VILNIUS UNIVERSITY

Artūras Vitas

THE ECONOMY STRUCTURAL CHANGES ANALYSIS AND EVALUATION IN BALTIC STATES

Summary of the Doctoral Dissertation
Social Sciences, Economics (04 S)

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VILNIAUS UNIVERSITETAS

Artūras Vitas

Baltijos šalių ūkio struktūrinių pokyčių analizė ir vertinimas

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Su disertacija galima susipažinti Vilniaus universiteto bibliotekoje ir Martyno Mažvydo bibliotekoje.

GENERAL CHARACTERISIC OF THE DISSERTATION

Relevance of the topic

When changing the juncture of market then in the structure of economy changes are in progress. They positively or negatively influence economic growth. Structural changes of economy intensify in the times of economic downturn and growth.

Global financial crisis, which started in 2008, showed that in the structure of the global economy issues have formed, which need to be solved immediately. Structural changes in the global economy occurred before 2008 produced positive short-term result – economical growth. However the fast growth of financial intermediation industry followed by construction sector revealed structural problems in the economy of USA as well as the Baltic states. Baltic countries had surprised the whole world demonstrating an impressive achievement of their economies before 2008. This situation proved that structural changes in the economies of the Baltic states are effective, because they ensure economical growth, which also surprised international organizations such as International Monetary Fund and World Bank. Governments of Baltic countries were satisfied with an achievement one of the main macro economical goals – steady yearly economic growth of 8-10%. The expectation of societies, governments and other important EU institutions were met with such a result. Nevertheless in the middle of year 2007 well-known economists of the Baltic states warned that structural changes in the economy are not effective despite short-term positive result – the growth of the economy. Overheating of the economy of Baltic countries was the main source of a concern, as economical structural changes were irrational, misguiding and illusive.

The main issue for the national governments in achieving long-term economic development goals is to form effective economic structure, which guarantees effective development of economical sectors. Each government tries to create such structural policy, which allows increasing structural changes of economy effectiveness. Baltic countries have similar history of economical evolution, but their economic growth and structural changes of economy effectiveness are different. No country wishes to have economic downturn and in order to avoid undesired situation, it is important not only to value structural changes of economy effectiveness but also to analyze reasons why they

have negative effect on economic development. Proper methodology which allows evaluating structural changes of economy effectiveness is required.

Research problem

Research problem is the lack of methodic to analyze structural changes of economy effectiveness thoroughly and properly. Few structural changes of economy analysis methods (structural change intensity coefficient, structural change absolute value, structural change index geometrical interpretation, structural dynamic analysis method etc.) only allow evaluating positive or negative influence on the economic growth. None of these methods indentifies the reasons why structural changes occur. Moreover, they cannot evaluate structure of economy effectiveness, the nature of changes and their significance. Application of these models for structural changes of economy evaluation provides only narrow result instead of full picture and its reasons.

The other research problem is that is it unclear how structure of economy should look like, so that economic sectors could guarantee long-term economic growth. Furthermore, it is not stated which sectors are the most important and what their share should be so that structure of economy would be effective.

The final issue is that it is unclear how macroeconomic model should look like, which would allow structural changes of economy effective evaluation and help governments to make the right decisions on effective structure of economy formation and rational policy on structure of economy for different economic circumstances.

The research problem scale

There is not enough attention devoted to structural changes, their analysis and evaluation in Baltic States. Only few papers of Lithuanian scientific are looking at structural changes of economy: N. Balčiūnas (2000), K. Matuzevičiūtė, S. Skunčikienė, E. Tamošaitytė (2010), P. Misiūnas, B. Kaminskienė (1999). Most of the Lithuanian authors investigated and evaluated structural changes when the Baltic states were creating market economy. The exception is the paper by K. Matuzevičiūtė, S. Skunčikienė, E. Tamošaitytė (2010). Authors analyze structural changes of Gross Domestic Product of Baltic countries, however, nor structure of economy, neither

structural changes of economy are evaluated. Structural changes evaluation issues are mostly investigated by foreign scholars.

Chen, Jefferson and Zhang (2010) see structural changes as the result of the adapted structural policy. Authors believe that using structural policy is the only way to achieve effective economic growth (stable, long-term, balanced). Cortuk and Singh (2010) provide main methods to evaluate structural changes of economy, which focus on interpretation of coefficients of structural changes. Katz (2000) identifies structural policy as the tool for structural changes of economy, which is used to solve structural problems in the economy.

Агибалов, Григорьев (2010) focus on economic growth and its effect on social area. Authors only briefly mention structural changes of economy related to the economic growth. Алиакберова (2009) evaluates foreign capital influence and its importance to structural changes of economy and the nature of their formation. Асемоглу (2009) analyzes the reasons of the economic downturn and evaluates different effects of structural changes on the economic growth, based on structural changes of economy. Белоусов (2001) investigates the characteristics of effective economic growth and how it is influenced by structural changes. Бильчак, Сафонова И.Ю (2008) list the reasons for structural changes. They claim that structural changes of economy happen due to the technological inventions and the application of high technologies. Гасанов (2009) believes that structural changes of economy take place due to the intensive application of innovations in business. Moreover, author stresses the importance of the innovations in the effective economical growth context. Гашимова (2009) characterizes the essence of structural changes of economy and provides their definition. Данеев (2004) investigates regional aspect of structure of economy modeling and provides definition of an effective structure of economy. Клинов (2008) believes that structural changes of economy happen due to fluctuation of the resource price and the changes in the national income size. Коровкин, Полежаев, Андрюнин (2002) see the reasons of structural changes of economy as a sequence of negative social and economical tendencies. Плеханова (2007) points out that structural changes of economy occur due to the implementation of innovative ideas and application of new technologies, as well as economic cycles. Саяпова (2004) analyzes structural changes of economy through explanation of the essence of structure of economy based on Leontjev produce table. Спасская (2003)

looks at the methods for structural changes of economy evaluation and provides the macro economical model, which should be used in the analysis of structural changes. Титов (2006) investigates the reasons of structural changes of economy and concludes that they occur due to the increase in the number of population, changes in employment levels in different sectors and changes in competition. Хоршев (2007) analyzes structural changes on a regional level. The focus of his paper is put on regional process effect to form the structure of economy. However, most of these scholars investigate structural changes of economies of their own countries or larger economies such as USA, Russia, Asian regions and put little effort into evaluation of the Baltic states.

Object of the research

Object of the research – analysis of structural changes of economy of Baltic countries and modeling the evaluation of effectiveness of these changes.

The aim and tasks of the research

The aim of the research is to analyze structural changes of economy of the Baltic states and suggest the model for structural changes of economy effectiveness evaluation, based on analysis results.

The aim of the research demonstrates general direction of the dissertation, considering the analysis of the topic from both theoretical and applied point of view. The model for of structural changes of economy effectiveness evaluation will be suggested, which can be used to evaluate these changes and identify the reasons for these changes to occur.

The numbers of **tasks** are solved in order to achieve the aim of the research:

1. Analyze the methods provided by scholars for structural changes of economy evaluation.
2. Create and apply the method for structural changes of economy effectiveness evaluation.
3. Analyze structural changes of economy in Baltic countries and provide their assessment.
4. Evaluate structural changes of economy in the Baltic states using few methods.

5. Evaluate structural changes of economy in Baltic countries using the suggested effectiveness evaluation model.
6. Evaluate the perspectives of structural changes of economy in the Baltic states applying the suggested effectiveness evaluation model.

Defended propositions:

- ❖ most of the current structural changes of economy evaluation methods provide only narrow analysis of their nature;
- ❖ the suggested structural changes of economy evaluation model provides macroeconomic information about the occurring issues in economic sectors and the state of structure of economy.

Scientific novelty and practical significance

The topic on structural changes of economy in the Baltic states and their evaluation chosen for this paper was not extensively investigated by Lithuanian scholars. Only few scientist investigated structural changes in Lithuania and Gross Domestic Product of Baltic countries. No research on recent structural changes of economy in Baltic countries and their evaluation has been conducted. Structural changes of economy in the Baltic states are evaluated in this paper using the model suggested by the author. As well as broader and more comprehensive structural changes of economy effectiveness evaluation is provided. The novelty of the paper is proved by the theoretical and practical results.

Theoretical utility:

- ❖ systematic analysis of Lithuanian and foreign countries scholarly literature on the topic of structural changes of economy evaluation was conducted;
- ❖ comprehensive definition of structural changes of economy is provided, highlighting the difference between structural changes and structural fluctuations;
- ❖ the definition of structural policy provided by scholars is analyzed, as well as its significance for economy and influence on structural changes of economy is provided;
- ❖ comparative analysis of economical activity at different levels is conducted;

- the new model, which emphasizes the reasons of structural changes of economy and provides their effectiveness evaluation, is presented, based on the analysis of evaluation methods of structural changes of economy.

Practical utility:

- structural changes of economy in the Baltic states are analyzed;
- characteristics and features of structure of economy of Baltic countries are investigated. Theoretical interpretation of structural changes of effective economy features and characteristics is provided.
- structural changes of economy evaluation model is created, which is used to identify the reasons and evaluate their effectiveness;
- structural changes of economy evaluation model can be applied for all countries;
- structural changes of economy in the Baltic states future perspectives are provided.

The research conducted in this paper can be used by economic (and structural) policy-makers in Baltic countries, economy ministry specialists, responsible for economy development and foreign capital attraction, and scholars interested in structural changes of economy in the Baltic states.

Research methods

Historical investigation, data analysis and comparison methods were used to analyze structural changes of economy in the Baltic states. Analytical and empirical methods, concretize, generalization, observation were used in conducting researches. Following information sources were used for the research: articles by Lithuanian and foreign scholars published in scientific journals, overviews of commercial banks in Baltic countries and data published by international financial organizations.

The results are generalized and conclusions are provided after the investigation of Baltic countries structure of economy and evaluation of its ongoing structural changes.

Empirical data was gathered in order to evaluate structural changes of economy in the Baltic states and generalized conclusions were provided.

Logical structure of the thesis

The doctoral thesis consists of the introduction, three chapters, conclusions. The volume of the work is 166 pages, 67 tables and 27 figures; 163 references were used while it writing the thesis.

The logical structure of the dissertation is showed in Fig. 1.

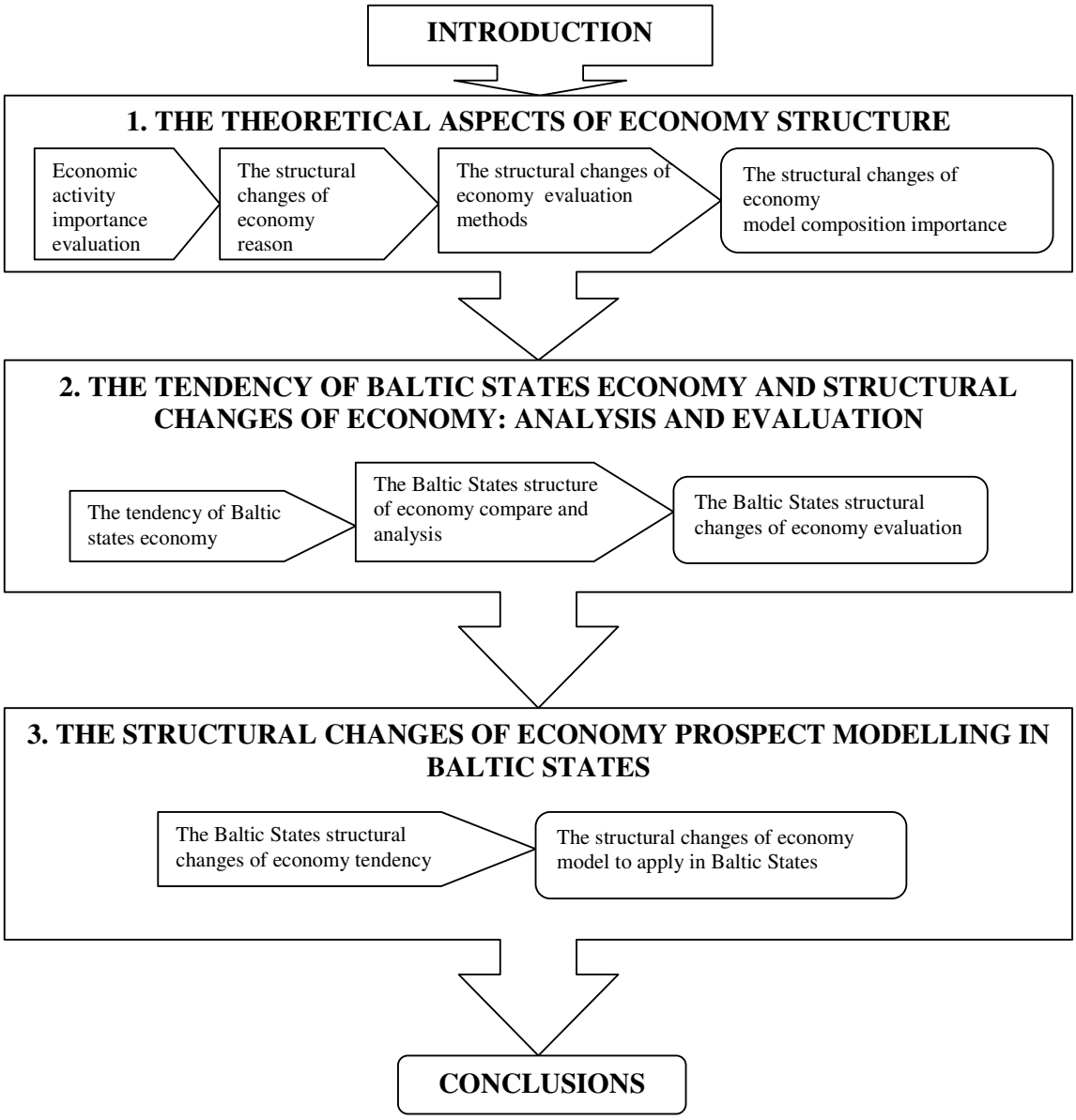


Fig. 1. **Logical structure of the dissertation**

SUMMARY

Classification definition of economic activities, structure of economy and economic sectors are examined in the **first chapter**. Structural policy, structural changes of economy and their evaluation methods are overviewed and new structural changes of economy evaluation model is suggested.

Analysis of economic activity concept is provided in **1.1. section**. Various definitions of economic activity provided by scholars are analyzed in this part. Economic activity is a complex integral system, where economic laws hold. Various economic processes constantly occur in such system based on economic logic. Economic activity is a rational activity by the subject aimed at gaining utility according to Choliz (2006). In this case utility is considered as profit achieving. Table 1 provides different definitions of economic activity found in scholarly literature:

Table 1. **Economic activity definitions**

Year	Author	Definition
2004	Raiser et al.	All subject's economic relations which are used as the basis for production and services provision for consumers.
2005	Franke et al.	Subjects', who are unified by economic relations, activity based on which output is manufactured and services are provided.
2006	Choliz et al.	Subjects' activity, unified by economic relations, based on which goods are created and services are provided for economic benefit purpose.
2007	Орехова	Subjects', who are unified by economic relations, activity for output manufacturing and services provision purposes.
2008	Проклин	Subjects' purposive activity, based on economic laws, for creation goods for satisfaction the demand of the society
2010	Федоляк	All subjects' economic relations which are used as the basis for production and distribution and services provision.
2010	Statistical yearbook	Subjects' activity required for creation of certain goods and services; the mode of resource use in order to create goods for satisfaction the demand of the society.

Source: compiled by author

Definitions provided in Table 1 suggest that majority of the authors distinguishes following purposes of economic activities:

- Satisfaction of society demand;
- Increase of current existing wealth.

Needs' satisfaction is necessary to ensure the existence and survival of individual in the society. Whereas the increase of owners' wealth is needed to survive in the market and gain profits from economical activity.

Structural changes of economy reasons are identified in **1.2. section**. The nature of structural changes of economy is analyzed in this part. Structural changes in the structure of economy form complex reform system. The issue derives from the fact that there is no clear definition or rule for the process in structure of economy to be considered fluctuation or change. Simply there are no defined tolerance lines, numbers or percentages, when process in structure of economy can be called structural change rather that structural fluctuation.

It may be supposed that structural changes show deformational processes in structure of economy:

Table 2. **Reasons of structural changes in scientific literature**

Year	Author	Reasons
2001	Яременко	Living standard, investment activity, changes in consumption trends of the society, overall decrease in manufacturing.
2002	Коровкин и др.	Sequence of accumulated negative social-economic tendencies.
2002	Суворов и др.	The result of the decrease in investment activity, primary capital, exports expansion possibilities.
2004	Raiser ir kt.	Too fast economic sector expansion financed by crediting.
2005	Franke ir kt.	Inefficiency in structure of economy – low labor productivity, low return on investment; formation of disproportions in structure of economy.
2005	Сидоренко	Changes in credits, taxes, trade, innovation policy application.
2006	Титов	Increase in population size, employment in economic sectors, study time, political regime, competitive advantage.
2007	Плеханова	New technologies application, innovative ideas realization, existence of structural cycles.
2008	Бильчак и др.	Technological inventions and discoveries application, high technologies application: informatics, biotechnology, genes engineering, satellite connection.
2008	Клинов	Fluctuation of resource prices and changes in national income.
2010	Кочкурова	Economic cycles, economic shocks, changes in structure of economic resources, changes in consumption and savings, changes in the needs of households and individuals.
2011	Guillo D. M.	Too fast crediting of the economy; changes in the needs of society; innovation application in economy.
2012	Hartwig J.	High technologies application in economic sectors; too fast expansion of financial sector.

Source: compiled by author

The overview of scholarly articles indicates that main reasons for structural changes of economy are associated with economic policy formed by the government (social, taxes, exports, structural, credits etc.) as well as global market conjuncture – international trade tendencies and consumption features of the society.

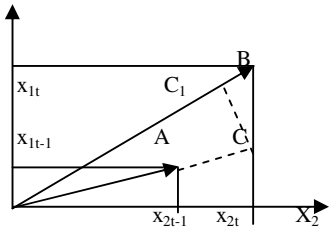
Majority of foreign scholars (Сидоренко, Кочкурова, Бильчак, Плеханова) investigating structural changes call them "the changes in the proportions of the economical system, occurring due to influence of all structural factors". It can be concluded that such structural changes definition is not sufficient, as the number of questions arises from it. Firstly, what can be defined as structural change? Should all processes in structure of economy be considered as structural? Secondly, should structural changes be considered as economic process in structure of economy? Should structural changes be considered and evaluated as the consequence of the past, present and future of processes in structure of economy? Whatever the answers are, all changes occurring in structure of economy are of a structural nature.

Structural changes can be evaluated according to their impact on whole structure of economy as well, i.e. changes significantly changing old structure of economy into new one and structural changes slightly changing structure of economy. Structural change of economy is considered as economic process correlated with other dynamic processes in economy: cycles, fluctuations and reformations. Economic cycle from the perspective of structural changes is considered as the result of few of those changes.

Structural changes of economy evaluation methods are analyzed in **1.3. section**. Few structural changes of economy evaluation methods are provided in scientific literature.

Table 3. **The structural changes of economy evaluation methods**

Method	Formula	Description	Positive	Negative
The intensive rate of structural changes	$K = \frac{\sqrt{\sum_{t=2}^{n} (S_{ti} - S_{t0})^2}}{m}$ Where K – the intensive rate of structural changes; S_{ti} – economic activity part; *ti, to* – current and basic time; n – economic activities quantity; m – time of years.	The intensive rate shows the structural changes intensive of economy in time *ti*, compare with basic period *to*. When this rate value is more bigest, then more intensive going structural changes, and conversely.	1. Easy to calculate.	1. The calculate take a long time. 2. Don't show effect for all structure of economy.
The absolute structural changes rate	$M = D_i - D_0$,	The absolute structural changes rate shows structural chnanges of	1. Easy to calculate. 2. Simple	1. The interpretation right for

	$M_{sum} = \sum_{i=1}^{n} M_i$ Where M – the absolute structural changes rate; D_i – economic activity part %; D_0 – economic activity part % basic period; M_{sum} – sun of the absolute structural changes rate.	economy and his effect to economic growth.If rate valu eis positive, then structural change raise economic growth and conversely – negative structural rate value reducible economic growth.	interpretation.	particular situation or particular analysis goal but it isn‘t show effect for total structure of economy.
The geometrical interpretation of structural changes	X_1  Where X_1, X_2 – economic activity; *A* – basic year (t -1); *B* – current year (t); x_i value added by „i“ economic activity. $\cos\alpha = \varphi_t = \frac{\sum x_{it} x_{it-1}}{\sqrt{\left(\sum x_{it}^2 \sum x_{it-1}^2\right)}}$ $\alpha = \arccos(\varphi_t)$	Length of vector *OA* and *OB* shows GDP value. *OA* and *OB* difference modulus shows GDP growth tempo. Maximum cos α value get, when $\alpha = 0$ (structures are consist – a little structural changes). And conversely, minimum cos α value get, when $\alpha = \pi / 2$ (structures aren‘t consist – the structural changes are in process).	1. The geometrical interpretation of structural changes index shows economic change from point A to B. It shows more exactly view about structural changes. 2. It shows the efficiency of structural changes of economy.	1. The calculution take a longer time. 2. Limited geometrical presentment of economic activities. 3. It is difficult interpration.
The analysis method of structural dynamics	S = N + D, Where *D* – rate of structural dynamics; *N* – economic development rate.	The analysis method of structural dynamics goal is – summarize S rate is two component aspect: structural dynamics *D* and economic development *N*. If $N + D > 0$ and $D<0$, then it comes economic structural crisis; if $N + D < 0$ and $D, N <0$, then comes economic crisis; If $N + D >0$, then comes economic growth.	1. It isn‘t difficult interpration. 2. It shows result of structural changes to economic development. 3. Simple rate composition.	1. Don‘t show structural changes reason.
The intensity of structural changes	$\begin{cases} E = M*V, \\ V = \frac{M - M_0}{T} \end{cases}$ *M* – economic activity part in current year; M_0 – economic activity part in basic year; *T* – time period; *V* – speed of structural changes; *E* – the intensity of structural changes.	The system of rates show structural changes and their speed. If V>0, then structural changes effect is positive for economic growth; if V <0, then structural changes effect is negative for economic growth.	1. Easy to calculate. 2. Simple interpretation.	1. Limited interpretation about structural changes. 2. Don‘t show structural changes reason.

Source: compiled by author by Бильчак, Сафонова (2008), Артемова, Кострюкова (2007), Сидоренко, Ясеновская (2005), Cortuk, Singh (2010), Domingo C., Tonella G. (2000)

The decision over which model to use depends on the aim of structural changes analysis. In order to evaluate structural changes in structure of economy the first two are usually used: i.e. structural changes intensity coefficient and structural changes absolute

measure. These indexes are applied, as they are easy to calculate and they are informative for interpretation of their significance to economic growth.

Author suggests evaluation method for structural changes of economy in **1.4. section**. Structure of economy of each country depends on available resource. Nevertheless general trends can be shaped: the dominance of traditional economic sectors – manufacturing, financial intermediation and services. Without these three economic sectors economy of the country would be paralyzed, therefore picture 2 shows the interdependence of manufacturing, financial intermediation and services sectors:

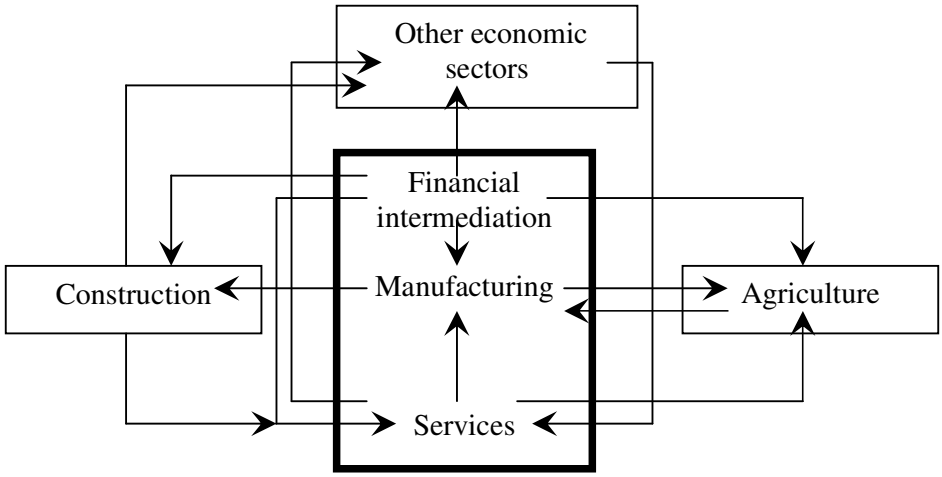


Fig.2. **Interdependence of economic sectors**

Source: compiled by author

Therefore structural changes in agriculture, construction and other economic sectors influence changes in manufacturing, financial intermediation and services and via-versa. Due to the fact that three main economic sectors – manufacturing, financial intermediation and services - are included in the definition of effective structure of economy, the model has following expression:

$$Y^t_{evm} = x_{1*}(\delta_1+\varepsilon_1)*t + x_{2*}(\delta_2+ \varepsilon_2)*t + x_{3*}(\delta_3- \varepsilon_3)*t, \quad (1)$$

where Y^t_{evm} – change of GDP at time t;

x_1 – manufacturing sector share in structure of economy;

x_2 – services sector share in structure of economy;

x_3 – financial sector share in structure of economy;

$\delta_1, \delta_2, \delta_3$ - $\alpha_1 + \beta_1$, $\alpha_2 + \beta_2$, $\alpha_3 + \beta_3$ sum;

ε_1 – (ΔW-ΔP_{pr}) the difference of average wage change and manufacturing output price change;

ε_2 – (ΔN+ΔW) the sum of population size change and average wage change;

ε_3 – (Δr_{EUR}+ΔW) the sum of interest rate (EURIBOR) change and average wage change;

t – number of years used to forecast structural changes of economy.

Structural changes of economy effectiveness evaluation models' essence is that is meets the criteria of effective structure of economy.

Baltic countries economy evolution analysis, Baltic countries structure of economy investigation and structural changes of economy evaluation in Baltic countries are provided in the **second chapter** of dissertation.

The Baltic states economy evolution is analyzed in **2.1. section**. Baltic countries were considered as one singe separate region of the EU before 2010. However their perspectives became viewed as separate region after 1st of January, 2011 when Estonia introduced Euro.

Table 4. **Baltic countries and EU-27 GDP change in 2001 – 2010, %, year 2001 = 100 %**

Year / Country	2001	2002	2003	2004	2005	2006	2007	2008	2009	2011
Lithuania	100,0	107,1	117,1	128,9	148,2	170,2	202,9	229,2	188,2	216,9
Latvia	100,0	105,0	107,5	120,0	142,5	175,0	232,5	255,0	205,0	248,7
Estonia	100,0	111,8	125,5	141,2	162,7	196,1	231,4	235,3	202,0	233,3
EU-27	100,0	103,5	105,1	109,6	113,6	119,7	126,3	126,8	119,2	126,8

Source: Eurostat statistical books (2001-2011)

GDP of Lithuania increased twice during the period of 10 years compared to 2001. Average annual GDP increase of Lithuania was 8% (comparing each years' increase with the previous year). GDP of Latvia increased more than twice during the period of 9 years compared to base year. Average annual GDP increase of Latvia was 10%. GDP of Estonia also increased more than twice during the period of 9 years compared to base year.

Baltic countries structure of economy is investigated in **2.2. section**. Structural changes of economy in Lithuania are occurred. Structure of economy in Lithuania is changing due to dynamic changes in economy during the downturn before 2010.

Table 5. **GDP structure (%) in Lithuania 2001 – 2010**

Economic sector	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Agriculture	5,5	5,4	5,0	4,7	4,8	4,3	3,9	3,7	3,4	3,5
Manufacturing	24,7	23,4	24,5	25,8	25,3	24,1	22,4	21,6	20,5	22,3
Construction	5,9	6,3	7,1	7,2	7,5	8,8	10,2	10,0	6,4	5,8
Trade	31,0	32,4	32,3	31,7	31,4	30,8	30,8	31,0	32,1	33,3
Financial intermediation	12,3	12,5	12,3	12,4	13,8	15,0	16,3	16,7	16,5	16,0
Others	20,6	20,0	18,8	18,2	17,2	17,0	16,4	17,0	21,1	19,1
Total:	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

Source: Lietuvos statistikos metraštis (2001 – 2010)

Agriculture share decreased 0,4 times in 2010 compared to 2001. Manufacturing sector share decreased by 10% in the same period. Construction sector share (before economic downturn in 2008) increased 1,7 times compared to 2001. Economy of *Latvia* similarly to Lithuania has been regulated for a long time according to the priorities of other country; therefore autonomous economic (and structural) policy has not existed. Such politic and economic situation had influence on formation of structure of economy in Latvia:

Table 6. **GDP structure (%) in Latvia 2001 – 2010**

Economic sector	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Agriculture	4,5	4,6	4,1	4,4	4,0	3,5	3,6	3,0	3,3	4,1
Manufacturing	17,5	17,2	16,7	16,4	15,5	14,5	14,2	14,0	14,0	16,8
Construction	5,6	5,5	5,6	5,8	6,1	7,4	9,0	9,0	6,6	5,0
Trade	34,0	34,1	34,6	35,3	35,5	34,2	31,8	29,4	28,0	30,2
Financial intermediation	18,4	18,9	18,6	18,9	20,1	21,7	22,3	23,5	26,1	23,6
Others	20,0	19,6	20,3	19,1	18,8	18,7	19,1	21,0	22,0	20,2
Total:	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

Source: Eurostat statistical books (2001-2010)

Structure of economy in Latvia is oriented towards the development and expansion of retail, manufacturing and financial intermediation sectors. The fastest development can be noted in financial intermediation sector in the period of 10 years. Financial intermediation sector share increased 1,3 times in 2010 compared to 2001. Agricultural sector is developed less, as its share decreased by 10% in the same period. Manufacturing sector share decreased 1,3 times in the same period of 9 years. Development of financial intermediation and real estate sectors stimulate construction

sector development. Construction sector share increased 1,6 times in 2008 compared to 2001. Structure of economy of Estonia is oriented towards the development of manufacturing, retail and financial intermediation sectors. Expansion of services sector becomes the priority of Estonia:

Table 7. **GDP structure (%) in Latvia 2001 – 2010**

Ūkio sektorius	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Žemės ūkis	4,7	4,2	3,9	3,9	3,5	4,2	3,1	2,8	2,6	3,5
Pramonė	22,6	22,5	22,8	21,9	21,5	21,1	20,6	20,6	19,5	22,8
Statyba	5,6	5,9	5,8	6,0	7,1	8,7	9,5	8,7	7,0	5,7
Prekyba	28,2	28,2	28,5	28,4	27,6	27,3	26,2	25,2	25,4	25,2
Finansinis tarpininkavimas	22,6	22,7	22,5	23,2	23,9	24,1	24,4	24,7	24,8	23,8
Kiti	16,3	16,5	16,5	16,6	16,4	14,6	16,2	18,0	20,7	19,0
Iš viso:	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

Source: Eurostat statistical books (2001-2010)

Agricultural sector share decreased 1,3 times in 2010 compared to 2001. This is related to redistribution of structural policy priorities, uncompetitive prices on international market and the expansion of other economic sectors. Manufacturing sector in Estonia remained stable. During 10 years period its share increased by 1%. Economical downturn decreased the opportunities for expansion of retail sector. Retail sector share decreased by 4% in 2010 compared to 2007.

Structural changes of economy in Baltic countries are analyzed in **2.3. section.** There are only few models for structural changes of economy evaluation; nevertheless none of them allows structural changes of economy effectiveness evaluation. Using the model provided by the author structural changes of economy in Lithuania effectiveness will be evaluated. Return on investment increases faster than productivity of labor, as demonstrated in Table 8. The rational rule states that increase of return on investment of 1,0 matches the increase of labor productivity of 0,8, but the story in Lithuanian economy is different. Labor productivity is very tricky indicator for structural changes of economy effectiveness evaluation; nevertheless it is necessary to consider it as well. The highest increase in labor productivity during 2006 – 2008 was in manufacturing, financial intermediation and construction sectors. Labor productivity increased only in agricultural sector during the downturn, as this sector was subsidized and that allowed producing more output and selling it on the market. Return on investment increased only

till economic downturn and then it decreased again. The largest increase can be noted in manufacturing and financial intermediation sectors in 2006. This is important for structural changes of economy effectiveness evaluation. Return on investment decreased during economic downturn and in 2007 compared to 2006 it decreased by 35% in manufacturing sector and 4 times in financial intermediation sector. On the other hand, it increased 3 times in services sector in 2007 compared to 2006. This fact is the result of development of services sector priorities (IT, transportation services, storage etc). Minor changes in return on investment can be noted in construction and other sectors. It is related to the fact that there are high operational costs in construction sector which occur because of the nature of financing - credit. Almost 90% of construction activity is financed by credits from commercial banks; therefore it is hard to expect fast return on investment.

Having evaluated structural changes of economy effectiveness using suggested model and based on data from Table 9 it can be concluded that only year when changes were effective is 2006. That is indicated by sum from the model $x_1+x_2+x_3 = 0{,}869$ (manufacturing, services and financial intermediation), the increasing labor productivity and positive change of return on investment as well as positive value of Y^t. Structure of economy is considered effective when $x_1+x_2+x_3 = 0{,}700$, still structural changes of economy in 2006 can be evaluated as the most effective in the period 2006-2010, based on theoretical definition of effective structural changes of economy.

Table 8. **GDP (%), labour productivity ir capital change in 2006 - 2010 year in Lithuania**

Economic sector	2006			2007			2008			2009			2010		
	x_n	α_n	β_n	x_n	α_n	β_n	x_n	α_n	β_n	x_n	α_n	β_n	x_n	α_n	β_n
Agriculture	0,043	0,004	-0,135	0,039	-0,874	0,074	0,037	0,130	-0,225	0,034	0,723	-0,506	0,035	-0,849	0,505
Manufacturing	0,241	0,106	0,480	0,224	0,040	0,311	0,216	0,154	-0,708	0,205	-0,043	-2,775	0,223	0,183	-2,904
Services	0,478	0,052	0,279	0,308	-0,128	0,716	0,310	0,087	-0,665	0,322	-0,454	-1,215	0,333	0,146	-5,658
Financial intermediation	0,150	0,100	1,320	0,163	2,292	0,321	0,167	0,100	-1,034	0,165	-0.010	-12,821	0,160	0,034	-1,053
Construction	0,088	0,188	0,252	0,102	0,076	0,193	0,100	0,078	-0,599	0,064	-0,269	-2,397	0,058	0,057	-0,929
Other	0,170	0,118	0,164	0,164	0,898	0,558	0,170	0,098	-0,901	0,210	-0,454	-3,780	0,191	0,537	-1,119
Total:	1,000			1,000			1,000			1,000			1,000		

Source: compiled by author

Table 9. **Economic structural changes efficiency model data in 2006 - 2010 year in Lithuania**

Economic sector	2006				2007				2008				2009				2010			
	x_n	δ_n	ε_n	Y^t	x_n	δ_n	ε_n	Y^t	x_n	δ_n	ε_n	Y^t	x_n	δ_n	ε_n	Y^t	x_n	δ_n	ε_n	Y^t
Agriculture	0,043	-0,131	-0,060	-0,071	0,039	-0,800	0,420	-1,220	0,037	-0,095	0,080	-0,175	0,034	-0,689	-0,220	-0,469	0,035	-0,344	0,120	-0,464
Manufacturing	0,241	0,586	0,260	0,846	0,224	0,351	-0,047	0,304	0,216	-0,554	0,410	-0,144	0,205	-2,818	-0,130	-2,948	0,223	-2,721	-0,17	-2,891
Services	0,478	0,331	0,164	0,495	0,308	0,588	0,200	0,788	0,310	-0,578	0,180	-0,398	0,322	-1,669	-0,050	-1,719	0,333	-5,512	-0,046	-5,558
Financial intermediation	0,150	1,420	0,390	1,030	0,163	2,613	0,620	1,993	0,167	-0,934	0,02	-0,954	0,165	-12,831	0,320	-13,151	0,160	-1,019	-0,620	-0,399
Construction	0,088	0,440	-0,056	0,384	0,102	0,269	-0,210	0,059	0,100	-0,521	0,01	-0,511	0,064	-2,666	0,310	-2,356	0,058	-0,872	0,544	-0,328
Other	0,170	0,282	0,164	0,446	0,164	1,456	0,200	1,656	0,170	-0,803	0,180	-0,623	0,210	-4,234	-0,050	-4,284	0,191	-0,582	-0,046	-0,628
Total:	1,000			0,52	1,000			0,59	1,000			-0,47	1,000			-4,15	1,000			-1,71

Source : compiled by author

Table 10. **GDP (%), labour productivity ir capital change in 2006 - 2010 year in Latvia**

Economic sector	2006			2007			2008			2009			2010		
	x_n	α_n	β_n	x_n	α_n	β_n	x_n	α_n	β_n	x_n	α_n	β_n	x_n	α_n	β_n
Agriculture	0,035	0,135	0,894	0,036	0,475	1,413	0,030	0,197	-0,521	0,033	0,075	-0,174	0,041	0,203	1,606
Manufacturing	0,145	0,069	0,601	0,142	0,326	-0,212	0,140	0,084	-0,692	0,140	0,048	-4,519	0,168	0,155	-2,732
Services	0,342	0,109	0,075	0,318	0,155	0,490	0,290	-0,008	-0,628	0,280	-0,049	-2,375	0,302	0,066	-1,704
Financial intermediation	0,217	0,192	1,333	0,223	0,192	-0,302	0,235	0,191	-1,350	0,261	-0,212	6,649	0,236	-0,148	0,744
Construction	0,074	0,340	1,884	0,090	0,331	0,207	0,090	0,067	-0,951	0,066	0,073	-3,357	0,050	-0,169	-0,143
Other	0,187	0,306	0,716	0,191	0,431	0,072	0,215	0,091	-0,638	0,220	-0,199	-1,982	0,203	-0,030	-1,720
Total:	1,000			1,000			1,000			1,000			1,000		

Source : compiled by author

Table 11. **Economic structural changes efficiency model data in 2006 - 2010 year in Latvia**

Economic sector	2006				2007				2008				2009				2010			
	x_n	δ_n	ε_n	Y^t	x_n	δ_n	ε_n	Y^t	x_n	δ_n	ε_n	Y^t	x_n	δ_n	ε_n	Y^t	x_n	δ_n	ε_n	Y^t
Agriculture	0,035	1,029	0,050	0,979	0,036	1,888	0,080	1,808	0,030	-0,324	0,120	-0,444	0,033	-0,099	-0,130	0,031	0,041	1,809	0,060	1,749
Manufacturing	0,145	0,670	0,380	1,050	0,142	0,114	-0,210	-0,096	0,140	-0,608	0,470	-0,138	0,140	-4,471	1,360	-3,111	0,168	-2,577	-1,730	-4,307
Services	0,342	0,184	0,220	0,404	0,318	0,645	0,310	0,955	0,290	-0,636	0,195	-0,441	0,280	-2,424	-0,044	-2,468	0,302	-1,638	-0,036	-1,674
Financial intermediation	0,217	1,522	-0,010	1,532	0,223	-0,110	-0,090	-0,020	0,235	-1,159	0,030	-1,189	0,261	6,437	0,320	6,117	0,236	0,596	0,560	0,036
Construction	0,074	2,224	0,000	2,224	0,090	0,538	-0,100	0,438	0,090	-0,884	-0,025	-0,909	0,066	-3,284	0,316	-2,968	0,050	-0,312	-0,626	-0,938
Other	0,187	1,022	0,220	1,242	0,191	0,503	0,310	0,813	0,215	-0,547	0,195	-0,352	0,220	-2,181	-0,044	-2,225	0,203	-1,750	-0,036	-1,786
Total:	1,000			1,239	1,000			0,650	1,000			-0,57	1,000			-0,770	1,000			-1,15

Source : compiled by author

Labor productivity increased almost in all economical sectors in the period 2006-2007. The fastest increase was in financial intermediation and construction sectors. Construction sector development is financed from borrowed funds from commercial banks; therefore added value created by financial sector is increased. Positive tendency is that during the economic downturn in Latvia labor productivity was positive in agriculture and manufacturing sectors. In 2010 compared to 2006 labor productivity in agriculture sector increased 1,5 times and in manufacturing sectors – 2 times. During slowdown of Latvian economy negative labor productivity was in services (2008), financial intermediation (2009) and construction sectors (2010). Labor productivity in services sector decreased 1,7 times in 2010 compared to 2006. Such decrease is considered negative according to suggested structural changes of economy evaluation model. Return on investment increased in all sectors until economic downturn and then it began to decrease. Fastest increase was in construction and financial intermediation sectors in 2006. It is important for structural changes of economy effectiveness evaluation. Return on investment decreased 9 times in construction and 4 times in financial intermediation sectors in 2007 compared to 2006 during economic downturn. It is related to the fact that there are high operational costs in construction sector which occur because of the nature of financing - credit. Almost 90% of construction activity is financed by credits from commercial banks; therefore it is hard to expect fast return on investment.

On the other hand, return on investment increased 4,5 times in services and 1,5 times in agriculture sectors in 2007 compared to 2006. This fact is the result of development of other sectors priorities (IT, transportation services, storage etc). Return on investment increase in agriculture sector is associated with funding for EU structural funds aimed at the development of this sector. Return on investment is negative from 2008 in all sectors after the beginning of economic downturn. This is associated with lower profits or even incurred losses. Positive return on investment was only in financial intermediation sector in 2009 and agriculture sector in 2010. Financial intermediation sector situation is crucial as it is connected with the effectiveness of structure of all economy. When situation in this sector worsens the results of services and manufacturing sectors activity also decrease (Table 11).

Having evaluated of structural changes of economy effectiveness using suggested model and based on data from Table 11 it can be concluded that only year when changes were effective is 2006. That is indicated by sum from the model $x_1+x_2+x_3 = 0,704$ (manufacturing, services and financial intermediation), the increasing labor productivity and positive change of return on capital as well as positive value of Y^t. Structure of economy is considered effective when $x_1+x_2+x_3 = 0,700$, still structural changes of economy in 2006 can be evaluated as the most effective in the period 2006-2010, based on theoretical definition of effective structural changes of economy. Year 2006 cannot be considered ideal from structural changes of economy effectiveness perspective, as added value created by financial intermediation and services sectors does not fully meet model criteria manufacturing sector share is too little and services sector share is too large. It means that the growth of services sector is too fast and manufacturing – too slow. Still labor productivity and return on investment increased in these sectors. Therefore it can be concluded that structural changes of economy and structure of economy only in 2006 meet model criteria. Structural changes of economy were not effective in 2007: GDP was increasing, but labor productivity and return on investment – decreasing. Structural changes of economy can be interpreted as negative: when Y^t was positive and return on investment – negative. Structural changes of economy clearly do not meet model efficiency criteria in the period of 2008 – 2010. Labor productivity and return on investment (values α_n and β_n) decreased in sectors important for economy – manufacturing, services and financial intermediation during this period. This is the issue which needs to be solved. Y^t is decreasing despite the fact that some of the model efficiency criteria are met: $x_1+x_2+x_3 \sim 0,700$. On the other hand, according to the model $\delta_1+\delta_2+\delta_3 \sim 2,4$ only in 2006, therefore this year should be considered when changing structure of economy.

Table 12. **GDP (%), labour productivity ir capital change in 2006 - 2010 year in Estonia**

Economic sector	2006			2007			2008			2009			2010		
	x_n	α_n	β_n	x_n	α_n	β_n	x_n	α_n	β_n	x_n	α_n	β_n	x_n	α_n	β_n
Agriculture	0,042	0,122	-0,222	0,031	0,359	0,837	0,028	0,047	-0,769	0,026	-0,178	-0,154	0,035	0,214	0,086
Manufacturing	0,211	0,206	0,474	0,206	0,192	-0,265	0,206	-0,021	-0,308	0,195	-0,040	-0,087	0,228	0,248	-0,132
Services	0,273	0,071	-0,156	0,262	0,194	-0,135	0,252	-0,016	-0,731	0,254	-0,139	-0,690	0,252	0,128	-0,649
Financial intermediation	0,241	0,166	0,118	0,244	0,096	-0,150	0,247	-0,032	-0,761	0,248	-0,126	-1,847	0,238	0,041	-0,763
Construction	0,087	0,049	0,092	0,095	0,009	-0,305	0,087	-0,035	-0,986	0,070	-0,198	-9,872	0,057	0,045	-3,291
Other	0,146	0,090	0,099	0,162	0,220	-0,203	0,180	0,147	-0,608	0,207	-0,063	-0,825	0,190	-0,019	-0,514
Total:	1,000			1,000			1,000			1,000			1,000		

Source: sudaryta autoriaus

Table 13. **Economic structural changes efficiency model data in 2006 - 2010 year in Estonia**

Economic sector	2006				2007				2008				2009				2010			
	x_n	δ_n	ε_n	Y^t	x_n	δ_n	ε_n	Y^t	x_n	δ_n	ε_n	Y^t	x_n	δ_n	ε_n	Y^t	x_n	δ_n	ε_n	Y^t
Agriculture	0,042	-0,100	0,243	-0,343	0,031	1,196	0,739	0,457	0,028	-0,722	0,840	-1,562	0,026	-0,332	-1,020	0,688	0,035	0,300	-0,270	0,570
Manufacturing	0,211	0,680	0,480	1,160	0,206	-0,073	0,438	0,365	0,206	-0,329	-1,068	-1,397	0,195	-0,127	1,539	1,412	0,228	0,116	0,380	0,496
Services	0,273	-0,085	0,176	0,091	0,262	0,059	0,203	0,262	0,252	-0,747	0,148	-0,599	0,254	-0,829	-0,049	-0,878	0,252	-0,521	0,001	-0,520
Financial intermediation	0,241	0,284	0,398	-0,114	0,244	-0,054	0,615	-0,669	0,247	-0,793	0,319	-1,112	0,248	-1,973	-0,409	-1,564	0,238	-0,722	-0,590	-0,132
Construction	0,087	0,141	0,044	0,185	0,095	-0,296	-0,207	-0,503	0,087	-1,021	-0,022	-1,043	0,070	-10,070	0,311	-9,759	0,057	-3,246	0,589	-2,657
Other	0,146	0,189	0,176	0,365	0,162	0,017	0,203	0,22	0,180	-0,461	0,148	-0,313	0,207	-0,888	-0,049	-0,937	0,190	-0,533	0,001	-0,532
Total:	1,000			0,224	1,000			0,022	1,000			-1,00	1,000			-1,840	1,000			-0,46

Source: sudaryta autoriaus

Labor productivity increased in almost all sectors in Estonia during the period 2006 – 2007. The largest increase was in financial intermediation and manufacturing sectors in 2006 and in services and agriculture sectors in 2007. The growth of first three sectors in interconnected (Fig. 2, page 16) and growth in agriculture can be explained by EU structural funds application. Positive trend can be seen in the fact that labor productivity was positive in agriculture and other sectors despite economic downturn in Estonia. Labor productivity in agriculture increased in 2010 twice compared to 2006 and in other economic sectors in 2008 almost 2 times compared to 2006.

Negative labor productivity was in services, financial intermediation and construction sectors when growth of Estonian economy slowed down. However, labor productivity increased in major economic sectors from 2010 compared to 2006: manufacturing 1,2 times and services 1,8 times. Such labor productivity tendency is seen as positive with regard to structural changes of economy effectiveness evaluation model. Return on investment increased in manufacturing, financial intermediation and construction sectors in 2006, whereas in 2007 it started to decrease. The fastest increase can be seen in manufacturing and financial intermediation in 2006. Return on investment started decreasing in all economical sectors with start of economical downturn in 2009 compared to 2006. It can be explained by the fact that profits in these sectors started decreasing and it became difficult to attract capital. This tendency is negatively interpreted by the model. Difficult situation in financial intermediation sector negatively affects the results in services and manufacturing sectors (Table 13). Therefore it is particularly important that financial intermediation sector stays stable in times of economic downturn. It is recommended to create stability (stabilization) fund for this sector in order to achieve this aim, which can be used as a support in the economic recession.

Structural changes of economy in Baltic countries perspectives are provided in **the third part** of dissertation. Structural changes of economy are constant dynamic process and they depend on economic conjuncture state of a country, intensity of investment attraction, labor productivity changes and other endogenous and exogenous factors. Evaluation and the effort to predict structural changes of economy are important, as it may help in time to protect economic sectors from vanishing (or at least the bankruptcy

of the companies in such sector) when economic situation changes in the country or globally.

Extrapolation method for average 2 year period is used in order to evaluate the perspectives of structural changes of economy in the Baltic states.

Table 14. **The forecast of GDP structure (%) changes 2012 – 2013 y. in Lithuania**

Economic sector	2008	2009	2010	2011	2012[f]	2013[f]	Structural change*, compare 2010 y.	Structural change*, compare 2011 y.	Structural change*, compare 2012 y.
Agriculture	3,7	3,4	3,5	3,3	3,4	3,4	-0,2	0,1	0,0
Manufacturing	21,6	20,5	22,3	22,5	22,7	23,0	0,2	0,2	0,3
Construction	10,0	6,4	5,8	4,4	3,3	2,6	-1,4	-1,1	-0,7
Retail	31,0	32,1	33,3	35,8	34,8	34,0	2,5	-1,0	-0,8
Financial intermediation	16,7	16,5	16,0	15,8	15,5	15,5	-0,2	-0,3	0,0
Other	17,0	21,1	19,1	18,2	20,3	21,5	-0,9	2,1	1,2
Total:	100,0	100,0	100,0	100,0	100,0	100,0	0,0	0,0	0,0

f – forecast, * - absolute rate of structural changes.

Negative structural changes occurred in construction sector in 2011. This is associated with the adjustment of construction sector to the changed market economy conjuncture. Construction sector share should decrease 2,2 times till 2013 compared to 2010 according to the forecast. It can be explained by the decreased crediting for construction sector and uncertainty in the financial markets. Financial intermediation sector share in GDP should decrease by 3,2% till 2013 compared to 2010. Agriculture sector share should increase by ~ 3,0% from 2012 till 2013 compared to 2011. This increase is correlated with the funding from EU structural funds till 2013. Positive structural change should occur in retail sector in 2011 compared to 2010.

Structural changes of economy in Latvia perspectives depend on fiscal discipline kept by Latvian government and other macroeconomic factors (exports tendencies, attracted investments size etc.).

Table 15. **The forecast of GDP structure (%) changes 2012 – 2013 y. in Latvia**

Economic sector	2008	2009	2010	2011	2012[f]	2013[f]	Structural change*, compare 2010 y.	Structural change*, compare 2011 y.	Structural change*, compare 2012 y.
Agriculture	3,0	3,3	4,1	4,5	4,8	5,2	1,0	0,3	0,4
Manufacturing	14,0	14,0	16,8	17,2	18,4	18,7	-5,1	1,2	0,3

Construction	9,0	6,6	5,0	3,7	2,8	2,5	-2,1	-0,9	-0,3
Retail	29,4	28,0	30,2	30,6	31,0	31,1	-2,7	0,4	0,1
Financial intermediation	23,5	26,1	23,6	15,6	16,7	17,0	-0,4	1,1	0,3
Other	21,0	22,0	20,2	28,4	26,3	25,5	9,3	-2,1	-0,8
Total:	100,0	100,0	100,0	100,0	100,0	100,0	0,0	0,0	0,0

f – forecast, * - absolute rate of structural changes.

Intensive structural changes should occur in manufacturing and retail sectors in 2011 according to the forecast for structure of economy in Latvia. The share of manufacturing sector increased by 2,4% in 2011 compared to 2010 and it should increase by 11,3% till 2013. The share of retail sector increased by 1,3% in 2011 compared to 2010. The share of construction sector should decrease ~ 2 times till 2013 compared to 2010. It is associated with the decrease in the activity of real estate sector and declined crediting. Economic evaluation index is indicating negative tendencies in construction sector in Latvia. Share of financial intermediation sector should decrease due to the slowdown of the expansion in retail as well as construction sectors and economic downturn. The share of financial intermediation sector will decrease 1,5 times in 2011 compared to 2010 and it should increase by 8,9% from 2012-2013. Recovering economic sectors will influence this growth. The share of agriculture sector should increase till 2013 because of financing from EU structural funds. Estonia is the leader among Baltic countries having introduced the Euro first, so its economy should develop faster:

Table 16. **The forecast of GDP structure (%) changes 2012 – 2013 y. in Estonia**

Economic sector	2008	2009	2010	2011	2012^f	2013^f	Structural change*, compare 2010 y.	Structural change*, compare 2011 y.	Structural change*, compare 2012 y.
Agriculture	2,8	2,6	3,5	3,9	4,2	4,9	0,4	0,3	0,7
Manufacturing	20,6	19,5	22,8	23,5	24,0	25,0	0,7	0,5	1,0
Construction	8,7	7,0	5,7	4,6	3,7	3,7	-1,1	-0,9	0,0
Retail	25,2	25,4	25,2	25,6	25,9	30,0	0,4	0,3	4,1
Financial intermediation	24,7	24,8	23,8	23,5	22,9	22,4	-0,3	-0,6	-0,5
Other	18,0	20,7	19,0	18,9	19,3	14,0	-0,1	0,4	-5,3
Total:	100,0	100,0	100,0	100,0	100,0	100,0	0,0	0,0	0,0

f – forecast, * - absolute rate of structural changes.

The share of agriculture sector increased ~ 11,4% in 2011 comparing to 2010 and it should increase 1,2 – 1,4 times in 2012-2013. It will significantly depend on financing from EU structural funds till 2013. The share of manufacturing sector will increase by ~ 9,6% in 2011 – 2013. It will be influenced by better crediting from commercial banks,

growing exports and more stable economy comparing to Latvia and Lithuania. Due to reviving exports that share of retail sector will increase 1,2 times in 2013 compared to 2010. The expansion of the Estonian economy will be negatively influenced by construction and financial intermediation sectors. These sectors are interconnected as showed in Picture 1. So the slowdown in financial intermediation sector expansion will negatively affect development of construction sector, since the crediting will be shrunken. The share of construction sector should decrease 1,5 times and financial intermediation sector - ~ 1,1 times till 2013 compared to 2010. Crediting of economic sectors will increase when economy recovers from economic downturn, so it will aid construction sector as well and it will initiate new structural changes of economy.

Based on conducted forecasts and evaluated structural changes of economy perspectives it can be concluded that intense structural changes will occur in retail and construction sectors. Intense structural changes in Lithuania will occur in retail sector due to exports expansion. Significant structural changes in Latvia will occur in manufacturing sector and it will be influenced by attracted investments in this sector. Structural changes in Estonia will be less intensive compared to Latvia and Lithuania due to stability in Estonian economy and rational use of financial resources from stabilization fund.

CONCLUSIONS

Structural change intensity coefficient, structural change absolute value, structural change index geometrical interpretation, structural dynamic analysis and structural change intensity are main methods allowing structural changes of economy evaluation. None of those methods can evaluate structure of economy effectiveness and only show positive or negative influence on economic growth.

Considering these facts author suggests application of structural changes intensity model. This model enables evaluation of the individual factors influence on economic growth and shows the intensity of those changes. Moreover, author suggests application of other derivative macroeconomic structural changes of economy model considering the limited applicability of the previous model for evaluation. It allows evaluating if occurring changes form effective structure of economy, if changes are effective as well

as forecast GDP size change, identify issues of economy and economic sectors and provides macroeconomic condition of the economy.

Structural changes of economy in Baltic countries analysis indicated that integration of Lithuania, Latvia and Estonia into EU economy was a positive step towards economy development: GDP and exports increased twice and 2,5 times more FDI was attracted. These changes are considered positive for such a small economies like Baltic countries. However Lithuania, Latvia and Estonia have one common problem – FDI is attracted to primitive economic sectors (food, oil and chemical industry) and the largest share in exports belongs to low added value production. It indicates that Baltic countries economy is primitive and sectors are not producing high added value output.

Structural changes of economy analysis in 2006 – 2011 using structural changes absolute index indicated that negative intensive changes occurred in retail sector in Latvia and Estonia and positive changes – in construction and financial intermediation sectors in Lithuania and Latvia. More intensive structural changes occurred in Latvia. It was indicated by structural changes intensity coefficient value, which is 1,4 times greater than in Estonia and 1,8 times greater than in Lithuania.

Having evaluated of structural changes of economy effectiveness in 2006-2010 using suggested model it can be concluded that changes in Lithuania were not effective and structure of economy is unbalanced by the market conditions. Y^t is decreasing despite the fact that some of the model efficiency criteria are met: $x_1+x_2+x_3$ ~0,700. Therefore issues of labor productivity and return on investment have to be solved in the period of economic downturn. Otherwise the price of production and services will become uncompetitive both on internal and external markets. It is necessary to determine optimal number of employees in sectors and eliminate the excess despite the fact that labor productivity issues solutions are painful from social perspective. This is essential condition for effective structural changes of economy. On the other hand, only in 2006 $\delta_1+\delta_2+ \delta_3$ ~ 2,4 according to the model, therefore this year should be considered when changing structure of economy.

Having evaluated of structural changes of economy effectiveness in 2006-2010 using suggested model it can be concluded that changes in Latvia were not effective and structure of economy is ineffective. Structural changes of economy in Lithuania are more

effective than in Latvia, since $x_1+x_2+x_3 < 0,700$ and $\delta_1+\delta_2+\delta_3 < 2,4$ during all the investigation period and it does not meet model efficiency criteria.

Having evaluated structural changes of economy effectiveness in 2006-2010 using suggested model it can be concluded that changes in Estonia were not effective as well, since $\delta_1+\delta_2+\delta_3 < 2,4$ and it does not meet model criteria. So the issues in Estonian economy already started in 2006. Decrease of return on investment in services sector influences the fact that $\delta_1+\delta_2+\delta_3 < 2,4$ in 2006. Consequently it is important to solve $\delta_1+\delta_2+\delta_3$ issues initially in order to achieve effective long-term economic growth. However structural changes of economy in Lithuania are more effective than in Estonia and Latvia according to the model criteria $\delta_1+\delta_2+\delta_3$, since in Estonia $\delta_1+\delta_2+\delta_3 < 2,4$ during all the investigation period and it does not meet model efficiency criteria. Still structural changes of economy in Estonia are more effective than in Lithuania and Latvia according to the model criteria $x_1+x_2+x_3$, since in the period 2006–2010 it partly matched effective structure of economy definition. As a result, none of Baltic countries ideally (100%) met model structural changes of economy effectiveness criteria.

Looking at structural changes of economy perspectives in Lithuania according to structural changes effectiveness model it can be stated that they will be effective only in 2025. This is demonstrated by model sum $x_1+x_2+x_3 = 0,772$ (manufacturing, services and financial intermediation). Though another issue arises – labor productivity decrease and negative direction of return on investment in the long run as well as negative value of Y^t. Structural changes of economy occurring in 2030 – 2040 become ineffective, since model criteria are not met: average $x_1+x_2+x_3 > 0,830$. This in an indication that one of three main sectors (manufacturing, services and financial intermediation) is being developed too rapidly. It can cause decline in a specific sector in the long run (5-10 years) and it will influence other related sectors. Services sectors will be developed the most in the period 2030–2040 and its share will increase by ~ 7,5% (or 0,75 % yearly). Another positive change is that manufacturing sector share will not decrease lower than 20% in the period 2030–2040 and that will accelerate production, create more output which can be consumed by society.

Looking at structural changes of economy perspectives in Latvia according to structural changes effectiveness model it can be stated that they will be partly effective only in 2025, 2040 and 2045. This is demonstrated by model sum $x_1+x_2+x_3 = 0,79$

(manufacturing, services and financial intermediation) in 2025 and 2040 and $x_1+x_2+x_3$ = 0,71 in 2045. Though another issue arises – labor productivity decrease and negative direction of return on investment in the long run as well as negative value of Y^t. Structural changes of economy occurring in 2040 are evaluated as the most effective according to $x_1+x_2+x_3$ = 0,71 from the whole period of 2025–2045 based on effective structure of economy theoretical definition. However year 2040 is not ideal from the perspective of structural changes of economy effectiveness since $\delta_1+\delta_2+\delta_3 > -2,4$. This is an issue, as labor productivity and return on investment will constantly decrease. Structural changes of economy in 2025 will be more effective according to $\delta_1+\delta_2+\delta_3$ model criteria compared to 2040 and 2045, since $\delta_1+\delta_2+\delta_3$ negative value is smaller. Consequently, Latvian government has to decide which problem to solve first: forming of effective structure of economy ($x_1+x_2+x_3$ = 0,700) or having effective structural changes of economy (increase labor productivity and return on investment in economic sectors) and set the priorities accordingly.

Looking at structural changes of economy perspectives in Estonia according to structural changes effectiveness model it can be stated that they will be partly effective only in 2035, 2040 and 2045. This is demonstrated by model sum $x_1+x_2+x_3$ = 0,74 (manufacturing, services and financial intermediation) in 2035, $x_1+x_2+x_3$ = 0,77 in 2045 and $x_1+x_2+x_3$ = 0,71 in 2040. Though another issue arises – labor productivity decrease and negative direction of return on investment in the long run. Structural changes of economy occurring in 2040 are evaluated as the most effective according to $x_1+x_2+x_3$ from the whole period of 2025–2045 based on effective structure of economy theoretical definition.

Structural changes of economy perspectives according to structural changes intensity model seem to be positive for economic growth in Baltic countries if attracted FDI, net exports and crediting changes are twice larger then structural changes intensity. The Baltic states should expect economic downturn if this condition is not followed in the mid-run.

According to the results obtained from various methods for analysis of structural changes of economy, as well as suggested intensity and effectiveness models Baltic countries governments should form active economic structural polity in the period of economic downturn: subsidies are necessary for export goods and stabilization fund for

main sectors (manufacturing and finance) should be formed. The creation and usage of these measures during the economic downturn can bring economic stability.

APPROBATION AND DISSEMINATION OF THE RESEARCH RESULTS

Publications in reviewed scientific journals and reviewed conference proceedings of international conferences:

1. Vitas A., 2012 m: Changing structure of exports in Lithuania: macroeconomic assessment. National economies and globalization, 28-29 June, 2012, P. 43 - 49.
2. Vitas A., Galinienė B. 2012: Методы оценки структурных изменений в отраслевой структуре. Actual problems of economics, № 2 (128), P. 359 - 374.
3. Vitas A. 2011: Struktūriniai pokyčiai nekilnojamojo turto rinkoje. Makroekonominis vertinimas. Konferencijos, vykusios Vilniuje Vilniaus universitete 2011 m. kovo 25 d. mokslo darbai, 166-171.
4. Vitas A. 2011: Theoretical aspects of changes in economic structure. Ekonomika, № 90 (3), P. 20 - 33.
5. prof. Galinienė B., prof. Miškinis A., Vitas A. 2011: Изменения структуры экспорта в Литве: макроэкономическая оценка. Международная конференция Экономическая теория и хозяйственная практика: глобальные вызовы, Санкт-Петербургскийй Университет, экономический факультет, Санкт-Петербург, Россия.
6. Vitas A. 2009: Lithuanian export structure changes. Report in Oulu University of Applied Sciences, Finland, Oulu.

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REZIUMĖ

Keičiantis ekonominei konjunktūrai, ūkio struktūroje vyksta dinaminiai pokyčių procesai. Jie teigiamai arba neigiamai veikia ekonominį augimą. Ūkio struktūriniai pokyčiai intensyvėja ekonominio nuosmukio ir ekonominio pakilimo metu.

2008 metais prasidėjusi pasaulinė finansų krizė parodė, kad pasaulio ūkio struktūroje susiformavo struktūrinės problemos, kurias reikėjo spręsti nedelsiant. Iki 2008 metų vykę struktūriniai pokyčiai pasaulio ūkyje davė trumpalaikį teigiamą rezultatą – ekonominį augimą. Tačiau per greitas finansinio tarpininkavimo, vėliau statybų sektoriaus augimas tik išryškino ūkio struktūros problemas ne tik JAV, bet ir Baltijos šalyse. Iki 2008 metų Baltijos šalių ekonomika stebino savo ūkio plėtros pasiekimais visą pasaulį. Visa tai rodė, kad Baltijos šalių ūkyje vykstantys struktūriniai pokyčiai yra efektyvūs, nes užtikrina ekonominį augimą, kuriuo stebėjosi net tokios tarptautinės organizacijos kaip Tarptautinis valiutos fondas ir Pasaulio bankas. Baltijos šalių vyriausybės buvo patenkintos, kad pasiekė vieną pagrindinių makroekonomikos tikslų – stabilus 8 -10 % ekonominis augimas per metus. Toks rezultatas tenkino visus – ir visuomenę, ir šalies valdžią bei kitas svarbias ES institucijas. Tačiau žinomi Baltijos šalių ekonomistai dar 2007 m. vidury ėmė skambinti pavojaus varpais, kad ūkyje vykstantys struktūriniai pokyčiai nėra efektyvūs, nors ir duoda trumpalaikį teigiamą rezultatą – ekonominį augimą. Pagrindinis jų skelbiamas pavojaus signalas – Baltijos šalių ekonomika perkais, nes ūkio struktūriniai pokyčiai neracionalūs, klaidingi ir apgaulingi.

Siekiant ilgalaikių ūkio plėtros tikslų, pagrindinė problema, kurią turėtų spręsti šalių vyriausybės – efektyvios ūkio struktūros formavimas, užtikrinančios efektyvią ūkio sektorių plėtrą. Kiekviena šalies vyriausybė stengiasi suformuoti tokią struktūrinę

politiką, kuri leistų padidinti ūkio struktūrinių pokyčių efektyvumą. Baltijos šalys turi panašią ūkio raidos istoriją, tačiau visų jų ekonominis augimas ir ūkio struktūrinių pokyčių efektyvumas skirtingas. Nei viena šalis nenori turėti ūkio nuosmukį, todėl, siekiant išvengti šios ekonominės situacijos, būtina ne tik vertinti ūkio struktūrinių pokyčių efektyvumą, bet ir analizuoti priežastis, dėl kurių jie neigiamai įtakoja visą ūkio plėtrą. Siekiant šių tikslų, būtina tinkama metodika, kuri leistų įvertinti ūkio struktūrinių pokyčių efektyvumą.

Mokslinė problema

Pagrindinė mokslinė problema, kuri šiai dienai egzistuoja vertinant ūkio struktūrinius pokyčius – metodikų trūkumas, kurios leistų išsamiau, o svarbiausia tinkamai – analizuoti ūkio struktūrinių pokyčių efektyvumą. Keletas ūkio struktūrinių pokyčių analizės metodų (struktūrinių pokyčių intensyvumo koeficientas, struktūrinių pokyčių absoliutus rodiklis, struktūrinių pokyčių indekso geometrinė interpretacija, struktūrinės dinamikos analizės metodas ir kt.) leidžia tik įvertinti teigiamą, ar neigiamą rezultatą duos ekonominiam augimui šie pokyčiai. Tačiau nei vienas jų neidentifikuoja problemų, priežasčių dėl ko vyksta tie ūkio struktūriniai pokyčiai, neleidžia įvertinti pačios ūkio struktūros efektyvumo, tų vykstančių pokyčių esmės ir prasmės. Todėl taikant tik aukščiau išvardintus metodus vertinant ūkio struktūrinius pokyčius, analizės interpretacija susiaurėja ir parodo tik patį rezultatą, o ne visumos vaizdą ir priežastis.

Kita mokslinė problema yra ta, kad neaišku, kaip turi atrodyti ta ūkio struktūra, kad ūkio sektoriai galėtų garantuoti ilgalaikę ūkio plėtrą. Neįvardijama, kokie pagrindiniai ir svarbiausia, kokios jų dalys turi būti visoje ūkio struktūroje, kad ūkio struktūra būtų efektyvi.

Problema yra ir ta, kad neaišku, kaip turėtų atrodyti makroekonominis modelis, kuris leistų efektyviai vertinti ūkio struktūrinius pokyčius ir padėtų vyriausybėms priimti tinkamus sprendimus dėl efektyvios ūkio struktūros suformavimo bei racionalios ūkio struktūrinės politikos skirtingomis ekonominėmis sąlygomis.

Problemos ištyrimo lygis

Struktūriniams pokyčiams, jų analizei ir vertinimui Lietuvoje vis dar neskiriamas pakankamas dėmesys. Lietuvos autorių mokslinių publikacijų apie pokyčius ūkio

struktūroje nėra daug: N. Balčiūnas (2000), K. Matuzevičiūtė, S. Skunčikienė, E. Tamošaitytė (2010), P. Misiūnas, B. Kaminskienė (1999). Dauguma Lietuvos autorių struktūrinius pokyčius vertino ir tyrinėjo, kai Baltijos šalys kūrė rinkos ekonomiką. Tik tai K. Matuzevičiūtės, S. Skunčikienės, E. Tamošaitytės straipsnyje analizuojami Baltijos šalių bendrojo vidaus produkto struktūriniai pokyčiai, tačiau nevertinama nei ūkio struktūra, nei struktūriniai pokyčiai ūkio struktūroje. Struktūrinių pokyčių vertinimo klausimai daugiau tyrinėjami užsienio mokslininkų.

Chen, Jefferson ir Zhang (2010) struktūrinius pokyčius vertina kaip pritaikytos struktūrinės politikos rezultatą. Jų nuomone, tik panaudojus struktūrinę politiką įmanoma pasiekti efektyvų ekonominį augimą (tvarų, ilgalaikį, subalansuotą). Cortuk, Singh (2010) pateikia pagrindinius ūkio struktūrinių pokyčių vertinimo metodus, orientuotus į struktūrinių pokyčių koeficientų interpretavimą. Katz (2000) identifikuoja struktūrinę politiką kaip ūkio struktūrinių pertvarkų priemonę, kuri naudojama spręsti struktūrines problemas ūkyje ir ekonomikoje.

Агибалов, Григорьев (2010) analizuoja labiau ekonominį augimą ir jo poveikį socialinei sričiai, mažiau užsimena apie ūkio struktūrinius pokyčius, susijusius su ekonominiu augimu. Алиакберова (2009) vertina užsienio kapitalo poveikį ir jo svarbą ūkio struktūriniams pokyčiams, jų susiformavimo esmę. Асемоглу (2009) analizuoja ekonominės krizės priežastis ir remiasi ūkio struktūros pokyčiais, vertina struktūrinių pokyčių skirtingą poveikį ekonominiam augimui. Белоусов (2001) tyrinėja, koks turėtų būti efektyvus ekonominis augimas ir kaip tai priklauso nuo struktūrinių pokyčių. Бильчак, Сафонова И.Ю (2008) įvardina priežastis, dėl kurių vyksta struktūriniai pokyčiai. Jų manymu, ūkio struktūriniai pokyčiai vyksta dėl technologinių išradimų ir aukštųjų technologijų taikymo. Гасанов (2009) nuomone, ūkio struktūriniai pokyčiai vyksta dėl intensyvaus inovacijų taikymo versle. Taip pat įvardina inovacijų svarbą efektyvaus ekonominio augimo kontekste. Гашимова (2009) apibrėžia ūkio struktūrinių pokyčių esmę, pateikia jų sampratą. Данеев (2004) tyrinėja ūkio struktūros modeliavimą regioniniu aspektu. Pateikia efektyvios ūkio struktūros sampratą. Клинов (2008) nuomone, ūkio struktūriniai pokyčiai vyksta dėl išteklių kainų svyravimo ir nacionalinių pajamų dydžio pokyčių. Коровкин, Полежаев, Андрюнин (2002) ūkio struktūrinių pokyčių priežastis įvardina kaip susikaupusių neigiamų socialinių ir ekonominių tendencijų seką. Плеханова (2007) savo tyrime nurodo, kad ūkio struktūriniai pokyčiai

vyksta inovacinių idėjų realizavimo, naujų technologijų taikymų ir mini ūkio cikliškumo priežastį. Саяпова (2004) analizuoja ekonomikos struktūros pokyčius, aiškindama ekonomikos struktūros esmę, remiasi Leontjevo gamybos lentele. Спасская (2003) analizuoja ūkio struktūrinių pokyčių vertinimo metodus, pateikia makroekonominį metodą, kaip turėtų būti vertinami struktūriniai pokyčiai. Титов (2006) tyrinėja ūkio struktūrinių pokyčių priežastis ir nurodo, kad jie vyksta dėl gyventojų skaičiaus augimo, užimtumo pokyčių ūkio sektoriuose ir konkurencingumo pokyčių. Хоршев (2007) analizuoja struktūrinius pokyčius regioniniu aspektu. Jo tyrime labiau akcentuojamas regionalizacijos procesai ūkio struktūros susiformavimo ypatybėms. Tačiau dauguma šių mokslininkų tyrinėja savo šalies arba didesnių ekonomikų (pavyzdžiui, JAV, Rusijos, Azijos regionai) struktūrinius pokyčius, bet mažai vertina Baltijos šalių.

Mokslinio tyrimo objektas

Mokslinio tyrimo objektas – Baltijos šalių ūkio struktūros pokyčių analizė ir jų efektyvumo vertinimo modeliavimas.

Darbo tikslas ir uždaviniai

Darbo tikslas – išanalizuoti ūkio struktūrinius pokyčius Baltijos šalyse ir atliktos analizės pagrindu pasiūlyti ūkio struktūrinių pokyčių efektyvumo vertinimo modelį.

Darbo tikslas rodo bendrą disertacijos kryptį, atsižvelgiant į mokslinės problemos analizę teorine ir taikomąja prasme. Pasiūlyti ūkio struktūrinių pokyčių efektyvumo vertinimo modelį, kuriuo remiantis įvertinami šie pokyčiai ir identifikuojamos priežastys, dėl kurių jie vyksta.

Tikslui pasiekti, darbe sprendžiami šie **uždaviniai**:

1. Išanalizuoti mokslininkų pateikiamus ūkio struktūrinių pokyčių vertinimo metodus.
2. Sukurti ir pritaikyti ūkio struktūrinių pokyčių efektyvumo vertinimo modelį.
3. Išanalizuoti ūkio struktūrinius pokyčius Baltijos šalyse ir pateikti jų vertinimą.
4. Įvertinti ūkio struktūrinius pokyčius Baltijos šalyse keliais metodais.
5. Įvertinti ūkio struktūrinius pokyčius Baltijos šalyse pagal siūlomą efektyvumo vertinimo modelį.

6. Įvertinti ūkio struktūrinių pokyčių perspektyvas Baltijos šalyse taikant siūlomą efektyvumo vertinimo modelį.

Ginami teiginiai:

- ❖ dauguma esamų ūkio struktūrinių pokyčių vertinimo metodų pateikia per siaurą analizę apie jų esmę;
- ❖ siūlomas ūkio struktūrinių pokyčių vertinimo modelis pateikia makroekonominę informaciją apie ūkio sektoriuose besiformuojančias problemas ir ūkio struktūros būklę.

Mokslinis naujumas ir praktinė reikšmė

Pasirinkta tema apie Baltijos šalių ūkio struktūros pokyčius ir jų vertinimą Lietuvos mokslininkų nagrinėta labai mažai. Tik keletas autorių tyrinėjo struktūrinius pokyčius Lietuvos ir Baltijos šalių bendrąjį vidaus produktą. Tačiau tyrimo, kuris apimtų naujausią Baltijos šalių ūkio struktūros pokyčius ir jų vertinimą nenagrinėta. Disertacijoje Baltijos šalių ūkio struktūriniai pokyčiai vertinami taikant autoriaus pasiūlytą modelį. Pateiktas platesnis ir išsamesnis ūkio struktūrinių pokyčių efektyvumo vertinimas. Darbo mokslinį naujumą išreiškia teoriniai ir praktiniai rezultatai.

Teorinė reikšmė:

- ❖ atlikta sisteminė Lietuvos ir užsienio šalių mokslinės literatūros ūkio struktūrinių pokyčių vertinimo klausimais analizė;
- ❖ pateikta išsamesnė ūkio struktūrinių pokyčių samprata, išryškinant skirtumus tarp struktūrinių pokyčių ir struktūrinių svyravimų;
- ❖ išanalizuota mokslininkų pateikiama struktūrinės politikos samprata, jos svarba ekonomikoje ir įtaka ūkio struktūriniams pokyčiams;
- ❖ atlikta ekonominės veiklos rūšių klasifikatoriaus skirtinguose lygmenyse lyginamoji analizė;
- ❖ atlikus ūkio struktūrinių pokyčių vertinimo metodų analizę, pateiktas naujas modelis, kuris išryškina ūkio struktūrinių pokyčių priežastis bei pateikiamas jų efektyvumo vertinimas.

Praktinė reikšmė:

- ❖ išanalizuoti ūkio struktūriniai pokyčiai Baltijos šalyse;
- ❖ ištirti Baltijos šalių ūkio struktūros bruožai, ypatumai ir savybės. Pateikiama efektyvios ūkio struktūros savybių ir ypatumų teorinė interpretacija;
- ❖ sukurtas ūkio struktūrinių pokyčių vertinimo modelis, skirtas identifikuoti pokyčių ūkio struktūroje priežastis ir įvertinti jų efektyvumą;
- ❖ sukurtas ūkio struktūrinių pokyčių vertinimo modelis gali būti pritaikomas visoms šalims;
- ❖ pateikiamos Baltijos šalių ūkio struktūrinių pokyčių perspektyvos artimiausiu metu.

Atliktas tyrimas yra naudingas Baltijos šalių ekonominės (ir struktūrinės) politikos formuotojams, ūkio ministerijos specialistams, atsakingiems už ūkio plėtrą bei užsienio kapitalo pritraukimą bei mokslininkams, besidomintiems Baltijos šalių ūkio struktūriniais pokyčiais.

Tyrimo organizavimas ir metodika

Analizuojant Baltijos šalių ūkio struktūrinius pokyčius buvo taikomi istorinio tyrimo, duomenų analizės ir palyginimo metodai. Atliekant tyrimus, buvo taikoma analitinio ir empirinio tyrimo metodai bei konkretizavimas, apibendrinimas, stebėjimas. Tyrimui naudoti šie informacijos šaltiniai: Lietuvos ir užsienio šalių autorių publikuoti straipsniai mokslo žurnaluose, Baltijos šalių komercinių bankų apžvalgos, tarptautinių finansinių organizacijų skelbti duomenys.

Ištyrus Baltijos šalių ūkio struktūrą ir įvertinus joje vykstančius struktūrinius pokyčius, gauti rezultatai apibendrinami ir pateikiamos išvados.

Vertinant Baltijos šalių ūkio struktūros pokyčius, buvo renkami empiriniai duomenys, pateikiamos apibendrinančios išvados.

Mokslinių publikacijų disertacijos tema sąrašas

Mokslo žurnale „Ekonomika“ paskelbtas straipsnis „Theoretical aspects of changes in economic structure“ ir tarptautiniame mokslo žurnale „Actual problems of economics“ straipsnis „Методы оценки структурных изменений в отраслевой структуре“

disertacijos tema. Paskelbtuose straipsniuose aptartos beveik visos daktaro disertacijos dalys ir tyrimų rezultatai. Detalesnis disertacijos tyrimų aprobavimas pateikiamas:

1. Vitas A., 2012 m: Changing structure of exports in Lithuania: macroeconomic assessment. National economies and globalization, 28-29 June, 2012, P. 43 - 49.
2. Vitas A., Galinienė B. 2012: Методы оценки структурных изменений в отраслевой структуре. Actual problems of economics, № 2 (128), P. 359 - 374.
3. Vitas A. 2011: Struktūriniai pokyčiai nekilnojamojo turto rinkoje. Makroekonominis vertinimas. Konferencijos, vykusios Vilniuje Vilniaus universitete 2011 m. kovo 25 d. mokslo darbai, 166-171.
4. Vitas A. 2011: Theoretical aspects of changes in economic structure. Ekonomika, № 90 (3), P. 20 - 33.
5. prof. Galinienė B., prof. Miškinis A., Vitas A. 2011: Изменения структуры экспорта в Литве: макроэкономическая оценка. Международная конференция Экономическая теория и хозяйственная практика: глобальные вызовы, Санкт-Петербургскийй Университет, экономический факультет, Санкт-Петербург, Россия.
6. Vitas A. 2009: Lithuanian export structure changes. Report in Oulu University of Applied Sciences, Finland, Oulu.

Darbo struktūra ir apimtis

Darbą sudaro įvadas, 3 skyriai, išvados ir pasiūlymai, literatūros sąrašas (163 šaltiniai).

Pirmajame skyriuje nagrinėjama ūkinės veiklos, ūkio struktūros ir ūkio sektorių klasifikavimo samprata. Apžvelgiami struktūrinės politikos, ūkio struktūriniai pokyčiai ir jų vertinimo metodai ir pasiūlytas naujas ūkio struktūrinių pokyčių efektyvumo vertinimo modelis.

Antrajame disertacijos skyriuje analizuojama Baltijos šalių ūkio raida, tyrinėjama Baltijos šalių ūkio struktūra ir vertinami Baltijos šalių ūkio struktūriniai pokyčiai.

Trečiajame disertacijos skyriuje pateikiamos ir modeliuojamos Baltijos šalių ūkio struktūros pokyčių perspektyvos.

Darbo apimtis 166 puslapiai, jame yra 27 paveikslai, 67 lentelės, 1 intarpas.