices and expansion of the Fed's balance sheet;
- a constant post-war increase in government spending in the structure of the gross domestic product [2].

Expanding the historical period of the study, the authors of the paper [2] established that in the USA the predominant form of financing additional financial needs of the state during the wars was:

- debt financing (World Wars I and II, «cold» war, wars in Iraq and Afghanistan);
- tax increase (Korean War);
- inducing inflation and increasing seigniorage (income obtained from the emission of money) (Vietnam war).

Since World War II was closest in time and similar in form of aggression, let's focus a little more on the specifics of the actions of the governments and central banks of the United States of America, Great Britain, the USSR, and Germany during this period (Table 1).

Table 1

Characteristics of the actions of the governments and central banks of the USA, Great Britain, the USSR and Germany during the Second World War*

Country	The central bank of the country	The government of the country
USA	<ul style="list-style-type: none"> – the Fed fixed interest rates on short-term treasury bonds at the level of 3/8 percent per annum; – the Fed bought short-term treasury bonds in significant quantities and played the role of «buyer of last resort»; – for long-term government bonds, the Fed also established the maximum level of yield and undertook to buy them in any amount; – the monetary base in the USA increased by 149 % or 2.5 times 	<ul style="list-style-type: none"> – the size of the US public debt exceeded 120 % of GDP
Great Britain	<ul style="list-style-type: none"> – the cost of raising loans for the UK Treasury was low and amounted to 2.7 % per annum (nominal rate); – monetary financing of the budget deficit reached about 5 % of its total volume; – currency control measures of the Bank of England prevented the transfer of national currency to foreign currency and the implementation of unjustified import purchases 	<ul style="list-style-type: none"> – state expenditures reached 70 % of GDP and only half of them were financed from tax revenues; – the British government, implementing Keynes's recommendations, issued significant volumes of public debt obligations; – domestic borrowing by UK private borrowers was limited in order not to create competition for the government
USSR	<ul style="list-style-type: none"> – savings banks placed government loans. The fourth issue of the third five-year loan was the first loan for which funds began to flow during the war. Then the State Military Loan of 1942, the Second, Third and Fourth Military Loans, issued for a period of 20 years at 4 % per annum, were placed. In total, during the war, income from loans amounted to 76 billion rubles. At the expense of these funds, 1/6 of all military expenses of the USSR, including the war with Japan, were covered 	<ul style="list-style-type: none"> – in the course of implementing the United States Defense Assistance Act (Lend-Lease), the Soviet Union was supplied with weapons and other equipment in the amount of 11.3 billion USD; – the Soviet authorities restructured the tax burden of income sectors, from individuals in particular. The tax burden on the population's income grew, especially for peasants
Germany	<ul style="list-style-type: none"> – direct crediting of the government by the German Reichsbank was introduced. The German Reichsbank was only «a cog in the mechanism of the German military economy»; – the Reichsbank was allowed to issue banknotes secured by treasury bills. During the war, the amount of money in circulation increased almost 7 times, in addition, so-called «occupation stamps» were issued in the occupied territories in the amount of 84 billion marks, which acted as legal tender in the occupied territories 	<ul style="list-style-type: none"> – the Hitler government introduced an additional 50 % tax on beer and tobacco products, and the income tax increased by 50 %; – the most profitable for the Nazi authorities was the opportunity to start open robbery of the occupied nations and peoples. Germany has mastered the natural resources and industrial base of all the occupied territories; – the government obtained more than 12.8 billion USD during the years of occupation and continued to pour about 4.8 billion USD into its own economy dollars annually

Note: * – compiled by the author according to [1, 3–7]

So it is possible to see that the actions of the governments and central banks of the USA and Great Britain were very similar and aimed mainly at financing defense costs by increasing the public debt and increasing the emission of money supply. Let's also note the maintenance of low yield of government debt securities and, as a result, the purchase of large volumes of these securities by the central banks of the mentioned countries. As for the USSR and Germany, we are also witnessing the growth of public debt and emissions, however, with a simultaneous increase in tax pressure in order to increase government tax revenues.

Two classical models of behavior are used in modern economic theory to determine the nature of the behavior of governments in the field of financing during wars of «jumps» in military spending: the Barro model (1979) and the Lucas-Stokey model (1983). Both models deal with how the government should adjust tax revenues and government borrowing in response to rising government spending. The models differ in the way the fiscal shock is absorbed: to what extent it is carried out by adjusting tax collections and to what extent by adjusting the amount of public debt.

Barro model, fiscal shocks consistently affect both tax collections and the amount of government debt, but do not affect the yield on government debt. Barro model predicts that a war expected to end in the short run should be financed more through public borrowing, while a war expected to end in the long run should be financed more through tax increases.

In the Lucas-Stokey model, fiscal shocks, no matter how deep, do not affect government tax collections, but affect

the actual profits of government creditors. Interest rates on government securities are exogenous (these values are autonomous and determined by governments and central banks of countries) in both models [8].

An example of the differences in the models of government behavior in the field of financing growing public expenditures during wars can be served by a brief analysis of financial data on the 4 wars of the United States of America (Table 2).

In order to evaluate the existing and choose the optimal model of behavior of the government and the National Bank of Ukraine in the future in the field of financing growing public expenditures in the conditions of Russia's existing aggression against our country, within the framework of classical economic approaches, let's make a brief overview of the actions of the Ukrainian government and the National Bank of Ukraine during the period from February 24, 2022 (Table 3).

According to the results of the Table 3, it is possible to see that the actions of the government and the National Bank of Ukraine have mixed characteristics of both models of behavior in the field of financing military expenses: from the Barro model – a significant impact on tax revenues and the volume of public debt, from the Lucas-Stokey model, an impact on the profitability of public debt. Therefore, in order to identify clearer boundaries of the application of the specified models in Ukrainian realities, let's conduct a detailed analysis of Ukraine's financial indicators in terms of comparing the indicators of 2014 (the beginning of Russia's aggression in Crimea and the armed conflict in the Luhansk and Donetsk regions of Ukraine) and 2022 (the active new military aggression of Russia February 24, 2022).

Table 2

Features of the financing of the 4 US wars caused by different models of the behavior of governments during the war (Barro model and Lucas-Stokey model)*

War	Features of financing
Anglo-American War of 1812	21 % of the war was financed by taxes, but with tax revenues falling relative to peacetime baselines, the tax contribution was negative
World War II	11.5 % of the war was financed by real GDP growth and debt depreciation due to inflation
Korean War	the war was 100 % tax-financed, but it must be taken into account that the government had a primary surplus at the start of the war and was paying off a debt incurred during World War II that had been deferred for the duration of the Korean War
The Vietnam War	the war was partially paid for by reducing non-defense spending

Note: * – compiled by the author according to [8]

Table 3

Characteristics of the actions of the government and the National Bank of Ukraine during the period of Russia's new military aggression on February 24, 2022*

Government of Ukraine	National Bank of Ukraine
A significant increase in total state budget expenditures (by 41.5 % in real terms) and the share of budget financing of the security and defense sector	Limitation by the National Bank of cross-border movement of capital and fixing of the exchange rate
Provision of tax benefits to Ukrainian businesses, which led to a nominal decrease in budget revenues	Expanding access to NBU refinancing
Active attraction of state loans and accumulation of state debt to counteract the decrease in tax revenues in the conditions of increasing state expenditures	Ban of the NBU for banks to distribute capital, in particular, to pay dividends
Intensification of grant and credit support from external official creditors	Temporary introduction of full guarantee of deposits of individuals and formalization of «credit holidays» for borrowers
Effectively shutting down external private sources of funding for the Government for an indefinite period of time	Postponement of the implementation or suspension of a number of NBU regulatory requirements and simplification of a number of requirements for the operational activities of banks
Issuance of domestic military bonds by the Government and attraction of emission resources of the NBU to maintain the desired volume of bond placement with weak participation of private investors	Increase of the NBU discount rate with the aim of ensuring the attractiveness of hryvnia deposits, increasing the yield of DGLB and as a result of reducing emission financing of the budget deficit

Note: * – compiled by the author according to [1, 9]

At the time of the analysis, the official exchange rate of the hryvnia as of October 31, 2022 was 0.27 USD, and as of November 30, 2022, it was unchanged at 0.027 USD. The data are presented in hryvnias in order to reflect the financial and economic trends in the development of Ukraine during the specified period. If to submit data in the c. u. this impact will be offset by fluctuations in the hryvnia exchange rate, which does not directly depend on the trends and indicators described by us. The exchange rate is not volatile in relation to the indicators displayed by us, especially in the specified period.

The fundamental financial indicator, which is directly affected by the country's military actions, is the indicator of budget expenditures for defense. It, as a rule, grows several times with the beginning of hostilities. Fig. 1 shows the dynamics of expenditures of the consolidated budget of Ukraine in 2013–2022. Let's observe an increase in defense expenditures in 2014 by 84.3 % and in 2022 by more than 5 times. It is clear that such fiscal shocks must be absorbed by the state through a significant increase in the sources of covering these expenses.

Tax revenues are one of the most important sources of filling the state budget of Ukraine. It is clear that the conduct of active hostilities in the regions of Ukraine significantly affects economic activity and changes trends in the receipt of taxes and fees in the state. So, Fig. 2 presents the dynamics of tax revenues of the Consolidated Budget of Ukraine and their growth rates for the period 2013–2022.

There is an increase in tax revenues in 2014 by 3 % and their slight decrease in 2022 by 1.6 % as of October 2022. However, if to compare this indicator as of October 2021, it is possible to state that tax revenues in 2022 even increased by 26.8 % [11]. At the same time, it is possible to emphasize that the specified growth is not enough to cover the exponentially growing defense costs.

As suggested earlier, according to the proposed classical behavioral models of governments and central banks during wars, they can be covered by the growth of money emission and public debt. Thus, the monetary base is used by the National Bank of Ukraine as one of the main indicators of monetary policy and represents the totality of cash issued by the National Bank of Ukraine, required reserve funds, funds on correspondent accounts and other funds of other deposit corporations (banks), funds of

state non-financial corporations and households (employees of the National Bank) in the National Bank of Ukraine [12]. This indicator can be used to judge the size of the issue of funds by the country's central bank.

Fig. 3 presents the growth dynamics of the monetary base indicator in 2014–2022. In 2014, this indicator increased by 8.4 %, and in 2022 – as much as 122.2 %. It will be logical to note that such a significant growth of the monetary base indicator in 2022 had a significant impact on the growth of the consumer price index in the same year (Fig. 4).

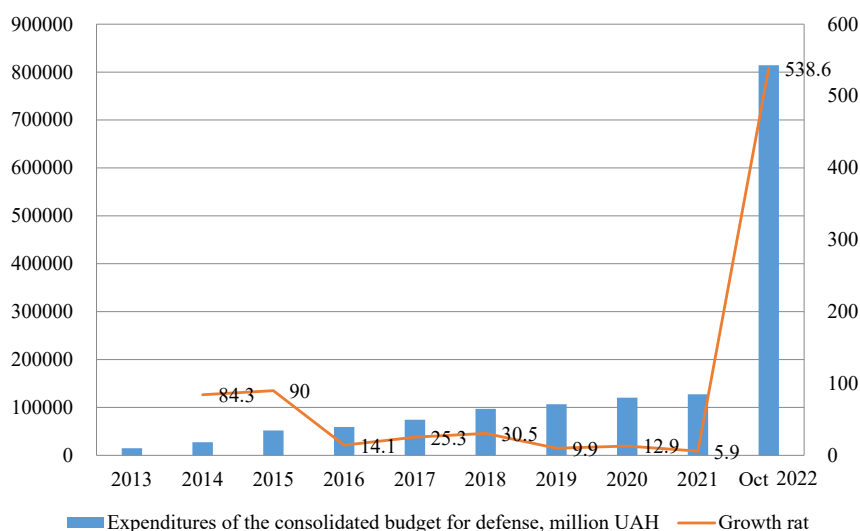


Fig. 1. Dynamics of defense expenditures of the consolidated budget of Ukraine and growth rates compared to the previous year in 2013–2022, million UAH, % (compiled by the author on the basis of official statistical data of the National Bank of Ukraine [10])

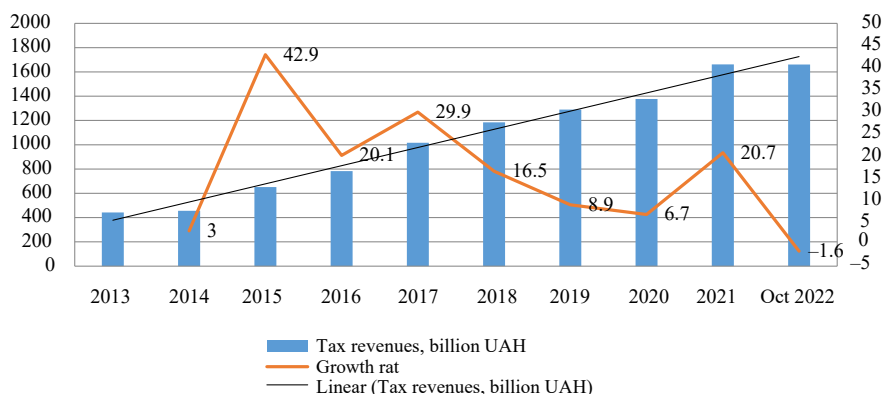


Fig. 2. Dynamics of tax revenues of the Consolidated Budget of Ukraine and their growth rates for 2013–2022, billion UAH, % (compiled by the author on the basis of official statistical data of the National Bank of Ukraine [10])

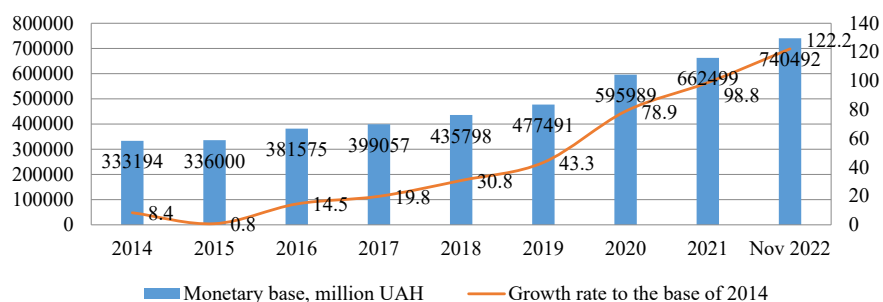


Fig. 3. Dynamics of the monetary base indicator (M3) in 2014–2022 and rates of its growth, million UAH, % (compiled by the author on the basis of official statistical data of the National Bank of Ukraine [10])

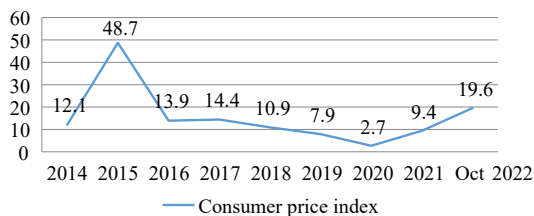


Fig. 4. Dynamics of the consumer price index in Ukraine (to the corresponding period of the previous year, cumulatively, %) in 2014–2022 (compiled by the author on basis and official statistical data of the National Bank of Ukraine [10])

One of the most important macro-economic indicators characterizing the state of economic and financial relations in the country is the consumer price index.

As a result of the distortion and complication of economic and financial relations during wars, this indicator usually increases. Fig. 4 presents the dynamics of this index to the corresponding period of the previous year (cumulatively) in 2014–2022. So, there is an increase in the consumer price index in Ukraine in 2014 – by 12.1 % and in 2022 (as of October) – by 19.6 %. The largest increase in the index was observed in 2015, probably as a result of the financial shocks caused by the annexation of Crimea and the beginning of hostilities in the Luhansk and Donetsk regions.

As a rule, active military actions of the state lead to currency shocks associated with a change in the nature of the movement of international capital and international trade relations. To absorb these shocks, the state mostly uses its own international currency reserves to cover the emerging deficit of foreign exchange reserves. Fig. 5 presents the growth dynamics of official international reserves of Ukraine in 2014–2022.

Let's observe a drop in their volume in 2014 by 63.1 % and in 2022 (as of November) – by 9.7 %. It is also possible to draw attention to the fact that the situation with international reserves significantly improved already in 2015, and they were formed with an increase of 76.6 %. This may indicate the significant potential of the government and the National Bank of Ukraine in the ability to increase official currency reserves due to the expansion of foreign economic activity, authority in the international arena and external borrowing. The government of Ukraine managed to maintain international currency reserves at a sufficient level in 2022 due to the implementation from the first days of the active phase of the war of a complete ban on cross-border withdrawal of capital, donor aid from foreign partners and the conclusion of an agreement with Russia, mediated by Turkey and the UN, on the export of Ukrainian agricultural products through the Black Sea. The so-called «grain agreement» unblocked Ukrainian ports, which contributed to the receipt of foreign exchange earnings under export-import contracts.

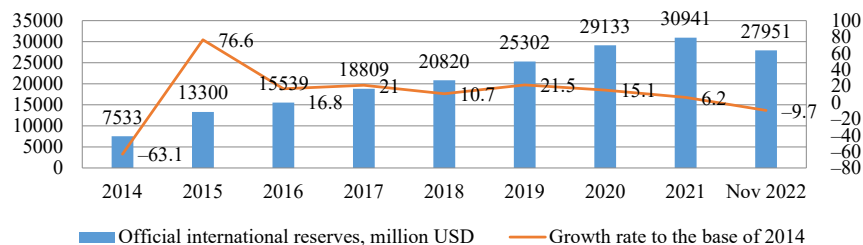


Fig. 5. Dynamics of volumes of official international reserves of Ukraine in 2014–2022 and their growth rates, million USD at the official exchange rate, % (compiled by the author on the basis of official statistical data of the National Bank of Ukraine [10])

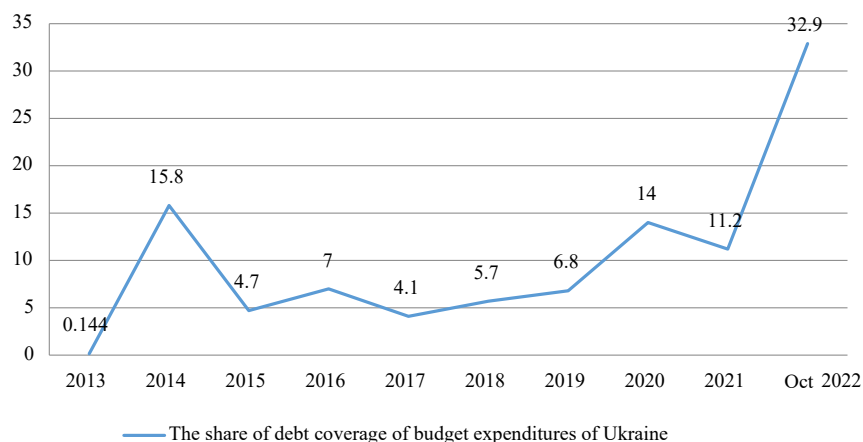


Fig. 6. Dynamics of the share of debt in the consolidated budget of Ukraine for 2013–2022, % (compiled by the author on the basis of official statistical data of the National Bank of Ukraine [10])

As already mentioned, the increase in defense expenditures in most cases leads to an increase in the share of public debt in the country's budget. Fig. 6 presents the dynamics of the share of debt in the consolidated budget of Ukraine in 2013–2022. It is possible to see an increase in the share of debt in financing expenditures of the consolidated budget of Ukraine in 2014 by 15.8 % (the beginning of Russia's military aggression in the Luhansk and Donetsk regions) and a sharp «jump» in the share of debt in 2022 due to the outbreak of a large-scale war in Ukraine up to almost 33 % as of October 2022 (Fig. 6).

The classic way of increasing public debt by countries is the issue of public debt securities. For Ukraine, such a classic instrument is domestic government loan bonds (DGLB).

Fig. 7 presents the dynamics of the amount of funds attracted to the State Budget of Ukraine due to the placement of DGLB bonds at auctions in 2013–2022. In general, let's observe a decrease in these volumes both in 2014 and in 2022. It is possible to state that not only this instrument is key in increasing the national debt of Ukraine during the military operations of 2014 and 2022. In 2022, military government bonds became the main instrument of public debt. As of December 1, 2022, the government of Ukraine has placed military bonds in the amount of 15 billion UAH and 387 million EUR [13].

An important indicator of the state of the state debt and the methods of servicing it is the average annual yield of state securities. Fig. 8 presents the dynamics of the average annual yield of DGLB bonds issued in Ukraine in the relevant currency in 2013–2022. Let's observe an increase in the yield of DGLB in hryvnias in 2014 by 6.4 % and in 2022 – as much as 57.2 %. This may indicate the orien-

tation of the actions of the government and the National Bank of Ukraine towards a long-term war according to the Lucas-Stokey model.

For a visual representation and generalization of the results of the above analytical study of the financial and economic indicators of Ukraine in terms of comparing the indicators of 2014 (the beginning of russian aggression in Crimea and the armed conflict in the Luhansk and Do-

netsk regions of Ukraine) and 2022 (active military aggression of russia on February 24, 2022) they are grouped in the Table 4.

So, the results in Table 4 testify to this. The second phase of russia's military aggression against Ukraine is somewhat different in the context of the results and reactions to the actions of the government and the National Bank regarding the financing of growing public expenditures.

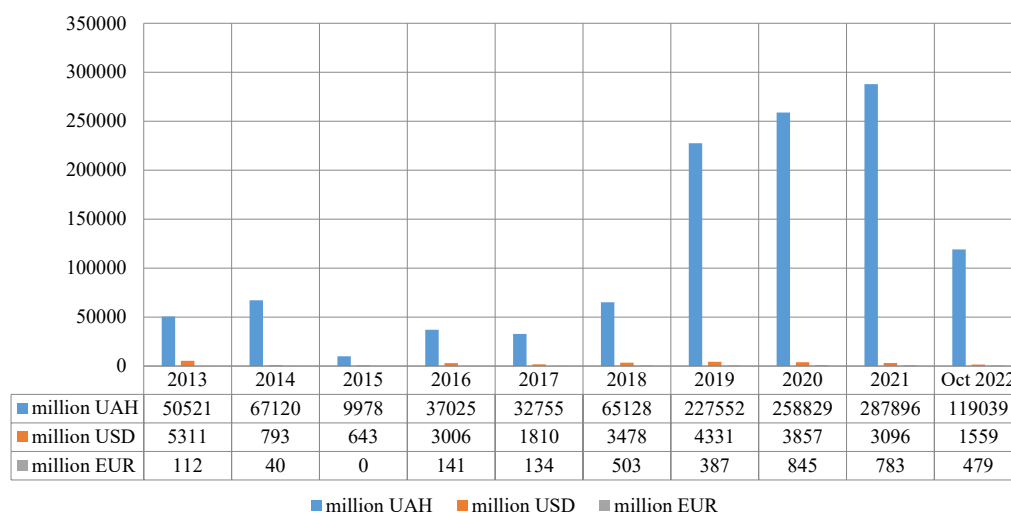


Fig. 7. Dynamics of the volume of funds attracted to the State Budget of Ukraine due to the placement of DGLB at auctions in 2014–2022, denominated in the relevant currency, million (compiled by the author on the basis of official statistical data of the National Bank of Ukraine [10])

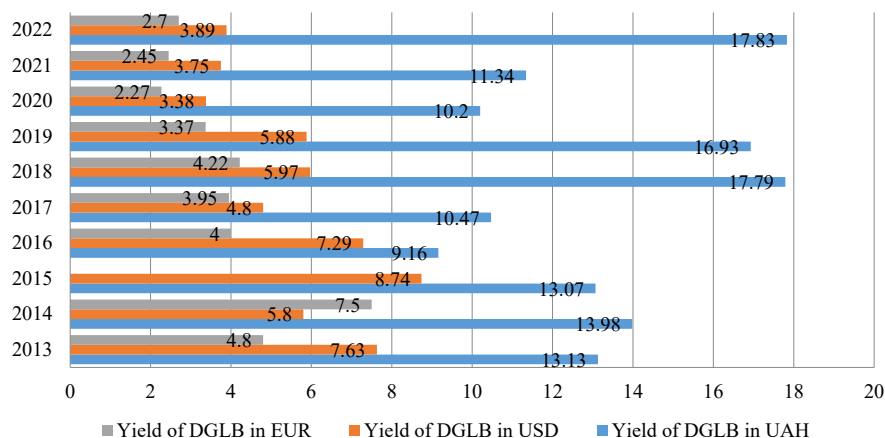


Fig. 8. Dynamics of the average annual yield of DGLB bonds issued in Ukraine in the corresponding currency in 2014–2022, % (compiled by the author on the basis of official statistical data of the National Bank of Ukraine [10])

Table 4

Comparison of financial and economic indicators of Ukraine in terms of comparison of indicators of 2014 (beginning of russian aggression in Crimea and armed conflict in the Luhansk and Donetsk regions of Ukraine) and 2022 (active military aggression of russia on February 24, 2022)

Indicator	2014	2022
Growth rate of consolidated budget expenditures on defense, % (Fig. 1)	84.3	538.6
Growth rate of tax revenues of the Consolidated Budget of Ukraine, % (Fig. 2)	3.0	–1.6 (26.8)
Growth rate of the monetary base indicator, % (Fig. 3)	8.4	122.2
Consumer price index (up to the corresponding period of the previous year, cumulatively), % (Fig. 4)	12.1	19.6
Growth rate of official international reserves, % (Fig. 5)	–63.1	–9.7
Share of debt in the consolidated budget, % (Fig. 6)	15.8	32.9
Growth rate of funds attracted to the State Budget of Ukraine due to the placement of OVDP bonds at auctions, denominated in the relevant currency, % (Fig. 7)	–21.3	–51.1
Growth rate of the yield of DGLB denominated in UAH, % (Fig. 8)	6.4	57.2

Thus, the most distinctive feature is a significant increase in the yield of government securities, which, with all other conditions unchanged (unchanged tax revenues and unchanged public debt), could indicate that the actions of the government and the National Bank of Ukraine follow the classic Lucas-Stokey model. However, let's also note a significant share of debt in the Consolidated Budget of Ukraine, especially for the current year, which, according to the classic Barro model, can only have a short-term effect in absorbing fiscal shocks. While the application of the Lucas-Stokey model will have a longer and probably more positive effect in this direction. Therefore, it is possible to make an interim conclusion about the correct decision of the National Bank of Ukraine to increase the discount rate in order to increase the yield of DGLB, adopted in June 2022. It is possible to draw attention to the growth rate of the monetary base, which in 2022 was 122 %. Similar actions took place in the activities of the US Fed during World War II, when the US monetary base increased by 149 %, as in principle and in a number of other countries, which mostly financed the growing military expenses through the additional emission of money.

Russia's existing aggression against Ukraine, within the framework of classical economic approaches, it was established that during the period of military aggression, almost the entire existing arsenal of tools and world practices was applied. This approach has mixed characteristics of both models of behavior in the field of financing military expenses: from the Barro model – a significant impact on tax revenues and the volume of public debt, from the Lucas-Stokey model, an impact on the profitability of public debt. In view of the sharp deterioration of the macroeconomic indicators of the economy of Ukraine and in the conditions of the uncertainty of the duration of the war, let's recommend giving preference to the Lucas-Stokey model, as it takes into account the specifics of long-term military conflicts. In the practical part of the application of the research results, it is also necessary to mention the strengthening of fiscal pressure, as an additional source of income, which has not been fully implemented so far. However, the increase in tax pressure still remains a debatable issue because it can manifest itself in both positive and negative effects due to the multi-vector nature of taxes.

The obtained results have limitations regarding their application, taking into account the specifics of the economic conditions in the country that preceded the start of hostilities. Thus, the economy of Ukraine is characterized as a «small open economy» and its experience in financing the costs of conducting military operations can be applied to countries with a similar model. The basis of the regulator's monetary policy is inflation targeting. A special feature of the targeting regime is the flexible floating rate in the corridor of expectations. Thus, the description of the actions of the regulator has a limitation of application for countries that have other goals at the basis of their monetary policy (stability of the national unit, etc.). Separately, it is necessary to mention the diversity of fiscal systems: in some countries, increasing the fiscal burden simply does not have a sufficient horizon of possibilities.

In the perspective of further research, it is possible to separately study the global experience of the impact of increasing or decreasing tax pressure on the part of the state in periods of turbulence caused by exogenous factors.

In this context, special attention should be paid to the motivation of taxpayers and internal public support, which may cause an additional fiscal burden. The role of fair taxation for different categories of taxpayers also remains an acute issue for Ukrainian society, taking into account the peculiarities of the mentality.

4. Conclusions

An analysis of the theoretical foundations and practical patterns of financial relations during wars in the leading countries of the world in the 20th century was carried out, and a detailed assessment of Ukraine's financial indicators in terms of the trends of conducting military operations on the national territory in 2014 and 2022 allows to draw the following conclusions.

First, according to the conducted research, the actions of the governments and central banks of warring countries, according to the classic Barro model, are characteristic of the early wars of the 20th century, including World War II. The most recent wars are characterized by following the classic Lucas-Stokey model with skillful manipulation of government debt rates in order to interest investors in long-term investments in government debt securities.

Secondly, in modern times, there is a decrease in the role of taxes as a lever for financing the growing defense expenditures of states. This is probably due to the growing role of international relations and the hegemony of individual countries on the world stage, due to which the role of international organizations and international financial aid is growing significantly. In this way, international financial resources are redistributed to «priority» countries that have the potential for future economic growth. In this context, it is possible to state the fact that the international community is interested in the future development of Ukraine, which is expressed in the unprecedented international financial assistance provided by international partners to Ukraine.

Thirdly, it can be confidently asserted that the actions of the Ukrainian government and the National Bank of Ukraine from February 24, 2022 fully correspond to modern theoretical and methodological assets in the organization of financing the defense expenditures of warring countries. Ukraine is using almost the entire arsenal of possible financing options: reducing non-military spending, increasing government borrowing, and issuing money. However, at the same time, the least attention was paid to the tax filling of the budget of Ukraine. Moreover, benefits were even granted to Ukrainian businesses, which had a negative impact on the revenue base of the budget. Taking into account the protracted nature of Russia's military aggression against Ukraine, it is possible to propose in this direction the strengthening of personal income taxation on a progressive scale, which will significantly improve the situation with tax revenues in Ukraine. It is convinced that such a decision will not be negatively accepted by the population of Ukraine, as every citizen in Ukraine now strives to contribute as much as possible to the victory over the enemy.

Conflict of interest

The authors declare that they have no conflict of interest in relation to this research, whether financial, personal,

authorship or otherwise, that could affect the research and its results presented in this paper.

Financing

The research was performed without financial support.

Data availability

The manuscript has no associated data.

References

- Bohdan, T. (2022). *Voienni finansy: shcho povynna robyty derzhava?* LB.ua. Available at: https://lb.ua/blog/tetiana_bohdan/523270_voienni_finansi_shcho_povinna_robiti.html Last accessed: 16.12.2022
- Hall, G. J., Sargent, T. J. (2022). Three world wars: Fiscal-monetary consequences. *Proceedings of the National Academy of Sciences*, 119 (18). doi: <https://doi.org/10.1073/pnas.2200349119>
- Kotyk, Yu. V. (2016). Opodatkuvannia naselennia URSR u 1941–1945 rr. *Ukrainskyi selianyn*, 16, 86–89.
- Fedorov, M. (2022). *Kak Sberbank rabotal v gody Velikoi Otechestvennoi voyny i vosstanavlival stranu posle nee*. Drugoi gorod. Available at: <https://drugoigorod.ru/sberbank-during-the-great-patriotic-war/> Last accessed: 05.01.2023
- Blokada Nimechchyny (1939–1945)*. Wikipedia. Available at: [https://uk.wikipedia.org/wiki/%D0%91%D0%BB%D0%BE%D0%BA%D0%B0%D0%B4%D0%B0_%D0%9D%D1%96%D0%BC%D0%B5%D1%87%D1%87%D0%B8%D0%BD%D0%B8_\(1939%E2%80%941945\)](https://uk.wikipedia.org/wiki/%D0%91%D0%BB%D0%BE%D0%BA%D0%B0%D0%B4%D0%B0_%D0%9D%D1%96%D0%BC%D0%B5%D1%87%D1%87%D0%B8%D0%BD%D0%B8_(1939%E2%80%941945)) Last accessed: 05.01.2023
- Reikhsbank*. Wikipedia. Available at: <https://uk.wikipedia.org/wiki/%D0%A0%D0%B0%D0%B9%D1%85%D1%81%D0%B1%D0%B0%D0%BD%D0%BA> Last accessed: 05.01.2023
- Hroshova systema Nimechchyny: rozvytok ta suchasnyi stan* (2011). MAUP. Available at: <http://osvita.dream.net.ua/vnz/reports/bank/21028/> Last accessed: 05.01.2023
- Hall, G. J., Sargent, T. J. (2020). *Debt and Taxes in Eight U.S. Wars and Two Insurrections*. NBER Working Paper Series. Working Paper 27115. Cambridge. doi: <https://doi.org/10.3386/w27115>
- Zvit pro finansovu stabilnist* (2022). Natsionalnyi bank Ukrainy. Available at: https://bank.gov.ua/admin_uploads/article/FSR_2022-H1.pdf?v=4 Last accessed: 16.12.2022
- Statystyka Natsionalnoho banku*. Available at: <https://bank.gov.ua/ua/statistic/nbustatistic>
- Makroekonomichni pokaznyky*. Natsionalnyi bank Ukrainy. Available at: <https://bank.gov.ua/ua/statistic/sector-financial#2fs> Last accessed: 16.12.2022
- Arbuzov, S. H., Kolobov, Yu. V., Mishchenko, V. I., Naumenkova, S. V. (2011). *Bankivska entsyklopediia*. Kyiv: Tsentr naukovykh doslidzhen Natsionalnoho banku Ukrainy: Znannia, 264.
- Informatsiia shchodo umov vypusku oblihatsii vnutrishnikh derzhavnykh pozyk, yaki znakhodiatsia v obihu stanom na 1 hrudnia 2022 roku* (2022). Ministerstvo finansiv Ukrainy. Available at: <https://mof.gov.ua/uk/ovdp-shho-perebuvajut-v-obigu> Last accessed: 22.12.2022

Natalia Shvets, Doctor of Economic Sciences, Professor, Vice Rector, Institute of Psychology and Entrepreneurship, Kozin, Kiyv Region, Ukraine, ORCID: <https://orcid.org/0000-0002-3113-7689>

✉ **Viktoriia Rudevska**, Doctor of Economic Sciences, Associate Professor, Department of Financial Technologies and Consulting, Ivan Franko National University of Lviv, Lviv, Ukraine, ORCID: <https://orcid.org/0000-0001-6697-9096>, e-mail: rudevska@ukr.net

✉ *Corresponding author*