MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

SUMY STATE UNIVERSITY

ESI FEM OF OLEG BALATSKIY

DEPARTMENT OF FINANCE AND ENTREPRENEURSHIP

Protection is allowed
Head of Department
_____prof.W.M.Boronos
«____»_____ 20__ y.

MASTER THESIS

ON THE TOPIC:

«Stock market's security in the context of strengthening the state financial security»

Educational level "Master"
Specialty 072 - "Finance, Banking and Insurance"

Scientific supervisor: _____   <u>Hrytsenko L.L.</u>
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Group: F.m-91/1en

Sumy 2020

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TASK
to a master's thesis

Student of group <u>F.m-91 / 1en</u> of the Institute (Center) of <u>Finance, Economics and Management</u> specialty <u>072 "Finance, Banking and Insurance"</u>

Shamkalo Kateryna
<div align="center">(surname, name)</div>

Theme of work: <u>«Stock market's security in the context of strengthening the state financial security»</u>

Approved by order of SSU №_____from "____"_____20____y.
The deadline for the student to complete the work "____"_____20____y.

Initial data for work: <u>normative and legislative acts, data of stock exchange sites, international ratings, articles, abstracts, monographs of domestic and foreign scientists, Internet portals of statistical data and Internet resources.</u>

Contents of the main part of the work (list of issues to be developed):
− to explore the essence of the concept of "financial security";
− to determine the components of financial security of the state;
− to characterize the influence of the investment sector and the stock market on ensuring the financial security of the state;
− to study the dynamics and conduct a comparative analysis of the volatility of the leading stock indices of Ukraine, Europe and America for the last 7 years;
− investigate the correlation between stock exchange indices.

Date of issue of the task: "___"_____20____y.

Supervisor of master's work: _____ _____
<div align="center">(academic title, surname and initials)   (signature)</div>

The task is accepted for execution "_____"_____20____y.   _____
<div align="right">(student's signature)</div>

ABSTRACT

Thesis: 51 pages, 12 figures, 3 tables, 3 formulas, 8 appendices, 50 sources.

The purpose of the work is to characterize the state of financial security of the state in modern globalization and study the impact of the stock market on the level of financial security of Ukraine.

The object of the research is the financial security of the state and the ways to ensure it through the stock market.

The subject of the research is the financial security of the Ukrainian stock market from the side of the investor's profitability.

Research methods - abstract-logical, comparative, analytical, synthesis and analysis, systemic, empirical, modeling and formalization.

The practical significance of the results. The methodological and scientific-methodological provisions outlined in the master's work have already been tested at the II All-Ukrainian Scientific and Practical Conference "Aviation, Industry, Society" [15], at the II International Scientific and Practical Internet Conference "Financial and Credit Mechanism for the Development of the Economy and Social Sphere" [16], in the electronic scientific journal "Priazovskiy economic bulletin" [35], in the monograph "Trajectories of the formation of a national innovative strategy for ensuring the economic security of Ukraine."

Work structure. The main part of the work consists of three sections. The first section considers the essence of the concept of "financial security", the components of the financial security system, the state of financial security in the light of investment attractiveness.

The second section substantiates the role of the stock market in ensuring the financial security of the state, describes the degree of importance of stock indices in the stock market, provides methodological approaches to the analysis of financial security of the stock market.

The third section compares the volatility of the Ukrainian stock market (PFTS, UX indices) relative to the European (DAX, FTSE indices) and American (Dow Jones, S&P 500 indices) taking into account the time horizon of investment and establishes a correlation between the analyzed indices. Based on the study, conclusions were drawn about the impact of stock index trends on the financial security of the state from the profitability of investors.

FINANCIAL SECURITY, INVESTMENT ATTRACTIVENESS, STOCK MARKET, STOCK INDEX, VOLATILITY, INVESTMENT RISK, PROFITABILITY.

CONTENT

INTRODUCTION

Relevance of the topic of work. Financial security is a complex and multi-level system. For effective development and financial security, it is necessary that the parameters of each subsystem of financial security are internally and externally balanced and resistant to destabilizing factors and threats. Gradually becoming an independent subject of international economic activity, Ukraine is increasingly under the influence of external factors that are inherent in all elements of economic interdependence. As a result, financial security plays a leading role in maintaining the stable functioning of the entire economic system of the state and attracting it to global integration processes.

The development of globalization processes, the dominance of international investment relations between countries, increased competition for foreign direct investment, an increase in domestic investment in priority sectors of economic complexes are increasingly affecting the country's investment security.

At the present stage of economic development, the level of financial security of stock market participants, namely securities traders, is a very important issue, since the purchase and sale of securities is one of the main sources of income for investors in the stock market.

The stock market is one of the key areas of market relations, where the sale of securities is a promising source of financial resources to meet the needs of business entities. In conditions of effective functioning, the stock market is a strong driving force for the economic development of any country, including Ukraine.

The current state of the Ukrainian stock market is characterized by cyclical development and constant volatility, therefore there is a need for a systematic study of its state.

The main indicators of the business activity of the securities market, indicators reflecting the dynamics of changes in the quotations of companies' shares on stock exchanges, are stock indices. They are the most used tools for financial analysis of the stock market in world practice, since they clearly and adequately reflect the nature of fluctuations in supply and demand for securities and are an integral source of income for investors.

The relevance of this study lies in the fact that at the present stage of globalization, when studying financial security, more and more attention is paid to the stock market and the investment sector, as the most active and most profitable and at the same time risky market segments.

A significant contribution to the study of theoretical and methodological issues of the functioning, development and instability of the stock market among scientists was made by S.V. Bezvukh, N.I. Berzon, I. Sitishin, Rekunenko I.I., I.O.Baranovskiy, S.A. Kushnir, M.V. Shuba, L.B. Dolinsky, A.A. Somchenkov and others.

The purpose of the work is to analyze the degree of influence of the stock market on ensuring the financial security of the state, comparing the dynamics and volatility of the leading indices of the stock exchanges of Ukraine, Europe and America on certain investment time horizons.

Research objectives that are set to achieve the goal:

− to explore the essence of the concept of "financial security" and its components;

− to characterize the current state of financial security of the state in the prism of the investment component;

− to substantiate the role of the stock market in ensuring the financial security of the state;

− to consider the scientific and methodological aspects of stock market security analysis;

− to conduct a comparative analysis of the volatility of the Ukrainian, European and American stock markets at different time investment horizons;

− to investigate the relationship between the stock markets under consideration.

The object of the research is the financial security of the state and the ways to ensure it through the stock market.

The subject of the research is the financial security of the Ukrainian stock market from the side of the investor's profitability.

Research methods – abstract-logical, comparative, analytical, synthesis and analysis, systemic, empirical, modeling and formalization.

The practical significance of the results. The methodological and scientific-methodological provisions outlined in the master's work have already been tested at the II All-Ukrainian Scientific and Practical Conference "Aviation, Industry, Society" [15], at the II International Scientific and Practical Internet Conference "Financial and Credit Mechanism for the Development of the Economy and Social Sphere" [16], in the electronic scientific journal "Priazovskiy economic bulletin" [35], in the monograph "Trajectories of the formation of a national innovative strategy for ensuring the economic security of Ukraine."

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the financial security system, the state of financial security in the prism of investment attractiveness.

The second section substantiates the role of the stock market in ensuring the financial security of the state, characterizes the degree of importance of stock indices in the stock market, provides methodological approaches to analyzing the financial security of the stock market.

The third section provides a comparative analysis of the volatility of the Ukrainian stock market (PFTS, UX indices) relative to the European (DAX, FTSE indices) and American (Dow Jones, S & P 500 indices) based on the investment time horizon and establishes a correlation between the indices under consideration. Based on the study, conclusions were drawn about the influence of trends in stock indices on the financial security of the state from the side of investor profitability.

The actual basis of the work is: normative and legislative acts, materials from periodicals, data from sites of stock exchanges, international ratings, articles, abstracts, monographs of domestic and foreign scientists, Internet portals of statistical data and Internet resources.

1. THEORETICAL AND SCIENTIFIC ASPECTS OF THE FINANCIAL SECURITY OF THE STATE

1.1 The essence of the definition of "financial security" and its components

International relations are an integral part of the modern globalization world. One of their negative manifestations is that they lead to interdependencies between countries and increase the risk of the influence of the international space on the emergence of crisis phenomena in national economies. Risks of the negative impact of international relations are manifested through international capital flows invested in the financial markets of individual countries, foreign direct investment in economic spheres, due to which the functioning of national economies is more and more externally controlled, and the research of financial security is updated.

Ensuring the financial security of the state is implemented through ensuring political stability, competent financial policy, and further contributes to the integration of the national economy into the world financial market in the context of financial globalization.

Ineffective government regulation of financial security is a prerequisite for a number of financial and economic disasters, negative social consequences, financial crises and the like. Therefore, the study of the financial security of Ukraine is an urgent issue today and attracts the attention of many authors as Varnaliy Z.S., [5], Zveruk L.A. [8], Kalantay A.M. [2], Shakirova A.V. [1], Baranovskiy A.I. [27], Haponyuk A.I. [6], Mikhailyuk V.V. [9] and others. Most scientists have their own approach to the definition of "financial security" (Appendix A).

Analyzing scientific works and definitions given in Appendix A, it can be seen how some of the group of authors, characterizing the concept of "financial security of the state", associate it with the national or economic security of the state, others state it as the degree of ability of public authorities to protect the financial interests of the state.

In the Methodology for calculating the level of economic security of Ukraine dated 10.19.2013, financial security is defined as the state of the country's financial system, which creates the necessary financial conditions for the stable socio-economic development of the country, ensures its resistance to financial shocks and imbalances, creates conditions for maintaining integrity and unity financial system of the country [11].

The main subject of financial security is, of course, the state, which carries out its functions in this area through government bodies and with the help of legal regulation.

Regulatory support for the regulation of the financial security of the state in different periods of time was formed by such regulatory documents as: the Constitution

of Ukraine, the Law of Ukraine "On the Fundamentals of National Security of Ukraine" dated June 19, 2003 The Concept (Fundamentals of State Policy) of National Security of Ukraine [3].

According to the above and Appendix A, we conclude that financial security shows the level of national security in the financial sphere, is characterized by a balanced activity of economic systems, according to the state of stability and security of the national financial system from internal and external threats, ensures the development of the economy and the achievement of the vital goals of society and the state [5].

So, financial security can be considered in the following directions:

1) as the main component of economic security;

2) as the degree of protection of interests by the state at all levels of financial relations;

3) as the state of the financial system, characterized by the balance of all its components.

According to the most accurate definition of financial security, I incline to the approach of A.A. Semenog [10] as he mentions all the above aspects.

The composition of financial security is a multi-level and complex system; on this issue, the opinions of scientists also differ slightly.

A. Ivashko [4] and A. V. Shakirova. [1] the components of financial security include budgetary, tax, debt security, financial security of the banking system, currency, monetary, investment, financial security of the insurance and stock markets [4].

Haponyuk A.I. [6] to the system of financial security of the state includes budgetary, currency, monetary, debt security, security of the insurance market and security of the stock market.

Varnaliy Z.S. [5] and Zveruk L.A. [8] note that the financial security system is not limited only to the financial market and its participants, therefore, the financial security of the country includes: budgetary, banking, debt, currency security, monetary and non-bank financial market security.

According to V. Mikhailyuk [9], financial security is ensured through a balanced financial policy, which is aimed at all areas of the financial system. Therefore, financial security consists of budgetary, debt, tax security, security of the banking system, exchange rate, monetary, security of the stock and insurance markets and investment and innovation component (including venture investment).

S.A. Nazarenko [3] considering the system of financial security of the state provides for control and supervision over the state of the banking system, non-banking financial sector (financial services market, stock market), internal and external borrowing, public finance, foreign exchange, monetary sphere.

In my opinion, Mikhailyuk V.V. and Shakirov V.V. give a complete description of the composition of the financial security system.

Analyzing the above proposals for the components of the financial security system, we depict our vision in Fig. 1.1.

National security → Economic security →

Financial security
budget security
tax security
debt security
financial security of the banking and non-banking sectors
exchange rate security
monetary security
investment security
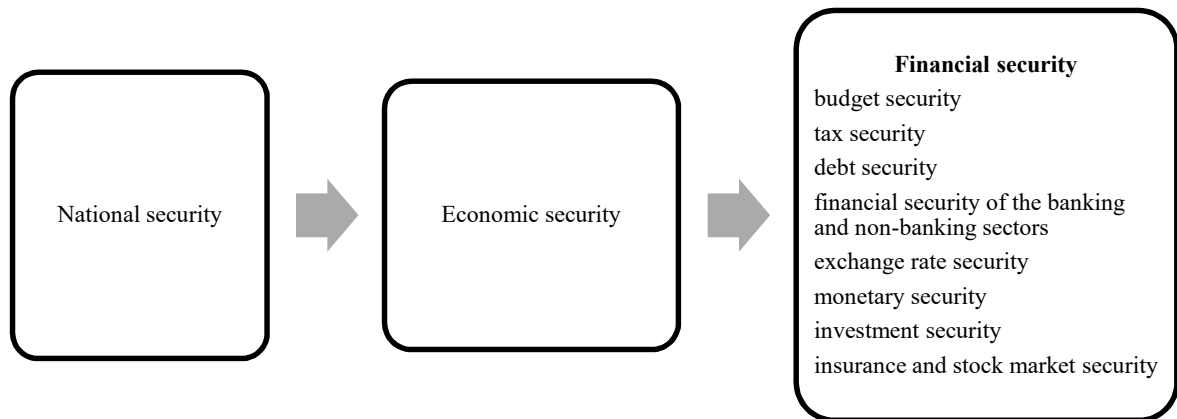insurance and stock market security

Figure 1.1 - Components of the financial security of the state
Source: developed by the authors

Consequently, ensuring financial security, on the one hand, depends on the interconnection of its subsystems (sectors), each of which has its own structure, on the other hand, on economic security (supported by a balanced budget and a relatively low level of public debt), which in turn is a component of the national state security.

We believe that ensuring the financial security of the state should be understood as such a state of the components of the country's financial security, which guarantees all participants in the financial system to achieve their financial interests, internal and external balance, provided there are no threats to the normal functioning of the financial spheres of the state's economy.

Speaking about the classification of the financial security of the state, Ivashko A., Shakirova A.V. [1], Nazarenko S.A. [3], Levchuk A. V. [13], Moiseenko K.E. [12] divide financial security into external and internal, or consider it at the macro and micro levels.

Internal financial security in works [1], [3] and [4] is defined:

‒   the nature of the formation of state and local budgets, according to the state of its balance of payments, the ratio of money in the official and shadow economy, the degree of return of money in circulation to banks, the movement of foreign exchange funds [1];

‒   protection of business entities from threats, which is characterized by a stable financial condition and is ensured by a balance between the availability of financial resources and their need [3];

– perfect legal, organizational and institutional framework, as well as political stability, the level of market risks, the scale of the shadow economy and the level of corruption in the state [4]

We think that one of the main components of the internal financial security of the state is the financial security of business entities, namely institutions, organizations, enterprises and regions, which covers the micro-level of financial security of the state and is the foundation for the formation of financial security of the state as a whole.

External financial security, first of all, is financial independence and financial sovereignty. Financial relations with international financial institutions, economic organizations, governments of individual countries, as well as the volume of foreign investments in the national economy are of great importance.

The external financial security of the state [12] is characterized by the presence of such a level of international financial relations at which the main units (households and enterprises), the financial system, government institutions are financially invulnerable to potential shocks in the world market, external financing flows and debt service costs.

In his study on the macroeconomic issues of economic security of Ukraine [13] presents, in our opinion, a fairly successful hierarchy of economic security.

We took the graph of Levchuk A.V. as a basis for depicting your own financial security hierarchy (Fig. 1.2).
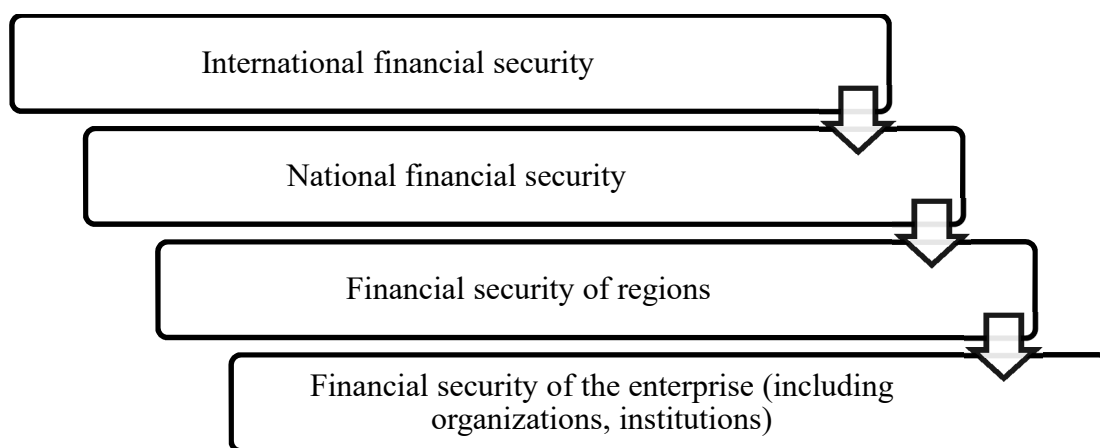
Fig. 1.2-Hierarchy of financial security

Source: developed by the authors

So, according to Figure 1.2, we attribute international and national financial security to the macro level, and the financial security of the regions and enterprises to the components of the micro level of the financial security of the state.

It should be noted that the financial security of the state and its micro-level can be provided both at the expense of each other and separately. Often due to the

contradiction of these two levels, problems occur in the development of financial security of Ukraine at the stage of integration into the world financial markets.

This paper will pay attention to the position of financial security of Ukraine at the macro level, or rather the development of investment security and security of the stock market of Ukraine in the international arena, because, in my opinion, the investor's activity is one of the most risky and most profitable at the same time.

1.2 Financial security of the state in the context of globalization

The financial security of each individual country largely depends on the integration of the national financial system into the world market. Financial security, both economic and national security, is an element of international security, forms a national position in the international arena through cooperation with other participants in the world. External economic threats in globalization conditions (disproportion in the level of wealth of countries, their investment attractiveness, technological development or competitiveness of production, etc.) actualize the issues of researching investment financial security in the international space [12].

Baranovsky A.I. [14] studied the works of a number of scientists on the essence of investment security and gave, in his opinion, 5 main directions in defining the essence of this concept with which we agree.

In our opinion, one should take into account such an understanding of investment security indicated [14] as:

− "investment attractiveness of investment objects, due to the prospects of development, acceptable volumes and prospects for the sale of products for investors, the provision of services and the performance of work, the efficiency of using such assets, their liquidity, solvency and financial stability;

− the presence of an investment doctrine, strategy and policy aimed at the formation and effective use of the investment potential of participants in investment processes, the creation of investment reserves of the national economy, countering the unproductive outflow of capital out of the country, the introduction of a civilized regime of divestments (withdrawal of investments), ensuring a favorable investment climate, preventing challenges and threats in the investment sphere and reducing the risks of implementing investment projects;

− avoidance of asymmetry (between investment demand and supply, investment volumes and GDP growth, domestic and foreign investment, investment volumes and structure in the regional and sectoral context) of investment processes and losses for making unjustified investment decisions."

He also successfully notes that the investment security of the state should be considered as achieving the level of investment that allows to optimally meet the current investment needs of the national economy in terms of volume and structure, taking into account the effective use and return of invested funds, the optimal ratio between the size of domestic and foreign investments, foreign investments in country and domestic abroad, maintaining a positive national balance of payments [14].

The safety of investor resources lies in the hypothesis: lower risk and higher profitability, gives them a significant guideline when deciding on capital investment. One of the characteristics and one of the main methods of ensuring investment security is the systematic assessment of the investment attractiveness of the investment object both by the investors themselves and by government authorities.

Investment attractiveness as an economic category is a set of indicators and characteristics of an investment object, in the analysis of which the investor has a desire to invest in it in order to obtain economic benefits in the future [15].

Investment attractiveness, as one of the characteristics of investment security of Ukraine, can be considered at the micro level (region, industry, enterprise) and macro level (country) [15]. Assessment of the investment attractiveness of the state as a whole makes it possible to most clearly identify the entire complex of connections between international and internal processes and fully disclose the system of factors forming the current state of financial security of the state.

One of the approaches to assessing the level of financial security is the results of ratings of international agencies. Despite their imperfection, the ratings form the country's image in the international arena, and, therefore, characterize the state of its economic and financial development at a certain point in time [3]. International ratings help to determine the degree of confidence in the lender, and the higher it is, the longer term and cheaper resources the borrower can count on [16].

The results of the analysis of the investment attractiveness of countries are very popular today, given by well-known investment, intermediary and consulting companies and rating agencies, as well as large corporations, stock exchanges and financial groups and business magazines, representing their interests in order to form a clearer understanding of them, they are divided into various groups [16].

The analysis of the country's investment attractiveness according to the assessments of international rating agencies and organizations is studied in their works by such scientists as A.I. Maslak, L.L. Hrytsenko, A.N. Tkachenko, N.V. Koval, V.V. Lishchuk, Plastun A.L., Tkachenko A.N., Fedorchak A.V., Shuba M.V. etc.

The most generalized classification of groups of international ratings, in our opinion, is given in the work of A.L. Plastun. [17], where it is proposed to distinguish

four groups depending on the type of organization, namely: research and international organizations, rating and information agencies, and ratings that have a direct impact on the investment attractiveness of Ukraine, namely: competitiveness rating (Development Institute management (IMD)); the index of global competitiveness of countries (World Economic Forum in Davos); the Index of Economic Freedom (The Heritage Foundation and The Wall Street Journal); investment attractiveness index (European Business Association); rating of investment attractiveness of the countries of the world International Business Compass (Hamburg Institute of World Economy and BDO); Doing Business Ranking (World Bank); credit ratings (Moody's, Fitch Ratings, Standard & Poor's) [16].

According to the given ratings and analyzed the investment attractiveness of Ukraine. The dynamics of the positions of Ukraine's investment attractiveness in the leading ratings is shown in Figure 1.3.
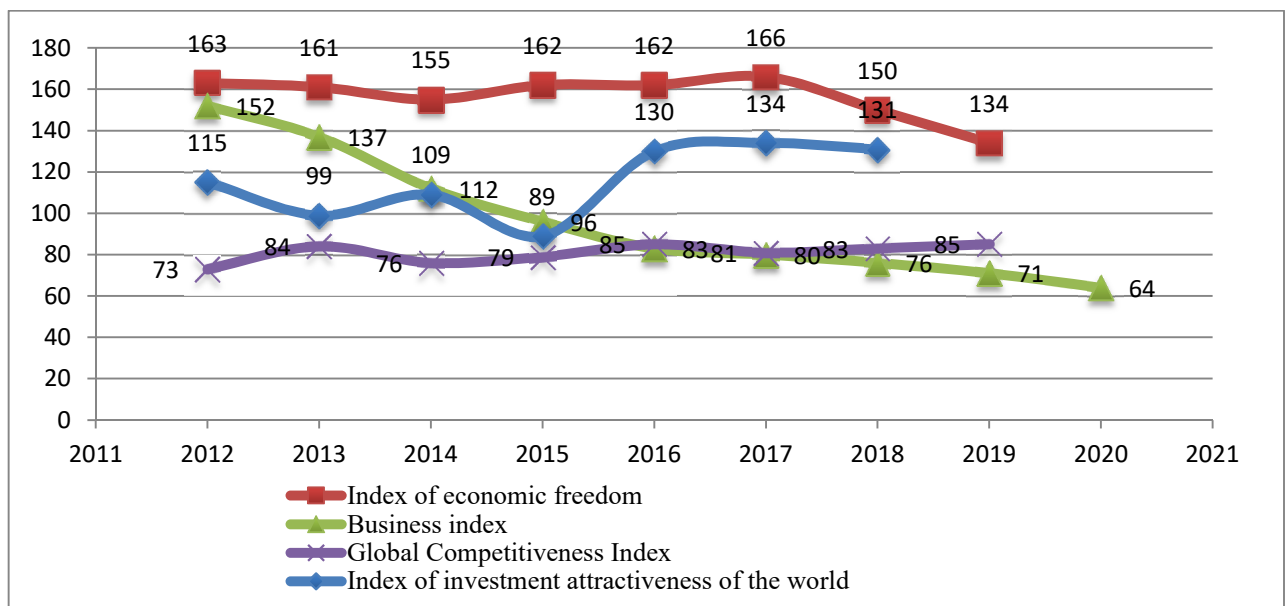
Fig. 1.3 - Dynamics of positions of investment attractiveness of Ukraine in leading ratings

Source: developed on the basis of [18], [19], [20], [21]

The study of the investment attractiveness of Ukraine on the basis of the data in Chart 1.3 suggests that today Ukraine has a very unattractive appearance, in the eyes of foreign investors Ukraine is too risky a country and requires radical conditions in the economic sector.

A constant positive trend can be observed only in the ranking of doing business (from 2012 to 2020, Ukraine rose in the ranking by 88 positions) and positive shifts in the ranking of economic freedom in 2018-2019.

2018 can be considered a starting point for Ukraine in the ranking of economic freedom, where it moved from the group of countries with a non-free economy to the group of countries with a predominantly non-free economy and received an improvement in points in 8 out of 12 freedoms.

Doing Business rating is a rating "which allows to determine the quality of business regulation rules, increase or restrict business activity of business entities in a certain country" [22].

During 2018-2020, a number of such reforms were carried out to improve doing business [21]:

— streamlined the dealing with construction permits process by eliminating the requirement to hire an external supervisor and introducing an online notification system. Ukraine also made obtaining a construction permit less costly by reducing the contribution fee to the Kyiv City Council;

— made getting electricity easier by streamlining the issuance of technical conditions and by implementing a geographic information system. Ukraine also improved the reliability of power supply by introducing an outage compensation mechanism;

— made registering property easier by increasing the transparency of the land administration system;

— improved access to credit information by establishing a new public credit registry in the National Bank of Ukraine;

— strengthened minority investor protections by requiring greater disclosure of transactions with interested parties;

— reduced the time to import by simplifying conformity certification requirements for auto parts.

Among the top-priority measures for solving the problem of negative dynamics of other indices, we include monitoring of the work of government bodies, reforming political and economic processes in Ukraine, which will help restore the confidence of foreign investors [16].

The low and stable dynamics in the rating of global competitiveness in Ukraine is a consequence of the underdevelopment of the market, in particular the unreliability of the banking system, ineffective regulation of the stock market, inaccessibility of financial services, and problems with attracting financial services and investments.

Assessments of Ukraine's current credit ratings are responsible for the monetary security of the state. Authoritative credit ratings are considered to be Moody's, Fitch Ratings, Standard & Poor's, which "analyze the issuer's ability to repay issued debt obligations, which depend on the political and economic risks of the object under study"

[23]. Each of these international rating agencies has its own credit rating scale for investment and speculative class. The overall rating scale is depicted in Appendix B.

Comparing the importance of Ukraine in the credit ratings of various agencies, their forecast is rather unstable, and changes from "negative" to "stable", thereby indicating an unstable situation in the economic and political spheres [23] (table 1.1).

Table 1.1 - Rating of Ukraine by credit rating agencies

Organization	Main rating (index)	Place of Ukraine								
		2012	2013	2014	2015	2016	2017	2018	2019	2020
Standard & Poor's (S&P)	Long-term liability rating	B (negative)	B- (negative)	CCC- (negative)	B- (stable)	B- (stable)	B- (stable)	B- (stable)	B (stable)	B (stable)
Moody's	Sovereign rating of the country	B3 (negative)	Caa1 (negative)	Caa2 (negative)	Caa3 (stable)	Caa3 (stable)	Caa2 (positive)	Caa1 (stable)	Caa1 (positive)	B3 (stable)
Fitch Ratings	Long-term issuer default rating	B (negative)	B- (negative)	B- (negative)	CCC (rating not assigned)	B- (stable)	B- (stable)	B- (stable)	B (positive)	B (stable)
	Short-term issuer default rating	B	B	C	C	B	B	B	B	B (stable)

Source: developed on the basis of [24]

The financial mechanisms used by transnational corporations and donor countries affect the financial security of debtor countries and lead to large-scale fluctuations in national currencies, and sometimes sovereign default. The strengthening of default risks for Ukraine is confirmed by the deterioration of credit ratings by international rating agencies [8].

In 2019, the international rating agency Moody's Investors Service improved the outlook for the ratings of the Ukrainian government from "stable" to "positive", confirming the long-term issuer ratings and priority loans to Ukraine at the "Caa1" level, and in 2020 we are already seeing a transition to the B3 level, that is from the class of "significant risk" to "highly speculative" [25]. The Fitch Rating agency has upgraded Ukraine's long-term and short-term credit rating in foreign and national currencies from B- to B, from C to B and improved the outlook from stable to positive, in 2020 everything remained unchanged only the outlook changed to "stable". The international rating agency S & P improved its long-term credit rating from "B-" to "B" in 2019, with a stable outlook.

Further positive ratings are possible if Ukraine demonstrates economic growth against the background of improving budgetary and foreign economic indicators and the situation in the east of the country stabilizes without further escalation of tension.

I want to note that one should not overestimate the methods of assessing investment attractiveness according to international ratings, because they have a trend towards constant changes, the number of analyzed countries can also change. But despite this, they are an integral source of information for making decisions on the development and implementation of measures to improve the investment attractiveness of the country, allow you to build a strategy for improving investment attractiveness and take measures to ensure the financial security of the state as a whole.

2 FINANCIAL SECURITY OF THE SUBJECTS OF THE STOCK MARKET IN THE SYSTEM OF FINANCIAL SECURITY OF THE STATE

2.1 The role of the stock market in ensuring the financial security of the state

According to the Law of Ukraine "On Securities and the Stock Market", the stock market (securities market) is a set of participants in the stock market and legal relations between them regarding the placement, circulation and accounting of securities and derivatives (derivatives) [26].

The stock market is an integral component of the market, and, accordingly, the financial security of the state. A developed and open stock market is a sign of a strong and stable economy and helps to attract foreign investors. It is one of the components of the financial security system, as it performs the function of organizing trade in financial instruments between buyers and sellers of financial resources.

We agree with A.I. Baranovsky. [27] that the great interest in the study of the current state of the stock market is due to its peculiarity as an effective driver for the redistribution of investment flows, attracting additional domestic financial resources, foreign investments to the national economy, as well as Ukraine's integration into the world economic complex. In addition, the stock market synchronously forms financial investments of speculative, accumulative, intermediate and portfolio nature.

In general, the problem of ensuring the security of the stock market, as one of the subsystems of financial security of the state devoted to the work of Baranovsky OI, Rekunenko I.I., Melnikov E.A., Sitash T., Kapelyushna T.V., Khadartsev O.V., Zaporozhets M.Yu., Dolinsky L., etc.

"The state body entrusted with the task of ensuring the financial security of the state in terms of the circulation of securities and the functioning of stock markets and their participants is the National Commission on Securities and Stock Market (NCSSC). The purpose of the regulatory activities of the National Commission as a whole is to improve and increase the efficiency of state regulation in the stock market, to promote the implementation of a unified state policy on the issue and circulation of securities, to protect the rights of investors and other participants in the stock market "[3].

The financial security of the stock market for investors is determined by the availability of investment funds, which give them the opportunity to reach a highly profitable market, the efficiency of development of the main sectors of the economy, and also guarantees capital growth.

The main institution in the stock market is the stock exchange, where the purchase and sale of securities takes place. Its effective functioning has a significant impact on

the economic development of the state, since it provides information that significantly influences the opinion of investors when making investment decisions.

Monetary indicators and the basis of the stock exchange are stock indices, which make it possible to assess the general trend in the stock market and characterize the price parameters of a set of securities. It is the behavior and volatility of stock indices that influence the strategic decisions of investors. Several different indices with different construction methods can exist on one financial market simultaneously [27].

Sitash T. gives the main characteristics that an ideal stock index should have in order to meet the main goals and meet the expectations of its users [28]:

—   "accurate and timely reflection of the market situation;

—   to be a tool for predicting the direction of the market movement, that is, to provide for situations using technical analysis tools

—   allow investors who make significant strategic investments in various markets, on which of them to bet;

—   show the basic minimum amount of income that a trader working in the market should receive, and the like."

One cannot but agree with A.V. Khadartzev [29] that in the modern conditions of globalization of the economy, stock indices of trading floors of the transnational level give a completely objective interpretation of the current state and development prospects - both of a certain market situation and national economies in general.

Stock indexes are digital statistical indicators expressing (as a percentage) consecutive changes in prices of a certain group of assets at a particular point in time, and the study of volatility of indices helps to determine the directions of economic development, modern trends in the functioning of stock markets and their integral assessment in general [27].

Volatility as an indicator characterizing the sensitivity of the index's reaction to international events and allows one to assess the level of riskiness of investments in securities and derivatives market instruments.

There are over two hundred stock exchanges in countries with market economies. In the USA, data on 20 indices are regularly published, in Europe - 25 each, in Japan - 3. Buenos Aires and Singapore stock exchanges have their own indices. The most widespread in the financial world are indices developed in the United States. This not only recognizes the leading role of this country in the global economy, but also reflects the fact that the daily turnover of the New York Stock Exchange (NYSE) is half of the world's securities turnover. The main indices that are calculated in the United States: the Dow-jones Average, the NYSE Composite Index, the AMEX Market Value Index, the

National Association of Securities Dealers (NASDAQ Index), Val Line Europe (VLA), Wilshire 5000-Equality Index, Standard & Poor's 500 (S & P 500). In Great Britain, the most famous are the stock indices of the Financial Times newspaper (FTSE, FTA, FTO), in Germany - the FAZ and DAX indices [35].

Sitash T. [28] and Azarenkova H. M. [36] state that Ukrainian stock indices are divided into:

- industry-specific, considering stocks or bonds of one industry;
- segment, consider any type of securities.

[28] believes that most of the stock market indices in Ukraine have small coverage and are practically not common in the world, because Ukrainian bonds are an instrument with specific dynamics (considered separately from municipal or state debt instruments).

We agree with the opinion of A.V. Khadarts. [29] as it examines the characteristics of stock indices at both the micro and macro levels. In the microenvironment, the stock index is the basis for concluding financial contracts, a criterion for the prospects of investment assets, and a vector of market dynamics. The stock index in the macro environment is one of the key indicators for monitoring the state of the national economy, along with the specific level of GDP, discount rate etc.

The main indicators of the state of the stock market of Ukraine included in the world list of stock indicators of the national economy are [29], [30], [31]:

— the PFTS index is calculated based on the results of trading on the PFTS exchange based on the weighted average prices for transactions;

— UX index, calculated by trading on the Ukrainian Stock Exchange based on the prices of shares of blue chips of Ukraine, the largest companies, leaders in their industries.

The values of the PFTS and UX indices are shown in Fig. 2.1, 2.2.

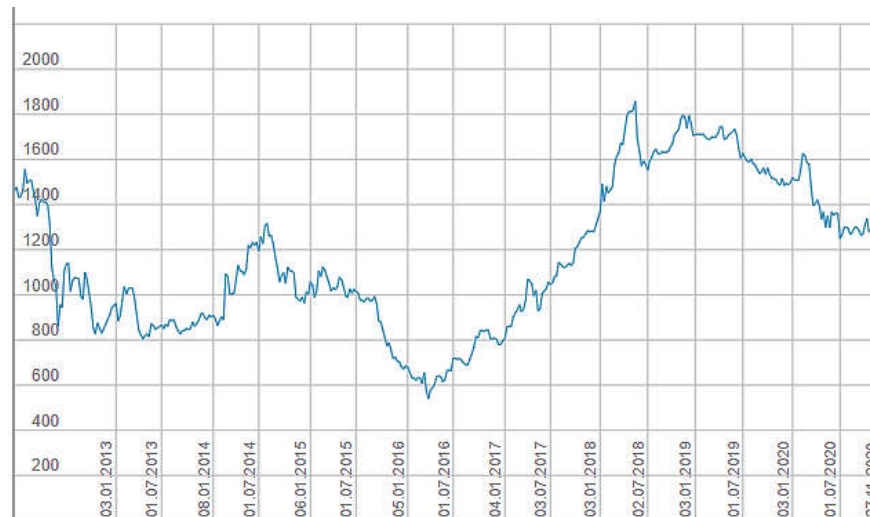Fig. 2.1 - the value of the PFTS index from 2010 to 2020

Source: [30]

Fig. 2.1 - the value of the UX index from 2013 to 2020

Source: [31]

So, from fig. 2.1. and 2.2., we see that the PFTS and UX indices have similar dynamics and during the period are characterized by their ambiguity and variability.

It can be seen from the graphs that starting in 2011, both indices began to decline, which lasted until July 2018. We think that the aggravation of the political situation, the beginning of military aggression in Crimea and in the East caused an outflow of capital from the real sector in financial markets and resources. In 2016-2017, the PFTS index basket was adjusted by quantitative characteristics, and this had a positive effect on its dynamics, since 2018 it has been growing. From March 16, 2018, the UX index began to include shares of six largest enterprises, namely: Donbasenergo, Raiffeisen Bank Aval, Centrenergo, Ukrnafta, Motor Sich, Turboatom, which also influenced its growth

since 2018. The optimism of the dynamics of 2018 was to a certain extent dictated by the upward trend in commodity prices in world markets. March 2020 is considered the beginning of the COVID-19 pandemic around the world, which led to negative consequences for both the stock market and the national economy.

We believe that domestic demand for securities could be a good impetus for the development of the economy and the stock market. The bulk of the population in Ukraine is not at all interested in the stock market and has no idea about the advantages of its effective functioning. In developing countries, citizens personally or through their pension funds invest in mutual and debt securities and at the same time have additional income, in our case, the citizen decides to take the money to the bank.

The reasons for this situation are:
— the instability of the political situation and the economic crisis;
— lack of an appropriate investment climate;
— instability of the hryvnia / dollar exchange rate;
— low business and professional qualifications of entrepreneurs;
— lack of attractive investment projects;
— complex taxation system;
— imperfect investment insurance system;
— high inflation rate;
— COVID-19 in 2020.

2.2 Scientific and methodological basis for the analysis of financial security of the stock market

As we noted in the previous paragraph, the effective functioning of the stock market contributes to the growth of the country's economic and financial security and ensures the movement of capital between various sectors of the national economy, stimulates the savings of the population and business entities, affects the stabilization of the financial and credit sphere, makes it possible to solve the problem of the resource base.

Research and comparison of the volatility of the Ukrainian stock market with other leading stock markets in Europe and America attracts more and more attention of foreign and domestic investors.

Sitash T. [28] and Bezvukh S.V. [32] give two main ways to determine the volatility of indices:

1) using the simple and weighted arithmetic mean;

2) using the geometric mean simple and weighted.

Arithmetic and geometric indices for the same stocks with the same initial value behave differently when prices move. The geometric index grows more slowly and falls faster than the arithmetic index, which is due to the method of its calculation. Arithmetic indices better reflect the increase or decrease in the value of shares, therefore, to assess the market conditions in general, arithmetic indices are often used, although it is often possible to find indices determined by both methods [35], [32].

Berzon N.I. in his study of the Russian market calculates the average monthly return of stock indices, the standard deviation (a generally accepted indicator of risk measurement) and in the analysis uses the Sharpe ratio, which characterizes the quality of investments (the greater its value, the better the asset), thereby proving that there is a clear connection between risk and profitability of the asset and the time horizon of investment, lengthening the investment period has a positive effect on the ratio of profitability and risk [33], [35].

S. A. Kushnir turns his attention to the CAMP model. This model describes the change in the additional profitability of a certain security in response to a change in the additional profitability of the market portfolio, while various stock indices are used to measure the profitability of the market portfolio, which characterizes the profitability of the stock market as a whole. This model demonstrates a direct relationship between the risk of a security and its return, which enables it to show fair return relative to the existing risk and vice versa. Using the CAPM model, it is possible to determine the degree of dependence of the return on an asset on the market return. If the model contains adequate assessments of the market and risk-free profitability, then the provided profitability of the asset can serve as an indicator for the investor when deciding whether to buy or sell securities [34], [35].

Quite interesting research in the direction of correlation and regression analysis of stock indices was carried out by L.B. Dolinsky [38] and M.V. Shuba. [37], Azarenkova G.M. [36]. [37] analyzed the degree of interdependence of the stock markets of individual countries based on the calculation of pair correlation. [39] conducted a correlation-regression analysis of the dependence of Ukrainian stock indices on the conjuncture of the world's stock markets based on statistical analysis. This study was carried out in the following sequence [35]:

−   to compare the historical volatility of stock indices, Dolinsky calculates the standard deviation of the value of instruments for a given period of time, this allows you

to determine the degree of risk of using a financial instrument for a given period of time;

– to study the dependence of the Ukrainian stock market on external factors, a correlation and regression analysis of the links between Ukrainian stock indices and the indices of the world's leading stock exchanges was carried out;

– to study the influence of changes in the world stock indices on the change of stock indices in Ukraine, regression coefficients are calculated, allowing to establish how the Ukrainian stock index changes on average when the factor changes by one.

[36] analyzed the key indices of Ukraine and the United States using a correlation matrix and, in her opinion, such basic statistical characteristics of returns as: mean, standard deviation, median, kurtosis, and asymmetry.

In our opinion, the work of A.A. Somchenkov [40] also requires attention. He investigated the behavior of participants in the Ukrainian stock market under the influence of world economic processes, the external stock environment, based on the analysis of generalized indicators of the state of the stock market - stock indices. First, according to Berzon N.I. he investigated the dynamism and volatility of the Ukrainian stock market relative to international stock indices, using the indicators of the standard deviation and the coefficient of variation, and then, by analogy with Dolinsky L.B. carried out a correlation-regression analysis to identify a possible relationship between phenomena (indicators) [35].

Blagun I.I. in his work tried to use the VAR model, which was also used in their works by S. Kamireli, N. Stsailun, I. Du E. Bash, S. Karak, M. Izmail and R. Rahman as one of the options for multivariate models for the vector autoregressive relationships between stock prices and key macroeconomic indicators: inflation, industrial production, interest rates, money supply and predicting relationships between stock markets based on stock indices [38].

In my opinion, stock exchange indices, calculated using the arithmetic mean simple and weighted for a certain investment time horizon, provide the most accurate and compact information about the state and dynamics of the stock market.

3. ANALYSIS OF DEVELOPMENT OF THE STOCK MARKETS OF UKRAINE, EUROPE AND AMERICA

3.1 Comparative analysis of the volatility of stock indices in Ukraine, Europe and America on different investment time horizons

In the context of globalization of the world economy, stock market indices are the main indicators of the state of financial markets, which make it possible to assess the general situation in the stock market and characterize the price parameters of a set of securities. It is the behavior and volatility of indices that influences the strategic decisions of investors.

Before investing, investors pay attention to the volatility of the indices, their sensitivity to international events and the factors leading to this result. Indeed, thanks to stock indices, an investor can learn not only about the dynamics of prices for shares of a particular company, but also general trends and activity of the entire market. Thanks to the indicators of the indices, one can observe the economic situation in the country and foresee the trends of changes in the economy.

In our study of the influence of the stock market on ensuring the financial security of the state by comparing the profitability of the stock exchanges of Ukraine with the leading stock markets of America and Europe, we will use the method used by N.I. Berzon, A.A. Somchenkov, T. Sitash and A. A. Zakharkin.

For comparison, the Ukrainian indices PFTS and UX, European DAX, FTSE 100, American Dow Jones and S&P 500 were used.

The PFTS index is a widely recognized indicator of the development of securities in Ukraine and abroad. It is calculated from October 1, 1997 on the basis of the prices of the most liquid shares of PFTS. The Ukrainian Exchange (UX) index has been calculated since March 26, 2006, the initial value of the UX index was 500 points. The UX index is calculated based on the value of stocks of companies quoted in the market and included in the index basket. During the trading session, the index is recalculated every 15 seconds [42], [43].

DAX is a capitalization-weighted (free-float) index of the 30 largest German companies listed on the Frankfurt Stock Exchange. DAX has been calculated by Deutsche Boerse AG since July 1, 1988. The index takes into account dividend earnings on stocks, assuming that dividends are reinvested in stocks. Thus, the Index reflects the total return on equity. Also DAX significantly affects the dynamics of the development of the European currency. FTSE 100 has been settled since January 3, 1984 by the independent FTSE Group, jointly owned by the Financial Times and the London Stock

Exchange. The FTSE 100 index includes highly liquid stocks of 100 blue-chip companies listed on the London Stock Exchange, whose total capitalization is about 80% of the UK stock market [45], [44].

The Dow Jones Index is the oldest, simplest, and most widely used stock index of the United States economy, first published on May 26, 1986. Currently, a scaled average is used to calculate this index to maintain the comparability of the index, taking into account changes in the internal structure of the shares included in it. The third comparable index in the study, which is considered a barometer of the US economy, is the S&P 500, published on March 4, 1957 [46],[47].

All indicators were taken over a 6-year period with a monthly interval to obtain more accurate results. For comparability, calculations were performed from January 1, 2013 until October 1, 2020. The study of changes in the volatility of these indicators was conducted at different intervals of investment from 1 month to 7 years and 6 months with an interval of 3 months. In the analysis of profitability in the intervals of investment was used exponential moving average with a consistent shift of 1 month.

The calculation of monthly yield was carried out according to the formula:

$$r_i = \frac{P_i - P_0}{P_0 * t} * 100\%$$ (3.1)

where ri is the monthly yield for the i-th period;

P_i - the value of the corresponding asset (stock index) at the beginning of the investment period;

P_0 - the value of the corresponding asset (stock index) at the end of the investment period;

t - the number of months that make up the investment period.

To assess the investment risk, the generally accepted indicator of risk measurement was used: standard deviation - Ϭ, which is calculated on the basis of variance indicators. The variance is calculated by the formula:

$$\sigma_x^2 = \frac{(X_i - \bar{X})^2}{n-1}$$ (3.2)

where X_i is the value of the variable X at time i;

$\bar{X}$- the average value of the variable X;

n is the number of observations in the sample.

Hence the standard deviation is:

$$\sigma = \sqrt{\sigma_x^2} \qquad (3.3)$$

The calculated indicators of average monthly return and risk of investing in the assets of the PFTS, UX, DAX, FTSE 100, Dow Jones and S&P 500 index are given in Annexes C, D, E, F, G, H and the graphs are shown in Figures 3.1-3.7.

Fig. 3.1 - Indicators of monthly profitability of the Ukrainian stock market (PFTS index) depending on the investment horizon

Source: created by the authors based on [42]
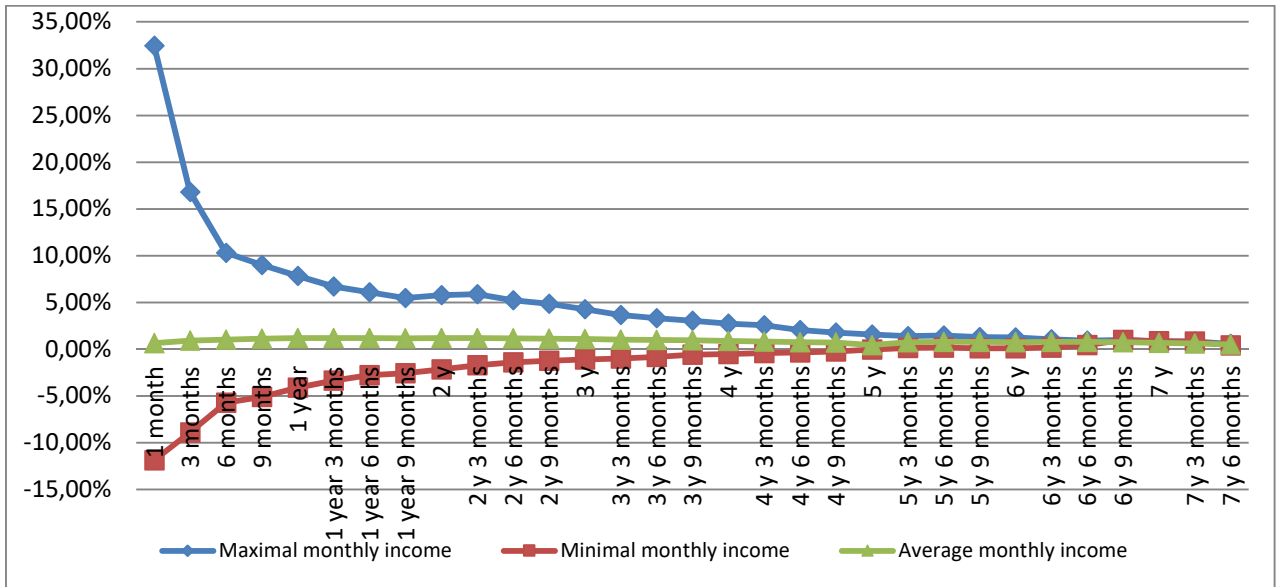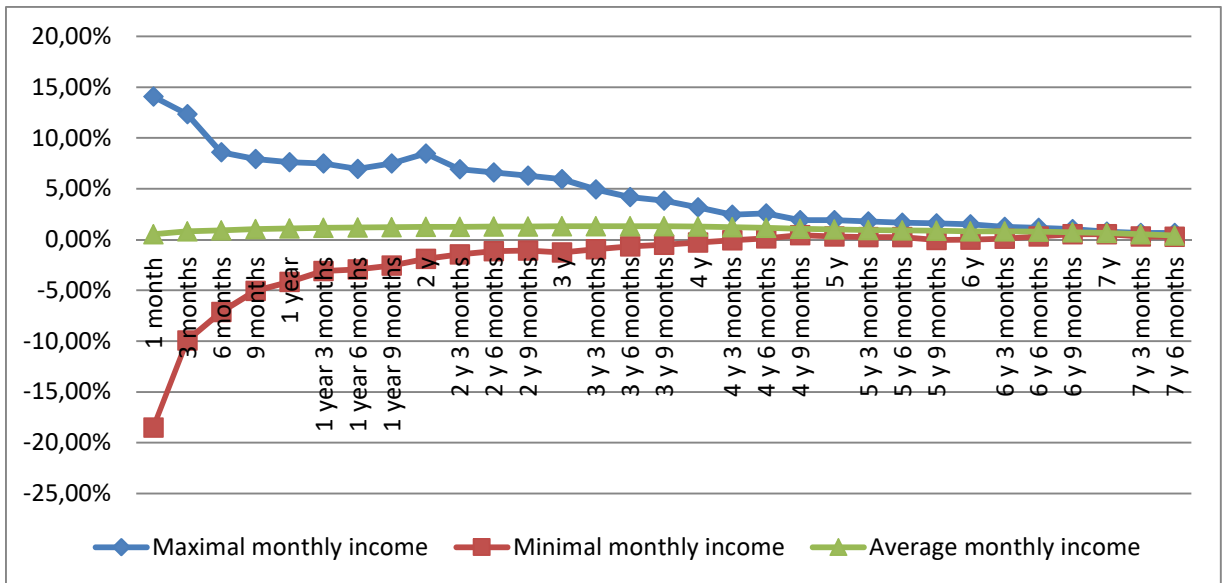
Fig. 3.2 - Indicators of monthly profitability of the Ukrainian stock market (UX index) depending on the investment horizon

Source: created by the authors based on [43]

According to the indicators in Fig. 3.1 and Appendix C, we see that according to the minimum monthly yield of the PFTS index, the probability of getting losses disappears after 5 years 3 months, the maximum yield in this time period is 1.40%. If you invest for 1 month. in PFTS securities, it is likely to get a yield of 32.45%, a loss of 11.90%, while a risk of 6.35%.

According to Fig. 3.2 and Appendix D, it can be seen that the probability of incurring losses when investing in securities of the UX index disappears already at 4 years and 6 months, which, in comparison with the PFTS index, occurs earlier. When investing for 1 month, there is a probability of getting a yield of 14.09%, a loss of 18.50%, with a risk of 6.44%.

It should be noted that for both Ukrainian indices under consideration, the high risk associated with high profitability, that is, with a decrease in profitability, the risk also decreases. This trend can be seen in Appendices C, D.

Fig. 3.3 - Monthly profitability indicators of the European stock market (FTSE index 100) depending on the investment horizon

Source: created by the authors based on [44]

Fig. 3.3 and Appendix E, we see that the likelihood of getting a loss when investing in FTSE securities does not disappear during the entire study period. When investing for one month, we have the opportunity to get a yield of 7.26%, damage 18.81% and risk 3.83%.

Fig. 3.4 - Indicators of monthly profitability of the European stock market (DAX index) depending on the investment horizon

Source: created by the authors based on [45]

According to the DAX index (Fig. 3.3 and Appendix F), the probability of a loss when investing disappears in the 6th year. If you invest for 1 month, the probability of getting a return of 19.30%, a loss of 20.52% and a risk of 5.40%.

I think that the problem of the decline in the profitability of these European indices, which began in February 2020, arose against the background of an increase in the number of patients with coronavirus.
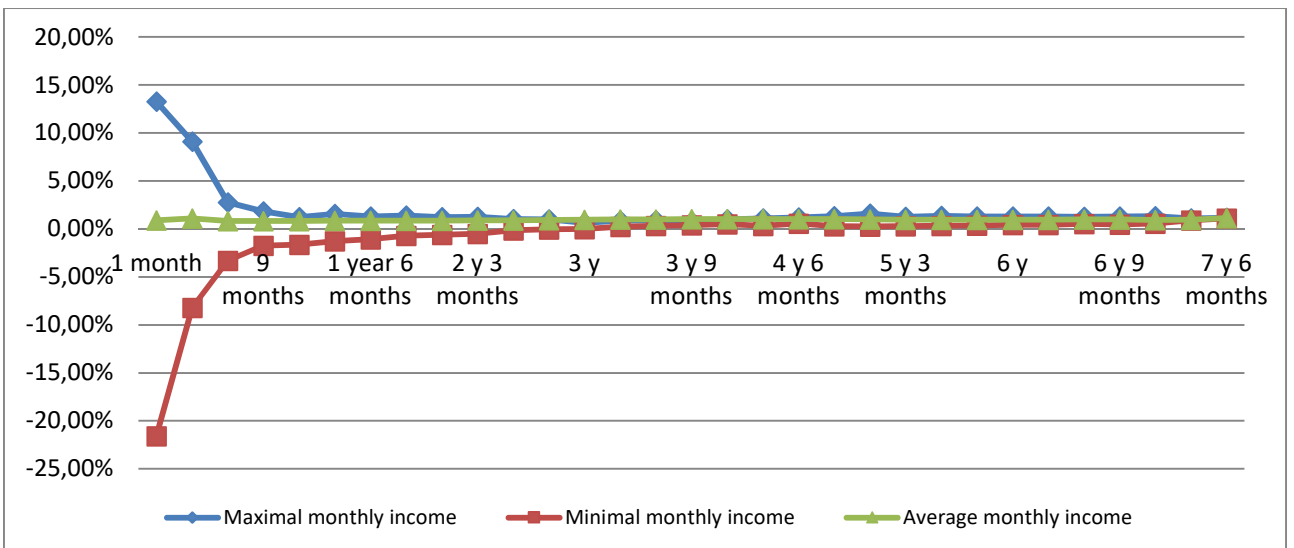
Fig. 3.5 - Indicators of monthly profitability of the US stock market (Dow Jones index) depending on the investment horizon
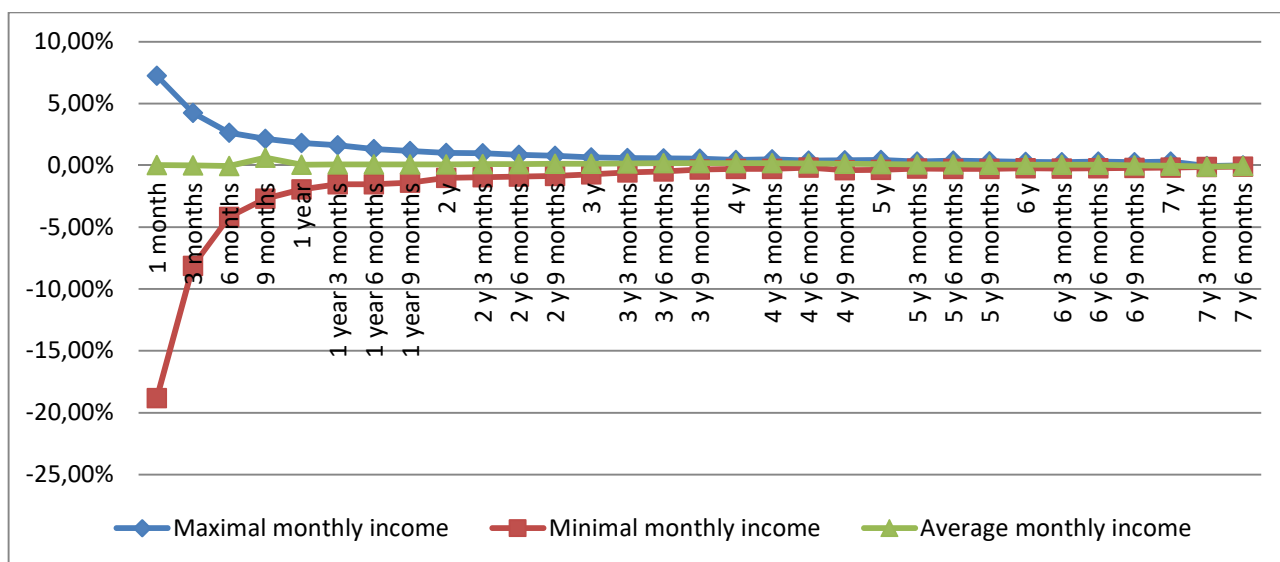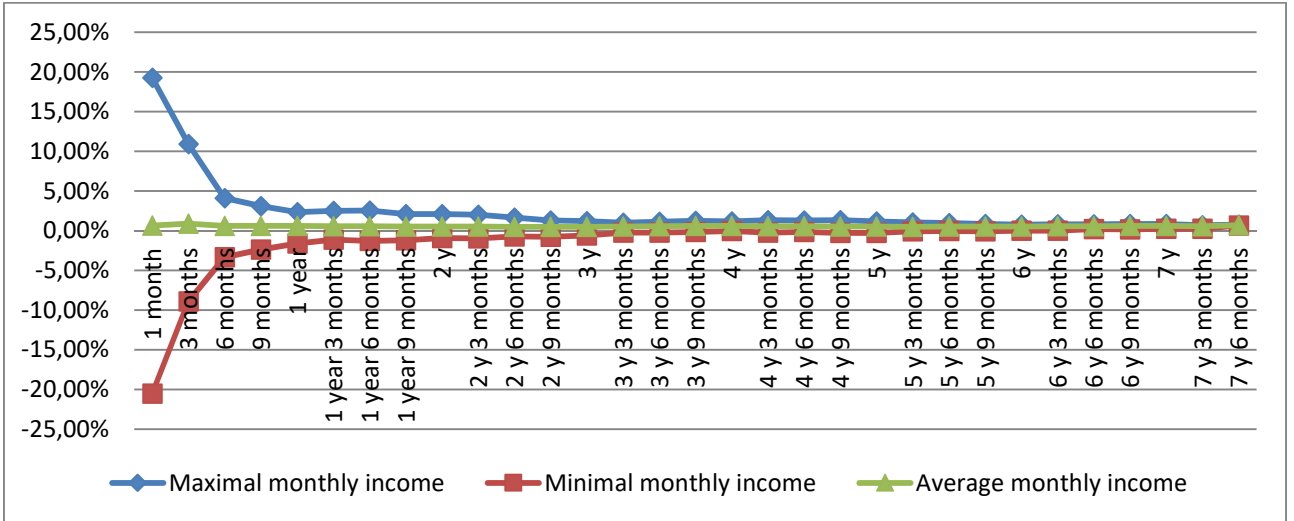
Source: created by the authors based on [46]
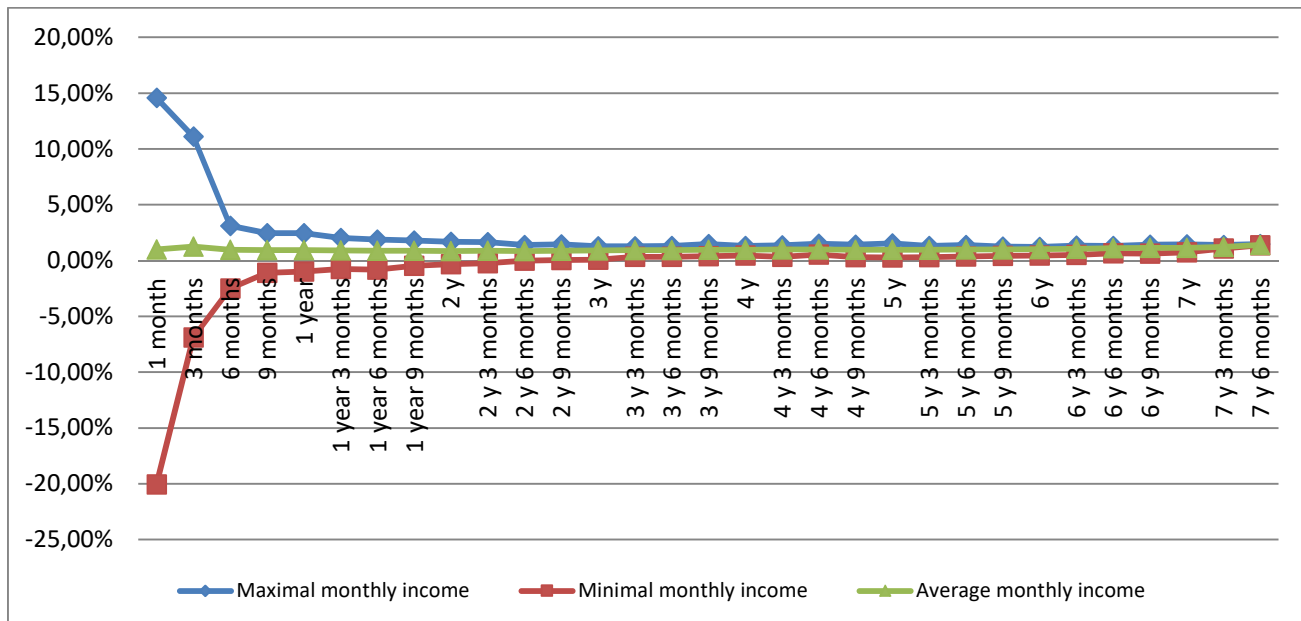
Fig. 3.6 - Monthly profitability of the US stock market (S&P 500 index) depending on the investment horizon

Source: created by the authors based on [47]

According to the indicators of the Dow Jones index (Fig. 3.5, Appendix G), we stop receiving a loss in the 3rd year and 3rd month. If you invest for 1 month, then we get the probability of max. profitability 13.27%, damage 21.57% and risk 4.57%.

The data that we obtained on the S & P 500 index (Fig. 3.6, Appendix H) shows that investors can receive income without damage, starting from 2 years 9 months. When investing for one month, the probability of getting a yield of 14.58%, a loss of 20.05% and a risk of 4.45%.

The indicators of the Dow Jones index, like the S & P 500, are characterized by an increase in maximum profitability, starting from year 7, that is, at the end of the investment horizon. I would like to note that the S & P 500 in June 2020 achieved its highest yield of 1.48% over the past two years, in 2018 it was 1.52%.
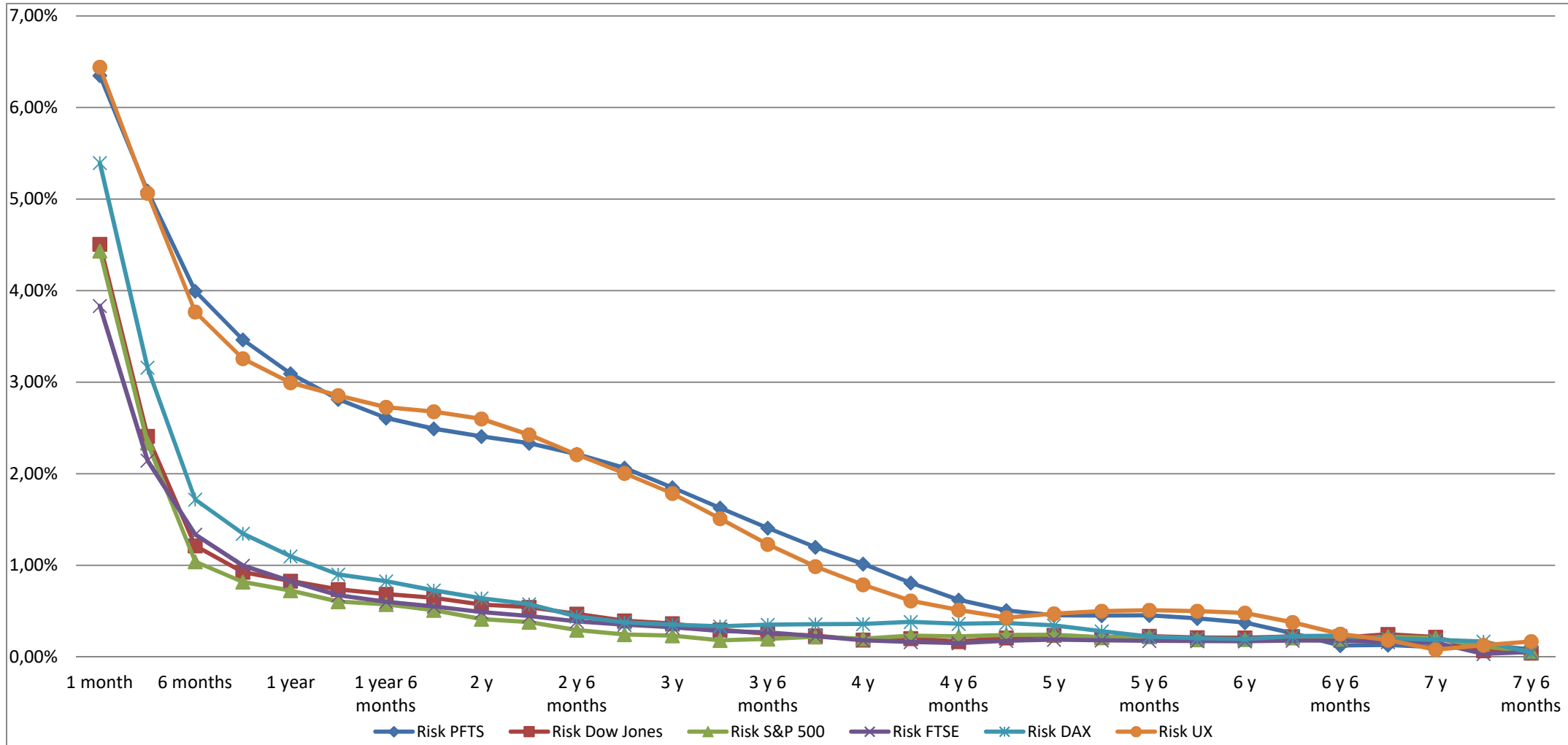
Fig.3.7 - Stock market risk indicators depending on the investment horizon

Source: created by the authors based on [42], [43], [44], [45], [46], [47]

In general, for all analyzed stock markets, a similar trend in the dynamics of profitability indicators is inherent. Among the studied indices of the Ukrainian, European and American stock markets, the highest maximum profitability can be obtained with an investment horizon of 1 month in PFTS 32.45% (Ukraine), DAX 19.30% (Europe "Germany") and S & P 500 14.58 % (America). We see that the PFTS is characterized by a significantly higher maximum profitability at investment intervals, which makes short-term investment in Ukrainian securities quite attractive.

The dynamics of risk indicators is characterized by a decrease with an increase in the investment period. According to Fig. 3.7, it can be seen that the most risky with an investment horizon of 1 month are investments in UX 6.44% (Ukraine), PFTS 6.35% (Ukraine) and DAX 5.40% (Europe "Germany"). The least risky are FTSE 4.43% (Europe "UK") and S&P 500 4.43% (America).

We would like to note the stock indices of the American stock market, since for the Dow Jones and S & P 500 indices, the minimum return becomes positive on average from the 3rd year of investment and further tends to grow. That is, an investor with a long-term investment in the securities of the analyzed indices will have a small but stable income.

According to our calculations, European indices have shown themselves to be too risky, because the probability of getting a loss on the FTSE does not disappear throughout the entire investment period, and when investing in DAX, the minimum profitability becomes positive only in the 6th year.

So, our research confirms the theory that the higher the risk, the more return is expected from the investment in the object.

3.2 Interrelation of stock indices of Ukraine, Europe and America and their impact on the financial security of the state

Based on the research of Dolinsky L.B. [39], Azarenkova H.M. [36], Somchenkova A.A. [29], Hnatyuka R.I. [41] to predict the development of the national economy, we estimate the probable relationship of stock indices of the Ukrainian stock market with the European and American, using correlation analysis.

Using the standard built-in functions of MS Excel, we have built an econometric model that shows the strength of the relationship between the considered indices (table 3.1).

Table. 3.1 - Correlation analysis between stock indices

	PFTS	Dow Jones	S&P 500	UX	FTSE	DAX
PFTS	1					
Dow Jones	0,6697	1				
S&P 500	0,6456	0,9845	1			
UX	0,8946	0,7922	0,7284	1		
FTSE	0,2944	0,5222	0,4249	0,5664	1	
DAX	0,3961	0,8393	0,8421	0,6013	0,6618	1

A qualitative assessment of the density of communication is carried out on the basis of the Chaddock scale (Table 3.2).

Table 3.2 - Chaddock scale

The value of the correlation coefficient	Degree of dependence
0,9-0,99	Very strong
0,7-0,9	Strong
0,5-0,7	Average
0,3-0,5	Weak
0,1-0,3	Almost absent

In accordance with the Chaddock scale, we see that according to table 3.1, average correlations between stock indices prevail. However, indices have the closest relationship: S & P 500 and Dow Jones - 98.45%, UX and PFTS - 89.46%, DAX and Dow Jones - 83.93%, DAX and S & P 500 - 84.21% , UX and S&P 500 - 72.84%, UX and Dow Jones - 79.22%. A weak direct relationship is: FTSE and PFTS - 29.4%, DAX and PFTS - 39.61%, FTSE and S & P 500 - 42.49%.

We would like to draw your attention to the fact that there is a weak connection between European stock indices and the Ukrainian PFTS, but the density with UX is average. We think that this can be explained by the strained relations between Ukraine and Europe, unsuccessful attempts to integrate Ukraine into the EU.

So, after conducting a correlation analysis between the indices, we showed that when making investments in the domestic market, it is worth monitoring the situation on foreign exchanges and analyzing the possible consequences of further communication. Indeed, when making an investment decision, it is important for an investor to know not only the correlation, as dependence and the degree of influence, but also to have a certain statistical data set.

CONCLUSIONS

Our research on ensuring the financial security of the state through the investment sector and the stock market has shown that at the current stage of economic globalization, Ukraine's integration into world financial markets is a complex process, where the state plays the main role, namely, its competent financial policy.

It is difficult to expect the proper financial security of Ukraine when there are threats on the stock market:

— defaults on bonds;

— speculative operations with securities;

— ineffective financial asset management;

— instability of the regulatory framework on the regulation of the stock exchange;

— the lack of a regulatory framework for ensuring the economic security of the activities of stock market entities.

The investment climate in our country does not stimulate the attraction of direct investment, an increase in domestic investment in priority sectors of the economy, and the strengthening of international relations. To restore the confidence of foreign investors in Ukraine, first of all, it is necessary to minimize its debt obligations, concentrate efforts on its competitive advantages (qualified labor force, geographical location, developed agricultural industries, high higher education, etc.) and promote the development of innovative activities.

The Covid-19 pandemic also made its own adjustments to the state of the national economy: the closure and bankruptcy of enterprises, an increase in demand for everyday products, speculation in the market for antiviral drugs, sanitary masks, and disinfectants. For the stock market, this was reflected in a sharp decline in returns. Most of all, the pandemic affected the European and Ukrainian stock markets.

According to a comparative analysis of the volatility of the leading stock indices of Ukraine, Europe and America, we conclude that the trend of the indices under consideration reflects in detail the current situation in the stock markets and their degree of influence on the state of financial security over the entire investment time horizon.

The results of researching the dynamics of stock indices show that there is a direct relationship between their profitability, risk and investment period. It can be seen that with an increase in the investment horizon, all indices are characterized by a decrease in risk and a narrowing of the spread between the indicators of maximum and minimum profitability. A decrease in risk with an increase in the investment period means that

long-term investments in securities of the analyzed indices are attractive. Volatility as an indicator for assessing the level of investment risk also decreases under the influence of this investment horizon.

With the help of correlation analysis, we found that the PFTS index has an average relationship with the American indices Dow Jones, S & P 500 and a weak relationship with the European FTSE, DAX indices. On the contrary, the UX index has a strong relationship with American indices and average with European ones. On the other hand, the PFTS is characterized by the highest maximum profitability in the studied investment interval, which makes short-term investment in Ukrainian securities attractive.

The relevance of further scientific developments in this direction lies in the study of the analysis of the indicators of profitability, risk and volatility of the Ukrainian stock market indices with other world stock indices and finding ways to increase the determination of Ukrainian indices with European ones.

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ANNEX A

Table A.1 - Approaches to the definition of the concept of "financial security

Author	Definition
Financial security as the degree of protection of the financial interests of the state by its state authorities	
Shakirova O.V. [1]	Financial security of the state - the degree of protection of the financial interests of the state, the state of financial, monetary, budget, tax, currency, banking, investment, customs-tariff, settlement and stock systems, characterized by balance, resistance to internal and external negative influences, the ability of the state to effectively to form and rationally use financial resources sufficient to meet its needs, by fulfilling obligations and ensuring socio-economic development
Kalantay A.M. [2]	The financial security of the state is the ability of its bodies to: ensure the sustainability of the economic development of the state; ensure the stability of the payment and settlement system and the main financial and economic parameters; neutralize the impact of global financial crises and deliberate actions of world structures on the national, economic and socio-political system; prevent large-scale capital flight abroad, prevent conflicts between authorities at different levels over the distribution and use of resources of the national budget system; it is most optimal for the country's economy to attract and use foreign borrowings; to prevent crimes and administrative offenses in financial legal relations (including legalization of laundering of proceeds from crime)
Nazarenko S. A. [3]	The financial security of the country is the ability of public authorities to ensure the safe functioning of all spheres of public life and economic activity by political, legal, economic and organizational methods and means, mediated by financial relations
Ivashko O. [4]	Financial security - protection of financial interests at all levels of financial relations; a certain level of independence, stability and sustainability of the country's financial system under the influence of external and internal destabilizing factors that threaten financial security; the ability of the state's financial system to ensure the effective functioning of the national economic system and sustainable economic growth
Varnaliy Z.S. [5]	Financial security is the protection of the financial interests of business entities at various levels of financial relations, as well as the provision of households, enterprises, organizations and institutions, regions, industries, sectors of the economy, the state with financial resources sufficient to meet their needs and fulfill obligations.
Financial security as a component of economic and / or national security	
Gaponyuk O.I. [6]	"Financial security is an important component of a country's national security, where the welfare of the state as a whole depends on its level." Financial security is a complex multi-level system, which is formed by a number of subsystems, each of which has its own structure and nature of development

Continuation of table. A.1

Chuban V.S. [7]	Financial security is the foundation of national security. The financial security of the state is a generalizing qualitative state of the functioning of the financial, monetary, currency, banking, budget, tax, investment, customs-tariff and stock systems, conditions, rules and instruments for their regulation, ensuring the effective functioning of the national economic system and its protection from internal and external threats
Zveruk L.A.[8]	Financial security is an integral part of economic security, it is a set of economic conditions that ensure the observance of national interests, the stability of the economic system and its protection from internal and external shocks
Mikhailyuk V.V. [9]	Financial security, he considers as a subsystem of the economic security of the state. Financial security is the state of the financial system, characterized by the balance of all its components, the protection of national financial interests, the ability to resist threats and ensure the country's economic growth
Semenog A.Yu. [10]	Financial security is an integral component of economic security and a guarantee of the national security of the state, expressed in a certain state of financial flows within the financial, monetary, currency, banking, fiscal, accounting, investment and stock systems of the country, characterized by balance, resistance to internal and external negative influences, the ability to divert external financial expansion, ensure financial stability, the effective functioning of the national economic system and economic growth in general

ANNEX B
Rating scale of credit rating agencies

Table B.1 - Rating scale of credit rating agencies

S&P	Fitch		Moody's	Generalized value	Type
	Long-term	Short-term			
AAA	AAA	F1	Aaa	The issuer has an exceptionally high ability to pay interest on debt obligations and the debts themselves	Investment ratings (limited risks)
AA+	AA+	F2	Aa1	The issuer has extremely high capabilities to pay interest on debt obligations and the debts themselves	
AA	AA		Aa2		
AA-	AA-		Aa3		
A+	A+	F3	A1	The issuer's ability to pay interest and debts is highly estimated, but depends on the economic situation	
A	A		A2		
A-	A-		A3		
BBB+	BBB+		Baa1	The issuer's solvency is considered satisfactory	
BBB	BBB	B	Baa2		
BBB-	BBB-		Baa3		
BB+	BB+		Ba1	The issuer is solvent, but unfavorable economic conditions may negatively affect the ability to pay	Speculative ratings (risks)
BB	BB		Ba2		
BB-	BB-		Ba3		

Continuation of the table. B.1

S&P	Fitch		Moody's	Generalized value	Type
	Long-term	Short-term			
B+	B+	B	B1 B2 B3	The issuer is solvent, but unfavorable economic conditions are likely to negatively affect its ability and willingness to make debt payments	Speculative ratings (risks)
B	B				
B-	B-				
CCC+	CCC+	C	Caa1	The issuer is experiencing difficulties with payments on debt obligations and its capabilities depend on favorable economic conditions	"Rubbish" (high risks)
CCC	CCC		Caa2		
	CCC-				
	CC				
CCC-	C		Caa3	Usually insolvent companies	
CC	RD	D	Ca	Partial default	
C	D		C	Default. Bankruptcy	
SD					
D					

Source: [48]

ANNEX C

PFTS index

Table C. 1 - PFTS index indicators at different investment time horizons

Investment horizon	Maximal monthly income	Minimal monthly income	Average monthly income	Maximal monthly income
1 month	32,45%	-11,90%	0,63%	6,35%
3 months	16,79%	-8,92%	0,93%	5,09%
6 months	10,29%	-5,71%	1,02%	3,99%
9 months	8,99%	-5,11%	1,11%	3,46%
1 year	7,85%	-4,11%	1,18%	3,09%
1 y 3 months	6,71%	-3,36%	1,21%	2,81%
1 y 6 months	6,08%	-2,77%	1,19%	2,61%
1 y 9 months	5,48%	-2,58%	1,17%	2,49%
2 y	5,78%	-2,18%	1,19%	2,41%
2 y 3 months	5,90%	-1,70%	1,18%	2,33%
2 y 6 months	5,23%	-1,40%	1,17%	2,21%
2 y 9 months	4,84%	-1,23%	1,12%	2,06%
3 y	4,27%	-1,09%	1,07%	1,85%
3 y 3 months	3,65%	-0,99%	1,03%	1,63%
3 y 6 months	3,31%	-0,81%	0,98%	1,41%
3 y 9 months	3,03%	-0,60%	0,94%	1,20%
4 y	2,72%	-0,52%	0,88%	1,01%
4 y 3 months	2,56%	-0,42%	0,81%	0,81%
4 y 6 months	2,05%	-0,36%	0,75%	0,62%
4 y 9 months	1,79%	-0,23%	0,72%	0,51%
5 y	1,58%	-0,03%	0,45%	0,45%
5 y 3 months	1,40%	0,13%	0,76%	0,45%
5 y 6 months	1,46%	0,17%	0,77%	0,45%
5 y 9 months	1,29%	0,09%	0,77%	0,42%
6 y	1,28%	0,08%	0,76%	0,37%
6 y 3 months	1,06%	0,17%	0,79%	0,26%
6 y 6 months	0,90%	0,45%	0,77%	0,13%
6 y 9 months	1,00%	1,00%	0,76%	0,11%
7 y	0,83%	0,83%	0,69%	0,14%
7 y 3 months	0,80%	0,80%	0,62%	0,50%
7 y 6 months	0,57%	0,41%	0,50%	0,08%

Source: calculated by the authors based on data [42]

ANNEX D

UX index

Table D. 1 - UX index indicators at different investment time horizons

Investment horizon	Maximal monthly income	Minimal monthly income	Average monthly income	Maximal monthly income
1 month	14,09%	-18,50%	0,54%	6,44%
3 months	12,36%	-9,94%	0,81%	5,06%
6 months	8,60%	-7,13%	0,90%	3,77%
9 months	7,92%	-5,05%	1,02%	3,26%
1 year	7,63%	-4,17%	1,10%	2,99%
1 y 3 months	7,49%	-3,09%	1,17%	2,85%
1 y 6 months	6,95%	-2,95%	1,20%	2,73%
1 y 9 months	7,49%	-2,57%	1,22%	2,68%
2 y	8,47%	-1,91%	1,26%	2,60%
2 y 3 months	6,91%	-1,44%	1,27%	2,43%
2 y 6 months	6,60%	-1,15%	1,27%	2,21%
2 y 9 months	6,28%	-1,07%	1,28%	2,01%
3 y	5,94%	-1,28%	1,31%	1,78%
3 y 3 months	4,95%	-0,96%	1,32%	1,51%
3 y 6 months	4,18%	-0,68%	1,33%	1,23%
3 y 9 months	3,84%	-0,51%	1,30%	0,99%
4 y	3,18%	-0,29%	1,28%	0,79%
4 y 3 months	2,44%	-0,06%	1,23%	0,61%
4 y 6 months	2,58%	0,13%	1,15%	0,51%
4 y 9 months	1,90%	0,42%	1,05%	0,43%
5 y	1,90%	0,30%	0,99%	0,47%
5 y 3 months	1,78%	0,24%	0,95%	0,50%
5 y 6 months	1,66%	0,24%	0,90%	0,51%
5 y 9 months	1,60%	-0,04%	0,87%	0,50%
6 y	1,49%	-0,02%	0,82%	0,48%
6 y 3 months	1,25%	0,10%	0,80%	0,38%
6 y 6 months	1,16%	0,30%	0,77%	0,25%
6 y 9 months	1,04%	0,54%	0,73%	0,18%
7 y	0,80%	0,52%	0,65%	0,08%
7 y 3 months	0,64%	0,32%	0,51%	0,13%
7 y 6 months	0,64%	0,29%	0,39%	0,17%

Source: calculated by the authors based on data [43]

ANNEX E

DAX index

Table E. 1 - DAX index indicators at different investment time horizons

Investment horizon	Maximal monthly income	Minimal monthly income	Average monthly income	Maximal monthly income
1 month	7,26%	-18,81%	0,05%	3,83%
3 months	4,26%	-8,13%	0,00%	2,15%
6 months	2,65%	-4,16%	-0,05%	1,34%
9 months	2,15%	-2,68%	0,63%	1,00%
1 year	1,83%	-1,94%	0,05%	0,83%
1 y 3 months	1,63%	-1,52%	0,07%	0,67%
1 y 6 months	1,33%	-1,52%	0,09%	0,60%
1 y 9 months	1,17%	-1,39%	0,08%	0,55%
2 y	1,02%	-1,00%	0,09%	0,49%
2 y 3 months	1,00%	-0,94%	0,11%	0,45%
2 y 6 months	0,85%	-0,89%	0,11%	0,39%
2 y 9 months	0,79%	-0,84%	0,13%	0,35%
3 y	0,66%	-0,73%	0,15%	0,32%
3 y 3 months	0,60%	-0,57%	0,17%	0,28%
3 y 6 months	0,58%	-0,48%	0,19%	0,27%
3 y 9 months	0,55%	-0,34%	0,20%	0,23%
4 y	0,45%	-0,27%	0,19%	0,18%
4 y 3 months	0,51%	-0,29%	0,18%	0,16%
4 y 6 months	0,41%	-0,18%	0,16%	0,15%
4 y 9 months	0,41%	-0,38%	0,14%	0,18%
5 y	0,45%	-0,34%	0,12%	0,19%
5 y 3 months	0,33%	-0,26%	0,10%	0,18%
5 y 6 months	0,39%	-0,28%	0,09%	0,18%
5 y 9 months	0,35%	-0,29%	0,07%	0,17%
6 y	0,28%	-0,22%	0,06%	0,17%
6 y 3 months	0,28%	-0,25%	0,06%	0,18%
6 y 6 months	0,31%	-0,24%	0,05%	0,18%
6 y 9 months	0,27%	-0,20%	0,02%	0,16%
7 y	0,31%	-0,18%	-0,01%	0,16%
7 y 3 months	-0,04%	-0,12%	-0,09%	0,03%
7 y 6 months	0,02%	-0,09%	-0,05%	0,05%

Source: calculated by the authors based on data [45]

ANNEX F

FTSE 100 index

Table F. 1 – FTSE 100 index indicators at different investment time horizons

Investment horizon	Maximal monthly income	Minimal monthly income	Average monthly income	Maximal monthly income
1 month	19,30%	-20,52%	0,67%	5,40%
3 months	10,92%	-8,89%	0,88%	3,16%
6 months	4,11%	-3,34%	0,63%	1,72%
9 months	3,13%	-2,38%	0,63%	1,35%
1 year	2,35%	-1,58%	0,61%	1,10%
1 y 3 months	2,53%	-1,13%	0,58%	0,90%
1 y 6 months	2,53%	-1,27%	0,56%	0,82%
1 y 9 months	2,13%	-1,20%	0,53%	0,73%
2 y	2,13%	-0,91%	0,52%	0,64%
2 y 3 months	2,03%	-0,96%	0,52%	0,58%
2 y 6 months	1,66%	-0,72%	0,49%	0,44%
2 y 9 months	1,31%	-0,75%	0,49%	0,38%
3 y	1,21%	-0,58%	0,51%	0,35%
3 y 3 months	1,04%	-0,25%	0,54%	0,33%
3 y 6 months	1,16%	-0,23%	0,57%	0,35%
3 y 9 months	1,26%	-0,17%	0,60%	0,36%
4 y	1,19%	-0,05%	0,60%	0,36%
4 y 3 months	1,35%	-0,23%	0,59%	0,38%
4 y 6 months	1,28%	-0,14%	0,56%	0,36%
4 y 9 months	1,34%	-0,29%	0,54%	0,37%
5 y	1,17%	-0,26%	0,52%	0,34%
5 y 3 months	1,05%	-0,07%	0,51%	0,28%
5 y 6 months	0,99%	-0,02%	0,52%	0,22%
5 y 9 months	0,86%	-0,06%	0,53%	0,20%
6 y	0,78%	0,02%	0,53%	0,19%
6 y 3 months	0,83%	0,02%	0,57%	0,23%
6 y 6 months	0,81%	0,20%	0,59%	0,23%
6 y 9 months	0,86%	0,18%	0,61%	0,20%
7 y	0,84%	0,24%	0,62%	0,19%
7 y 3 months	0,71%	0,26%	0,57%	0,17%
7 y 6 months	0,77%	0,67%	0,71%	0,05%

Source: calculated by the authors based on data [44]

ANNEX G

Dow Jones index

Table G. 1 - Dow Jones index indicators at different investment time horizons

Investment horizon	Maximal monthly income	Minimal monthly income	Average monthly income	Maximal monthly income
1 month	13,27%	-21,57%	0,89%	4,51%
3 months	9,11%	-8,21%	1,08%	2,41%
6 months	2,75%	-3,30%	0,82%	1,21%
9 months	1,82%	-1,74%	0,83%	0,93%
1 year	1,22%	-1,63%	0,83%	0,83%
1 y 3 months	1,56%	-1,26%	0,84%	0,74%
1 y 6 months	1,28%	-1,07%	0,85%	0,68%
1 y 9 months	1,40%	-0,71%	0,85%	0,64%
2 y	1,23%	-0,62%	0,86%	0,57%
2 y 3 months	1,27%	-0,50%	0,88%	0,54%
2 y 6 months	1,04%	-0,16%	0,89%	0,47%
2 y 9 months	1,00%	-0,03%	0,93%	0,40%
3 y	0,63%	-0,02%	0,95%	0,36%
3 y 3 months	0,86%	0,23%	0,98%	0,29%
3 y 6 months	0,89%	0,33%	1,00%	0,25%
3 y 9 months	0,77%	0,39%	1,02%	0,23%
4 y	1,01%	0,50%	1,03%	0,19%
4 y 3 months	1,10%	0,33%	1,03%	0,20%
4 y 6 months	1,18%	0,56%	1,02%	0,17%
4 y 9 months	1,31%	0,28%	1,01%	0,21%
5 y	1,59%	0,24%	0,99%	0,24%
5 y 3 months	1,26%	0,28%	0,97%	0,21%
5 y 6 months	1,35%	0,34%	0,97%	0,23%
5 y 9 months	1,29%	0,36%	0,96%	0,21%
6 y	1,28%	0,41%	0,97%	0,21%
6 y 3 months	1,29%	0,41%	0,97%	0,22%
6 y 6 months	1,26%	0,53%	0,98%	0,21%
6 y 9 months	1,29%	0,46%	0,98%	0,25%
7 y	1,33%	0,57%	0,93%	0,22%
7 y 3 months	1,09%	0,88%	0,96%	0,07%
7 y 6 months	1,16%	1,08%	1,11%	0,04%

Source: calculated by the authors based on data [**Ошибка! Источник ссылки не найден.**]

ANNEX H

S&P 500 index

Table F. 1 – S&P500 index indicators at different investment time horizons

Investment horizon	Maximal monthly income	Minimal monthly income	Average monthly income	Maximal monthly income
1 month	14,58%	-20,05%	1,01%	4,43%
3 months	11,12%	-6,89%	1,27%	2,34%
6 months	3,12%	-2,50%	0,97%	1,04%
9 months	2,47%	-1,11%	0,95%	0,82%
1 year	2,45%	-0,99%	0,93%	0,72%
1 y 3 months	2,04%	-0,76%	0,91%	0,60%
1 y 6 months	1,90%	-0,82%	0,89%	0,57%
1 y 9 months	1,81%	-0,46%	0,87%	0,51%
2 y	1,68%	-0,32%	0,86%	0,41%
2 y 3 months	1,65%	-0,24%	0,87%	0,38%
2 y 6 months	1,40%	-0,01%	0,87%	0,29%
2 y 9 months	1,47%	0,05%	0,89%	0,24%
3 y	1,29%	0,09%	0,91%	0,23%
3 y 3 months	1,29%	0,33%	0,93%	0,18%
3 y 6 months	1,31%	0,33%	0,95%	0,20%
3 y 9 months	1,49%	0,39%	0,97%	0,22%
4 y	1,30%	0,46%	0,98%	0,20%
4 y 3 months	1,38%	0,34%	0,98%	0,23%
4 y 6 months	1,52%	0,54%	0,98%	0,22%
4 y 9 months	1,41%	0,30%	0,98%	0,24%
5 y	1,55%	0,28%	0,97%	0,24%
5 y 3 months	1,32%	0,32%	0,97%	0,21%
5 y 6 months	1,40%	0,35%	0,98%	0,22%
5 y 9 months	1,27%	0,41%	0,99%	0,19%
6 y	1,23%	0,44%	1,03%	0,19%
6 y 3 months	1,33%	0,50%	1,06%	0,21%
6 y 6 months	1,31%	0,65%	1,10%	0,20%
6 y 9 months	1,41%	0,62%	1,14%	0,22%
7 y	1,45%	0,75%	1,15%	0,21%
7 y 3 months	1,41%	1,08%	1,23%	0,11%
7 y 6 months	1,48%	1,36%	1,41%	0,06%

Source: calculated by the authors based on data [47]