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**AUCTION TRADE OF GOVERNMENT AND CORPORATE DEBT IN A CRISIS**

**Abstract.** Debt securities auction is the kind of trading the most often used in a crisis. The market of bonds, government debt, and debt of private structures are the objects of empiric, scientific and applied researches. The goal of the current scientific work is to identify the peculiarities of auction trade and the state debt policy in a crisis situation basing on the foreign and domestic experience, to investigate the choice of formats of debt securities auction at the secondary market of securities and management of the factors for elimination of the distortion of such kind of trading at financial markets, contributing to the economic growth. The work specifies that in the institutional environment of development of the securities secondary market, where investment organizations and banks, including foreign ones, are the potential buyers of debt securities, the modern practice of auctions and new formats of their holding are determined by the new rules of trade, increasing importance of the private value of lots and informational support for the auction. At the stage of the economy digitalization and formalization of interrelated processes and transactions at the financial markets, it is necessary to develop an adequate mechanism of auction trade. It is confirmed that the mechanism of improvement of the auction practice and large-scale implementation of the new formats of their holding are inefficient with no agreement of the interests of investors, emitters, and different interested parties to eliminate the distortion of the debt securities auction at the financial markets. The research has determined significant deviations in the rates of the GDP growth and government debts, particularly in Poland, Japan and Ukraine that is explained by the level of confidence in the state and specialized institutions of debt management, target long-term economic strategy and monetary policy in the crisis conditions, particularly in the EU countries and in Ukraine. The authors of the article identify directions of the further scientific and applied researches to improve flexibility of the system of debt securities auctions amid the crisis and intensify their positive impact on the economic growth.

**Keywords:** auction, economic crisis, debt securities, government debt, secondary market, investor, financial market, economic growth.

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## АУКЦІОННА ТОРГІВЛЯ ДЕРЖАВНИМ І КОРПОРАТИВНИМ БОРГОМ В УМОВАХ КРИЗИ

**Анотація.** Аукціонна торгівля борговими зобов'язаннями найчастіше використовується в умовах розгортання кризових явищ. Ринок облігацій, державний борг і борг приватних структур виступають як об'єкти емпіричних і науково-прикладних досліджень. Метою нашої наукової роботи є визначення особливостей аукціонної торгівлі і державної боргової політики в умовах кризових ситуацій на основі узагальнення закордонного і вітчизняного досвіду, дослідження процесів вибору форматів аукціонної торгівлі борговими зобов'язаннями на вторинному ринку цінних паперів (ЦП) та управління факторами для усунення викривленості такої торгівлі на фінансових ринках, що сприятиме економічному зростанню. Визначено, що в певному інституційному середовищі розвитку вторинного ринку ЦП, де потенційними покупцями боргових ЦП є інвестиційні організації і банки, у т. ч. іноземні, сучасна практика аукціонної торгівлі і нові формати її проведення супроводжуються встановленням нових правил торгів, зростаючим значенням приватної цінності об'єкта й інформаційного супроводу аукціону. В умовах цифровізації економіки і формалізації взаємопов'язаних процесів і трансакцій на фінансових ринках адекватним має бути механізм аукціонної торгівлі. Доведено, що механізм удосконалення практики аукціонної торгівлі і розширення масштабів упровадження нових форматів її проведення неможливі без узгодження інтересів інвесторів, емітентів і різних зацікавлених сторін для усунення викривленості аукціонних торгів борговими зобов'язаннями на фінансових ринках. Виявлено значні відхилення в темпах росту ВВП і державних боргів, зокрема в Польщі, Японії і в Україні, що пояснюються рівнем довіри до держави і спеціалізованих інституцій з управління боргами, цільовою орієнтацією довгострокової економічної стратегії і монетарної політики в умовах кризових ситуацій, зокрема у країнах ЄС і в Україні. Визначено напрями подальших науково-прикладних досліджень для цілей підвищення гнучкості системи аукціонних торгів борговими зобов'язаннями в умовах кризи і посилення їхнього позитивного впливу на економічне зростання.

**Ключові слова:** аукціонна торгівля, криза економіки, боргові цінні папери, державний борг, вторинний ринок, інвестор, фінансовий ринок, економічне зростання.

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**Introduction.** In the conditions of a deep crisis both in the post-industrial and developing countries, the growing interest is raised to solution of the problem of debt management of different economic agents in the current and distant prospect. At the secondary market, the auction lots are represented by the debts of the state and private structures, accumulated because of the lost financial stability and incapability to execute the contract liabilities, including international ones. Activation of the debt securities auctions depends on the institutional environment quality, transparency of the state debt policy and consideration of the interests both of the debt securities emitters and participants of the financial market. A broader choice of the auction formats at the financial market of Ukraine requires studying the world and European experience concerning the peculiarities of state debt policy and the processes of debt management with participation of different interested parties.

Automation of the auction procedures improves its efficiency in terms of conformity with the rules of bidding and holding direct trading, rises the auction speed, reliability and economic efficiency. Digitalization of the economy expands the analytics of the potential participants' activity at the «land», energy, and «green» auctions, as well as the instruments and formats of other debts auctions, because negative effects of the financial crisis and COVID-19 pandemic hinder economy

recovering both in the post-industrial and developing countries unless involving external sources of funding, including from selling the debt securities at the secondary markets.

**Analysis of researches and targets setting.** The problems of auctions have been considered in the scientific researches of P. R. Milgrom, R. J. Weber [1]. The reasons of auction failure and factors of impact on the securities return at the secondary market are considered by R. Beetsma, Massimo Giuliadori, M. Hanson, Je. Frank de Jong [2]. In the pandemic conditions, changes in the behavioral models of the central bank and other banking structures, being auction participants, are described in the work of William A. Allena [3], who stresses on active performance of the Federal Open Market Committee (FOMC) to support the permanent operation of industrial and consumer markets in the USA. Empiric investigations of the auction trade with descriptive modeling were conducted by K. Hendrix, R. Porter and B. Bordo [4]. Theory and practical aspects of the crisis recovery are considered by scientists through the new auction formats. Thus, in their work on solution of the problem of improvement of the auction theory basing on new formats, the Nobel laureates of 2020 Paul R. Milgrom and Robert B. Wilson [5] point that the main focus of the research is shifted from the auctions with one lot to the auctions with several lots because of the wish to use the markets for trading a wide range of objects. They investigated new formats of auctions of goods and services, e.g. radio frequency, electric energy and distressed debts, which were not well sold in the traditional way. Methodological aspects of the econometric modeling of securities auctions and their information and analytical support are considered in the works of M. I. Dyba and O. Yu. Kikot [6; 7].

*The goal of the present scientific work* is to identify peculiarities of the auction trade and the state debt policy in a crisis basing on the consolidated foreign and domestic experience, to study the choice of formats of the debt securities auctions at the secondary market of securities and management of the factors to eliminate the distortion of such trading at the financial markets, contributing to the economic growth.

**Research results.** The government loans evolve with the passage of time. Depending on the political situation in the country, its economic strategy of development, i.e. «short or long run», financial markets follow different directions in their development. In the work [8], it is mentioned that governments can be motivated to invest in the strategies of debt management, which minimize the auction risk, being higher in the crisis conditions. Even the economy of post-industrial countries experiences a great debt burden, particularly the government debt of the USA has reached the record of USD 26 trillion [9]. The American auction of 20-year bonds was first characterized by a great demand, when the government initiated a new emission to extend the time of debt redemption for a longer period [10].

To support economic recovery of Chinese economy (second in the world rating) from the first consequences of the coronavirus pandemic in 2019—2020, Chinese corporative and supranational structures in the Asia-Pacific emitted dollar bonds of 144 A investment type (high class debt supplied larger spreads as a difference between the prices of securities purchase and sale). It expanded the base of Chinese credit bonds due to the increasing demand among American investors, as the last were attracted by the bonds return (3—5%); the foreign share in the value of Chinese bonds made 9%. China's entering the international secondary capital market and participation of the world leading banks, such as Deutsche Bank, Bank of America, Citigroup, JPMorgan and others, in the auctions have forced the necessity for the USA to set barriers for free Chinese capital flow at the international capital markets: they make a rigid control on the transparency of accounting of the Chinese companies' securities, which are listed on the US Stock Exchange. At the auction in January 2020, the China sold specific exchequer bonds for USD 10 billion [12]. The specific feature of the Chinese exchequer bonds is their long redemption time (70% of such bonds — 10-year redemption time); low risk, because the bonds can be used as shares for refunding, i.e. as equity capital; above CNY1 trillion of emitted bonds are intended to support economic stimuli; the bond rates variate within 2.4—2.7% p.a.

In the 21<sup>st</sup> century, the perfect online auction systems provide great opportunities for institutional investors, being sensitive to crisis, as they can immediately participate in the auctions,

going over the heads of primary dealers [13]. On one hand, financial integration has intensified the «competition» between the market practice and policy of debt management in the leading EU countries, whereas on the other hand, globalization processes of the financial and credit activity have contributed to appearance of new so-called «standard» financial products, focused on several «global targets», such as 10-year German bonds and 10-year exchequer bonds of the USA, which are high liquid securities at the other markets in the world. Entry of such securities into the international capital markets is hastened by FinTech-technologies, change the configuration of the secondary securities market, intensify the competition between the auction participants, because application of the modern technology of distributed register, artificial intellect, analysis of huge data or cloud calculations possess a significant potential for the change of lifecycle of bonds as debt securities, i.e. year of emission, trading before payment and impact on the financial market performance [14].

In August 2020, the record demand for debt securities was caused by the auction of the 30-year bond, placed in Germany, in spite of the negative return of the securities, placed at minus 0.05% p.a. The Ministry of Finance of Germany proposed bonds for investors in the amount of EUR 1.5 billion, whereas the volume of applied requests made EUR 3.6 billion [15]. To compare: in Ukraine the rates of internal government bonds at the primary market, placed by the Ministry of Finance of Ukraine (as of January 2020), were: UAH — 9.5%—10%; USD — 3.0%—3.5%; EUR — 1.0%. In 2019, the government emitted the internal government bonds in the amount of UAH 329.9 billion or almost USD 12 billion [16]. Thus, in Ukraine, the return of the internal government bonds and financial costs for servicing the debt by the state securities are much higher than in Germany or in other countries; currency risks are also higher, considering the structural correlations of the debts in the national currency and denominated in the foreign one. Great Britain conducts a strong monetary policy and efficient management of government debts, because at all 500 auctions (conducted since 2009), the government bonds have been nominated in the country's national currency and proposed with the minimum return, i.e. return of the 10-year bonds made 0.24% in October 2020 [17].

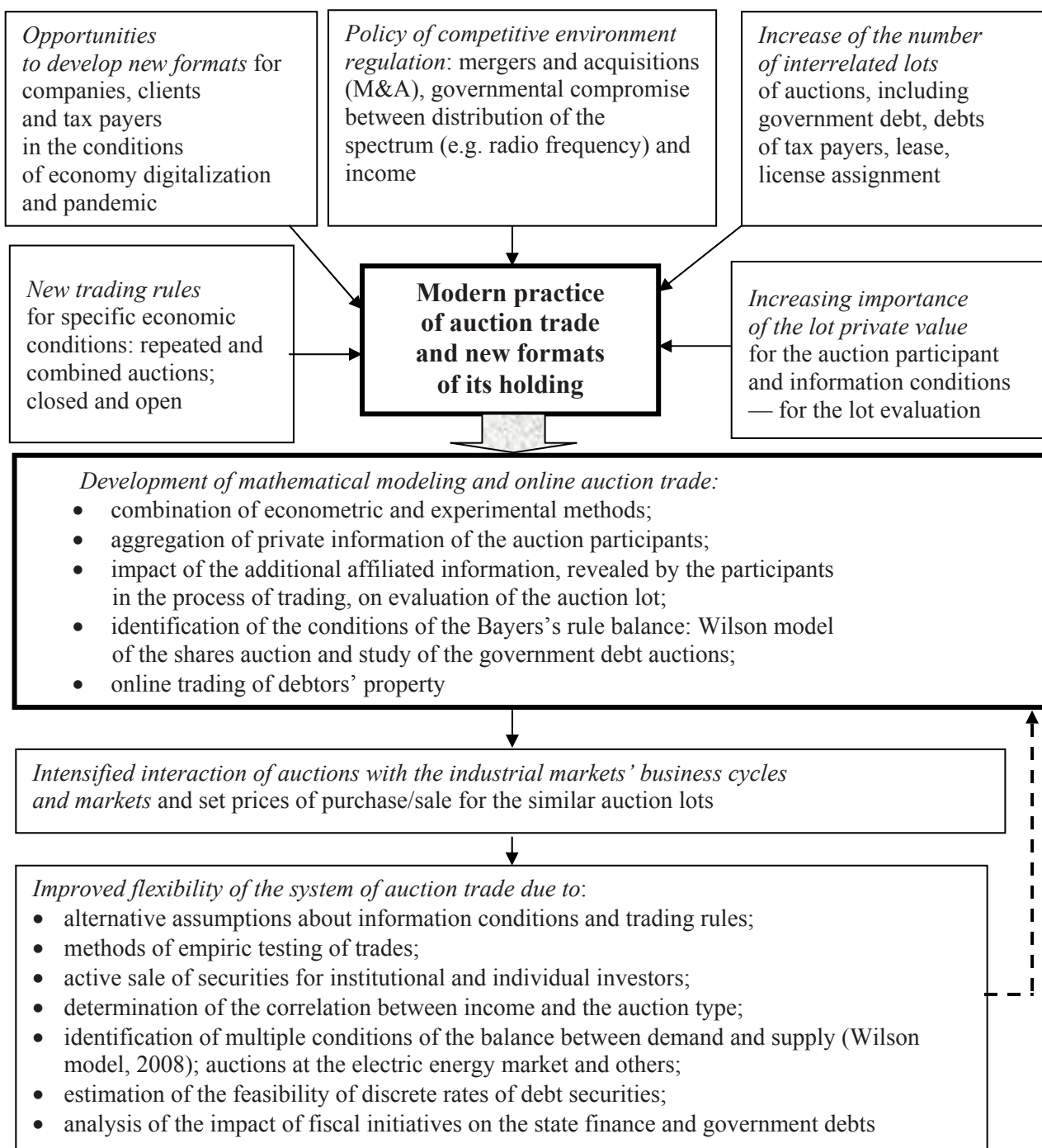
*Fig. 1* presents the mechanism of improvement of the practice of auction trade and new formats of its holding, developed referring to the analysis of approaches by the Nobel laureates of 2020 Paul R. Milgrom and Robert B. Wilson, as well as study of the specificity of auctions in the field of power engineering, telecommunications and other spheres of the economy in different countries.

Debt trading in the world has been activated by the findings of the Nobel laureates Paul R. Milgrom and Robert B. Wilson, being useful for organization of transactions in trading and for tax payers. For instance, the International Renewable Energy Agency (IRENA) is the intergovernmental organization, which supports countries on the way of transition to the sustainable energy future, identifies the reasons of potential weaknesses of auctions, caused by unfinished buildings and delays in the construction sphere.

Very aggressive trades in the competitive environment hinder reduction of technological and financial costs in case of projects delays. Manifestation of weaknesses/or strengths of auctions depends on the choice of their formats and on how new formats are adapted to the conditions and specific context of the country.

In February 2018, Ukraine legally became a member of the International Renewable Energy Agency (IRENA), being established by Germany. According to the new legislation of Ukraine, since 2020 it is necessary to participate in the new lot auctions (wind generation — above 5 megawatt and solar generation — above 1 megawatt) for the guaranteed purchase of electric energy, generated by the country.

Choosing the auction formats, including those in the energy sector, it is important to consider high transaction costs, which are related with administrative procedures for organization of the auction participation, particularly for small and new players. In that context, it is significant to apply the classification, suggested by V. M. Polterovych, on costs distribution into transaction and transformation ones [18]. Transaction costs are borne by juridical and physical institutes, not by the state. Transformation costs are related with participation in auctions and are paid by separate participants and by the state.



**Fig. 1. Mechanism of improvement of the practice of auction trade and new formats of its holding**

Source: built by the authors.

The cumulative difference between old and new transaction costs should cover the transformation costs, which include development of the auction formats, «lobbying» private interests, creation and support for participation of intermediary institutes, etc. That is their principal difference. Moreover, transaction costs are referred to the category of current, whereas the transformation ones — to the one-time (capital) costs, i.e. at the moments of change of the form of participants' (in the current case of auction) interaction with the external environment.

It is reasonable to consider the experience of France on introduction of new formats of auctions at the market of telecommunications — its annual capacity is almost EUR 31 billion.

In 2001, the France Télécom launched the largest emission of corporative bonds, aiming to attract almost USD 16.4 billion to reduce the expected debt in the amount of EUR 60 billion, as the operator spent great costs for licenses for the next generation of mobile phones.

Except for the supply of bonds at the reduced prices at the secondary market, France Télécom protected the rights from the probable fall of the credit rating [19]. Innovations at the market of telecommunications are supported by RF spectra auctions. Similar auctions are effective in the USA, bringing above USD 120 billion in the country economy, whereas in the world, radio frequencies have been sold in the amount of USD 200 billion. The Nobel laureate Paul Milgrom is the author of the new auction format with two rounds: first, the regulator buys radio frequencies from the license owners, and afterwards, he/she sells the licenses for the most efficient mobile operators to increase the auction attractiveness.

Demand for the debt securities depends on the possible combinations of different formats of auctions, efficiency of stock exchanges and on the crisis stage in the country (Fig. 2).

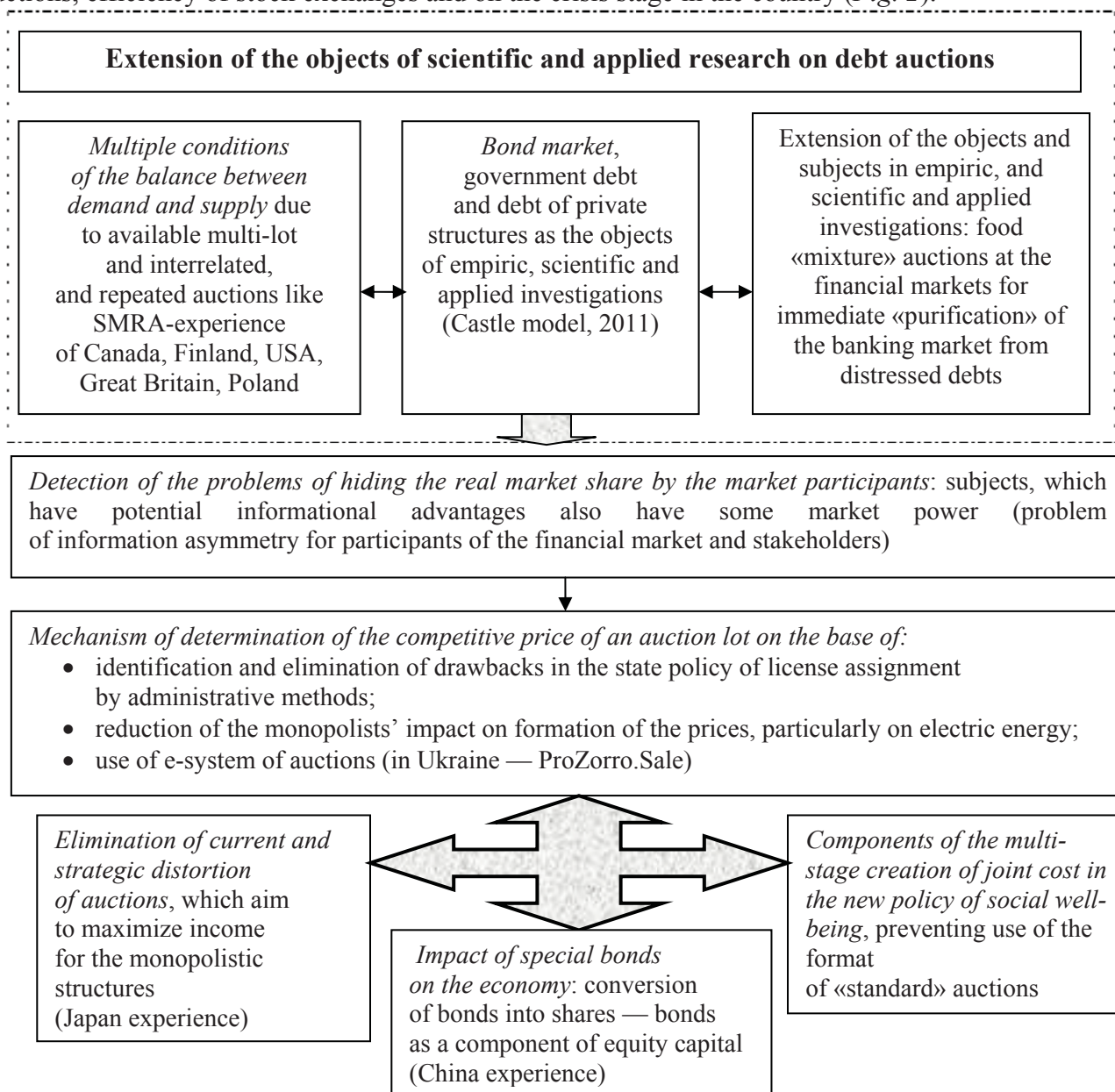
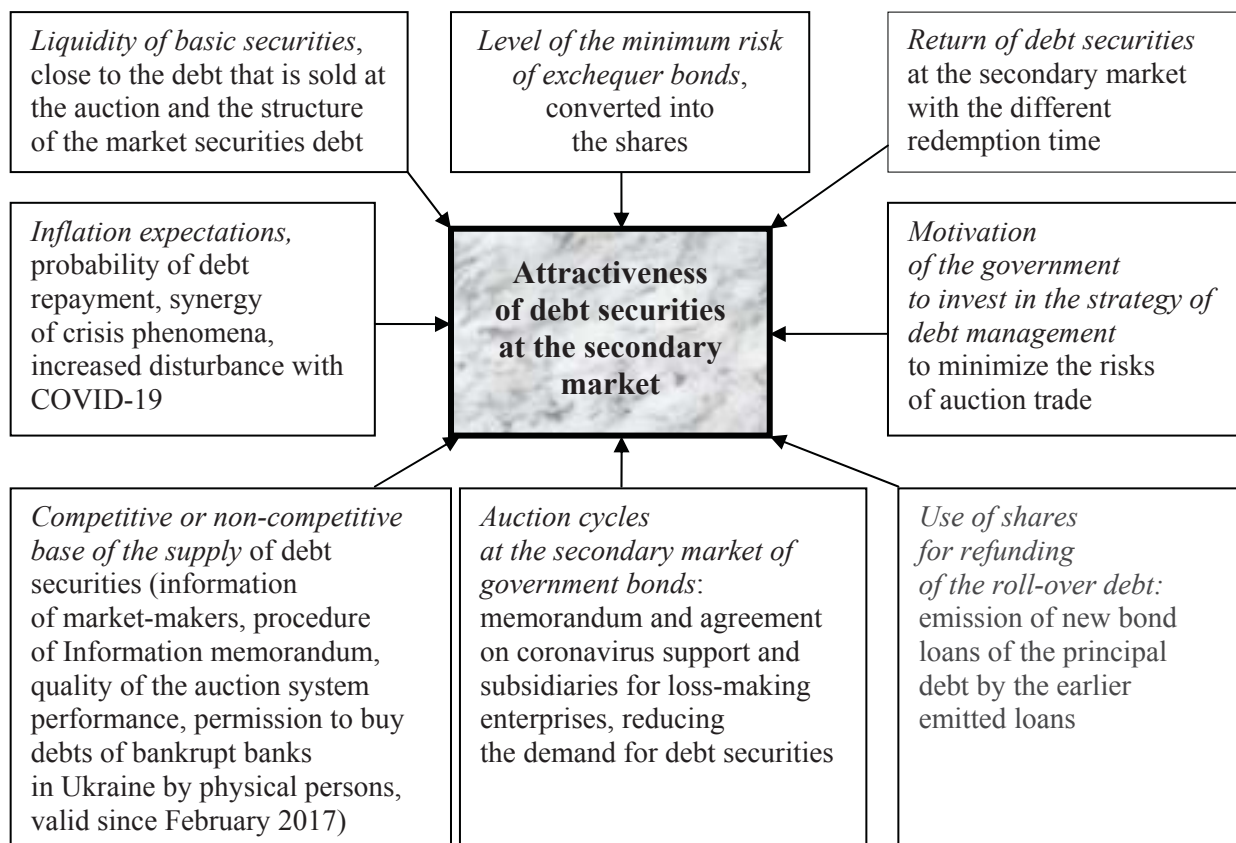


Fig. 2. **General conceptual model of the factor management for elimination of the distortion of debt securities auctions at financial markets**

Source: built by the authors.

Recovery of the world economy losses from the Covid-19 pandemic needs funding target programs. Thus, the European Commission considers the opportunities to hold auctions for funding the programs of recovery after the pandemic (for more than EUR 100 billion). Attractiveness of the emitter’s debt securities for the institutional and private investors depends on numerous factors of

political, financial, and economic nature, which interact at the international and general national levels (Fig. 3).

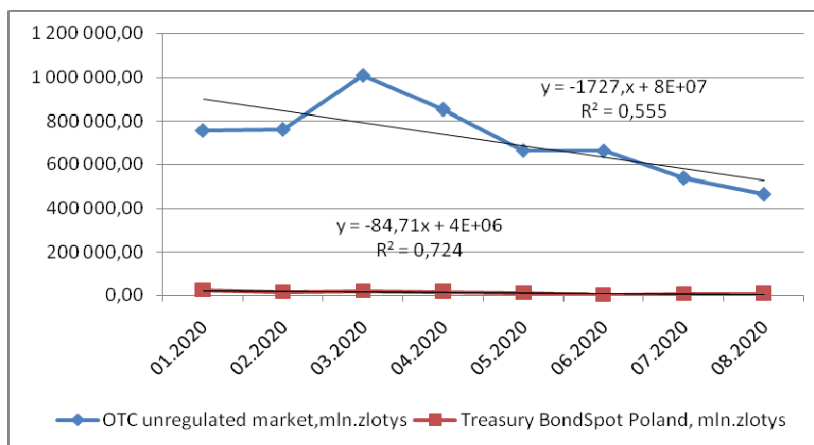


**Fig. 3. Factors determining attractiveness of debt securities at the secondary market for institutional and private investors**

*Source:* built by the authors.

Analysis of the inflation expectations, probability of debt repayment, synergy of crisis phenomena and their impact on the return of debt securities are supplied in the work [8]. Crisis phenomena in the country serve as a driving force for improvement of debt management and institutional environment. In Poland, transactions at the secondary market of exchequer securities are simultaneously made at several markets, particularly unregulated interbank market, online trading platform Treasury BondSpot Poland and at the regulated markets, established by the Warsaw Stock Exchange and BondSpot S. A. (only bonds). At the unregulated interbank market, bond trading takes 98.3%, whereas the share of online platform TBS Poland is 1.7% in the total value of trades, and the share of Warsaw Exchange GPW is at the level of 0.01%. In 2020, the dynamics of debt securities sales in Poland at the over-the-counter unregulated market and treasury house BondSpot is demonstrated at the Fig. 4. In 2018, the index agency FTSE Russel (the leading share index of London Stock Exchange) officially recognized Poland as a developed market, which joined the 25 countries with developed markets. It also includes Germany, Japan, USA [21].

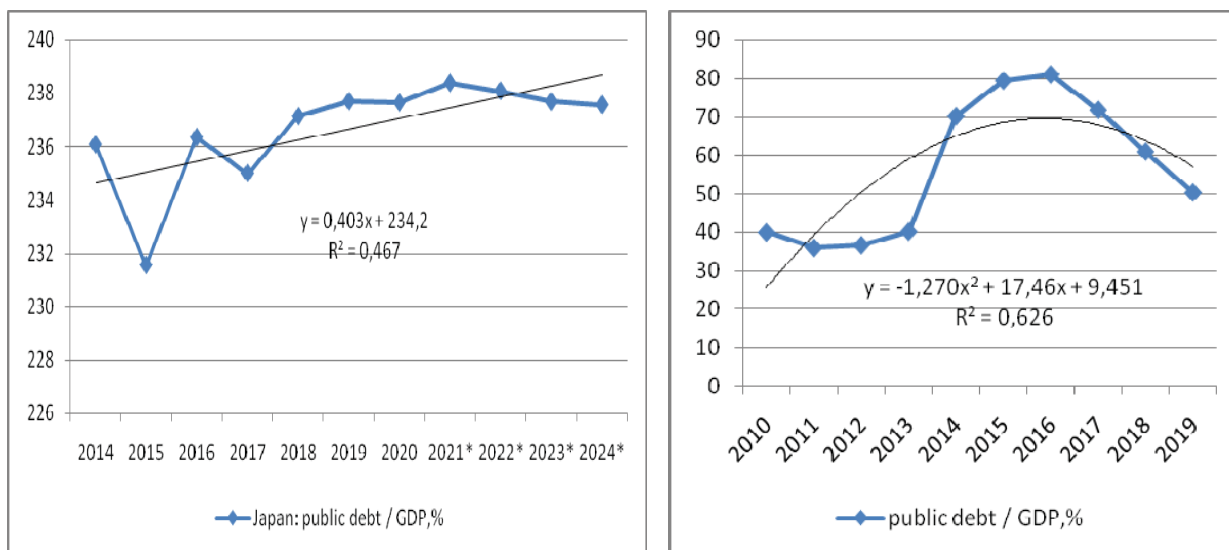
Such recognition makes a positive impact on the demand for debt securities, emitted by Poland, contributes to their flow into the international capital markets and attraction of the required costs to Polish debt securities auctions. In June 2020, the national debt of Poland reached USD 308.1 billion, whereas the nominal GDP of the country made USD 128.1 billion, i.e. government debt took 55% of the nominal GDP of the country [22]. Poland implements the innovative policy at the market of «green» bonds, which has secured reduction of costs for ecological projects, improvement of the cost supply for those projects and increase of the number of active local investors [23].



**Fig. 4. Dynamics of debt securities sales in Poland in 2020 — on the over-the-counter unregulated market and the Treasury Bond Spot**

Source: built by the authors on the basis of data [21].

In the modern business world, capital is very mobile and advanced information technologies minimize the time and organization costs for implementation of financial investments. It is confirmed by the experience of Japan, where a constant demand for long-term debt securities is in trend. Although in 2015—2020, in that country the ratio of the government debt to the GDP increased at an exponential rate (in 2020, the debt to GDP ratio has exceeded 230%), but they skillfully transform globalization of financial flows into the resource, used for development of the country’s economy, and efficiently manage debts and financial investments (Fig. 5).



a) in Japan

b) in Ukraine

**Fig. 5. The government debt to GDP ratio in 2014—2020 (and the forecast until 2024 — in Japan)**

Source: built by the authors on the basis of data [25; 26].

None country of the world has lately had a higher government debt to GDP ratio than Japan. It proves a high investors’ confidence in the state economic policy and its capability to manage risks at the level of macroeconomics that is confirmed by the fact that in July 2020, the 20-year government bonds (0.4% rate of return) were sold in the amount of USD 11.2 billion [24]. Such long-term position of investors, who act as a moving force for the economic growth in Japan, will significantly influence other markets and yen stability.

The regression model of the trend demonstrates that in 2014—2020, the Japan’s annual average «government debt to GDP ratio» increased by 4.04 p.p. (under the lowest edge of 234.2%).

The rapid growth of debts in Japan is explained by the banking policy of cheap (close to zero) credits (late 1980s — early 1990s), when the real estate market developed at a torrid pace and banking system promoted mortgage crediting, including land mortgage [27]. The current asymmetry in evaluation of the debt value by investors and by banks has hindered establishing a liquid distressed-debt market: bank have transformed the accounts with impaired loans into perpetual loans, slowing down the rates of accumulation of the future money flows of debtors; investors with the distressed debt consider their investments as a share of equity capital improving future money flows. Over time, the collapse of the land mortgage has almost totally exhausted the banking capital and damaged the whole banking system because of accumulation of sub-performing loans (SPL). It is important that investors supply a low price for the real estate objects as mortgage securities, because first, they need to use fixed assets for creation of money flows; second, the value of mortgage is estimated only at liquidation. However, for those investors, the initial rates for buying a loan reduce the default probability and opportunities of liquidation, particularly in the crisis. Moreover, the main solvent banks in Japan, which still have rich mortgage securities, do not only control insolvent debtors, but also «relieve» so-called non-property banks during the debt restructuring. It has resulted in the delay of the fundamental restructuring of distressed debts. The described factors retard development of the liquid distressed-debt market.

The unsatisfied demand at the primary market of Ukraine (low investment attractiveness of securities, schemes of concealing beneficial property) causes the emitters and investors search for the opportunities of debt securities trading at the secondary market. In 2014—2016, Ukraine three times emitted the medium-term external government bonds, guaranteed by the USA, at the rate less than 2% p.a. with the redemption time in 2021. It means that Ukraine has no such «long» financial resource as Japan to recover its economy and there is still the problem of low quality of debt securities auctions. The country plans to hold auctions to allocate quotas for the support of renewable energy in 2021. Start of the land market in Ukraine will probably stimulate auctions of the specialized permissions for the natural subsoil use. However, increase of the volume of debt sales at the secondary market depends on the limits of operating banks and peculiarities of their risk-management: in autumn 2020, the list of the banks of Ukraine, where interim administration has been introduced, 1.5 times exceeds the number of currently operating ones [28]. The share of banks with 100% foreign capital is 28%. It is apparent that foreign capital does not work to strengthen the market position of the «foreign» country, but aims to reach its private goals. Without permission of the parent foreign company, banks cannot independently make decisions on purchasing internal government bonds of Ukraine, particularly in hryvnias.

**Conclusions and directions of the further scientific research.** In the following scientific researches, it is important to make a deep study of the opportunities of the international move of capital due to improvement of the institutional environment of the debt securities auctions, as well as the structure of debt contracts. In terms of the economic safety of Ukraine, there is still no answer to the questions on the government debt transformation into safe and high liquid assets, which can attract both domestic and foreign investors. Practical value will be secured by the following research, based on the system analysis of the state economic policy goals by holding the government debt auctions with different debt redemption time and alternatives of debt formation with the minimum debt share, denominated in foreign currency, that is particularly important in the conditions of intensive inflation processes. Digitalization of the analytical technologies provides conceptual modeling of scenarios of the government debt management, as well as study of the correlation between the quality of debt management at auctions and economic growth in the future. Moreover, the client, who presents different digital FinTech technologies at the secondary markets, transforms the economic space for distribution of new financial instruments at the capital market that is a prerequisite for flexibility of the system of auction trade and raises the practical interest to the problem.

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