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## **Analysis and evaluation of the effectiveness of structural changes in the national economy of Kazakhstan**

**Abstract.** In the context of post-industrial development of the world economy, the intensification of internationalization and globalization of international economic relations led to unprecedented structural changes in the economic system of society. Transition of development of the society to the post-industrial stage demands fundamental alteration the structure of national economy. Here, first of all we have to pay attention to the increase of the share of sectors of processing industry and services in the structure of national economy and also to their continued support. The results of any structural transformations carried out in the economy should change directly the structure of GDP, export and import, the balance of payments and also the structure of employment of the population on branches of the economy. The structural changes in the economy that took place for the years of independence are analyzed and quantitative estimates of these changes are presented as well. In the conclusion the need of active implementation of structural changes in the economy of Kazakhstan in the conditions of decrease of the world prices for mineral raw material resources is reasoned.

**Key words:** structural changes, economic growth, diversification, manufacturing industry, structural policy.

**Аңдатпа.** Әлемдік экономиканың постиндустриалды даму контекстінде халықаралық экономикалық қатынастардың жаһандануы мен интернационализациясының күшеюі қоғамның экономикалық жүйесінде теңдессіз құрылымдық өзгерістерге алып келді. Қоғам дамуының постиндустриалды кезеңге өтуі ұлттық экономиканың түбегейлі өзгеруін талап етеді. Мұнда, бірінші кезекте ұлттық экономика құрылымындағы өңдеуші өнеркәсіп пен қызмет көрсету секторларының үлесінің артуы мен оларды үнемі қолдауға назар аудауға тиіспіз. Экономикада жүргізілген кез келген құрылымдық өзгерістердің нәтижелері ЖІӨ, экспорт пен импорт, төлем балансының құрылымын, сондай-ақ экономика салалары бойынша халық жұмысбастылығының құрылымын да өзгертуі тиіс. Мақалда тәуелсіздік жылдарында жүргізілген экономикадағы құрылымдық өзгерістер талданады және осы өзгерістердің сандық бағалауы келтірілген. Қорытынды бөлімде минералды-шикізат ресурстарына әлемдік бағаның төмендеуі жағдайында Қазақстан экономикасында құрылымдық өзгерістерді белсенді жүзеге асыру қажеттілігі негізделеді.

**Түйін сөздер:** құрылымдық өзгерістер, экономикалық өсу, диверсификация, өңдеуші өнеркәсіп, құрылымдық саясат.

**Аннотация.** В контексте постиндустриального развития мировой экономики усиление интернационализации и глобализации международных экономических отношений привело к беспрецедентным структурным изменениям в экономической системе общества. Переход развития общества на постиндустриальный этап требует коренного изменения структуры национальной экономики. Здесь, в первую очередь, мы должны обратить внимание на увеличение доли секторов обрабатывающей промышленности и услуг в структуре национальной экономики, а также на их постоянную поддержку. Результаты любых структурных преобразований, проводимых в экономике, должны из-

менить структуру ВВП, экспорта и импорта, платежного баланса, а также структуру занятости населения по отраслям экономики. В статье проанализированы структурные изменения в экономике, которые произошли за годы независимости и представлены количественные оценки этих изменений. В заключении обосновывается необходимость активной реализации структурных изменений в экономике Казахстана в условиях снижения мировых цен на минерально-сырьевые ресурсы.

**Ключевые слова:** структурные изменения, экономический рост, диверсификация, обрабатывающая промышленность, структурная политика.

## Introduction

One of the most important elements of the state policy aimed at the sustainable economic development is the structural policy including diversification of the economy for the purpose of formation of the branch structure corresponding to tendencies of development of modern world economy. Though new market economies are still capable to exploit the opportunities of the catching-up development, they have to make constant, rapid and sometimes difficult structural changes along with the reforms and construction of new institutes. The ability to assimilation of structural changes has deeply settled in many new market economies, became a basis of potential growth of these economies [1].

Theoretical and methodological aspects and practical issues of realizing structural changes in the economy were studied in the works of foreign researchers, such as H. Chenery [2], J. Schumpeter [3], S. Kuznets [4], W. Rostow [5], M. Penderer [6], L. Pasinetti [7], J. Fagerberg [8], N. Kaldor [9], J. Metcalfe [10], R. Nurkse [11], S. Fabricant [12] and russian researchers as O.Yu. Krasilnikov [13], O.S. Sukharev [14], M.M. Butakova [15], V.A. Titova [16], A.G. Granberg [17], L.A. Berkovich [18], E.V. Kochkurova [19].

This article analyses structural changes of the economy of Kazakhstan during the years of independence at the macro-level i.e in the large spheres and sectors of economy and the problems of its diversification for the purpose of making national economy resistant to the influence of sharp changes in the environment of the world market.

Now practically all theoretical and applied models of state regulation of market economy include structural policy as an element of economic policy of the state [20].

## Methods

When writing article the authors applied the dialectic method, including historical and logical methods, as well as general scientific methods such as analysis, synthesis, comparing, induction, deduction, abstraction, generalization, etc.

## Main body

There are some macroeconomic indicators which are characterized by efficiency of the carried-out structural changes in economy: weight, index, relative indicator and speed of structural shifts.

A lot of structural shift show the speed of change of a share of structural elements of the economy for the long period. It is determined by the formula:

$$M = F_2 - F_1 \quad (1)$$

where  $F_1$ ,  $F_2$  mean respectively specific weight of elements of structure in the basic and reporting periods.

The index of structural shift is determined by the following formula:

$$I = \frac{F_2 - F_1}{F_1} * 100 \quad (2)$$

The value of the index of structural shift in the branch of crop production demonstrates that in 2016 decrease in a share has made 4,8%  $((55,6-58,4)/58,4 \times 100)$  to the level of 1996 whereas the share of branch of livestock production has grown by 15,5%  $((44-38,1)/38,1 \times 100)$  that demonstrates strengthening of production of livestock production in structure of agriculture. For receiving the most exact picture of structural changes in agriculture the index of structural shift is defined for every 5 years. (Figure 1).

The relative indicator of structural shift characterizes growth rate or decrease in elements of structure and is used at assessment of development of structural shifts in economy. We will determine a relative indicator of structural shift by the formula:

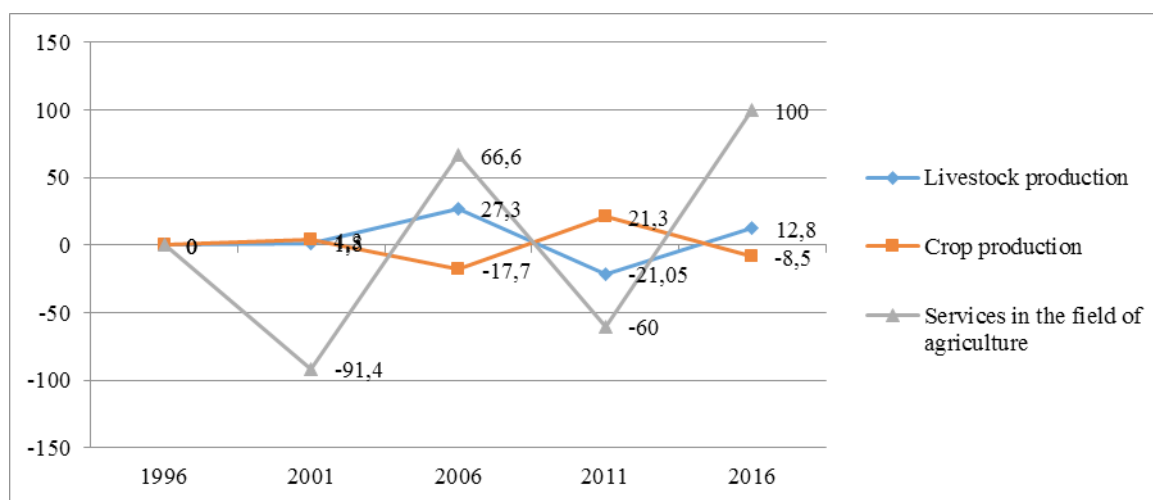
$$K = \frac{F_2}{F_1} \quad (3)$$

The relative indicator of the structural shift for 20 years in livestock production is – 1,1; in crop production – 0,9; in a services sector in the field of agriculture – 0,11.

**Table 1** – Structural shifts in agriculture by types of economic activity (as a percentage, in established prices)

№	Branch, type of production	Years					Index of structural shift
		1996	2001	2006	2011	2016	
1	Livestock production	38,1	38,8	49,4	39	44	15,5
2	Crop production	58,4	60,9	50,1	60,8	55,6	- 4,8
3	Services in the field of agriculture	3,5	0,3	0,5	0,2	0,4	- 88,6
4	Agriculture – total	100	100	100	100	100	- 77,9

Note: the table is made by the author on the basis of a source [21].

**Figure 1** – The index of structural shifts on agriculture.

The weight, relative indicator and the index of structural shift aren't proportional each other: to smaller "absolute" gains there can correspond big growth rates, and to large "absolute" increases – smaller growth rates.

Speed of the structural shifts reflects their dynamics in time and allows to compare shifts of various elements of structure, to establish asynchrony of shifts, etc. It is determined by the formula:

$$V = \frac{I}{T} \quad (4)$$

where I is the index of structural shifts, T is time of course of structural shift.

In our case time of a course of structural shift is 20 years from 1996 to 2016. As a result, the speed of structural shifts in 20 years in livestock production is – 0,7; in crop production – (-0,24); in a services sector in the field of agriculture – (-0,43).

Results of calculation of speed of structural shifts in agriculture for each 5 years are given in the chart.

(Figure 2).

The intensity of structural shifts shows extent of change of weight of structural shift in a year, characterizing nonlinearity of development of shifts in structure of economy and is determined by the following formula:

$$E = M \times V \quad (5)$$

where M is a weight of structural shifts, V is the speed of structural shifts.

The intensity of structural shifts in 20 years in livestock production is – 4,13; in crop production – 0,7; in a services sector in the field of agriculture – 13,7. Corresponding data for each 5 years looks as follows. (Figure 3).

Industries of Kazakhstan have also undergone a number of structural changes directed to decrease in a share of mining industry and increase in a share of manufacturing industry. However, in structure of the industry the mining industry still dominates.

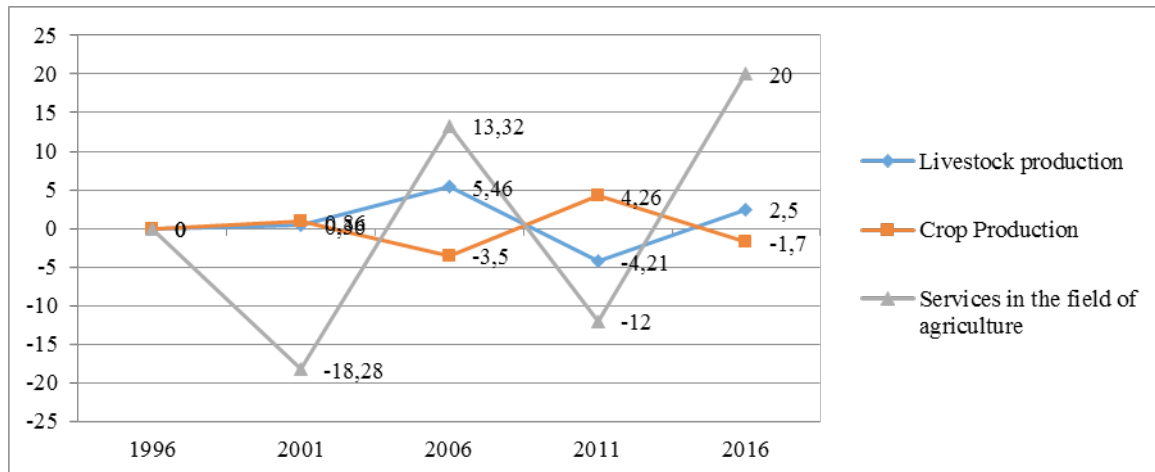


Figure 2– Speed of structural shifts on agriculture

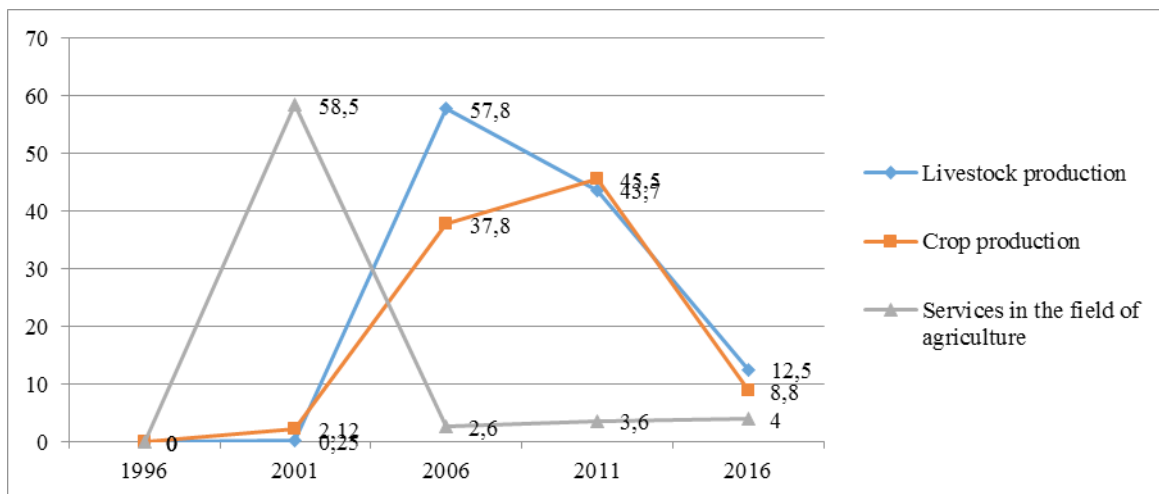


Figure 3 – Intensity of structural shifts on agriculture

Table 2 – Structural shifts in the industry by types of economic activity (as a percentage, in established prices)

№	Branch, type of production	Years					Index of structural shift
		1996	2001	2006	2011	2016	
1	Mining industry and development of pits	26,4	44,4	57,4	63,3	49,4	87,1
2	Manufacturing industry	50,6	46,2	36,7	30,1	42,3	- 16,4
3	Power supply, supply of gas, steam and air conditioning	20,7	8,1	4,9	5,6	7,3	- 64,7
4	Water supply, sewer system	2,3	1,3	1,0	1,0	1,0	- 56,5
5	The industry – total	100	100	100	100	100	- 50,5

Note: the table is made by the author on the basis of a source [21].

Indexes of structural shift on the industry with breakdown on five-years periods in the following chart. (Figure 4).

At the same time the relative indicator of structural shift in 20 years in the mining industry is

1,9; in manufacturing industry – 0,8; in power supply – 0,3; in water supply – 0,4.

As a result, the speed of structural shifts in the mining industry is – 4,3; in manufacturing industry – (-0,82); in power supply – (-3,2); in water supply – (-2,8).

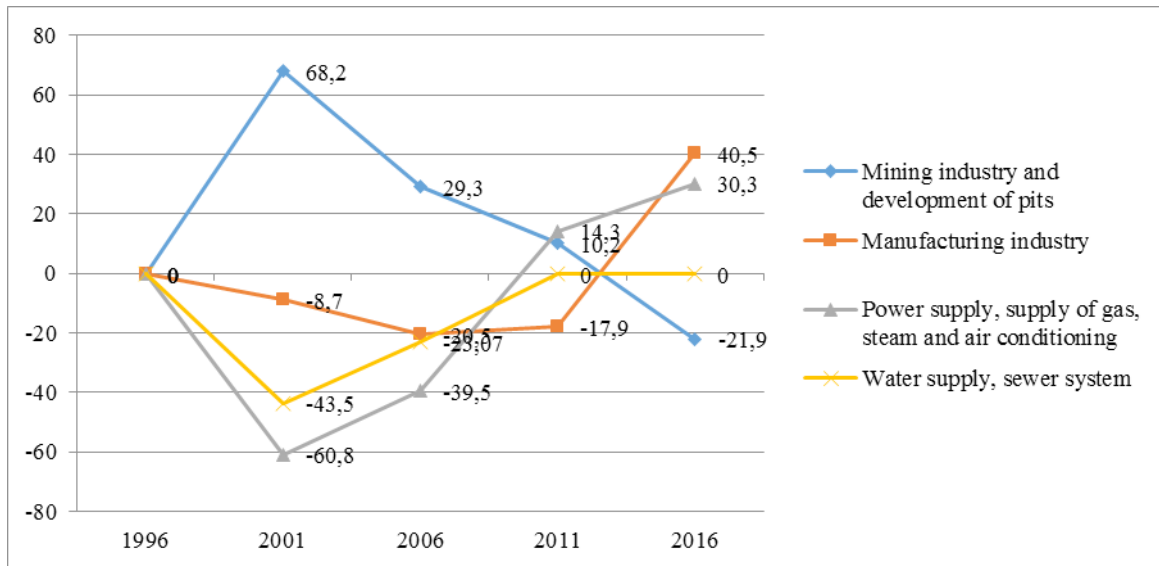


Figure 4 – The index of structural shifts on the industry

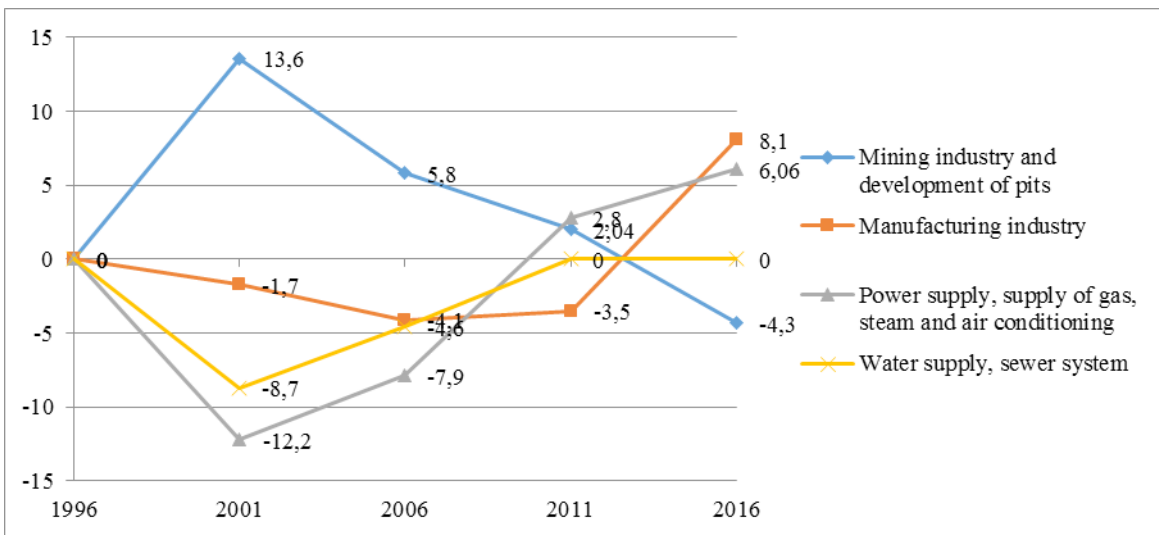


Figure 5 – Speed of structural shifts on the industry

Apparently, as we see from the figure 6. from 1996 to 2001 the largest rates had reduced production and distribution of the electric power, supply of gas, steam. More dynamic growth rates of the mining industry from 1996 to 2011 brightly demonstrate that the country leaders for many years

adhered to a course of raw orientation, thanks to the high prices on oil and other mineral resources. In turn, after the beginning of world financial and economic crisis of 2008, in connection with the reduction of volume of the world production the mining industry of the country has gone down,

and manufacturing industry, since 2011 has begun to grow promptly at the largest rates probably this consequence of adoption of the state program of the forced industrial innovative development for 2010-2014.

During the studied period the intensity of structural shifts in the mining industry is 98,9; in manufacturing industry – 6,8; in power supply – 42,8;

in water supply – 3,6. As we see, the taken measures on structural changes were more intensive in the mining industry from 1996 to 2001, then they became less intensive though not sharply. On the contrary, since 2011 structural shifts on manufacturing industry have become more intensive that testifies the beginning of a new stage of development of national economy with more perfect macroeconomic structure.

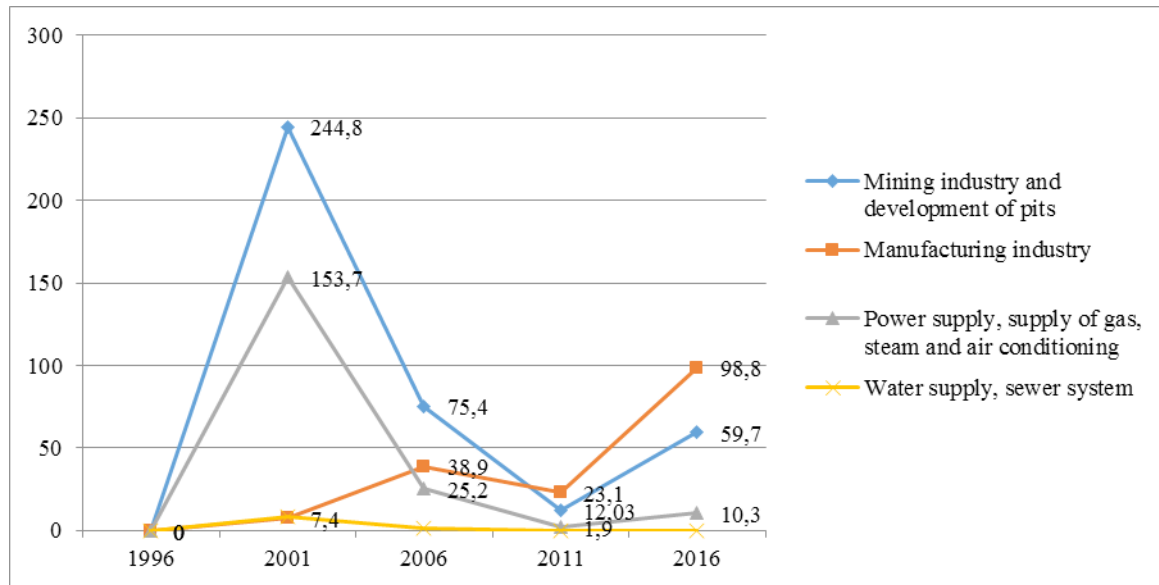


Figure 6 – Intensity of structural shifts on the industry

During the era of post-industrial development of the world economy the main driver of this or that national economy is a development of branches of services. In Kazakhstan the services sector develops promptly, however, thanks to not innovative types

of service, but so-called traditional types that isn't characteristic to post-industrial, innovative economy.

For complete idea of development of a services sector we have executed calculations of quantitative assessment of structural shifts for services.

Table 3 – Structural shifts in production of services (as a percentage, in established prices)

№	Branch, types of service	Years					Index of structural shift
		1996	2001	2006	2011	2016	
1	Transport	13,5	12,8	11,5	10	8,2	-39,2
2	Trade	44,8	67,5	70	72	72,5	61,8
3	Communication	2,9	3,5	3,2	3	2,1	-27,5
4	Other branches	38,8	16,2	15,3	15	17,2	-55,6
5	Services – total	100	100	100	100	100	-60,5

Note: the table is made by the author on the basis of a source [21].

For descriptive reasons of the analysis calculations of the index of structural shifts for service with an interval of 5 years have been executed. Results of the calculation look as follows. (Figure 7).

The relative indicator of structural shift in 20 years in the sphere of transport is 0,6; in trade – 1,6; in the sphere of communication – 0,7; in other types of service – 0,4.

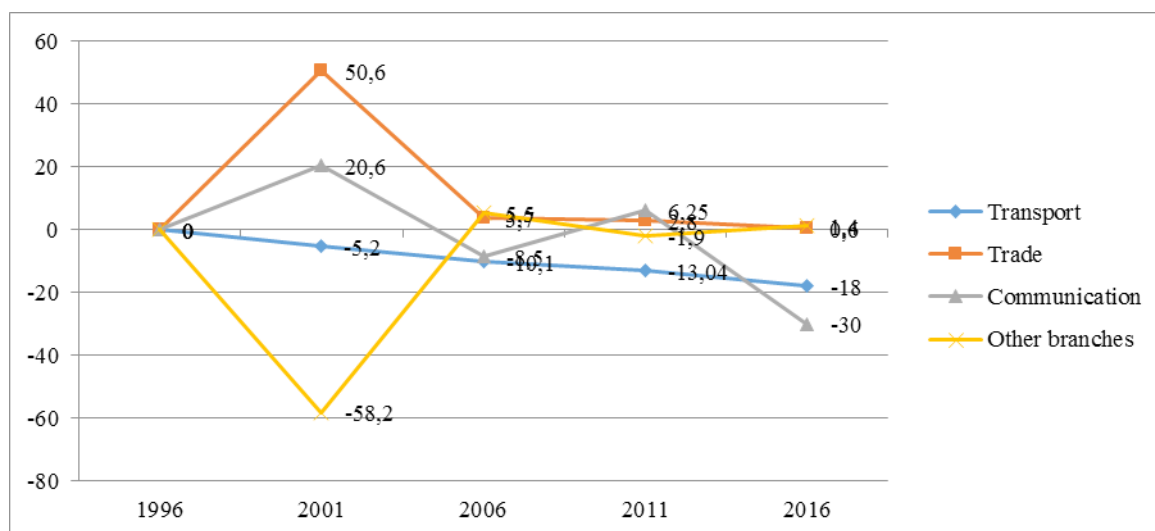


Figure 7 – The index of structural shifts on services

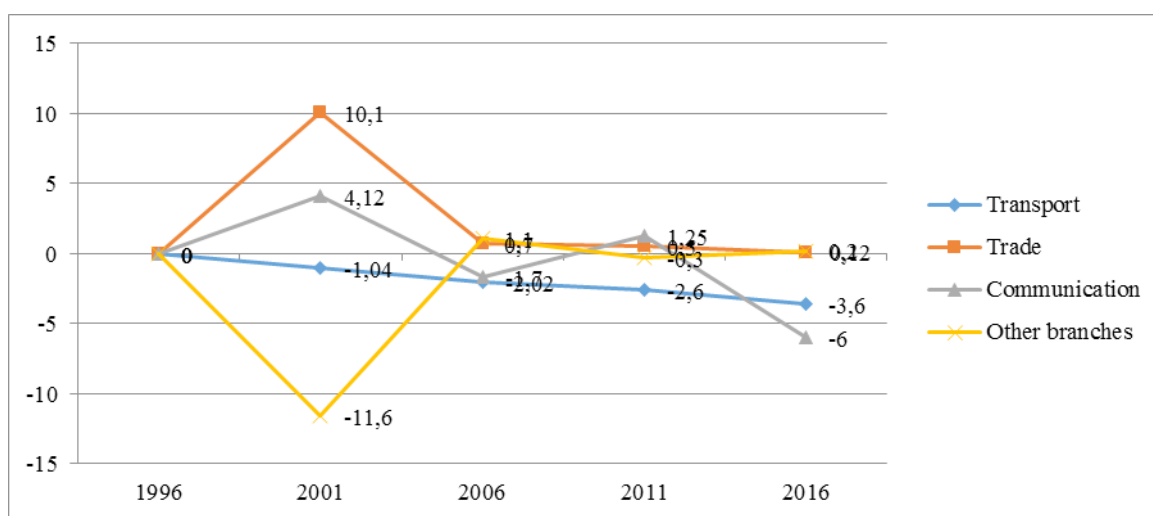


Figure 8 – Speed of structural shifts on services

From the submitted figure it is visible that since 1996 on 2001 providing trade services had the largest rates and slightly less was communication services, and new, innovative types of service included, probably, in other branches practically didn't develop

or developed slightly.

From the figure 10 it is visible that from 1996 to 2006 within ten years structural shifts were less intensive in spheres of transport and communication, than trade most less in other types of service.



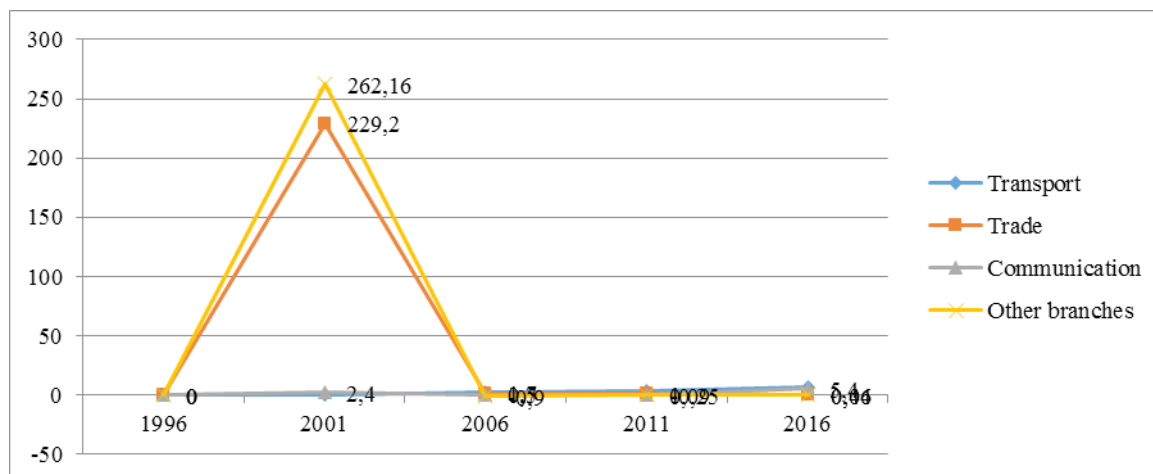


Figure 9 – Intensity of structural shifts on services

## Conclusions

As a result of the retrospective analysis of dynamics of basic macroeconomic indicators and quantitative assessment the historical picture of efficiency of the carried-out structural changes in economy of Kazakhstan is received. The received results allow to draw the following conclusions:

1. The economy of Kazakhstan remains strongly dependent on the world prices for mineral raw material resources. In 1991 the greatest share in the industrial output of Kazakhstan looked as follows: food – 30% and light industry – 13%, metal working – 13% and mechanical engineering – 10%. Now in this structure over 40% is taken by the share of oil and gas production, 14% by metal working and only 9% by the food industry. Such change of structure is generally related to the increase of prices for production in these branches to the level of the world prices and also the increase in inflow of investments into development of these branches of economy.

2. The undertaken structural reforms generally had short-term character and therefore haven't given essential effects in the long-term period;

3. Despite the undertaken structural reforms, in structure of import the share of ready-made products of processing industry, and in structure of export mineral and raw products of mining industry prevails.

Of course, the state program on industrial innovative development (GPFIIR) for 2010-2014 allowed to create certain prerequisites for further development of the industrial sector: the system of institutes of development has been created, a number of necessary normative legal acts has been adopted, separate tools have been developed. Execution of GPFIIR resulted in trend shift towards increase in level of manufacturing industry, but it still remains rather low [22].

As the President of the country N. Nazarbayev noted in the Message to the people of Kazakhstan in 2017 "It is necessary to develop such perspective branches in the country as 3D-printing, online trade, mobile banking, digital services, including in health care and education, and others. These industries have already changed structure of economies of the developed countries and gave new quality to traditional branches" [23].

Of course, the taken measures on questions of state regulation of economy, introducing the amendments into the adopted programs and strategy, restoration of an environment of the energy market have short-term character. The main thing is taking the course towards essential changes of structure of economy aimed at the accelerated development of processing industry and new technologies for which there are favorable conditions in Kazakhstan.

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