

<https://doi.org/10.31891/2307-5740-2022-306-3-46>

UDC 330.322:332.146

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TRANSFORMATION THE INVESTMENT POLICY OF UKRAINE IN THE CONTEXT OF NON-STATIONARY ECONOMY: MONITORING OF MACROECONOMIC INDICATORS

The paper proposes the use of modern tools for monitoring macroeconomic indicators and the study of their non-stationary dynamics in the context of the implementation of investment policy based on the tools of phase and cointegration analysis, which makes it possible to obtain a comprehensive assessment and analyze the stability of the macroeconomic dynamics of Ukraine in the context of increasing globalization transformations in the dynamics of territorial development, ongoing in the conditions of global crisis processes. This study is aimed at identifying and assessing the factors (determinants) that affect the inflow of foreign direct investment into the regions of Ukraine. The paper examined the factors that have a significant impact on the volume of foreign direct investment. To verify the hypotheses, an economic-mathematical model with fixed effects is proposed.

Keywords: direct investment, investment activity, investment policy, investment program, non-stationary economy, territorial development, monitoring

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ТРАНСФОРМАЦІЯ ІНВЕСТИЦІЙНОЇ ПОЛІТИКИ УКРАЇНИ В УМОВАХ НЕСТАЦІОНАРНОЇ ЕКОНОМІКИ: МОНІТОРИНГ МАКРОЕКОНОМІЧНИХ ІНДИКАТОРІВ

Наукове дослідження полягає в обґрунтуванні та розробці концептуальних засад та рекомендацій щодо трансформації інвестиційної політики України в умовах нестационарної економіки на засадах моніторингу макроекономічних показників. У роботі пропонується використання сучасних інструментів моніторингу макроекономічних показників та дослідження їх нестационарної динаміки в контексті реалізації інвестиційної політики на основі інструментів фазового та коінтеграційного аналізу, що дає змогу отримати комплексну оцінку та проаналізувати стабільність макроекономічної динаміки України в умовах посилення глобалізаційних перетворень у динаміці територіального розвитку, що відбуваються в умовах глобальних кризових процесів. Це дослідження спрямоване на виявлення та оцінку факторів (детермінант), що впливають на приток прямих іноземних інвестицій у регіони України. У роботі досліджено фактори, які суттєво впливають на обсяги прямих іноземних інвестицій. Для перевірки гіпотез запропонована економіко-математична модель з фіксованими ефектами.

Метою роботи є вивчення трансформації інвестиційної політики України в умовах нестационарної економіки. Автори систематизують інструментальну базу екстраполяції та побудови прогностичної обґрунтованості міжнародної інвестиційної діяльності на територіальному рівні. Практичний бік роботи виражають економічні статистичні дослідження прямих іноземних інвестицій в Україні. У даній роботі авторами запропоновано систематизацію основних показників, які використовуються в економіко-статистичних методах для прогнозування рівня ризику при оцінці ефективності інвестиційних проектів. Прикладні аспекти ґрунтуються на систематизації інструментальної бази моделювання інвестиційної політики в Україні на засадах аналітичної функції оцінки макроекономічних індикаторів.

Впровадження інструментарію дослідження динаміки взаємодії основних макроекономічних індикаторів на основі пропонуваної методики моніторингу нестационарних динамічних процесів дозволить визначити стратегію стабілізації і подальший розвиток економіки держави, якісний стан якої визначається тісним нелінійним асинхронним взаємозв'язком основних макроекономічних індикаторів, що характеризують реальний стан соціально-економічної системи в поточний період та отримати адекватні прогнози.

Перспективами подальших досліджень виступає вдосконалення питань щодо трансформації інвестиційної політики України та здійснення інтегрованого управлінського аналізу. Заплановано подальші дослідження у напрямку розробки та застосування адекватного інструментарію моніторингу макроекономічних показників на основі вивчення їх нестационарної динаміки в контексті реалізації інвестиційної стратегії держави.

Ключові слова: прями інвестиції, інвестиційна діяльність, інвестиційна політика, інвестиційна програма, нестационарна економіка, територіальний розвиток, моніторинг

Problem setting

Investigating the mechanisms of public administration in Ukraine, the target, functional, methodological, information-analytical and instrumental parts are need to be identified. Giving the positive assessment of this proposal, we note that the mechanism of systematic management of development processes in the region should have a structure, correlate with the structure of tasks and functions, be systemically integrated, take into account their purpose and content, strengthen its flexibility and adaptability to systemic transformation changes and

present it as a mechanism for systematic management of regional development processes. Numerous economic studies, the implementation of joint business projects and the mentality of Ukrainian society have proven the need to attract foreign investment for the progressive future of Ukraine and the achievement of European living standards. Foreign capital can significantly influence the introduction of technical innovations and advanced technologies in the area of production, provision of financial and non-financial services and the quality of management in the real and financial sectors of the economy. The current state of economic and social development of Ukraine requires an understanding of the effective role of investment policy in the economic system of the state.

Foreign direct investment (hereinafter referred to as FDI) plays an important role in the global economy. According to statistics, over the past 30 years, foreign direct investment flows have increased 26.3 times, while the world gross domestic product has increased only 5.8 times. The main driver of global growth, according to "UNCTAD" [1], is a sharp increase in international mergers and acquisitions. There is huge competition between countries for foreign direct investment, since FDI has a positive effect on the economy of the recipient country. In addition to direct effects, such as an increase in GDP, budget revenues, decrease in unemployment, an increase in the quality of products and, as a result, an expansion of relations with foreign markets, FDI also indirectly has a positive impact on the host country, in the form of new knowledge, transfer of experience, dissemination technologies, increasing demand for local goods and services, staff training, etc. Foreign investment also allows accelerating the process of adaptation of local enterprises to world standards. Thus, foreign capital is quite attractive not only for the economy of the host entity, but also for society. After analyzing the data on FDI inflows to Ukraine, we can conclude that their volume has declined sharply. Analysts say that the sharp decline in foreign investment was caused by the depreciation of the hryvnia, energy prices.

Recent publications analysis

For sustainable socio-economic development of the regions of Ukraine it is necessary to attract a sufficient amount of funds from both internal and external sources. For sustainable socio-economic development of the regions of Ukraine it is necessary to attract a sufficient amount of funds from both internal and external sources.

The results of basic research by Ukrainian and foreign scientists clearly indicate that the processes of economic renewal and growth are determined by the size and structure of investments, the quality and speed of their implementation. Many scholars have paid attention to the study of modern vectors to the formation of the country investment policy. A wide range of issues related to research in the field of investment activity and attracting foreign investment in order to improve the investment climate are reflected in the works of domestic and foreign scientists and economists. For example, Drobyazko S. (2020) presents innovative methods for the development of business economic security at the micro and macro levels. Mayorova (2013) in the work paid attention to investment process and financial and credit importance of its activation in Ukraine. Pearce (2013), for instant, had dedicated his works to strategic management, formulation, implementation, and control. Karpenko (2017) is working on the issues analytical tools of integrated managerial analysis for the activation strategy of the enterprise innovative investment development the system. Research in the formation of international investment strategies can be seen in articles of scientists Lipkova & Bohac (2016). Thus, the chosen research topic is relevant, requiring constant improvement and elaboration of ways to optimize investment activity.

The goal of this work

The aim of the work consists of studying transformation the investment policy of Ukraine in the context of non-stationary economy. The authors systematize the instrumental base for extrapolating and building the prognostic validity of international investment activity at the territorial level. The practical side of the work is expressed by the economic statistical investigations of foreign direct investment in Ukraine. In this paper, authors propose systematisation of the main indicators which are used in economic and statistical methods for predicting the level of risk in assessing the effectiveness of investment projects is represented.

Key research findings

The non-stationary economy is such an "economic system, which is characterized by rather sharp and poorly predictable changes in many macroeconomic indicators, the dynamics of which do not correspond to the normal economic cycle. In essence, the non-stationary system is characterized by such conditions that are inherent in "crisis or post-crisis economic processes". In other words, such processes are constant in a non-stationary economy; while in stationary economic systems they (processes) are temporary, being only one of the elements of cyclical economic development. This is the most common conclusion of researchers from the analysis of the non-stationary economy of Ukraine for the period from 1992 to 2009, i.e. for 19 years.

The author's research is also interesting from a narrowly professional point of view, especially in the area of efficiency of investment projects. Professionals involved in appraisal activities can also learn a lot.

The development and implementation of an effective investment policy strategy occupies an important place among the main factors of effective management of the state economy. Therefore, there is a need to develop and implement a strategy for socio-economic development under proper control and evaluation, which in the long run will increase the effectiveness of strategic management of the economy and lead to economic growth based on

modern tools of modelling and management.

Ukraine is a potentially rich country that is self-aware and externally perceived as a political and economic state. The National Strategy for Increasing Foreign Direct Investment in Ukraine was developed at the request of the Government of Ukraine with the support of the USAID Competitive Economy of Ukraine EY Ukraine in cooperation with the National Investment Council Office, the Ministry of Economy and the Ukraine Investment Promotion and Support Office.

The strategy provides recommendations for the development of promising industries to attract investment and ways to increase the inflow of foreign direct investment in Ukraine. The document was created primarily for the international investment community and Ukrainian institutions whose activities are focused on attracting investment.

The strategy is built around cross-sectoral (privatization, export promotion, education, digital transformation, etc.) and sectoral incentives to increase foreign investment. The strategy contains specific recommendations on how to make the country more attractive to potential foreign investors - both in terms of relocation of production capacity and in terms of starting activities in Ukraine. The strategy is divided into 3 sections: a macro view of FDI, sectoral analytical documents and a directly proposed Action Plan and Vision to 2030.

The mechanism of formation and implementation of the socio-economic development strategy of the state should be based on the principle of systemic integration, as it is based on a cyclical planning process based on the principles of event management in the direction of achieving goals through monitoring; repeated cycles of analysis of decision-making, planning and implementation of tasks with specific goals and a deadline for their solution; continuous monitoring and evaluation of the achievement of goals according to the content of the strategy and selected measures; facilitating the coordination of the actions of the strategy implementers with the use of monitoring, analysis and availability of sources of funding for certain activities [2].

The set of principles of behaviour, the requirements for strategic analysis, is determined by the long-term goals of the state economy. In the conditions of high turbulence ("vortex" nature of changes), increasingly fierce mega-competition and transitive nature of Ukraine's economic development, the top hierarchical level of strategic monitoring is a priority.[3] The set of requirements for strategic monitoring of macroeconomic indicators of socio-economic development and the monitoring of macroeconomic indicators based on cointegration analysis is presented in Fig.1.

Since the monitoring of significant macroeconomic indicators, the dynamics of which is key in developing and implementing a strategy for sustainable socio-economic development in the context of strategic management, is a complex multifaceted process, to assess, analyze and predict their status in the literature uses a wide range of formalized and informal methods. There are tools which consist of: determination of integrated indicators of the level of security in the space-time section based on the use of a set for different indicators with their threshold and optimal values.

The methodology of the proposed tools allows building available for review models of processes taking into account pre-crisis and crisis phenomena. At the same time, pre-crisis phenomena are associated with a complication of the nature of the dynamic process. These approaches prove their applicability, they are used to study dynamic modes and, perhaps, not only qualitative but also quantitative determination of system parameters at which pre-crisis and crisis phenomena can occur.

The choice of this mathematical toolkit for studying the dynamics of time series and assessing the relationship of macroeconomic indicators is due to the following features of this toolkit:

1) cointegration analysis is based on the concept of long-term relationship between non-stationary variables. The proposed methodology allows: to identify long-term relationships in non-stationary time series; is a convenient tool for short- and medium-term forecasting of individual time series; allows you to include and explore the complementary relationships between indicators and their lag values; allows you to perfectly describe and interpret the relationships between variables and their deviation from equilibrium; assess the degree of stability of the system;

2) the methodology of phase analysis allows to determine the equilibrium state, which may be several, and to assess the stability or instability of the corresponding equilibrium state at this point and its type, and is to build a phase portrait of the system as a method of depicting a dynamic process the ability to visualize the whole set of movements that occur in the system under different initial conditions.

A comprehensive monitoring of the study of the dynamics of macroeconomic indicators was carried out on the following indicators: GDP dynamics (GDP), investment dynamics (INVEST), industrial production dynamics (VPROD), import dynamics (IMPORT), M3 aggregate (M3), construction work dynamics (VBUD), wages (ZARPLATA), dynamics of migration rate (KOEFL_MIGR) and natural population growth (EST_PRIROST) according to official data of the state statistics of Ukraine.

Monitoring of the level of long-term interrelation of macroeconomic indicators of the economy of Ukraine on the basis of cointegration analysis was carried out in the following scheme, which is shown in Fig.1.

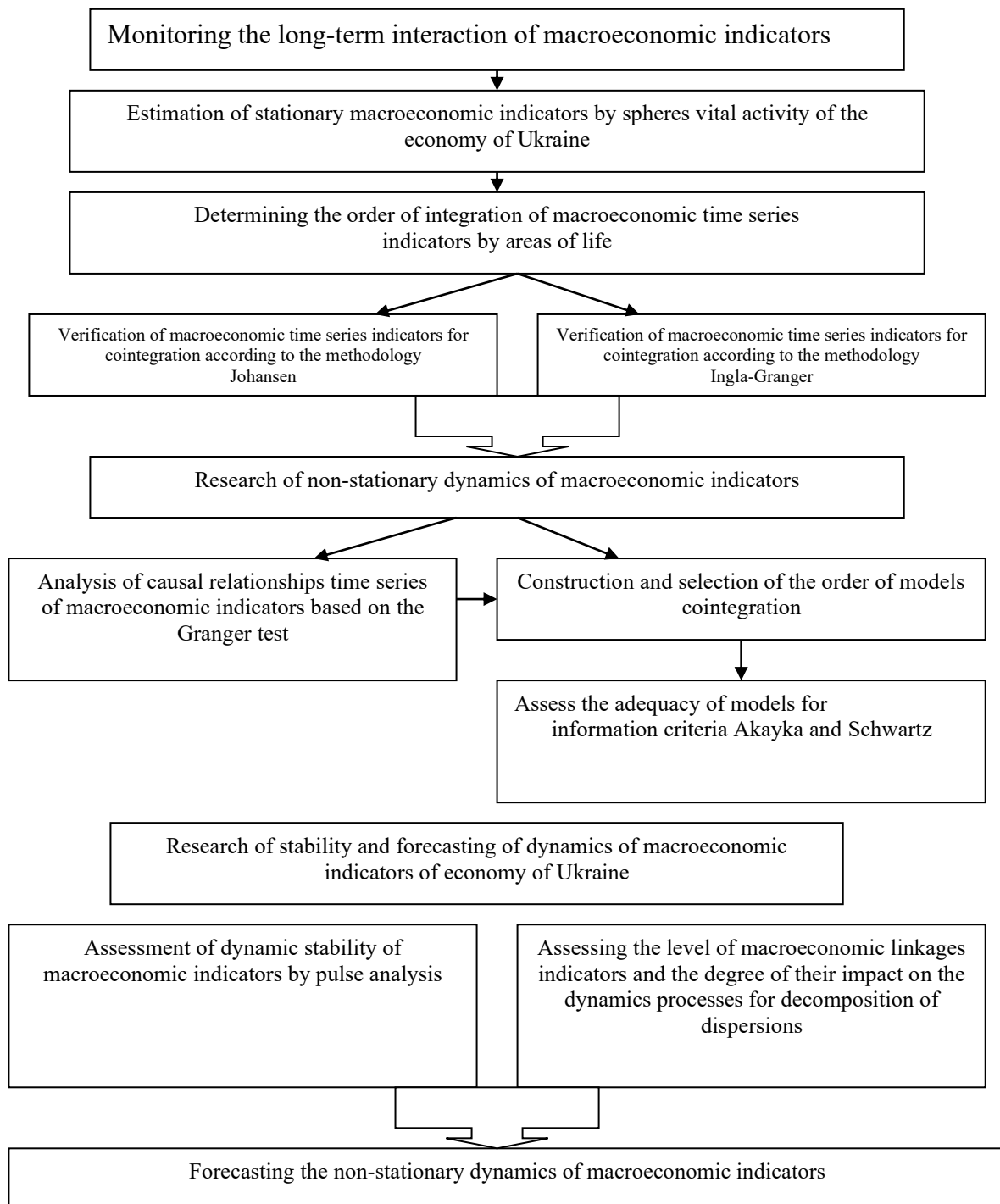


Fig. 1. Monitoring of macroeconomic indicators based on cointegration analysis

However, the intensification of globalization transformations in the dynamics of territorial development takes place in the context of global crisis processes and the strengthening of nonlinear relationships and processes that take place in them. Thus, it requires the improvement of management tools at all levels of the hierarchy and qualitative assessment of macroeconomic indicators, the dynamics of their behaviour and causation.

At present, the activity of transnational corporations (TNCs) and the inflow of foreign direct investment in Ukraine is significantly inferior to other countries of Western Europe and the CIS, but, despite this, Ukraine has significant potential for foreign investors and is a promising market[4].

When making investment decisions and choosing a country for the implementation of an investment project, TNCs are guided by many factors. In the scientific literature, there is still no generally accepted explanation of the reasons that determine the choice by corporations of a particular area for deploying an investment project.

At the same time, there are several groups of criteria for evaluating the effectiveness of an investment project:

- the attractiveness of the country in terms of costs (here, the cost of labour, the characteristics of the tax system and subsidies, the quality of infrastructure, human resources and the development of financial markets are

taken into account);

- the attractiveness of the country in terms of sales: characteristics of the local market, its development, growth potential and the country's openness to international trade;
- the attractiveness of the country in terms of cultural characteristics and political risk. According to these criteria, Ukraine is quite attractive for the activities of TNCs, but some factors still offset this attractiveness, while reducing the competitive advantages of our country.

The next we are going to investigate and describe *the optimal investment strategies with investor liabilities and investment determinants*.

Up to this point, the optimization model has focused primarily on portfolio assets, however practically all portfolios exist in order to meet some future obligations. Pension funds are set up to provide income and benefits to retirees. Endowments support current and future expenses of universities and foundations. Insurance company portfolios are designed to build assets in order to meet future claims. In all of these cases, the primary goal of the investor is not simply asset growth, but fulfilling future commitments. The investor is thus concerned with the growth of assets net of future outflows. In particular, a financial intermediary may be concerned with changes in net worth, where net is defined in terms of a set of existing liabilities[5].

There are different ways to express the problem of net worth optimization, however they all are related to the basic challenge of adapting a potentially complex set of future liabilities to the two-dimensional framework of the portfolio optimization model. In essence, the liabilities faced by the fund must be characterized by expectations of mean return, standard deviation, and correlations to assets if they are to fit into the risk-return space.

Consider, for example, a pension fund that has a known set of cash payouts due in a five year period extending from ten years to fifteen years in the future. The efficient frontier technology can be adapted to optimizing the portfolio with respect to these anticipated liabilities. In this case, the riskless asset from the fund's perspective would be a portfolio of bonds with cash flows precisely matching the future stream of liabilities. The risk and return and correlations of this matching portfolio of bonds perfectly characterize the liabilities, so in this sense it could be called a "liability asset."

This cash flow matching portfolio is also said to defeat the liabilities. It thus functions much like the riskless asset in the standard model. Once these known liabilities have been defeated, the fund can optimize over the remaining assets. This is equivalent mathematically to treating the liabilities as negative assets, and constraining the portfolio to hold the "liability asset" in the proportion that the present value of these future liabilities bears to the current value of the assets in the portfolio[6].

Thus, returns on net worth can be expressed in terms of assets and liabilities[7]. If S_t is surplus or net worth (assets minus liabilities), then return on surplus is

$$R_S = \frac{S_{t+1} - S_t}{S_t} \quad (1)$$

S_{t+1} - is determined as assets minus liabilities in period $t + 1$. It follows that

$$(1 + R_S) = \frac{A_{t+1} - L_{t+1}}{S_t} = \frac{A_{t+1}}{S_t} - \frac{L_{t+1}}{S_t} \quad (2)$$

Multiplying the first term by A_t / A_t and the second term by L_t / L_t results in

$$(1 + R_S) = \frac{A_{t+1}}{S_t} \times \frac{A_t}{S_t} - \frac{L_{t+1}}{L_t} \times \frac{L_t}{S_t} \quad (3)$$

recognizing that $A_t - L_t = S_t$.

One approach to net optimization is to use historical asset returns net of liabilities as an empirical starting point for the analysis. In the previous example, let us assume that the present value of the assets is twice that of the present value of the liabilities. Since a portfolio of intermediate-term zero-coupon government bonds defeases the liabilities, we may estimate the risk, return, and correlations of liability asset R_L using the historical time series performance of intermediate term government bonds.

We may also estimate the inputs for three asset classes: stocks [S], intermediate-term government bonds [B], and Treasury bills [F] using historical data. Then we transform each return series to the return on net worth by subtracting off the appropriately scaled liability series.

Thus, our "net" time-series, used to calculate inputs to the optimization model, are

$$R_S - \frac{1}{2}R_L, R_B - \frac{1}{2}R_L \text{ and } R_F - \frac{1}{2}R_L. \quad (4)$$

The means, standard deviations, and correlations of these three net series are then used to calculate an efficient frontier. What will this frontier look like? Note first that all of the positions of the basic asset classes change as a result of subtracting off the liabilities.

Consider a portfolio entirely invested in B . Since L and B are perfectly correlated to each other, the liabilities are defused, i.e., perfectly hedged through matching cash flows. This only requires half of the assets, however. The remaining half of the assets are then invested in intermediate term bonds. This asset portfolio now has half the expected return and half the variance compared to what a bond portfolio would have in an "asset only" optimization because the liabilities have effectively perfectly helped away this amount of the risk and return from the net investment.

Conclusions

Will Ukraine finally become an investment-attractive country for doing business and investing, or is it better to continue withdrawing capital and selling off assets? When will the best time to invest and how not to miss it? What new opportunities may open up for private and institutional investors in Ukraine in connection with the change in the country's geopolitical course? These and other topical questions are being asked today by business owners and active investors in Ukraine.

Due to the high level of uncertainty in the military-political sphere of Ukraine, it is difficult today to build any economic forecasts and give recommendations to investors. At the same time, we would like to draw the attention of the "waiting" investor to the opening prospects, unrealized and hidden investment opportunities. Ukraine today is a good place and time to invest.

The allocation of significant financial assistance and credit resources by international economic and financial organizations, the EU and the United States should stabilize the state of Ukraine's financial system in the near future. In turn, such a precedent should draw the attention of international private investors to the economy of our country.

The current time must be used effectively; it is the most promising for attracting foreign capital, because the attention of the whole world is focused today on the events in Ukraine. Right now the capitalization of Ukrainian companies is reaching the bottom and they are being sold at a discount, right now investments are needed to financially support promising companies and bring them on a growth trajectory.

In the work authors propose to improve the mechanisms of the state's investment policy based on the institutional quality and economic growth. The issue of improving the investment climate and business conditions has been and remains the most relevant for any country, especially a developing one. Lack of stable economic development, low level of product competitiveness, depreciation of fixed assets by 90% in virtually all sectors of the economy and a number of other factors, exacerbated the investment attractiveness of the state, especially in the context of recent events. Discussions in the field of European integration processes are impossible without a detailed assessment of the investment attractiveness and competitiveness of the Ukrainian economy [8].

Currently, international cooperation in the region is somewhat formal. Interregional relations are limited to the signing of memoranda between partner regions. Large cities of different countries usually hold large-scale events of an international nature, which unite representatives of the world community and are of interest for establishing business contacts with foreign partners. There is also no practice of exchanging experience between specialists who are directly involved in attracting investment and international cooperation [9].

Particular attention needs to be paid to attracting projects (programs) of international technical assistance, which are important for socio-economic development of the region, as their implementation significantly reduces the burden on local budgets, active institutional changes, infrastructure development, which in turn, creates a favourable investment environment in the region. Some projects (programs) of international technical assistance allow to solve first of all social problems, which are often financed on a residual basis [10].

Common factors hindering investment attraction and development of foreign economic cooperation are imperfection, instability and inconsistency of the legal framework governing capital investment in Ukraine, low awareness of the international community about the investment potential of Ukraine as a whole and its individual regions.

Summarizing the above, the following can be noted. In the context of economic imbalances and global challenges, it is expedient to pursue an active state investment policy. An important role in attracting investment is played by ensuring political and legislative stability, purposefully informing the public about the results of measures taken to improve the investment climate in the country, which should give a positive signal to potential investors. The implementation of the proposed recommendations will raise the investment sphere of the state to a qualitatively new level and will contribute to its socio-economic and technological development.

The analysis of the constructed models of interaction of macroeconomic indicators and their phase trajectories allows to conclude that at this stage of development of economy of Ukraine unsteady and unstable

dynamics is observed, trajectories have fluctuating periodic or periodic character, therefore, insufficient stability of system leads to strengthening over time, it can be increasingly influenced, which can lead to catastrophic consequences.

Taking into account nonlinear effects in models of economic dynamics allows to analyze the patterns of development of real socio-economic processes in difficult conditions, which determine the monitoring methodology is a set of models of cointegration and phase analysis of macroeconomic indicators in Ukraine's economy qualitative analysis of factors of sustainability of development, determining the features of the development of transformation and transition processes. Introduction of tools for studying the dynamics of interaction of key macroeconomic indicators based on the proposed method of monitoring non-stationary dynamic processes will determine the strategy of stabilization and further development of the state economy, the quality of which is determined by close get adequate forecasts.

Further research is planned in the direction of development and application of adequate tools for monitoring macroeconomic indicators based on the study of their non-stationary dynamics in the context of the implementation of the investment strategy of the state.

Acknowledgement

The scientific and methodical tools have been implemented: by the Executive Committee of the Odessa City Council in the form of "Scientific and methodological recommendations to local authorities regarding the evaluation of the effectiveness of investment projects under the conditions of compliance control (certificate No. 12.2-16 outgoing number / 890 dated December 6, 2016, Act No. 21 / 01-12 / D dated September 1, 2016); Department of Economic Development of Odessa City Council (certificate No. 2565 / 01-41 dated December 5, 2016) during the development of the Strategy of Economic and Social Development of Odessa City until 2022, Program of Socio-Economic and Cultural Development of Odessa City in 2020, Investment Strategy "Odessa 5T".

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