Tamara S. Klebanova[1], Lidiya S. Guryanova[2], Inna K. Shevchenko[3]
MODEL BASIS OF EARLY WARNING AND LOCALIZATION OF CRISES IN ECONOMIC SYSTEMS OF TERRITORIES

The article offers the model basis for early warning and crises prevention based on the methods of econometric modelling, Fourier analysis, adaptive filtration, multidimensional analysis, scenario and imitating modelling. The offered basis enables investigating the resonance phenomena in their cyclic dynamics of economic indices and take strategic preventive measures directed at the localization of crisis phenomena in economic systems of territories.
Keywords: territories; cyclic development; resonance dynamics of economic indices; crisis phenomena; forecasting; prevention.

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МОДЕЛЬНИЙ БАЗИС РАННЬОГО ІНФОРМУВАННЯ Й ЛОКАЛІЗАЦІЇ КРИЗ В ЕКОНОМІЧНИХ СИСТЕМАХ ТЕРИТОРІЙ

У статті запропоновано модельний базис раннього інформування й попередження криз, заснований на методах економетричного моделювання, Фур'є-аналізу, адаптивної фільтрації, багатомірного аналізу, сценарного й імітаційного моделювання. Запропонований базис надає можливість досліджувати резонансні явища у циклічній динаміці економічних індикаторів, сформувати комплекс стратегічних превентивних заходів, спрямованих на локалізацію кризових явищ в економічних системах територій.
Ключові слова: території; циклічний розвиток; резонансна динаміка економічних індикаторів; кризові явища; прогнозування; попередження.
Форм. 1. Табл. 5. Рис. 2. Літ. 14.

Тамара С. Клебанова, Лидия С. Гурьянова, Инна К. Шевченко
МОДЕЛЬНЫЙ БАЗИС РАННЕГО ИНФОРМИРОВАНИЯ И ЛОКАЛИЗАЦИИ КРИЗИСОВ В ЭКОНОМИЧЕСКИХ СИСТЕМАХ ТЕРРИТОРИЙ

В статье предложен модельный базис раннего информирования и предупреждения кризисов, основанный на методах эконометрического моделирования, Фурье-анализа, адаптивной фильтрации, многомерного анализа, сценарного и имитационного моделирования. Предложенный базис дает возможность исследовать резонансные явления в циклической динамике экономических индикаторов, сформировать комплекс стратегических превентивных мер, направленных на локализацию кризисных явлений в экономических системах территорий.
Ключевые слова: территории; циклическое развитие; резонансная динамика экономических индикаторов; кризисные явления; прогнозирование; предупреждение.

Problem statement. Under the conditions of cyclic recession which has a negative impact on the dynamics of national economies development, including Ukraine and Russia, the increasing attention has been paid to spatial and dynamic analysis of crisis phenomena. The increase in the level of economy openness, the formation of market economy in the shape of a global system led to the growth of system risks which are shown, in particular, in resonance interaction of economic indices. The analysis of the business cycles structure and their interrelation enables predicting the formation of crisis situations and to have a choice of instruments for state regulation

of the economy, the negative consequences of economic crises aiming at smoothing and forming a steady trajectory of economic growth. Thus, depending on the efficiency of predicting systems and finding the point of crisis occurrence along with adaptation potential, both positive and negative trends of economic system development can be identified.

The localization of cyclic crises is carried out by means of using various tools of stabilization policy to which credit and monetary and financial leverages belong. The basic unit of stabilization policy in Ukraine and Russia is the tax and budgetary policy (fiscal policy). It should be noted that strengthening of the unevenness of territories' development, caused by various potentials to the adaptation of regional systems to changed conditions of functioning, led to the expansion of a number of chronically depressive territories, the decrease in stability of the budgetary system. In particular, it is shown in the essential delay of economic growth rates of territories which are the "basis" of national economy. The consequence of budget insufficiency is the decrease in the financial potential in alignment the levels of socioeconomic development of regions (territories), the increase of social tensions, the emergence of "funnel" of an economic crisis and the increase in the cyclic recession depth.

Under these conditions the problem of the improvement of the model basis for the warning system and the prevention of crisis phenomena in the economy is urgent and paramount.

Recent research and publications analysis. As the research of crisis phenomena is a difficult and complex process, for their assessment, analysis and forecasting a wide range of formalized and unformalized methods is used. In the works (Mezentsev, 2007; Solovyov and Ganchuk, 2009) econophysics methods are applied to analyze the crises at currency markets. In the works (Grinyaev et al., 2010; Sadovnichiy et al., 2011) it is offered to apply computer imitating modelling to forecast crises and their cyclic dynamics on the basis of J. Forrester's concept of system dynamics. The forecasting of phases in such a cycle in (Mashchenko, 2002) is carried out by means of expert methods of forecasting based on T. Saati's method of hierarchy analysis. In (Tsvetkov, 2010) the methods of analyzing and modelling the cyclic development of economic dynamics are added with the approach based on the use of production functions which proved its efficiency on substantial empirical data.

Econometric methods, casual and non-casual approaches, panel data; spatial lag models (Ponomarenko et al., 2009); multidimensional analysis (Ponomarenko et al., 2004) and imitating modelling are also applied to model the processes of financial regulation under the crisis conditions in economy development (Luk'yanenko, 2004; Lychkina, 2009).

Unresolved issues. However, in spite of the fact that the issue mentioned above has been discussed widely, a number of aspects connected with forecasting the cyclical dynamics of territories, research of crisis phenomena of various nature, the analysis of consequences of resonance fluctuations, the assessment of coherence of fiscal policy indices, their influence on the processes of convergence of regional development, have not been studied properly yet.

The research objective is to develop a model basis of the system of early informing and crises localization in economic systems of territories using the methods of forecasting management, the concept of cyclic dynamics of economic systems which

allows defining the "turning points", to reveal the preconditions of crisis phenomena, to investigate their depth and scale, to select fiscal policy tools directed at localizing (preventing or smoothing) negative consequences of crisis phenomena in territories economic systems.

Key research findings. The offered model basis includes the following main modules:

M1 — forecasting of macroeconomic indicators taking into account the cycle forming factors;

M2 — forecasting of indicators of regional development taking into account cycle development;

M3 — forecasting of balanced development of territories on the basis of fiscal policy tools.

The contents of the M1 module is the assessment and analysis of cyclic fluctuations; forecasting of macroindicators taking into account the factors of cyclic development. The methodical support of this module includes the technique to forecast the cyclic dynamics, the technique to analyze cyclic dynamics and forecast cycle phases. These techniques are based on the application of forecasting adaptive methods, methods of adaptive filtration, analytical alignment of a trend, methods of spectral analysis, autoregression models — the integrated sliding average value, methods of cluster analysis and hidden Markov models (Ponomarenko et al., 2012).

On the basis of the developed models of the module forecasting of economic indicators is carried out, forming the hypothesis of cyclic dynamics of development. The volume of industrial output is considered as such an indicator. The graphical analysis allowed drawing conclusions on the existence of a trend and periodic fluctuations. The assumption of trend components existence in a time row was also confirmed by the results of stationary check of a row using the Dickiy-Fuller's criterion.

To confirm the hypothesis on the existence in a time row of a short-term cyclic component, the adaptive models of forecasting considering or not considering short-term cyclic fluctuations were constructed. The analysis of the obtained data lead to a conclusion that adaptive models considering a linear trend give a smaller error in forecasts in comparison with other options of models. The quality criteria of a trend — seasonal models testify the existence of short-term cyclical fluctuations.

To develop the trend model various classes of growth curves are considered. As competing options of the trend model linear and exponential function are considered. The comparative analysis of the quality of trend models allowed choosing the linear model.

The study of the first remainder terms of the line with the methods of spectrum analysis showed the availability of the following periodic entries (Table 1).

Table 1. **Distribution of varieties among harmonic components,**
authors' development

Cycle period, months	48	96	32	19.2	24	16	9.6	13.71	7.38	2.9	10.7
Harmonic component contribution to process dispersion, %	43.31	22.90	6.23	6.03	2.88	2.01	1.31	1.02	1.00	0.96	0.72

The calculated values of periodic components of the line as well as the values of the $\varepsilon(t)$ second remainder terms gained with the help of trend and periodic compo-

nent elimination allow drawing a conclusion on the availability of a downward wave which can be explained by the availability of a long-term cycle at a time line.

The harmonic function was used to take into account the influence of the cycle component as a trend model. Its parameters are given below:

$$f(t) = 43468.6 - 26974.8\cos\frac{2\pi}{192}t - 2753.2\sin\frac{2\pi}{192}t. \tag{1}$$

The values of harmonic model quality criteria of the trend as well as the comparative analysis of actual and calculated values of the leveled lines allowed drawing a conclusion about quite a high accuracy of approximation. The analysis of the second remainder term shows the availability of autocorrelation in the remainder line. *ARIMA* models were used to describe the current regularities considering that the time line length did not let examine periodic entries which have higher cycle time. The values of the cogeneration model remainder autocorrelation function allow drawing a conclusion that the remainders stay as white noise with the probability point of 0.7351. It says about the appropriateness of the model chosen. The average absolute percent error of the cogeneration model approximation is 5.0377%.

The compositional analysis of the time lines of the following national measures was studied the same way: retail turnover (mln UAH), monthly average salary (UAH), real salary index (%), consumer market price index (%), producer price index of industrial products (%), product and service export (mln USD), real fixed capital formation (mln UAH), volume of building and construction work (mln UAH), money stock (M3 aggregate), migration rate (ths people).

The conducted research allowed us draw the following conclusions.

The short-term cyclic components have a dominating impact upon intra-temporal changes in such indicators as the real salary index (%), the consumer market price index (%), the price index of industrial producers (%), goods and services export (mln USD).

Mid-term cyclic components heavily influence the development of such indicators as the industrial output volume (explaining 84.38% of the process dispersion), the average monthly salary (explaining 87.84% of the process dispersion); M3 money supply (explaining 83.65% of the process dispersion).

Mid-term cyclic fluctuations have an essential impact on the development of the retail turnover, building construction volume, migration coefficient. Medium-term periodic components of a temporal series of retail turnover explain 45.483% of the process dispersion, 33.02% of the volume building construction works, and 17.27% of the migration coefficient.

The long-term cyclic fluctuations produce a dominating influence upon the inter-temporal changes in fixed investments, population shifts.

The results of the phases in business cycles forecasting which stem from the research into the mid-term cyclic components of temporal series, are given in Table 2.

The analysis of the resonance phenomena (Table 2) in the intra-temporal changes in macroeconomic indices shows the coincidence between the shrinking phases in the development of the indicators like industrial production volume, retail turnover, average monthly salary, migration coefficient and fixed investments and a possible formation of critical situations.

Table 2. **Phases of business cycles,** *authors' development*

point of maximum	shrinking phase	point of minimum	growth phase	point of maximum	shrinking phase	point of minimum	growth phase	point of maximum	shrinking phase	point of minimum	growth phase	point of maximum
industrial production volume												
99										128		
retail commodity turnover												
98		103		108		116		121		127		
average monthly salary												
99						120						128
building construction volume												
		99		103		109		116		122		128
the M3 money supply												
		101		114		118						126
migration coefficient												
		105		110								
fixed investments												
		98										

The aim of the *M2* module is to reveal and analyze the cyclical fluctuations of the indicators of regional development, to predict the indicators of cyclical development of regional social and economic systems. The aims of this module can be achieved using the clustering analysis methods, "barycentre" method, the methods of analyzing and predicting the cyclical development of economic intra-temporal changes (Klebanova et al., 2011).

The regions grouping according to the level of socioeconomic development was carried out by means of hierarchical and iterative methods of cluster analysis which enabled obtaining strong clusters (Table 3).

The analysis of the regions' trends enables detecting the principles of the development of the obtained clusters the gravity centre method was applied. The results of the representative selection are presented in Table 4.

As it is clearly seen in Table 4, Zaporizhzhia and Khmel'nyts'kyi regions are the representatives of the groups with high and low levels of socioeconomic development. With the help of the models set the composition of time series of the production index, volume of the used capital investments, the total area set in operation, retail turnover, financial results of ordinary business, average monthly salary and migration growth coefficient of these regions are analyzed.

The obtained results indicate that mid-term cyclical constituents have a dominant impact on the dynamics of such indices as the industry production index, average monthly salary and migration growth coefficient. The dynamics of the used capital investments and the total area set in operation is influenced by short-term cyclical constituents. On the basis of the research of the mid-term periodic components of time series phases of economic cycles in regional systems were singled out.

The evaluation of resonance phenomena in the dynamics of regional development indices allows concluding that the recession phases of a number of indices coincide, the indices being the industry production index, retail turnover, average monthly salary, migration coefficient, the total area set in operation. This testifies to the possible formation of crisis situations.

Table 3. **Classification of Ukrainian regions by the level of their socioeconomic development,** *authors' development*

	Region	Years										Spatial and dynamic classification
		1	2	3	4	5	6	7	8	9	10	
1	ARC	l*	l	h	h	h	l	l	h	h	h	l
2	Vinnytsia	l	l	l	l	l	l	l	l	l	l	l
3	Volyn	l	l	l	l	l	l	l	l	l	l	l
4	Dnipropetrovs'k	h	h	h	h	h	h	h	h	h	h	h
5	Donets'k	h	h	h	h	h	h	h	h	h	h	h
6	Zhytomyr	l	l	l	l	l	l	l	l	l	l	l
7	Zakarpattya	l	l	l	l	l	l	l	l	l	l	l
8	Zaporizhzhia	h	h	h	h	h	h	h	h	h	h	?
9	Ivano-Frankivsk	l	l	l	l	l	l	l	l	l	l	l
10	Kyyiv	l	h	h	h	h	l	h	h	h	h	h
11	Kirovohrad	l	l	l	l	l	l	l	l	l	l	l
12	Luhans'k	l	h	h	h	h	l	h	h	h	h	h
13	L'viv	h	h	h	h	h	l	h	h	h	h	h
14	Mykolayiv	l	l	h	h	h	l	h	l	l	l	l
15	Odessa	h	h	h	h	h	l	h	h	h	h	h
16	Poltava	h	h	h	h	h	h	h	h	h	h	h
17	Rivnen	l	l	l	l	l	l	l	l	l	l	l
18	Sumy	l	l	l	l	l	h	l	l	l	l	l
19	Ternopil	l	l	l	l	l	l	l	l	l	l	l
20	Kharkiv	h	h	h	h	h	h	h	h	h	h	h
21	Kherson	l	l	l	l	l	l	h	l	l	l	l
22	Khmel'nyts'kyi	l	l	l	l	l	l	l	l	l	l	l
23	Cherkasy	l	l	l	l	l	l	h	l	l	l	l
24	Chernivtsi	l	l	l	l	l	l	l	l	l	l	l
25	Chernihiv	l	l	l	l	l	l	h	l	l	l	l

* l – group of regions with low level of socioeconomic development (SED); h – group of regions with high level of socioeconomic development (SED).

Table 4. **Regions – group representatives,** *authors' development*

Region group/Year	1	2	3	4	5
SED high level	Kharkiv	Zaporizhzhia	Zaporizhzhia	Odessa	Zaporizhzhia
SED low level	Khmel'ny-ts'kyi	Cherkasy	Zhytomyr	Khmel'ny-ts'kyi	Khmel'ny-ts'kyi
Region group/Year	**6**	**7**	**8**	**9**	**Spatial and dynamic data**
SED high level	Zaporizhzhia	Poltava	Zaporizhzhia	Zaporizhzhia	**Zaporizhzhia**
SED low level	Khmel'ny-ts'kyi	Khmel'ny-ts'kyi	Khmel'ny-ts'kyi	Khmel'ny-ts'kyi	**Khmel'ny-tskyi**

The aim of Module *M3* is the development of the inertia scenario of changing the characteristics of social and economic development of these territories due to the fiscal policy. Besides, the Module is intended to analyze dynamically the unbalanced features of regional development as well as to design and analyze alternative scenarios for managing the social and economic development of these territories. To solve the Module tasks the methods of imitation and scenario modelling are applied (Klebanova et al., 2012, 2013)

The development of inertia scenario of changing the characteristics of the social and economic development of territories as a result of the approved fiscal (tax-budget) policy was carried out on the basis of the disproportion levelling using tax levers and the imitation model of the region financial regulation. The disproportion level-

ing model enables calculating the forecast values of tax revenues taking into consideration the import substitution policy and attaching greater importance to the excise tax fiscal role. It also enables analyzing the tax load dynamics and determine financial opportunities of leveling the disproportions in regional development. The model of financial regulation of regional development provides an opportunity to carry out polyvariant forecast calculations on economic development of the regions and the state as a whole subject to the financial regulation policy.

While developing the scenarios, interbudgetary transfer values were treated as management variables. Determining the investment transfer values the changes in the Budget Code regarding the formation of the regional development fund were considered. We develop the optimistic inertia scenario (Scenario 1) and the pessimistic inertia scenario (Scenario 2). Scenario 1 considers positive reactions in the economy, the growth of tax revenues due to the growing tax database due to change tax policy parameters. Scenario 2 assumes forming positive reactions in the economy with a time lag and budget insufficiency which affects financial opportunities of levelling the social and economic development of territories and eliminating the negative aftermath of cyclical fluctuations with the help of interbudgetary transfers.

The results of calculating the integral index of the level of regional socioeconomic development (Ponomarenko et al., 2004) obtained on the basis average indices of socioeconomic development of 25 Ukrainian regions within the forecasted period and characterizing the development trend of the national economy in general are presented in Figure 1.
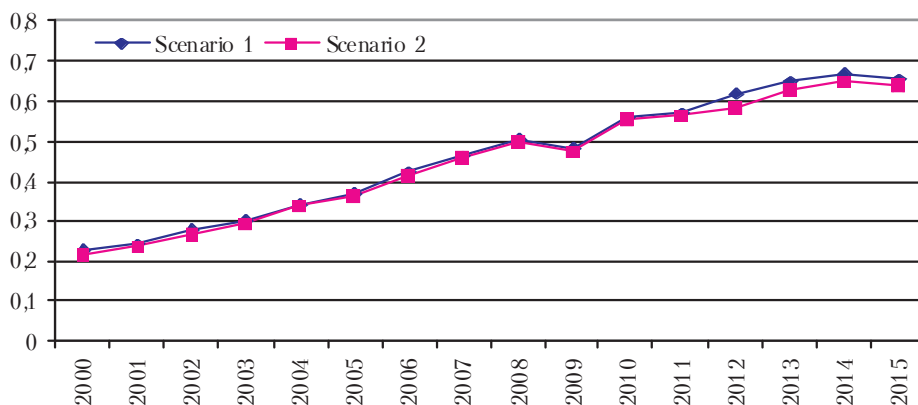

Figure 1. **Dynamics of the integral index of the level of the socioeconomic development of the territories,** *authors' development*

As seen in Figure 1, the approved stabilization policy enables getting positive mid-term effect in both Scenario 1 and Scenario 2. This is testified by the dynamics of the integral index values within 2012−2014. Reducing the integral index values in 2015 provides an opportunity to conclude that there is a downward trend in the development and a "deferred" cyclical recession. This confirms the necessity to correct the parameters of allocating interbudgetary transfers.

To develop an efficient regional financial policy the regions were classified according to the level and rate of their socioeconomic development. The research of

the regions according to this classification variables enabled to identify the following groups of regions: regions-leaders, stagnating regions, developing regions, problem regions. The regions comprising each group are presented in Table 5.

Table 5. **Grouping the regions for regional management,** *authors' development*

Name of the regions group	Regions comprising the cluster	Specification
Regions-leaders	Dnipropetrovs'k, Zaporizhzhia, Kyyiv, Luhans'k, Mykolayiv, Odessa, Poltava, Kharkiv	Regions with high level and rate of socioeconomic development
Stagnating regions	Crimea, Donets'k, L'viv	Regions with high level and low rate of socioeconomic development
Developing regions	Kirovohrad, Ternopil, Kherson, Cherkasy, Chernivtsi	Regions with low level and high rate of socioeconomic development
Problem regions	Vinnytsa, Volyn, Zhytomyr, Zakarpatye, Ivano-Frankivs'k, Rivne, Sumy, Khmel'nyts'kyi, Chernihiv	Regions with low level and rate of socioeconomic development

The analysis of the share of investment transfers allocated to the abovementioned groups of regions enables the conclusion that the approved policy of levelling the regional socioeconomic development is aimed at supporting the stagnating and problem regions in the first place.

As an alternative scenario of regional financial policy the compensational scenario (Scenario 3) was taken. This scenario assumes stimulation of economic growth of not only problem and stagnating regions, but also regions-leaders which experience the economic growth deceleration. The possibility of changing the distribution mechanisms since 2013 was also considered. As benchmark data to form the scenario the forecast of tax revenues was taken. The forecast was carried out on the basis of the model of levelling the disproportions of socioeconomic systems using tax leverage. The analysis was carried out according to the pessimistic development scenario, because this scenario enables the evaluation of whether the compensation effect is achieved on account of changing the budget policy parameters.

The alternative anti-crisis scenario (Scenario 4) views a step-by-step financial support of regions-recepients and regions-donors. Modelling the sums of investment transfers in 2013 we consider the parameters of distributing the regional development fund approved by the Budget Code. The parameters are intended to arrange priority-oriented financial support for the problem regions. In 2014 in order to prevent the cyclical recession in the dynamics of macroeconomic indices expected in 2015, the parameters of distributing investment transfers were corrected to support not only the problem regions, but also the leaders which experience the growth rate deceleration.

Regarding various scenarios, the values of the integral index of the region socioeconomic development, characterizing the tendency of the development of the national economy as a whole are shown in Figure 2.

As it is clear from Figure 2, under Scenario 3 being implemented, the predicted stagnation phase is formed regarding the dynamics of macroeconomic indices throughout the 2013. This confirms the efficiency of the approved stabilization policy which enables prolonging the growth phase for 2013—2014.

The change of budget policy parameters in 2014 provides an opportunity to reduce the gravity of the crisis compared to the basic pessimistic scenario of budget

insufficiency. The dynamics of the integral index under Scenario 4 coincides with the dynamics of index while implementing Scenario 1 taking into consideration the optimistic forecast of the budget tax revenues.
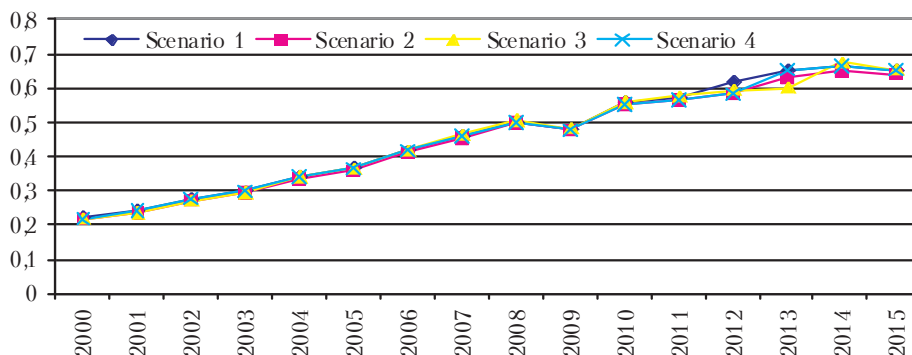

Figure 2. **The values of the integral index of the socioeconomic development of territories,** *authors' development*

Conclusion. The developed model basis of informing and localizing crises in regional economic systems enables analyzing the resonance phenomena in the dynamics of economic indices of regional development and forecast the likelihood of local and global crises. Besides, the basis provides an opportunity to correct promptly the parameters of the fiscal policy aimed at the region balanced development and the prevention of economic disasters.

References:

Исследование экономических циклов в странах постсоветского пространства / А. Цветков, К. Зоидов, В. Губин и др. — М.: ЦЭМИ РАН, 2010. — 310 с.

Лук'яненко І.Г. Системне моделювання показників бюджетної системи України: принципи та інструменти. — К.: Києво-Могилянська академія, 2004. — 541 с.

Лычкина Н.Н. Компьютерное моделирование социально-экономического развития регионов в системах поддержки принятия решений, 2009 // simulation.su.

Мащенко Е.В. Прогнозування економічних криз в умовах сучасних світогосподарських відносин: Автореф. дис... канд. екон. наук: 08.05.01 / НАН України. Ін-т світ. економіки і міжнар. відносин. — К., 2002. — 18 с.

Мезенцев О.М. Рекурентна карта світової валютної кризи 1998 року // Інформаційні технології та моделювання в економіці: Збірник наук. праць Другої всеукраїнської наук.-практ. конф. молодих науковців (Черкаси, 15—17 травня 2007 р.). — Черкаси: Брама, 2007. — С. 90—92.

Методы прогнозирования сроков наступления финансово-экономических кризисов: Аналитический доклад / С.Н. Гриняев, А.Н. Фомин, С.А. Крюкова, Г.А. Макаренко. — М.: Центр стратегических оценок и прогнозов, 2010. — 44 с.

Модели оценки неравномерности и циклической динамики развития территорий: Монография / Под ред. Т.С. Клебановой, Н.А. Кизима. — Х.: ИНЖЭК, 2011. — 352 с.

Моделирование социально-экономических систем: теория и практика: Монография / Под ред. В.С. Пономаренко, Т.С. Клебановой, Н.А. Кизима. — Х.: ИНЖЭК, 2012. — 592 с.

Неравномерность и цикличность динамики социально-экономического развития регионов: оценка, анализ, прогнозирование. Монография / Т.С. Клебанова, Н.А. Кизим, Л.С. Гурьянова и др. — Х.: ИНЖЭК, 2012. — 512 с.

Пономаренко В.С., Клебанова Т.С., Чернова Н.Л. Экономическая безопасность региона: анализ, оценка, прогнозирование: Монография. — Х.: ИНЖЭК, 2004. — 144 с.

Современные проблемы моделирования социально-экономических систем: Монография / Под ред. В.С. Пономаренко, Н.А. Кизима, Т.С. Клебановой. — Х.: ИНЖЭК, 2009. — 440 с.

Соловйов В.М., Ганчук А.А. Еконофізичні індикатори-предвісники раннього попередження кизових явищ // Проблеми економічної кібернетики: Тези доповідей XIV Всеукраїнської науково-методичної конференції (8—9 жовтня 2009 р. м. Харків). — Х.: ХНУ ім. В.Н. Каразіна, 2009. — С. 134—135.

Сценарий и перспектива развития России. Будущая Россия / В.А. Садовничий, А.А. Акаев, А.В. Коротаев, Г.Г. Малинецкий. — М.: Ленанд, 2011. — 320 с.

Сценарные модели сбалансированного социально-экономического развития регионов: Монография / Т.С. Клебанова, О.В. Мозенков, Л.С. Гурьянова и др. — Бердянск, 2013. — 328 с.

Стаття надійшла до редакції 18.06.2013.

КНИЖКОВИЙ СВІТ

СУЧАСНА ЕКОНОМІЧНА ТА ЮРИДИЧНА ОСВІТА
ПРЕСТИЖНИЙ ВИЩИЙ НАВЧАЛЬНИЙ ЗАКЛАД
НАЦІОНАЛЬНА АКАДЕМІЯ УПРАВЛІННЯ
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МАРКЕТИНГ
підручник
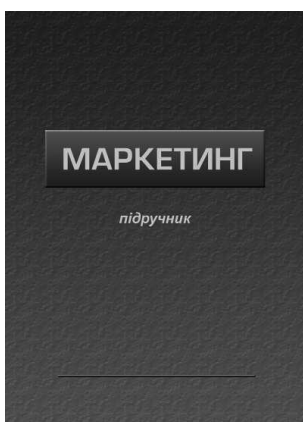
Маркетинг: Підручник / За заг. ред. д.е.н., проф. М.М. Єрмошенка, д.е.н., проф. С.А. Єрохіна. — К.: Національна академія управління, 2011. — 632 с. Ціна без доставки — 140 грн.

Має гриф підручника від МОН України.

У підручнику в концентрованому вигляді викладено зміст усіх нормативних дисциплін по спеціальності «Маркетинг». По кожній з дисциплін базового курсу пропонуються контрольні питання, тести, глосарій і література.

Для викладачів, майбутніх бакалаврів і магістрів, аспірантів, маркетологів-практиків, наукових працівників, а також для всіх, хто цікавиться сучасними технологіями маркетингу.

Зміст