

## 1. Introduction

Cardinal changes, taking place in the modern world-system, qualitatively modify positions of countries (regions) by the level of inclusive development, its transparency as to Sustainable development aims of UNO till 2030, vision of the global financial stability by the International monetary fund, taking into account the coronavirus (COVID-19) pandemic, implementation results of the scientific-technological progress in the sphere of sustainable nature management and development of financial literacy in institutional-natural centers, insertion of their strategies in model visions of the bank system as a whole and banks (both commercial and state ones) in particular as to own financial stability and financial-economic safety of activity. But the wide penetration of two opposite and at the same time complementary conceptions “green economy” and “financial globalism” in the theory of sustainable economic development during the last twenty years forms both new tendencies within the global economic initiative (for example, initiation of a “green” charge card, produced of bio-raw materials only by SB “UkrGasbank”) and risks to the financial support of sustainable nature management, influenced by aim setting of the accelerated economic dynamics, accompanied by deepening inter-country and inter-sector contradictions, structural disproportions and asymmetries in the process of ecological and financial balancing, regulatory institutionalization and the role of financial stability of bank system functioning in sustainable nature management financial support.

The UNO program on the external environment at participation of the Nobel peace prize-winner Theodore Panayotou [11] in 1994 raised the role of the bank sector in the sustainable and inclusive development of the external environment within the global ecologic initiative and food problem to the level of the theoretical-methodological discussion, which apogee became the Handbook-OECD [10] for forming the econometric “foundation” for conducting a project modeling of budgetary allotments of OECD country members for attaining aims of the UNO Millennium declaration by them, introducing the category “ecological finances” in the

## MODELING OF ECONOMIC SAFETY OF SUSTAINABLE NATURE MANAGEMENT FINANCIAL SUPPORT

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**Abstract:** The study systematizes mutual influences and connections of the economic safety of bank sector functioning as a whole, bank activity (state and commercial) at the fund market and financial support of sustainable nature management, taking into account bank strategies “threading” by Sustainable development aims of UNO till 2030 of both own activity (concrete examples are given) and one of market agents of the nature-resource sector of the national economy, for which a financial-credit institution acts as a specific financial provider in the world of sustainable nature management and comprehensive development, taking into account the global ecologic initiative. There are given parallels in aim setting of supranational and national regulators in two opposite and at the same time complementary conceptions: “green economy” and “financial globalism”, expecting dynamism of unpredictability and inertia of global financial stability absence on the ecologically influenced stability of the economic dynamics. There are constructed correspondent econometric dependence models of a triad “financial safety of the bank sector – financial support stability – nature management sustainability” on variables – corporative equity and bond issue, using special methods and program environment Eviews and Statistica. It has been revealed, that the market of bonds and the one of equities differently react on changes of the economic dynamics – the equity issue volume, as opposite to corporative bond issue, doesn’t depend on nature management sustainability indices, and its financial support stability is not in the sphere of financial-economic parameterization, but in the political conjuncture, socio-psychological and mental transformation in the direction of economic subjects’ readiness to conducting ecologically and at the same time socially responsible business that needs modernization of the purpose orientation of safe bank strategies, taking correspondent anti-crisis arrangements by them for providing safety of their activity at the fund market under conditions of intensification of the COVID-19 pandemic influence. Obtained modeling results may be used by the National bank of Ukraine for actualizing the macroprudential policy, directed on elimination of system risks for preventing crises or diminution of losses from them by the system of financial stimulation of rational nature management.

**Keywords:** economic safety, bank sector, financial support, sustainable nature management, fund market.

scientific circulation as an answer to different vectors of aim setting in the conception “green economy” and “financial globalism” that in its turn evolved in works by Dragizi Stojanovic and Bilyan Ilich [12] in the direction of “green finances” that widened the theoretical understanding of financial risks in realization of sustainable nature management aims.

As to studies by native scientists, theoretical-methodological attempts of combining bank sector functioning safety through anti-crisis arrangements of the macroprudential policy in the period of economic stagnation, the growing role of uncertainty in banks and fund markets’ functioning and financial support of the natural-ecologic potential reproduction for the sustainable development of Ukraine are mainly accented in works by Bogdan Danilishyn [5, 6]. Instead of it, modern founders of the Ukrainian school of sustainable development Mikhaylo Khvesyuk and Igor Bistryakov in their work [9] investigate only the orthodox set of financial-economic factors of the Governmental vision (within aim 9.7 «Ukrainian save natural ecosystems for succession» of the activity Program of the Cabinet of ministries of Ukraine) of the natural-resource potential reproduction, without taking into account the financial-safety sector. As opposite in works by Genadiy Bortnikov, Sergiy Gasanov and Olexander Liubych [3, 4] and other progressive financiers [1, 2], a central place is occupied by safety questions of banking sector functioning as a donor of sustainable nature management under condition of the growing role of the state segment in this sector (state banks), and questions of mathematical study of financial-economic phenomena in

whole and bank activity in particular were investigated by Sergiy Petrukha and Vladislav Rashkovan respectively [7, 8].

Alongside with it, polysemy studies of the growing influence of geoeconomic and ecological imperatives, functioning turbulence of the global financial system on the safety and sustainability of financial channels of sustainable nature management support, probation of theoretical modulators of mutual influences and connections of the banking sector safety of countries within the multilevel integration of financial

markets and institutional-spatial environment of the rational use, protection and reproduction of the natural-resource potential are almost absent. The abovementioned conditioned the topicality of the chosen research problem, its aim, tasks and determined the logic-structure of presentation of theoretical and empirical results.

The research aim is in deepening theoretical and practical principles of mutual influences and dependencies of the development safety of the bank sector as a financial donor of sustainable nature management support and at the same time an active participant of the fund market, highly dependent on economic “stresses” and financial “shocks”.

**2. Methods**

For solving the formulated tasks, general scientific and special methods, namely: system, factor and comparative analysis, scientific abstraction, historical-logic, synthesis, induction, deduction, statistic, econometric modeling and graphic-table visualization in the program environment Eviews and Statistica were used in the research.

**3. Results**

The corporative securities market reminds of 4-D model, consisted of equities, bonds, bills and negotiable securities. But from the point of view of bank activity as a donor of sustainable nature management, the determining role is played by corporative bonds and equities, and also their mutual influence and interdependence on the macroeconomic dynamics (gross savings, GDP, external debt volume, direct foreign investment, inflation level, discount rate of the National bank of Ukraine), bank activity safety and sustainable nature management financial support stability. Ascertainment of these dependencies needs to use empirical data not only under current functioning conditions, but also in time periods with a certain delay, because separate factors influence the studied processes not immediately, but with a certain delay or lag. In this econometric model such indicators are GDP and inflation level.

Natural logarithms of variables, conditioned by the concavity of theoretical economic ratios and statistical properties of the studied ranges, were used at modeling. Coefficients of the logarithmic-linear model determine the elasticity of the volume of corporative bonds and equities issue (endogenous variable) by determined exogenous variables, among which the leading place is occupied by the mass of financial allotments for sustainable nature management needs. That is they show, how many percents the volume of corporate equities and bonds issue increase by at the increase of one exogenous variable by 1 %, when all other factors remain invariable.

The modeling results give a possibility to state:

At first, the elasticity of volumes of bonds issues by gross savings is 2.54 % that is its increase by 1 % conditions the growth of the mass of financial resources, directed on the sustainable nature management support through bonds issue by 2.54 %. They are determined by the high dependence of the corporative bonds issue volume on the level of gross savings and discount rate of the National bank of Ukraine – its growth by 1 % favors the decrease of the bonds issue volume by 0.09 %, creating essential risks (threats) to bank activity as a financial donor of sustainable nature management. At that another statistically significant factor, influencing the corporative bonds issue volume is a change of the GDP volume, expressed through the inclusion of the sustainable and comprehensive natural-spatial development with a lag in one year – at its

growth by 1 % the issue volume also grows by 1.57 %, forming the effect of eco-dependence. That is the concept of “green economy” threads the economic dynamics that is observed in a series of supranational and national program documents and positively influences both banks’ business activity at the fund market and stability of the donor channel of sustainable nature management financial support;

At second, as opposite to bonds, equities issue has no enough correlation level with both macroeconomic indicators of the economic dynamics and the bank sector orientation on the “green economy” concept (determination index  $R^2$  and  $F$ -Statistics of Fisher are 0.59 and 1.46 respectively). For revealing latent factors, conditioning the most part of total dispersion of the data, the multifactor analysis was conducted in the package of Statistica applied programs. Based on Kettel’s “stone scree” criterion, there were separated three latent factors, explaining 87.5 % of the total data dispersion. The matrix of factor loads, obtained after rotation of factors by the method of normalized varimax, allows to state that the first latent factor conditions more than 45 % of the total data dispersion and characterizes the macroeconomic dynamics, expressed through GDP, volume of savings and direct foreign investments (this factor conditions more than 80 % of the bond issue volume dispersion, and its influence on the equity issue volume dispersion is near 12 %). Another latent factor explains more than 29 % of the total data dispersion and characterizes the level of inflation and discount rate. A direct influence of this factor on the studied values is practically absent. But it influences macroindicators indirectly that to some extent conditions its indirect influence on the bond volume dispersion. The third factor explains almost 13 % of the total data dispersion and characterizes near 85 % of the equity issue volume dispersion. Fig. 1 allows to distinguish the equity issue volume as a separate factor, practically independent from the other studied data of the macroeconomic dynamics, its low orientation level from the nature management sustainability, donor financing stability of tasks, determined by the Law of Ukraine “On main principles (strategy) of the state ecological policy of Ukraine for the period until 2030”, their balancing with the renewed Principles of strategic reformation of the state banking sector, development Strategy of the financial sector of Ukraine until 2025.

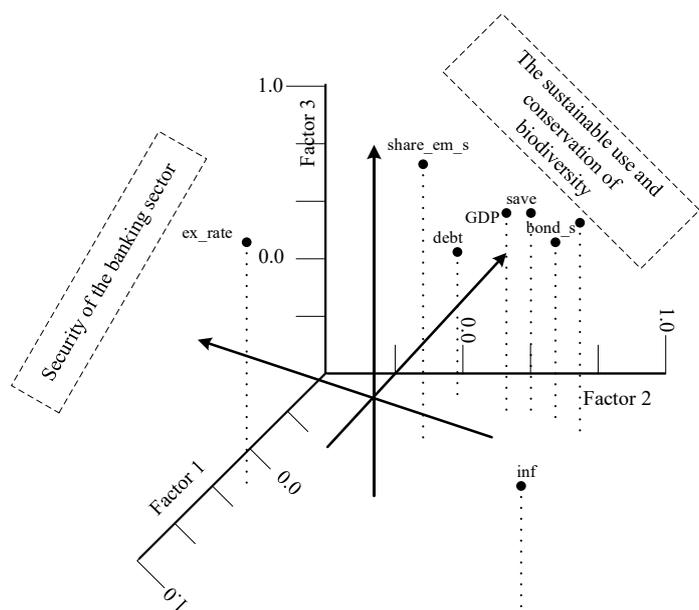


Fig. 1. Placement of variables in the space of latent factors, their parity to sustainable nature management and biodiversity conservation

#### 4. Discussion

As a result of the econometric modeling, it has been revealed, that the market of bonds and the one of equities differently react to changes of the economic dynamics – the equity issue volume, as opposite to the one of corporative bonds, doesn't depend on nature management sustainability indices, and its functioning stability is in the sphere of financial-economic parametrization, but in the political conjuncture, socio-psychological and mental transformation in the direction of economic subjects' readiness to conducting ecologically and at the same time socially responsible business that obviously discords with the results of the studies, conducted in the country members of OECD [10], and needs modernization of the purpose orientation of safe strategies of banks (commercial and state ones), taking correspondent anti-crisis arrangements by them for providing safety of their activity at the fund mar-

ket under conditions of coronocrisis reign, absence of financial stability, inertioning and "thread" of the systems of sustainable nature management financial support by uncertainty and high turbulence. The obtained modeling results also add the safety clusterization of Ukrainian banks, offered by Vladislav Rashkovan [8], and may be used by the National bank of Ukraine for actualizing the macroprudential policy, directed on elimination (limitation) of system risks for preventing crises or diminution of losses from them by the system of financial stimulation of the rational nature management, protection and reproduction of the natural-resource potential and external natural environment, provision of ecological safety of the socio-economic development and human life activity, according to aim 9.7 «Ukrainian save natural ecosystems for succession», determined in the activity Program of the Cabinet of ministries of Ukraine.

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